

AB 1504 California Forest Ecosystem and Harvested Wood Product Carbon Inventory: 2017 Reporting Period

FINAL REPORT

Forest Ecosystem:

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Report completed through an agreement between the U.S. Forest Service (Agreement No. 18-CO-11052021-214) and California Department of Forestry and Fire Protection (Agreement No. 8CA04056)

Harvested Wood Products:

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Acronym List

AB – Assembly Bill

AGL – aboveground live

ALCI – attributional life-cycle inventory

Board; BOF – California Board of Forestry and Fire Protection

BF – board feet

BLM – Bureau of Land Management

C – carbon

CALFIRE – California Department of Forestry and Fire Protection

CALGREEN – California Green Building Standards Code

CARB – California Air Resources Board

CALRECYCLE – California Department of Resources, Recycling, and Recovery

CBM – Canadian Carbon Budget Model

CF – cubic feet

CFPP – California Forest Project Protocol

CH₄ - methane

CI – confidence interval

CLCI – consequential life-cycle inventory

CMAI – culmination of mean annual increment

CO - carbon monoxide

CO_{2e} – carbon dioxide equivalent

DBH – diameter at breast height

EPA – Environmental Protection Agency

FCAT – California Forest Climate Action Team

FCP – California Forest Carbon Plan

FF – Forest Land Remaining Forest (IPCC terminology)

FIA – Forest Inventory and Analysis

FIADB – FIA database

FMRL – Forest Management Reference Level

FS – Forest Service

GHG – greenhouse gas

GRM – Growth, Removals and Mortality

HA – hectares

HWP – harvested wood product
HWP-use – harvested wood products in use
HWP-SWDS – harvested wood products at a solid waste disposal site
HWP-energy – harvested wood products burned for energy production
HWP-without energy – harvested wood products decayed or burned without energy production
ICE – Image-based Change Estimation
InTEC – USFS Integrated Terrestrial Ecosystem Carbon Model
IPCC – Intergovernmental Panel on Climate Change
LCA – life-cycle analysis
LCI – life-cycle inventory
LF – Forest Land Conversions (IPCC terminology)
LULCF – Land-use, Land-use Change and Forestry (IPCC terminology)
mm – millimeter
MBF – thousand board feet
MMBF – million board feet
MMT – million metric tons
MT – metric tons
NEE – Net Ecosystem Exchange
NFS – National Forest System
NGHGI – National Greenhouse Gas Inventory
NMVOC – non-methane volatile organic compounds
N₂O – nitrous oxide
NO_x - nitrogen oxides
NPV – net present value
NRCS – Natural Resources Conservation Service
NRI – Natural Resources Inventory
PNW – Pacific Northwest Research Station
RCRA – Resource Conservation and Recovery Act of 1976
RPA – Resources Planning Act
RS – remote sensing
SOC – soil organic carbon
SWDS – solid waste disposal site
TBD – to be determined

TPO – Timber Products Output

μm – micrometer i.e., one millionth of a meter

UC – University of California

U-MT BBER - University of Montana's Bureau of Business and Economic Research

UNFCCC – United Nations Framework Convention on Climate Change

USDA – United States Department of Agriculture

USDI – United States Department of Interior

USFS – United States Forest Service

USGS – United States Geological Survey

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1 Executive summary and key findings

The state of California has enacted a variety of legislation establishing greenhouse gas (GHG) emissions reduction targets. Currently, the state has a net carbon sequestration target for the forest sector of 5 million metric tons (MMT) of carbon dioxide equivalent (CO₂e) annually until 2020, establishing a critical role for California's forests in meeting the state's targets. This data update was provided to inform several elements of the state's effort to meet GHG emissions reduction targets by compiling best-available data on GHG emissions, stock and flux from California's forest sector, identifying critical gaps in data, and suggesting strategies to reduce uncertainty in estimating the magnitude of stocks and flux within the forest sector.

This is the third release in a series of annual Assembly Bill (AB) 1504 Forest Ecosystem and Harvested Wood Product (HWP) Carbon Inventory reports to the California Board of Forestry and Fire Protection (also referred to as the Board). Based on the 2017 CA AB 1504 reporting period, California's forests remain net sinks, sequestering 27.9 MMT CO₂e per year. This value includes changes in forest ecosystem pools (29.2 MMT CO₂e per year), harvested wood product pools (0.9 MMT CO₂e per year), non-CO₂ emissions from wildfires (-0.5 MMT CO₂e per year), and forest land conversions (-1.7 MMT CO₂e per year).

The 2017 reporting period annual rate of carbon sequestration for just the forest ecosystem pools is 29.2 MMT CO₂e per year. This value is down by approximately 2.2 MMT CO₂e per year from the 2016 measurement cycle. This reduction in carbon sequestration is the result of several factors including improvements in inventory methodology but is also being driven by two complementary factors; an increased rate of tree mortality and decreased gross growth rate on live trees during the most recent measurement years. Tree mortality regardless of cause, accounted for an additional 2.5 MMT of CO₂e converted to dead wood annually. Gross growth on trees measured 10-years earlier declined by 1.2 MMT CO₂e annually further reducing the net rate of sequestration. Changes in growth, removals, mortality and flux vary in each region, displaying different patterns amongst each category. Additional work is being completed to assess these differences in more detail.

Forest ecosystem and harvested wood product carbon stocks are approximately 3.4 billion metric tons. For just the forest ecosystem, carbon stocks are approximately 3.3 billion metric tons. This is an increase of 1.2 billion metric tons of carbon stocks primarily due to the improvement of the forest soils estimates that added 1.1 billion tons of carbon stocks. Estimates of carbon on the forest floor were added in 2017 and contributed 0.1 billion tons of carbon stocks. Other notable changes with the addition of the 2017 measurements include overall live tree carbon stocks declining by 2.2 MMT C while dead tree stocks increased by 5.9 MMT C. The exchange of carbon between these pools reflects similar changes in 2017 as

measured by annual net carbon flux (CO₂e). Harvested wood products contribute an additional 133.4 MMT C to the forest ecosystem carbon stocks from current and historic harvests going back to 1952.

In many forest types, current stocking levels reflect over a century of fire suppression and may not represent stand densities that are resilient to disturbances common to California forests such as fire or pest outbreaks. Additionally, as the forests age in unharvested stands, growth rates slow. Older forests tend to store more carbon, but they might not accumulate new carbon as quickly as younger, fast-growing stands. Consequently, the stocks and flux represented in this report may not be sustainable into the future without forest management given the uncertainty in potential effects from climate change, the current level of forest disturbances from wildfire and pests, and aging of forests on federal lands. From the 2015 reporting cycle, we are already beginning to see drought effects on tree growth and mortality. Forests provide many other services beyond carbon sequestration and storage, so there are many other considerations beyond forest carbon dynamics when developing management actions.

Key Findings:

FOREST ECOSYSTEM CARBON

Forest land area:

- As of 2017 there are approximately 32 million acres of forest land across all ownerships.
- 16.5 million acres are classified as timberland with an additional 4.2 million acres of productive forest land in reserves.
- The federal government manages 58% of California's forest lands, with the remaining areas under state and local government (3.5%) or private management (39%) (Figure 2.4).
- Overall there was a net loss of forest land at the rate of 28 ± 8 thousand acres per year, primarily to developed land-uses (Table 4.8/E1). The confidence interval is high compared to the estimate because it is a relatively rare event at the scale of the inventory.
- Most of the forest land loss occurred on non-productive "other forest" (62%), followed by timberland (31%), with little change occurring on reserved lands (4%).
- Western oak woodlands cover the greatest area of all forest types at approximately 8.8 ± 0.38 million acres, followed by California mixed conifer at approximately 7.9 ± 0.34 million acres (Table 4.11; Appendix 2, Table A17).

Average net annual forest carbon dioxide sequestration - overview:

- Overall California forests are exceeding the 5 MMT CO₂e target rate of annual sequestration established by AB 1504, sequestering 27.9 ± 5.0 MMT CO₂e per year (excludes confidence interval for HWP C flux; Table 7.1). This value includes changes in forest ecosystem pools (29.2 MMT CO₂e per year), harvested wood product pools (0.9 MMT CO₂e per year), non-CO₂ emissions from wildfires (-0.5 MMT CO₂e per year), and forest land conversions (-1.7 MMT CO₂e per year).
- Based on plots initially measured between 2001-2007 and re-measured between 2011-2017, the average statewide rate of forest carbon sequestration is 29.2 ± 4.9 MMT CO₂e per year, excluding net CO₂e contributions from other sources such as, harvested wood products, forest land conversions and non-CO₂ GHG emissions from wildfire (Table 4.1, 4.3).
- The soil organic carbon pool is estimated to lose 0.6 ± 0.8 MMT CO₂e per year (Table 4.1-4.3).
- Combined annual net emissions of non-CO₂ GHGs (methane and nitrous oxide) from wildfire is estimated to be 0.5 ± 0.1 MMT CO₂e per year (Table 4.2a, 4.7).
- Changes in land-use between forest and non-forest land condition is estimated to have a net effect of emitting 1.7 ± 1.0 MMT CO₂e per year (Table 4.2a, 4.9).
- Based on the 2017 measurement period, after accounting for these other CO₂ and greenhouse gas sources the statewide rate of carbon sequestration on all forest land is 27.0 ± 5.5 MMT CO₂e per year (Table 4.2a), down slightly from the 2015 measurement cycle estimate of 32.8 ± 5.5 MMT CO₂e and the 2016 measurement period estimate of 30.7 ± 5.3 MMT CO₂e. This value excludes contributions from HWP pools.

Average net annual forest carbon dioxide sequestration – by pool:

- Growth on live trees, including foliage and live roots, makes up 79% of the annual CO₂e flux on all forest land at a net rate of about 22.9 ± 4.3 MMT CO₂e per year (Table 4.3).
- Of the estimated 13.8 MMT CO₂e per year cut within the forest (Table 4.3, 4.6a), approximately 10.2 MMT CO₂e per year in the form of commercial timber was removed from the forest to either be stored long term in durable wood products or emitted from burning (Appendix 3, Table 3.14).

Average net annual forest carbon dioxide sequestration – by owner:

- Individual noncorporate forest land owners provide the largest contribution, accounting for 36% of the statewide annual flux at a rate of 10.3 ± 1.6 MMT CO₂e per year (figure 4.1).

- The national forests account for 35% of the statewide annual flux at a rate of 10.3 ± 2.8 MMT CO₂e per year (figure 4.1).
- Corporate forest land accounts for 16% of the statewide annual flux at a rate of 4.8 ± 3.5 MMT CO₂e per year (figure 4.1).
- State and local governments contribute 7% of the statewide annual flux at a rate of 2.2 ± 0.9 MMT CO₂e per year (figure 4.1).
- Other federal lands contribute 6% of the statewide annual flux at a rate of 1.6 ± 1.3 MMT CO₂e per year (figure 4.1).
- Only on reserved forest lands managed by the Forest Service is live tree growth not currently estimated to exceed carbon losses from the live tree pool due to tree mortality (Figure 4.4a, Table 4.4a).
- Annual gross growth per acre on live trees is currently exceeding all other carbon losses from the live tree pool due to mortality or harvest on unreserved timberland for all ownerships including lands managed by the Forest Service.
- The annual net rate of carbon sequestration per acre in the live tree pool is greatest on timberland owned by state and local government at 4.1 ± 2.0 metric tons of CO₂e per acre per year (Appendix 2, Table B12).
- The next highest annual net rate of carbon sequestration per acre in the live tree pool is on timberland owned by private individuals at 2.6 ± 0.4 metric tons of CO₂e per acre per year (Figure 4.4b, Table 4.4b).
- Trees growing on all ownerships across all of California's forests are sequestering carbon at a net rate of 0.6 ± 0.1 metric tons CO₂e per acre per year (Table 4.4a).

Average net annual forest carbon dioxide sequestration – by region:

- The Sierra/Cascades region has the greatest net live tree CO₂e flux due to higher total annual growth in its forests relative to growth from other regions. This region also has the greatest amount of mortality but after accounting for harvest, live trees in the Sierra/Cascades region are still sequestering 5.5 ± 2.7 MMT CO₂e per year, more than any other region (figure 4.6). This is down slightly from the 2015 measurement period which estimated a rate of 8.7 ± 3.0 MMT CO₂e per year and the 2016 measurement period which estimated a rate of 7.8 ± 2.7 MMT CO₂e per year.
- The Southern Coastal Mountains and Deserts region continues to be the only region where tree mortality is exceeding tree growth, resulting in a net carbon reduction of the live tree pool of 0.8 ± 0.5 MMT CO₂e per year (figure 4.6). Further analysis is being conducted to determine why this region is experiencing an annual net loss of CO₂e and will be presented in a later report.

Average net annual forest carbon dioxide sequestration – Forest Practice Districts

- Net annual sequestration from forests in the Northern Forest Practice District is 10.5 ± 3.3 MMT CO₂e; in the Southern Forest Practice District net annual forest sequestration is 5.0 ± 2.0 MMT CO₂e; and in the Coastal Forest Practice District it is 13.1 ± 3.1 MMT CO₂e (Table 4.2b). These values include change from all forest ecosystem pools and non-CO₂ emissions from wildfires, but does not include change from harvested wood product pools or from forest land use conversions.
- The Southern Forest Practice District is experiencing carbon losses due to mortality primarily on forest land managed by National Forests nearly equaling gross growth on live trees leaving this district susceptible to net carbon loss if the current rate of disturbance increases (Tables 4d, 4e, 4f).

Average net annual forest carbon dioxide sequestration – County

- Mendocino (4.8 ± 1.6 MMT CO₂e per year) and Humboldt (4.7 ± 2.5 MMT CO₂e per year) counties have the highest net carbon sequestration rates for all forest pools (Table 4.6b).
- By county, notable counties estimated in 2017 to have a net loss of carbon based on all pools are; San Bernardino (-0.3 ± 0.3 MMT CO₂e per year), Santa Barbara (-0.2 ± 0.2 MMT CO₂e per year), and Tuolumne (-0.2 ± 1.0 MMT CO₂e per year) (Table 4.6b).

Average net annual forest carbon dioxide sequestration – National Forests

- The Shasta-Trinity National Forest has the highest net annual carbon sequestration rate for all forest pools at approximately 2.7 ± 0.9 MMT CO₂e per year (Table 4.6b).
- There are four national forests in California currently experiencing a net loss of carbon based on all pools; San Bernardino (-0.3 ± 0.3 MMT CO₂e per year), Los Padres (-0.3 ± 0.4 MMT CO₂e per year), Angeles (-0.05 ± 0.2 MMT CO₂e per year), and the Lake Tahoe Basin (-0.07 ± 0.2 MMT CO₂e per year) (Table 4.6c).

Carbon stocks for forest land remaining forest land (FF) by pool:

- Currently there are just over 3.3 billion metric tons of carbon stocks stored on forest land including forest soils across all ownerships in California (Table 4.12a, figure 4.9, 4.10).
- This is an increase of 1.2 billion metric tons of carbon stocks primarily due to the improvement of the forest soils estimates that added 1.1 billion tons of carbon stocks.
- Approximately one third of this stored carbon is found above ground in the live tree pool (including foliage) ($1,064 \pm 27$ MMT C, Table 4.12a, figure 4.9).
- Forest soils store about half of the carbon ($1,579 \pm 19$ MMT C, Table 4.12a, figure 4.9).

- Approximately 10% of the stored carbon is found aboveground in dead wood pools (209 ± 7 MMT C, Table 4.12a, figure 4.9).
- Estimates of carbon on the forest floor was added in 2017 and contributed 136 ± 2 MMT C, Table 4.12a, figure 4.9).

Carbon stocks for forest land remaining forest land (FF) by owner:

- Approximately two-thirds of the carbon stocks in the state are found on public forest land (2,112 ± 41MMT C), with approximately 80% of that on National Forest System lands (1,686 ± 32 MMT C) (Table 4.12a, figure 4.8).
- Private corporate forest land contains approximately 17% of the state's carbon stocks (543 ± 29 MMT C, Table 4.12a, figure 4.8).
- Private noncorporate forest land contains approximately 18% of the state's carbon stocks (601 ± 31 MMT C, Table 4.12a, figure 4.8).
- Approximately 59% of the forest carbon stores are found on unreserved timberland (1,935 MMT C, Table 4.12a, Figure 4.10).

Carbon stocks for forest land remaining forest land (FF) by region:

- Nearly half of California's carbon stocks in all carbon pools are found in a single region, the Sierra and Cascade Mountain Ranges. This region represents 47% of the forest land area and contains 1,536 ± 49 MMT C (Table 4.19, figure 4.11).
- The next largest carbon store, the Klamath Interior and Coast Ranges region has about half the carbon stocks found in the Sierra and Cascades and just over a quarter of those found in the state at 909 ± 45 MMT C (Table 4.17, figure 4.11).
- For each of these regions the dead tree and down woody material pools are each about 10% of the live tree carbon pool.

Carbon stocks for forest land remaining forest land (FF) by forest type:

- The California mixed conifer forest type contains the largest carbon stock compared to all other forest types, storing approximately 1,031 ± 46 MMT C (Table 4.21, Figure 4.12).
- Western oak forests follow with 679 ± 32 MMT C (Table 4.20, Figure 4.12).
- In 2017, with the addition of improved estimates of carbon within forest soils for most forest types the majority of carbon stores are now found in the soil organic carbon pools, not the live trees as was first estimated. (Table 4.20, Figure 4.12).
- Notable exceptions of forest types where live tree carbon exceeds soil carbon includes the redwood, Douglas-fir, and tanoak/laurel types.
- Most carbon stocks are found on unreserved timberland for most softwood forest types (Table 4.22, figure 4.13).

- The redwood forest type has the highest carbon density per acre (figure 4.14).
- Regional data by forest type is included in Appendix 1.

Carbon stocks for forest land remaining forest land (FF) by county:

- The counties with the highest carbon stocks are Siskiyou county with 349.5 ± 30.0 MMT C, Humboldt county with 248.7 ± 31.5 MMT C and Trinity county with 233.7 ± 26.7 MMT C (Table 4.12b).

Carbon stocks for forest land remaining forest land (FF) by National Forest:

- The Shasta-Trinity National Forest has the highest carbon stocks at 241.0 ± 26.2 MMT C and is also the largest National Forest at approximately 1.9 ± 0.2 million acres. (Table 4.12c)

Carbon stocks for forest land remaining forest land (FF) by Forest Practice District:

- The Northern Forest Practice District has the highest carbon stocks at $1,585.5 \pm 48.2$ MMT C (Table 4.12e).
- In the Northern and Southern Forest Practice Districts, carbon on public lands make up the majority of the forest carbon, while in the Coastal Forest Practice District carbon on private lands make up the majority of the forest carbon (Table 4.12d, e, f).

Comparison to the Forest Management Reference Level (FMRL):

- FIA's initial 10-year forest inventory in California installed from 2001 - 2010 is the FMRL basis (i.e., baseline) to evaluate relative changes in California forest carbon stocks between measurement periods.
- Stock-change comparisons to the FMRL cannot determine net flux until the entire 10-year re-measurement period is complete in 2020. The GRM method is used to estimate annual net flux.
- Comparison to the FMRL show that overall California's forest carbon stocks are increasing over time with minor annual variations (table 4.31).

HARVESTED WOOD PRODUCT CARBON

HWP C stock

- For the 2017 California AB 1504 reporting period, the average HWP C stock is approximately 78.3 MMT C for products in use (HWP-use), 55.0 MMT C for products in solid waste disposal sites (HWP-SWDS), and approximately 133.4 MMT C for both HWP pools (see Table 6.5). Monte Carlo analysis for total stock for single years show confidence intervals equivalent to approximately a $\pm 0.04\%$ difference from the mean.

- For the 2017 California AB 1504 reporting period, carbon stored from privately owned forestland comprises 67% of the HWP C stock at 89.5 MMT C. Carbon stored from harvest originating from USFS forestland comprises 31% of the HWP C stock at 41.4 MMT C, with the remainder of the HWP C stocks coming from Tribal, BLM, and State and other public land.

HWP C flux

- For the 2017 California AB 1504 reporting period, the average HWP C flux is approximately -1.1 MMT CO₂e for products in use, 2.0 MMT CO₂e for products in SWDS, and 0.9 MMT CO₂e for all pools (see Table 6.6).
- For the 2017 California AB 1504 reporting period, for all ownerships, net flux in the products in use pool is negative, representing a shift in HWP C from the products in use pool to the SWDS pool faster than new carbon is being added to the products in use pool.

Harvest

- The weighted average annual harvest values associated with the 2017 California AB 1504 reporting period is approximately 2.8 MMT C (1.6 million MBF). This equates to approximately 10.2 MMT CO₂e per year in the form of commercial timber removed from the forest (Appendix 3, Table 3.14). Based on the forest ecosystem portion of the inventory for the same time period, approximately 13.8 MMT CO₂e per year is cut within the forest (Table 4.6a).

HWP C Emissions

- HWP C emissions data for HWP burned with and without energy capture are not included in forest sector C accounting, but are used in other sectors (i.e., waste, energy). Cumulative emissions associated with these pools (HWP-energy, HWP-without energy) for individual years can be found in table 6.2. However, without a greater understanding of the reporting timeframes and data needs from these other sectors, additional calculations on HWP emissions are not provided in this report at this time.

Background:

The forest sector carbon data provided in this update comply with the Intergovernmental Panel on Climate Change Tier 3 good practice guidelines for carbon accounting (IPCC 2006, 2014) and are intended to assist the Board in evaluating and monitoring progress on meeting California's forest sector carbon sequestration target. This update can inform policy decision-making, but is not intended to be a complex policy assessment framework. Forest ecosystem carbon stocks

and flux are established using direct measurements on forested plots throughout the state of California as part of the United States Department of Agriculture (USDA) Forest Service Forest Inventory and Analysis (FIA) program. Harvested wood product carbon (HWP C) stocks are based on estimates from the California variant of the harvested wood product carbon accounting model based upon the IPCC Tier 3 production accounting approach.

The forest ecosystem data presented in this report are based on the 2008-2017 FIA measurement cycle. Carbon stocks physically present in the forest are based on a 10-year average for the time-period of 2008-2017 and given in metric tons (MT) of carbon (C). The estimates of average annual carbon sequestration (i.e., net flux) is based on plots and trees initially measured between 2001 and 2007 then re-measured 10 years later between 2011 and 2017. Calculating flux based on actual growth, removals and mortality (i.e., the GRM approach) allows for annual reporting and is more robust than a simple stock-change approach.

Harvested wood product carbon estimates include contributions from current and historic harvests going back to 1952, the year annual harvest data was available for all ownerships. Harvested wood product carbon stocks are reported by the HWP C model in the year following harvest, i.e. harvested wood product carbon stock associated with 2017 removals is reported in year 2018. To be consistent with FIA's forest ecosystem ten-year average reporting periods and correspond with 2008-2017 annual harvests, the 10-year average of the HWP C stock for the years 2009-2018 is reported. Harvested wood product carbon flux for the 2017 reporting period is reported as the average annual flux for the seven ten-year intervals of 2002-2012, 2003-2013, 2004-2014, 2005-2015, 2006-2016, 2007-2017, and 2008-2018 to match the removals associated with the 2017 FIA plot remeasurement cycle.

Forest ecosystem and harvested wood product carbon stock and flux results associated with these time periods are referred to as 2017 results, 2017 reporting period results, or 2017 measurement cycle results throughout the report. To more clearly describe the time periods covered in the stock and flux estimates in this report, please note that the title has been changed to reflect the "2017 reporting period," rather than specific ranges of years.

In this analysis results of carbon physically present in the forest or in harvested wood products in use or at solid waste disposal sites are given in metric tons (MT) of carbon (C). Results of carbon flux are given in metric tons (MT) of carbon dioxide equivalent (CO₂e). Net changes in individual carbon pools are also shown in units of CO₂e to provide insight into the components of change, even if they aren't a direct flux with the atmosphere (e.g., tree mortality, which is a conversion from live to dead wood that initially stays in the ecosystem; transition from harvested wood products in use to harvested wood products in solid waste disposal sites).

Carbon can be converted to CO_{2e} by multiplying by 3.667 or the fraction 44/12¹. Ranges in the text presented for forest ecosystem results (i.e., ±) represent a 95% confidence interval (CI), while values in the tables report the sampling error (SE; CI = 1.96*SE). Confidence intervals around forest ecosystem flux estimates tend to be slightly smaller than in the previous year's report because estimates are based on more plots (7/10ths of the full cycle compared to 6/10ths).

Reports released to date include:

- [AB 1504 California Forest Ecosystem and Harvested Wood Product Carbon Inventory: 2006 – 2015 FINAL REPORT](#) (Christensen et al. 2017).
- [AB 1504 California Forest Ecosystem and Harvested Wood Product Carbon Inventory: 2006 – 2015 ERRATUM SHEET](#) (Christensen et al. 2018a).
- [AB 1504 California Forest Ecosystem and Harvested Wood Product Carbon Inventory: 2007 – 2016 DATA UPDATE](#) (Christensen et al. 2018b).
- [AB 1504 California Forest Ecosystem and Harvested Wood Product Carbon Inventory: 2017 Reporting Period FINAL REPORT \(i.e., this report\).](#)

Errors found after release of the initial inventory (Christensen et al. 2017) are detailed in Christensen et al. 2018a and are also corrected in subsequent reports. Please note that to compare some results to the initial report, the erratum must be referred to. Changes to this report from previous reports include:

- Inclusion of forest floor stock and flux estimates.
- Revision of soil organic carbon stock and flux estimates.
- Dead tree carbon stock estimates for trees ≥ 5.0 inches instead of 1.0 inches.
- Inclusion of forest ecosystem carbon stock and flux estimates at the county, National Forest, and California Forest Practice District levels.
- Inclusion of harvested wood product carbon stock and flux estimates.

¹ Throughout the forest ecosystem portion of the inventory, results are converted from C to CO_{2e} by multiplying by 3.667. Throughout the harvested wood product portion of the inventory, results are converted from C to CO_{2e} by multiplying by 44/12 providing more significant digits and therefore slightly different numbers when rounded compared to multiplying by 3.667.

2 Introduction

2.1 California forest carbon policy background

The Global Warming Solutions Act (Assembly Bill 32, Chapter 488, Statutes of 2006) requires California to reduce greenhouse gas (GHG) emissions to 1990 levels by 2020, which is approximately 15% below a business-as-usual scenario. It tasks the California Air Resources Board (CARB) with determining the statewide greenhouse gas emissions level in 1990, and the statewide greenhouse gas emissions limit that is equivalent to that level, to be achieved by 2020. To achieve this target, CARB was also required to develop a Scoping Plan that identifies direct emission reduction measures, alternative compliance mechanisms, market-based compliance mechanisms, and potential monetary and nonmonetary incentives to achieve the maximum technologically feasible and cost-effective emissions reductions. The Scoping Plan lays out the state's strategy for meeting the goals of the law by 2020 and must be updated at least every five years. The first Scoping Plan was finalized in 2008, with an initial update in 2014.

The initial AB 32 Scoping Plan (CARB 2008) included a forest sector target with a goal of maintaining the forest carbon sink with a net annual sequestration rate of 5 million metric tons of carbon dioxide equivalent (MMT CO₂e). This target was based on a 2004 GHG inventory by Winrock International (Brown et al. 2004). The 2014 update to the Scoping Plan carried forward the forest net sink goal and called for the development of a Forest Carbon Plan to set mid-term and long-term quantitative planning targets while ensuring forest resilience, health, and continued ecosystem services; identify actions to meet those targets; and provide recommendations on funding those actions.

The responsibility for setting forest carbon policy to ensure the AB 32 forest sector goals are met lies with the California Board of Forestry and Fire Protection (also referred to as the Board). The California Board of Forestry and Fire Protection is the entity responsible for promulgating the state's Forest Practice Rules, which regulate timber harvest on privately owned lands. In 2008, the Board developed "The 2008 Strategic Plan and Report to the California Air Resources Board on Meeting the AB 32 Forestry Sector Targets" (CA BOF 2008). The 2008 Strategic Plan recognized the following guiding principal related to the AB 32 mandate.

"The Board of Forestry and Fire Protection is mandated to maintain a vigorous, resilient and healthy forest land base in California, which supports the ecological needs of the forest ecosystem and its human dependencies. The Board recognizes the importance of the carbon sequestration potential for forests, and their benefits in achieving GHG emission reduction targets established by the Global Warming Solutions Act (AB 32). At the same time the Board acknowledges that these needs must be considered in

conjunction with many other ecological and human benefits that forests provide and for which the Board has responsibility” (CA BOF 2008).

The 2008 Strategic Plan identified the following approaches to meet the Board’s responsibility in achieving the AB 32 forest sector targets:

- Improvement of forest inventory and monitoring to ensure changes will be detected.
- Consideration of additional statutory and regulatory needs, including a review of the effects of existing regulations on carbon sequestration.
- Working with Federal agencies to maintain and increase sequestration levels by: 1) preventing losses of inventory and growth rates; 2) continuing reforestation efforts; and 3) fuels management treatments on federal lands to reduce the risk of catastrophic wildfire.
- Reducing barriers and providing additional incentives to encourage voluntary action by private landowners to increase inventory and growth rates while decreasing risk of losses.
- Developing sound policies and regulations for CALFIRE that will contribute to reduction of the risk of catastrophic wildfire.
- Encouraging research related to climate change impacts for the forest sector.
- Working with other agencies and legislative authorities to ensure development of policies, infrastructure and funding to support fuels reduction and biomass utilization.

The 2008 Strategic Plan also noted that the 2004 Winrock estimate of forest carbon sequestration in California had a high uncertainty of roughly +/- 38%, and is a major reason that continued work on refining the forest sector portion of the statewide GHG inventory is a high priority.

The Board of Forestry and Fire Protection’s responsibility in meeting or exceeding the AB 32 forest sector targets was formalized in Assembly Bill 1504 (AB 1504, Chapter 534, Statutes of 2010). AB 1504 emphasizes the critical and unique role California’s forests play in the state’s carbon balance by sequestering carbon dioxide from the atmosphere and storing it long-term as carbon. It also emphasizes the goal of maximum sustained production of high-quality timber products in serving the public while also providing other benefits and ecosystem services such as sequestration of carbon dioxide, recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment, and aesthetic enjoyment. The bill requires the Board to ensure the rules and regulations governing the harvest of commercial tree species consider the capacity of forests to sequester 5 Million Metric Tons (MMT) of CO₂e annually by 2020.

To assess whether the AB 32/AB 1504 goals are being met and to carry out the Board's 2008 Strategic Plan, this report is the third in a series of annual Forest Ecosystem and Harvested Wood Product Carbon Inventory reports to the Board (i.e., the AB 1504 inventory). Although the California Forest Practice Rules only apply to privately owned lands, because the Board represents the state's interest in federal matters pertaining to forestry (CA PRC § 740), and because the federal government manages more than half of the forest land within the state's forest sector, all ownerships are included in the AB 1504 inventory.

2.2 Relationship of this report to other inventory efforts

In addition to the 2006 Assembly Bill 32 and the 2010 Assembly Bill 1504, Governor Edmund G. Brown provided additional leadership and guidance to implement the state's climate change policy. In 2014, under his direction, the CA Forest Climate Action Team (FCAT) was formed to develop a statewide plan to identify actions needed to reduce GHG emissions and enhance carbon sequestration on California forest land. In 2015, the Governor issued Executive Order B-30-15 establishing a GHG reduction target for California of 40 percent below 1990 levels by 2030 and 80 percent by 2050 to help limit global warming to 2 degrees Celsius or less as identified by the IPCC to avoid potentially catastrophic climate change impacts. In 2016, the California Legislature passed Senate Bill 32 (Chapter 249, Statutes of 2016), which codifies the Governor's Executive Order. CARB updated the AB 32 Scoping Plan in 2017 to reflect the 2030 target (CARB 2017a). In this plan, forests are included in the natural and working lands portion of the state's climate strategy and calls for maintaining these lands as a carbon sink and, where appropriate, minimizing the net GHG and black carbon emissions associated with management, biomass utilization, and wildfire events. This Plan also proposes an intervention based reduction goal of at least 15-20 million metric tons CO₂e by 2030. While neither forest sector emissions nor emissions reductions count towards the 2030 and 2050 SB 32 emissions reduction targets, this new legislation signifies an ongoing role for California forests to play in carbon sequestration beyond the original 2020 deadlines associated with AB 32 and AB 1504. The FCAT also finalized the state's Forest Carbon Plan in 2018, which outlines a framework for how California forests will contribute to meeting the State's long term objective of maintaining California's Natural and Working Lands, including forests, as a carbon net sink (FCAT 2018). Accompanying release of the Forest Carbon Plan, Governor Brown's Executive Order B-52-18 on forest management emphasizes the importance of implementing the Forest Carbon Plan. Executive Order B-55-18 also calls for California to achieve carbon neutrality no later than 2045, with carbon sequestration targets to be set in the Natural and Working Lands to help achieve this goal. Lastly, in 2016 Senate Bill 859 was also passed (SB 859, Chapter 368, Statutes of 2016), requiring CARB to complete a statewide GHG inventory by the end of 2018.

In addition to this AB 1504 Forest Ecosystem and Harvested Wood Product Carbon Inventory, there are several efforts within the state to address forest carbon sequestration, which are described in this section. Comparisons of results from this report to other inventories can be found in sections 8 and 9.

2.2.1 FCAT/FCP

As stated above, the CA Forest Carbon Action Team's Forest Carbon Plan (FCAT 2018) outlines a framework for how forests can contribute to meeting the State's objectives and goals for Natural and Working Lands in the AB 32 2030 Scoping Plan Update and forthcoming Natural and Working Lands Implementation Plan. The AB 1504 Forest Ecosystem and Harvested Wood Products Carbon Inventory and the CARB's Natural and Working Lands GHG inventory will inform whether the goals identified within the FCP are being met.

2.2.2 CARB Natural and Working Lands Inventory

As stated above, through Assembly Bill 32 and Senate Bill 859, CARB is obligated to provide a statewide greenhouse gas (GHG) inventory. The Forest Carbon Plan summarizes information about CARB inventory efforts, stating that the inventory will represent sectors such as energy production, industry, waste and recycling, transportation and communities, water resources, and natural and working lands (FCAT 2018). The CARB's Natural and Working Lands GHG Inventory ("CARB Inventory") reports both carbon stock and GHG flux associated with stock-change on forests and other lands. The initial analysis period for the forests and other natural lands (FONL) portion of the CARB inventory is 2001-2010 using methods developed from collaboration with the University of California-Berkeley, the National Park Service, USDA Forest Service Pacific Southwest Research Station and the Spatial Informatics Group (CARB 2016, CARB 2017b). Satellite imagery modeled on FIA standing stock measurements and other data informs CARB's estimates of carbon stock in wildland forests and other lands. Chaparral is included in the forest land category for the purposes of the CARB inventory. The inventory models carbon stocks, stock-change, and GHG flux between discrete points in time, estimating natural processes such as growth and mortality, disturbance events such as wildfire, timber harvests and other activities, land conversion to other uses, and fluxes associated with wood processing and the disposition of discarded wood products. Unlike the AB 1504 inventory which takes the **production** accounting approach for wood products, the **atmospheric flow** approach of carbon accounting in the CARB inventory includes imported harvested wood products. The CARB Inventory serves as an important source of information to assess net GHG flux associated with forests and other lands, and interactions with other sectors. CARB is currently developing methods to estimate carbon stocks and stock-change associated with urban forests and croplands, neither of which are addressed in the AB 1504 inventory. CARB plans to publish a NWL inventory that includes all quantified land types by December 30, 2018 and update it on a

bi-annual basis. Forest land stock and flux will be reported for the initial analysis period of 2001-2010 and include two additional reporting periods of 2010-2012 and 2012-2014.

CARB is also looking to develop in-house technical capability to conduct prospective inventory analysis (i.e., future projections) and “what-if” scenario analysis. These tools may be used for understanding how a management or policy decision impacts future NWL carbon stocks, and how the impacts may cascade throughout the state’s ecosystems and society.

2.2.3 U.S. National Greenhouse Gas Inventory

The U.S. Environmental Protection Agency coordinates and compiles summaries and analyses by multiple agencies to produce the National Greenhouse Gas Inventory (NGHGI). The most recent published report provides national estimates of stocks and flux of greenhouse gases for 1990-2016 (US EPA 2018a). However, the last NGHGI that included state-level estimates was released in 2016 (USDA OCE Climate Change Program Office 2016). The core dataset for forest carbon used in the NGHGI is the USDA Forest Service’s Forest Inventory and Analysis (FIA) inventory. The inventory is based on empirical field measurements of carbon pools and on models that complement the field measurements for pools and/or time periods with few data. The NGHGI follows IPCC guidance as closely as possible with available datasets.

This report differs from the NGHGI analysis in that some of the fluxes can be estimated from measurements available in California, rather than models designed for national estimation, and in not attempting to model results back to 1990 for all lands. Instead, we summarize available empirical data for that time-period and identify alternatives for improving estimates. We refer to the methods of the NGHGI extensively, however, for estimating flux in pools and processes for which empirical data are limited (e.g., soils). Other differences include the use of regional biomass equations instead of national ones, and adjustments for decay and fragmentation of snags. We detail differences in section 3.2 and 8.1.

2.3 Forest carbon cycle overview

The global carbon cycle includes movement of carbon (C) among vegetation, soil, ocean, rock, and atmosphere (Ryan et al. 2010). Although the amount of C in vegetation and soils (i.e., **stores**) is much smaller than that in the ocean, the movement of C to and from the atmosphere (i.e., **flux**) is comparable. Vegetation absorbs C from the atmosphere through photosynthesis and fixation of C in living material, and vegetation and soils emit C to the atmosphere through respiration and microbial decay of dead plant matter (Figure 2.1). Forests are particularly important to the carbon cycle because they can store large amounts of C and can be dynamic over relatively short time periods (e.g., decades). It is thought that forests in the Northern Hemisphere in particular are absorbing more C from the atmosphere than they are emitting (Pacala et al. 2001). C removed from the atmosphere by forest growth or stored in harvested

wood products for the U.S. in 2016 were estimated to offset 11.6% of U.S. emissions from industry and agriculture (US EPAa 2018).

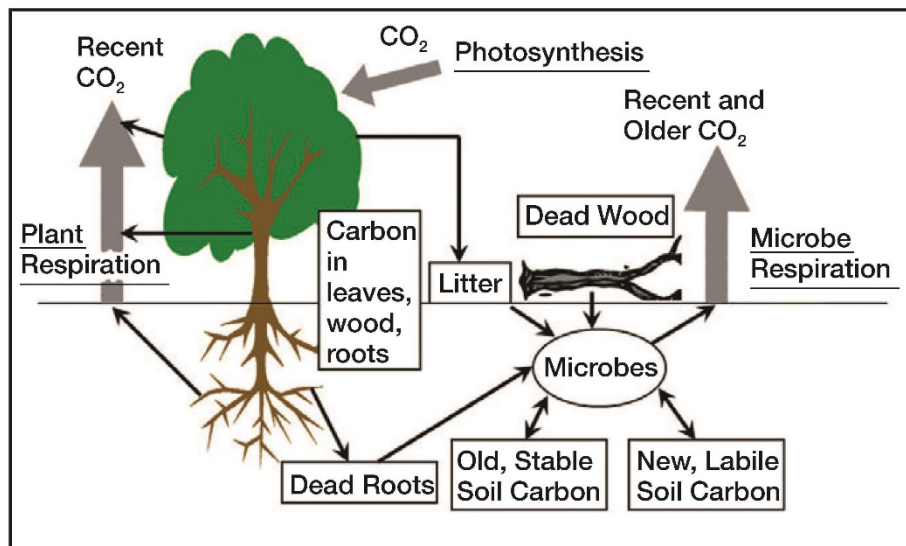


Figure 2.1: Flows of carbon in a forest from the atmosphere to the forest and back. Carbon is stored mostly in live and dead wood as forests grow (extracted from Ryan et al. 2010 Figure 2). Does not include C removed from harvest, or soil C removed in groundwater or erosion.

Live forest vegetation absorbs C from the atmosphere through photosynthesis of carbon dioxide (CO₂). A large proportion of that carbon is respired by living plant cells, but a portion of it goes into the production of tissues like leaves; twigs; fine roots; flowers and fruits; and wood and bark in boles, branches, and coarse roots. Depending on their longevity (a matter of weeks for fine roots, or centuries for tree boles), these tissues die and begin to decompose due to microbial action, whereby C is emitted to the atmosphere, primarily as CO₂. Some of the partially-decomposed tissue stays in the soil mineral and organic layers, where C may accumulate over time. When the net effect of the many C fluxes in a forest results in increased storage of C it is referred to as **sequestration**.

In addition to CO₂, other greenhouse gases emitted by forests and/or forest products include methane (CH₄), and nitrous oxide (N₂O). In this report carbon stocks are reported in metric tons of carbon mass. Changes in carbon stocks that involve transfers between different components of the forest ecosystem or to/from the atmosphere are reported in units of metric tons of carbon dioxide equivalent (CO₂e), which puts the various greenhouse gases on the same footing

in terms of their absorption of infrared radiation. One metric ton of carbon mass in live and dead biomass or soil is equal to 3.667 metric tons CO₂e (also the fraction 44/12²).

While tree mortality occurs naturally in all forests, natural disturbance events such as wildfire, pest outbreaks, windthrow, and drought can result in high mortality rates, potentially killing all aboveground live vegetation over large areas. In the case of wildfire, some C (as well as other greenhouse gases such as nitrogen oxides) can be emitted directly to the atmosphere through combustion, or lost from the area as soot. Fine particulate matter in soot ($\leq 2.5 \mu\text{m}$ in diameter) is referred to as “black carbon” and although it only remains in the atmosphere for a few weeks, it contributes to the greenhouse effect by absorbing solar radiation and heating the atmosphere. In some cases, black carbon can take on the form of charcoal, which can be a stable, long-lived form of C in the forest. Dead tissue left after the disturbance then decays, emitting C to the atmosphere over weeks in the case of scorched needles or over decades in the case of large dead trees. In severely disturbed forests, C emissions to the atmosphere will initially exceed absorption, and total C will decrease (Figure 2.2). As vegetation becomes established and the amount of growing tissue increases, at some point absorption will exceed emissions, and total C will increase. This net flux from the atmosphere (accumulation) tends to decrease as forests age and appears to come close to zero, or equilibrium, in older forests (Gray et al. 2016). At this point when annual emissions equal annual uptake, forests have reached the **carbon sink saturation point**.

² Throughout the forest ecosystem portion of the inventory, results are converted from C to CO₂e by multiplying by 3.667. Throughout the harvested wood product portion of the inventory, results are converted from C to CO₂e by multiplying by 44/12 providing more significant digits and therefore slightly different numbers when rounded compared to multiplying by 3.667.

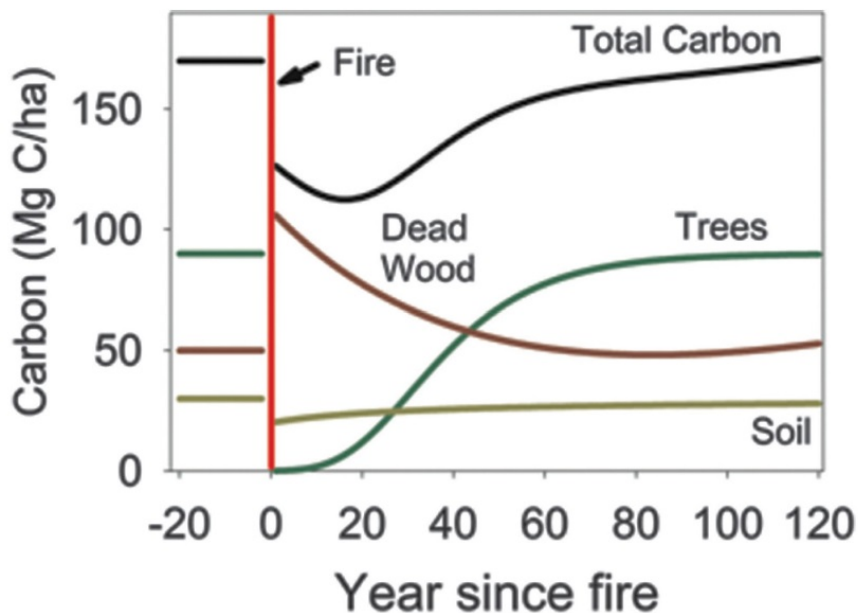


Figure 2.2: Idealized cartoon of carbon trajectories in live trees, dead wood, and soil in a forest where all trees are killed by severe wildfire and vegetation subsequently regenerates (extracted from Ryan et al. 2010 Figure 3). With sufficient time, the forest will recover the carbon lost in the fire and the decomposition of trees killed by the fire as long as there were no conversion to lower carbon vegetation types such as shrub lands or grasslands.

In addition to growth and mortality, the C stored in forests can change through increases in forest area (**afforestation**) or decreases in forest land (**deforestation**). While vegetation on afforested sites may accumulate at rates comparable to regenerating forest, levels of soil C tend to take longer (e.g., several decades) to accumulate to levels typically found in forests. Consequently, recently deforested areas may not reflect a significant loss in soil C for many years. Similarly, deforested lands lose soil C over decades until they reach levels typical of non-forest land-uses. While trees are often found in non-forest land-uses (e.g., urban areas, windbreaks or stream buffers in agricultural lands), their C stores are typically included in the carbon assessments of those other land-uses identified as sectors of national assessments.

Tree harvest removes C from forests in the form of logs. However, the C in those logs is emitted to the atmosphere at different rates depending on how the wood and bark are used, so the tracking of the fate of forest C in various harvested wood products (HWP) becomes an important part of forest C accounting. Some portions of harvested trees remain in the forest, moving between forest ecosystem carbon pools and decay slowly along with other dead tissue (e.g., branches and foliage) or are disposed of through in-forest burning with immediate carbon and other greenhouse gas emissions. Other parts become stored in short-lived or long-lived products (e.g., paper and house frames, respectively), converted into other bioproducts, or

burned to supply industrial or residential energy and/or heat. At the mill, sawlogs, pulpwood, fuelwood (termed **timber product classes**) are converted to primary timber products (i.e., lumber, plywood, veneer, residues, etc.). Each of these products are then allocated to various end-uses such as residential construction, manufacturing, packaging and shipping, or biomass energy, to name a few. Wood products within these various end-uses have different lifetimes. A product's **half-life** is the number of years it takes for half of the initial amount of wood to be discarded and can be used to determine how much of the original product remains in use versus disposed (Skog 2008). Once disposed, discarded wood products decay over time releasing carbon back to the atmosphere. The process by which this happens is dependent on the manner of disposal. In anaerobic environments such as in landfills, wood decay releases carbon (mostly in the form of methane (CH₄), a more potent greenhouse gas than CO₂) and ceases after several decades, leaving a carbon fraction that persists in solid form indefinitely. Newer landfill technologies are being implemented in parts of the country to allow for methane capture and combustion (oxidation), thus reducing overall methane emissions to the atmosphere with formation of CO₂, a less powerful greenhouse gas. In some cases, at the end of product use-life, products can remain in use through recycling, burned for energy, or burned as waste (Stockmann et al. 2012). When the product is kept out of the landfill methane emissions from landfill decay are substantially decreased.

Fossil fuel and other emissions not derived directly from forest ecosystems that are generated in the forest management and manufacturing process are typically not included in forest sector C analyses but are included in the industrial sector (e.g., US EPAa 2018).

Accumulating C in standing forests is one clear way to increase absorption from the atmosphere. Accumulating C in forests could be accomplished by reducing the amount of C removed during harvest. However, to the extent that the demand for wood products remains, one result could be **leakage** where storing more carbon in forests in one region (or country) is offset by reduced storage of carbon in other regions, with no net gain in global carbon storage (McKinley et al. 2011). Conversely, intensive commercial timber production may decrease demand for wood from other lands, thereby increasing the in-forest carbon stocks on those other lands (Heath et al. 2010).

Another concern with increasing carbon stores in forests is the notion of **permanence**; areas that are fire-prone are at higher risk that live trees will be killed and C lost to fire and decay, especially in forest types where denser (higher C) forests are likely to burn at higher severity. Many forests in California are fire-prone; see the Forest Carbon Plan (FCAT 2018) for a more detailed discussion of issues and management options.

The use of harvested wood and wood products may reduce overall C emissions through their use as **biomass energy** in situations where the use of wood as biomass for fuel results in fewer

C emissions from the use of fossil fuels. Another effect of using wood products could be through **substitution** of wood instead of steel or concrete, which result in more C and other greenhouse gas emissions to produce.

While tracking the changes in C stocks (and therefore C flux) can be relatively straight-forward, quantifying leakage, permanence, and substitution can be more difficult and is discussed in more detail in section 11. One analysis that incorporated biomass energy as a reduction in fossil fuel emissions compared overall emissions from open pile burning of logging residues to processing and burning in a biomass energy plant, and found a net reduction in emissions of 0.54 tons CO₂e per dry ton of biomass (Figure 2.3; Springsteen et al. 2015).

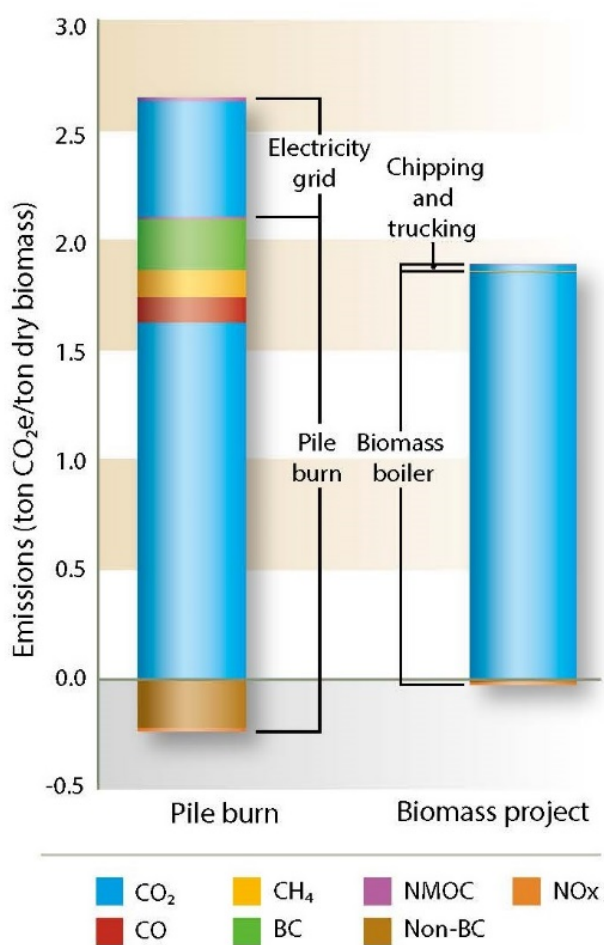


Figure 2.3: Comparison of greenhouse gas emissions between a pile burn of logging residue versus chipping, hauling, and burning it in a biomass energy plant. Analysis estimates CO₂-equivalent effects of different gases and particulates, as well as the additional emissions needed in the case of the pile burn to generate the same amount of electricity from natural gas. (Extracted from Springsteen et al. 2015).

2.4 Overview of California forests

California hosts a wide variety of tree species, including many species of conifers as well as oaks and other hardwoods. Assemblages of tree species are often grouped into forest types to support inventory and reporting. The Forest Inventory and Analysis (FIA) program defines a variety of coniferous forest types in California including redwood, Douglas-fir, California mixed conifer, lodgepole pine, ponderosa pine, pinyon/juniper, fir/spruce/mountain hemlock and others. Hardwood forest types include tanoak/laurel, western oak, woodland hardwoods, elm/ash/cottonwood, and alder/maple among others.

FIA **land status** distinguishes **forest land** from non-forest (i.e., crops, improved pasture, residential areas, city parks, etc.) and other area (i.e., water), and also distinguishes differences in **forest land status**. For example, forest land in California is also categorized into timberland and other forest land based on its ability to grow commercial tree species (**productive capacity**) and its availability for timber extraction. Lands that can produce 20 cubic feet of wood volume per acre per year of commercial tree species are termed **Productive Forest land**. Productive forest land that is available for management for timber production (i.e., not in a **reserve status**) is called **Timberland**. Forest land that is not capable of producing 20 cubic feet of wood volume per acre per year of commercial tree species is called **Other forest land**. Forests in reserve status (i.e., wilderness designation, National Monuments, National Parks, etc.) can include both productive and other forest land. Although management for production of wood products in reserved forests is precluded, in some cases timber harvest can still occur for various objectives (i.e., restoration, salvage, etc.). Approximately half (16.5 million acres) of the 31.8 million acres of forest land in California are classified as timberland, with an estimated 4.2 million acres of productive forest land in reserves. There are approximately 8.7 million acres of non-reserve other forest land and 2.4 million acres of reserved other forest land.

Management and use of forest land is often a function of ownership and land status in California. California's forest land is divided between private and public ownership (see Figures 2.4 and 2.5). The federal government manages 58% of these lands, with the remaining areas under state and local government (3.5%) or private management (39%). Approximately 9.1 million of the 16.5 million acres of timberland are managed by the federal government, 7.2 million are in private ownership, with the remainder in other public ownership. Approximately 5.1 million of the 8.7 million acres of other forest land in non-reserved status is privately owned, 3.4 million acres in federal management, with the remainder in other public ownership. Of the 6.6 million acres of forest land in California in reserved status (National Wilderness designations, etc.), 5.8 million acres are managed by the federal government, with the remainder in other public ownership.

To better understand the carbon dynamics in California's forests, information in this report and appendices is provided for different forest types, ownerships, forest reserve classes, and on a regional basis (see figure 4.5).

The way in which forests are used and managed impact both forest health and resilience as well as carbon storage and sequestration. California's forested landscape consists of a mosaic of land-uses including working forests, conservation reserves, and those associated with human-dominated uses. Forests in which trees are harvested regularly are often referred to as **working forests**. Whether a forest is considered a working forest or not, forested landscapes provide several important ecosystem services, including carbon sequestration as well as wildlife habitat, water, recreational opportunities and other cultural values. A variety of recent studies exhibit concern that current forest conditions resulting from management activities centered on fire suppression have negatively impacted the resiliency of forest ecosystems and carbon stocks. For example, some studies suggest certain forest types, such as mixed conifer forests of the Sierra Nevada, have changed when compared to historic conditions, with more of the current carbon stock in higher densities of small, fire-prone trees (Collins et al. 2011, North et al. 2009, Lydersen et al. 2013, Earles et al. 2014). These forests are thought to be vulnerable to fire, pest outbreaks, and other disturbance, especially as changes in climate continue to affect the timing, frequency, intensity and extent of disturbances such as wildfire and pest outbreaks. In the short-term, management strategies to improve forest health and resiliency and reduce hazardous fuels may decrease in-forest carbon stocks and result in other greenhouse gas emissions through tree removal or prescribed fire. However, in the long-term forest carbon stocks may benefit from these treatments through continued growth and decreased mortality from wildfire, pests and drought (North and Hurteau 2011). While the actual occurrence of wildfire on a given acre is subject to many factors, opting instead to minimize tree removal to maintain current carbon stocks can come with risk of loss in California's fire prone forests (discussed further in section 11.4). Similarly, debate continues around the long-term storage of carbon in harvested wood products when compared to not harvesting trees and instead increasing carbon stocks on forest land (discussed further in section 11.5). Also, competing uses for forest land and the potential for economic gain can create pressure to convert forest land to other uses which can have severe impacts on forest carbon outcomes (discussed further in section 11.3).

For a more detailed discussion on California forest carbon dynamics and potential forest management strategies, refer to the California Forest Carbon Plan (FCAT 2018) and Sapsis et al. (2016).

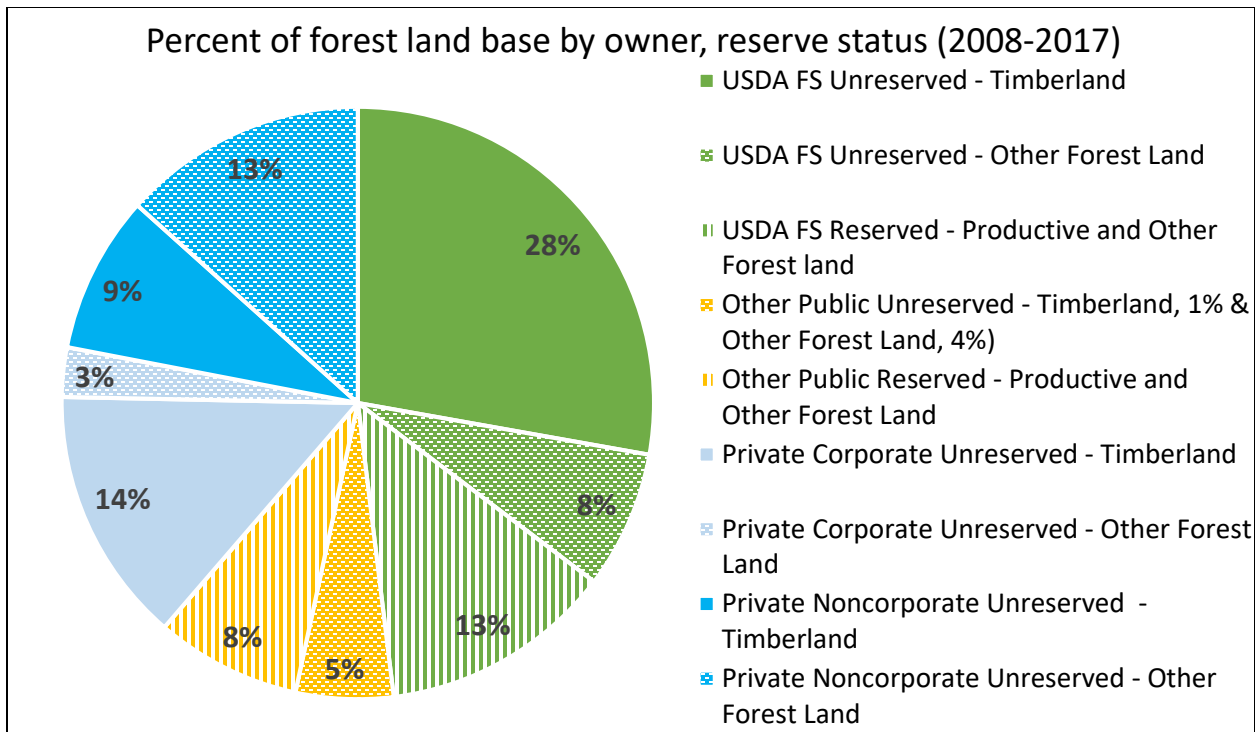


Figure 2.4: Percent of forest land base by owner, reserve status for forest land remaining forest land (2008-2017).

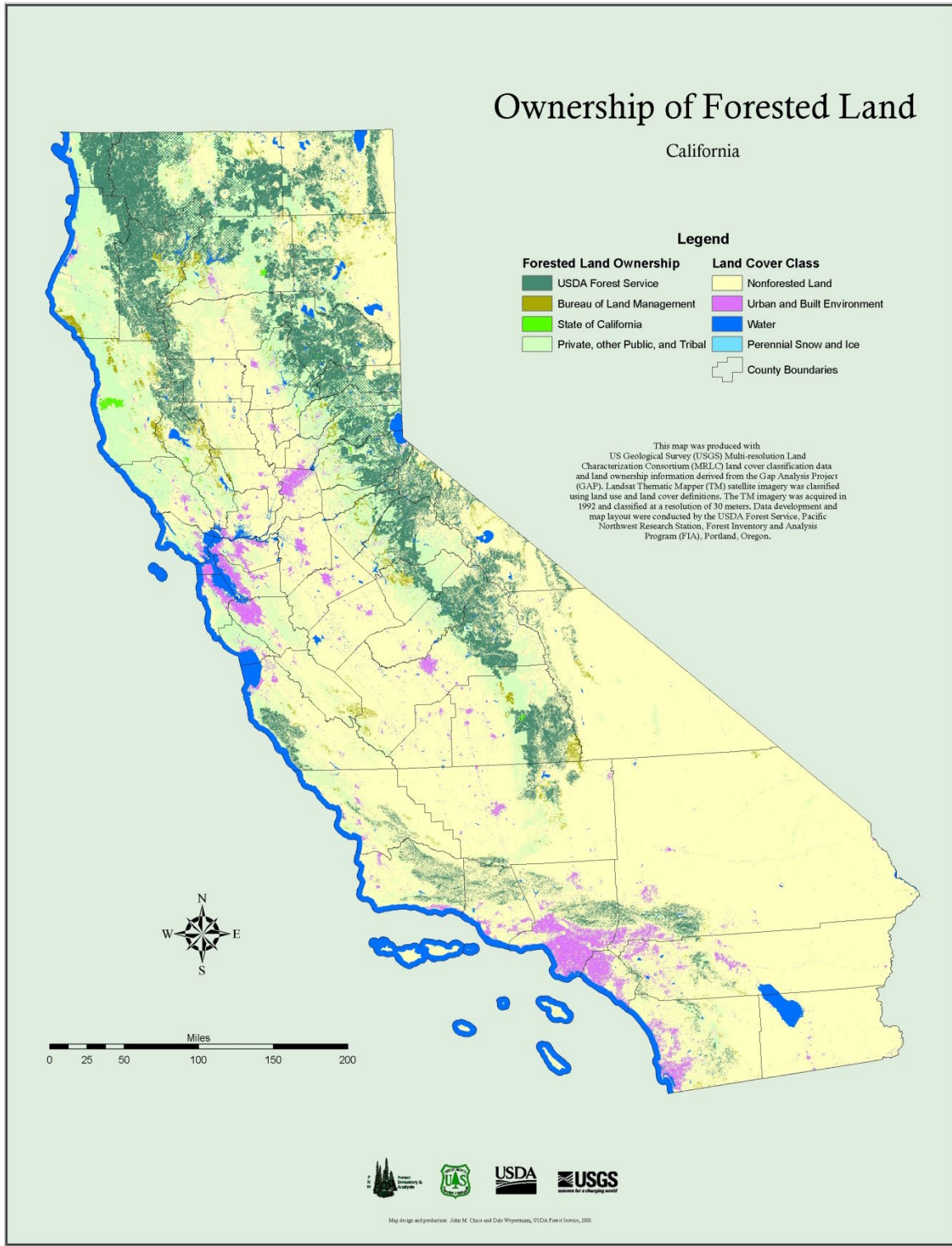


Figure 2.5: Ownership of Forested Land in California

Source: USDA FS 2016b

3 Forest ecosystem carbon inventory methods

3.1 Use of IPCC inventory approach/methods

The Intergovernmental Panel on Climate Change (IPCC) was created in 1988 to prepare assessments on all aspects of climate change and its impacts based on available scientific information and is the key international body studying global warming. The IPCC issues guidance on reporting carbon stock inventories and emissions designed to implement the international United Nations Framework Convention on Climate Change (UNFCCC) 1992 Kyoto Protocol agreement. Although the U.S. is not a signatory to the Kyoto Protocol, the U.S. NGHGI follows IPCC guidance for international reporting for subsequent agreements and negotiations. Similarly, although California is not a reporting party to the Kyoto Protocol, this inventory will comply with IPCC-defined “good practices” as much as possible. The 2006 IPCC “Guidelines for National Greenhouse Gas Inventories” (IPCC 2006) provides a conceptual framework, sectoral scope definition, description of tiered inventory methods, calculation steps and uncertainty assessment steps. An important element specified in the 2006 Guidelines is a **key category analysis** in which key emissions categories are identified and prioritized. The focus of this report as directed by AB 1504 is on determining if the AB 32 Scoping Plan target for the forest sector in California of sequestering 5 million metric tons of CO₂e annually by 2020 is occurring. These legislative contexts serve to identify key categories for this analysis.

The key categories described in IPCC (2006) for forest-related fluxes include:

- CO₂ emissions and removals resulting from C stock changes in biomass, dead organic matter and mineral soils; and
- CO₂ and non-CO₂ emissions from fire on all managed land, including methane (CH₄), nitrous oxide (N₂O), non-methane volatile organic compounds (NMVOC), nitrogen oxides (NO_x), and carbon monoxide (CO).

Minor elements that may be relevant to forested wetlands and fertilized forest plantations include:

- N₂O emissions from managed soils, and
- CO₂ emissions associated with liming and urea application to managed soils.

The U.S. NGHGI only calculates N₂O emissions from southeastern forests and Douglas-fir stands in western Oregon and Washington (US EPAa 2018), so these emissions are assumed to be negligible for California forests and are not included in this report. Similarly, the U.S. NGHGI only calculates CO₂ emissions associated with liming and urea for agricultural soils, so these emissions are assumed to be negligible for California forests and are not included in this report.

The IPCC guidelines only require reporting for **managed lands** under the assumption that nations cannot affect, or be held responsible, for changes happening on lands that aren't being managed. According to IPCC 2006, "managed land is land where human interventions and practices have been applied to perform production, ecological or social functions" (Paustian et al. 2006). Because even most Wilderness areas and National Parks in the U.S. are impacted by human management in some form, e.g., from fire suppression, in practice all lands in the lower 48 states are considered "managed" (e.g., US EPAa 2018).

In 2014, the IPCC published the "Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol" (IPCC 2014) which provides additional guidance on estimating flux from land-use, land-use change and forestry (LULUCF) activities. For forest land, the primary change from IPCC 2006 are guidelines for reporting on forest management and on harvested wood products (HWP). Procedures for estimating HWP stocks and flux are addressed in section 5.

3.1.1 Rationale for use of Tier 3 approach

The IPCC guidance on greenhouse gas accounting describes three "tiers" or approaches to reporting that accommodate the range of data and institutional support in different countries. Gain-loss methods estimate the net balance of additions to and removals from each carbon stock. Stock-difference methods are a more rigorous approach that track the amounts in each carbon stock and their change over time.

Tier 1 methods are the simplest, and apply IPCC equations and default parameter values for emission and stock change factors (e.g., deforestation/afforestation, disturbance, harvest, grazing) to available information on land-use and activity (e.g., from land cover maps derived from satellite mapping). Tier 2 can use the same approach as Tier 1 but applies region- or country-specific emission and stock change factors. Tier 3 methods apply models and inventory measurements tailored to national conditions, are repeated over time, are driven by high-resolution activity data and disaggregated at sub-national level. Models are expected to undergo quality checks, audits, and validations and be thoroughly documented. Tier 3 methods are often referred to as "stock-difference," because C flux is derived from the difference in estimates of individual C pools at different points in time.

Most nations with more detailed economic and natural resource information are expected to follow the Tier 3 approach. This is the approach used by the U.S. NGHGI, built on a wide range of economic, environmental, and natural resource data already being collected for a variety of objectives. This is the approach used in this report as well, with a focus on forested lands as sampled by the FIA program.

Six land-use classes are recognized in IPCC assessments. While the IPCC does not prescribe specific definitions for each class, it does require that countries explicitly and consistently define and track them. These land-uses are further defined for the U.S. in the NGHGI (US EPA 2017) and are described in section 3.2.2. The IPCC land-use classes are:

1. Forest land: includes all land with woody vegetation, using consistent and well-defined criteria for minimum area, minimum cover, and minimum height at maturity to define “forest land” (specifying minimum width too is “good practice”). Assessment of this land-use class is split between land remaining forest land, and land converted to forest land from other uses. In the U.S., the FIA definition for forest land is used for reporting this category.
2. Cropland: cropped land and agro-forestry where structure falls below forest land.
3. Grassland: includes rangelands and pasture not considered cropland. Also includes systems with woody vegetation or herbs that fall below thresholds for forest land. For example, chaparral falls in this category in the U.S. NGHGI.
4. Wetlands: areas of peat extraction and covered by water for all or part of the year that doesn’t fall in the vegetated or settlement categories.
5. Settlements: developed land, including transportation infrastructure and settlements of any size, unless placed in other categories by national definitions.
6. Other land: bare soil, rock, ice, and all other land areas, including unmanaged lands.

In addition to identifying these six land-use categories and subcategories, IPCC requires distinguishing natural from planted forest, identifying areas subject to different natural disturbances and their effects on flux, identifying areas subject to management, and identifying areas of mineral and organic soils, with the latter split into drained, wet, or rewetting.

3.1.2 Determining the Forest Management Reference Level

The concept of a Forest Management Reference Level (FMRL) was established in the 1992 Kyoto Protocols and guidelines for implementing it are described in IPCC (2014, section 2.7.5). The FMRL is a baseline value of average annual net emissions and removals from “forest management” (i.e., all lands that remain forested or that change land-use to/from forest). All pools and gases and the area under forest management that are included in the calculation of the FMRL are to be identified. The FMRL facilitates consistent comparison of forest carbon stocks and losses through time by comparing one or more time periods to a reference baseline that is calculated in the same way, including all the same pools and assumptions.

The UNFCCC and AB 32 both refer to emissions in 1990 as the baseline that targets are tied to for future emissions levels.

For California, the availability of forest inventory data is more limited for the period including 1990 than for more recent years (2001 and on). Specifically, field measurements that span 1990 and that can be used to estimate change only consist of live trees on timberland outside of National Forests (Fried and Zhou 2008). Estimation of flux in 1990 for other lands and carbon pools requires substantial modeling and/or extrapolation from more recent datasets. An extrapolation approach was adopted for U.S. forests in the most recent U.S. NGHGI but the resolution of the estimates currently does not support analysis at less than the state level (US EPA 2017, Woodall et al. 2015). Some national and international assessments and negotiations have used other dates as baselines (e.g., 2005) to align better with available data.

In this report, we establish an FMRL for in-forest carbon based on data from the complete 10-year inventory in California conducted during the time-period 2001-2010 (the first comprehensive, standardized FIA inventory of California's forest lands since 1963 (Oswald and Hornibrook 1966)).

In this report, the FMRL provides a complete estimate of all pools of forest carbon in California and the trends over time as 10-year moving averages. Although there are large overlaps between periods, re-measurement data makes it possible to review trends from complete samples (i.e., all plots) in California for 2001-2010, 2002-2011, 2003-2012, 2004-2013, 2005-2014, 2006-2015, 2007-2016, and 2008-2017. However, estimates of change between 10-year stock averages (i.e., Stock-Change approach) are a less accurate and less precise way to infer flux than the GRM method described below. The FMRL identifies 6 key pools including Aboveground Live (trees and shrubs), Aboveground Dead (standing snags and down wood), Belowground Live (roots), Belowground Dead, Forest Floor Litter and Soil Organic Carbon (organic soil layers). The Harvested Wood Product (HWP) carbon pools are determined for the FMRL in this report.

Although we present data for the FMRL and 10-year moving stock averages to compare to it, in this report we determine annual flux through the Growth, Removals and Mortality (GRM) approach. Comprehensive forest inventories that are based on re-measured, permanent sample plots have the potential to provide the most accurate estimates of forest volume and carbon. This direct measurement of growth, removals and mortality would be considered an IPCC Tier 3 approach to carbon accounting as it is based on more advanced country-specific data and methods. It is also still considered a stock-difference approach, but by measuring changes in the same trees over time the components of change can be detailed (i.e., growth, removals, mortality).

The Forest Inventory and Analysis Program (FIA) of the USDA Forest Service began inventorying forest land in California in 2001 by installing a complete sample of the state each year using 10% of the full set of plots (16,868 on land, excluding census water). This equates to a complete

sample of all inventory in California every 10 years. FIA completed their first full annualized inventory of California forests in 2010 (previous inventories were conducted periodically on a nominal 10-year interval). In 2011, FIA began re-measuring the same plot locations as established in 2001 and as of 2017, they had re-measured 70% of the plots in the state. As FIA re-measures more forest inventory plots in California (through 2020 and beyond) the ability to derive more precise estimates of change for smaller domains of interest will improve (e.g., regions and ownerships), and will be incorporated into future annual reports. The USDA Forest Service Pacific Northwest Research Station (PNW) manages the FIA program for the state of California.

3.2 Forest inventory compilation methods

This section is designed to document the basic estimation and compilation methods used for this report, and identify options for improving estimates in future reports. As mentioned above, this assessment relies primarily on empirical data from FIA inventories of the forests of California and to a large extent applies methods and models used in the NGHGI in accordance with IPCC guidance.

3.2.1 Inventory design

The population, or scope, of the inventory of California is the boundaries of the state, including offshore islands and approximately 3 nautical miles of ocean out from the coastline. Beginning in the 2001 nationally-standardized “annual inventory”, the sampling frame for this area was determined by a national layer of hexagons approximately 6,000 acres in size. Plot sample locations were identified within each hexagon in a manner sometimes referred to as “randomized systematic”. For hexagons that contained plot locations that were part of the previous FIA or National Forest System (NFS) inventories, the previous plot was selected for the annual inventory (or one was randomly selected if more than one was present). For hexagons without a previous plot, a new location was randomly generated within the hexagon. The total number of plots (forested and non-forested) in California is 17,641.

The hexagons in California are assigned to ten evenly-dispersed panels. Each panel is measured in a specific year, providing a balanced annual sample of the state each year. All panels are measured after ten years, at which point the cycle starts over and plots are re-measured on a ten-year interval. The first cycle of annual inventory in California occurred in 2001-2010, and seven years of re-measurement data are available for this report, covering 2011-2017.

All inventory estimates are based upon the grid of plots and the classifications and measurements taken on them. The precision of the estimates is improved, however, by incorporating information from independent, ancillary datasets in a process referred to as “post-stratification” (MacLean 1972, Bechtold and Patterson 2005). Satellite imagery, historic

maps, and ownership layers are combined and pixels with similar attributes related to forest/non-forest delineation and forest characteristics are grouped into strata. The number of pixels in each strata and the number of plots that intersect them are used to define weights for each plot in the inventory. Potentially-forested plots that were unable to be sampled (e.g., access was denied or plots were too hazardous to measure safely) are assumed to be missing at random. The methods represent nonsampled plots by increasing the weights of sampled plots found in the same strata as the nonsampled plots.

The plot sample and stratification are used in the calculation of sampling errors, which are provided with the results of this report. These errors describe the uncertainty associated with sampling the forest (i.e., with plots) instead of measuring the entire population. Additional details on inventory design and estimation methods are provided in Bechtold and Patterson (2005) and Christensen et al. (2016).

3.2.2 Forest land-use and land-use change

As provided for in IPCC guidelines, the NGHGI uses the FIA definition of forest land to define the specific lands covered, including the change in land-use between forest land and other land-uses. The current FIA definition of forest land (Woudenberg et al. 2010) is land with at least 10 percent cover by live forest trees of any size, or that formerly had such cover and that will be artificially or naturally regenerated (i.e., is not being managed for non-forest uses). The area must be at least 1 acre in size and at least 120 feet wide. Tree-covered areas where management precludes natural vegetation development (e.g., through mowing, disking, regular herbicide application, or intensive grazing) are not considered forest land. FIA maintains a national list of species that are considered forest trees; these generally are species that form dominant central stems and attain heights greater than 16 feet over the majority of their range. However, some international definitions refer to trees being able to attain 16 feet in height “in situ”, and recent NGHGI and Resources Planning Act reports (RPA; Oswalt et al. 2014) have reclassified some forest land as “woodland”. The in-situ criterion implemented for NGHGI/RPA classifies plots based on a combination of current tree height, forest type, site class, and ecoregion. The criteria relevant to California that would result in changes of FIA data from forest land to woodland (a component of forest land) are:

- mean height of trees \geq 5 inches diameter is $<$ 16.4 feet; and
- FIA forest type code =184 (juniper woodland), 185 (pinyon-juniper woodland), 971 (deciduous oak woodland), 972 (evergreen oak woodland), 973 (mesquite woodland), or 976 (miscellaneous woodland hardwoods); and
- site class = 7 (unproductive forest of $<$ 20 ft³/ac/yr maximum growth; i.e., culmination of mean annual increment); and

- in ecoregions 322 (Mojave, Sonoran, and Colorado deserts), 341 (Mono and Southeastern Great Basin semi-deserts), or 342 (Northwestern Basin and Range).

The NGHGI also states that “land is not classified as Forest Land if completely surrounded by urban or developed lands, even if the criteria are consistent with the tree area and cover requirements for Forest Land. These areas are classified as Settlements” (US EPAa 2018). Forested FIA plots in urban areas were not specifically excluded from the NGHGI calculations; instead, forest estimates were adjusted by the land-use categories derived from the USDA Natural Resources Conservation Service (NRCS) Natural Resources Inventory (NRI; e.g., USDA NRCS 2015) to implement these criteria.

In this analysis, we did not separate out FIA-classified forested lands that fell in the NGHGI-classes of woodland and urban from total forest land. We estimate that 380 ± 92 thousand acres of forest land meet the woodland definition, or 1.2% of the total forested area. Of the reclassified woodland, 88% of the area was on federal land, with the remainder on private land. Using currently-measured heights in the criteria ends up misclassifying some recently disturbed (seral) stands where trees have not reached their height potential. However, a **potential change** to match NGHGI reporting as closely as possible would be to incorporate woodland and urban criteria in the next iteration of the report.

Inventory crews delineate the area covered by different land-uses that fall in the FIA plot footprint. These proportions, in combination with the plot weights from the stratification, enable FIA to estimate the area of all land-use classes in the state (i.e., forest, non-forest, water). In sparsely-covered stands, crews take additional measurements and estimates (e.g., of dead or harvested trees) to determine whether the 10 percent threshold is met. Non-forest land-uses are identified either on the ground (for field-visited plots) or using recent imagery (for non-field-visited plots), which makes it possible to classify non-forest lands into most of the other IPCC classes (i.e., cropland, grassland, settlements, other). When plots were re-measured, changes in land-use within the plot footprint were delineated, enabling the estimation of change in forest land area and the land-uses that forest lands are coming from or changing into. Wetlands are apparently delineated in the USDA NRCS NRI used in the NGHGI, but their locations are not yet clear; we assumed there was no land-use change between wetlands and forest.

The NGHGI definitions for non-forest land-uses are:

- Cropland: Areas used to produce adapted crops for harvest, including both cultivated and non-cultivated (e.g., hay, orchards), and agroforestry and windbreaks.
- Grassland: Areas where plant cover is composed principally of grasses, grass-like plants (i.e., sedges and rushes), forbs, or shrubs, including pastures and native

- rangelands. Savannas, deserts, and tundra, and drained wetlands with the appropriate plant cover are included. Systems with woody vegetation or herbs that fall below the thresholds for forest land are also included in grasslands (i.e., chaparral).
- Wetlands: Areas covered or saturated by water for all or part of the year, in addition to the areas of lakes, reservoirs, and rivers. Does not include areas of drained wetland that meet other categories, or un-drained forested wetlands.
 - Settlements: Areas of at least 0.25 acres that includes residential, industrial, commercial, and institutional land; construction sites; public administrative sites; railroad yards; cemeteries; airports; golf courses; sanitary landfills; sewage treatment plants; water control structures and spillways; parks within urban and built-up areas; and highways, railroads, and other transportation facilities. Also included are tracts of less than 10 acres that may meet the definitions for Forest Land, Cropland, Grassland, or Other Land but are completely surrounded by urban or built-up land.
 - Other Land: Areas of bare soil, rock, ice, and all land areas that do not fall into any of the other five land-use categories. Following IPCC (2006), C stock changes and non-CO₂ emissions are not estimated for Other Lands. However, C stock changes and non-CO₂ emissions are estimated for Land Converted to Other Land during the first 20 years following conversion to account for legacy effects.

Prior to the implementation of the national FIA field guide 6.0 in 2012, the definition of forest land used on the west coast was slightly different and was based on a 10 percent stocking threshold rather than cover. This was changed to cover to improve national and international consistency and the ability to relate ground classifications to imagery. The change in definition has little impact on the majority of forest land in California which easily exceeds both thresholds, but can lead to some differences in sparse forest conditions that may be found in oak and juniper woodlands (Azuma and Gray 2014). Nevertheless, the change raises the possibility that areas may change designation due to procedural change and not real change on the ground. PNW-FIA field crews have been distinguishing procedural from real changes and taking additional measurements of cover and stocking in sparse stands to be able to better quantify the relationship between cover and stocking in different forest conditions. This will make it easier to compare estimates between older and newer inventories.

This report incorporates regional assessments of land-use change, after accounting for definition changes, procedural changes, and previous errors. This analysis of land-use change is NOT reflected in the publicly-available online FIA databases. The PNW-FIA program is in the process of evaluating how to implement databases that reflect correct analyses of change using current definitions while maintaining previous data used to generate earlier assessments.

3.2.3 Carbon pool calculations

Aboveground live tree—Estimates of aboveground live-tree woody C were based on regional FIA equations of the sum of bole, bark, and branch biomass in metric tons for each tree measurement multiplied by 0.5, the C fraction of biomass. Bole biomass (ground to tip) was calculated from regional species-specific volume equations documented in Zhou and Hemstrom (2010) and species-specific wood density values documented in Woudenberg et al. (2010). Bark and branch biomass were calculated from regional species-specific equations selected from Means et al. (1994) and documented in Zhou and Hemstrom (2010), except branch Equation 16 used Snell and Little (1983) and bark Equations 8 and 20 used Means et al. (1994) Equations 5 and 275, respectively. Most equations use both diameter at breast height (dbh) and height data, whereas a few bark and branch equations use diameter only. Foliage biomass was calculated using the Jenkins et al. (2003) ratios to total tree biomass as implemented in Woodall et al. (2011) and added to aboveground wood biomass before calculating aboveground live tree C. In contrast, the NGHGI estimates of live tree biomass are based on the “component ratio method” equations in Woodall et al. (2011). An expansion factor derived from the fixed-area plot size was used to convert individual tree C to an area basis (e.g., metric tons per acre).

Aboveground standing dead tree—Estimates of aboveground standing dead tree carbon followed the same procedures as for aboveground live trees, but with the following modifications. Gross volume from ground to tip was adjusted for broken tops by calculating the gross volume (to an intact “total” height estimated in the field or modeled using Barrett (2006)) and the net volume to the broken “actual” height with a Flewelling (1994) taper equation for Douglas-fir. The proportion of net to gross volume from the Flewelling equation was applied to reduce the gross volume calculated for each tree. In addition, the biomass of all components (bole, bark, and branch) were reduced for decay using the hardwood/softwood parameters in Harmon et al. (2011), Table 6. Standing dead biomass was further reduced to account for the tendency of bark and branches to be dropped from snags sooner than bole biomass; component reductions described in Harmon et al. (2011) were applied to further reduce bark and branch biomass. Biomass calculations in metric tons were multiplied by 0.5 to calculate C. In contrast, the NGHGI estimates of standing dead tree biomass are based on the equations in Woodall et al. (2011) and the species-specific decay-reduction factors in the table REF_SPECIES in Woudenberg et al. (2010). The species-level decay factors appear to be based on small datasets and highly variable among similar species; the hardwood/softwood parameters seemed more reliable. Stumps are not included and it is unlikely that they will be included in future inventories.

Belowground live and standing dead tree (i.e., roots) —Estimates of belowground biomass (i.e., coarse roots > 2 mm diameter) were based on the ratios for species-groups developed in Jenkins et al. (2003) as implemented in Woodall et al. (2011); i.e., adjusting the estimate by the

ratio of the FIA volume-based estimate of bole biomass to the Jenkins equation-based estimate. Decay class of standing dead trees was used to reduce belowground calculations using the species- and decay class-specific parameters in the REF_SPECIES table (Woudenberg et al. 2010); biomass calculations in metric tons were multiplied by 0.5 to calculate C.

Aboveground down wood—Estimates of carbon in down wood were based on the transect-intercept measurements of coarse wood (≥ 3 inches intersect diameter) and counts of fine wood (≥ 0.25 to < 3 inches diameter). Piles were not included, as the field estimates of pile density in the initial years of the inventory were unreliable. Biomass of coarse wood was calculated using the equations in Woodall and Monleon (2008) with wood density and decay-class reduction factors from the REF_SPECIES table (Woudenberg et al. 2010). A ***potential improvement*** for a future report would involve using the hardwood/softwood decay-reduction parameters from Harmon et al. (2011) instead (as described above for snags), as they seem less variable among similar species than the species-specific variables in REF_SPECIES, which were also derived from Harmon et al. (2011). Log inclinations were measured in PNW inventories starting in 2013 with the implementation of core FIA manual 6.0. Where available, inclinations were factored into the calculation of coarse wood biomass and carbon (inclined logs have a lower probability of being intercepted by a transect, so the calculated C per acre is greater than if the same log were lying flat). For the smaller size classes of down wood (“fine wood”) we followed the procedures in Woodall and Monleon (2008) where the fine wood piece counts in each size class are multiplied by a quadratic mean diameter (QMD) to calculate volume, and a wood density factor to calculate biomass, which is multiplied by 0.5 to calculate C. Parameters are specific to forest type group and available in REF_FOREST_TYPE_GROUP in the FIA database (FIADB) (Woudenberg et al. 2010). Although measurements of piles were taken, estimates of wood density in piles tended to be unrealistically high, particularly in the initial inventory years. As a result, we currently do not include pile data in the down wood calculations, but may be able to develop replacements for current values with reasonable assumptions with greater scrutiny.

Aboveground and belowground understory vegetation—Estimates of above- and belowground biomass and C of understory vegetation (which includes live trees < 1 inch in diameter) are based on the calculations from the U.S. Forest Carbon Budget Model (FORCARB2) (Smith et al. 2006), as populated in the FIADB. Calculations are based on FORCARB estimates of live-tree biomass, (calculated from forest type and stand age), and are highest at low levels of live tree biomass and decline slightly at higher levels. Dead understory vegetation is not included and there are no plans to include it at this time. It was previously identified that a potential improvement for a future report would use the cover and layer height data collected on FIA plots to calculate understory biomass directly, provided suitable equations can be found.

However, after further research it was determined that potential equations were very general and from different vegetation types/areas that are likely not relevant for CA.

Forest floor—In a change from the previous report (Christensen et al. 2017), we currently provide estimates for carbon in the forest floor (i.e., duff and litter), which was identified as a planned improvement in that report. We applied the same model used in the NGHGI which was based on FIA Phase 3 data and predictor variables of location, elevation, forest type group, live tree C, and some climate variables (Domke et al. 2016). Although PNW-FIA crews have measured forest floor depth on the down wood transects since the beginning of annual inventory, there were methodological problems in the initial years and the estimates are quite sensitive to seemingly small measurement errors of depth (e.g., a tenth of an inch). **A potential improvement** for a future report is to continue evaluating flux estimates using more recently-remeasured forest floor depths and adopt them if/when they appear to be reliable.

Soil—In a change from the previous report (Christensen et al. 2017), we estimate soil organic C stocks to a 1 meter depth using the modeled estimates from Domke et al. (2017) as implemented in the latest NGHGI report, which was identified as a potential improvement in the previous report. This model incorporated data from soil cores on FIA plots with other national datasets and values compare favorably with those calculated from FIA cores in California. The new values are 3.4 times greater than those provided with the earlier model by Smith et al. (2006).

3.2.4 Flux calculations

The Growth, Removals, and Mortality (i.e., GRM) approach was used to calculate change in forest C pools and the magnitude of flux by comparing measurements taken on the same set of plots and trees 10 years apart.

All flux calculations were summarized based on the condition classification at the initial measurement (e.g., owner, forest type, etc.). It was fairly common for the condition classification on a plot to change over time: usually it was a result of disturbance or management changing the forest type and/or stand size class, but sometimes there was a change in land-use on the plot. The change in C was calculated for individual trees between measurements. For live trees that died or were cut between measurements, growth equations were used to estimate tree diameter and height at the midpoint of the measurement interval and calculate C at the time of death (Bechtold and Patterson 2005); using the dimensions at the first measurement would result in a biased under-estimate for mortality and harvest. New trees that grew into the sapling size class (≥ 1 inch diameter) between estimates were considered ingrowth (a component of growth). Live tree C was allocated into the components of change based on initial and re-measurement tree status, namely: growth, removals, and mortality. Change in C for standing dead trees was based on the difference in calculated C at each time-

period and would include live tree C entering this pool through mortality, and dead tree C leaving this pool through decay, transition to other pools, or combustion; trees that fell over or were cut were assigned zero for the second measurement. Changes in down wood C were estimated at the plot level, based on calculations that did not incorporate log inclination from the most recent measurements. Changes in this pool include tree C entering this pool from live or standing dead pools and C leaving this pool through decay, transition to other pools, or combustion. Changes in understory vegetation were based on modeled estimates (from live tree biomass) from each measurement. Flux was also calculated for forest floor and mineral soil C based on the difference in modeled estimates for each plot at each measurement, using the models described in sections 3.2.3. While there is some confidence in the estimates of C stocks using these models, their accuracy at estimating C flux in California is unknown.

For land-use change (i.e., forest to non-forest or non-forest to forest), all non-soil pools were assumed to be zero for non-forest conditions. Although in some cases this is unrealistic (e.g., not all trees are cut when houses are built on forest land), there are currently no data to estimate those pools on non-forest lands. For soil organic carbon (SOC), the IPCC Tier 2 approach is to use country-specific data to assign carbon concentrations by land-use, climate zone, and soil type, and assume a 20-year lag for SOC to reach a new equilibrium. However, most of the recent IPCC values and research on SOC appear to focus on agricultural soils and effects of different types of management (Ogle et al. 2003, IPCC 2006). The approach in Ogle et al. (2003), which is used in the NGHGI, assumes that forest, rangeland, and urban land-uses have the same SOC as uncultivated land (primarily due to lack of information for urban). Because the agricultural land-uses involved in land-use changes in California were either pasture or orchard (i.e., did not involve any plowing or intensive row cropping), we assumed that SOC changes due to land-use were zero.

3.2.5 Disturbance classification and assessment

FIA crews identify the types of treatments and disturbances that have occurred on the plot since the previous measurement. Up to three management treatments, and up to three natural disturbances can be coded. Disturbances must meet a minimum threshold that cause mortality or damage to at least 25 percent of all trees in a stand or 50 percent of an individual species' count. We classified disturbance codes hierarchically for analysis, with both fire and harvest taking precedence over other disturbances. Harvest treatments of Trees removed (generic), Clearcut, Partial heavy, Partial light, Precommercial, and Improvement were classified as "Cut". Any record of fire (Fire [generic], Ground fire, and Crown fire) were classified as "Fire". If either of these types were recorded, they were identified with the condition; if both were recorded, the condition was classified as "Cut and Fire". (Note: Cut and Fire includes stands that were thinned and prescribe burned, as well as stands that were burned by wildfire and salvage-logged.) If neither of those were coded, then any insect or disease disturbances were used to

classify the condition disturbance as “Insect and Disease”. If nothing had been classified yet, then any weather disturbances (including landslide and avalanche) were coded as “Weather”. Finally, if none of the previous had been recorded but treatment codes for Firewood cutting, Incidental cutting, Stand conversion, Clean and release, or Chaining were present, then the disturbance was classified as “Other cut”. Although estimated trends in area burned are similar between FIA and other methods, other approaches don’t distinguish forest from non-forest burned area (Christensen et al. 2016).

Because change analyses are based on the conditions as designated at the first measurement, and disturbance is coded at the second measurement, when condition mapping may change, a mechanism to associate the disturbance code with the condition as classified at the first measurement is needed. For changes in tree carbon, the individual trees were assigned to both the current and previous condition IDs. For the other pools (e.g., down wood and understory veg) biomass estimates for each subplot were proportioned by the condition-change proportions on the subplot to link up the first and second measurements and calculate change. **Potential additions:** there is substantial interest in using remote sensing of disturbances to provide modeled up-to-date estimates of change; however, this would also require modeling growth, mortality, and decay on the undisturbed plots which could require substantial effort.

3.2.6 Estimation of additional greenhouse gases

The primary non-CO₂ greenhouse gas emissions for forest land are for methane (CH₄) and nitrous oxide (N₂O) from combustion in prescribed fire and wildfire. The default IPCC (2006) method is to estimate pre-fire fuel mass (live vegetation, litter, and dead wood), and apply combustion factors for the amount of woody material consumed (defaults in IPCC 2006 Table 2.6). Because we have measurements of change in C pools on plots that burned, we used the change in C on each burned plot instead. We then multiplied the amount combusted by emissions factors listed in IPCC 2006 Table 2.5 (CH₄=4.7, N₂O=0.26 g/kg of dry matter burnt for non-tropical forests). The CO₂ equivalents for the greenhouse gas effect of these gases (i.e., 100-year global warming potentials) are listed in IPCC (2007b) as CH₄=25 and N₂O=298. Greenhouse gas equivalents were not found for CO and NO_x, so analyses of emissions of these gases were not included, which is consistent with the NGHGI.

4 Forest ecosystem results: Carbon flux, stock and trends

In this analysis results of carbon physically present in the forest are given in metric tons (MT) of carbon (C). Averages throughout the forest ecosystem part of the report are a ratio-of-means estimators as described in Bechtold et al. (2005). They are computed as the ratio of the means of two estimates such as net carbon sequestration per acre forested land. Results of carbon flux, the amount and rate of gaseous carbon being emitted or sequestered by the forest, are given in metric tons (MT) of carbon dioxide equivalent (CO₂e). Net changes in individual carbon pools are also shown in units of CO₂e to provide insight into the components of change, even if they aren't a direct flux with the atmosphere (e.g., tree mortality, which is a conversion from live to dead wood that initially stays in the ecosystem). Carbon can be converted to CO₂e by multiplying by 3.667 or the fraction 44/12³. Negative values indicate an emission or loss. Ranges in the text (i.e., ±) represent a 95% confidence interval (CI), while values in the tables report the sampling error (SE; CI = 1.96*SE). Estimates of carbon storage and net flux provided in this report based on modeled attributes (e.g. belowground roots, soils), or estimates based on measured values but summarized for a small area or filtered set of specific criteria (e.g. C in storage for a forest type, single ownership, and a small forested region) should be interpreted with caution. An estimate of error (SE, and 95% CI) is provided as an aid in interpretation and as a measure of confidence in each summarized result. The sampling error for modeled attributes (e.g. belowground roots, soils) does not account for potentially much larger model error. Additionally, modeled attributes are developed estimating total carbon storage and not carbon change. Any small bias for carbon model totals can lead to very large biases for carbon change.

4.1 Average annual net carbon flux

4.1.1 Statewide net carbon flux 2001-2007 & 2011-2017 – overview

This updated estimate of average annual net carbon sequestration is based on a 10-year average from plots and trees initially measured between 2001 and 2007 then re-measured 10 years later between 2011 and 2017. Results from this remeasurement period are referred to as 2017 results, or results from the 2017 reporting period or 2017 measurement cycle results throughout the report. Remeasuring permanently located inventory plots gives the FIA forest

³ Throughout the forest ecosystem portion of the inventory, results are converted from C to CO₂e by multiplying by 3.667. Throughout the harvested wood product portion of the inventory, results are converted from C to CO₂e by multiplying by 44/12 providing more significant digits and therefore slightly different numbers when rounded compared to multiplying by 3.667.

inventory program the unique ability to fully evaluate and monitor changes on each plot in all carbon pools especially changes in tree growth, removals, and mortality across all ownerships and forested areas of the state.

As of the 2017 reporting period, California continues to exceed the 5 MMT CO₂e target rate of annual sequestration established by AB 1504. Using recent FIA plot measurements, the 2017 statewide rate of carbon sequestration from all forest ecosystem pools across all ownerships is 29.2 ± 4.9 MMT CO₂e per year, excluding net CO₂e contributions from other sources such as harvested wood products, land moving to and from a forested condition, and non-CO₂ greenhouse gas emissions from wildfire (Table 4.1, 4.3). After accounting for forest land use conversions and non-CO₂ greenhouse gas emissions from wildfire, the 2017 statewide rate of carbon sequestration on all forest land is 27.0 ± 5.5 MMT CO₂e per year (Table 4.2a). Changes in land-use between forest and non-forest land condition is estimated to have a net effect of emitting 1.7 ± 1.0 MMT CO₂e per year (Table 4.2a, 4.9). Combined annual net emissions of non-CO₂ greenhouse gases (methane and nitrous oxide) from wildfire is also accounted for and is estimated to be 0.5 ± 0.1 MMT CO₂e per year (Table 4.2a, 4.2b, 4.7). Accounting for the additional net sequestration associated with HWP pools of 0.9 MMT CO₂e per year (Table 6.6), the 2017 statewide rate of carbon sequestration for all forest land across all ownerships is 27.9 ± 5.0 MMT CO₂e per year (excludes confidence interval for HWP C flux; Table 7.1).

The statewide rate of annual carbon sequestration on all forest land remaining as forest land declined by 2.2 MMT CO₂e since 2016 (Christensen et al. 2018). This reduction in carbon sequestration is the result of several factors including improvements in inventory methodology but is also being driven by two complementary factors; an increased rate of tree mortality and decreased gross growth rate on live trees during the most recent measurement years. Tree mortality regardless of cause, accounted for an additional 2.5 MMT of CO₂e converted to dead wood annually. Gross growth on trees measured 10-years earlier declined 1.9 MMT CO₂e annually further reducing the net rate of sequestration.

Net annual sequestration from forests in the Northern Forest Practice District is 10.5 ± 3.3 MMT CO₂e; in the Southern Forest Practice District net annual forest sequestration is 5.0 ± 2.0 MMT CO₂e; and in the Coastal Forest Practice District it is 13.1 ± 3.1 MMT CO₂e (Table 4.2b). These values include change from all forest ecosystem pools and non-CO₂ emissions from wildfires, but does not include change from harvested wood product pools or from forest land use conversions. See Figure 4.5 for a map of Forest Practice Districts.

Table 4.1: Statewide average annual net CO₂e flux from forest pools in forest land remaining forest land based on plots initially measured between 2001-2007 and re-measured between 2011-2017.

	Net flux	
	Total*	SE
<i>million metric tons CO₂ equivalent</i>		
CARBON POOL		
Forest		
Aboveground live ¹	19.1	2.2
Aboveground dead ²	5.8	1.5
Belowground live ³	3.8	0.4
Belowground dead ⁴	1.0	0.2
NET FLUX	29.6	2.4
Forest Floor ⁵	0.1	0.2
Soil Organic C	-0.6	0.4
TOTAL FOREST NET FLUX	29.2	2.5

¹includes live trees, foliage, and understory veg

²includes standing and down dead wood

³includes live tree and understory veg roots

⁴includes dead tree roots

⁵Forest floor flux is a new addition from previous reports and is separated as a line item to highlight this addition. In future reports this will likely be lumped with aboveground dead.

*totals may be off due to rounding

Table 4.2a: Statewide average annual net CO₂e flux from forest pools, non-CO₂ emissions from forest fires in Forest land remaining forest land, and changes due to forest land conversions (i.e., by forest land-use and land-use change). Plots initially measured between 2001-2007 and re-measured between 2011-2017.

Land-use category	Net flux	
	Total*	SE
	<i>million metric tons CO₂ equivalent</i>	
Forest land remaining forest land		
Changes in forest carbon	29.6	2.4
Changes in forest floor carbon ¹	0.1	0.2
Changes in Soil Organic Carbon	-0.6	0.4
Non-CO ₂ emissions from forest fires	-0.5	0.1
net flux	28.7	2.5
Forest land conversions		
Changes in forest carbon, forest to non-forest	-3.2	0.5
Changes in forest carbon, non-forest to forest	1.5	0.3
net flux	-1.7	0.5
total net flux	27.0	2.8

Note: negative numbers are a net emission to the atmosphere

¹Forest floor flux is a new addition from previous reports and is separated as a line item to highlight this addition. In future reports this will likely be lumped with aboveground dead.

*totals may be off due to rounding

Table 4.2b: Average annual net CO₂e flux from forest ecosystem pools and non-CO₂ emissions from forest fires in forest land remaining forest land, 2001-2007 to 2011-2017: Forest Practice Districts.

Forest Practice District	Forest Pools Net flux		Soil Organic C		Forest Floor		non-CO ₂ emissions from forest fires		Total Net Flux	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>million metric tons CO₂ equivalent</i>										
Northern	11.4	1.6	-0.6	0.3	0.1	0.1	-0.3	0.0	10.5	1.7
Southern	5.1	1.0	0.0	0.2	-0.1	0.1	-0.2	0.0	4.9	1.0
Coastal	13.1	1.6	0.0	0.2	0.1	0.0	0.0	0.0	13.3	1.6
All California	29.6	2.4	-0.6	0.4	0.1	0.2	-0.5	0.1	28.7	2.5

Note: negative numbers are a net emission to the atmosphere

4.1.2 Net carbon flux for forest lands remaining forest (FF)

4.1.2.1 Net carbon flux by pool and ownership

Table 4.3: Statewide estimate of average annual net carbon flux (CO₂e) by pools and owner, 2001-2007 to 2011-2017. Changes in CO₂e due to land-use and non-CO₂ greenhouse gas emissions are not included. See also Appendix 2, Table B1.

	Public						Private						Total	
	National forest		Other federal		State and local govt.		Corporate		Non Corporate		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons CO₂ equivalent per year</i>														
Standing Live tree														
Mortality	-26,162	1,340	-3,451	652	-1,252	277	-3,733	284	-4,438	323	-8,172	408	-39,037	1,562
Cut	-1,751	329	-6	6	-119	120	-10,616	1,134	-1,313	294	-11,929	1,158	-13,805	1,210
Gross Growth	31,611	572	4,031	311	3,122	301	19,114	757	13,154	654	32,267	779	71,031	992
Net	3,698	1,463	574	661	1,751	350	4,764	1,277	7,402	638	12,166	1,413	18,189	2,165
Foliage	254	75	33	29	84	17	265	66	328	30	593	71	964	109
Roots														
Live	893	291	137	116	344	69	1,012	263	1,390	132	2,402	291	3,775	433
Dead	820	202	38	92	-14	34	17	55	130	56	147	79	991	238
Standing Dead	5,194	971	509	534	-40	131	459	216	871	234	1,330	318	6,992	1,159
Dead Woody Debris	69	636	318	284	114	137	-1,685	484		302	-1,686	570	-1,184	910
Understory Vegetation														
Above Ground	-45	51	5	26	-17	7	27	41	-53	19	-26	45	-84	73
Below Ground	-5	6	1	3	-2	1	3	5	-6	2	-3	5	-9	8
Total (excluding soils)	10,877	1,321	1,614	603	2,220	433	4,861	1,705	10,061	792	14,923	1,867	29,634	2,394
Forest Floor	-40	132	-26	57	5	17	-16	93	169	58	152	110	92	182
Soils	-534	234	4	94	-58	44	-92	243	111	111	19	267	-569	371
Total (including soils and forest floor)	10,303	1,419	1,592	638	2,167	436	4,753	1,780	10,341	816	15,094	1,945	29,156	2,519

Growth on live trees make up 79% of the annual CO₂e flux on forest land from all ownerships. Live trees including foliage and live roots contribute carbon at a net rate of about 22.9 ± 4.3 MMT CO₂e per year (Table 4.3). It is estimated that down wood as fallen logs and other decaying woody material is losing CO₂e to the atmosphere and other forest ecosystem pools at a rate of 1.2 MMT CO₂e per year but the relatively large range (± 1.8 MMT CO₂e) suggests that this estimate is not significantly different from zero. Net emission of CO₂ from down wood is partially due to the overall rate of wood decay combined with losses from disturbance events such as wildfire exceeding the rate of recruitment of new material through fallen trees and branches. Potential woody material is also being partially off-set as harvested trees from what would become part of the down wood carbon pool. Carbon in wood products manufactured from a portion of the wood volume in these harvested trees is not immediately emitted as CO₂, but is stored as sequestered C. See section 2.3 and 5 for a discussion of the role these harvested wood products play in the carbon cycle. The large increase in snag carbon on National Forests will likely result in future increases in down wood in unharvested stands.

As single ownerships, the national forests and private noncorporate forests provide similar contributions to overall net annual CO₂e sequestration, each accounting for 35-36% of the statewide net forest ecosystem carbon flux (Figure 4.1). Net tree growth on corporate forest land currently contributes about 16% to total annual carbon sequestration from California's forests. This does not include carbon storage in harvested wood products.

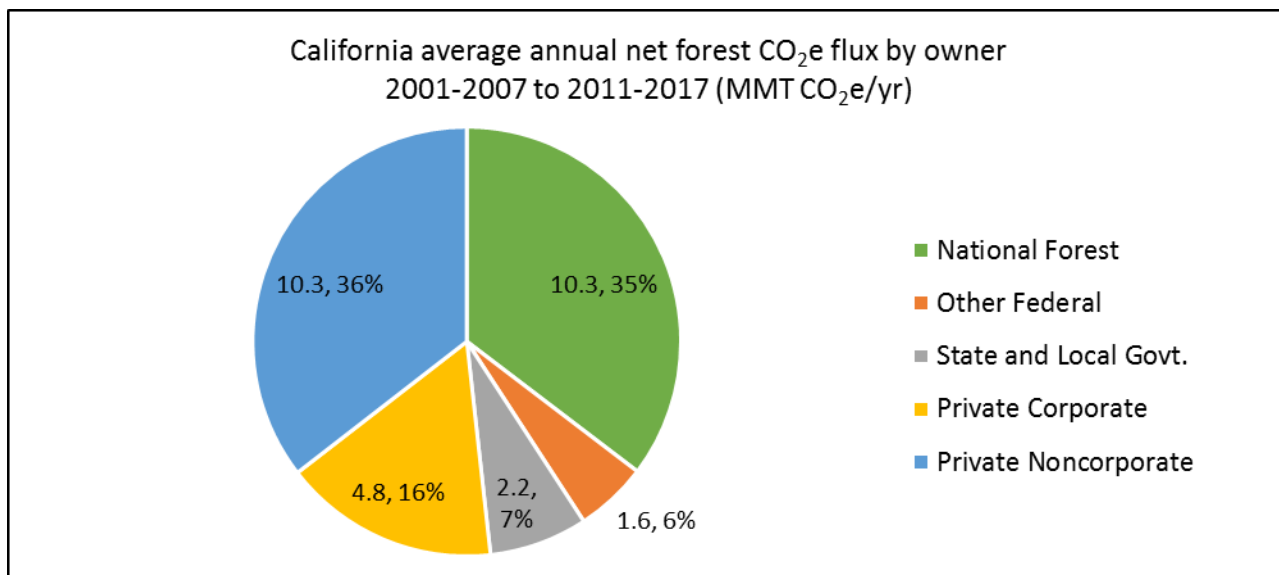


Figure 4.1. California average annual net forest CO₂e flux including soils and forest floor flux by owner, 2001-2007 to 2011-2017 (MMT CO₂e/yr). Figure derived from table 4.3/Appendix 2, Table B1.

Evaluating the contribution of each ownership by carbon pool highlights the significant roles played by both the National Forests and private ownerships to overall annual carbon sequestration. It is the combined effect of annual growth on live trees from all ownerships that overcome annual carbon losses due to any single source of emission (Figure 4.2). National Forests and forest land managed by private individuals are each currently at or exceeding the 5 MMT CO₂e per year target established by AB 1504 when evaluating flux on all forest land (Figure 4.2).

With the addition of the 2017 measurements the overall rate of average annual carbon flux on forest land for all by ownerships declined by 2.2 MMT CO₂e since 2016 (Christensen et al. 2018). Between pools, the slightly reduced statewide rate of net flux is evident in the smaller contribution from live trees moving into the contribution from dead trees (Figures 4.2, 4.3). By ownership, most of this shift between live and dead tree pools occurred on the National Forests and private individual owner’s forest land.

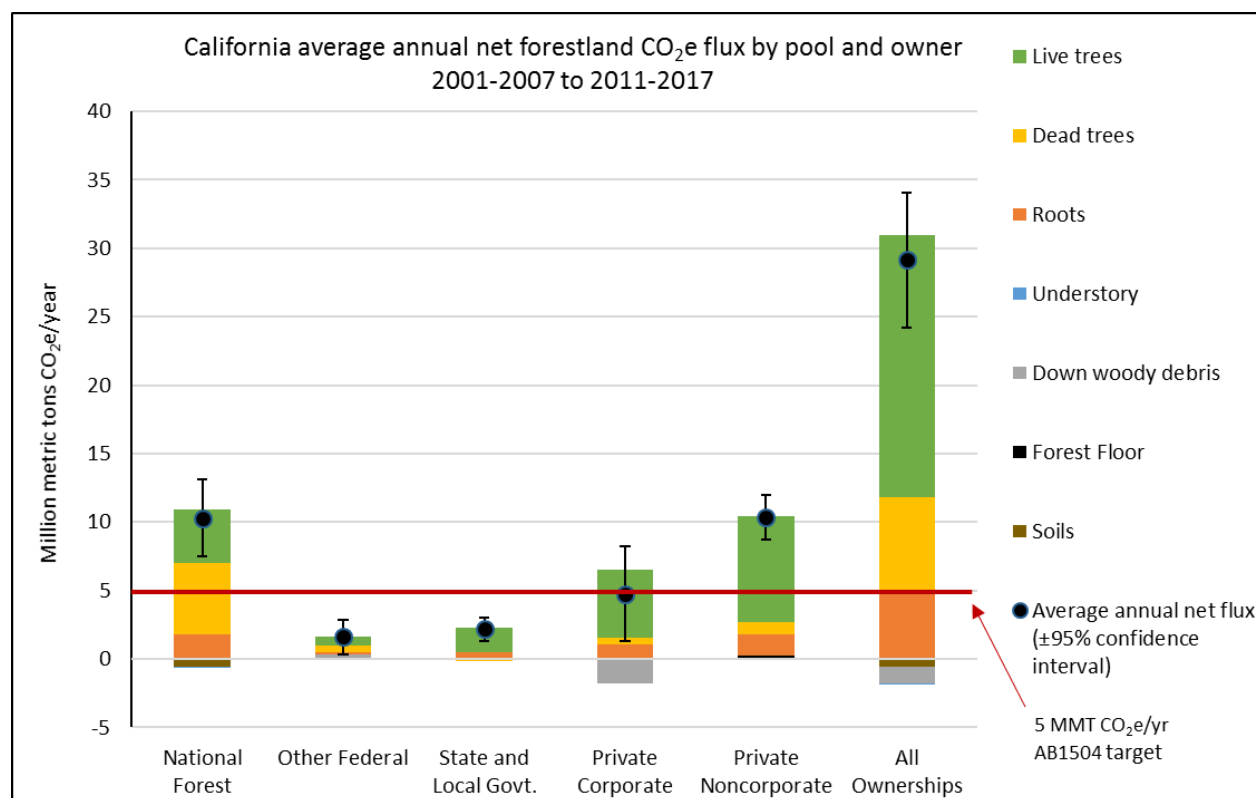


Figure 4.2. California forest land statewide estimate of average annual carbon flux (MMT CO₂e/yr) by pool and ownership, 2001-2007 to 2011-2017. Estimates exclude emissions from land-use changes (1.7 MMT CO₂e/yr) and non-CO₂ greenhouse gases (0.5 MMT CO₂e/yr). Roots includes belowground live and dead tree roots. Understory includes aboveground and

belowground understory vegetation. Error bars represent the 95 percent confidence interval of net change. Figure derived from Appendix 2, Table B1.

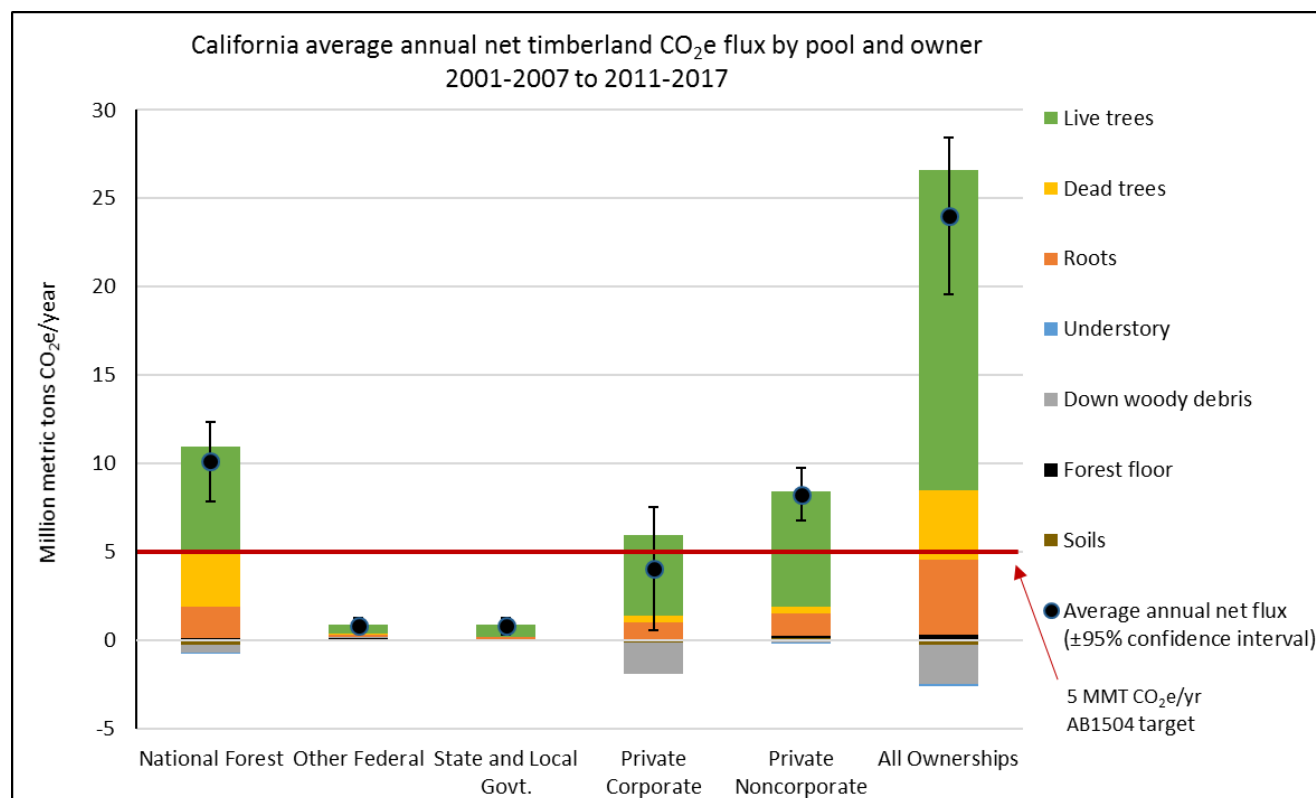


Figure 4.3. California timberland statewide estimate of average annual carbon flux (MMT CO₂e/yr) by pool and ownership, 2001-2007 to 2011-2017. Estimates exclude emissions from land-use changes and non-CO₂ greenhouse gases. Roots includes belowground live and dead tree roots. Understory includes aboveground and belowground understory vegetation. Error bars represent the 95 percent confidence interval of net change.

4.1.2.2 Net carbon flux aboveground live tree pool, by owner and land status

As noted in our previous estimates and continuing with the 2017 updates, only on reserved forest lands managed by the USDA Forest Service are carbon reductions from mortality in the live tree pool estimated to exceed gains from live tree growth (Figure 4.4a, Table 4.4a). In these reserved forests, tree mortality primarily due to wildfire is currently driving the overall net carbon emission of 0.44 ± 0.47 metric tons CO₂e per acre per year in 2017. This is an increase since the 2016 report when it was estimated to be 0.20 ± 0.47 metric tons CO₂e per acre per year. However, annual gross growth per acre on live trees is currently exceeding all other carbon losses from the live tree pool due to mortality or harvest on unreserved forest land (Figure 4.4a) or timberland (Figure 4.4b) for all other ownerships including lands managed by the Forest Service (Figure 4.4b). By ownership, the annual net rate of carbon sequestration is

the greatest on timberland owned by private individuals where 2.62 ± 0.39 metric tons of CO₂e per acre are added each year (Figure 4.4b, Table 4.4b). Together, trees growing on all ownerships across all of California's forests are currently sequestering carbon at net annual rate of 0.60 ± 0.14 metric tons CO₂e per acre (Figure 4.4a, Table 4.4a). Average annual net change totals for the aboveground live tree carbon pool by disturbance, ownership and land status are found in table 4.6a and discussed in section 4.1.2.4. Note that Figures 4.4a and 4.4b have been updated so only acres in a different land status but also in a similar productive capacity are now compared (i.e. only the productive component of reserved National Forest acres are compared to timberland acres on other ownerships).

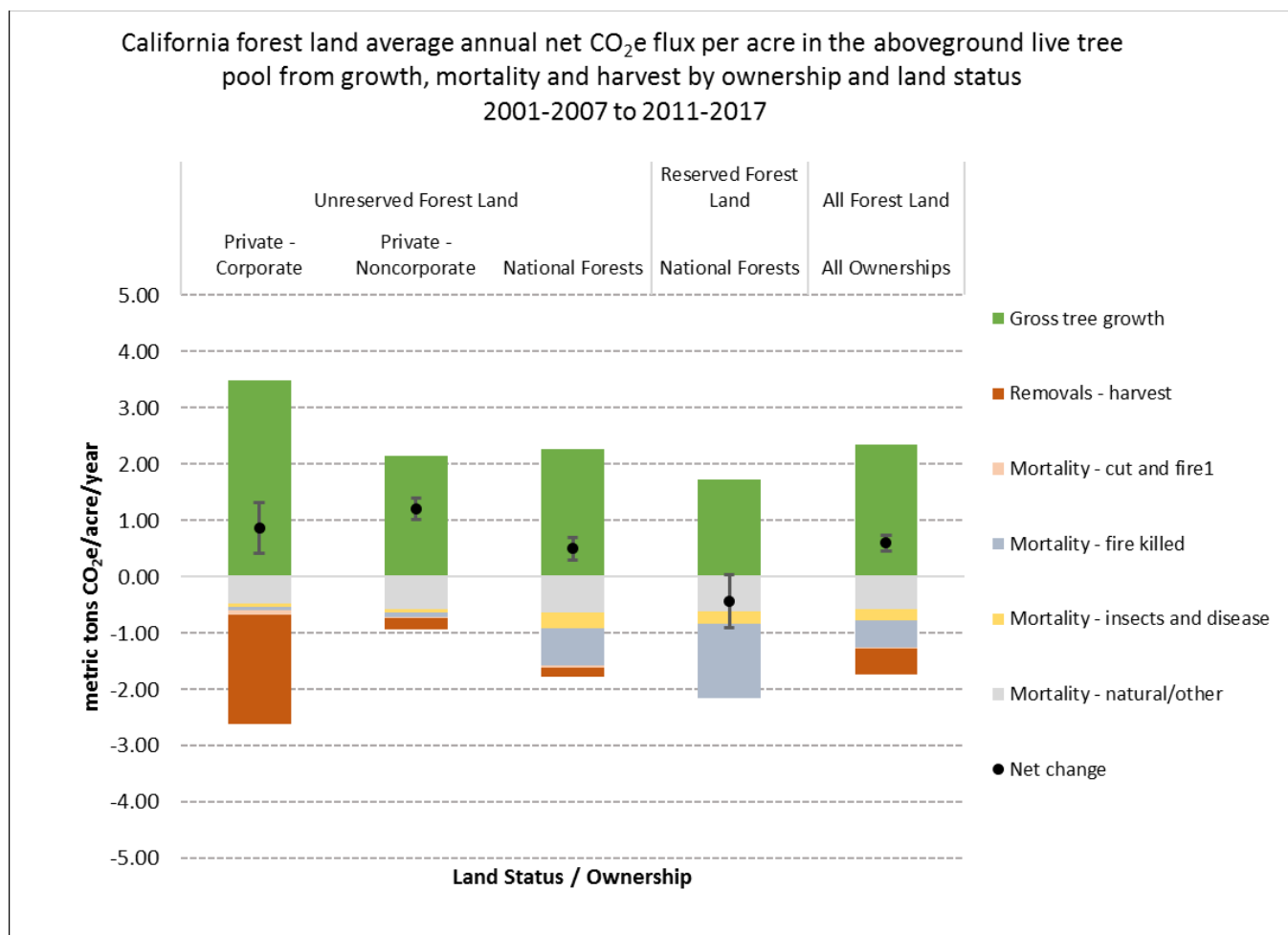


Figure 4.4a. Forest land average annual growth, mortality, harvest, and net change per acre in aboveground live tree carbon pool by ownership and land status of California's forests (MT CO₂e/acre/year), 2001-2007 to 2011-2017. The "all ownerships" category includes all other state and federal agencies managing fewer overall acres of forest land in California. The error bars represent the 95% confidence interval of net change. Figure derived from Appendix 2, Table B10.

Table 4.4a. Forest land average annual growth, mortality, harvest, and net change per acre in aboveground live tree carbon pool by ownership and land status of California's forests, 2001-2007 to 2011-2017. The all ownerships category includes all other state and federal agencies managing fewer overall acres of forest land in California.

	Unreserved Forest Land			Reserved Forest Land	All Forest Land
	Private - Corporate	Private - Noncorporate	National Forests	National Forests	All Ownerships
	<i>Metric tons CO₂e/acre/year</i>				
Gross tree growth	3.49	2.15	2.27	1.72	2.34
Removals - harvest	-1.94	-0.21	-0.16	0.00	-0.46
Mortality - fire killed	-0.06	-0.08	-0.66	-1.31	-0.48
Mortality - cut and fire¹	-0.08	-0.01	-0.03	--	-0.03
Mortality - insects and disease	-0.07	-0.07	-0.28	-0.22	-0.20
Mortality - natural/other	-0.47	-0.57	-0.64	-0.62	-0.57
Net change (± 95% Confidence Interval)	0.87 (0.45)	1.21 (0.20)	0.5 (0.20)	-0.44 (0.47)	0.6 (0.14)

¹Mortality - Cut and fire: plots where tree mortality has occurred due to both harvest and fire.

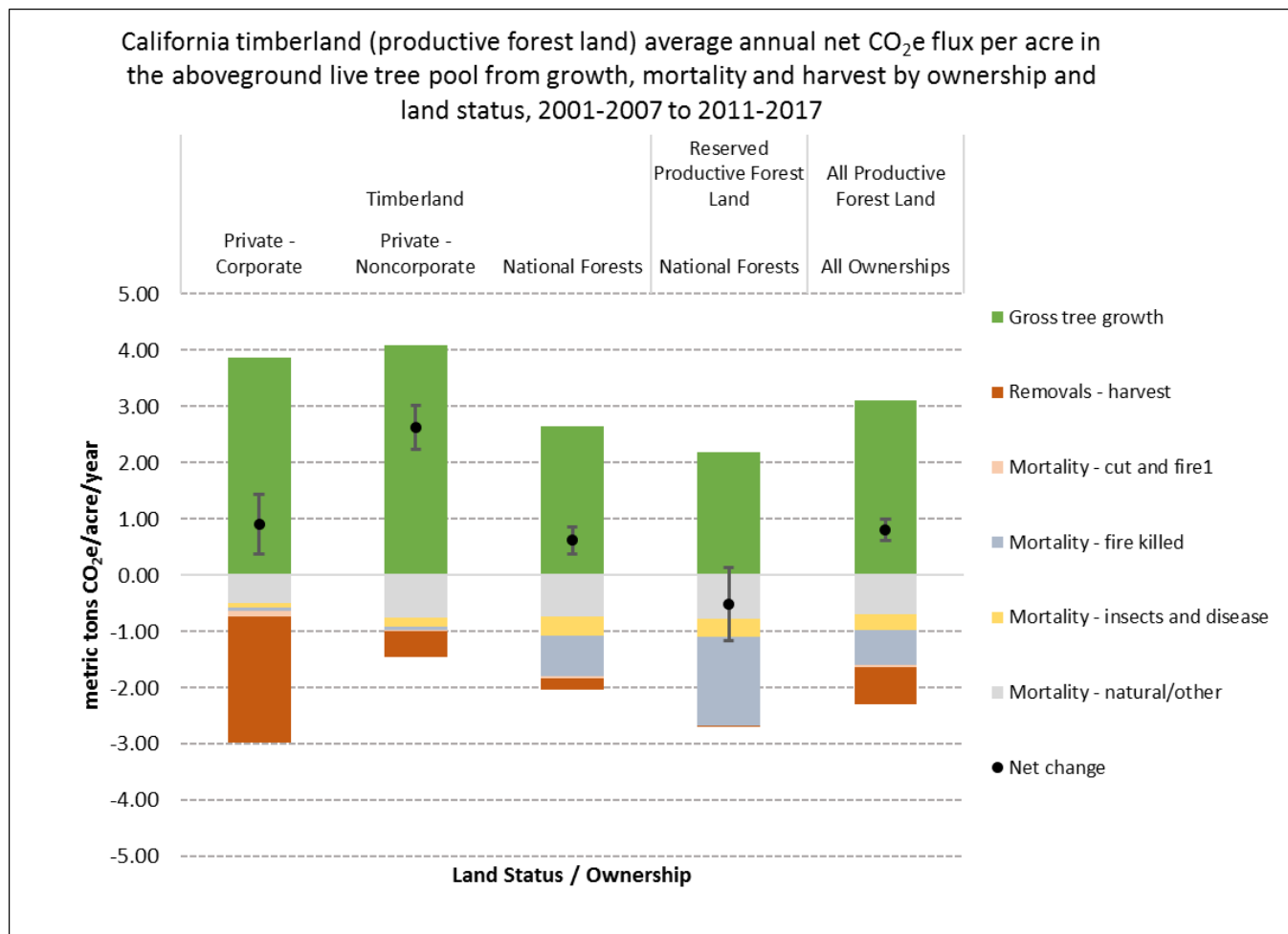


Figure 4.4b. Timberland (productive forest land) average annual net CO₂e flux per acre in aboveground live tree carbon pool from growth, mortality and harvest by ownership and land status of California’s productive forests (MT CO₂e/acre/year), 2001-2007 to 2011-2017. The “all ownerships” category includes all other state and federal agencies managing fewer overall acres of forest land in California. The error bars represent the 95% confidence interval of net change. Figure derived from Appendix 2, Table B12.

Table 4.4b. Timberland (productive forest land) average annual growth, mortality, harvest, and net change per acre in aboveground live tree carbon pool by ownership and land status of California’s productive forests, 2001-2007 to 2011-2017. The all ownerships category includes all other state and federal agencies managing fewer overall acres of forest land in California.

	Timberland			Reserved Productive Forest Land	All Productive Forest Land
	Private - Corporate	Private - Noncorporate	National Forests	National Forests	All Ownerships
	<i>Metric tons CO₂e/acre/year</i>				
Gross tree growth	3.87	4.09	2.65	2.18	3.11
Removals - harvest	-2.23	-0.47	-0.20	-0.01	-0.66
Mortality - fire killed	-0.07	-0.07	-0.73	-1.59	-0.62
Mortality - cut and fire ¹	-0.10	-0.01	-0.03	--	-0.04
Mortality - insects and disease	-0.07	-0.16	-0.33	-0.31	-0.28
Mortality - natural/other	-0.50	-0.75	-0.74	-0.78	-0.70
Net change	0.91 (0.53)	2.62 (0.39)	0.62	-0.51 (0.65)	0.81 (0.20)

¹Mortality - Cut and fire: plots where tree mortality has occurred due to both harvest and fire.

4.1.2.3 Net carbon flux aboveground live tree pool, by region

By region, the Sierra/Cascades region has the most forest land and the greatest net live tree CO₂e flux due to higher total annual growth in its forests relative to growth from other regions (Figures 4.5 and 4.6, Table 4.5). This region also has the greatest rate of mortality but after accounting for harvest, Sierra/Cascades aboveground live tree pool is still sequestering 5.5 ± 2.7 MMT CO₂e/yr, which is more than any other region. This region also saw the largest increase in the rate of tree mortality measured in 2017 when it increased to 19.6 ± 5.0 MMT CO₂e, up from $17.8 \text{ MM} \pm 2$ MMT CO₂e in 2016. In 2017, the Southern Coastal Mountains and Deserts region continues to be the only region where tree mortality is exceeding tree growth resulting in a net carbon reduction of the live tree pool of 0.8 ± 0.5 MMT CO₂e per year which was a minor change since 2016 (1.1 ± 0.7 MMT CO₂e per year). Further analysis is being conducted to determine why this region is experiencing an annual net loss of CO₂e and will be presented in a later report.

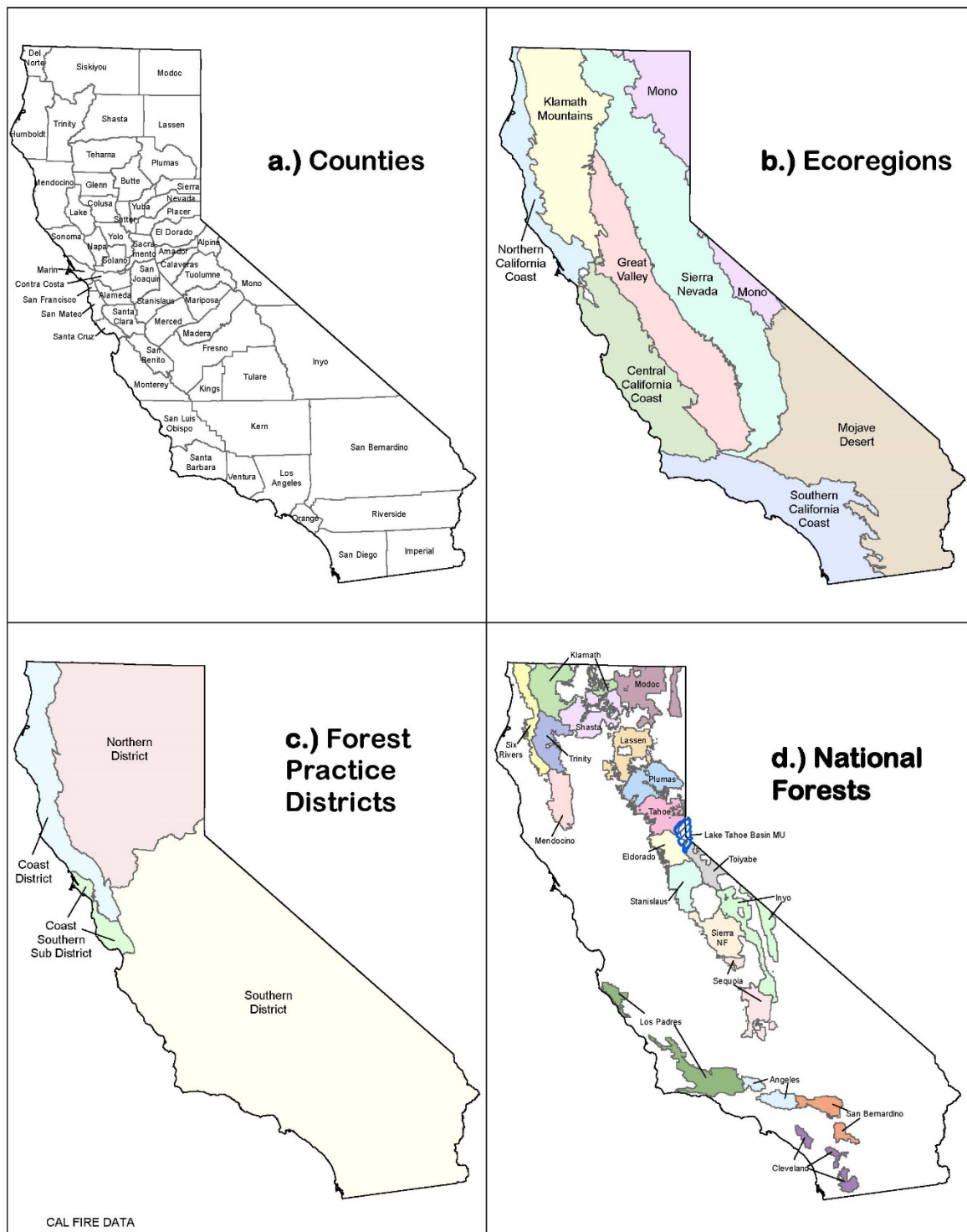


Figure 4.5. a.) California counties; b.) CAL FIRE ecoregions used in this analysis, based on ecological sections as described by Cleland et al. (2007). To comply with FIA's individual ownership confidentiality requirements the southern two ecoregions are combined into a single area for analysis; c.) California Forest Practice Districts – in this analysis the Coast Southern sub district is lumped with the greater Coast district; d.) National Forest System boundaries.

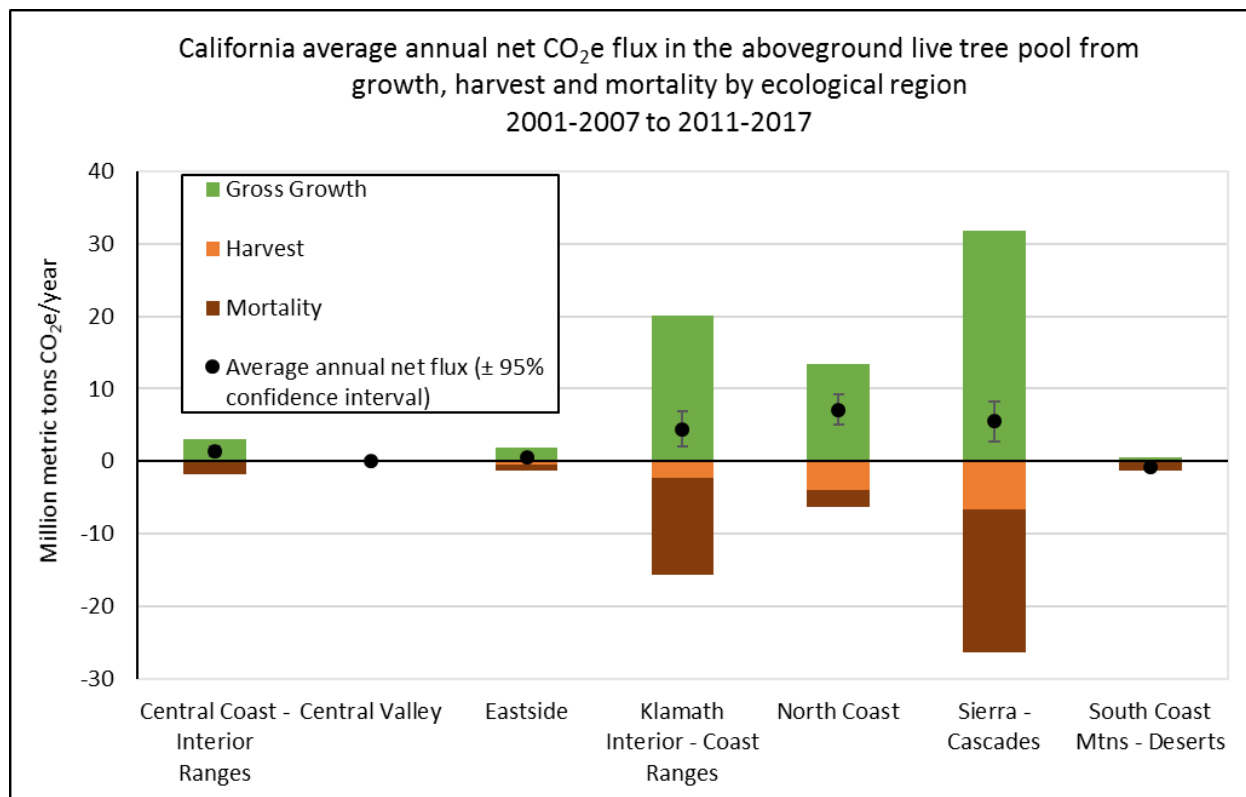


Figure 4.6. Average annual net CO₂e flux in live trees from growth, harvest and mortality by ecological region, 2001-2007 to 2011-2017 (MMT CO₂e/yr). Error bars represent the 95% confidence interval of estimated net flux. Figure derived from Table 4.5/Appendix 2, Tables B2-B8.

Table 4.5. Average annual net CO₂e flux in live trees from growth, harvest, mortality by ecological region, 2001-2007 to 2011-2017. Compare to Appendix 2, Tables B2-B8.

	Gross Growth		Harvest		Mortality		Net Flux	
	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Thousand Metric Tons CO₂ equivalent per year</i>							
Central Coast and Interior Ranges	3,110	386	-199	93	-1,541	253	1,371	341
Central Valley	83	39	-5	5	-48	25	31	24
Eastside	1,850	178	-515	137	-831	155	505	204
Klamath Interior Coast Ranges	20,081	749	-2,297	508	-13,374	1,099	4,410	1,243
North Coast	13,490	830	-3,999	840	-2,357	308	7,135	1,033
Sierra Cascades	31,853	833	-6,729	765	-19,630	1,147	5,494	1,401
South Coast Mountains and Deserts	564	83	-62	37	-1,257	269	-755	241
All California	71,031	992	-13,805	1,210	-39,037	1,562	18,189	2,165

4.1.2.4 Disturbance effects on carbon flux

The net change in C by pool varied with management, disturbance, and ownership. In stands that experienced harvesting, the net change of live trees on National Forest lands was not significantly different from zero (-0.05 ± 0.3 MMT CO₂e per year), since on average growth almost equaled harvest on those stands (Table 4.6a). In contrast, on private corporate lands, the net change in live trees on cut stands was -5.5 ± 1.8 MMT CO₂e per year, reflecting greater proportional removals of live trees in stands that were cut on that ownership compared to others. Accounting for additional losses of dead wood resulted in a net removal of -7.9 ± 2.6 MMT CO₂e per year in stands where harvesting occurred across all ownerships in California and is similar to what was estimated using the 2016 measurements (Christensen et al. 2018). Of the estimated 13.8 MMT CO₂e per year cut within the forest (Table 4.6a), approximately 10.2 MMT CO₂e per year in the form of commercial timber was removed from the forest (Appendix 3, Table 3.14) to remain stored in HWP or were utilized for bioenergy production.

The total net change in C in stands that experienced fire in California was -6.8 ± 1.8 MMT CO₂e per year. Most of that loss occurred on National Forest lands. Although live tree mortality was twice that amount on National Forests (-12.4 ± 2.5 MMT CO₂e per year) which is also an increase from the -10.8 ± 2.6 MMT CO₂e per year that was found a year earlier in 2016 reporting period, growth remains significant (reflecting many stands with partial mortality) and a large portion of the live tree C converted to standing dead tree C.

In contrast to stands experiencing fire and/or cutting, stands affected by weather disturbances or insect and disease accumulated C in the live and dead tree pools. Overall, in spite of statewide live tree losses of -18.0 ± 3.2 MMT CO₂e per year from fire and/or cutting across California, accumulations on stands experiencing other disturbances, and undisturbed stands, resulted in a net overall accumulation of nearly 30 MMT CO₂e per year which is a slight decline from the net accumulation of 31.7 ± 5.1 MMT CO₂e per year found in 2016.

By county, notable counties estimated in 2017 to have a net loss of carbon based on all pools are; San Bernardino (-0.3 ± 0.3 MMT CO₂e per year), Santa Barbara (-0.2 ± 0.2 MMT CO₂e per year), and Tuolumne (-0.2 ± 1.0 MMT CO₂e per year). Each of these counties has recently experienced enough loss of carbon on forest land that gross growth on live trees is likely not enough to overcome annual carbon loss due to disturbances such as wildfire or insect and disease induced mortality (Table 4.6b). Mendocino (4.8 ± 1.6 MMT CO₂e per year) and Humboldt (4.7 ± 2.5 MMT CO₂e per year) counties have the highest net carbon sequestration rates for all forest pools (Table 4.6b). See figure 4.5 for a map of California counties.

There are four national forests in California currently experiencing a net loss of carbon based on all pools; San Bernardino (-0.3 ± 0.3 MMT CO₂e per year), Los Padres (-0.3 ± 0.4 MMT CO₂e per year), Angeles (-0.05 ± 0.2 MMT CO₂e per year), and the Lake Tahoe Basin (-0.07 ± 0.2 MMT

CO₂e per year). Similar to what is occurring within those counties experiencing a net loss of carbon, each of these National Forests has recently experienced enough loss of carbon due to disturbances such as wildfire or insect and disease induced mortality that the annual rate of carbon accumulation from aboveground vegetation growth such as live trees is likely not enough to sequester new carbon stocks on these forests (Table 4.6c). The Shasta-Trinity National Forest has the highest net annual carbon sequestration rate for all forest pools at approximately 2.7 ± 0.9 MMT CO₂e per year (Table 4.6b). See figure 4.5 for a map of National Forests within California.

By forest practice district, all three districts are currently accumulating carbon (CO₂e) at annual rates exceeding loss due to harvest or mortality. The Southern Forest Practice District is however experiencing carbon losses due to mortality primarily on forest land managed by National Forests nearly equaling gross growth on live trees leaving this district susceptible to net carbon loss if the current rate of disturbance increases (Tables 4d, 4e, 4f). See figure 4.5 for a map of California forest practice districts.

Table 4.6a: Average annual net carbon (CO₂e) flux by pool on forest land by disturbance type and ownership, 2001-2007 to 2011-2017. See also Appendix 2, Table B9.1.

	USDA Forest Service						Other Public						Private				Total			
	Timberland		Reserved		Low productive, unreserved		Total		Other federal		State and local govt.		Corporate		Non Corporate				Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE		
<i>thousand metric tons CO₂ equivalent per year</i>																				
Cut																				
Mortality	-160	68	-6	7	--	--	-167	69	--	--	-4	3	-387	73	-219	72	-606	101	-776	122
Cut	-977	219	-3	4	--	--	-980	219	-6	6	--	--	-8,788	1,052	-869	276	-9,657	1,078	-10,643	1,100
Gross Growth	1,082	182	15	16	--	--	1,097	182	14	14	3	3	3,667	356	941	224	4,607	410	5,721	450
Net Live	-55	156	6	6	--	--	-50	156	8	8			-5,508	911	-147	237	-5,656	942	-5,698	955
Standing Dead Change	-144	72	--	--	--	--	-144	72	--	--	3	3	-103	81	66	61	-37	102	-178	125
Dead Woody Debris Change	-75	74	-2	2	--	--	-77	74	4	5	-9	8	-596	307	22	136	-573	336	-656	344
Total Net ¹	-301	250	5	5	--	--	-296	250	14	15	-6	5	-7,487	1,280	-98	317	-7,585	1,320	-7,874	1,343
Cut and Fire																				
Mortality	-298	132	--	--	--	--	-298	132	--	--	-18	20	-452	156	-33	34	-485	159	-801	208
Cut	-507	238	--	--	--	--	-507	238	--	--	-112	120	-1,008	402	--	--	-1,008	402	-1,627	483
Gross Growth	225	72	--	--	--	--	225	72	--	--	60	65	192	64	5	5	197	64	482	116
Net Live	-579	255	--	--	--	--	-579	255	--	--	-70	75	-1,269	441	-28	28	-1,296	442	-1,946	516
Standing Dead Change	44	61	--	--	--	--	44	61	--	--	-1	1	85	65	-8	8	78	65	121	89
Dead Woody Debris Change	-53	41	--	--	--	--	-53	41	--	--	13	14	95	110	-8	8	87	110	47	118
Total Net ¹	-700	312	--	--	--	--	-700	312	--	--	-70	75	-1,350	472	-49	50	-1,399	474	-2,169	573
Fire																				
Mortality	-6,483	875	-5,286	933	-640	171	-12,409	1,287	-1,252	457	-217	117	-316	104	-482	135	-798	170	-14,676	1,381
Cut	-27	20	--	--	-2	2	-29	20	--	--	--	--	-15	13	-41	25	-55	28	-85	34
Gross Growth	2,066	232	1,227	181	150	44	3,444	298	504	122	46	29	178	61	262	76	440	98	4,434	337
Net Live	-4,444	771	-4,059	852	-492	151	-8,994	1,157	-748	407	-171	91	-153	84	-260	107	-413	136	-10,326	1,237
Standing Dead Change	2,625	584	2,136	571	65	103	4,826	822	188	362	61	36	11	69	91	63	102	94	5,177	904
Dead Woody Debris Change	-339	202	33	158	-1	48	-306	262	-85	96	13	37	-114	53	134	83	19	98	-359	298
Total Net ¹	-2,654	535	-2,375	563	-542	175	-5,571	794	-791	418	-122	94	-276	145	-76	103	-353	178	-6,836	920

Table 4.6a. Average annual net carbon (CO₂e) flux by pool on forest land by disturbance type and ownership, 2001-2007 to 2011-2017 (Continued).

	USDA Forest Service								Other Public				Private				Total			
	Timberland		Reserved		Low productive,		Total		Other federal		State and local		Corporate		Non Corporate		Total		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE		
<i>thousand metric tons CO₂ equivalent per year</i>																				
Insect and Disease																				
Mortality	-2,936	337	-896	219	-156	75	-3,988	407	-1,153	471	-194	90	-389	89	-451	130	-841	157	-6,176	647
Cut	-74	35	--	--	--	--	-74	35	--	--	--	--	-47	20	-34	22	-80	30	-154	46
Gross Growth	4,325	358	843	158	79	27	5,246	392	547	125	323	127	1,185	218	878	200	2,063	293	8,180	517
Net Live	1,316	310	-54	173	-77	57	1,185	360	-605	415	129	82	749	165	393	167	1,142	234	1,850	606
Standing Dead Change	26	236	55	117	53	53	134	269	607	363	-97	107	-33	45	82	108	49	117	693	479
Dead Woody Debris Change	315	235	341	212	6	36	662	319	154	102	46	87	-92	67	-25	53	-118	85	745	356
Total Net ¹	1,982	380	365	218	-27	48	2,320	441	147	133	96	167	785	191	556	178	1,341	259	3,904	553
Other cut and weather																				
Mortality	-821	202	-330	134	-110	48	-1,262	245	-43	24	-6	5	-236	91	-501	151	-737	176	-2,048	303
Cut	-113	58	-15	12	--	--	-128	59	--	--	-3	3	-240	92	-166	67	-405	114	-536	128
Gross Growth	1,097	188	311	87	80	35	1,488	208	99	54	37	39	798	194	738	155	1,536	247	3,161	329
Net Live	163	169	-34	101	-31	24	98	199	56	51	28	35	322	149	72	170	394	226	577	307
Standing Dead Change	322	156	68	142	63	36	453	214	11	8	-8	15	40	20	276	123	316	125	772	248
Dead Woody Debris Change	-8	127	80	62	23	32	94	145	13	22	42	34	-251	146	199	110	-52	183	97	237
Total Net ¹	554	174	112	110	58	37	724	208	91	68	66	44	182	196	625	182	807	267	1,688	348
Less than 25% disturbed																				
Mortality	-5,554	429	-2,158	253	-327	64	-8,038	494	-1,003	193	-813	247	-1,952	181	-2,753	209	-4,705	266	-14,559	640
Cut	-31	15	-1	1	-1	1	-34	15			-4	3	-519	124	-204	69	-723	141	-761	142
Gross Growth	14,670	562	4,536	346	904	126	20,110	625	2,867	302	2,652	315	13,095	730	10,329	596	23,424	824	49,053	1,092
Net Live	9,084	549	2,378	318	576	116	12,038	625	1,863	275	1,835	315	10,623	657	7,372	531	17,995	761	33,733	1,052
Standing Dead Change	355	299	-388	244	-87	51	-121	388	-297	161	1	64	460	170	363	145	823	223	407	481
Dead Woody Debris Change	-274	355	28	265	-5	88	-251	452	232	243	10	92	-727	319	-322	226	-1,049	390	-1,057	651
Total Net ¹	11,384	687	2,455	440	562	142	14,401	804	2,153	392	2,256	364	13,008	878	9,104	680	22,111	1,015	40,921	1,382
Total																				
Mortality	-16,252	974	-8,677	933	-1,233	202	-26,162	1,340	-3,451	652	-1,252	277	-3,733	284	-4,438	323	-8,172	408	-39,037	1,562
Cut	-1,729	329	-19	12	-4	2	-1,751	329	-6	6	-119	120	-10,616	1,134	-1,313	294	-11,929	1,158	-13,805	1,210
Gross Growth	23,465	551	6,933	350	1,213	140	31,611	572	4,031	311	3,122	301	19,114	757	13,154	654	32,267	779	71,031	992
Net Live	5,485	1,093	-1,764	954	-23	202	3,698	1,463	574	661	1,751	350	4,764	1,277	7,402	638	12,166	1,413	18,189	2,165
Standing Dead Change	3,227	715	1,872	648	94	132	5,194	971	509	534	-40	131	459	216	871	234	1,330	318	6,992	1,159
Dead Woody Debris Change	-434	497	480	382	23	111	69	636	318	284	114	137	-1,685	484	302		-1,686	570	-1,184	910
Total Net ¹	10,264	1,061	562	774	51	234	10,877	1,321	1,614	603	2,220	433	4,861	1,705	10,061	792	14,923	1,867	29,634	2,394

¹ Total Net value includes change from roots and understory vegetation which are not enumerated in this table.

Table 4.6b: Average annual carbon (CO₂e) flux in live trees from growth, harvest, mortality by county, 2001-2007 to 2011-2017. See also Appendix 2, Table B9.2.

County	Standing Live														All Pools			
	Gross Growth		Harvest		Fire killed		Cut and fire		Insects and disease		Natural/other		Total Mortality		Net Flux		Net Flux	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>Thousand Metric Tons CO₂ equivalent per year</i>																		
Alameda	128	45	-6	5	--	--	--	--	--	--	-41	23	-41	23	81	34	94	49
Alpine	524	100	--	--	-9	9	--	--	-196	70	-164	58	-369	89	155	65	223	149
Amador	453	134	-46	28	-46	38	-107	113	-3	3	-177	73	-333	140	73	144	34	158
Butte	1,757	285	-337	161	-165	84	-56	49	-33	15	-457	103	-712	144	708	277	915	348
Calaveras	1,269	244	-294	118	-50	45	--	--	-17	13	-355	186	-421	191	553	249	737	253
Colusa	159	47	-1	1	-228	150	--	--	--	--	-79	41	-306	156	-148	139	-22	78
Contra Costa	66	29	-7	7	--	--	--	--	--	--	-22	16	-22	16	37	24	55	33
Del Norte	2,612	393	-479	285	-285	162	--	--	-19	8	-756	257	-1,061	303	1,072	413	960	511
El Dorado	2,736	329	-502	222	-330	193	-96	88	-282	82	-638	110	-1,346	251	889	368	1,449	437
Fresno	1,800	225	-34	19	-297	218	-49	37	-133	65	-1,222	261	-1,702	350	64	334	853	279
Glenn	386	96	-1	1	-145	121	--	--	-10	8	-95	41	-250	128	135	108	111	148
Humboldt	9,200	740	-2,589	682	-210	126	--	--	-49	29	-1,631	213	-1,890	249	4,721	838	4,694	1,277
Imperial			--	--	--	--	--	--	--	--	--	--	--	--			-1	1
Inyo	98	17	--	--	--	--	--	--			-26	11	-26	11	72	15	-5	52
Kern	397	84	--	--	-79	55	--	--	-22	15	-256	83	-357	100	40	105	71	168
Lake	690	139	-11	8	--	--	--	--	-6	8	-221	125	-227	125	452	158	484	176
Lassen	1,730	193	-557	153	-131	73	-16	15	-76	32	-316	73	-539	109	634	199	427	314
Los Angeles	80	29	--	--	-185	116	--	--	--	--	-24	18	-209	117	-129	101	-57	97
Madera	1,244	209	-37	24	-160	155	--	--	-481	207	-622	190	-1,264	320	-56	283	769	287
Marin	325	155	-2	3	--	--	--	--	-72	62	-21	15	-93	64	229	145	230	140
Mariposa	1,320	206	-60	45	-562	231	--	--	-257	134	-360	115	-1,180	287	81	245	548	287
Mendocino	6,516	562	-1,420	477	-260	126	-18	20	-166	62	-813	119	-1,257	185	3,839	638	4,838	793
Merced	8	6	--	--	--	--	--	--	--	--	--	--	--	--	8	6	2	13
Modoc	1,359	167	-425	116	-72	61	-123	82	-137	51	-180	53	-512	126	422	168	378	224
Mono	343	62	-10	8	-41	29	--	--	-107	62	-119	33	-266	76	67	77	176	143
Monterey	400	93	-1	1	-426	189	--	--	--	--	-172	80	-598	205	-199	164	24	142
Napa	377	107	-4	4	-81	72	--	--	--	--	-154	60	-235	93	138	105	271	112
Nevada	1,080	191	-231	114	--	--	--	--	-187	87	-186	67	-373	110	477	167	706	205
Placer	1,976	267	-379	220	-108	63	-8	8	-282	100	-508	122	-905	170	691	282	1,051	399
Plumas	3,979	363	-855	291	-1,760	522	-101	58	-494	132	-627	105	-2,982	551	141	605	502	683
Riverside	80	35	--	--	-5	6	--	--	-82	51	-12	12	-99	52	-19	33	33	55

Table 4.6b: Average annual carbon (CO₂e) flux in live trees from growth, harvest, mortality by county, 2001-2007 to 2011-2017 (Continued).

County	Standing Live																All Pools	
	Gross Growth		Harvest		Fire killed		Cut and fire		Insects and		Natural/other		Total Mortality		Net Flux		Net Flux	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>Thousand Metric Tons CO₂ equivalent per year</i>																		
Sacramento	6	5	--	--	--	--	--	--	--	--	-1	1	-1	1	5	4	6	5
San Benito	124	52	--	--	--	--	--	--	--	--	-40	23	-40	23	84	49	123	51
San Bernardino	187	52	-42	33	-195	127	-16	17	-16	12	-148	62	-376	143	-230	141	-299	161
San Diego	51	22	-15	15	-66	38	--	--	--	--	-26	17	-92	42	-56	46	-91	58
San Joaquin	29	29	-5	5	--	--	--	--	--	--	-17	17	-17	17	7	8	25	22
San Luis Obispo	169	35	--	--	--	--	--	--	--	--	-107	43	-107	43	62	32	215	54
San Mateo	538	191	-65	52	--	--	--	--	-33	44	-156	67	-189	83	285	149	561	221
Santa Barbara	83	33	--	--	-268	168	--	--	--	--	-72	29	-340	171	-257	144	-173	129
Santa Clara	322	89	--	--	-23	27	--	--	--	--	-112	44	-136	52	186	65	235	63
Santa Cruz	1,308	306	-120	77	-8	8	--	--	-88	56	-261	78	-357	97	831	244	974	349
Shasta	4,691	384	-1,743	443	-636	206	-182	90	-230	71	-1,105	195	-2,153	304	796	542	1,793	634
Sierra	1,329	196	-449	188	-89	91	--	--	-180	54	-178	50	-447	117	433	194	108	316
Siskiyou	6,980	447	-1,628	449	-3,144	792	-12	11	-510	127	-1,350	171	-5,015	813	337	899	1,792	878
Solano	11	9	--	--	--	--	--	--	--	--	--	--	--	--	11	9	10	8
Sonoma	1,246	221	-35	27	--	--	--	--	-182	81	-159	45	-341	92	870	171	1,114	257
Stanislaus	31	11	--	--	-7	6	--	--	--	--	-13	10	-20	12	11	8	9	32
Sutter	23	21	--	--	--	--	--	--	--	--	-1	1	-1	1	22	21	27	25
Tehama	1,691	221	-298	156	-381	184	--	--	-186	72	-579	144	-1,146	242	248	242	383	343
Trinity	4,769	377	-841	295	-2,414	640	-15	14	-213	85	-1,394	203	-4,036	666	-108	683	1,201	650
Tulare	1,588	209	-4	4	-687	268	--	--	-265	123	-566	117	-1,518	315	66	295	460	302
Tuolumne	2,171	260	-221	98	-985	449	-1	1	-1,158	494	-627	155	-2,771	682	-821	623	-208	523
Ventura	64	20	-4	4	-140	75	--	--	--	--	-23	15	-163	77	-103	68	-59	57
Yolo	23	9	--	--	--	--	--	--	--	--	-14	12	-14	12	9	9	20	9
Yuba	505	142	-49	42	--	--	--	--	--	--	-182	62	-182	62	274	104	381	171
All counties	71,031	992	-13,805	1,210	-14,676	1,381	-801	208	-6,176	647	-17,383	698	-39,037	1,562	18,189	2,165	29,156	2,519

Table 4.6c: Average annual carbon (CO₂e) flux in live trees from growth, harvest, mortality by National Forest, 2001-2007 to 2011-2017. See also Appendix 2, Table B9.3.

	Standing Live														All Pools			
	Gross Growth		Harvest		Fire killed		Cut and fire		Insects and disease		Natural/other		Total Mortality		Net Flux		Net Flux	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>Thousand Metric Tons CO₂ equivalent per year</i>																		
Region 5																		
Angeles	93	33	--	--	-185	116	--	--	--	--	-24	18	-209	117	-116	102	-54	98
Cleveland	9	7	--	--	-7	7	--	--	--	--	--	--	-7	7	2	9	5	15
Eldorado	1,954	273	-254	208	-366	196	-115	114	-203	63	-454	101	-1,138	255	562	349	808	411
Inyo	510	98	-10	8	-2	3	--	--	-59	37	-206	58	-267	69	234	81	219	206
Klamath	2,820	274	-109	67	-2,747	778	-10	11	-306	101	-799	141	-3,862	793	-1,152	745	228	500
Lake Tahoe Basin	282	95	-35	33	--	--	-7	7	-104	54	-73	62	-185	82	62	75	-68	108
Lassen	2,445	274	-342	136	-863	353	-41	25	-303	102	-752	161	-1,959	398	144	389	379	468
Los Padres	300	72	--	--	-778	254	--	--	--	--	-88	31	-866	256	-566	215	-333	189
Mendocino	1,761	218	-15	9	-1,145	489	--	--	-127	61	-519	146	-1,791	512	-45	475	282	405
Modoc	1,130	144	-108	56	-11	8	-42	44	-180	59	-235	68	-467	100	554	119	449	171
Plumas	3,019	311	-150	72	-1,466	452	--	--	-297	94	-486	94	-2,250	469	619	470	1,044	483
San Bernardino	193	54	-42	33	-154	121	-16	17	-91	52	-135	60	-395	145	-244	137	-336	156
Sequoia	1,247	192	-10	6	-673	259	--	--	-73	48	-636	168	-1,382	311	-144	298	273	300
Shasta-Trinity	4,960	380	-234	91	-1,776	450	-2	2	-231	85	-1,474	208	-3,483	489	1,243	476	2,704	478
Sierra	2,315	271	-46	27	-511	274	-49	37	-519	209	-1,412	283	-2,491	447	-222	402	914	338
Six Rivers	3,396	357	-62	59	-1,058	294	-15	14	-138	73	-814	159	-2,025	339	1,309	369	1,422	510
Stanislaus	2,006	253	-42	25	-504	221	--	--	-630	218	-691	230	-1,825	382	139	321	657	296
Tahoe	2,471	282	-291	143	-116	93	--	--	-572	140	-441	102	-1,130	195	1,051	244	1,319	356
Toiyabe	357	65	--	--	-49	31	--	--	-153	68	-118	45	-320	87	37	77	52	119
Total	31,266	568	-1,749	329	-12,409	1,287	-298	132	-3,987	407	-9,357	537	-26,051	1,340	3,466	1,459	9,962	1,414
Region 6																		
Rogue River / Siskiyou	345	84	-3	5	--	--	--	--	-1	2	-110	49	-111	49	232	94	342	117
Total	345	84	-3	5	--	--	--	--	-1	2	-110	49	-111	49	232	94	342	117
All National Forests	31,611	572	-1,751	329	-12,409	1,287	-298	132	-3,988	407	-9,467	539	-26,162	1,340	3,698	1,463	10,303	1,419

Table 4.6d: Average annual carbon (CO₂e) flux in live trees from growth, harvest, mortality, 2001-2007 to 2011-2017: Coastal Forest Practice District. See also Appendix 2, Table B9.4.

	USDA Forest Service								Other Public				Private				Total				
	Timberland		Reserved		Low productive, unreserved		Total		Other federal		State and local govt.		Corporate		Non Corporate						
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE			
<i>thousand metric tons CO₂ equivalent per year</i>																					
Cut																					
Mortality	--	--	--	--	--	--	--	--	--	--	--	--	--	-119	37	-113	46	-233	59	-233	59
Cut	--	--	--	--	--	--	--	--	--	--	--	--	--	-3,452	810	-524	254	-3,976	845	-3,976	845
Gross Growth	--	--	--	--	--	--	--	--	--	--	--	--	--	1,091	226	525	184	1,616	289	1,616	289
Net Live	--	--	--	--	--	--	--	--	--	--	--	--	--	-2,480	692	-113	223	-2,593	726	-2,593	726
Standing Dead Change	--	--	--	--	--	--	--	--	--	--	--	--	--	-5	63	30	33	24	72	24	72
Dead Woody Debris Change	--	--	--	--	--	--	--	--	--	--	--	--	--	-419	275	-54	110	-473	297	-473	297
Total Net ¹	--	--	--	--	--	--	--	--	--	--	--	--	--	-3,535	1,023	-168	284	-3,703	1,062	-3,703	1,062
Cut and Fire																					
Mortality	--	--	--	--	--	--	--	--	--	--	-18	20	--	--	--	--	--	--	--	-18	20
Cut	--	--	--	--	--	--	--	--	--	--	-112	120	--	--	--	--	--	--	--	-112	120
Gross Growth	--	--	--	--	--	--	--	--	--	--	60	65	--	--	--	--	--	--	--	60	65
Net Live	--	--	--	--	--	--	--	--	--	--	-70	75	--	--	--	--	--	--	--	-70	75
Standing Dead Change	--	--	--	--	--	--	--	--	--	--	-1	1	--	--	--	--	--	--	--	-1	1
Dead Woody Debris Change	--	--	--	--	--	--	--	--	--	--	13	14	9	8	--	--	9	8	22	16	16
Total Net ¹	--	--	--	--	--	--	--	--	--	--	-70	75	9	9	--	--	9	9	-60	75	75
Fire																					
Mortality	-314	139	-285	162	--	--	-599	213	--	--	-79	84	-79	59	-54	39	-133	70	-811	240	
Cut	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-1	1	-1	1	-1	1	
Gross Growth	144	57	132	60	--	--	276	83	--	--	25	27	40	34	76	43	116	55	417	103	
Net Live	-170	99	-153	119	--	--	-323	155	--	--	-54	58	-39	25	21	43	-17	50	-394	173	
Standing Dead Change	59	49	-5	58	--	--	54	76	--	--	10	11	29	29	16	10	45	30	109	83	
Dead Woody Debris Change	60	49	55	65	--	--	115	82	--	--	-25	27	-47	35	38	34	-9	49	80	99	
Total Net ¹	-113	61	-156	141	--	--	-268	154	--	--	-79	85	-58	41	86	50	28	65	-319	187	

Table 4.6d: Average annual carbon (CO₂e) flux in live trees from growth, harvest, mortality, 2001-2007 to 2011-2017: Coastal Forest Practice District (Continued).

	USDA Forest Service								Other Public				Private				Total			
	Timberland		Reserved		Low productive,		Total		Other federal		State and local		Corporate		Non Corporate		Total		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE		
<i>thousand metric tons CO₂ equivalent per year</i>																				
Insect and Disease																				
Mortality	-26	24	-18	8	--	--	-44	25	-33	44	-134	83	-113	48	-207	84	-320	97	-531	136
Cut	--	--	--	--	--	--	--	--	--	--	--	--	-16	14	-16	13	-31	19	-31	19
Gross Growth	78	46	68	34	--	--	146	57	8	11	105	68	289	136	458	173	747	220	1,006	237
Net Live	52	32	50	27	--	--	102	42	-25	33	-28	22	160	92	235	135	396	164	444	173
Standing Dead Change	-1	2	-9	7	--	--	-9	7	6	7	-78	102	3	23	32	28	35	36	-47	109
Dead Woody Debris Change	-10	7	-23	26	--	--	-33	27	17	22	68	81	1	10	21	39	22	41	74	96
Total Net ¹	43	31	33	20	--	--	77	37	-5	7	-52	132	211	126	341	148	552	194	571	238
Other cut and weather																				
Mortality	-75	46	-15	13	--	--	-90	47	--	--	--	--	-98	68	-51	31	-149	75	-240	89
Cut	--	--	--	--	--	--	--	--	--	--	--	--	-142	84	-50	29	-193	89	-193	89
Gross Growth	172	84	25	19	--	--	197	86	--	--	--	--	341	140	267	115	608	180	805	200
Net Live	97	63	10	7	--	--	107	63	--	--	--	--	100	102	166	78	266	128	373	143
Standing Dead Change	24	20	7	5	--	--	31	20	--	--	--	--	16	9	7	5	23	10	54	23
Dead Woody Debris Change	17	18	3	3	--	--	20	19	--	--	--	--	-39	52	48	48	9	71	29	73
Total Net ¹	166	85	21	16	--	--	188	87	--	--	--	--	105	144	264	121	368	188	556	207
Less than 25% disturbed																				
Mortality	-494	130	-267	91	--	--	-760	158	-282	109	-597	244	-878	127	-949	133	-1,827	179	-3,467	357
Cut	--	--	--	--	--	--	--	--	--	--	-3	3	-291	103	-72	46	-362	112	-366	113
Gross Growth	1,370	237	986	211	--	--	2,355	314	1,051	254	1,979	307	6,877	654	5,145	511	12,022	782	17,407	925
Net Live	876	197	719	175	--	--	1,594	262	769	191	1,378	302	5,708	576	4,124	445	9,833	692	13,574	816
Standing Dead Change	9	72	45	45	--	--	54	85	-83	66	32	40	248	132	115	66	363	148	366	187
Dead Woody Debris Change	-83	66	-85	68	--	--	-169	95	-84	153	-51	74	-485	272	-301	159	-786	315	-1,090	370
Total Net ¹	1,025	235	808	217	--	--	1,833	318	730	256	1,695	350	6,949	779	4,889	547	11,838	913	16,095	1,054
Total																				
Mortality	-909	195	-585	185	--	--	-1,494	268	-316	119	-828	265	-1,287	164	-1,375	169	-2,662	229	-5,299	455
Cut	--	--	--	--	--	--	--	--	--	--	-115	120	-3,900	831	-663	260	-4,563	866	-4,678	874
Gross Growth	1,764	259	1,210	221	--	--	2,975	336	1,059	255	2,169	307	8,638	701	6,471	569	15,109	835	21,312	975
Net Live	855	232	625	216	--	--	1,480	316	744	193	1,226	331	3,450	921	4,434	521	7,884	1,046	11,334	1,154
Standing Dead Change	91	89	38	74	--	--	129	116	-77	67	-37	110	292	151	198	80	490	171	505	244
Dead Woody Debris Change	-16	85	-50	104	--	--	-66	134	-68	155	5	114	-981	389	-247	206	-1,228	441	-1,358	499
Total Net ¹	1,122	258	707	261	--	--	1,829	366	725	255	1,493	415	3,681	1,308	5,411	642	9,093	1,450	13,140	1,569

¹ Total Net value includes change from roots and understory vegetation which are not enumerated in this table.

Table 4.6e: Average annual carbon (CO₂e) flux in live trees from growth, harvest, mortality, 2001-2007 to 2011-2017: Northern Forest Practice District. See also Appendix 2, Table B9.5.

	USDA Forest Service								Other Public				Private				Total		Total	
	Timberland		Reserved		Low productive, unreserved		Total		Other federal		State and local govt.		Corporate		Non Corporate					
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE		
<i>thousand metric tons CO₂ equivalent per year</i>																				
Cut																				
Mortality	-98	45	--	--	--	--	-98	45	--	--	--	--	-226	59	-21	10	-247	60	-345	75
Cut	-903	216	--	--	--	--	-903	216	-6	6	--	--	-4,649	669	-296	108	-4,944	675	-5,853	709
Gross Growth	826	162	--	--	--	--	826	162	14	14	--	--	2,194	266	277	97	2,471	281	3,311	324
Net Live	-175	142	--	--	--	--	-175	142	8	8	--	--	-2,680	583	-40	73	-2,720	588	-2,887	605
Standing Dead Change	-80	39	--	--	--	--	-80	39	--	--	--	--	-85	49	-20	17	-105	51	-185	65
Dead Woody Debris Change	-9	55	--	--	--	--	-9	55	4	5	--	--	-185	129	-5	26	-190	131	-195	143
Total Net ¹	-299	223	--	--	--	--	-299	223	14	15	--	--	-3,526	765	-90	96	-3,616	772	-3,901	804
Cut and Fire																				
Mortality	-118	54	--	--	--	--	-118	54	--	--	--	--	-362	129	-33	34	-395	133	-513	144
Cut	-395	232	--	--	--	--	-395	232	--	--	--	--	-987	402	--	--	-987	402	-1,382	464
Gross Growth	123	51	--	--	--	--	123	51	--	--	--	--	139	49	5	5	145	50	268	71
Net Live	-390	228	--	--	--	--	-390	228	--	--	--	--	-1,210	433	-28	28	-1,238	434	-1,627	490
Standing Dead Change	36	48	--	--	--	--	36	48	--	--	--	--	78	64	-8	8	70	65	106	81
Dead Woody Debris Change	-46	35	--	--	--	--	-46	35	--	--	--	--	86	110	-8	8	78	110	33	115
Total Net ¹	-479	287	--	--	--	--	-479	287	--	--	--	--	-1,299	461	-49	50	-1,347	464	-1,826	545
Fire																				
Mortality	-5,004	805	-3,359	842	-255	112	-8,618	1,170	-189	107	-81	72	-233	87	-184	83	-417	120	-9,304	1,183
Cut	-15	15	--	--	-2	2	-17	15	--	--	--	--	-15	13	-25	20	-39	24	-56	28
Gross Growth	1,647	215	823	162	84	30	2,554	271	201	76	10	9	134	52	127	57	261	77	3,027	292
Net Live	-3,371	713	-2,537	773	-174	97	-6,081	1,055	13	71	-70	63	-113	80	-81	48	-195	93	-6,334	1,064
Standing Dead Change	1,963	520	1,402	516	36	47	3,401	734	45	33	20	18	-18	63	9	47	-9	79	3,456	739
Dead Woody Debris Change	-256	181	35	126	15	30	-206	222	21	29	23	20	-68	40	62	64	-6	75	-168	237
Total Net ¹	-2,009	500	-1,405	502	-160	95	-3,574	714	84	67	-39	34	-218	140	-28	74	-246	158	-3,775	735

Table 4.6e: Average annual carbon (CO₂e) flux in live trees from growth, harvest, mortality, 2001-2007 to 2011-2017: Northern Forest Practice District (Continued).

	USDA Forest Service								Other Public				Private				Total			
	Timberland		Reserved		Low productive,		Total		Other federal		State and local		Corporate		Non Corporate		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE		
	<i>thousand metric tons CO₂ equivalent per year</i>																			
Insect and Disease																				
Mortality	-1,837	237	-274	97	-10	10	-2,121	256	-109	45	-6	8	-271	75	-100	30	-371	81	-2,607	272
Cut	-58	31	--	--	--	--	-58	31	--	--	--	--	-31	14	--	--	-31	14	-89	34
Gross Growth	2,946	298	340	109	21	15	3,306	318	124	58	14	18	843	169	256	67	1,098	181	4,542	369
Net Live	1,051	219	66	73	10	16	1,127	231	15	48	8	11	540	134	156	51	696	143	1,846	276
Standing Dead Change	-138	154	37	64	-1	8	-103	167	41	18	4	5	-8	30	-11	44	-19	53	-77	176
Dead Woody Debris Change	316	162	38	56	-30	30	325	174	-13	26			-121	61	-29	29	-150	68	162	189
Total Net ¹	1,468	292	173	83	-16	27	1,625	304	65	57	14	19	523	141	158	82	681	162	2,386	350
Other cut and weather																				
Mortality	-232	85	-27	14	--	--	-258	86		1	-1	1	-136	60	-2	1	-138	60	-397	105
Cut	-92	54	-13	12	--	--	-104	55	--	--	-3	3	-97	38	-57	50	-154	63	-261	84
Gross Growth	608	144	45	23	3	2	655	145	51	50	33	39	446	135	131	54	577	145	1,316	215
Net Live	285	103	5	28	3	2	292	107	50	50	30	35	213	108	72	58	285	123	658	174
Standing Dead Change	-41	59	-60	57			-102	82	4	4	-12	14	25	18	-9	6	17	19	-93	86
Dead Woody Debris Change	36	120	33	32	-3	4	66	124	-5	6			-198	136	4	28	-195	139	-134	187
Total Net ¹	327	142	-31	63	-1	5	295	154	63	62	21	25	83	132	81	83	164	156	543	230
Less than 25% disturbed																				
Mortality	-3,432	298	-901	167	-124	38	-4,458	342	-351	145	-104	34	-957	131	-928	121	-1,885	176	-6,798	413
Cut	-28	15	--	--	-1	1	-30	15			-1	1	-146	45	-35	21	-181	49	-212	52
Gross Growth	10,013	493	1,614	211	527	97	12,154	531	686	133	346	96	5,294	404	3,184	295	8,478	479	21,664	730
Net Live	6,553	438	712	167	402	80	7,667	469	335	153	241	84	4,191	358	2,221	252	6,412	424	14,655	652
Standing Dead Change	20	199	-283	193	-56	27	-320	279	107	56	30	16	152	104	21	110	174	151	-9	323
Dead Woody Debris Change	-137	316	131	104	-31	72	-38	340	106	51	-36	19	-138	159	35	124	-103	202	-71	399
Total Net ¹	7,939	587	677	293	357	99	8,972	654	669	155	294	97	5,210	463	2,782	361	7,991	571	17,926	884
Total																				
Mortality	-10,720	858	-4,561	838	-390	118	-15,671	1,201	-649	185	-191	80	-2,186	226	-1,268	162	-3,454	274	-19,965	1,246
Cut	-1,491	322	-13	12	-4	2	-1,507	322	-6	6	-4	3	-5,925	778	-412	124	-6,337	785	-7,853	849
Gross Growth	16,164	548	2,821	241	635	103	19,619	587	1,076	166	403	105	9,051	495	3,980	323	13,031	549	34,129	814
Net Live	3,953	934	-1,753	807	241	127	2,441	1,239	421	183	208	112	941	837	2,301	282	3,241	883	6,311	1,536
Standing Dead Change	1,759	583	1,095	557	-22	55	2,832	808	197	66	41	28	145	150	-18	129	127	198	3,198	835
Dead Woody Debris Change	-96	421	237	171	-48	83	93	462	113	65	-13	28	-624	279	58	147	-566	316	-373	564
Total Net ¹	6,947	923	-586	602	179	140	6,540	1,106	895	187	291	107	773	1,041	2,854	407	3,628	1,119	11,353	1,586

¹ Total Net value includes change from roots and understory vegetation which are not enumerated in this table.

Table 4.6f: Average annual carbon (CO2e) flux in live trees from growth, harvest, mortality, 2001-2007 to 2011-2017: Southern Forest Practice District. See also Appendix 2, Table B9.6.

	USDA Forest Service								Other Public				Private				Total			
	Timberland		Reserved		Low productive, unreserved		Total		Other federal		State and local govt.		Corporate		Non Corporate					
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE		
<i>thousand metric tons CO2 equivalent per year</i>																				
Cut																				
Mortality	-62	52	-6	7	--	--	-68	52	--	--	-4	3	-41	24	-85	55	-126	60	-198	80
Cut	-74	35	-3	4	--	--	-77	35	--	--	--	--	-687	244	-49	24	-736	245	-814	248
Gross Growth	256	85	15	16	--	--	271	86	--	--	3	3	381	119	139	87	520	147	794	173
Net Live	120	64	6	6	--	--	125	65	--	--	--	--	-348	195	5	32	-343	198	-218	208
Standing Dead Change	-65	60	--	--	--	--	-65	60	--	--	3	3	-13	14	57	48	44	50	-18	79
Dead Woody Debris Change	-66	50	-2	2	--	--	-68	50	--	--	-9	8	9	45	80	75	89	88	12	101
Total Net ¹	-3	112	5	5	--	--	2	112	--	--	-6	5	-426	225	160	104	-265	249	-269	272
Cut and Fire																				
Mortality	-180	121	--	--	--	--	-180	121	--	--	--	--	-90	88	--	--	-90	88	-270	149
Cut	-111	53	--	--	--	--	-111	53	--	--	--	--	-21	19	--	--	-21	19	-133	56
Gross Growth	102	52	--	--	--	--	102	52	--	--	--	--	53	41	--	--	53	41	154	66
Net Live	-190	115	--	--	--	--	-190	115	--	--	--	--	-59	85	--	--	-59	85	-249	143
Standing Dead Change	9	37	--	--	--	--	9	37	--	--	--	--	7	7	--	--	7	7	16	38
Dead Woody Debris Change	-7	22	--	--	--	--	-7	22	--	--	--	--	1	1	--	--	1	1	-7	22
Total Net ¹	-221	124	--	--	--	--	-221	124	--	--	--	--	-61	98	--	--	-61	98	-282	158
Fire																				
Mortality	-1,165	344	-1,642	420	-385	130	-3,191	557	-1,063	448	-58	37	-4	4	-244	99	-248	100	-4,561	723
Cut	-13	13	--	--	--	--	-13	13	--	--	--	--	--	--	-15	15	-15	15	-28	20
Gross Growth	275	79	273	75	67	33	614	113	302	99	11	6	3	3	60	25	63	25	990	152
Net Live	-903	295	-1,369	371	-318	116	-2,590	486	-761	403	-47	33	-1	1	-200	86	-201	86	-3,598	638
Standing Dead Change	603	272	739	241	30	92	1,372	375	143	360	31	29	--	--	66	41	66	41	1,613	522
Dead Woody Debris Change	-143	76	-57	66	-16	38	-216	107	-106	91	16	16	1	1	33	40	34	40	-272	148
Total Net ¹	-532	188	-814	239	-382	147	-1,728	338	-875	413	-4	22	-1	1	-134	53	-135	53	-2,742	536

Table 4.6f: Average annual carbon (CO₂e) flux in live trees from growth, harvest, mortality, 2001-2007 to 2011-2017: Southern Forest Practice District (Continued).

	USDA Forest Service								Other Public				Private				Total			
	Timberland		Reserved		Low productive,		Total		Other federal		State and local		Corporate		Non Corporate		Total		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons CO₂ equivalent per year</i>																				
Insect and Disease																				
Mortality	-1,073	247	-605	201	-146	75	-1,823	326	-1,011	467	-55	37	-5	5	-144	96	-150	96	-3,038	579
Cut	-16	16	--	--	--	--	-16	16	--	--	--	--	--	--	-18	18	-18	18	-34	24
Gross Growth	1,302	212	435	117	58	23	1,794	243	415	112	204	108	53	35	164	75	217	83	2,631	300
Net Live	213	217	-170	156	-88	55	-44	273	-595	410	149	77	48	35	2	84	50	91	-441	507
Standing Dead Change	165	178	27	98	54	53	247	210	560	362	-23	35	-29	25	61	94	32	98	817	432
Dead Woody Debris Change	9	170	325	203	35	20	370	266	151	96	-22	28	28	25	-17	22	11	33	509	286
Total Net ¹	471	244	158	201	-11	40	618	319	86	121	134	94	51	33	58	58	108	66	947	360
Other cut and weather																				
Mortality	-515	178	-289	133	-110	48	-914	227	-42	24	-5	5	-2	2	-448	148	-450	148	-1,411	272
Cut	-21	20	-2	2	--	--	-23	20	--	--	--	--	--	--	-59	33	-59	33	-82	39
Gross Growth	317	91	242	82	77	35	636	126	48	20	4	2	11	8	340	90	351	90	1,039	157
Net Live	-219	118	-49	97	-33	24	-301	154	6	11	-2	5	9	7	-166	140	-157	140	-454	209
Standing Dead Change	339	143	122	130	64	36	524	196	6	7	4	4	-2	2	278	123	277	123	812	232
Dead Woody Debris Change	-62	37	44	52	26	32	8	72	18	21	42	34	-13	14	147	94	134	95	202	126
Total Net ¹	60	56	121	90	59	37	241	111	28	27	45	36	-5	10	280	106	274	107	588	161
Less than 25% disturbed																				
Mortality	-1,628	304	-990	180	-202	52	-2,820	356	-370	80	-111	34	-117	37	-875	121	-992	126	-4,294	387
Cut	-3	3	-1	1	--	--	-4	3	--	--	--	--	-82	53	-98	48	-180	71	-183	71
Gross Growth	3,287	334	1,937	214	377	82	5,601	398	1,130	151	328	92	924	204	2,000	221	2,923	298	9,981	525
Net Live	1,656	326	947	212	175	84	2,777	395	760	145	216	87	724	188	1,027	205	1,751	276	5,504	510
Standing Dead Change	326	210	-149	144	-31	43	146	259	-321	133	-61	47	59	26	227	67	286	72	50	303
Dead Woody Debris Change	-54	149	-17	233	27	52	-44	282	211	182	97	50	-105	41	-55	103	-160	111	103	357
Total Net ¹	2,420	366	969	251	206	102	3,595	453	755	263	267	105	849	216	1,433	263	2,282	339	6,899	632
Total																				
Mortality	-4,622	553	-3,531	501	-843	165	-8,997	756	-2,486	633	-234	62	-260	99	-1,796	239	-2,056	258	-13,772	1,020
Cut	-238	70	-6	4	--	--	-244	70	--	--	--	--	-791	261	-239	67	-1,030	269	-1,274	278
Gross Growth	5,538	406	2,901	253	579	97	9,017	474	1,896	191	550	139	1,425	243	2,702	264	4,127	354	15,591	632
Net Live	677	526	-636	470	-265	157	-223	723	-590	593	316	120	373	286	668	277	1,041	399	545	1,027
Standing Dead Change	1,377	417	739	327	117	120	2,233	542	389	526	-45	66	23	40	690	179	713	183	3,289	780
Dead Woody Debris Change	-322	250	293	325	72	74	43	416	273	227	123	70	-80	70	188	165	108	179	547	512
Total Net ¹	2,196	514	440	411	-127	188	2,508	683	-5	512	436	145	406	326	1,796	312	2,202	450	5,141	975

¹Total Net value includes change from roots and understory vegetation which are not enumerated in this table.

4.1.2.5 Implications of recent tree mortality events on carbon flux

Substantial tree mortality has been observed in recent years in California associated with several years of severe drought. A concern has been raised that this mortality event has caused the forests in California to become net emitters of carbon due to dead tree decay. FIA is investigating this event in collaboration with UC Berkeley, but some preliminary results are available.

On average between 2001-2017, there were 10.1 billion live trees in California, of which 191 million died each year, for an annual mortality rate of $1.89\% \pm 0.13\%$. For National Forests, there were 4.8 billion live trees, of which 105 million died each year, for an annual mortality rate of $2.19\% \pm 0.24\%$. This number is complementary to that provided by the Forest Service's Pacific Southwest Region Aerial Detection Survey of 129 million dead trees since 2010, because those surveys were focused on unusual groups of trees detectable from the air, instead of trees of all sizes (overstory and understory) and relatively normal mortality of scattered individual trees. As shown in report table 4.3, storage of carbon in live trees and dead wood all increased over this time-period. Mortality rates in terms of carbon were highest on National Forest system lands ($1.3 \pm 0.1\%$), with 47% of the mortality occurring on plots disturbed by fire. As a result, the increase in the aboveground live tree pool was modest (3.7 ± 2.8 MMT CO_{2e} per year) and the increase in the snag plus down wood pool substantial (5.3 ± 1.2 MMT CO_{2e} per year).

There was substantial year-to-year variation in the amount of carbon in mortality trees over the assessment period (Figure 4.7), driven primarily by mortality from fire in most years, but with a significant spike from other causes in 2015 and 2016. Although the 2016 wildfire season burned fewer acres than 2015, recorded mortality was significantly greater at 218 ± 94 MMT CO_{2e} per year. The most prominent mortality causes in terms of C in 2016 were disease (37%), drought (31%), insect (14%), and fire (10%). Twenty-four percent of the mortality C in 2016 was based on trees over 50 inches dbh, with the majority being sugar pine (*Pinus lambertiana*). From 2001-2010, the highest C mortality rates (3-7% per year) were in the South Coast and Mountains (Deserts not included), but for the 2014-2016 period, the highest rate, 3.4% per year, was in the Sierra. Estimated mortality of sugar pine in this period in the Sierra was an astounding 14 ± 7.8 % per year; 51% of the sugar pine live C in 2001-7 had died by 2011-17. The next two high rates of mortality for the 2014-2016 period in the Sierra were Ponderosa pine (*Pinus ponderosa*) at 5.9 ± 3.5 %/year and interior live oak (*Quercus wislizeni*) at 5.9 ± 3.3 %/year. While drought-related mortality is known to have continued into 2017, the 2017 data available are a partial sample and we will not have reliable estimates until the 2018 field season is concluded.

The immediate effect of a pulse of tree mortality is to reduce storage in the live tree pool and convert live tree carbon to dead tree carbon. The increasing dead wood pool in recent years (Table 4.3) indicates that wood was being added at a faster rate than it was decaying, and that would be increased further during a mortality pulse. Live tree growth is the engine that drives forest carbon sequestration. For the balance to result in a net emission, mortality would have to exceed growth for an extended period such that the live tree pool declines, the total dead tree pool stabilizes, and decay of the larger dead wood pool results in greater emissions.

Given a total dead pool of 140 ± 5.5 MMT C on National Forests (not including litter or duff), annual decay could range from a low of 5.1 MMT CO₂e per year (1%) to 25.6 MMT CO₂e per year (5%). (Decay rates are highly variable—Kahl et al. 2017 found the former rate for conifers and the latter for hardwoods.) In order for forests on National Forests to be net emitters, the sum of additions to dead wood and live wood (currently 10.9 ± 2.6 MMT CO₂e per year) would need to fall below the actual decomposition rate.

The available data on mean carbon storage in recent years in California, and on National Forests in particular, indicates that the forests are still a net sink of carbon from the atmosphere. It is possible that during specific years of severe drought, growth rates are so reduced and mortality so high that decay exceeds new storage. A physiological model based on annual climate would likely be required to assess that question (e.g., Turner et al. 2016).

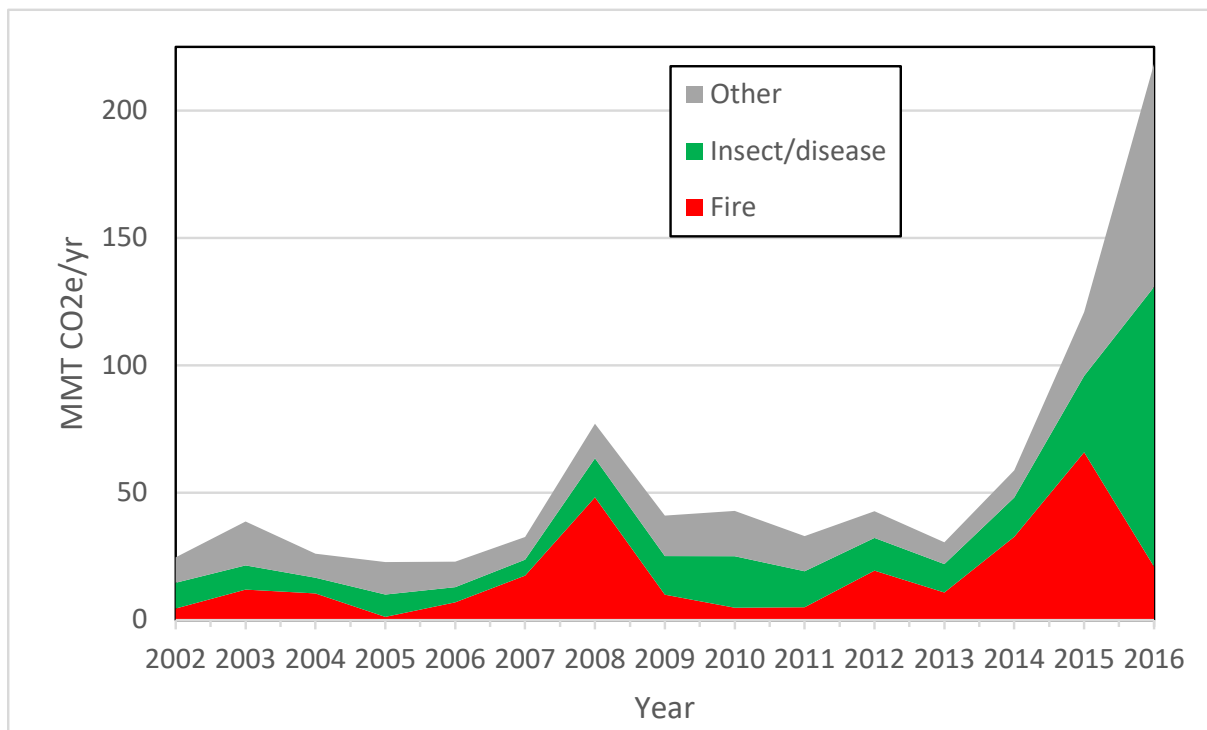


Figure 4.7. Estimated amount of carbon in mortality trees in California by year and cause of death, 2002-2016.

4.1.2.6 Net flux from non-CO2 GHG emissions from wildfire

Emissions of methane and nitrous oxides due to fires on forest land are estimated to add 478 ± 82 thousand metric tons of CO₂e per year to California's statewide emissions (Table 4.7). The greatest source of these emissions was from fire on National Forest lands. A substantial amount was also estimated for the "cut and fire" category on private corporate lands. There are a few uncertainties with this estimate that may result in compensating effects. Our approach underestimates non-CO₂ gas emissions because we currently do not have an estimate of combustion of forest floor; and because, in the use of net change in C, some of the C that was combusted would be masked by subsequent forest growth. Alternatively, our approach may overestimate non-CO₂ gas emissions because some of the cut and fire category were cut before they were burned, so the amount combusted was less than the net change; and because some of the change in C of dead wood came from decay after the fire, and not entirely from combustion. We will examine options to refine this estimate. Nevertheless, we believe the calculation based on field measurements will be more accurate than a default emission factor applied to an estimate of area burned as in the default approach for IPCC 2006.

Table 4.7 - Annual Net Emissions of Non-CO2 Greenhouse Gases from Fire, 2001-2007 to 2011-2017: All California. CO2 values are from table 4.6 and were used to calculate the other gases. See also Appendix 2, Table F1.

	Public						Private				Total		Total		
	National Forest		Other Federal		State and local govt.		Corporate		Non Corporate		Total	SE	Total	SE	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	
<i>thousand metric tons CO2 equivalent per year</i>															
Cut and Fire															
CO2	-700	312	--	--	-70	75	-1,350	472	-49	50	-1,399	474	-2,169	573	
CH4	-22	10	--	--	-2	2	-43	15	-2	2	-45	15	-69	18	
N2O	-15	7	--	--	-1	2	-29	10	-1	1	-30	10	-46	12	
Fire															
CO2	-5,571	794	-791	418	-122	94	-276	145	-76	103	-353	178	-6,836	920	
CH4	-178	25	-25	13	-4	3	-9	5	-2	3	-11	6	-219	29	
N2O	-118	17	-17	9	-3	2	-6	3	-2	2	-7	4	-144	19	
Total Fire															
CO2	-6,271	852	-791	418	-192	119	-1,627	492	-125	136	-1,752	511	-9,005	1,084	
CH4	-201	27	-25	13	-6	4	-52	16	-4	4	-56	16	-288	35	
N2O	-132	18	-17	9	-4	3	-34	10	-3	3	-37	11	-190	23	

4.1.3 Net carbon flux associated with forest land conversions (LF)

4.1.3.1 Changes in forest land area from forest land conversions

Approximately 28 ± 8 thousand acres of forest land were converted to non-forest (i.e., deforested) every year in California between 2001-2007 and 2011-2017 (Table 4.8). Most of the deforestation (54%) was to developed uses, with about 2/3 being urban and 1/3 being rights-of-way (i.e., roads, including logging roads). The conversion to cropland consisted of pasture and orchards. Approximately 11 ± 4 thousand acres of non-forest land were converted to forest every year (i.e., afforestation). Most of the afforestation (59%) was from grassland (primarily rangeland) and most of the remainder was from developed uses (primarily rights of way—e.g., abandoned logging roads). Overall there was a net loss of forest land at the rate of 16.4 ± 9.0 thousand acres per year, primarily to developed land-uses. The confidence interval is high compared to the estimate because it is a relatively rare event at the scale of the inventory. The majority of the forest land loss occurred on non-productive “other forest” (62%), followed by timberland (31%), with little change occurring on reserved lands (4%).

4.1.3.2 Net carbon flux from forest land conversions

Deforestation resulted in a loss of 3.2 ± 0.9 MMT CO₂e from forest carbon pools per year (Table 4.9). Note that it is the inclusion of the forest litter pool that accounted for most of the change compared to previous estimates of CO₂e loss due to deforestation. Deforestation was partially compensated for by the addition of 1.5 ± 0.5 MMT CO₂e per year due to afforestation, resulting in a net loss of 1.7 ± 1.1 MMT CO₂e per year. Most of the gains and losses were due to the live tree pool as has found in earlier estimates of carbon flux due to forest land conversions.

Uncertainties in land classification are low, because FIA plots are visited on the ground in the case where there is any potential for forest land to be present on the plot (based on past history, the vegetation of the local area, and examination of aerial photography). Non-forest plots which are not field visited are classified from aerial photography of at least 1 m resolution. Where definitions have changed over time, field crew measurements (i.e., the old way and the new way) and detailed written descriptions are used to correctly assess change between forested lands and other land-uses.

Table 4.8. Annual change in forest land area to/from other IPCC land-use classes in California, 2001-2007 to 2011-2017. See also Appendix 2, Table E1.

	Timberland ¹		Other forest ²		Reserved		All forest land	
	Total	SE	Total	SE	Total	SE	Total	SE
<i>Acres per year</i>								
Forest to nonforest:								
Cropland	1,032	850	3,504	1,541	--	--	4,536	1,759
Developed	8,710	2,167	5,535	1,522	517	310	14,762	2,664
Grassland	1,019	978	5,510	2,141	718	718	7,247	2,461
Other					8	8	8	8
Water	775	559	107	80	129	124	1,011	578
Total	11,537	2,591	14,657	3,052	1,371	793	27,564	4,078
Nonforest to forest:								
Cropland	172	113	--	--	--	--	172	113
Developed	2,965	682	914	339	46	35	3,925	762
Grassland	3,255	1,258	3,201	1,405	201	124	6,657	1,888
Other	--	--	142	147	--	--	142	147
Water	18	19	275	235	--	--	293	236
Total	6,411	1,436	4,532	1,471	247	129	11,190	2,056
Net change to forest land:								
Cropland	-859	857	-3,504	1,541	--	--	-4,364	1,763
Developed	-5,745	2,272	-4,621	1,546	-471	312	-10,837	2,767
Grassland	2,236	1,600	-2,309	2,561	-517	729	-590	3,106
Other	--	--	142	147	-8	8	134	147
Water	-757	559	168	248	-129	124	-717	624
Total	-5,126	2,975	-10,124	3,384	-1,125	803	-16,375	4,577

Note: Totals may be off because of rounding

¹ Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

² Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table 4.9. Annual change in carbon pools due to change in land-use between forest and non-forest in California, 2001-2007 to 2011-2017. See also Appendix 2, Table E2.

Carbon pool	Forest to nonforest		Nonforest to forest		Net change	
	Total	SE	Total	SE	Total	SE
	<i>Thousand metric tons CO2 equivalent per year</i>					
Live tree	-2,018	343	1,044	210	-974	403
Standing dead	-198	120	33	9	-165	120
Down wood	-232	54	56	22	-175	59
Understory veg	-281	43	123	22	-157	49
Litter	-467	70	270	44	-197	83
Soil*	0		0		0	
All pools	-3,196	473	1,528	264	-1,668	543

* No changes in landuse involved cultivated land so soil organic carbon change was assumed to be zero (Ogle et al. 2003)

4.2 Carbon stocks for forest land remaining forest land (FF)

4.2.1 FF land area

As of the 2017 reporting period, there are approximately 32 million acres of forest land across all ownerships in California. Public agencies and state/local governments manage the majority of these forests, (approximately 61%, 19.5 million acres) (Table 4.10). Private ownerships are split between corporate forest lands owning approximately 5.3 million acres, and private individuals owning approximately 7.0 million acres. By region, nearly half of the forested acres are found within the Sierra and Cascades Mountain ranges. The region with the next greatest share of forested area is the Klamath Interior and Coast Ranges region having approximately a quarter of all forested acres in the state. The North Coast region is the only region that has a disproportionately larger share of privately owned forests compared to those managed by public agencies. This region contains about 18% of all privately-owned forests, but only about 2% of all the public forest land. Western oak woodlands cover the greatest area of all forest types at approximately 8.8 ± 0.38 million acres, followed by California mixed conifer at approximately 7.9 ± 0.34 million acres (Table 4.11).

Table 4.10. Area of forest land remaining forest land by ownership group and region in California, 2008-2017. Table derived from Appendix 2, Tables A10-A16.

Region: Land Status	Public		Private		All Ownerships	
	Total	SE	Total	SE	Total	SE
<i>Thousand acres</i>						
Central Coast and Interior Ranges:						
Unreserved forest land	250	37	1,073	74	1,323	82
Reserved forest land	487	49	--	--	487	49
Total forest land	736	61	1,073	74	1,809	95
Central Valley:						
Unreserved forest land	4	3	78	20	83	20
Reserved forest land	6	5	--	--	6	5
Total forest land	10	6	78	20	88	21
Eastside:						
Unreserved forest land	2,004	101	526	56	2,531	116
Reserved forest land	296	43	--	--	296	43
Total forest land	2,300	109	526	56	2,827	123
Klamath Interior Coast Ranges:						
Unreserved forest land	3,227	119	2,892	121	6,119	170
Reserved forest land	1,758	86	--	--	1,758	86
Total forest land	4,985	142	2,892	121	7,877	186
North Coast:						
Unreserved forest land	149	29	2,220	101	2,369	105
Reserved forest land	330	42	--	--	330	42
Total forest land	479	49	2,220	101	2,699	111
Sierra Cascades:						
Unreserved forest land	6,714	150	5,212	146	11,926	206
Reserved forest land	3,220	115	--	--	3,220	115
Total forest land	9,934	177	5,212	146	15,146	225
South Coast Mountains and Deserts:						
Unreserved forest land	549	54	275	39	824	67
Reserved forest land	475	53	--	--	475	53
Total forest land	1,024	76	275	39	1,299	85
All California:						
Unreserved forest land	12,898	149	12,277	153	25,175	202
Reserved forest land	6,571	135	--	--	6,571	135
Total forest land	19,469	160	12,277	153	31,746	200

Table 4.11. Area of forest land remaining forest land by forest type, ownership group and region in California, 2008-2017. See also Appendix 2, Table A17.

Forest type group	USDA Forest Service				Other federal				State and local government				Private corporate				Private non-corporate				All owners	
	Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand acres</i>																						
Softwoods:																						
California mixed conifer	4,138	121	1,017	69	67	20	420	46	30	13	50	17	1,721	91	--	--	462	51	3	3	7,908	173
Douglas-fir	168	30	167	31	19	11	51	18	24	12	30	14	329	42	--	--	332	43	--	--	1,120	78
Fir / spruce / mountain hemlock	1,118	76	432	49	6	6	201	34	11	8	11	8	190	33	--	--	67	21	--	--	2,035	104
Western Hemlock / Sitka spruce	--	--	--	--	--	--	1	1	1	1	1	1	28	14	--	--	1	1	--	--	32	14
Lodgepole pine	222	35	485	50	--	--	234	36	9	8	6	6	31	14	--	--	29	13	--	--	1,016	74
Pinyon / juniper	11	8	723	61	--	--	558	56	--	--	81	22	--	--	41	16	--	--	120	26	1,534	91
Ponderosa pine	1,246	76	235	36	36	15	44	16	4	4	18	10	511	53	4	3	283	39	2	2	2,382	108
Redwood	3	3	16	10	--	--	31	14	38	15	65	19	403	48	--	--	217	35	--	--	774	65
Western juniper	127	27	629	58	22	11	332	43	--	--	17	11	11	6	72	21	21	11	269	40	1,499	91
Western white pine	30	13	122	27	--	--	13	9	--	--	--	--	--	--	--	--	--	--	--	--	165	31
Other western softwoods	31	13	305	41	3	2	150	29	--	--	14	9	16	10	--	--	16	10	6	6	540	55
Total	7,093	129	4,132	117	152	30	2,034	90	117	25	292	39	3,240	114	117	27	1,427	85	400	48	19,005	219
Hardwoods:																						
Alder / maple	27	12	15	8	12	7	28	13	--	--	7	6	81	21	1	1	34	14	18	8	222	34
Aspen / birch	8	6	54	17	--	--	9	7	--	--	1	1	4	4	--	--	--	--	--	--	76	20
Elm / ash / cottonwood	--	--	5	5	--	--	1	1	--	--	8	6	--	--	3	2	--	--	17	8	34	11
Tanoak / laurel	185	32	235	37	13	8	57	19	10	8	150	30	504	53	21	10	547	56	87	22	1,809	98
Western oak	915	70	1,570	90	103	25	510	52	19	10	440	44	359	46	712	62	602	58	3,570	122	8,799	192
Woodland hardwoods	20	11	67	19	--	--	56	17	--	--	9	7	--	--	--	--	--	--	29	12	181	31
Exotic hardwoods	--	--	--	--	2	2	--	--	--	--	--	--	--	--	--	--	--	--	3	2	5	3
Other hardwoods	129	26	84	22	11	8	16	10	4	4	36	15	57	17	3	3	91	23	98	23	528	54
Total	1,284	81	2,029	100	142	28	677	59	33	13	651	54	1,004	74	739	63	1,274	82	3,820	124	11,654	212
Nonstocked	448	49	273	40	14	9	91	24	--	--	7	5	199	32	--	--	34	12	22	10	1,088	77
All forest types	8,825	121	6,433	131	307	42	2,802	96	150	28	950	61	4,444	122	856	68	2,735	112	4,242	131	31,746	200

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

4.2.2 FF carbon stock, all California, county, National Forest, and Forest Practice Districts

FIA plot measurements currently indicate that in the 2017 reporting cycle there are 3.3 ± 0.1 billion metric tons of carbon stocks stored on forest land including forest floor and forest soils across all ownerships in California (Table 4.12a, Figures 4.9 and 4.10). This is an increase of 1.2 billion metric tons of carbon stocks primarily due to the improvement of the forest soils estimates that added 1.1 billion tons of carbon stocks. Estimates of carbon on the forest floor was added in 2017 and contributed 0.1 billion tons of carbon stocks. Other notable changes with the addition of the 2017 measurements include overall live tree carbon stocks declining by 2.2 MMT C while dead tree stocks increased by 5.9 MMT C. The exchange of carbon between these pools reflects similar changes in 2017 as measured by annual net carbon flux (CO_2e). Please note that standing dead tree stocks are based on dead trees greater than 5.0 inches dbh instead of 1.0 inches dbh as in the previous reports. This change was made due to incomplete data for trees less than 5.0 inches for earlier measurement years. **Potential improvement:** During the next measurement cycle it is likely that we can include estimates for dead trees to 1.0 inches again.

Approximately two-thirds of these carbon stocks are found on public forest land with the National Forests containing over half of all carbon stocks (Figure 4.8, 4.9, 4.10). Just under half of all stored carbon is found belowground in forest soils, and about a third is found aboveground in the live tree pool (Figure 4.9). The remaining stored carbon is divided between dead trees, down wood, forest floor and understory vegetation pools. Approximately 59% of the forest carbon stores are found on unreserved timberland (Figure 4.10). Table 4.12a below provides detailed estimates of forest carbon stocks for each pool by ownership and land status updated for the ten-year measurement period between 2008 and 2017.

The counties with the highest carbon stocks are Siskiyou county with 349.5 ± 30.0 MMT C, Humboldt county with 248.7 ± 31.5 MMT C and Trinity county with 233.7 ± 26.7 MMT C (Table 4.12b). Siskiyou county is also the county with the most forest land at approximately 3.1 ± 0.3 million acres. Trinity county is the county with the third highest amount of forest land at approximately 1.8 ± 0.2 million acres and Humboldt county has the fifth highest amount of forest land at approximately 1.7 ± 0.2 million acres.

The Shasta-Trinity National Forest has the highest carbon stocks at 241.0 ± 26.2 MMT C and is also the largest National Forest at approximately 1.9 ± 0.2 million acres. (Table 4.12c).

Of the three Forest Practice Districts, the Northern Forest Practice District has the highest carbon stocks at $1,585.5 \pm 48.2$ MMT C (Table 4.12e). In the Northern and Southern Forest Practice Districts, carbon on public lands make up the majority of the forest carbon, while in the

Coastal Forest Practice District carbon on private lands make up the majority of the forest carbon (Table 4.12d, e, f).

Table 4.12a. Forest land carbon stock by ownership and land status, 2008-2017: ALL CALIFORNIA. Table derived from Appendix 2, C tables.

	Live trees				Dead trees				Understory vegetation				Down wood		Forest Floor		Soil		Total C		Acres	
	Aboveground		Belowground		Aboveground		Belowground		Aboveground		Belowground		Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons C¹</i>																					
National Forests																						
Timberland	383.95	8.13	72.93	1.56	40.53	1.92	9.40	0.43	7.75	0.16	0.86	0.02	39.41	1.17	49.99	0.77	468.81	6.60	1,073.64	16.50	8,825.18	120.68
Other forest	25.37	2.05	5.02	0.41	2.28	0.30	0.56	0.07	4.21	0.19	0.47	0.02	4.02	0.35	5.86	0.28	111.52	4.72	159.32	7.31	2,382.80	98.48
Reserved - productive	129.91	6.14	24.37	1.14	19.33	1.42	4.42	0.31	2.39	0.10	0.27	0.01	13.27	0.87	14.74	0.52	149.67	4.84	358.37	12.40	2,787.26	90.28
Reserved - other	16.86	1.66	3.39	0.33	2.42	0.34	0.58	0.08	1.73	0.12	0.19	0.01	2.87	0.31	4.12	0.28	62.39	3.82	94.55	6.04	1,263.28	76.15
Total	556.09	9.07	105.71	1.72	64.56	2.35	14.97	0.53	16.09	0.24	1.79	0.03	59.57	1.44	74.71	0.75	792.39	6.54	1,685.88	16.16	15,258.52	122.36
Other Federal																						
Timberland	10.85	2.15	2.22	0.45	0.37	0.10	0.10	0.03	0.37	0.05	0.04	0.01	0.79	0.15	1.28	0.20	14.93	2.09	30.97	4.73	307.48	42.29
Other forest	7.25	0.91	1.44	0.19	0.37	0.07	0.10	0.02	1.99	0.15	0.22	0.02	1.12	0.15	2.10	0.16	48.27	3.41	62.87	4.54	1,037.39	72.29
Reserved - productive	62.58	5.80	11.44	1.02	9.70	1.29	2.07	0.25	0.83	0.06	0.09	0.01	6.93	0.70	6.95	0.44	55.71	3.27	156.31	10.80	1,067.34	62.68
Reserved - other	8.42	1.28	1.68	0.25	0.67	0.14	0.17	0.04	0.99	0.09	0.11	0.01	1.76	0.32	2.03	0.22	31.00	2.77	46.83	4.50	697.45	61.25
Total	89.09	5.97	16.79	1.07	11.11	1.29	2.44	0.25	4.18	0.17	0.46	0.02	10.61	0.76	12.36	0.48	149.92	4.81	296.97	11.59	3,109.67	99.32
State and Local Government																						
Timberland	10.86	2.36	2.06	0.44	0.45	0.17	0.11	0.03	0.14	0.03	0.02	0.00	0.76	0.26	0.78	0.16	7.80	1.47	22.97	4.60	150.44	28.10
Other forest	2.84	0.67	0.57	0.14	0.08	0.03	0.02	0.01	0.31	0.05	0.03	0.01	0.30	0.10	0.41	0.07	8.34	1.41	12.91	2.27	194.70	32.50
Reserved - productive	34.10	6.74	6.44	1.23	1.17	0.23	0.32	0.06	0.37	0.05	0.04	0.01	2.29	0.40	1.54	0.17	16.17	1.77	62.44	9.53	326.64	35.40
Reserved - other	7.72	1.35	1.45	0.26	0.33	0.09	0.09	0.02	0.66	0.07	0.07	0.01	0.71	0.14	0.98	0.11	18.92	1.99	30.93	3.54	428.92	44.84
Total	55.52	6.53	10.52	1.19	2.03	0.28	0.54	0.07	1.48	0.09	0.16	0.01	4.06	0.45	3.71	0.22	51.23	2.82	129.25	9.52	1,100.70	61.38
Total Public																						
Timberland	405.67	8.66	77.22	1.67	41.35	1.92	9.62	0.44	8.26	0.17	0.92	0.02	40.96	1.20	52.05	0.80	491.54	6.99	1,127.58	17.54	9,283.10	129.19
Other forest	35.46	2.34	7.03	0.47	2.73	0.31	0.69	0.07	6.51	0.25	0.72	0.03	5.44	0.39	8.37	0.33	168.14	5.98	235.09	8.88	3,614.90	126.02
Reserved - productive	226.59	10.79	42.26	1.96	30.20	1.93	6.81	0.41	3.59	0.13	0.40	0.01	22.49	1.19	23.23	0.70	221.55	6.08	577.12	18.97	4,181.24	115.15
Reserved - other	33.00	2.48	6.51	0.49	3.42	0.38	0.84	0.09	3.39	0.16	0.38	0.02	5.34	0.47	7.13	0.37	112.31	5.11	172.31	8.31	2,389.65	107.34
Total	700.71	12.32	133.02	2.28	77.70	2.69	17.95	0.59	21.75	0.31	2.42	0.03	74.24	1.67	90.78	0.86	993.54	8.07	2,112.10	20.78	19,468.89	159.77
Private Corporate																						
Timberland	162.64	6.19	31.24	1.19	8.68	0.70	2.28	0.19	4.83	0.17	0.54	0.02	23.75	1.10	22.70	0.69	226.15	6.33	482.80	14.25	4,443.95	121.98
Other forest	13.55	1.44	2.56	0.27	0.45	0.08	0.11	0.02	1.36	0.11	0.15	0.01	1.12	0.15	1.84	0.16	38.82	3.12	59.95	4.94	856.12	68.11
Total	176.19	6.30	33.80	1.21	9.14	0.71	2.39	0.19	6.18	0.20	0.69	0.02	24.86	1.11	24.53	0.70	264.96	6.87	542.75	14.79	5,300.07	135.80
Private Noncorporate																						
Timberland	131.76	6.83	25.89	1.33	4.87	0.44	1.20	0.10	3.05	0.14	0.34	0.02	11.08	0.74	12.41	0.55	134.33	5.55	324.93	14.26	2,734.91	111.65
Other forest	55.19	2.38	10.71	0.46	2.43	0.29	0.60	0.07	6.73	0.22	0.75	0.02	5.07	0.33	8.54	0.29	185.79	5.81	275.81	8.82	4,241.95	130.69
Total	186.95	6.99	36.60	1.36	7.30	0.52	1.81	0.12	9.78	0.24	1.09	0.03	16.15	0.80	20.95	0.59	320.12	7.51	600.74	15.78	6,976.86	160.61
Total Private																						
Timberland	294.40	7.47	57.13	1.45	13.55	0.80	3.49	0.20	7.87	0.18	0.87	0.02	34.82	1.19	35.10	0.67	360.48	6.13	807.73	14.78	7,178.86	118.79
Other forest	68.74	2.68	13.27	0.52	2.88	0.30	0.71	0.07	8.09	0.23	0.90	0.03	6.18	0.36	10.38	0.31	224.61	6.24	335.76	9.58	5,098.07	139.18
Total	363.14	7.40	70.40	1.43	16.43	0.84	4.20	0.21	15.96	0.26	1.77	0.03	41.01	1.21	45.48	0.66	585.09	7.32	1,143.49	15.01	12,276.93	152.74
All Ownerships																						
Timberland	700.07	11.24	134.35	2.17	54.91	2.08	13.11	0.48	16.13	0.24	1.79	0.03	75.78	1.68	87.15	1.01	852.02	8.94	1,935.31	22.20	16,461.96	168.22
Other forest	104.20	3.55	20.30	0.70	5.61	0.43	1.40	0.10	14.60	0.34	1.62	0.04	11.63	0.53	18.75	0.45	392.75	8.54	570.85	12.92	8,712.96	185.25
Reserved - productive	226.59	10.79	42.26	1.96	30.20	1.93	6.81	0.41	3.59	0.13	0.40	0.01	22.49	1.19	23.23	0.70	221.55	6.08	577.12	18.97	4,181.24	115.15
Reserved - other	33.00	2.48	6.51	0.49	3.42	0.38	0.84	0.09	3.39	0.16	0.38	0.02	5.34	0.47	7.13	0.37	112.31	5.11	172.31	8.31	2,389.65	107.34
Total	1,063.85	13.95	203.42	2.61	94.13	2.81	22.15	0.62	37.71	0.38	4.19	0.04	115.24	2.03	136.26	1.01	1,578.63	9.91	3,255.59	23.73	31,745.82	200.45

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

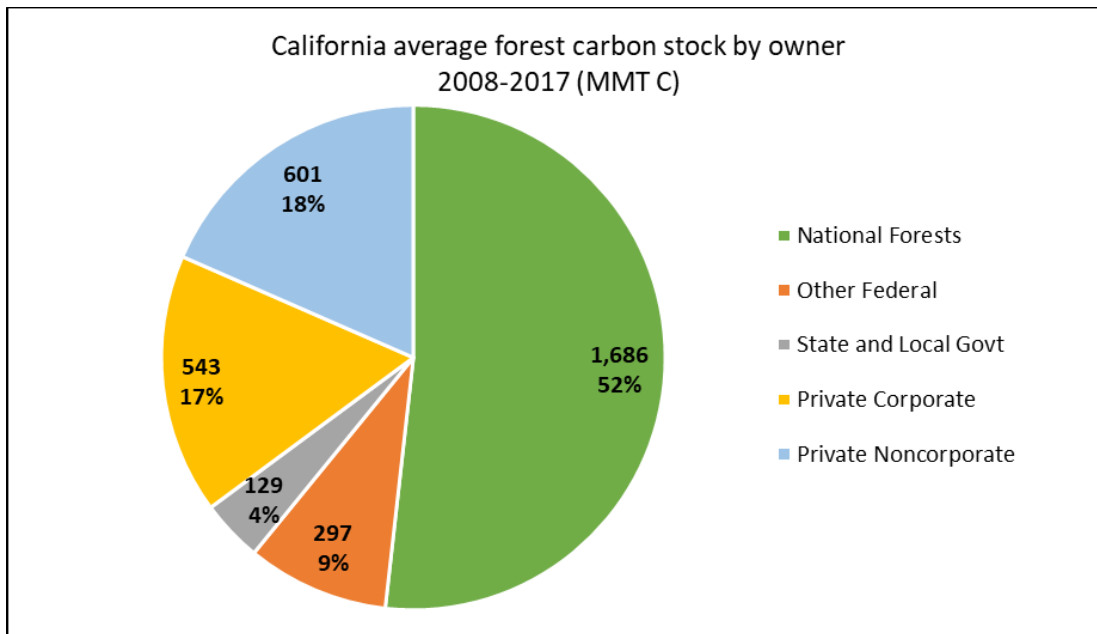


Figure 4.8. California statewide average forest carbon stock by owner, 2008-2017 (MMT C). Figure derived from Table 4.12.

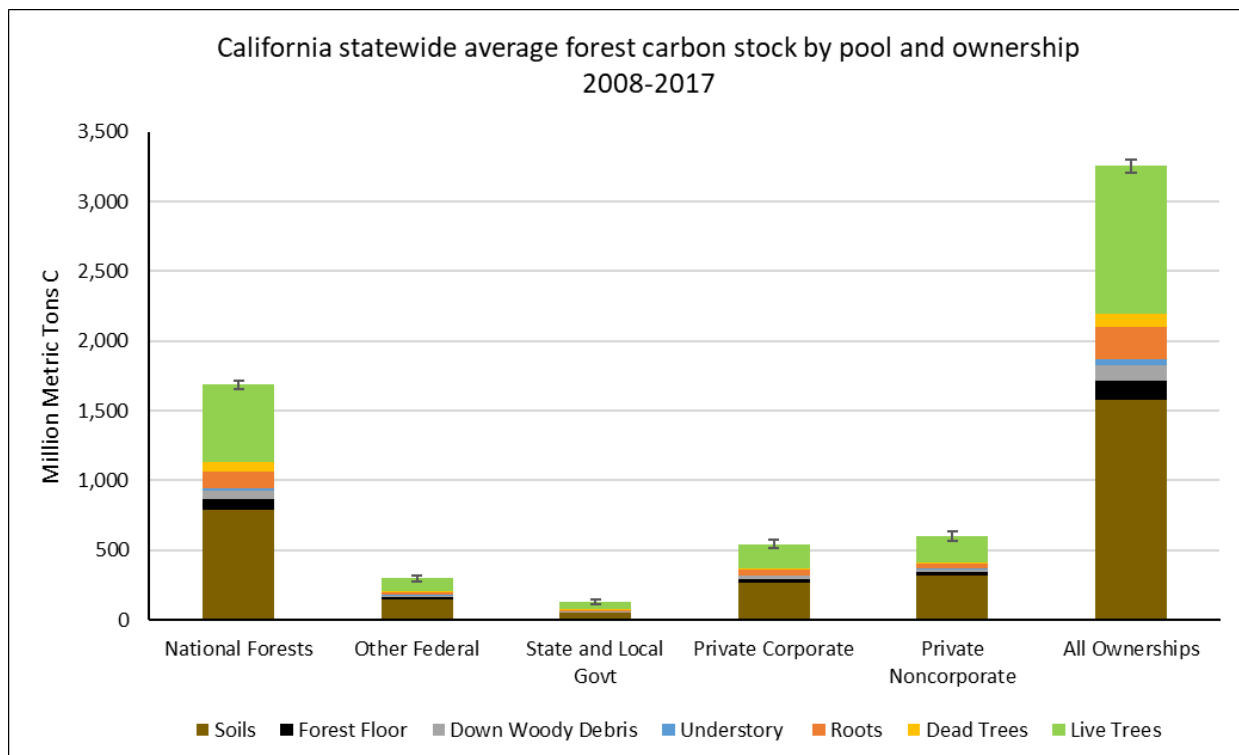


Figure 4.9. California statewide average forest carbon stock by pool and ownership, 2008-2017 (MMT C). Error bars represent 95% interval of estimated total stock for each ownership. Figure derived from table 4.12.

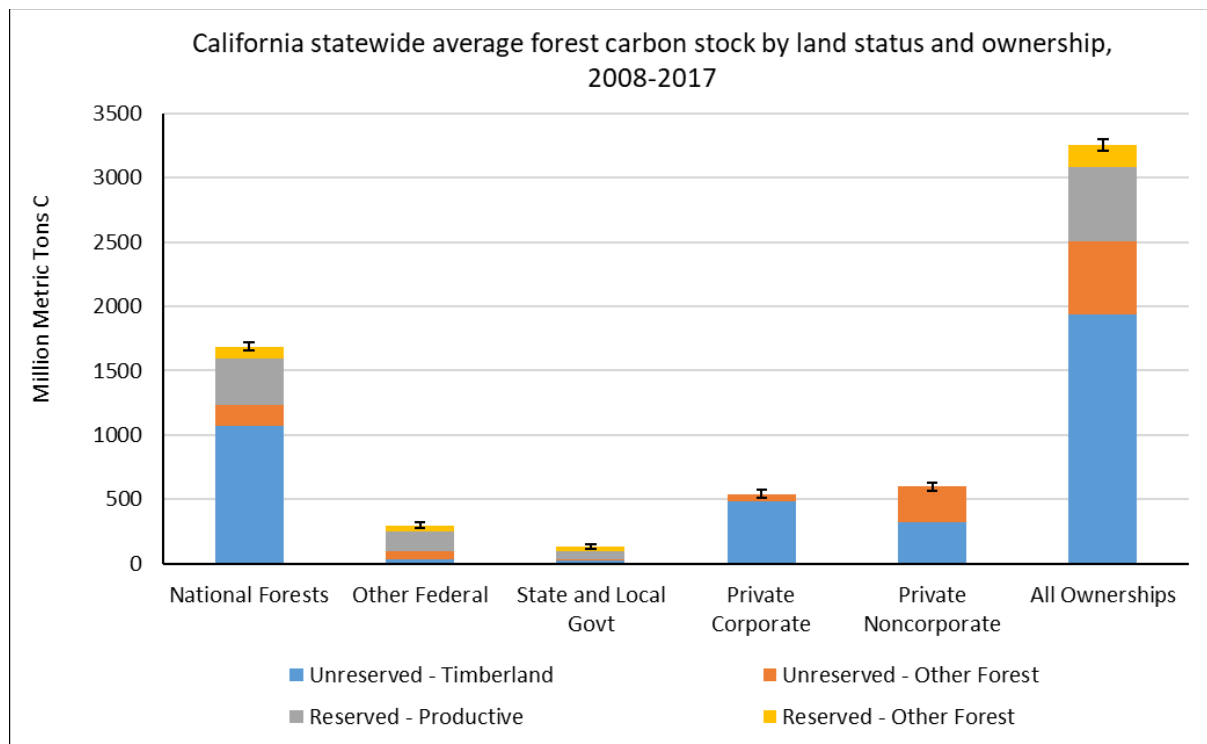


Figure 4.10. California statewide average forest carbon stock by land status and ownership, 2008-2017 (MMT C). Error bars represent 95% confidence interval of estimated total stock for each ownership. Figure derived from table 4.12.

Table 4.12b. Forest land carbon stock by county, 2008-2017: COUNTY

County	Live trees				Dead trees				Understory vegetation				Down wood		Forest Floor		Soil		Total C		Acres			
	Aboveground		Belowground		Aboveground		Belowground		Aboveground		Belowground		Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE												
	Million metric tons C ¹																							Thousand acres
Alameda	2.65	0.65	0.50	0.12	0.07	0.03	0.02	0.01	0.17	0.04	0.02	0.00	0.23	0.09	0.29	0.07	5.22	1.18	9.16	2.08	113.61	25.61		
Alpine	11.12	1.82	1.95	0.32	1.16	0.22	0.25	0.05	0.36	0.05	0.04	0.01	1.29	0.27	2.03	0.27	20.24	2.58	38.44	5.19	388.86	48.92		
Amador	5.45	1.27	1.05	0.24	0.61	0.24	0.13	0.05	0.28	0.05	0.03	0.01	0.68	0.17	0.83	0.16	10.84	1.81	19.90	3.60	218.99	35.94		
Butte	23.12	3.08	4.44	0.59	1.02	0.20	0.26	0.05	0.66	0.07	0.07	0.01	2.09	0.29	2.36	0.27	28.47	2.96	62.49	6.98	553.36	56.88		
Calaveras	14.56	2.20	2.75	0.41	0.96	0.38	0.19	0.06	0.61	0.07	0.07	0.01	1.17	0.19	1.98	0.27	24.11	2.65	46.40	5.64	509.52	54.86		
Colusa	2.47	0.69	0.49	0.13	0.40	0.22	0.09	0.05	0.32	0.05	0.04	0.01	0.40	0.11	0.41	0.08	10.23	1.75	14.85	2.68	207.45	35.07		
Contra Costa	1.41	0.47	0.26	0.08	0.00	0.00	0.00	0.00	0.08	0.02	0.01	0.00	0.06	0.03	0.14	0.04	2.64	0.79	4.61	1.40	51.75	15.60		
Del Norte	38.93	6.94	7.56	1.30	2.56	0.43	0.69	0.12	0.83	0.08	0.09	0.01	2.91	0.45	2.44	0.24	36.50	3.50	92.52	11.43	647.38	61.71		
El Dorado	37.86	4.02	7.15	0.76	3.27	0.50	0.73	0.11	0.78	0.08	0.09	0.01	3.88	0.48	5.17	0.46	44.05	3.71	102.98	9.23	842.42	69.71		
Fresno	37.72	3.91	7.06	0.71	4.36	0.60	1.00	0.13	1.22	0.10	0.14	0.01	3.55	0.48	5.63	0.45	57.09	4.01	117.76	9.21	1,193.01	83.15		
Glenn	5.87	1.39	1.17	0.27	0.46	0.20	0.11	0.04	0.23	0.04	0.03	0.00	0.50	0.13	0.80	0.16	10.05	1.77	19.21	3.65	197.39	34.06		
Humboldt	111.68	8.56	21.80	1.64	6.90	0.87	1.90	0.24	2.07	0.12	0.23	0.01	13.01	1.11	6.57	0.38	84.35	4.91	248.52	16.07	1,666.12	95.35		
Imperial	0.04	0.05	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.01	0.22	0.17	0.30	0.24	6.09	4.51		
Inyo	3.01	0.45	0.64	0.10	0.30	0.07	0.08	0.02	0.76	0.08	0.08	0.01	0.72	0.14	1.28	0.16	21.99	2.39	28.87	3.18	505.10	54.29		
Kern	9.01	1.16	1.72	0.22	0.81	0.18	0.17	0.04	1.04	0.10	0.12	0.01	1.56	0.25	1.59	0.19	32.13	2.93	48.15	4.61	714.87	64.65		
Lake	8.96	1.52	1.78	0.31	0.55	0.16	0.15	0.04	0.48	0.06	0.05	0.01	0.97	0.18	1.36	0.20	18.69	2.40	33.00	4.45	368.02	46.61		
Lassen	22.87	2.13	4.31	0.40	1.49	0.26	0.32	0.06	1.94	0.16	0.22	0.02	3.78	0.39	5.77	0.42	66.73	4.39	107.41	7.38	1,340.62	87.58		
Los Angeles	2.01	0.48	0.38	0.09	0.27	0.09	0.07	0.02	0.29	0.05	0.03	0.01	0.32	0.09	0.42	0.08	8.83	1.50	12.62	2.18	195.37	32.68		
Madera	24.06	3.32	4.32	0.58	3.20	0.67	0.70	0.15	0.64	0.07	0.07	0.01	2.75	0.59	3.21	0.37	29.10	2.87	68.06	7.68	630.31	61.31		
Marin	4.92	1.86	0.92	0.34	0.22	0.13	0.05	0.03	0.13	0.03	0.01	0.00	0.39	0.22	0.34	0.09	4.71	1.18	11.68	3.48	91.66	23.00		
Mariposa	19.98	2.66	3.76	0.49	2.99	0.57	0.65	0.12	0.76	0.08	0.08	0.01	2.72	0.43	2.93	0.34	30.36	2.92	64.23	6.85	640.26	61.14		
Mendocino	81.04	5.69	15.91	1.11	3.30	0.41	0.89	0.10	2.16	0.13	0.24	0.01	7.09	0.64	6.26	0.37	80.34	4.68	197.23	12.09	1,670.59	96.11		
Merced	0.36	0.18	0.07	0.03	0.01	0.01	0.00	0.00	0.05	0.02	0.01	0.00	0.01	0.01	0.06	0.03	1.27	0.51	1.84	0.73	32.17	12.58		
Modoc	16.90	1.76	3.08	0.31	1.25	0.23	0.27	0.05	2.24	0.17	0.25	0.02	2.62	0.28	4.55	0.34	64.12	4.17	95.28	6.55	1,337.97	86.47		
Mono	9.68	1.20	1.96	0.24	0.74	0.17	0.18	0.04	1.05	0.10	0.12	0.01	1.87	0.24	2.59	0.25	37.36	3.15	55.54	4.89	803.49	67.45		
Monterey	11.38	2.88	2.05	0.49	0.90	0.28	0.21	0.06	0.68	0.08	0.08	0.01	0.89	0.22	1.17	0.14	23.30	2.57	40.64	5.56	461.78	50.81		
Napa	4.95	1.11	0.97	0.22	0.22	0.07	0.05	0.02	0.26	0.05	0.03	0.01	0.33	0.09	0.46	0.09	7.92	1.41	15.20	2.85	175.80	31.22		
Nevada	14.92	2.22	2.85	0.42	0.92	0.24	0.22	0.06	0.43	0.06	0.05	0.01	1.51	0.34	1.95	0.25	21.39	2.58	44.23	5.64	424.75	50.17		
Orange	0.01	0.01	0.00	0.00	--	--	--	--	0.00	0.00	0.00	0.00	--	--	0.00	0.00	0.10	0.10	0.12	0.12	2.17	2.23		
Placer	24.00	2.98	4.48	0.56	2.04	0.35	0.46	0.08	0.64	0.07	0.07	0.01	2.43	0.35	3.18	0.34	33.87	3.33	71.17	7.40	619.59	60.17		
Plumas	55.31	4.47	10.16	0.81	6.54	0.90	1.51	0.20	1.29	0.10	0.14	0.01	6.23	0.56	8.99	0.58	74.77	4.59	164.95	10.78	1,482.44	90.25		
Riverside	0.70	0.32	0.14	0.06	0.04	0.03	0.01	0.01	0.15	0.04	0.02	0.00	0.21	0.08	0.22	0.07	4.27	1.01	5.76	1.45	105.13	24.56		

Table 4.12b. Forest land carbon stock by county, 2008-2017: COUNTY (Continued).

County	Live trees				Dead trees				Understory vegetation				Down wood		Forest Floor		Soil		Total C		Acres	
	Aboveground		Belowground		Aboveground		Belowground		Aboveground		Belowground		Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons C¹</i>																					
	<i>Thousand acres</i>																					
Sacramento	0.15	0.13	0.03	0.03	--	--	--	--	0.02	0.01	0.00	0.00	0.00	0.00	0.02	0.01	0.46	0.29	0.67	0.46	11.94	7.68
San Benito	1.68	0.59	0.29	0.10	0.03	0.02	0.01	0.00	0.21	0.04	0.02	0.00	0.12	0.04	0.26	0.06	6.16	1.28	8.79	1.91	130.12	27.19
San Bernardino	4.52	0.98	0.81	0.16	1.04	0.30	0.24	0.07	0.61	0.07	0.07	0.01	1.17	0.24	1.05	0.16	18.63	2.20	28.12	3.60	438.81	51.11
San Diego	1.43	0.55	0.25	0.10	0.15	0.06	0.04	0.02	0.19	0.04	0.02	0.00	0.28	0.10	0.25	0.06	5.02	1.05	7.63	1.69	120.95	24.91
San Joaquin	0.35	0.27	0.07	0.05	0.01	0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.03	0.03	0.03	0.02	0.56	0.33	1.09	0.70	13.74	8.05
San Luis Obispo	4.22	0.85	0.75	0.15	0.15	0.04	0.03	0.01	0.37	0.05	0.04	0.01	0.43	0.12	0.50	0.08	11.20	1.66	17.69	2.74	242.58	35.20
San Mateo	7.09	2.31	1.32	0.43	0.32	0.11	0.09	0.03	0.11	0.03	0.01	0.00	0.69	0.27	0.32	0.09	4.64	1.19	14.59	4.17	86.50	22.07
Santa Barbara	2.15	0.57	0.38	0.10	0.38	0.15	0.09	0.03	0.37	0.06	0.04	0.01	0.36	0.09	0.41	0.07	9.72	1.54	13.89	2.29	233.51	36.60
Santa Clara	6.86	1.25	1.29	0.24	0.25	0.09	0.08	0.03	0.40	0.06	0.04	0.01	0.50	0.10	0.79	0.12	11.31	1.61	21.52	3.21	272.23	38.64
Santa Cruz	18.34	3.60	3.47	0.68	0.42	0.10	0.10	0.02	0.25	0.04	0.03	0.00	0.89	0.21	0.92	0.16	11.05	1.82	35.47	6.33	210.81	34.72
Shasta	54.70	3.90	10.71	0.77	3.50	0.46	0.80	0.10	2.05	0.13	0.23	0.01	6.09	0.52	9.21	0.57	93.39	5.24	180.68	10.66	1,854.89	102.41
Sierra	20.91	2.87	3.92	0.54	1.48	0.26	0.34	0.06	0.48	0.06	0.05	0.01	2.03	0.28	2.86	0.31	28.86	3.04	60.94	6.85	535.93	55.56
Siskiyou	106.45	6.07	20.43	1.17	12.81	1.54	3.06	0.36	3.28	0.16	0.36	0.02	12.14	0.80	15.62	0.70	167.22	7.01	341.36	15.32	3,101.86	129.11
Solano	0.41	0.21	0.07	0.04	--	--	--	--	0.04	0.02	0.00	0.00	0.07	0.03	0.06	0.03	1.29	0.59	1.94	0.85	28.73	12.80
Sonoma	23.47	3.57	4.55	0.68	0.65	0.15	0.17	0.04	0.58	0.07	0.06	0.01	1.58	0.25	1.44	0.17	20.31	2.34	52.81	6.78	440.41	50.64
Stanislaus	0.82	0.23	0.16	0.05	0.01	0.01	0.00	0.00	0.16	0.04	0.02	0.00	0.10	0.04	0.21	0.05	4.29	1.02	5.77	1.39	103.07	24.51
Sutter	0.19	0.17	0.04	0.03	--	--	--	--	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.02	0.40	0.27	0.66	0.51	9.66	6.76
Tehama	26.03	2.93	4.97	0.55	2.27	0.40	0.55	0.10	1.18	0.11	0.13	0.01	3.28	0.45	3.74	0.35	48.79	3.88	90.95	7.95	958.78	74.53
Trinity	83.46	5.62	16.88	1.15	9.62	1.03	2.36	0.25	1.70	0.11	0.19	0.01	8.37	0.65	9.67	0.57	101.33	5.60	233.58	13.60	1,835.18	100.76
Tulare	43.95	4.32	8.02	0.75	6.14	0.79	1.29	0.16	1.38	0.10	0.15	0.01	5.25	0.61	6.24	0.47	63.01	4.20	135.42	10.15	1,351.09	89.49
Tuolumne	39.45	3.95	7.28	0.71	6.57	1.24	1.34	0.23	1.03	0.09	0.11	0.01	4.63	0.50	6.28	0.51	54.99	4.04	121.68	9.83	1,079.41	78.57
Ventura	1.43	0.39	0.28	0.08	0.46	0.23	0.11	0.06	0.36	0.06	0.04	0.01	0.28	0.07	0.43	0.08	9.88	1.60	13.28	2.21	233.78	37.19
Yolo	0.48	0.15	0.09	0.03	0.03	0.02	0.01	0.00	0.10	0.03	0.01	0.00	0.04	0.02	0.10	0.03	2.67	0.83	3.53	1.08	62.30	18.84
Yuba	8.36	1.91	1.69	0.39	0.28	0.09	0.08	0.02	0.21	0.04	0.02	0.00	0.75	0.25	0.83	0.17	8.18	1.44	20.41	3.99	191.50	33.50
All counties	1,063.85	13.95	203.42	2.61	94.13	2.81	22.15	0.62	37.71	0.38	4.19	0.04	115.24	2.03	136.26	1.01	1,578.63	9.91	3,255.59	23.73	31,745.82	200.45

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.12c. Forest land carbon stock, 2008-2017: National Forest

	Live trees				Dead trees				Understory vegetation				Down wood		Forest Floor		Soil		Total C		Acres		
	Aboveground		Belowground		Aboveground		Belowground		Aboveground		Belowground		Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE											Total
	<i>Million metric tons C¹</i>																				<i>Thousand acres</i>		
Region 5																							
Angeles	2.23	0.62	0.40	0.10	0.22	0.09	0.06	0.02	0.22	0.04	0.02	0.00	0.33	0.09	0.42	0.10	7.45	1.44	11.34	2.26	157.00	29.95	
Cleveland	0.17	0.11	0.02	0.02	0.01	0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.01	0.01	0.04	0.02	0.71	0.40	0.98	0.53	16.28	8.88	
Eldorado	31.77	3.71	5.98	0.71	3.14	0.51	0.69	0.10	0.47	0.05	0.05	0.01	3.05	0.42	4.02	0.41	34.01	3.35	83.17	8.52	601.21	58.84	
Inyo	14.15	1.71	2.89	0.34	1.17	0.19	0.28	0.05	1.11	0.09	0.12	0.01	2.49	0.38	3.36	0.29	43.35	3.28	68.92	5.59	950.90	71.49	
Klamath	55.98	4.80	10.85	0.94	8.98	1.38	2.15	0.32	1.30	0.10	0.14	0.01	6.33	0.64	6.79	0.46	72.12	4.68	164.65	11.52	1,317.28	84.48	
Lake Tahoe Basin	4.73	1.68	0.82	0.29	0.50	0.19	0.11	0.04	0.11	0.03	0.01	0.00	0.44	0.15	0.65	0.16	5.32	1.24	12.71	3.43	111.97	25.83	
Lassen	35.37	3.39	6.35	0.60	3.88	0.70	0.84	0.14	0.95	0.08	0.11	0.01	4.43	0.51	5.62	0.44	53.55	3.92	111.09	8.77	1,030.60	74.90	
Los Padres	9.78	2.61	1.77	0.45	1.46	0.37	0.33	0.08	0.93	0.09	0.10	0.01	1.23	0.23	1.44	0.16	27.55	2.67	44.60	5.28	611.82	58.13	
Mendocino	26.89	2.95	5.37	0.59	3.39	0.63	0.81	0.15	0.88	0.08	0.10	0.01	3.14	0.39	3.46	0.32	43.92	3.74	87.97	7.92	796.56	67.48	
Modoc	17.48	1.98	3.16	0.34	1.46	0.27	0.32	0.06	1.88	0.15	0.21	0.02	2.40	0.28	4.10	0.32	55.77	3.82	86.79	6.46	1,141.44	77.40	
Plumas	50.80	4.60	9.49	0.86	5.38	0.74	1.30	0.18	1.04	0.09	0.12	0.01	5.13	0.50	6.96	0.50	58.44	3.98	138.66	10.17	1,157.89	78.13	
San Bernardino	3.69	0.85	0.68	0.15	0.89	0.29	0.20	0.07	0.33	0.05	0.04	0.01	0.92	0.18	0.85	0.15	11.60	1.75	19.19	3.08	262.70	39.43	
Sequoia	27.88	3.45	5.03	0.60	4.48	0.67	0.95	0.14	0.95	0.09	0.11	0.01	3.10	0.46	4.02	0.38	43.10	3.50	89.63	8.11	895.44	72.34	
Shasta-Trinity	86.25	5.48	17.15	1.11	8.75	0.87	2.12	0.21	1.64	0.10	0.18	0.01	8.36	0.64	10.77	0.59	105.68	5.58	240.91	13.36	1,917.18	100.17	
Sierra	46.41	4.39	8.54	0.79	5.87	0.81	1.29	0.18	0.95	0.08	0.11	0.01	4.80	0.67	6.25	0.49	53.08	3.84	127.32	10.12	1,083.54	77.86	
Six Rivers	64.77	5.80	12.84	1.16	6.90	0.99	1.72	0.24	1.28	0.10	0.14	0.01	5.12	0.55	4.63	0.34	63.47	4.49	160.86	12.26	1,100.62	77.56	
Stanislaus	31.48	3.50	5.68	0.62	3.98	0.70	0.83	0.13	0.70	0.07	0.08	0.01	3.12	0.38	4.69	0.44	41.86	3.63	92.43	8.64	778.25	66.74	
Tahoe	35.09	3.65	6.56	0.69	2.99	0.42	0.69	0.09	0.75	0.07	0.08	0.01	3.60	0.48	4.54	0.39	46.85	3.87	101.16	8.81	835.99	68.04	
Toiyabe	6.47	1.05	1.20	0.19	0.75	0.19	0.17	0.04	0.48	0.07	0.05	0.01	1.17	0.23	1.69	0.22	19.85	2.36	31.83	3.95	409.76	48.42	
Total	551.41	9.05	104.79	1.72	64.18	2.35	14.87	0.53	16.01	0.24	1.78	0.03	59.17	1.44	74.30	0.75	787.69	6.55	1,674.20	16.16	15,176.44	122.50	
Region 6																							
Rogue River / Siskiyou	4.68	0.91	0.92	0.19	0.38	0.13	0.10	0.04	0.08	0.01	0.01	0.00	0.40	0.09	0.40	0.04	4.70	0.42	11.68	1.46	82.08	6.65	
Total	4.68	0.91	0.92	0.19	0.38	0.13	0.10	0.04	0.08	0.01	0.01	0.00	0.40	0.09	0.40	0.04	4.70	0.42	11.68	1.46	82.08	6.65	
All National Forests	556.09	9.07	105.71	1.72	64.56	2.35	14.97	0.53	16.09	0.24	1.79	0.03	59.57	1.44	74.71	0.75	792.39	6.54	1,685.88	16.16	15,258.52	122.36	

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

4.2.3 FF carbon stocks by pool and region

Tables 4.13 to 4.20 below summarize forest land carbon stocks by specific pool as found on both public and private ownerships for each region of the state. Similar to forested acres, nearly half of California's forest carbon stocks are found in a single region, the Sierra and Cascade Mountain Ranges, containing 47% of all forest carbon stocks (Table 4.19, Figure 4.11). The next largest carbon store, the Klamath Interior and Coast Ranges region has about half the carbon stocks as found in the Sierra and Cascades and about a quarter of those found in the state (Table 4.17, Figure 4.11). For each of these regions the dead tree and down woody material pools are each about 10% of the live tree carbon pool. In these tables, the belowground carbon is accounted for by inclusion with its respective aboveground carbon pool (i.e., live tree roots are included with live trees). The carbon storage on reserve public forests and unreserved public and private forests varies by region, with private forests containing the majority of the carbon in the Central Coast and Interior Ranges, the Central Valley and the North Coast (Figure 4.11).

Table 4.13. Forest land carbon stocks by ownership and pool, 2008-2017: All California. Table derived from Appendix 2, C tables.

Owenship/forest land status	Live Trees	Dead Trees	Understory	Down wood	Forest Floor	Soil	Total C	Acres
<i>Million metric tons C¹</i>								<i>X1000</i>
Public reserved	308.40	41.30	7.80	27.80	30.40	333.90	749.40	6,571
Public unreserved	525.40	54.40	16.40	46.40	60.40	659.70	1,362.70	12,898
Private corporate	210.00	11.50	6.90	24.90	24.50	265.00	542.70	5,300
Private noncorporate	223.60	9.10	10.90	16.10	20.90	320.10	600.70	6,977
Total	1,267.30	116.30	41.90	115.20	136.30	1,578.60	3,255.60	31,746

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.14. Forest land carbon stocks by ownership and pool, 2008-2017: Central coast/interior ranges. Table derived from Appendix 2, C tables.

Owenship/forest land status	Live Trees	Dead Trees	Understory	Down wood	Forest Floor	Soil	Total C	Acres
<i>Million metric tons C¹</i>								<i>X1000</i>
Public reserved	23.10	1.10	0.80	1.20	1.40	23.30	51.00	487
Public unreserved	4.40	0.20	0.40	0.40	0.50	11.20	17.10	250
Private corporate	7.60	0.20	0.30	0.50	0.50	8.90	18.00	186
Private noncorporate	30.20	1.30	1.40	1.80	2.30	42.10	79.10	887
Total	65.30	2.80	2.90	4.00	4.80	85.50	165.30	1,809

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.15. Forest land carbon stocks by ownership and pool, 2008-2017: Central Valley. Table derived from Appendix 2, C tables.

Owenship/forest land status	Live Trees	Dead Trees	Understory	Down wood	Forest Floor	Soil	Total C	Acres
<i>Million metric tons C¹</i>								<i>X1000</i>
Public reserved	0.20	0.00	0.00	0.00	0.00	0.20	0.40	6
Public unreserved	0.10	0.00	0.00	0.00	0.00	0.20	0.30	4
Private corporate	--	--	--	--	--	--	--	--
Private noncorporate	1.20	0.00	0.10	0.10	0.10	3.00	4.60	78
Total	1.50	0.10	0.10	0.10	0.20	3.40	5.30	88

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.16. Forest land carbon stocks by ownership and pool, 2008-2017: Eastside. Table derived from Appendix 2, C tables.

Owenship/forest land status	Live Trees	Dead Trees	Understory	Down wood	Forest Floor	Soil	Total C	Acres
<i>Million metric tons C¹</i>								<i>X1000</i>
Public reserved	4.90	0.40	0.40	0.60	1.00	13.60	20.90	296
Public unreserved	23.70	2.00	3.90	3.40	5.90	96.10	135.00	2,004
Private corporate	3.50	0.30	0.50	0.70	1.10	14.30	20.50	296
Private noncorporate	2.40	0.10	0.50	0.30	0.70	11.20	15.10	231
Total	34.50	2.70	5.30	5.00	8.70	135.20	191.50	2,827

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.17. Forest land carbon stocks by ownership and pool, 2008-2017: Klamath Interior/Coast Ranges. Table derived from Appendix 2, C tables.

Owenship/forest land status	Live Trees	Dead Trees	Understory	Down wood	Forest Floor	Soil	Total C	Acres
<i>Million metric tons C¹</i>								<i>X1000</i>
Public reserved	96.00	15.00	2.10	8.00	7.90	98.70	227.70	1,758
Public unreserved	182.50	19.30	3.60	14.50	16.00	176.60	412.50	3,227
Private corporate	39.40	2.40	1.50	5.30	5.20	59.40	113.30	1,157
Private noncorporate	58.90	2.00	2.70	4.00	5.20	82.30	155.10	1,735
Total	376.80	38.80	9.90	31.90	34.40	416.90	908.70	7,877

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.18. Forest land carbon stocks by ownership and pool, 2008-2017: North Coast. Table derived from Appendix 2, C tables.

Owenship/forest land status	Live Trees	Dead Trees	Understory	Down wood	Forest Floor	Soil	Total C	Acres
<i>Million metric tons C¹</i>								<i>X1000</i>
Public reserved	39.00	2.30	0.50	2.20	1.30	16.10	61.40	330
Public unreserved	12.10	0.40	0.20	0.70	0.60	7.20	21.10	149
Private corporate	81.20	5.00	1.70	9.20	4.80	58.60	160.40	1,240
Private noncorporate	67.10	2.10	1.40	4.30	3.70	45.80	124.50	980
Total	199.40	9.80	3.80	16.40	10.30	127.80	367.40	2,699

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.19. Forest land carbon stocks by ownership and pool, 2008-2017: Sierra/Cascades.
Table derived from Appendix 2, C tables.

Owership/forest land status	Live Trees	Dead Trees	Understory	Down wood	Forest Floor	Soil	Total C	Acres
<i>Million metric tons C¹</i>								<i>X1000</i>
Public reserved	140.30	20.90	3.20	14.60	17.60	161.50	358.10	3,220
Public unreserved	295.90	31.40	7.30	26.40	36.10	344.90	742.00	6,714
Private corporate	77.90	3.60	2.80	9.10	12.80	121.70	227.80	2,370
Private noncorporate	60.40	3.30	4.40	5.00	8.50	125.90	207.60	2,842
Total	574.50	59.30	17.70	55.10	75.00	753.90	1,535.50	15,146

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.20. Forest land carbon stocks by ownership and pool, 2008-2017: South Coast Mountains/Deserts. Table derived from Appendix 2, C tables.

Owership/forest land status	Live Trees	Dead Trees	Understory	Down wood	Forest Floor	Soil	Total C	Acres
<i>Million metric tons C¹</i>								<i>X1000</i>
Public reserved	5.00	1.50	0.70	1.10	1.10	20.50	29.90	475
Public unreserved	6.60	1.10	0.90	1.10	1.30	23.50	34.60	549
Private corporate	0.30	0.00	0.10	0.00	0.10	2.10	2.60	51
Private noncorporate	3.30	0.30	0.40	0.50	0.40	9.80	14.70	224
Total	15.30	2.90	2.10	2.80	2.90	55.90	81.90	1,299

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

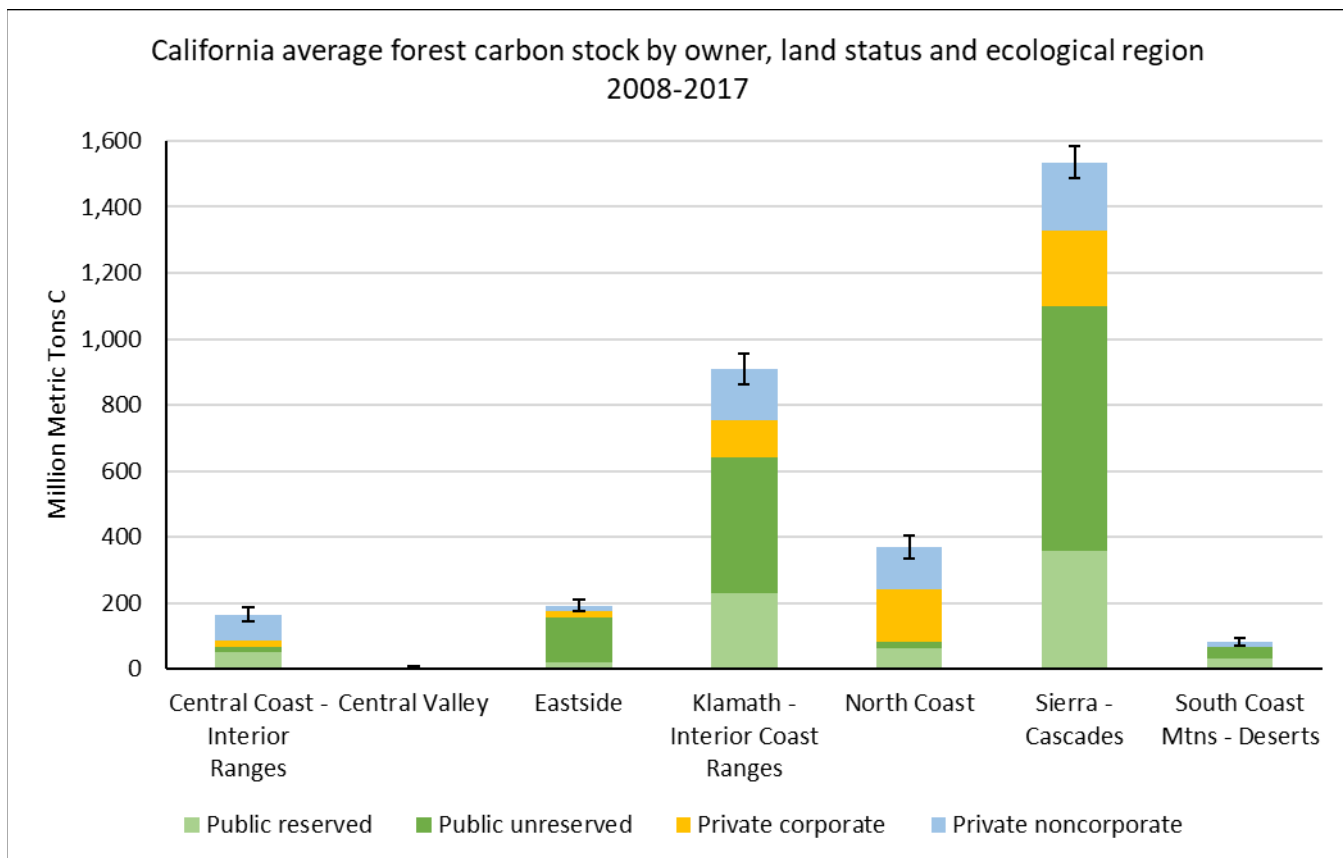


Figure 4.11. Average carbon stock (MMT C) by owner, land status and ecological region, 2008-2017. Error bars represent 95% confidence interval of estimated total stock for each region.

4.2.4 FF carbon stocks by forest type

The California mixed conifer forest type contains the largest carbon stock compared to all other forest types, storing approximately $1,031 \pm 46$ MMT C (Table 4.21, Figure 4.12). Western oak forests follow with 679 ± 32 MMT C. In 2017 with the addition of improved estimates of carbon within forest soils for most forest types the majority of carbon stores are now found in the soil organic carbon pools, not the live trees as was first estimated. Notable exceptions of forest types where live tree carbon exceeds soil carbon includes the redwood, Douglas-fir, and tanoak/laurel types. Across all forest types carbon in the live trees account for roughly 33% of the total forest carbon and forest soils make up about 48% of all carbon pools. As of 2017, dead trees now comprise only about 3% of all carbon stocks of all forest types. The western Juniper forest type has the lowest proportion of carbon in dead trees, less than 1% (note that for 2017, western juniper has been included as its own forest type in the provided tables). Most softwood carbon stocks are found on unreserved timberland. However, lodgepole pine, pinyon-juniper, western white pine and other western softwood forest types had a majority of their stocks outside of timberland, either in reserve forests or in unreserved forests not productive enough to be considered timberland. Approximately half of the carbon stocks associated with

hardwood forest types are found in unreserved timberland (Table 4.22, figure 4.13). Although the California mixed conifer forest type has the largest stock and covers a substantial area, the redwood forest type has the highest carbon density per acre (figure 4.14). For information on forest types by region refer to appendix 1.

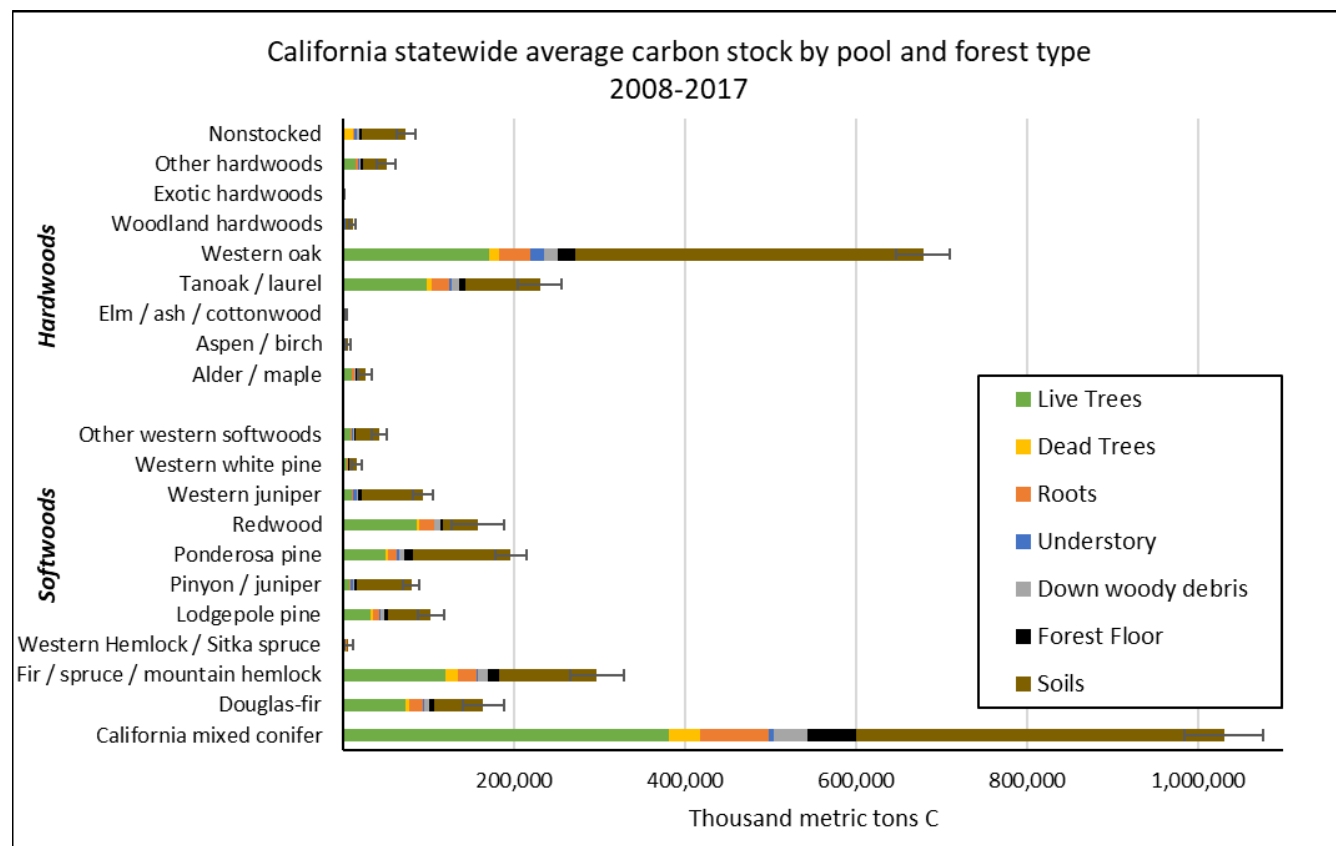


Figure 4.12. California statewide average carbon stock by pool and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table 4.21; compare to Appendix 2, D tables.

Table 4.21: Forest land carbon stocks by forest type and pool, 2008-2017: All California. Compare to Appendix 2, D tables.

	Live Trees		Dead Trees		Roots		Understory		Down wood		Forest Floor		Soil		All pools	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>Thousand metric tons C</i>																
Softwoods:																
California mixed conifer	381,083	10,090	36,025	1,819	80,390	2,136	5,642	168	40,174	1,372	56,151	1,263	431,338	9,559	1,030,803	23,587
Douglas-fir	72,721	5,949	4,091	521	16,067	1,321	1,319	93	6,694	710	4,759	335	57,981	4,111	163,632	12,173
hemlock	119,647	7,446	13,538	1,124	22,955	1,425	1,653	87	11,248	847	12,892	675	114,756	5,930	296,687	16,199
spruce	2,417	1,054	283	179	605	281	39	17	351	235	289	121	1,809	779	5,794	2,483
Lodgepole pine	31,519	2,741	3,436	408	7,291	628	774	70	4,236	515	5,323	401	49,392	3,641	101,970	7,715
Pinyon / juniper	6,339	550	495	69	1,439	121	2,750	163	1,959	226	2,577	176	63,724	3,811	79,281	4,782
Ponderosa pine	49,758	2,961	1,770	241	11,063	665	2,648	150	5,756	454	10,191	483	114,313	5,194	195,499	9,245
Redwood	85,574	10,184	3,285	585	16,752	1,932	812	71	6,961	869	3,086	261	40,605	3,412	157,075	15,894
Western juniper	9,573	845	383	78	1,761	160	3,822	259	1,500	187	3,570	231	72,165	4,393	92,775	5,708
Western white pine	3,789	859	560	143	854	191	152	33	414	107	835	164	8,358	1,592	14,961	2,907
Other western softwoods	7,491	1,103	830	166	1,765	272	794	102	1,502	267	2,209	237	26,803	2,734	41,394	4,394
Total	769,911	14,629	64,695	2,180	160,942	2,948	20,404	372	80,796	1,900	101,880	1,258	981,244	11,371	2,179,872	28,569
Hardwoods:																
Alder / maple	9,306	1,686	787	198	2,046	365	364	56	1,480	309	803	124	10,836	1,666	25,622	4,123
Aspen / birch	774	317	75	40	161	64	134	35	285	119	265	70	4,057	1,070	5,750	1,527
Elm / ash / cottonwood	743	334	31	19	136	65	57	19	71	29	85	31	1,456	492	2,579	944
Tanoak / laurel	97,366	6,380	5,723	746	20,100	1,314	2,935	159	9,697	774	7,011	385	86,878	4,791	229,709	13,307
Western oak	169,989	5,457	12,486	1,142	36,752	1,180	14,822	323	16,727	740	21,014	509	406,476	9,075	678,266	16,160
Woodland hardwoods	888	203	206	68	201	43	322	55	267	79	503	92	8,073	1,413	10,460	1,822
Exotic hardwoods	3	3	--	--		1	9	6	6	6	9	6	215	138	244	157
Other hardwoods	13,416	2,230	939	214	2,952	489	904	93	1,975	374	1,900	203	27,832	2,875	49,918	5,690
Total	292,484	8,325	20,246	1,384	62,348	1,758	19,547	356	30,509	1,152	31,590	635	545,823	10,168	1,002,547	20,514
Nonstocked	1,453	309	9,192	1,549	2,288	348	1,950	137	3,940	504	2,786	203	51,563	3,663	73,171	5,575
All forest types	1,063,849	13,954	94,134	2,807	225,577	2,768	41,901	426	115,245	2,034	136,256	1,005	1,578,629	9,908	3,255,591	23,729

Note: Totals may be of because of rounding

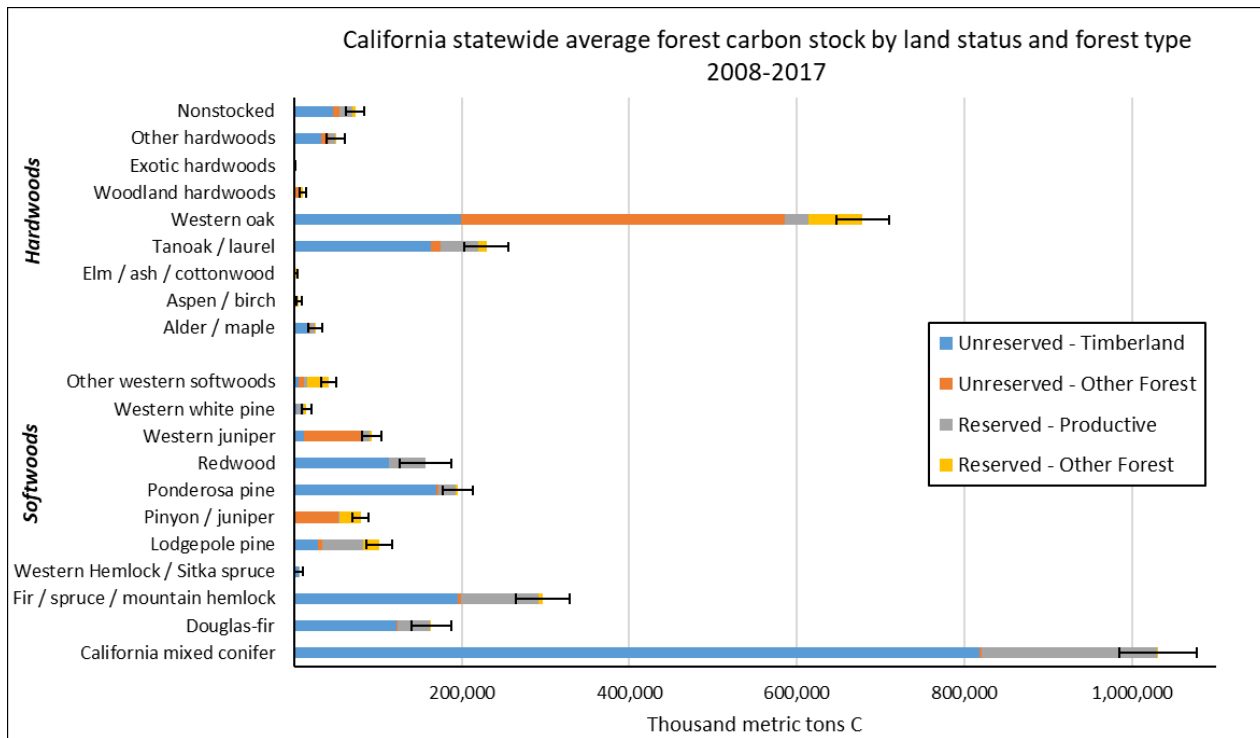


Figure 4.13. California statewide average forest carbon stock by land status and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table 4.22; compare to Appendix 2, D tables.

Table 4.22. Forest land carbon stocks (thousand metric tons C) by forest type and land status, 2008-2017: All California. Table derived from Appendix 2, D tables.

	Unreserved Forests:				Reserved Forests:				All forest land	
	Timberland		Other Forest		Productive		Other Forest		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE		
<i>Thousand metric tons C</i>										
Softwoods:										
California mixed conifer	818,345	20,834	1,609	842	209,458	12,721	1,391	1,186	1,030,803	23,587
Douglas-fir	122,213	10,135	773	780	38,697	6,768	1,950	980	163,632	12,173
Fir / spruce / mountain hemlock	195,815	12,703	3,166	1,451	92,207	9,857	5,499	2,005	296,687	16,199
Western Hemlock / Sitka spruce	5,520	2,469	--	--	273	272	--	--	5,794	2,483
Lodgepole pine	29,059	4,247	5,003	1,763	47,947	5,612	19,961	3,367	101,970	7,715
Pinyon / juniper	647	460	52,631	3,884	294	276	25,709	2,858	79,281	4,782
Ponderosa pine	169,166	8,505	3,063	1,092	20,881	3,491	2,389	934	195,499	9,245
Redwood	112,776	10,842	--	--	44,300	11,832	--	--	157,075	15,894
Western juniper	12,344	2,169	70,121	4,804	7,583	2,082	2,727	1,038	92,775	5,708
Western white pine	2,703	1,155	--	--	9,023	2,343	3,236	1,283	14,961	2,907
Other western softwoods	5,767	1,795	5,847	1,503	4,700	1,585	25,080	3,413	41,394	4,394
Total	1,474,354	23,888	142,213	6,632	475,363	18,998	87,941	6,002	2,179,872	28,569
Hardwoods:										
Alder / maple	17,644	3,373	2,147	815	5,122	2,160	709	562	25,622	4,123
Aspen / birch	1,123	684	1,588	714	1,326	780	1,713	864	5,750	1,527
Elm / ash / cottonwood	--	--	1,972	836	25	25	581	438	2,579	944
Tanoak / laurel	162,819	11,155	12,316	2,577	45,074	6,598	9,499	2,600	229,709	13,307
Western oak	198,971	10,947	386,908	11,189	27,593	4,112	64,794	5,250	678,266	16,160
Woodland hardwoods	1,474	817	6,954	1,468	--	--	2,032	709	10,460	1,822
Exotic hardwoods	106	106	137	115	--	--	--	--	244	157
Other hardwoods	31,797	4,762	9,448	1,759	7,326	2,535	1,348	728	49,918	5,690
Total	413,936	15,858	421,470	11,580	86,466	8,291	80,675	6,007	1,002,547	20,514
Nonstocked	47,020	4,388	7,165	1,461	15,293	2,942	3,693	1,090	73,171	5,575
All forest types	1,935,311	22,197	570,849	12,924	577,122	18,972	172,309	8,310	3,255,591	23,729

Note: Totals may be of because of rounding

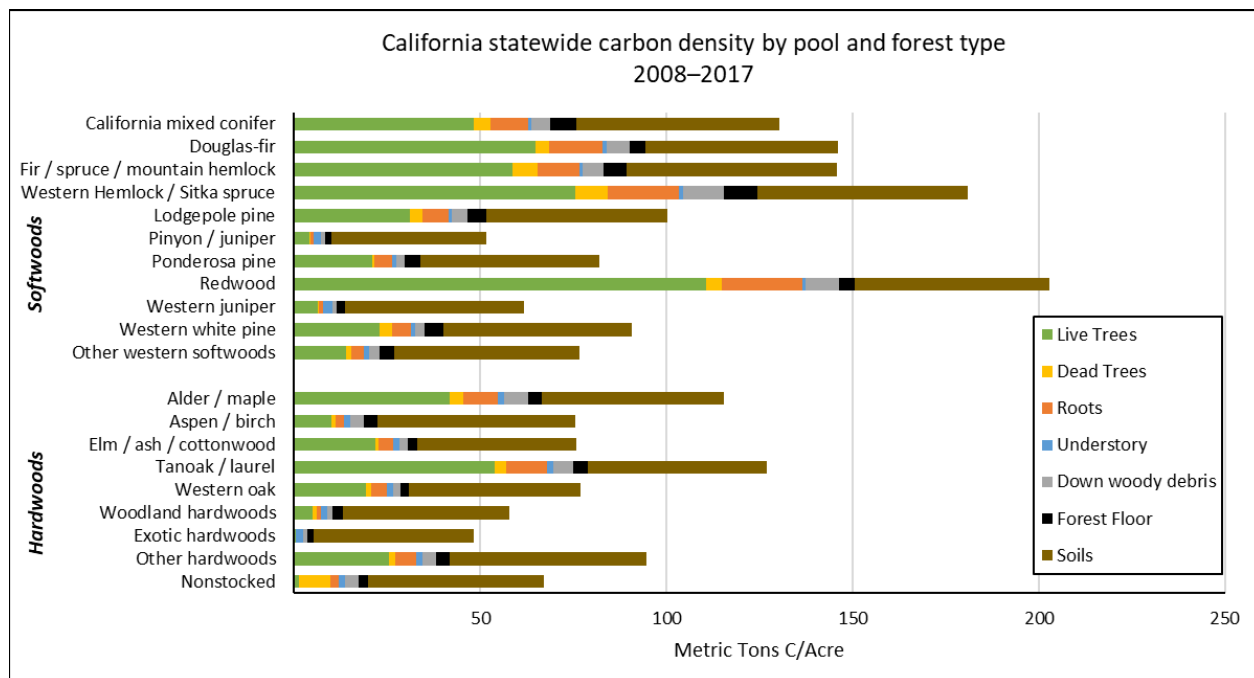


Figure 4.14. California statewide carbon density by pool and forest type, 2008-2017 (metric tons C/acre).

4.2.5 FF carbon pools – stock and flux

The following tables provide carbon stock and flux data for each pool by ownership group.

These carbon stock results are also compiled in table 4.12a as the totals for each pool for each ownership group. Carbon flux results are also compiled in table 4.3 as the totals for each pool for each ownership group.

4.2.5.1 Aboveground live (AGL) carbon

The aboveground carbon pool includes all live trees 1-inch dbh and larger and includes estimates of the live understory vegetation component. Carbon in live tree foliage is included in estimates of live tree stocks and flux. The decline in understory vegetation is an artifact of the model, which predicts less understory when there is more overstory tree carbon.

Table 4.23: Aboveground live carbon (C) stocks on forest land by ownership, 2008-2017. Compare to Table 4.12; Appendix 2, Tables C1 and C19.

	Public						Private				All ownerships	
	National Forest		Other Federal		State and local govt.		Corporate		Non Corporate			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons C¹</i>											
Live trees	556.09	9.07	89.09	5.97	55.52	6.53	176.19	6.30	186.95	6.99	1,063.85	13.95
Live understory	16.09	0.24	4.18	0.17	1.48	0.09	6.18	0.20	9.78	0.24	37.71	0.38

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.24 Aboveground average annual live carbon flux (CO₂e) on forest land by ownership, 2001-2007 to 2011-2017. Compare to table 4.3 and Appendix 2, Table B1.

	Public						Private				Total			
	National forest		Other federal		State and local govt.		Corporate		Non Corporate					
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE		
	<i>Million Metric Tons CO₂ Equivalent Per Year</i>													
Live trees	3.70	1.46	0.57	0.66	1.75	0.35	4.76	1.28	7.40	0.64	12.17	1.41	18.19	2.16
Foliage	0.25	0.08	0.03	0.03	0.08	0.02	0.26	0.07	0.33	0.03	0.59	0.07	0.96	0.11
Live understory	-0.05	0.05	0.00	0.03	-0.02	0.01	0.03	0.04	-0.05	0.02	-0.03	0.05	-0.08	0.07

Note: Totals may be of because of rounding

4.2.5.2 Belowground live and dead carbon

The belowground carbon pool in stocks and calculated flux includes estimates of carbon in live and dead tree roots. Estimated carbon in understory roots is also included with this pool.

Table 4.25. Belowground live and dead carbon (C) stocks on forest land by ownership, 2008-2017. Compare to Table 4.12; Appendix 2, Tables C28, C36 and C45.

	Public						Private				All ownerships	
	National Forest		Other Federal		State and local govt.		Corporate		Non Corporate			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons C¹</i>											
Live tree roots	105.71	1.72	16.79	1.07	10.52	1.19	33.80	1.21	36.60	1.36	203.42	2.61
Dead tree roots	14.97	0.53	2.44	0.25	0.54	0.07	2.39	0.19	1.81	0.12	22.15	0.62
Understory roots	1.79	0.03	0.46	0.02	0.16	0.01	0.69	0.02	1.09	0.03	4.19	0.04

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.26. Belowground live and dead average annual carbon flux (CO₂e) on forest land by ownership, 2001-2007 to 2011-2017. Compare to table 4.3 and Appendix 2, Table B1.

	Public						Private				Total	
	National forest		Other federal		State and local govt.		Corporate		Non Corporate			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons CO₂ Equivalent</i>											
Live tree roots	0.89	0.29	0.14	0.12	0.34	0.07	1.01	0.26	1.39	0.13	3.77	0.43
Dead tree roots	0.82	0.20	0.04	0.09	-0.01	0.03	0.02	0.06	0.13	0.06	0.99	0.24
Understory roots	-0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01	0.01

Note: Totals may be of because of rounding

4.2.5.3 Aboveground dead wood

The aboveground dead wood carbon pool includes measurements of standing dead trees, estimates of carbon in dead understory vegetation, and down wood as measured along FIA's down wood transects at each sampled field plot. Please note that standing dead tree stocks are based on dead trees greater than 5.0 inches dbh instead of 1.0 inches dbh as in the previous reports. This change was made due to incomplete data for trees less than 5.0 inches for earlier measurement years. During the next measurement cycle it is likely that we can include estimates for dead trees to 1.0 inches again.

Table 4.27. Aboveground dead wood carbon (C) stocks on forest land by ownership, 2008-2017. Compare to Table 4.12; Appendix 2, Tables C10 and C62.

	Public						Private				All ownerships	
	National Forest		Other Federal		State and local govt.		Corporate		Non Corporate			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons C¹</i>											
Standing dead trees	64.56	2.35	11.11	1.29	2.03	0.28	9.14	0.71	7.30	0.52	94.13	2.81
Down woody material	59.57	1.44	10.61	0.76	4.06	0.45	24.86	1.11	16.15	0.80	115.24	2.03

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.28. Aboveground dead wood average annual carbon flux (CO₂e) on forest land by ownership, 2001-2007 to 2011-2017. Compare to table 4.3 and Appendix 2, Table B1.

	Public						Private				Total	
	National forest		Other federal		State and local govt.		Corporate		Non Corporate			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons CO₂ Equivalent</i>											
Standing dead trees	5.19	0.97	0.51	0.53	-0.04	0.13	0.46	0.22	0.87	0.23	6.99	1.16
Down woody material	0.07	0.64	0.32	0.28	0.11	0.14	-1.69	0.48	0.00	0.30	-1.18	0.91

Note: Totals may be of because of rounding

4.2.5.4 Forest floor carbon and Soil organic carbon

Estimate of current forest floor and soil organic carbon stocks by ownership. FIA forest floor estimates based on Domke et al. (2016) and soil organic carbon estimates based on Domke et al. (2017). See section 3.2.3 for additional details about the forest floor and soil organic carbon pools.

Table 4.29: Soil organic carbon and forest floor (C) stocks on forest land by ownership, 2008-2017. Compare to Table 4.12; Appendix 2, Table C53 and C71.

	Public						Private				All ownerships	
	National Forest		Other Federal		State and local govt.		Corporate		Non Corporate			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons C¹</i>											
Forest Floor	74.71	0.75	12.36	0.48	3.71	0.22	24.53	0.70	20.95	0.59	136.26	1.01
Soil organic carbon	792.39	6.54	149.92	4.81	51.23	2.82	264.96	6.87	320.12	7.51	1,578.63	9.91

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

Table 4.30: Soil organic carbon and forest floor average annual flux (CO₂e) on forest land by ownership, 2001-2007 to 2011-2017. Compare to table 4.3 and Appendix 2, Table B1.

	Public						Private				Total	
	National forest		Other federal		State and local govt.		Corporate		Non Corporate			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons CO₂ Equivalent</i>											
Forest Floor	-0.04	0.13	-0.03	0.06	0.01	0.02	-0.02	0.09	0.17	0.06	0.09	0.18
Soil organic carbon	-0.53	0.23	0.00	0.09	-0.06	0.04	-0.09	0.24	0.11	0.11	-0.57	0.37

4.3 Forest Management Reference Levels (FMRL) and C stock-change

As described in the 1992 Kyoto Protocols and Guidelines, the concept of a forest management reference level (FMRL) is used to establish baseline forest carbon stock values so that average annual net change from managed forests can be calculated (IPCC 2014, section 2.7.5) and for comparing long term projections to reference conditions in a consistent fashion. For this report, we have established FIA's initial 10-year forest inventory in California as the FMRL baseline, which was installed from 2001 through 2010. Calculating a current stock in a consistent way with the FMRL is an IPCC-recommended approach to carbon accounting and allows evaluation of relative changes in California forest carbon stocks by pool and ownership between measurement periods. In this way progress toward specific statewide climate objectives, such as are established by AB 1504 and AB 32 for California can be estimated. However, estimates of change between 10-year stock averages (i.e., Stock-Change approach) are not as accurate or precise as those made using the GRM approach. Each successive 10-year period includes 9 years of the previous period's measurements. For example, the periods 2005-2014 and 2006-2015 share data for years 2006-2014. Although these 10-year moving stock averages can be used for estimating the relative direction of change between periods, especially between two full 10-year inventories, it is problematic to use for evaluating flux until then. A more accurate and meaningful way to calculate change and the magnitude of flux is by using the Growth, Removals and Mortality (GRM) approach. This GRM approach is considered an IPCC Tier 3 approach to carbon accounting, which refers to using more advanced country-specific data and methods. The GRM method compares measurements taken on the same set of plots and trees at different times. This method measures trees 10 years apart to allow enough growth between each measurement to reliably distinguish measurement of actual change from possible measurement error. In addition, it makes it possible to identify causes of changes to individual plots instead of simply comparing total stocks. The GRM approach to calculate change is the approach used nationally by the FIA Program and is also used for this report (see section 4.1).

Our estimate of C flux and current trends is determined by comparing measurements taken in 2001-2007 to those taken on the same plots and trees in 2011-2017. This provides 7 years of re-measured tree data to calculate actual growth, removals, and mortality on the same set of trees. However, because the current estimates of change use only 7 years of re-measured plot data, only 70 percent of all the plots initially installed from 2001 to 2010 are included. One would expect estimates of flux to change slightly as more data are collected, with improvements in sampling error as plots approach 100 percent re-measurement in 2020 and beyond. See section 3.1.2 for more information about FMRL and methods used.

Table 4.31 provides FMRL estimates from 2001-2010 by forest carbon pools including the total estimated carbon for this initial 10-year period. All estimates in table 4.31 have been updated to reflect the new calculation of organic carbon in forest soils, and the addition of carbon found on the forest floor litter and duff. The 2001-2010 FMRL for total carbon from all pools including updated estimates for soil organic carbon and carbon found on the forest floor is $3,244 \pm 24$ MMT C. The live tree pool now accounts for approximately 32% of the entire forest carbon pool, while organic carbon in forest soils account for half of the total carbon, 50%. Standing dead trees, down wood, understory vegetation, forest floor and roots account for the remaining carbon. The current stock values for each of these pools are estimated as stock totals for each 10-year period (i.e., complete plot set) through the current period of 2008-2017. During this time, there is no meaningful change in most carbon pools from the established FMRL except in growth from live trees (Figure 4.15), demonstrating the difficulty in using this approach as it does not take full advantage of re-measurement information. As was presented earlier in this section, we use the GRM approach to determine the 2017 statewide rate of carbon sequestration on all forest land including flux from forest land conversions non CO_2 emissions from fire, which is estimated at 27.0 ± 5.5 MMT CO_2e per year. The 2001-2010 FMRL baseline for live tree carbon is $1,025 \pm 27.5$ MMT C and in 2008-2017 total carbon in live trees increased to $1,064 \pm 27.3$ MMT C. Using the stock-change approach comparing the 2008-2017 time-period to the FMRL, which is equivalent to a difference of 7 years, puts the net change in carbon stocks on all forest land at approximately 39 MMT C. When this value is converted to CO_2e and annualized over a 7-year period, it is equivalent to approximately 20.4 MMT CO_2e per year. This value is lower than the net live tree sequestration rate determined by the direct-measurement GRM approach and again highlights some of the challenges with using the stock-change approach until full re-measurement is complete. Future forest carbon pools are projected out to the year 2020 by applying current flux estimates based on re-measured trees to each 2008-2017 C pool estimate (Figure 4.15) assuming a constant flux rate.

Table 4.31: Forest carbon pools by 10-year inventory period, 2001-2010 through 2008-2017. Compare to Appendix 2, C tables. Please review section 4.3 for an understanding of how stock changes calculated from this table differ from flux determined by directly measuring growth, removals and mortality on the same plots over time.

	Live Trees		Dead Trees		Down wood		Understory		Belowground roots		Forest Floor		Soil		Total carbon	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons C¹</i>															
2001 - 2010	1,025.30	14.01	79.35	2.35	118.28	1.92	44.55	0.43	216.23	2.78	136.71	1.00	1,623.56	9.87	3,243.97	23.95
2002 - 2011	1,034.59	14.12	81.69	2.38	118.09	1.97	44.10	0.43	218.46	2.80	136.30	1.00	1,614.58	9.87	3,247.82	24.14
2003 - 2012	1,035.19	13.53	83.21	2.41	117.30	1.95	43.74	0.44	218.42	2.70	137.37	1.00	1,614.95	10.00	3,250.18	23.25
2004 - 2013	1,045.34	13.67	83.53	2.43	116.18	1.94	43.00	0.44	220.34	2.72	136.94	1.01	1,601.69	9.99	3,247.04	23.41
2005 - 2014	1,054.83	13.63	84.43	2.46	115.57	1.96	42.61	0.43	222.37	2.72	136.94	1.01	1,595.58	10.00	3,252.34	23.46
2006 - 2015	1,061.02	13.73	86.57	2.49	115.80	2.00	42.31	0.43	223.91	2.74	136.93	1.01	1,587.66	9.95	3,254.20	23.55
2007 - 2016	1,064.86	13.89	89.09	2.55	115.13	2.01	42.09	0.43	224.78	2.76	136.78	1.01	1,583.29	9.93	3,256.02	23.67
2008 - 2017	1,063.85	13.95	94.13	2.81	115.24	2.03	41.90	0.43	225.58	2.77	136.26	1.01	1,578.63	9.91	3,255.59	23.73

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

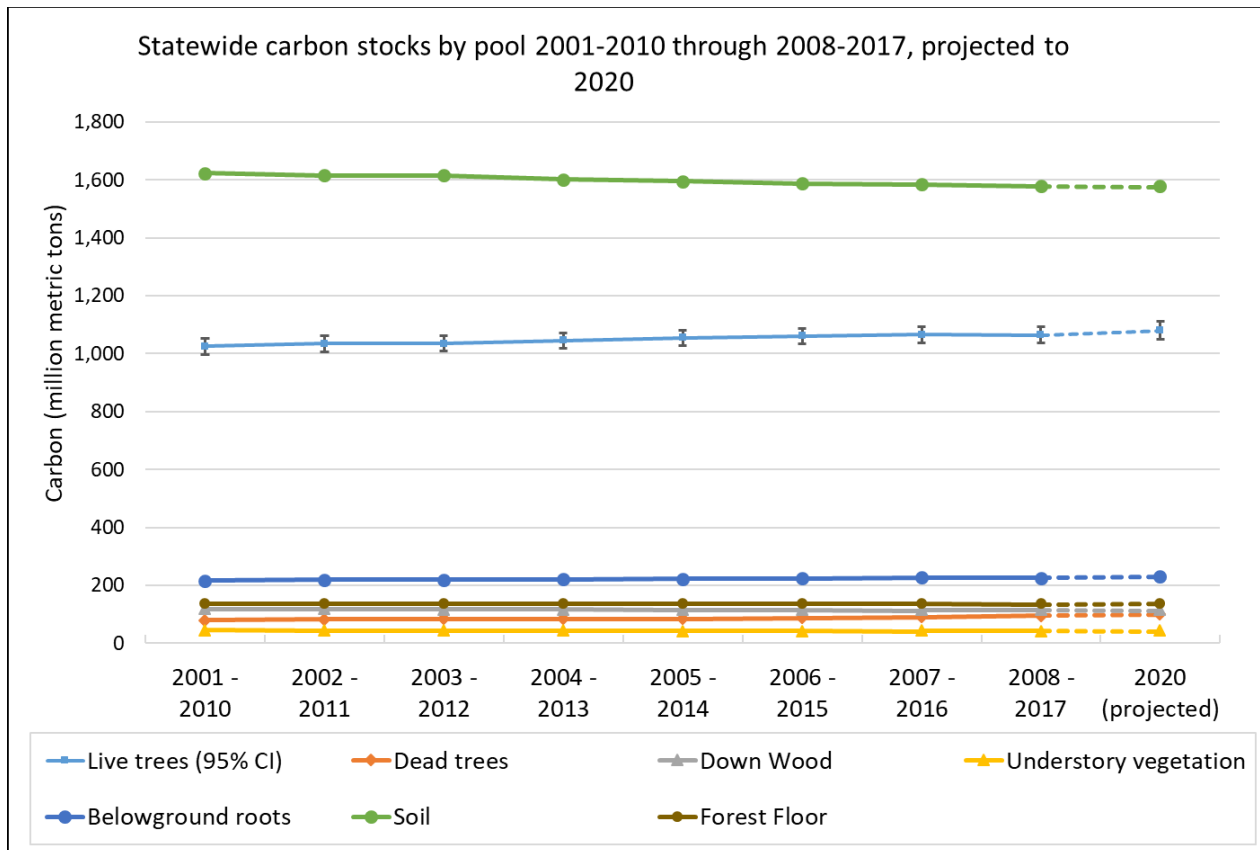


Figure 4.15. California carbon stocks by source pool, 2001-2010 through 2008-2017 with projection to 2020. Error bars represent the 95% confidence interval of live tree carbon stocks to 2020.

We also evaluate current C stocks by ownership from the 2001-2010 FMRL in 10-year periods to 2008-2017. The aboveground live tree C pool by ownership and land status is highlighted in Table 4.32. The live tree pool is evaluated on its own since re-measurement has so far suggested an elevated rate of annual flux relative to all other C pools. Most ownerships and land status (timberland and reserved forest land) indicate increasing or flat C stocks throughout this time-period based on the 2001-2010 FMRL and the standard error of each estimate. This same trend appears to persist when evaluating the sum of all C pools by the same ownership and land status groups (Table 4.33).

Table 4.32: Live tree carbon stocks by ownership and land status, 2001-2010 through 2008-2017. Compare to Appendix 2, C tables. Please review section 4.3 for an understanding of how stock changes calculated from this table differ from flux determined by directly measuring growth, removals and mortality on the same plots over time.

	Unreserved timberland						Reserved forest land		All forest land	
	Private - corporate		Private - noncorporate		National forests		National forests		All ownerships	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons C¹</i>									
2001-2010	139.81	5.67	136.57	6.59	373.85	8.88	138.54	6.99	1,025.30	14.01
2002-2011	137.06	5.64	138.40	6.69	380.19	9.04	140.57	7.10	1,034.59	14.12
2003-2012	138.86	5.53	141.06	6.81	377.97	7.98	145.47	6.03	1,035.19	13.53
2004-2013	142.96	5.66	142.25	6.93	381.41	8.04	145.56	6.10	1,045.34	13.67
2005-2014	144.72	5.67	139.98	6.84	383.68	8.01	148.36	6.14	1,054.83	13.63
2006-2015	152.16	5.96	136.91	6.78	385.08	8.05	147.63	6.14	1,061.02	13.73
2007-2016	158.25	6.12	133.51	6.80	385.14	8.09	147.83	6.12	1,064.86	13.89
2008-2017	162.64	6.19	131.76	6.83	383.95	8.13	146.77	6.10	1,063.85	13.95

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂)

Table 4.33. Forest carbon stocks by ownership and land status, 2001-2010 through 2008-2017. Compare to Appendix C tables. Standard errors not included due to combining mixed estimates from separate pools. Please review section 4.3 for an understanding of how stock changes calculated from this table differ from flux determined by directly measuring growth, removals and mortality on the same plots over time.

	Unreserved timberland						Reserved forest land		All forest land	
	Private - corporate		Private - noncorporate		National forests		National forests		All ownerships	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Million metric tons C¹</i>									
2001-2010	436.56	13.85	365.85	14.39	1,050.23	18.25	420.76	15.93	3,243.97	23.95
2002-2011	428.28	13.87	365.65	14.53	1,064.31	18.69	424.43	16.10	3,247.82	24.14
2003-2012	434.37	13.67	369.63	14.63	1,065.54	16.35	441.51	12.02	3,250.18	23.25
2004-2013	440.61	13.81	365.32	14.69	1,067.68	16.42	442.04	12.04	3,247.04	23.41
2005-2014	444.45	13.82	356.30	14.51	1,071.87	16.34	447.52	12.01	3,252.34	23.46
2006-2015	459.62	14.05	346.47	14.41	1,074.02	16.38	449.32	12.01	3,254.20	23.55
2007-2016	472.35	14.22	333.48	14.29	1,074.21	16.44	453.22	11.98	3,256.02	23.67
2008-2017	482.80	14.25	324.93	14.26	1,073.64	16.50	452.92	12.00	3,255.59	23.73

¹Multiply carbon (C) by 3.667 to calculate equivalent carbon dioxide (CO₂e)

5 Harvested Wood Products

5.1 Background

In 2012, Stockmann et al. published a paper using two methods to estimate HWP C for the US Forest Service Northern Region: the Intergovernmental Panel on Climate Change (IPCC) production approach (adopted by the US Environmental Protection Agency (EPA)), and the California Forest Project Protocol (CFPP). For a comparison between methods refer to Stockmann et al. (2012). Stemming from the work by Stockmann et al. was a model created based upon the IPCC production approach using country-specific Tier 3 criteria data. At the request of California Department of Forestry and Fire Protection's Climate Change and Forest Inventory Specialist, the University of Montana's Bureau of Business and Economic Research (U-MT BBER), in coordination with the US Forest Service Pacific Northwest Research Station (USFS PNW), was contracted to provide estimates of HWP C using state-specific data within the IPCC production approach context.

HWP C monitoring systems have been implemented at the national level (US EPA 2018a, Skog 2008, IPCC 2006, 2014, Smith et al. 2006). Robust inventory-based methods for estimating carbon stocks and flux in forest ecosystems are well established in the US and several tools are available to forest managers (Smith et al. 2006, 2004, Zheng et al. 2010, Galik et al. 2009). However, some of the tools used to estimate carbon stored in forests do not provide estimates of HWP C (e.g., U.S. Forest Carbon Calculation Tool, Smith et al. 2006) while others are restricted to national level HWP C accounting (e.g., WOODCARB II, Skog 2008). Neither models independently serve as accessible and practical tools for estimating and monitoring stocks and flux in HWP C at the state level (Ingerson 2011, Stockmann et al. 2012).

As defined by the IPCC, HWP are made from wood including lumber, panels, paper, paperboard, and wood used for fuel (Skog 2008). The HWP C pool includes both products in use (HWP-use) and products that have been discarded to solid waste disposal sites (HWP-SWDS). These pools represent carbon storage and are the only harvested wood product pools reported in the forest sector. Additions to the HWP C pool are made through harvesting, and emissions result from decay and combustion of wood products. Forest management can affect the quantity of carbon stored in both ecosystems and forest products over time, and management activities in the US frequently include silvicultural treatments that produce HWP. Credible information on forest ecosystem and HWP C stocks and fluxes can inform California forest managers, policy-makers, and the public of the tradeoffs between carbon storage and other forest management objectives, and between the short and long-term carbon consequences of alternative forest management strategies (Galik and Jackson 2009, Ryan et al. 2010, McKinley et al. 2011). Though the HWP C fraction of the pool is small compared to ecosystem carbon, it is an important component of carbon accounting and reporting.

Here we develop the means to quantify the contribution of HWP C to carbon pools and greenhouse gas mitigation resulting from California timber harvests for the California Board of Forestry and Fire Protection's annual AB 1504 carbon inventory. Our objectives are to:

- 1) Use the internationally established and accepted IPCC Tier 3 production approach to make estimates of HWP C stocks and fluxes for the state of California;
- 2) Provide a framework with clear metrics and estimation methods that can be applied to other land management units, such as by ownership or state sub-regions.

We have not developed a system nor estimates of carbon stored in HWP for evaluating the future impacts of specific management actions, nor do we advocate any particular course of action to improve carbon stewardship.

5.2 HWP C Methods

The methods used to estimate HWP C for California is discussed here in four parts: production approach, computational methods, data sources, and uncertainty analysis; and generally follows the methodology outlined in Stockmann et al. (2012), Anderson et al. (2013) and Loeffler et al. (2014). The first part provides a general overview of the framework used for carbon accounting, including defining the scope of analysis, relevant carbon pools, and associated fluxes. The second part provides detailed information about the data we used in our calculations that transform harvest data into carbon accounting metrics. Then we describe the origins of the data used in this analysis, with an emphasis on understanding what inputs are required and how data quality can vary over time. Lastly, the quantitative treatment of uncertainty is discussed in light of limitations of the approach used, computational methods, and data. California's forest product infrastructure in relation to forestland and development is depicted in figure 5.1.

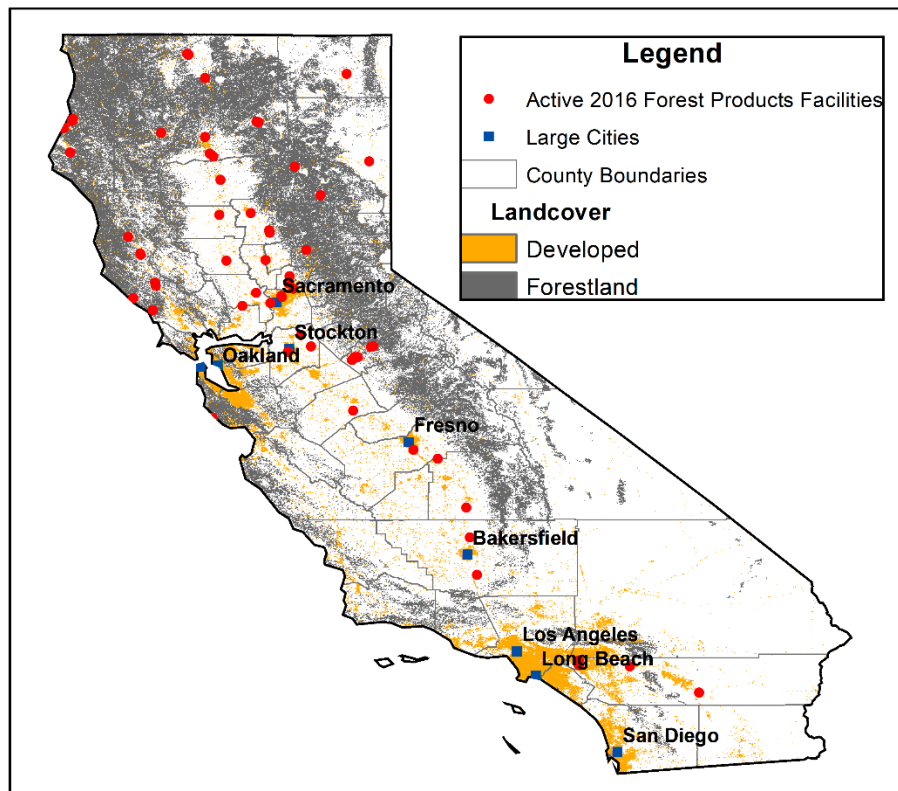


Figure 5.1. California human population densities, forestland (Homer et al. 2015) and forest product facilities (BBER 2016).

5.2.1 Harvested wood products carbon accounting approach

We use the IPCC production approach, which has been adopted by the US EPA, to estimate annual changes (flux) in HWP C pools in California (Figure 5.2). In this IPCC approach, the annual carbon stock change for the state’s forest sector is a function of carbon flow among the atmosphere, forest ecosystems, and HWP, and is calculated as:

$$\Delta S = (NEE - H) + (\Delta C_{CA})$$

In this equation ΔS is the annual stock change for the state’s forest sector, H – the focus of this analysis – is the annual harvest of wood from the California’s forests for products and **NEE is the annual net ecosystem exchange** between the atmosphere and the state’s forests from all ecosystem processes including photosynthesis, decay, and natural and anthropogenic fire. ΔC_{CA} is the flux in carbon stored in HWP that were made from wood harvested from the state’s forests (Figure 5.2, Table 5.1). In the IPCC approach used in this analysis, the flux in carbon stored in HWP (ΔC_{CA}) is the sum of the net flux in carbon stored in products in use ($\Delta C_{IU\ CA}$) and the net flux in carbon stored in products at solid waste disposal sites ($\Delta C_{SWDS\ CA}$) (Table 5.1). By calculating the HWP C pools on an annual basis, we can estimate the annual stock change in the California HWP C pool (ΔC_{CA}), which is the relevant metric for this approach. Although emissions are inherent in stock change accounting, additional information on HWP C losses associated

with (HWP-energy) and without energy capture (HWP-without energy) are provided and do not include other carbon-based greenhouse gases such as methane. Carbon emissions from burning wood for energy are included in the energy sector for informational purposes only. While the HWP-SWDS pool represents stored carbon, this pool is also used to determine methane emissions from decay at landfills, which are included in the waste sector. Information from this report can support the CARB GHG inventory calculations for these emissions, although the HWP-SWDS pool may need to be further broken down to include the quantity of short-lived products (e.g., paper) and long-lived products (e.g., solid wood).

The following harvested wood product pools are new to the AB 1504 inventory:

- Harvested wood products in use (i.e., HWP-use, typically storage)
- Harvested wood products in solid waste disposal sites (SWDS) (i.e., HWP-SWDS, typically storage; also used to determine methane landfill emissions in the waste sector)
- Harvested wood products with energy production (i.e., HWP-energy, typically an emission, reported in energy sector for informational purposes only; does not differentiate between end-uses in the fuelwood category i.e., firewood, biomass energy plant feedstock) or end-use sectors (i.e., industrial, transportation, residential, commercial, electric power, etc.)
- Harvested wood products that decay or are burned without energy production (i.e., HWP-without energy, carbon emissions from this pool implicitly accounted for in losses to the other forest ecosystem and HWP pools; used to determine non-GHG emissions)

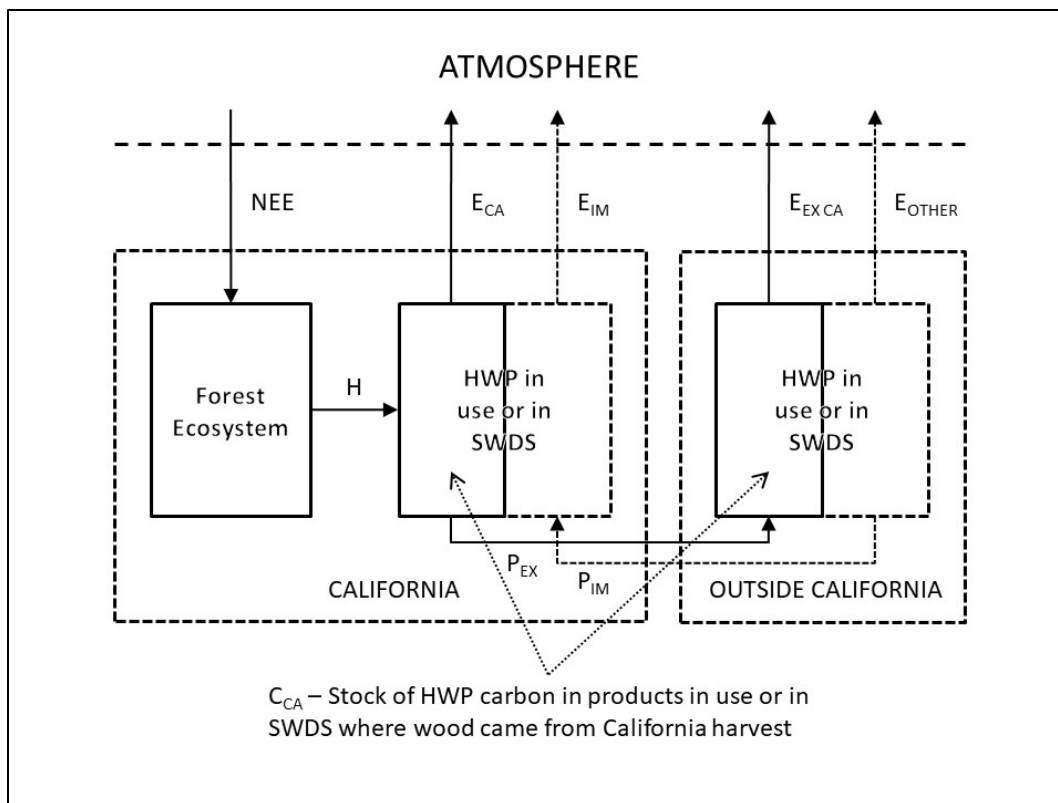


Figure 5.2. Carbon flows and stocks associated with forest ecosystems and harvested wood products (HWP) to illustrate the IPCC production (adapted from Skog 2008). See Table 1 for variable definitions.

Table 5.1. Variable definitions for the IPCC production approach shown in Figure 5.2 (Skog 2008). Units for all variables are MT C per year.

Variable	Definition
ΔS	Annual carbon stock change, which is calculated as $\Delta S = (NEE - H) + (\Delta C_{CA})$ in the production accounting approach.
NEE	Annual net ecosystem carbon exchange, the annual net carbon that moves from the atmosphere to forests.
H	Annual harvest of wood for products, which includes wood and residues removed from harvest sites, but excludes residues left at harvest sites.
HWP	Harvested wood products in use or at solid waste disposal sites.
E_{CA}	Annual emission of carbon to the atmosphere in California from products made from wood harvested in California.
E_{IM}	Annual emission of carbon to the atmosphere in California from products made from wood harvested outside of California and imported into California.
P_{EX}	Annual exports of wood and paper products out of California, including roundwood, chips, residue, pulp and recovered (recycled) products.
P_{IM}	Annual imports of wood and paper products into California, including roundwood, chips, residue, pulp and recovered (recycled) products.
$E_{EX CA}$	Annual emission of carbon to the atmosphere in areas outside of California from products made from wood harvested in California.
E_{OTHER}	Annual emission of carbon to the atmosphere in areas outside of California from products made from wood harvested outside California.
C_{CA}	Stock of harvested wood products carbon in use or at solid waste disposal sites where products used wood from California.
$\Delta C_{IU CA}$	Annual change (flux) in carbon stored in harvested wood products in use where products used wood from California.
$\Delta C_{SWDS CA}$	Annual change (flux) in carbon stored in harvested wood products at solid waste disposal sites where products used wood from California.
ΔC_{CA}	Annual change (flux) in carbon stored in harvested wood products in use and at solid waste disposal sites where products used wood from California.

5.2.2 System boundaries

Most people are familiar with imports and exports in the context of international trade; here the concept can be applied to understand the treatment of carbon imports and exports in the IPCC production approach. In this case the terms “export” and “import” refer to the border of the state of California. For example, HWP manufactured in the state may be used locally by consumers inside the state or exported from the local area for use elsewhere outside the state. Similarly, HWP produced outside the state may be imported for use within the state. Figure 5.2 shows that carbon emissions attributed to HWP from the state (indicated with solid boxes) include both emissions to the atmosphere from wood products harvested and used within California (E_{CA}) and emissions to the atmosphere from wood products harvested in California that were exported outside California ($E_{EX\ CA}$). Emissions (E_{CA} and $E_{EX\ CA}$) are further categorized as emitted with energy capture (e.g. fuelwood) and emitted without energy capture (e.g. decomposition, and burning for waste disposal, i.e. incineration). All fuelwood is assumed to be oxidized during the year of harvest. Exports (P_{EX}) include wood and paper products, as well as roundwood, chips, residue, pulp and recovered (recycled) products from wood harvested in California. Under the IPCC production approach, imports from elsewhere (indicated with dotted lines around the right side of both HWP boxes in Figure 2) are not included in regional accounting because the emphasis is on the location of harvest (H). Care must be given if including imported wood products to avoid double-counting with the inventory in the country of origin.

Additionally, this approach does not account for all emissions associated with HWP. For example, carbon emissions from fossil fuels used in harvest, transportation and manufacture of HWP are not deducted from the HWP pool, and are generally a small proportion of carbon storage (Lippke et al. 2011). Similarly, although HWP emissions with energy capture are quantified in the IPCC production approach, they are not assumed to substitute for an equivalent amount of fossil fuel carbon (i.e., **wood energy substitution**), potentially reducing fossil fuel emissions in some scenarios (Jones et al. 2010). Material left in the woods after harvest (i.e., **logging residues**) is not accounted for in HWP C as it remains part of the forest ecosystem. The USFS and the University of Montana-BBER are conducting a study to provide better information on logging utilization and logging residues left on site. When by-products of commercial harvest, fuels reduction and salvage (i.e., logging slash, sub-merchantable biomass, dead material) are utilized to create energy, emissions from fossil fuel-based energy, in-forest decay, and open-pile burning may be reduced, but are not quantified here. This study may provide further insight on this matter. Bark is also not included in this approach. However, based on 2012 green timber harvest volumes reported in McIver et al. (2015) and updated via McIver and Morgan (2017) to better reflect the contributions of timber, woody biomass, and bark utilization in California, bark comprised 8% of the total volume utilized for products and energy production and 19% of the total volume combusted for energy production (Christensen

et al. 2017 ⁴). Bark is typically utilized for short-lived landscaping products or is otherwise burned for energy (McIver et al. 2015), therefore it's omission from HWP C storage accounting is negligible. Emissions from bark utilization for energy production should be accounted for in the IPCC energy sector for informational purposes, but is not provided in this analysis. **Potential improvement:** Include information on bark utilization for carbon accounting in other sectors. Wood products can also have a lower emissions profile when used instead of other, more energy intensive building materials such as cement and steel. This approach does not incorporate carbon fluxes associated with **wood material product substitution**, and the associated land use changes that may ensue.

Currently IPCC does not provide guidance on addressing avoided emissions from burning wood for energy or wood product substitution. These emissions reductions are implicitly addressed in changes in emissions from other IPCC sectors and reporting categories such as the energy and building sectors. If wood is replacing fossil fuel energy or more energy-intensive materials, then emission from those categories should decrease. However, if overall consumption increases, the benefits from wood material and energy substitution (discussed further in section 11.6) could be diluted in the calculations. Additionally, as renewable energy use increases, the benefits of avoided fossil fuel emissions associated with wood products are likely to change. To fully understand the emissions reductions in these other sectors that might be directly associated with the forest sector, additional quantification is needed. Though emissions tradeoffs from product substitution are outside the scope and purpose of the approach applied in this report, there are well-developed methods of life cycle assessment (LCA) that account for all carbon emissions associated with manufactured products and that facilitate the comparison between wood products and alternative products (Rebitzer et al. 2004, CORRIM 2018). This IPCC approach provides information that can be used in an LCA.

If management decisions require information about harvesting, transportation and processing emissions, product substitutions, or other trade components not included in the approach used here, a consequential LCA is appropriate. However, for sub-national carbon accounting, the IPCC approach has several benefits over LCA. It is relatively easy to apply and congruent with US national carbon accounting standards, which is particularly important in developing tools that can be used by managers to meet carbon monitoring goals.

Potential improvement: It is a goal for future AB 1504 carbon inventories to provide information on actual and potential avoided emissions to more fully describe the carbon

⁴ Table 5.1 and Figure 5.2(b) in Christensen et al. 2017 incorrectly reports the carbon profile for wood associated with energy combustion from the 2012 harvest as 73% from harvested woody biomass, 16% from mill residues and 11% from bark. These values should be 53% from harvested woody biomass, 33% from mill residues and 14% from bark.

benefits associated with forests and wood products through life-cycle analysis/inventory accounting, discussed further in section 10.3.4 and 11.6. Inclusion of these data would be for informational purposes only. An upcoming sawmill energy use study conducted by U-MT BBER should provide information useful for HWP C LCA/LCI. Additionally, the logging utilization study being conducted by U-MT BBER and the USFS should provide useful information on the quantities of logging residues potentially available for utilization and decreased or avoided emissions.

5.2.3 Computational Methods

The HWP C model uses a series of complex calculations to estimate carbon storage metrics for timber harvested in California. Figure 5.3 provides a flow chart of the computational methods used to calculate annual stock changes and emissions from HWP for the IPCC production approach. This approach does not apply simple storage ratios to the harvest; rather it tracks carbon through the product life cycle from harvest to timber products to primary wood products to end use to disposal, applying best estimates for product ratios and half-lives at each stage.

Timber harvest records are used to distribute annual cut timber volumes among specific timber product classes (e.g., softwood ties, softwood sawlogs, softwood pulpwood, softwood poles, softwood fuel wood, softwood non-saw, etc.) (Appendix 3 Table 3.1). This distribution results in a set of **timber product ratios** across each timber product class (Appendix 3, Table 3.2). For periods of time when timber product ratios could not be determined, ratios available from a more recent time period were used. Following the same logic, timber products are further distributed to specific primary wood products resulting in **primary product ratios** (e.g. softwood lumber, softwood plywood softwood mill residue used for non-structural panels, etc.) (Appendix 3, Table 3.3). To develop these ratios, we used data from California-specific timber product output (TPO) literature that describe primary products output at intervals over the time period spanning 1968 through 2012 (Barrett et al. 1970, Howard 1972, Hiserote and Howard 1978, Howard and Ward 1988, 1991, McIver et al. 2015, Morgan et al. 2004, 2012, Ward 1995, 1997). Again, for periods of time when primary product ratios could not be determined, ratios available from a more recent time period were used. Mill residues are included as primary wood products with some entering SWDS immediately and some getting converted into products that rely on mill residues as raw material, such as particleboard and paper.

Harvested timber is sometimes reported in multiple or different units, primarily board feet (BF) Scribner log scale, and cubic feet (CF). In instances where harvested timber is reported in cubic feet, California-specific conversion factors were used to convert CF to BF using Keegan et al. (2010), Morgan et al. (2004, 2012), and McIver et al. (2015). As seen in Table 5.2, over time, the BF per CF relationship has changed for a number of reasons; for more information see Keegan

et al. (2010). Primary wood product outputs are converted from their reporting units to MT C using standard conversion factors for primary wood products (Smith et al. 2006, Table 5.2).

The recalcitrance of HWP C is highly dependent on the end use of those products. For example, carbon in lumber used in new single family home construction has a longer duration than carbon in lumber used for shipping containers, which is released into the atmosphere more quickly through combustion and decay. Annual primary product output was distributed to specific end uses according to annual wood product consumption estimates in McKeever, i.e. **end-use ratios** (McKeever 2009, McKeever et al. 2011) (Appendix 3, Table 3.4).

Table 5.2. Conversion factors used in this analysis.

Conversion	Units	Conversion location
6.0200	BF per CF, timber harvest 1952 – 1979	
5.3500		
4.7170	BF per CF, timber harvest 1980 – 1989	
4.6213		
3.9594	BF per CF, timber harvest 1990 – 2000	External
	BF per CF, timber harvest 2001 – 2006	
	BF per CF, timber harvest 2007 – 2017	
33 to 42	lbs per cubic foot, primary products	Internal
2204.6	lbs per metric ton	Internal
0.95 to 1.0	Metric ton wood fiber per metric ton product	Internal
0.5	Metric ton carbon per dry metric ton wood fiber	Internal
0.711 to 0.919	MT C per CCF, primary products ¹	Internal

¹See Appendix 3, Table 3.9 for CCF to MT C conversions for all primary products.

For each of the 224 different possible end uses from California's HWP (e.g. softwood lumber/new housing/single family, softwood lumber/new housing/multifamily, softwood lumber/new housing/manufactured housing, softwood lumber/manufacturing/furniture, softwood lumber/packaging and shipping, etc.) for each vintage year, the amount of carbon remaining in use at each inventory year is calculated based on the product half-life (Appendix 3,

Table 3.5) and the number of years that have passed between the year of harvest and the inventory year. The **end use product half-life** value expresses the decay rate at which carbon in the products in use category passes into the discarded products category, representing the transition between the two pools. The remaining HWP C in use in a given inventory year is calculated for each vintage year end use based on a standard decay formula:

$$N_t = N_0 \exp\left(\frac{-t \ln(2)}{t_{1/2}}\right)$$

where N_t is the amount of carbon remaining in use in inventory year t , N_0 is the amount of carbon in the end use category in the vintage year of harvest, t is the number of years since harvest, $t_{1/2}$ is the half-life of carbon in that end use, and \exp is notation for the exponential function. In our calculations, the starting amount (N_0 , at $n=0$) is adjusted downward by an 8% **loss factor** (McKeever 2004, Skog 2008) to reflect an immediate loss before entering the products in use category. The lost material is assumed to enter the discarded products category. This loss in use accounts for waste when primary products (e.g. softwood lumber) are put into specific end uses (e.g. new single family residential housing), and this waste is immediately distributed to the discarded products category. Fuelwood products are assumed to have full emissions with energy capture in the year they were produced.

For carbon of a particular vintage in a given inventory year, the balance of HWP C that is not in use and not emitted with energy capture is assumed to be in the discarded products category (Figure 5.3). Carbon in the discarded products category is partitioned into five disposition categories: burned, recovered, composted, landfills and dumps. The proportion of discarded products that ends up in each of these five categories is different for paper and solid wood products, and has changed over time. For example, prior to 1970 wood and paper waste was generally discarded to dumps, where it was subject to higher rates of decay than in modern landfills. Since then, the proportion of discarded wood going to dumps has dropped to below 2%, while the proportion going to landfills has risen to 67%, with the remainder going to the other disposition categories (Skog 2008). Similarly, composting and recovery (i.e. recycling and reuse) have become a more prominent part of waste management systems. In 2004, approximately 50% of paper waste was recovered, compared to 17% in 1960. The disposition of carbon in paper and solid wood products to dumps and landfills categories is based on percentages in Skog (2008), i.e. **discarded products disposition ratios** (Appendix 3, Table 3.6).

Carbon from burned and composted discarded products is assumed to be emitted without energy capture. Currently it is assumed that discarded wood and paper burned with energy capture in California (i.e. waste incineration) is assumed to be zero due to lack of data (Figure 3). Carbon in the recovered category reenters the products in use category in the year of recovery. Carbon in products discarded to landfills and dumps are subject to decay determined

by their respective half-lives. The values for **discarded product disposition half-lives** in dumps and landfills expresses the decay rates at which carbon in these categories is emitted to the atmosphere (Appendix 3, Table 3.7). However, the calculations consider the fact that only a fraction of the discarded products pool in landfills is considered to be subject to decay; the **landfill fixed ratio** of solid wood carbon is 77% and 44% for paper. These ratios are identified as fixed carbon, not subject to decay in landfills (Skog 2008). For a given vintage year, the carbon remaining in SWDS in a given inventory year is the sum of fixed carbon and the carbon remaining after decay. We do not account for the difference between methane or other carbon-containing greenhouse gas emissions in terms of CO₂ equivalents, nor do we account for methane remediation that includes combustion and subsequent emissions with energy capture at landfills. All landfill and dump emissions are considered emissions without energy capture.

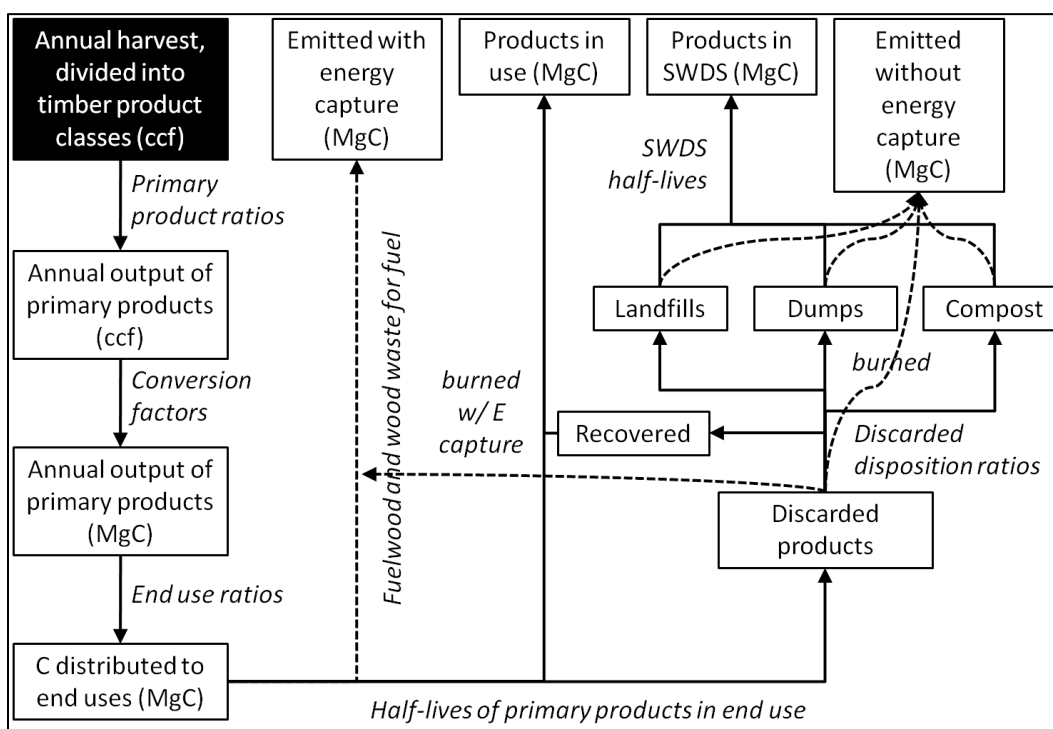


Figure 5.2. A schematic of calculations to quantify HWP storage and emissions. These calculations quantify HWP products in use, products in SWDS, emissions with energy capture, and emissions without energy capture using the IPCC approach.

These methods were used to calculate annual gross stocks and gross emissions for all inventory years from 1952 through 2017. Results for each inventory year were used to calculate net flux in stocks of carbon in the state's HWP products in use ($\Delta C_{IU, CA}$) and SWDS ($\Delta C_{SWDS, CA}$), as well as net flux in emissions from SWDS and fuelwood (E_{CA}). Note that stocks, emissions, and net flux associated with the latest year of harvest, which is 2017 in this case, is reported in year 2018.

5.2.4 California AB 1504 total carbon inventory reporting period

The 2017 California AB 1504 *forest ecosystem carbon stock* reporting period of total forestland inventory is a 10-year average consisting of 2008-2017 USDA Forest Service Forest Inventory and Analysis (FIA) annual inventory years. *Forest ecosystem carbon flux* is reported as the average annual flux from the seven ten-year time periods from plots initially measured between 2001-2007 and then re-measured between 2011-2017. To be consistent with FIA's forest ecosystem ten-year average reporting periods and correspond with 2008-2017 annual harvests, the 10-year average of the cumulative *HWP C stock* for the years 2009-2018 is reported (HWP-use, HWP-SWDS pools). The average annual *HWP C flux* (HWP-use, HWP-SWDS) for the seven ten-year intervals of 2002-2012, 2003-2013, 2004-2014, 2005-2015, 2006-2016, 2007-2017, and 2008-2018 is reported to match the 2017 FIA plot re-measurement cycle (Appendix 3, table 3.13).

To compare the removals reported during the FIA 2017 plot re-measurement cycles to the HWP C harvest for the 2017 AB 1504 reporting period (i.e., 2008 – 2017), the weighted average of the annual harvest values between 2001 to 2017 is reported. Average annual harvest is weighted by the proportion of FIA plots re-measured each year. As the proportion of re-measured plots increases so does the probability of measuring trees harvested from any plot (Appendix 3, table 3.14).

5.2.5 Online harvested wood products carbon accounting tool

Estimates of HWP C were calculated using an online carbon accounting model based on the IPCC Tier 3 production approach, and developed by personnel at the US Forest Service, the University of Montana, the California Department of Forestry and Fire Protection, and Utah State University. Two versions of the model exist. The original version of the HWP C accounting model referenced in Stockmann et al. (2012) requires two inputs: a harvest time series and a time series of timber product ratios that partition the harvest into different timber product classes, which were previously discussed and are discussed in more detail below. In addition, the user can further parameterize the original model with primary product ratios, if derived from defensible sources, or use any one of nine sets of regional values obtained from Smith et al. (2006). The option to input primary products ratios allows the user to more accurately reflect state or other regional changes in industry structure and associated primary product manufacturing if desired.

After much discussion with CALFIRE personnel, and following a stakeholder workshop presentation and exercise regarding the original model, a HWP C accounting model variant was developed specifically for California (CALFIRE). The resulting HWP C model CALFIRE variant allows the user to enter any or all of eight additional model inputs, or use the default values provided that were previously hardwired into the original model. The additional CALFIRE model variant inputs are:

1. Yearly end-use product ratios;
2. Products end-use half-lives;
3. Discarded products disposition ratios;
4. Discarded products disposition half-lives and landfill fixed ratios;
5. Distribution parameters;
6. Ratios for wood and paper burned with energy capture;
7. Thousand board feet (MBF) to hundred cubic feet (CCF) conversion factors;
8. Primary product CCF to metric tons C conversion factors.

As with the original model, the HWP C CALFIRE variant also performs Monte Carlo simulations that determine statistical confidence intervals, including random variable distributions and number of iterations. The original version of the model, with supporting documentation, can be found at: <http://maps.gis.usu.edu/HWP>. The HWP C accounting CALFIRE variant of the original model developed as a significant component of this effort was used for this analysis and will soon be made publicly available.

5.2.6 Data Sources

Data quality impacts the uncertainty and reliability of the estimates, and although the data used in this analysis were derived from published sources, there are still challenges associated with using historical data in HWP C accounting. This section is divided into four parts: first we discuss historical timber harvest data acquisition and limitations, and how those limitations were addressed. Following that we describe how the data were allocated to timber products, how timber products were allocated to primary products and finally how we allocate primary products to end use products. By standardizing units and partitioning the harvest among different timber and primary product classes, we created a continuous dataset spanning 1952 through 2017 that meets the criteria for estimation established by the IPCC (2006, 2013).

5.2.6.1 Historical timber harvest data

California timber harvests have been reported publicly for vintage years 1952 to the present (BLM 2016, CDTFA 2016, Bolsinger 1976, Warren 2005, USDA FS 2017, Zhou 2015). These reports and websites include volume of timber harvested in the state. Throughout the harvest record, data were available at the state or ownership level, with no instances of voids in the harvest data sets. All results in this report are based upon calendar year harvest reports. See Appendix 3, Table 3.1 for harvest volume data. These estimates could be further improved if harvest data for all California ownerships were readily available prior to 1952.

Because the model developed for this purpose is based upon cubic foot calculations, yet for simplification was altered to require thousand board feet (MBF) Scribner short log scale input metrics for harvested timber, the model uses internal and external conversion factors for specific timber products to convert volumes from MBF Scribner to hundred cubic feet (CCF) (Table 5.2). Furthermore, BF per CF conversion factors have changed over time. For example, Keegan et al. (2010) have found a 17% decrease in BF Scribner per CF conversion in California

from 1970s to 2000s. This information was incorporated into our calculations, and to accommodate this type of variability over time we provide an uncertainty analysis in this report, which is discussed below.

5.2.6.2 Historical timber product data

In this analysis, timber products are the category into which harvested timber is allocated. The model has 40 timber product categories (Appendix 3, Table 3.10). California harvest records from 1952 through 2017 do not partition the harvest among different timber product classes; they contain only total annual harvest. To calculate the proportion of total California timber harvest that went into each timber product class, we used TPO or similar data described above in the ‘Computational methods’ section (Barrett et al. 1970, Howard 1972, Hiserote and Howard 1978, Howard and Ward 1988, 1991, McIver et al. 2015, Morgan et al. 2004, 2012, Ward 1995, 1997). For each vintage year that TPO or similar data was reported, we derived the proportion of the harvest represented by each timber product class from 1952 through 2017. Although there are 40 timber product classes, the vast majority of harvested timber was categorized in the literature into seven categories (Table 5.3). See Appendix 3, Table 3.2 for all timber product ratios.

Table 5.3. The average annual proportion of California harvests distributed to timber product classes between 1952 to 2017 (n=66).

Product class	Mean	Std. deviation
Sawtimber, hardwood	0.001	0.001
Sawtimber, softwood	0.913	0.119
Pulpwood, hardwood	0.001	0.002
Pulpwood, softwood	0.002	0.003
Poles, softwood	0.003	0.003
Fuelwood, hardwood	0.001	0.002
Fuelwood, softwood	0.078	0.121
Other	0.001	0.000

5.2.6.3 Historical primary product data

The HWP C distributed from timber products to primary products is based upon disposition connections from harvested timber products to primary products. Although sets of primary product ratios are available in Smith et al. (2006), in this analysis we used the most California-

specific data available to derive primary product ratios (Barrett et al. 1970, Hiserote and Howard 1978, Howard 1972, Howard and Ward 1988, 1991, McIver et al. 2015, Morgan et al. 2004, 2012, Ward 1995, 1997). The HWP C model contains these California-specific primary product ratios as well as other regional default ratios found in Smith et al. (2006) for use outside California. See Appendix 3, Table 3.3 for California primary product ratios.

5.2.6.4 Historical end use data

Following the methodology in Stockmann et al. (2012) the historical end use data used for this analysis was obtained from McKeever (McKeever 2009 and McKeever et al. 2011). End use categories are shown in Appendix 3, Table 3.11. This national data set was used for a series of analyses and reports generated for all NFS Regions (USDA FS 2018) for the distribution of primary products to end uses (Appendix 3, Table 3.4). Unfortunately, there are no reported regional or state-level variations of end use in the literature. We acknowledge that this is not ideal, but no other comprehensive data could be found for this component of the analysis. Periodically updated HWP end use estimates would allow better HWP C storage and flux estimates in the future.

5.2.7 Uncertainty analysis

Interpretation of the results should be made in light of some constraints. Though we attempted to compile the most accurate information available, there exists an unknown amount of uncertainty among the computational data. Conversion factors (which depend on log size, mill technology and efficiency, etc.), distribution of timber products to primary products, and the distribution of primary products to end uses have changed over time. Though we have used annual data whenever possible, there is some uncertainty associated with applying averages to the early years of the harvest series.

Uncertainty was quantified using the methods described in Skog (2008) and are generally as follows: First, we identified the most critical sources of uncertainty in our analysis (Table 5.4). Second, we developed probability distributions (using expected ranges) for each of four major sources of uncertainty (conversion factors, reported harvest, product distribution variables, and product decay parameters) and in the model are referred to as **distribution parameters**. See Appendix 3, Table 3.8 for a list of distribution parameters included in the uncertainty analysis. Lastly we carried out Monte Carlo simulations to determine the collective effect of uncertainty in these variables on estimates of HWP stocks.

Table 5.4. Sources of uncertainty and range of the triangular distribution for each random variable used in the Monte Carlo simulation.

Source of uncertainty	Range of distribution	Years
Timber product ratios	±20%	1952 to 1979
	±15%	1980 to end
Primary product ratios	±20%	1952 to 1979
	±15%	1980 to end
Conversion factors, CCF to MT C	±5%	all years
End use product ratios	±15%	all years
Product half lives	±15%	all years
Discarded disposition ratios (paper)	±15%	all years
Discarded disposition ratios (wood)	±15%	all years
Landfill decay limits (paper)	±15%	all years
Landfill decay limits (wood)	±15%	all years
Landfill half-lives (paper)	±15%	all years
Landfill half-lives (wood)	±15%	all years
Dump half-lives (paper)	±15%	all years
Dump half-lives (wood)	±15%	all years
Recovered half-lives (paper)	±15%	all years
Recovered half-lives (wood)	±15%	all years
Burned with energy capture ratio	±15%	all years

We did not explore the contribution of each variable in a sensitivity analysis, but instead address collective uncertainty. Further investigation into the level of uncertainty of each

random variable and its effect on confidence intervals could help determine where to focus improvements in reporting to reduce uncertainty in carbon storage and flux estimates. Across all variables, sensitivity analyses could be used to identify variables that have the greatest impact on carbon storage and flux, and compare alternative levels of those variables associated with different scenarios of forest management and HWP production, use and disposition. As noted by Skog (2008), “The evaluation of uncertainty is itself uncertain because the true shape of the distributions is not known for many variables...” (p.68).

Because we apply different distributions to different time periods for some variables, the 18 distributions cover 16 different variables. Multiple time-delineated distributions are used for reported harvest, primary products ratios, and end use ratios, with time periods separated at benchmark years related to data quality. The probability distributions of these random variables were developed based on estimates in Skog (2008) and on professional judgment, and are assumed to be triangular and symmetric. Compared to normal distributions, triangular distributions are more conservative because they distribute values somewhat more broadly and have a higher probability for outlying values as a result (Campbell et al. 2018, Sprow 1967). The distributions are assumed to be independent of one another.

The effect of uncertainty in these variables on HWP C storage was evaluated using Monte Carlo simulation. For each simulation, a mean value and 90% confidence intervals are the results of 5,000 iterations performed to reach a stable standard deviation in the mean (Stockmann et al. 2012). In each iteration, HWP C stocks are calculated using values for variables drawn at random from the established distributions. Using thousands of draws, we produce a simulation mean and a distribution of values that can be used to establish the confidence intervals shown in the tables. These confidence intervals show the range of values in which 90% of all values are expected to fall. Although confidence interval selection is rather arbitrary at 90%, 95% and 99%, we selected the 90% confidence interval, which follows the methodology in Skog (2008) and is the basis of US national level HWP C accounting.

6 HWP C results: Carbon flux, stock and trends

In this analysis results of carbon physically present in harvested wood products in use or at solid waste disposal sites are given in metric tons (MT) of carbon (C). Results of carbon flux and emissions are given in metric tons (MT) of carbon dioxide equivalent (CO₂e). Net changes in individual harvested wood product carbon pools are also shown in units of CO₂e to provide insight into the components of change, even if they aren't a direct flux with the atmosphere (e.g., transition from harvested wood products in use to harvested wood products in solid waste disposal sites). Carbon can be converted to CO₂e by multiplying by 3.667 or the fraction 44/12⁵. Negative values indicate an emission or loss.

6.1 HWP C summary, 2017 reporting period

6.1.1 HWP C Stock and flux summary

For the 2017 California AB 1504 reporting period, the average HWP C stock is approximately 78.3 MMT C for products in use (HWP-use), 55.0 MMT C for products in SWDS (HWP-SWDS), and approximately 133.4 MMT C for both HWP pools (see Table 6.5). Monte Carlo analysis for total stock for single years show confidence intervals equivalent to approximately a ±0.04% difference from the mean.

For the 2017 California AB 1504 reporting period, the average HWP C flux is approximately -1.1 MMT CO₂e for products in use, 2.0 MMT CO₂e for products in SWDS, and 0.9 MMT CO₂e for all pools (see Table 6.6).

The weighted average annual harvest values associated with the 2017 California AB 1504 reporting period is approximately 2.8 MMT C (1.6 million board feet). This equates to approximately 10.2 MMT CO₂e per year in the form of commercial timber removed from the forest (Appendix 3, Table 3.14). Based on the forest ecosystem portion of the inventory for the same time period, approximately 13.8 MMT CO₂e per year is cut within the forest (Table 4.6a).

6.1.2 HWP C Emissions summary

HWP C emissions data for HWP burned with and without energy capture are not included in forest sector C accounting, but are used in other sectors (i.e., waste, energy). Cumulative emissions associated with these pools (HWP-energy, HWP-without energy) for individual years can be found in table 6.2. However, without a greater understanding of the reporting

⁵ Throughout the forest ecosystem portion of the inventory, results are converted from C to CO₂e by multiplying by 3.667. Throughout the harvested wood product portion of the inventory, results are converted from C to CO₂e by multiplying by 44/12 providing more significant digits and therefore slightly different numbers when rounded compared to multiplying by 3.667.

timeframes and data needs from these other sectors, additional calculations on HWP emissions are not provided in this report at this time. A **potential improvement** would be to include more information on HWP C emissions after collaboration with CARB or other agencies responsible for reporting on wood energy emissions.

6.2 Total California timber harvest

From 1952 through the 1960's annual timber harvests in California remained well above 6 MMT C per year (5 million MBF per year). This was followed by a slow overall decrease in harvesting during the 1970's, when levels decreased 32% from the decades old high harvest in 1955 of 7.4 MMT C (6.02 million MBF) (Table 6.1, Figure 6.1). Following a steady decrease in timber harvesting during the 1960's and 1970's, a precipitous decline in harvest coincided with the twin recessions of the late 1970's and early 1980's to the lowest levels in decades of 3.4 MMT C (2.5 million MBF) in 1982. A massive rebound immediately followed leading to a fifteen year high harvest of nearly 6.7 MMT C (4.8 million MBF) in 1988, with all years in the latter half of the 1980's seeing harvests well above 6 MMT C.

However, beginning in the early 1990's during the two year recession and continuing beyond the implementation of Northwest Forest Plan in 1994, California timber harvests decreased steadily and rapidly to a new low in the time series data of 2.8 MMT C (1.8 million MBF) in 2001. Harvests then remained relatively steady, hovering around 1.8 MMT C (2.9 million MBF) during most of the 2000's. After a one-year uptick in 2007, harvests decreased to a time series all-time low of 1.7 MMT C (950,000 MBF) in 2009, almost two years after the beginning of the Great Recession in the fall of 2007. Since 2009 timber harvest has rebounded slightly to levels around those seen in the 2000's with 3.2 MMT C (1.7 million MBF) harvested in calendar year 2017 (Table 6.1, Figure 6.1).

For the 2017 California AB 1504 reporting period, the weighted average of the annual harvest values between 2001 to 2017 is 2.8 MMT C (1.6 million MBF). This equates to approximately 10.2 MMT CO₂e per year in the form of commercial timber removed from the forest (Appendix 3, Table 3.14). Based on the forest ecosystem portion of the inventory for the same time period, approximately 13.8 MMT CO₂e per year is cut within the forest (Table 4.6a). This value includes all components of the tree rather than just the merchantable components, and some portions of the tree may remain on site. Given this qualification, the removals reported in the forest ecosystem portion of the inventory are reasonably comparable to the harvest values used in the HWP C analysis.

Table 6.1. Annual timber product output in California for selected years using the IPCC production approach. This table shows carbon removed from the ecosystem by harvesting.

Harvest year	Harvest (MBF Scribner)	Timber product output (MT C)
1952	5,057,000	6,210,832
1960	5,137,000	6,309,054
1970	4,566,000	5,607,171
1980	3,441,000	4,749,024
1990	4,251,000	6,642,580
1995	2,535,000	3,967,873
2000	2,112,000	3,305,696
2001	1,751,800	2,788,949
2002	1,838,753	2,927,226
2003	1,812,713	2,885,759
2004	1,875,287	2,985,609
2005	1,889,454	3,008,052
2006	1,774,600	2,825,202
2007	1,776,300	3,317,489
2008	1,497,513	2,796,902
2009	915,095	1,709,183
2010	1,302,764	2,433,257
2011	1,464,641	2,735,606
2012	1,437,180	2,684,315
2013	1,767,033	3,300,403
2014	1,494,437	2,791,258
2015	1,703,188	3,181,156
2016	1,687,376	3,151,622
2017	1,695,956	3,167,648

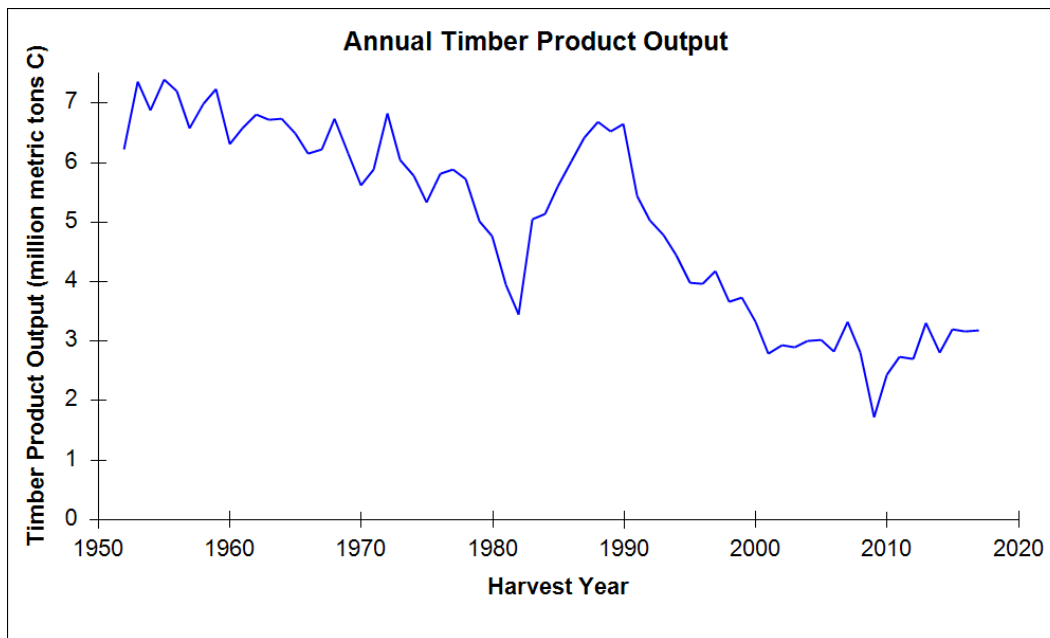


Figure 6.1. Annual timber product output in California, converted to metric tons carbon 1952 to 2017.

6.3 Total California HWP carbon stock and flux

The cumulative carbon stored in California HWP since 1952 is presently peaking at 135.2 MMT C, or 4.2 percent of forest ecosystem C (Figure 6.2, Table 6.2, Appendix 3, Table 3.12). For the 2017 California AB 1504 reporting period, the average HWP C stock is approximately 78.3 MMT C for products in use, 55.0 MMT C for products in SWDS, and approximately 133.4 MMT C for both HWP pools (Table 6.5). For reference, this is equivalent to 489.1 MMT CO₂, the CO₂ equivalent annual emissions from 93.5 million passenger vehicles, 1,135 million barrels of oil, or 2.6 million railcars of coal (US EPA 2018b).

From 1952 to 2000, carbon stocks in the California HWP pool have been increasing at an average rate of 2.7 MMT C per year. From 2000 to present the average annual additions to the state's HWP C pool decreased to approximately 360,000 MT C per year with negative flux of 313,000 MT C occurring in 2010. Recall that flux is the difference between annual additions and emissions (i.e. net annual storage). From 2011 to present HWP C additions have exceeded emissions by approximately 350,000 MT C per year.

Additions to carbon stored in products in use exceeded additions to SWDS from 1952 to 1992, except for 1980 – 1985 when additions to SWDS exceeded those to products in use. From 1995 to 2017 additions to SWDS have exceeded additions to products in use at an average rate of 760,000 MT C per year (Figure 6.2, Table 6.2, Appendix 3, Table 3.12).

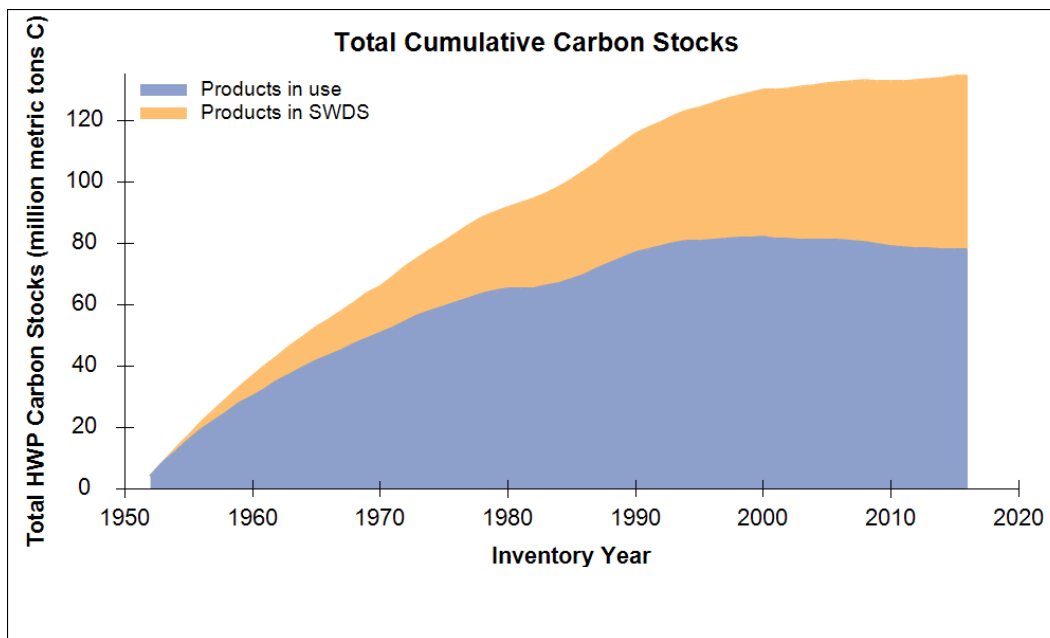


Figure 6.2. Cumulative total carbon stored in HWP manufactured from California timber using the IPCC production approach, 1952-2017. Carbon in HWP includes both products that are still in use and carbon stored at solid waste disposal sites (SWDS).

All else being equal, higher harvest levels result in more carbon removed from the ecosystem pool and added to the HWP pool (Figure 6.2). Figure 6.2 shows the cumulative carbon in both products in use and SWDS components of the HWP pool for California. Table 6.2 shows how the disposition of HWP C is broken into the four IPCC categories: emitted with energy capture, emitted without energy capture, products in use and products in SWDS. However, at the specific request of the California Board of Forestry and Fire Protection, HWP C emissions were converted into CO₂ equivalents.

Table 6.2. Cumulative disposition of California HWP C for selected years using the IPCC production approach. This table shows the fate of all carbon removed from the ecosystem by harvesting.

Inventory year	Emitted with energy capture (metric ton CO₂e)^a	Emitted without energy capture (metric ton CO₂e)^a	Products in use (metric ton C)	SWDS (metric ton C)	Total in HWP pool^b (metric ton C)
1960	61,908,899	16,232,248	27,667,761	5,327,633	32,995,394
1970	132,479,288	70,420,973	48,887,049	14,508,602	63,395,651
1980	181,420,269	135,260,390	64,078,978	25,694,013	89,772,991
1990	237,574,946	191,806,224	74,909,331	37,326,158	112,235,489
1995	263,901,420	224,437,893	80,400,038	42,418,528	122,818,566
2000	284,511,853	254,996,505	81,618,619	47,050,952	128,669,571
2001	288,013,803	260,890,976	81,652,928	47,901,672	129,554,599
2002	291,800,018	266,661,122	81,275,533	48,542,699	129,818,232
2003	295,774,167	272,204,241	81,076,267	49,141,885	130,218,152
2004	299,692,035	277,631,610	80,901,596	49,744,851	130,646,447
2005	303,745,145	282,878,612	80,837,280	50,312,157	131,149,437
2006	307,828,876	287,945,893	80,827,860	50,875,753	131,703,613
2007	311,664,369	292,831,580	80,750,592	51,440,696	132,191,288
2008	318,013,698	297,537,409	80,529,571	52,004,397	132,533,968
2009	323,366,512	302,069,347	80,110,589	52,563,202	132,673,791
2010	326,637,490	306,416,547	79,245,849	53,114,937	132,360,786
2011	331,294,180	310,630,581	78,743,395	53,642,072	132,385,466
2012	336,529,493	314,722,670	78,406,165	54,181,755	132,587,920
2013	341,666,649	318,698,498	78,069,992	54,731,949	132,801,941
2014	347,982,853	322,588,424	78,025,876	55,287,066	133,312,942
2015	353,324,672	326,377,453	77,768,409	55,864,087	133,632,496
2016	359,412,664	330,093,437	77,697,059	56,440,165	134,137,224
2017	365,444,137	333,737,339	77,621,397	57,032,821	134,654,218
2018 ^c	371,506,279	337,316,698	77,559,925	57,635,099	135,195,025

^a HWP-energy and HWP-without energy pools. HWP C emissions were converted to CO₂ equivalents at the request of the California Board of Forestry and Fire Protection. Multiply carbon (C) by 44/12 to calculate equivalent carbon dioxide (CO₂e).

^b Sum of products in use (HWP-use) and SWDS (HWP-SWDS).

° Although no harvest records are entered for 2018, the cumulative dispositions from prior year harvests are estimated for 2018. Note that HWP storage and emissions as a result of the 2017 harvest are reported by the model in 2018.

For each inventory year shown in the first column in Table 6.2, the second column represents the cumulative carbon emitted with energy capture (i.e. fuelwood; HWP-energy) in CO₂ equivalents, the third column shows cumulative carbon emitted through decay or combustion from SWDS in CO₂ equivalents (HWP-without energy), and the fourth and fifth columns show cumulative carbon stored in products in use (HWP-use) and products in SWDS (HWP-SWDS), respectively. The final column, the “Total in HWP pool” is the sum of products in use and carbon in SWDS. Note that the estimate for each inventory year includes the portion of HWP C still in use and in SWDS for all previous vintage years. Some of the cumulative emissions from the burned and decayed HWP (Table 6.2, second and third columns) are theoretically taken out of the atmosphere by regrowth on harvested sites, but this effect is accounted for in the ecosystem carbon component (NEE) of the change in carbon stock equation, not in the HWP component (H and ΔC_R).

Figure 6.3 and Table 6.3 present the net annual change (flux) in HWP C stocks. Negative flux in HWP C stocks values means that total carbon stored in the HWP pool in the inventory year is lower than in the previous year. In other words, a decline in the HWP pool results in a transition from a positive flux in carbon stocks to a negative flux in carbon stocks.

From the beginning of the harvest time series in 1952 additions to carbon stocks in HWP were generally decreasing until the early 1970’s during which two years of additions exceed the previous year’s additions. Following this, the decline in HWP C additions continued into the early 1980’s. Beginning in 1984 annual net additions began to again exceed the previous year additions at an average rate of 2.5 MMT C per year. In the 1990’s total net annual HWP C additions were again decreasing with average additions of 1.8 MT C per year. For the first decade of the 2000’s net additions remained relatively stable with average additions of approximately 510,000 MT C per year, almost entirely due to products moving into SWDS. Again, 2010 saw negative HWP C flux during which HWP C emissions exceeded storage by 313,000 MT C. From 2002 to the present, additions to products in use has been decreasing at an average annual rate of 240,000 MT C per year.

For the 2017 California AB 1504 reporting period, the average HWP C flux is approximately -1.1 MMT CO₂e for products in use, 2.0 MMT CO₂e for products in SWDS, and 0.9 MMT CO₂e for all pools (Table 6.6).

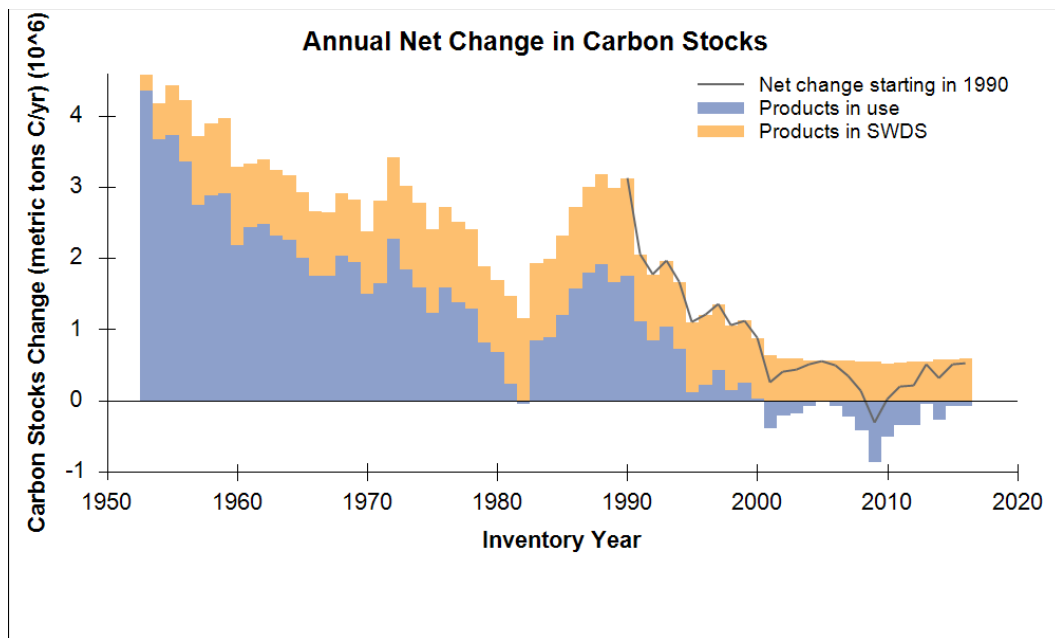


Figure 3.3. The flux in carbon stocks in HWP from the previous year using the IPCC production approach, 1952-2017. Negative values for products in use or at SWDS indicate that the carbon in those pools are shrinking, while positive values indicate that those pools are growing. The net stock change trend line is the sum of net flux for SWDS and products in use.

Table 6.3. Selected total stock change (net flux) in cumulative HWP stocks for products in SWDS, products in use, and total from harvests.

Inventory year	Products in SWDS	Products in use	Total stock change ^a
	MT CO ₂ e per year		
1960	3,900,098	10,666,720	14,566,818
1970	3,211,418	7,139,555	10,350,973
1980	3,916,620	3,031,061	6,947,681
1990	4,828,690	6,137,510	10,966,200
1995	3,431,240	2,669,878	6,101,117
2000	3,173,171	955,402	4,128,573
2001	3,119,305	125,797	3,245,102
2002	2,350,433	-1,383,779	966,654
2003	2,197,016	-730,643	1,466,373
2004	2,210,874	-640,460	1,570,413
2005	2,080,125	-235,825	1,844,300
2006	2,066,516	-34,540	2,031,976
2007	2,071,459	-283,315	1,788,144
2008	2,066,903	-810,411	1,256,492
2009	2,048,954	-1,536,268	512,685
2010	2,023,027	-3,170,714	-1,147,688
2011	1,932,828	-1,842,332	90,496
2012	1,978,838	-1,236,508	742,330
2013	2,017,378	-1,232,635	784,742
2014	2,035,430	-161,757	1,873,673
2015	2,115,742	-944,046	1,171,696
2016	2,112,287	-261,617	1,850,670
2017	2,173,073	-277,428	1,895,644
2018 ^b	2,208,352	-225,395	1,982,958

^a Net annual change (flux) in CO₂e in products in use and SWDS. HWP C emissions were converted to CO₂ equivalents at the request of the California Board of Forestry and Fire Protection.

^b Although no harvest records are entered for 2018, the annual net flux from the prior year harvest is estimated for 2018. Note that HWP storage and emissions as a result of the 2017 harvest are reported by the model in 2018.

Table 6.4 displays the cumulative disposition of HWP C for the disposition categories shown in boxes in Figure 3. These are carbon remaining in end-use products, recovered products, landfills, and dumps. Also displayed is carbon emitted from recovered (recycled) products, compost, dumps, landfills, and carbon emitted from burning discarded products with and without energy capture. Due to a lack of reliable data, carbon emitted from burning discarded products with energy capture is zero for all vintage years.

Table 6.4. Selected yearly carbon dispositions. These calculations quantify cumulative carbon storage from HWP products in use and in SWDS, and cumulative emissions with and without energy capture using the IPCC production approach.

Disposition category	2018 ^a	2017	2010	2000	1990
Cumulative storage (MT C per year)					
Products in use:					
End-use products	77,037,876	77,083,980	78,472,415	80,491,658	74,177,617
Recovered products	522,050	537,417	773,434	1,126,961	731,715
Products in SWDS:					
Carbon in landfills	53,260,383	52,483,316	47,057,770	37,645,813	22,689,570
Carbon in dumps	4,374,716	4,549,505	6,057,167	9,405,139	14,636,588
Cumulative emissions (MT CO₂e per year)					
Emissions w/ energy capture:					
Emitted from fuelwood	371,506,279	365,444,137	326,637,490	284,511,853	237,574,946
Emitted from burning discarded products	0	0	0	0	0
Emissions w/o energy capture:					
Emitted from landfills	40,535,827	39,554,598	32,328,953	20,792,426	10,055,952
Emitted from dumps	132,612,323	131,857,057	125,518,693	111,893,385	89,042,729
Emitted from recovered products	48,865,689	48,280,885	43,447,680	32,303,902	20,289,150
Emitted from burning	104,500,017	103,698,991	98,010,015	88,052,525	72,418,393
Emitted from compost	10,802,842	10,345,808	7,111,207	1,954,267	0

^a Although no harvest records are entered for 2018, the annual net flux from the prior year harvest is estimated for 2018. Note that HWP storage and emissions as a result of the 2017 harvest are reported by the model in 2018.

6.4 Timber harvest by owner group

Figure 6.4 displays total California timber harvest, converted to MMT C, by ownership group. Ownerships groups analyzed are privately owned forestlands, and publicly owned forestlands that include USDA Forest Service, State and other public, U.S. Department of the Interior (USDI) Bureau of Land Management (BLM), and Tribal. By far, timber harvested from privately owned forestlands have stored more HWP C than any other ownership group. To date, HWP harvested from privately owned California forestland between 1952 and 2017 is cumulatively storing nearly 91.5 MMT C – the highest level since 1952. Carbon stored in products in use from privately owned forestland peaked in 2008 at 54.5 MMT C whereas carbon stored in SWDS is currently at the highest level since 1952 at nearly 37.8 MMT C. Having peaked in 1998 at nearly 43.1 MMT C, overall total cumulative USFS HWP carbon storage is declining due to carbon storage in products in use decreasing at a faster rate than carbon in SWDS is increasing. Presently, total cumulative USFS HWP carbon storage is about 41.2 MMT C.

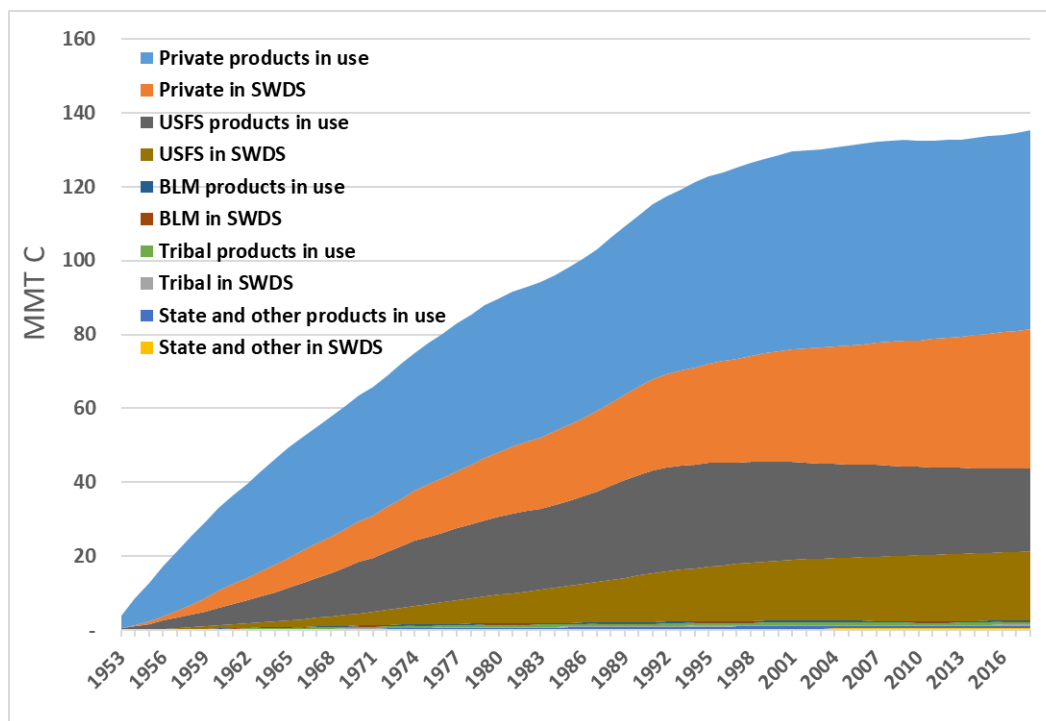


Figure 6.4. Cumulative total carbon stored in HWP, by owner group, manufactured from California timber using the IPCC production approach, 1952-2017. Carbon in HWP includes both products that are still in use and carbon stored at solid waste disposal sites (SWDS).

Although difficult to interpret, State, Tribal, and BLM owned forestland together comprise the tiny sliver of HWP carbon storage in Figure 6.4. Therefore, Figure 6.5 displays only these three forestland ownerships without the competing timber harvest magnitudes of private and USFS HWP C. Note the scales are the same units (MMT C), yet diminished magnitude. Presently,

California state and other publicly owned forestlands are at peak cumulative carbon storage with nearly 1.1 MMT C remaining in HWP; having peaked in 2001 at 0.7 MMT C, carbon in products in use has been increasing since 2011 and is currently storing 0.6 MMT C while carbon stored in SWDS from state and other publicly owned forestlands is currently at the highest level, storing just over 0.4 MMT C. Cumulative carbon storage in HWP from Tribal forestlands peaked in 2016 at nearly 1 MMT C and is currently storing nearly a similar amount of carbon. Carbon from Tribal forestlands in SWDS is presently at the highest level since 1952 at over 0.4 MMT C and carbon in products in use peaked in 2005 at just under 0.6 MMT C and is currently storing well over 0.5 MMT C. HWP C from BLM forestlands peaked in 1997, storing just over 0.5 MMT C, and in 2018 is storing approximately the same amount of carbon at slightly under 0.5 MMT C. Carbon in HWP products in use from BLM forestlands peaked in 1995 at over 0.3 MMT C and is currently storing well under 0.3 MMT C. Carbon in SWDS is at the highest level since 1952 at over 0.2 MMT C (Figure 6.5).

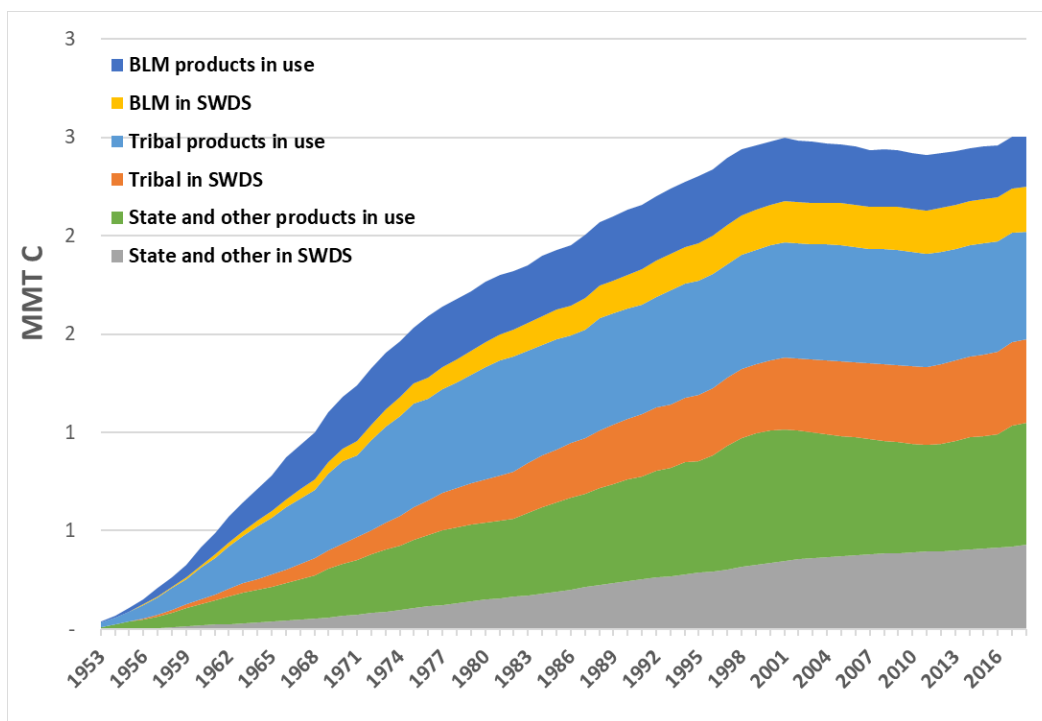


Figure 6.5. Cumulative total carbon stored in HWP, by State and other public, Tribal, and BLM owner groups, manufactured from California timber using the IPCC production approach, 1952-2017. Carbon in HWP includes both products that are still in use and carbon stored at solid waste disposal sites (SWDS).

For the 2017 California AB 1504 reporting period, average HWP C stocks and flux by owner and pool are shown below in Tables 6.5 and 6.6. Carbon stored from harvests originating on privately owned forestland comprises 67% of the HWP C stock at 89.5 MMT C. Carbon stored from harvest originating from USFS forestland comprises 31% of the HWP C stock at 41.4 MMT

C, with the remainder of the HWP C stocks coming from Tribal, BLM, and State and other public land. For all ownerships, net flux for the products in use pool is negative (see Appendix 3, table 3.13 for calculations). The average annual HWP C net flux from harvest originating from USFS and BLM owned forestland is negative for the 2017 California AB 1504 reporting period; HWP C emissions from these two ownerships exceed additions. The average annual net flux for all ownerships during the reporting period is 0.9 MMT CO₂e.

Table 6.5. Average HWP C stocks by owner group for the 2017 California AB 1504 reporting period (2008 – 2017 harvests).

Owner group	Products in use	SWDS	Total
Private	53,685,169	35,797,892	89,483,061
USFS	23,227,944	18,215,259	41,443,203
BLM	272,395	222,983	495,377
State and other public	571,573	404,440	976,013
Tribal	567,785	408,742	976,527
All owners	78,324,866	55,049,316	133,374,181

Table 6.6. Average of HWP C flux by owner group and pool for the 2017 California AB 1504 reporting periods.

Owner group	Products in use	SWDS	Total
Private	-208,341	1,539,685	1,331,344
USFS	-861,386	476,383	-385,003
BLM	-11,935	4,109	-7,825
State and other public	-12,181	15,108	2,926
Tribal	-8,769	13,360	4,591
All owners	-1,102,613	2,048,645	946,033

6.5 Uncertainty

To quantify uncertainty, confidence intervals were estimated for HWP C stock estimates using Monte Carlo simulation, representing 18 random variable distributions, with distributions determined from publications and expert opinion. Table 6.7 shows the resulting confidence

intervals for the IPCC-based estimates for selected years. For harvest between 1952-2017, the year of peak carbon stocks in Table 6.2, the 90% confidence interval ranges from 135,052,919 MT C to 135,172,532 MT C, with a mean value of 135,112,726 MT C (Table 6.7). This is equivalent to a $\pm 0.04\%$ difference from the mean. There is less than a 1% difference between the Monte Carlo Analysis simulated mean of 135,112,726 MT C and the reported HWP C stock of 135,195,025 MT C.

Table 6.7. Confidence intervals for cumulative carbon in HWP for selected years for harvests beginning in 1960 using the IPCC production. Means and confidence intervals were calculated using Monte Carlo simulation (5,000 iterations).

Inventory year	Simulation Mean Total in HWP pool (MT C)	90% Confidence interval	
		Lower limit 5% (MT C)	Upper limit 95% (MT C)
1960	32,976,429	32,950,180	33,002,678
1970	63,333,746	63,296,850	63,370,642
1980	89,666,391	89,620,516	89,712,266
1995	122,730,205	122,676,004	122,784,405
2000	128,579,328	128,523,490	128,635,167
2001	129,465,521	129,409,358	129,521,684
2002	129,728,964	129,672,720	129,785,207
2003	130,130,757	130,074,403	130,187,112
2004	130,559,219	130,502,752	130,615,686
2005	131,064,742	131,008,039	131,121,446
2006	131,621,547	131,564,606	131,678,488
2007	132,110,071	132,052,955	132,167,186
2008	132,453,054	132,395,719	132,510,388
2009	132,594,880	132,537,379	132,652,381
2010	132,280,845	132,223,329	132,338,362
2011	132,304,806	132,247,154	132,362,459
2012	132,507,086	132,449,172	132,565,000
2013	132,720,948	132,662,806	132,779,090
2014	133,232,744	133,174,265	133,291,223
2015	133,552,331	133,493,597	133,611,065

2016	134,056,598	133,997,575	134,115,620
2017	134,572,103	134,512,701	134,631,506
2018 ^a	135,112,726	135,052,919	135,172,532

^a Although no harvest records are entered for 2018, cumulative HWP C confidence intervals are estimated for 2018. Note that HWP storage and emissions as a result of the 2017 harvest are reported by the model in 2018.

6.6 HWP C FMRL

The following table shows HWP C pools by 10-year inventory period. These values can be appended to table 4.31, which shows forest ecosystem pools by 10-year inventory period. The 10-year period corresponding with 2002-2011 corresponds with the Forest Management Reference Level for harvested wood product carbon reporting.

Table 6.8: HWP carbon pools by 10-year inventory period, 2002-2011 through 2009-2018¹.

	2002-2011	2003-2012	2004-2013	2005-2014	2006-2015	2007-2016	2008-2017	2009-2018
	<i>Metric tons C</i>							
Private:								
Products in use	54,082,911	54,072,156	54,036,950	53,998,909	53,931,961	53,856,353	53,767,825	53,685,169
SWDS	32,858,494	33,277,992	33,695,463	34,111,036	34,528,682	34,948,257	35,371,246	35,797,892
<i>Total</i>	<i>86,941,405</i>	<i>87,350,148</i>	<i>87,732,414</i>	<i>88,109,945</i>	<i>88,460,643</i>	<i>88,804,610</i>	<i>89,139,071</i>	<i>89,483,061</i>
USFS:								
Products in use	24,872,408	24,611,856	24,360,035	24,121,648	23,891,451	23,661,830	23,439,750	23,227,944
SWDS	17,305,801	17,441,128	17,573,797	17,703,745	17,832,591	17,960,720	18,088,087	18,215,259
<i>Total</i>	<i>42,178,209</i>	<i>42,052,983</i>	<i>41,933,832</i>	<i>41,825,392</i>	<i>41,724,042</i>	<i>41,622,550</i>	<i>41,527,837</i>	<i>41,443,203</i>
BLM:								
Products in use	295,179	291,523	288,005	284,750	281,594	278,632	275,803	272,395
SWDS	215,137	216,291	217,426	218,537	219,645	220,751	221,863	222,983
<i>Total</i>	<i>510,317</i>	<i>507,814</i>	<i>505,431</i>	<i>503,287</i>	<i>501,239</i>	<i>499,383</i>	<i>497,666</i>	<i>495,377</i>
State and other public:								
Products in use	594,828	584,028	575,509	569,903	565,953	563,747	566,750	571,573
SWDS	375,598	379,919	384,019	387,980	391,948	395,941	400,020	404,440
<i>Total</i>	<i>970,426</i>	<i>963,948</i>	<i>959,528</i>	<i>957,884</i>	<i>957,901</i>	<i>959,689</i>	<i>966,770</i>	<i>976,013</i>
Tribal:								
Products in use	584,527	583,354	581,790	579,507	576,870	574,188	571,702	567,785
SWDS	383,235	386,840	390,471	394,100	397,726	401,363	405,029	408,742
<i>Total</i>	<i>967,762</i>	<i>970,194</i>	<i>972,261</i>	<i>973,607</i>	<i>974,596</i>	<i>975,551</i>	<i>976,731</i>	<i>976,527</i>
All owners:								
Products in use	80,429,853	80,142,916	79,842,289	79,554,717	79,247,830	78,934,750	78,621,830	78,324,866
SWDS	51,138,265	51,702,171	52,261,177	52,815,398	53,370,591	53,927,033	54,486,245	55,049,315
<i>Total</i>	<i>131,568,118</i>	<i>131,845,087</i>	<i>132,103,466</i>	<i>132,370,115</i>	<i>132,618,421</i>	<i>132,861,782</i>	<i>133,108,075</i>	<i>133,374,181</i>

¹ Note that 2002-2011 through 2009-2018 correspond with FIA periods of 2001-2010 through 2008-2017.

6.7 Discussion

6.7.1 National context

Our calculations of HWP C flux will allow California forestland managers and policymakers to reasonably account for carbon that was harvested from California forests over the study period. Although these results rely on numerous calculations, the time series of annual harvest volume

(Figure 6.1) is at the root of the trends in carbon stocks and flux for the California HWP pool. To place these HWP C estimates in the context of the total forest carbon, including both ecosystem carbon and HWP C, based on the 2017 AB 1504 reporting period HWP stock estimate of 133.4 MMT C presented in Table 6.5 and the California forest ecosystem carbon stock of 3,256.8 MMT C estimated by Christensen et al. (2018), we estimate that California HWP C stocks represent roughly 3.9% of total forest carbon storage associated with all forests in California as of the 2017 AB 1504 reporting period. At the national level, based on the EPA's total US HWP 2017 stock estimate of 2,612 MMT C (US EPA 2018a), using California HWP C stock through the 2017 harvest year represented 5.2% of total US HWP C stocks.

The 2017 California AB 1504 reporting period HWP C flux is 0.9 MMT CO₂e (Table 6.6). From the forest ecosystem portion of the inventory, net flux in forest land remaining forestland excluding non-CO₂ emissions from fires is 29.2 MMT CO₂e. Flux in HWP C pools therefore represents 3.1% of the total flux associated with forest land remaining forest land. At the national level, based on the EPA's total 2016 US HWP C flux estimate of 99.7 MMT CO₂e, using the California 2016 HWP C flux of 1.9 MMT CO₂e (Table 6.3) represented 1.9% of total US HWP C flux.

6.7.2. Applications of this approach by forest managers

The methods presented here for estimating the HWP C pool will allow resource managers and the public to develop a more complete understanding of the dynamics of HWP as a component of total forest carbon pool, and may allow the evaluation of the effect of alternative harvesting intensities on carbon stocks and fluxes. Furthermore, a benefit may be realized by evaluating the feasibility, utility, uncertainty, and limitations of the metrics and estimation methods that could be used to meet carbon monitoring objectives.

The IPCC approach requires harvest information for many prior years to make an estimate of net flux to carbon stocks each inventory year over time. We recommend that all applications of the IPCC approach consider the quality of the data and adjust their uncertainty analysis accordingly, particularly with regards to the distributions of random variables (e.g., Table 4). However, though carbon of older vintages may be associated with higher uncertainty, it is also likely to have a smaller impact on current stocks and fluxes than more recent harvests. Although we do not currently have harvest data for all California ownerships prior to 1952, we can look to the USFS Northern Region to demonstrate the relative importance of early harvests to current HWP C storage. For example, in the USFS Northern Region – which spans northern Idaho, Montana, North Dakota, South Dakota, and eastern Washington – Stockmann et al. (2012) quantified the portion of the current HWP pool that is attributable to carbon harvested prior to 1950. In 1950 the Northern Region HWP C pool was 4.5 million MT C. By inventory year 2010, only 1.7 million MT C of the carbon harvested before 1950 remained in products in use and SWDS, which accounted for 6.6% of the total stocks of 25.8 million MT C in 2010. This small contribution to current stocks is a result of two factors. First, there was greater harvesting

activity for the period after 1950. Second, following the passage of the Resource Conservation and Recovery Act of 1976 (RCRA, 42 USC 6901) and after a short lag, a much larger portion of discarded HWP goes into modern landfills where it is subject to lower rates of decay than in aerobic dumps or disposal by open burning, which were the dominant disposal methods prior to RCRA.

Obtaining historical information may present a challenge for some forestland owners and managers. It may be particularly difficult to reconstruct harvest data. In some instances, regression of trends after the period might be appropriate for extrapolation to earlier periods. Alternatively, managers could base their carbon accounting on national level parameters, making the assumption that national-level numbers are adequate for regional and sub-regional analysis. If national level values represent the best available data, the IPCC method requires only harvest volume information from the user. Many regional and forest type-specific default dynamics and decay functions are supplied by national level efforts (Skog 2008, Smith et al. 2006). The simplicity associated with using national data in calculations may make the system functional and effective in meeting monitoring needs for forest managers both within and outside of California, regardless of data quality.

We successfully applied the methods described by Skog (2008) to estimate the uncertainty associated with our California total HWP C stock estimates (Table 6.7). However, it is unclear how the magnitude of this uncertainty would change, if at all, if the analysis were done on smaller management units (e.g. individual or agency ownerships). The change in uncertainty would, in large part, depend on assumptions made about the distributions of random variables used in the analysis. In some cases, a state-level analysis may be sufficient to inform smaller land management planning, forest management practices, and planning of long-term (programmatic) timber harvest levels and associated effects on carbon flux. A sub-state analysis may be needed where there are significant within-state differences in ecosystems and disturbance processes and harvest levels.

6.6.3. Summary

The IPCC production approach is data intensive because it includes past harvest and product disposition data for each inventory year, but it provides estimates of total stocks and stock change making it congruent with national accounting and reporting protocols. HWP is an important carbon pool that should be considered in decision making associated with carbon monitoring and climate change adaptation and mitigation. However, as $\Delta S = (NEE - H) + (\Delta C_{CA})$ shows, total forest carbon is a function of both HWP and ecosystem carbon, which may have increased over the study period. The results from this report provide the first HWP C estimates for the California Board of Forestry and Fire Protection's annual AB 1504 forest carbon inventory. Now that this approach has been operationalized for use at the state level, other states are looking to follow suit.

Though our analysis is at the California state level, we provide a framework by which the IPCC method can be applied broadly at other geographic scales of timber harvest to estimate harvest and the resulting change in HWP C stocks for a region. We estimated the change of carbon stored in products in use each year by summing our estimates from wood harvested in the region and the change of carbon stored in solid waste disposal systems from wood harvested in the region. We were fortunate to have access to literature containing historic harvest volume data and records for the partitioning of the harvest to timber and primary product classes. Furthermore, we believe the accuracy of the reported data improved markedly as the literature approached the present time. Unlike estimates for the USFS Northern Region in Stockmann et al. (2012), this allowed us to develop timber product distributions and primary product distributions across the time series in this analysis. This also allowed us to make adjustments to primary product distributions to reflect the manufacturing changes for several primary product classes based on historical information.

The IPCC approach could be used to predict changes to the HWP component of the forest carbon pool resulting from planned or potential change in the amount of wood harvested. Quantifying uncertainty is an important component regardless of the analytical approach used because it quantifies the confidence we have in estimates of carbon stocks. Further research could help policy makers and managers better understand the implications of alternative forest management strategies on HWP C stocks and stock change. An integrated approach might include consequential LCA that evaluates changes in harvest activity on carbon emissions including all sources of emissions and product substitutions.

7 Forest ecosystem and HWP C Flux and Stock summary

7.1 Statewide average annual net carbon flux, 2017 reporting period

This updated estimate of average annual net forest ecosystem carbon sequestration is based on a 10-year average from plots and trees initially measured between 2001 and 2007 then re-measured 10 years later between 2011 and 2017. Throughout the report, results from this remeasurement period are referred to as 2017 results, or results from the 2017 reporting period or 2017 measurement cycle. Remeasuring permanently located inventory plots gives the FIA forest inventory program the unique ability to fully evaluate and monitor changes on each plot in all carbon pools especially changes in tree growth, removals, and mortality across all ownerships and forested areas of the state.

Harvested wood product carbon flux for the 2017 reporting period is reported as the average annual flux for the seven ten-year intervals of 2002-2012, 2003-2013, 2004-2014, 2005-2015, 2006-2016, 2007-2017, and 2008-2018 to match the removals associated with the 2017 FIA plot remeasurement cycle (Appendix 3, table 3.13).

As of the 2017 reporting period, California's forests remain net sinks, sequestering 27.8 MMT CO₂e per year. This value includes changes in forest ecosystem pools (29.2 MMT CO₂e per year), harvested wood product pools (0.9 MMT CO₂e per year), non-CO₂ emissions from wildfires (-0.5 MMT CO₂e per year), and forest land conversions (-1.7 MMT CO₂e per year).

The 2017 statewide rate of carbon sequestration for all forest land across all ownerships is 30.0 ± 4.9 MMT CO₂e per year, which includes the rate of carbon sequestration from all forest ecosystem pools across all ownerships is 29.2 ± 4.9 MMT CO₂e per year (Table 4.1, 4.3, 7.1) and the additional net sequestration associated with all HWP pools of 0.9 MMT CO₂e per year (Table 6.6) (excluding confidence interval for HWP C flux; Table 7.1). After also accounting for non-CO₂ greenhouse gas emissions from wildfire (methane and nitrous oxide), the 2017 statewide rate of carbon sequestration on all forest land remaining forest land is 29.6 ± 4.9 MMT CO₂e per year (95% CI; Table 7.2). Changes in land-use between forest and non-forest land condition is estimated to have a net effect of emitting 1.7 ± 1.0 MMT CO₂e per year (Table 4.2a, 4.9, 7.2). When these land use conversions are also accounted for, the *total* 2017 statewide rate of carbon sequestration for all forest land across all ownerships is 27.9 ± 5.0 MMT CO₂e per year (excludes confidence interval for HWP C flux; Table 7.2).

Table 7.1: Statewide average annual net CO₂e flux from forest ecosystem and harvested wood product pools in forest land remaining forest land for the 2017 CA AB 1504 reporting period.

	Net flux	
	Total*	SE
	<i>million metric tons CO₂ equivalent</i>	
<u>CARBON POOL</u>		
<i>Forest land remaining forest land (FF)</i>		
<i>Forest ecosystem</i>		
Aboveground live ¹	19.1	2.2
Aboveground dead ²	5.8	1.5
Belowground live ³	3.8	0.4
Belowground dead ⁴	1.0	0.2
<i>NET FLUX</i>	29.6	2.4
Forest Floor ⁵	0.1	0.2
Soil Organic C	-0.6	0.4
<i>FOREST ECOSYSTEM NET FLUX</i>	29.2	2.5
<i>Harvested Wood</i>		
Products in use	-1.1	--
Products at SWDS	2.0	--
<i>HWP NET FLUX</i>	0.9	--
<i>TOTAL NET FLUX</i>	30.0	2.5⁶

¹includes live trees, foliage, and understory veg

²includes standing and down dead wood

³includes live tree and understory veg roots

⁴includes dead tree roots

⁵Forest floor flux is a new addition from previous reports and is separated as a line item to highlight this addition. In future reports this will likely be lumped with aboveground dead.

⁶Excludes HWP C sampling error. There is no HWP C sampling error, just modeling error.

*totals may be off due to rounding

Table 7.2: Statewide average annual net CO₂e flux from forest ecosystem and harvested wood product pools, including non-CO₂ emissions from forest fires in forest land remaining forest land (FF) and from changes due to forest land conversions (i.e., by forest land-use and land-use change) for the 2017 CA AB 1504 reporting period.

<u>Land-use category</u>	Net flux	
	Total*	SE
<i>million metric tons CO₂ equivalent</i>		
Forest land remaining forest land (FF)		
Forest ecosystem		
Changes in forest ecosystem carbon	29.2	2.5
Non-CO ₂ emissions from forest fires	-0.5	0.1
Changes in HWP carbon	0.9	--
NET FLUX	29.6	2.5¹
Forest land conversions (LF)		
Changes in forest carbon, forest to non-forest	-3.2	0.5
Changes in forest carbon, non-forest to forest	1.5	0.3
TOTAL NET FLUX (LF)	-1.7	0.5
TOTAL NET FLUX (FF & LF)	27.9	2.5¹

¹Excludes HWP C sampling error. There is no HWP C sampling error, just modeling error

*totals may be off due to rounding

7.2 Statewide average carbon stock, 2017 reporting period

The 2017 California AB 1504 forest ecosystem carbon stock reporting period of total forestland inventory is a 10-year average consisting of 2008-2017 USDA Forest Service Forest Inventory and Analysis (FIA) annual inventory years. Harvested wood product carbon stocks are reported by the HWP C model in the year following harvest, i.e. harvested wood product carbon stock associated with 2017 removals is reported in year 2018. To be consistent with FIA's forest ecosystem ten-year average reporting periods and correspond with 2008-2017 annual harvests, the 10-year average of the HWP C stock for the years 2009-2018 is reported.

For the 2017 reporting period, the total statewide forest ecosystem carbon stocks is approximately 3,256.8 MMT C, total statewide harvested wood product carbon stock is approximately 133.4 MMT C, for a total forest ecosystem and harvested wood product carbon stock of approximately 3,390.2 MMT C (Table 7.3).

Table 7.3. Statewide average carbon stock for the 2017 CA AB 1504 reporting period.

<i>Carbon pool</i>	<i>Stock (MMT C)</i>
Forest Ecosystem¹	3,256.8
Harvested wood product²	133.4
Total carbon stock	3,390.2

¹For a complete breakdown of carbon stocks in the forest ecosystem pools, refer to table 4.12a

²For a complete breakdown of HWP C pools, refer to table 6.5

8 Comparison with other reports – Forest Ecosystem Carbon

A comparison of the results of this forest carbon inventory to past FIA inventories was included in the first report (Christensen et al. 2017) and is not repeated here.

8.1 National Greenhouse Gas Inventory

Table 8.1. Differences between net carbon sequestration rates for California in the U.S. NGHGI and this report (MMT CO₂e/yr).

Inventory	Live Tree ¹	Non-live tree, non-soil	Method/year
	<i>Net Sequestration, MMT CO₂e/yr</i>		
U.S. NGHGI (USDA OCE Climate Change Program Office 2016)	36.2	2.6	Stock-change, FIA direct-measurement 2013
1504 CA Forest Ecosystem & HWP (i.e., this report)	22.9	6.7	GRM, FIA direct-measurement 2017

¹ Live tree includes aboveground wood, foliage, and roots

The U.S. National Greenhouse Gas Inventory (NGHGI) is aggregated at the national level, so state-level estimates are not available to compare to those produced here. However, a report that uses the same data and methods is produced periodically that provides disaggregated results at regional and state levels. The most recent version of this report provides forest carbon stock and flux estimates for 2013, but does not include HWP (USDA OCE Climate Change Program Office 2016). The USDA report estimates live tree net stock change at 36.2 MMT CO₂e per year for California, while in this report we estimate the change at 22.9 MMT CO₂e per year (Table 8.1). The primary cause for this difference is in the use of regional equations used to calculate biomass from the tree measurements; the difference in time periods is also a factor. While both methods are based on the same merchantable tree volume calculations as described in section 3, we use a set of regionally-derived biomass equations while the NGHGI uses national component ratio equations. Both approaches use equations with built-in assumptions and are based on small datasets resulting in estimates of unknown accuracy (Weiskittel et al. 2015). This issue is further discussed in section 10.3.1 of this report. In addition, the USDA flux estimates use a stock-change approach as opposed to a GRM approach, but given the similarity of the estimates from both approaches in this report the effect is likely minor.

The USDA (2016) report estimates total non-soil stock change at 38.8 MMT CO₂e; after subtracting the live tree change this results in a non-live tree, non-soil stock change of 2.6 MMT

CO₂e per year. In comparison, we estimate changes in those pools of 6.7 MMT CO₂e per year, with most of the change attributed to standing dead trees. While the difference in tree-level biomass equations may have played a role, the use of models based on forest type and stand age to estimate down wood in the NGHGI report may have been a factor as well.

8.2 California Air Resources Board –Natural and Working Lands Inventory

Table 8.2. Differences between CARB inventory and this report.

Inventory	Net Sequestration (MMT CO ₂ e/yr)	Net flux from land-use change (MMT CO ₂ e/yr)	Stock (MMT C)	Pool	Method/year
Gonzalez et al. 2015, adjusted for undetected growth)	7.3 (7.8) ¹	-16.3 (-17.3) ¹	888 (945) ¹	Aboveground Live Vegetation (includes shrubs)	RS/land-cover change 2010
CARB 2017	7.1 (7.6) ¹	-16.5 (-17.5) ¹	892 (949) ¹	Aboveground Live Vegetation (includes shrubs)	RS/land-cover change 2010 & growth
1504 CA Forest Ecosystem & HWP (i.e., this report)	18 ²	-1.7 ³	1,025	Aboveground Live Tree (excludes shrubs). Stock includes foliage.	GRM, FIA direct-measurement, 2010 data for stock, 2017 data for flux

¹Quantities in parenthesis use carbon fraction of biomass equal to 0.5 for better comparison to the FIA-based quantities

²Based on latest year of data for 1504. 2015 data showed AGL net sequestration rate of 24 MMT CO₂e, and 2016 data showed 22 MMT CO₂e.

³Based on latest year of data for 1504. 2015 data showed net flux from land-use change of -1.2 MMT CO₂e and 2016 data showed -1.5 MMT CO₂e.

The California Air Resources Board (CARB) estimates for biomass, carbon stocks and stock change on forests and other lands for 2001 – 2010 are based on sources and methods developed under a contract with the University of California (Battles et al. 2013), reported in Gonzalez et al. (2015), and developed further under a follow-up contract (Saah et al. 2016). Gonzalez et al. (2015) reported a carbon stock of 840 ± 210 MMT C in 2010 and a net loss in aboveground live (AGL) carbon of 29 ± 10 MMT C in California forests remaining forests for the time-period of 2001-2010, or 12 MMT CO₂e per year. There is an approximate error of 25% associated with the C stock estimate and a 35% associated with the flux estimate. Other carbon pools were not estimated. Gonzalez et al. (2015) attributed most of the losses in aboveground live carbon to wildfire, but estimated net losses in unburned forests as well, and on both private and public lands. Gonzalez et al. (2015) used spatial data from LANDFIRE, which estimates vegetation types, canopy cover and height classes from Landsat remote sensing (RS)

data calibrated against FIA and other field data. Regression equations were derived to relate the LANDFIRE tree-dominated vegetation types to the plots to estimate aboveground biomass densities. Aboveground live carbon stocks were then estimated using the carbon fraction of biomass (0.47 ± 0.0235 grams carbon/grams biomass) and land area. Stock change between 2001 and 2010 was determined by calculating the change in land cover area by vegetation type and cover/height and associated stock changes. However, the authors noted that due to the coarse resolution of height classes in LANDFIRE, the remote sensing based methods employed in the study exhibited sensitivity to disturbance, and less sensitivity to tree growth. Working from data reported in FIA database version 6.0 of plots first measured between 2001-2002 and re-measured between 2011-2012, the authors posited a decadal statewide average tree growth rate of approximately 6% or $+47 \pm 8$ MMT C, representing tree growth undetected by remote sensing. By including this estimated undetected growth, the 2001-2010 AGL stock-change in forest land remaining forest land evaluates to a gain of 18 MMT C and would put the 2010 carbon stock at 888 MMT C (or 945 MMT C assuming a carbon fraction for biomass of 0.5). When annualized, the AGL stock-change rate evaluates to a gain of 2 MMT C per year or 7.3 MMT CO_{2e} per year (Table 6.2). For the more recent CARB inventory, live and dead pools were included, and a growth increment was applied to AGL stocks associated with tree-dominated areas that remained tree-dominated throughout the analysis period (CARB 2017). As a result, forest land AGL stocks in 2010 evaluated to 892 MMT C (or 949 MMT C assuming a carbon fraction for biomass of 0.5) and net sequestration evaluated to 7.1 MMT CO_{2e} per year (or 7.6 MMT CO_{2e} per year assuming a carbon fraction for biomass of 0.5). Research from a UC-Berkeley group further examining the difficulty LANDFIRE-C has in detecting growth is expected to be published in 2019 and may provide further insight (T. Holland, pers. communication, December 14, 2018).

In contrast, in 2010 we estimate slightly higher AGL stocks of $1,025 \pm 28$ MMT C (Table 4.31). Using 2017 data, we estimate an annual AGL gain of 18.2 ± 4.2 MMT CO_{2e} per year (Table 4.3). There is an approximate 3% error associated with the stock estimate and 23% associated with the flux estimate. Some of the differences may be attributed to the different time periods of analysis for flux estimates, land category definitions such as inclusion of shrub-dominated land in the Gonzalez/CARB estimates but not in the FIA estimate, slight differences in the carbon fraction of biomass used in the calculations for each estimate, and trade-offs associated with sources and methods. When the Gonzalez/CARB estimates use a 0.5 carbon fraction of biomass value instead of 0.47 their estimates approach the FIA estimates but are still slightly less. The Gonzalez approach appears to attribute greater losses of carbon in disturbed areas, and fewer gains of carbon in undisturbed areas, than the analysis in this report.

The Gonzalez paper attributes an additional aboveground live tree loss of 4.4 MMT C to land-use change, or 16.3 MMT CO_{2e}/yr, while in this report we estimate a net loss of 1.7 MMT

CO₂e/yr. This difference is likely due to Gonzalez et al. (2015) using land cover as the basis for analysis, and estimating that forest land area was converted to non-forest at a rate of 1% per year, while our analyses are based on land-use and estimate the area of forest land converted to non-forest was at a rate of 0.08% per year. The land cover/land-use distinction is a common confusion about whether disturbances reflect a change in land-use (e.g., forest to grassland) or a change in successional status (e.g., mature to seedling stage (e.g., Coulston et al. 2014)). Differences in time periods for analysis are a contributing factor here as well. Opportunities to further understand processes occurring in California's forests will accrue with advances in both remote sensing-based techniques and as the FIA program continues to refine methods to calculate carbon pools and to account for disturbance processes.

CARB and CALFIRE staff will collaboratively examine differences between the latest 1504 inventory and the CARB NWL inventory; publication is expected in 2019.

8.3 Other comprehensive carbon research in California

8.3.1 Comparisons to other spatial estimates

Battles et al. (2018) report for California's 4th climate assessment developed and tested methods for estimating above-ground live tree carbon stocks and flux. The approach used Landsat imagery, climate models, and other data to impute FIA plots across California, used temporally-smoothed Landsat imagery to create imputed maps at a 30 m scale for every year (called LT-GNN). A U.S. Geological Survey (USGS) land cover layer was used to separate forest from nonforest. They compared carbon stocks between their model and FIA design-based estimates at the county level for 2001-10. They also compared change at individual plot locations between FIA measurements and the LT-GNN predictions for the same measurement years. Comparisons were also made between LT-GNN estimates and LiDAR-based models for selected stands. The authors conclude that caution should be used at finer scales with high-biomass forests; for example, the model was not accurate for estimating biomass of an old-growth redwood forest. The county-level biomass stock comparisons with FIA fell along a 1:1 line but with an average difference in estimates for counties with more than 500 thousand acres of forestland of 5.8% (five of those 23 counties had differences >10%). The LT-GNN method tended to underestimate biomass increases measured at FIA plots, with an overall correlation for change in biomass of 0.42. The change estimates were most accurate for disturbed stands (correlation=0.60) and least for undisturbed stands that appeared stable in the imagery (correlation=0.14). The authors provide suggestions for improving the accuracy of the LT-GNN model.

Wilson et al. (2013) imputed carbon pools from FIA plots across the lower 48 states of the U.S. at a scale of 250 m pixels. They validated their model by comparing to FIA design-based estimates at 25, 50, 100, and 200 km scales (134 thousand to 8.56 million acres). At the smallest scale, the mean difference in modeled and design-based estimates was 4% for all pools, and 7% for above-ground live. The authors conclude that additional development is likely necessary before applying this modeling approach to monitoring carbon stocks at the project scale.

8.3.2 Comparisons to other wildfire emission estimates

Garcia et al. (2017) integrated pre- and post-fire Landsat with LiDAR and plots collected in and around the Rim Fire in the California Sierra to estimate pre- and post-fire above-ground biomass, and then subtracted to estimate "consumption" of 3.29 ± 0.02 MMT C (12.06 ± 0.06 MMT CO₂e). The Rim Fire burned 104 thousand ha, so their estimate translates to 31.6 metric tons C/ha. In this report, our statewide estimates of net change are 14.1 metric tons C/ha for aboveground wood (derived from Table B9 and an area burned of 2,632,000 acres), or 26.4

metric tons C/ha for live trees. The Garcia estimate is not too different from our estimate of live tree mortality. Indeed, they only focused on live tree biomass, and even adjusted out the post-fire dead trees from affecting their LiDAR-based estimates of biomass to avoid “bias”. In effect, their paper does not estimate fire emissions, but only the mortality of the live tree pool; at rates comparable to what we found in burned areas across the state. Our results show that even after severe mortality events and the subsequent decay between the events and the plots being measured, the majority of the C is still present in dead wood.

Wiedinmyer and Hurteau (2010) estimate fire emissions for California of 18 MMT CO₂e/yr for 2001-2008, which is an update (and reduced estimate) of the model and results presented in Wiedinmyer and Neff (2007) and Wiedinmyer et al. (2006). Given that the above-ground combustion factor used for forests in Wiedinmyer and Neff (2007) was 0.33 and estimated 24 MMT CO₂e/yr, the updated combustion factor would work out to be 0.25 on average. For comparison, the estimate in this report for fire (Appendix Table B9) is 6.8 MMT CO₂e/yr for 2001-7 to 2011-17 (with an additional 2.2 MMT CO₂e/yr net change for burned and cut areas). If we assume that on average, half of the gross growth of trees in burned areas occurred after the fire, an additional 2.2 MMT could have been emitted by the fire. If we assume the statewide average forest floor stock density (10.8 Mg/ha) occurred in the burned areas and was completely consumed by the area burned—both unrealistic assumptions—an additional 4.2 MMT might have been emitted. Adding up all these extra emissions comes to 15.4 MMT CO₂e/yr, which is in the ballpark of the Wiedinmyer and Hurteau (2010) estimate, though still low. This is perhaps not surprising given the uncertainties in the modeling approach, including the combustion factors being based primarily on high-intensity forest clearing fires, primarily from the tropics, and being applied to any detection of fire in a 1 km pixel (i.e, assuming the entire pixel burned at high intensity).

9 Comparison with other reports – Harvested Wood Product Carbon

9.1 Forest Carbon Plan

An analysis of harvested wood product carbon was completed for the California Forest Carbon Plan (FCAT 2018) using information on the 2012 California timber harvest (McIver et al. 2015, McIver and Morgan 2017). In that analysis 1,425 million board feet (MMBF) resulted in approximately 0.97 MMT C processed into finished lumber and other products and approximately 1.03 MMT C burned for energy production. An additional 0.10 MMT C from bark utilization was processed into timber products and 0.16 MMT C was burned for energy production.

In this analysis, the harvest volume for 2012 was 1,437 MMBF. However, for comparison sake, if 1,425 MMBF is run by itself through the harvested wood product model used in this report, it results in approximately 1.17 MMT C processed into finished lumber and other products in use and approximately 1.39 MMT C burned for energy production. An additional 0.02 MMT C was burned without energy production. There is no quantification of products or energy produced from bark utilization.

The numbers produced for the Forest Carbon Plan are comparable to the numbers generated by the harvested wood product carbon model when the same harvest volume is used for a single year. The numbers produced for the Forest Carbon Plan are based on converting volumes for primary products to carbon and do not take into account end-use product ratios, product half-lives, or other more detailed nuances that are addressed in the harvested wood product carbon model. The work for the Forest Carbon Plan demonstrated some additional utilization of bark for energy production that is not captured in the harvested wood product carbon model. A ***potential improvement*** for future 1504 reports would be to capture carbon associated with bark utilization.

9.2 CA Air Resources Board - Natural and Working Lands Inventory

The CA Air Resources Board plans to release a Natural and Working Lands inventory that will include estimates for carbon stored in harvested wood products. At this time their results are not available. However, collaboration between CARB and CALFIRE staff will compare the results from the NWL inventory and the 1504 inventory when the data become available.

10 Strategies to improve the 1504 inventory

10.1 Completed improvements since last report

- 1) Create estimates of stock and flux for the forest floor pool.
- 2) For estimates of soil carbon, apply the newer modeled calculations from Domke et al. (2017) that incorporate soil core measurements rather than the ones used in previous NGHGI reports.
- 3) Include regional area tables by forest type and ownership group.
- 4) Include stock and flux tables for counties, forest practice districts, and National Forests.
- 5) Include HWP carbon pools in the inventory based on IPCC Tier 3 inventory methods using the “production approach.” Pools include HWP-use, HWP-SWDS, HWP-energy, and HWP-without energy. HWP-use and HWP-SWDS represent storage pools. HWP-SWDS is also used to calculate landfill methane emissions for the waste sector. HWP-energy is used for informational purposes only in the energy sector and HWP-without energy is used to determine other GHG emissions associated with HWP.

10.2 Potential improvements to data collection

10.2.1 Increased number of plots measured per year

The possibility of increasing the intensity of the FIA inventory has been raised as a way to get more precise information on conditions and changes in California’s forest land. Concerns revolve around getting more precise estimates of the timing and causes of changes to forests, and getting more precise estimates of the changes on specific ownerships or vegetation types. The options to improve inventory precision include doubling the number of plots in the state (spatial intensification) and halving the measurement interval (temporal intensification).

While the number of plots measured each year would be the same for the temporal and spatial intensification, the implications for analysis of forest resources would differ. In the case of temporal intensification, a shorter cycle would provide better resolution on the timing of changes. However, the precision of estimates for any specific year (e.g., area burned in 2009) would be the same as the current inventory, as all the plots are used to do the calculation. Under temporal intensification, change and carbon flux estimates for the full set of re-measured plots would span 10 years instead of 20 under the current or spatially-intensified design. Measurement errors (e.g., shrinking trees, timing of plot measurements affecting number of growing seasons) would increase in importance. In the case of spatial intensification, more plots would provide more information on specific forest types, land owners, and regions and smaller confidence intervals for all the inventory estimates.

Doubling the number of plots (spatial intensification) enables more precise estimates for particular types of forest that are of interest. In general, the standard error for a doubling of plots will decrease by a factor of 0.71 ($=1/\sqrt{2}$). For example, for the estimate of live tree carbon change in the North Coast of $7,104 \pm 1,206$ (Table 4.5), based on available re-measurement of half the plots in California, the SE for double-intensity of plots would be 856. The mean using all the re-measured plots (10-year cycle) with a double-intensity would be 603, or half the current error estimate.

There are substantial logistical considerations involved in doubling the FIA sample each year, whether by spatial or temporal intensification, to ensure the resulting data are useful and accurate. There are 16,868 land plots in the California base inventory (all ownerships) and the current federal cost (field, data management, analysis, and overhead combined) is approximately \$1500 per plot. In many states, it has been advantageous to having the field work done by state crews or contractors. Regardless of who employs the field crews, significant training and field testing would be desirable to ensure high-quality data. Fluctuation in budgets that result in changing the number and timing of plot measurement would complicate the analysis of the inventory and could render some intensified data unusable. Additional analysis of goals and options will be needed to flesh out potential strategies.

This report can serve as a starting point to identify specific concerns surrounding uncertainty values, such as for a particular ownership or region, or timing of estimates with further discussion regarding the best strategies to address these concerns.

10.2.2 Improved estimation of non-sampled plots

Many analysts within FIA share the concern expressed about the numbers of non-sampled plots we are experiencing in some states, particularly as a result of denied access on private non-industrial ownerships. The current national approach for accounting for non-sampled plots assumes that those plots are the same as the mean of the rest of the plots in the same stratum, but the strata are fairly coarse and this assumption could be resulting in biased estimates (i.e., inaccuracies). These biases could affect state-level or ecoregion-level estimates as well as the particular areas that are under-sampled. Several ideas have been generated for researching approaches to create better estimates that rely on different kinds of remote sensing, statistical procedures, and/or modeling. However, given current research capacity and priorities, we are not aware of a study currently focused on this issue. It should also be noted that under a temporal intensification strategy, it's possible that more frequent contact of private landowners could result in greater rates of denied access.

10.2.3 Increased use of remote sensing

There is substantial interest in using remote sensing of disturbances to provide modeled up-to-date estimates of change; however, this would also require modeling growth, mortality, and decay on the undisturbed plots which could require substantial effort and potentially introduce bias in the sample. Remotely-sensed data are already an integral part of inventory estimation as it is a key attribute used to post-stratify the data and build estimates and sampling errors. It might be possible to develop more precise estimates of change by incorporating remote-sensing change detection layers into the stratification. Change detection from satellite images is often used to model potential changes in disturbed areas, but those model estimates have difficulty assessing growth and land-use change, and would essentially be independent estimates outside the inventory estimation framework. As mentioned in section 10.2.2, use of high-resolution imagery (e.g., aerial photography) could greatly improve estimation of characteristics of non-sampled plots.

Improved estimation of changes in land-use and land cover on non-forest plots, and more rapid assessment of change on forest plots, should be possible by additional analysis of inventory plots with high-resolution imagery. FIA is currently developing the Image-based Change Estimation (ICE) project that interprets changes in cover and land-use at every forest and non-forest plot location on a 2-3 year schedule in order to provide more consistent and timely estimates of change. These data could be useful in estimating change in carbon stocks on non-forest land-uses that FIA currently is not funded to measure in the field (e.g., chaparral, agriculture, urban).

10.3 Potential improvements to data compilation

10.3.1 Better tree biomass equations

One of the weakest links in any and all forest carbon estimates may be the equations used to calculate tree biomass. The tree carbon estimates in this report are based on a combination of tree volume, bark, and branch equations that were created from independent datasets. Most of the biomass equations were developed to provide initial approximations, and are almost all based on small numbers of trees with a narrow range of sizes from one or two locations. These equations are then applied to all the trees in a region, resulting in estimates of unknown accuracy (Temesgen et al. 2015, Weiskittel et al. 2015). For example, the bark and branch calculations for all Ponderosa pine on the west coast are based on a sample of 23 trees at Pringle Falls Experimental Forest in central Oregon. While alternative national-scale biomass equations developed by Jenkins et al. (2003) are often used, they are essentially a reformulation and averaging of the same limited sets of regional equations. The national FIA component ratio estimates described in Woodall et al. (2011) are a potential improvement because they are scaled to the volume equations used by FIA, which generally are based on

much larger samples than the biomass equations, but the overall accuracy of the estimates is still unknown.

The FIA program has attempted to reduce this uncertainty by funding detailed biomass studies to collect new data in geographically-distributed samples of trees growing in a range of conditions, that combine taper-based volume measurements with biomass measurements so that estimates will be additive and accurate. The initial effort is focused on the most abundant species in the nation (and includes the species that make up 75% of cubic volume in the west) and is incorporating existing and publicly-available volume and biomass data into an open library to aid in model development (Weiskittel et al. 2015). While many of the most important species in the West also occur in California, several species that are abundant in the state are not on the initial list (e.g., redwood, red fir, black oak). The current plan is to wrap up data collection for the initial list by 2019 and produce a set of improved equations for implementation in FIA estimates in the following year or two.

10.3.2 Planned improvements - Forest Ecosystem Carbon

No planned improvements are identified for forest ecosystem carbon data at this time. Potential improvements will be addressed if feasible.

10.3.3 Potential improvements - Forest Ecosystem Carbon

- 1) Separate out woodlands from forest using the NGHGI approach designed to exclude vegetation types where tree species rarely form single stems and do not attain a height of at least 16 feet in situ. Because the minimum height criteria could exclude recently-disturbed sites which merely haven't had enough time for the trees to reach site potential, we could add an additional limitation that the site has not had a severe disturbance within the last 30 years (or as far back as records go).
- 2) Remove forests less than 10 acres in size entirely surrounded by urban area, as in the NGHGI criteria, where they are classified as settlements. There might be a relatively simple (though imprecise) way to do this by identifying all forest plots within urban areas, or by classifying satellite-based vegetation maps and identifying plots where tree cover patches are too small.
- 3) For down wood carbon compilation, we could use the hardwood/softwood decay-reduction parameters from Harmon et al. (2011) instead of the species-level ones from the same publication which are currently used by FIA. The source data for the species-level parameters has small sample sizes for many species and exhibits unusual patterns of proportional decay with decay class when comparing among apparently-similar species.
- 4) Include data for dead trees <1.0 inches dbh when becomes available, rather than less than 5.0 inches dbh.

10.3.4 Planned improvements - Harvested Wood Product C

No planned improvements are identified for HWP carbon data at this time. Potential improvements will be addressed if feasible.

10.3.5 Potential improvements - Harvested Wood Product C

- 1) Include information on bark utilization for carbon accounting in other sectors.
- 2) Include information on actual and potential avoided fossil fuel emissions associated with HWP carbon pools to understand the potential benefits and trade-offs associated with wood utilization and wood energy and material substitution. These data would be used for informational purposes only as they are not currently a part of IPCC guidance for carbon accounting. Comprehensive life-cycle based analysis such as the Canadian Carbon Budget Model could be used to provide this information. Forest biomass energy analysis similar to Abt et al. (2018) could also be conducted for California. An upcoming sawmill energy use study conducted by U-MT BBER should provide information useful for HWP C LCA/LCI. Additionally, the logging utilization study being conducted by U-MT BBER and the USFS should provide useful information on the quantities of logging residues potentially available for utilization and decreased or avoided emissions. Additional work could be explored in the future as well to provide this information.
- 3) Include more information on HWP C emissions after collaboration with CARB or other agencies responsible for reporting on wood energy emissions.

11 Strategies leveraging forests for emissions reductions

11.1 Range of policy options

A range of policy options have been suggested for forest land management and resource use in the United States to reduce carbon emissions to or increase sequestration from the atmosphere (Malmsheimer et al. 2011, McKinley et al. 2011). Additionally, the Intergovernmental Panel on Climate Change's Fifth Assessment Report identifies strategies to mitigate potential negative climate change impacts through land management in the forest sector (Smith et al. 2014). Options include:

1. Promote afforestation/avoid deforestation: Forests store more C than other vegetation types and land-uses, so a net increase in forest land would increase sequestration. Reduce carbon losses in soils and biomass associated with land-use change.
2. Increase C stores in forests: Promoting forest growth through sustainable forest management practices would increase the amount of C stocks and/or increase sequestration, considering the age of the stand and other forest management objectives. Reduce carbon losses in soils and biomass associated with disturbance such as wildfires and pest outbreaks. Uncertainty about leakage effects. Trade-offs with carbon stored in harvested wood products.
3. Manage forest densities and fuels: In some forest types, thinning and prescribed fire can reduce the probability of trees dying in a fire, from pest outbreaks, or from density-dependent competition, but also reduces C stores in the near-term. Lack of consensus on trade-off effects on long-term sequestration.
4. Increase C in HWP pools: Continued or increased harvest, improved growth and yield, increased and efficient utilization of woody biomass, improved removal efficiency, diversifying products, increased use of long-term wood products, increased use-life through re-use or recycling, end-of-life energy capture, and reducing the climate impact from wood products such as by reducing landfill methane emissions or manufacturing emissions would increase sequestration and in some cases reduce fossil fuel emissions. Trade-offs with carbon stored within forests.
5. Wood energy and material substitution effects: Replacement of fossil fuel-based energy and fossil fuel-intensive construction materials with wood energy and construction materials would reduce fossil fuel emissions over time. Sustainability of forest practices, indirect land-use changes, actual fossil fuel substitution, timing of mitigation benefits, and efficiency of waste

and residue utilization and bioenergy systems must be considered. Life-cycle assessments can identify options with better greenhouse gas mitigation potential, such as sustainable use of biomass waste and residues. Lack of consensus on the extent to which substitution occurs and how to properly account for it.

11.1.1 CARB Forest Offset Protocol

The state of California has already made efforts to employ some of the climate mitigation strategies from the forest sector identified by the IPCC and others. Under the California Greenhouse Gas Cap-and-Trade program, the California Air Resources Board Compliance Offset Protocol for U.S. forests has identified reforestation, improved forest management, and avoided forest land conversion as eligible activities for offset credits (CARB 2013). Entities under the Cap and Trade regulation can use a limited number of offset credits to meet their compliance obligations, and all offset projects must result in GHG emissions reductions or removal enhancements additional to those legally required or that would otherwise occur based on a business-as-usual scenario. The following information summarizes the requirements for the forest offset credits; federal forest lands are excluded from the CARB forest offset protocol (CARB 2015).

Reforestation activities:

- Occur on land with less than 10% canopy cover for at least 10 years or land that has experienced a disturbance resulting in a loss of at least 20% of the aboveground biomass.
- Prohibit harvesting of planted trees for at least 30 years unless it is needed to prevent or reduce imminent threat of disease.

Improved forest management activities:

- Increase the overall age of the forest by increasing rotation ages.
- Increase the forest productivity by thinning diseased and suppressed trees.
- Manage competing brush and short-lived forest species.
- Increase the stocking of trees on understocked areas, and/or maintaining stocks at a high level.

Avoided conversion activities

- Utilize conservation easements or transfers of forest land to public ownership (excluding federal), thereby preventing conversion of private forest land to non-forest land-uses.

Auction Proceeds

Proceeds from California's Cap-and-Trade auctions are held in the state's Greenhouse Gas Reduction Fund (GGRF). The legislature allocates GGRF funds to support a wide range of programs and projects that further reduce greenhouse gas emissions and deliver other economic, environmental and public health benefits, through California Climate Investments (CCI) programs at various state agencies (<https://ww2.arb.ca.gov/our->

work/programs/california-climate-investments/about). These programs include the CCI Forest Health, CCI Urban and Community Forestry, and CCI Fire Prevention grant programs administered by the California Department of Forestry and Fire Protection (CAL FIRE).

CCI programs at the various agencies are coordinated by the California Air Resources Board (CARB), who sets grant funding guidelines, develops GHG quantification methods, consults on program administration, and performs annual reporting. The CAL FIRE-CCI Forest Health, Urban and Community Forestry and Fire Prevention programs provide grants for projects that result in net GHG emissions reductions through reduced incidence of severe or catastrophic wildfire, reforestation, forest pest management, forest conservation, biomass utilization, and urban greening. Additional CCI funding has been awarded to CAL FIRE to facilitate implementation of the California Forest Carbon Plan, including a significant increase in the use of prescribed fire. Recently approved legislation (S.B. 901) solidified funding for these CAL FIRE-CCI programs at \$200 million annually through 2023.

11.1.2 CA Forest Practice Act and Rules

One of the main purposes of AB 1504 (2010) is for the California Board of Forestry and Fire Protection to ensure that the rules and regulations that govern harvesting of commercial forest tree species consider the capacity of forests to sequester carbon dioxide sufficient to meet or exceed 5 MMT CO₂e annually by 2020, consistent with the Scoping Plan adopted by CARB. While this inventory has shown that California's forests are currently exceeding this goal, this sequestration rate may not be sustainable into the future given the uncertainty in the effects from climate change, the current level of forest disturbances from wildfire and pests, and aging of forests on federal lands. Additionally, with updates to the Scoping Plan and newer legislation specifying GHG emissions reductions, there may still be a need for the Board to review their rules and regulations. In a report to CAL FIRE, Buchholz et al. (2015) reviewed the California Forest Practice Act and Rules to determine the number of rules with carbon relevance and could serve as starting point for the Board.

The California Z'berg-Nejedly Forest Practice Act of 1973 (CA PRC § 4511-4629.13) provides a general set of definitions and regulations, and applies to private lands and non-federal public lands (except state parks) only. In a 2015 report to CALFIRE, Buchholz et al. identified 33 rules under this act with carbon relevance within the scope of the AB 1504 legislation. The following rules are likely to have the greatest influence:

- Maximum Sustained Production of High Quality Timber Products – Article 1, 4513(b)
- Stocking standards for point count and basal area – Article 5, 4561(a) and (b)
- Fire protection zone rules - Article 5, 4562

- Control of soil erosion - Article 5, 4562.5
- Nonindustrial Timber Management Plan - Article 7.5
- Conversions - Article 9

The California Forest Practice Rules (CA CCR tit. 14 § 895-1112) are intended to provide field personnel with working rules and apply to private land and non-federal public lands only. In reviewing the 2014 CA Forest Practice Regulations., Buchholz et al. also identified 225 rules with carbon relevance within the scope of the AB 1504 legislation, with the following likely having the greatest influence:

- Harvest Standards
 - Maximum Sustained Production of High Quality Timber Products – Subchapter 4, 5, & 6, Article 3, 913, 933, 953
 - Resource conservation standards for minimum stocking – Subchapter 4, 5, & 6, Article 2, 912.7
- Wildfire/Pest Control/Wildlife:
 - Treatment of logging slash to reduce fire hazard – Subchapter 4, 5, & 6, Article 7, 917.2, 937.2, 957.2
 - Burning of piles and concentrations of slash - Subchapter 4, 5, & 6, Article 7, 917.5, 937.5, 957.5
 - Protection of Residual Trees - Subchapter 4, 5, & 6, Article 7, 917.7, 937.7, 957.7
 - Fire Protection - Subchapter 4, 5, & 6, Article 8, 918, 938, 958
 - Emergency notice for fuel hazard reduction – Subchapter 7, Article 2, 1052.4
- Soil Erosion
 - Tractor operations - Subchapter 4, 5, & 6, Article 4, 914.2(c), 934.2(c), 954.2(c)
 - Timber operation, winter period - Subchapter 4, 5, & 6, Article 4, 914.7, 934.7, 954.7
 - Use of heavy equipment for site preparation - Subchapter 4, 5, & 6, Article 5, 915.1, 935.1, 955.1
 - Treatment of vegetative matter - Subchapter 4, 5, & 6, Article 5, 915.2, 935.2, 955.2
 - Reduction of soil loss - Subchapter 4, 5, & 6, Article 6, 916.7, 936.7, 956.7
- Conversion - Subchapter 7, Article 7, 1103, 1104.1, 1104.2

Additional work is required to determine how forest carbon dynamics would change with the current implementation of these rules (i.e., baseline, business-as-usual) compared to changes

to these rules. However, the results from the first AB 1504 Forest Ecosystem and Harvested Wood Product Carbon Inventory and the initial list of forest practice rules and regulations affecting forest carbon (Buchholz et al. 2015) could serve as a starting point in evaluating potential policy changes to affect forest carbon sequestration.

11.2 Promote afforestation/avoid deforestation associated with forest land conversion

Forests store more carbon per acre than other vegetation types and land-uses. Although it is counterintuitive, demand for wood products and a robust timber industry provides incentives to retain and maintain forests (Miner et al. 2014). Historically, forestry in the U.S. has demonstrated that forest area can increase and emissions can decrease with increased timber demand and production (Miner et al. 2014, Heath et al. 2010). Strategies that incentivize a robust timber industry within the state could ultimately help conserve California's forests.

However, even with sufficient demand for timber, if there are other more valuable uses for land then the market forces may not be sufficient to retain forest land. One study found that increased timber prices were still not strong enough to encourage increased investment in forest land in the West (Nepal et al. 2015). In these cases, instituting policies that decrease forest land-use conversions might be necessary (Skog et al. 2014). While the CARB Compliance Offset Protocol for U.S. forests provides some tools to reduce forest land conversions and the CA Forest Carbon Plan has identified that reducing forest land conversion is an important strategy in protecting the forest carbon sink, additional work may be needed to ensure adequate policies, tools, and incentives exist to encourage forest landowners to maintain their forests, including the federal government.

Gaining greater understanding of the conversions that do occur would provide insight into additional efforts that may be needed to reduce forest land conversions. Forest land-use conversions are currently permitted under the Forest Practice Rules through a timberland conversion permit (CA CCR tit. 14 § 1103), with exemptions permitted for conversions less than 3 acres in size (CA CCR tit. 14 § 1104.1) or for larger scale conversions for subdivision development on lands not zone as timberland production zones (CA CCR tit. 14 § 1104.2). Buchholz et al. (2015) recommended establishing a database of all reported timberland conversions to analyze their GHG consequences. However, such a database would only capture those completed legally. There appear to be many illegal forest land conversions, such as to marijuana grows, that do not go through the timberland conversion permit or exemption process. FIA data reflect land conversions that happen on plots to which crews are allowed access, which is unlikely in the case of illegal conversions. In the case of marijuana grows, if the FIA crew came across what appeared to be an illegal grow operation, they are instructed to

leave immediately for their own safety. The timberland conversion permit and exemption process also does not address conversions on oak woodlands, which are not a commercial tree species in California and are not subject to the Forest Practice Rules. For oak woodlands that were initially dense enough to qualify as “forest” rather than “rangeland,” FIA would have ground measurements of the amount of carbon lost to development. For lower-density oak woodlands that do not qualify as forest, additional information could be included during FIA’s photo-interpretation of land-use to estimate loss of woodlands.

In this report, the carbon density of California forest lands being deforested was similar to those on newly-forested lands being afforested (25 vs. 27 metric tons/acre, respectively). In contrast, in Oregon deforested lands tend to be carbon-dense Douglas-fir forest while afforested lands tend to be carbon-sparse juniper forest (Gray et al. 2014). In addition to the impacts of wholesale conversion of forest land to development, dispersed housing within forest land (e.g., low density residential or vacation homes) tends to be associated with reduced likelihood of forest management and changes in forest condition (Kline et al. 2004, Azuma et al. 2014). These changes in management in the wildland urban interface may lead to higher fire severity in those forests when fire occurs.

Opportunities and benefits for afforestation depend on the potential vegetation types of specific locations. Opportunities to convert non-forest to forest in productive vegetation types (e.g., mixed conifer forest) may be more limited due to existing population and land-uses than in lower-productivity areas (e.g., oak woodlands and juniper forests in current rangeland). Assessing the amount of effort required to reforest marginal lands could be useful. For example, promoting trees in urban areas, or in areas where trees might not naturally occur, may have limited climate benefits if the trees require large inputs of fertilizer, water, and energy (McKinley et al. 2011).

11.3 Increasing carbon stores in forests

Forest development after severe disturbances like clearcutting or stand-replacing wildfire follows a characteristic sigmoidal curve of carbon accumulation (Figure 2.2). Live tree mass accumulates slowly at first, then rapidly as canopy cover reaches a maximum and trees mature, then slowly again as trees fully occupy the site and come close to the maximum amount of biomass a site can support (e.g., Ryan et al. 2010, Gray et al. 2016). The maximum carbon stores are generally found in the oldest stands, although net accumulation approaches zero as these forests approach the carbon sink saturation point (Gray et al. 2016). Disturbances or thinning of even-aged or uneven-aged stands that cause partial mortality or removal temporarily reduce total stand carbon stores and temporarily reduce carbon accumulation rates (Oliver and Larson 1990, McKinley et al. 2011).

Extensive carbon losses to forests and soils can occur through poor land management practices. However, the California Z'berg-Nejedly Forest Practice Act of 1973 (CA PRC § 4511-4629.13) and associated Forest Practice Rules (CA CCR tit. 14 § 895-1112) were enacted to ensure that private commercial harvest is done in a manner that preserves and protects the state's natural resources and results in sustained timber yield (discussed further in this section). A variety of federal laws establish sustained yield directives for different federal land management agencies conducting timber harvests, such as the National Forest Management Act of 1976 which pertains to the U.S. Forest Service, or the Federal Land Policy and Management Act of 1976 which pertains to the U.S. Bureau of Land Management.

While minimizing disturbance and harvest and promoting maximum stand development would store more carbon in forests, as discussed in the previous section, reduced revenue could incentivize deforestation for some landowners. In addition, denser forests could be more prone to severe and uncontrollable wildfire, and reduced harvesting in one region could simply result in leakage, with forest products being harvested somewhere else. For forests that are managed for wood products, the decision of when to harvest, and how much of the wood in the stand to remove, affects the amount of carbon stored on the landscape, the rate at which carbon will subsequently be accumulated in the forest, and the rate at which carbon is being stored in wood products.

For many landowners where the primary objective is revenue, the decision of when to harvest is heavily influenced by estimates of *net present value* (NPV) or the revenue discounted by compounded interest on investment in regeneration and other stand management activities. Alternatively, for landowners where the objective is maximizing the amount of wood product, the decision of when to harvest is heavily influenced by the estimated point at which stands reach *culmination of mean annual increment* (CMAI). Management to CMAI results in stands that are older and store more carbon than management for NPV (Smith 1986, Newman 1988). Management to CMAI, also referred to as *maximum sustained yield*, would also create more wood products for potential storage in the HWP pool. Under the National Forest Management Act of 1976, National Forests are precluded from scheduling rotations (i.e., stand replacing harvests) before the estimated age of CMAI. The California Forest Practices rules also encourage landowners to develop a Sustained Yield Plan where "maximum sustained production" is a key criterion, along with environmental and economic considerations.

In addition to rotation considerations, carbon in forests can be increased by promoting increased forest growth (McKinley et al. 2011). Fertilizing, planting, and control of competing vegetation can greatly boost growth, but also involve energy costs. Short-rotation high-volume tree crops (i.e., hybrid poplar) can be part of a carbon sequestration strategy as well (Malmsheimer et al. 2011).

In terms of leakage, although California and the United States have sustainable forest management policies, timber demand in California is such that the state could be receiving imports from places where sustainable forest practices are not employed. In supplemental calculations completed for Battles et al. 2014, it was found that California harvests supplied over 30% of the state's wood demand in the 1970s, but dropped to less than 10% in the first decade of the 2000's (Buchholz and Robards 2013). As California timber demand exceeds within-state supply, it's possible that leakage in the form of increased harvests elsewhere within the United States or in other countries is occurring. The magnitude of leakage depends on the level of sustainable forestry practiced in supplying wood to meet California demand. Research could determine if negative leakage is occurring from wood product demand within the state and identify strategies to minimize it if it is occurring. Possible strategies could include identifying if and where it would be possible to increase harvests within the state as long as other forest ecosystem services are still being provided, or could include policies to incentivize sustainably harvested imports.

11.4 Manage forest densities and fuels

Large areas of forest land in the western United States have been managed with effective fire suppression for almost a century (Agee 1993). In many forest types, the removal of frequent fire (e.g., average rotations < 30 years) has resulted in the development of denser stands with small trees (e.g., Dolanc et al. 2014). In the mixed-conifer forests of the Sierra Nevada, compared to historic conditions, more of the current carbon stock is in higher densities of small, fire-prone trees (Collins et al. 2011, North et al. 2009, Lydersen et al. 2013, Earles et al. 2014). Stands with this kind of structure tend to burn at greater intensity, with higher mortality of overstory trees, than stands affected by frequent fire. Denser stands may also lead to higher mortality of overstory trees during severe drought due to competition for soil moisture. Consequently, these stands are at risk of losing carbon stocks in live pools, decreasing the stability of California's forest carbon sink.

Thinning stands from below is an effective management approach that can reduce the probability of the remaining trees dying in a subsequent fire or from pest outbreaks. Prescribed burning during optimal conditions can reduce live and dead fuels in the understory, thereby reducing the probability of the remaining trees dying in a subsequent fire. Depending on the landowner objectives, thinning alone, or thinning followed by burning, may be used to promote stand resilience to fire and pest outbreaks. However, both treatments also reduce the amount of carbon stored in the forest (McKinley et al. 2011), although some of the carbon in this material may be transferred to HWP pools depending on what happens to the wood. Additionally, while the quantity of the forest carbon stock may decrease, the quality may improve if treatments result in more carbon stored in live pools compared to dead pools or if

growth rates increase as a result of less competition and improved growing conditions. However, treatments involving prescribed fire can also result in additional greenhouse gas emissions.

There is a lack of consensus on the overall impact on carbon sequestration of thinning and/or burning. While there is agreement that fire severity is reduced in the short term, it is not clear how long the treatments are effective (e.g., Campbell and Agar 2013). Treatments may need to be repeated, potentially without the revenue available from harvesting merchantable material in the first entry. There is disagreement whether the survival of more live trees in lower density stands stores more carbon on the landscape compared to a greater abundance of dead snags and down wood that may take decades to decay (e.g. North and Hurteau 2011, Mitchell et al. 2009). Mitchell et al. (2009) found that dead wood persisted after fire in the wetter forest types with longer fire rotations of the Pacific Northwest (i.e., west Cascade western hemlock – Douglas fir and Coast Range western hemlock – Sitka Spruce forests) and in some cases in the dry Ponderosa pine forests of the east Cascades. However, in these dry Ponderosa pine forests with fire regimes and climate more typical of California forests, there were carbon benefits associated with certain types of fuel reduction treatments in stand conditions with uncharacteristic levels of understory fuel accumulation. There is also disagreement on whether treatment can ever affect fire behavior at the landscape scale, given that there is a very low likelihood that the small proportion of the landscape that is effectively treated will be visited by the small proportion of the landscape affected by wildfire each year (Restaino and Peterson 2013). However, while the modern burn probability is hard to predict for any single project or site, both modeling and empirical analysis reveal that burn rates are increasing in conifer forests throughout the west, and are likely to increase further due to climate change (Westerling et al. 2006, Westerling et al. 2011, Dennison et al. 2014). The increasing size of individual wildfires is resulting in larger patches of complete overstory tree mortality (Miller et al. 2009, Miller and Safford, 2012) and limiting natural conifer regeneration due to lack of seed source (Carlson et al. 2012, Collins and Roller 2013) which can negatively impact current and future forest carbon stocks.

Reducing forest densities and fuels to mitigate wildfire severity is a management strategy for addressing a wide range of objectives beyond their impact on carbon sequestration (e.g. Mitchell et al. 2009). The discussion over appropriate trade-offs for the quantity, quality, and stability of carbon storage will depend on management objectives and expectations for particular vegetation types.

11.5 Increase carbon in HWP pools

11.5.1 Use of life-cycle analysis

Carbon stored in harvested wood product pools may provide several benefits, but has associated trade-offs with forest ecosystem pools and intersects with a variety of other sectors. Consequently, it is important to mention the use of **life-cycle analysis** (LCA), which can help identify key trade-offs between forest management and fossil fuel use. LCA's help keep track of the complex series of interactions between such things as impacts to forest area and forest carbon stocks, timing of changes in carbon storage and emissions, the magnitude and warming impact of near-term and long-term emissions, and additional environmental impacts that may exist (Lippke et al. 2011, Miner et al. 2014, Skog et al. 2014, Bergman et al. 2014). This type of analysis extends beyond the forest to evaluate the energy, materials and associated emissions and waste required to produce wood products for every stage along the production and supply chain, including forest regeneration and management, harvesting, transport, processing, manufacture, use, maintenance and final disposal (Lippke et al. 2011; Heath et al. 2010, figure 11.1). LCA's are important in understanding the benefits associated with HWP pools, as well as wood energy and material substitution.

Valuable information for life-cycle analysis can be obtained from mill surveys that measure the inputs and outputs for various stages of wood processing (Puettmann and Wilson 2005, Puettmann et al. 2010). Components of life-cycle analysis can vary depending on the study and are also not required in IPCC carbon accounting. For example, LCA's can include other greenhouse gas emissions from in-forest decay of logging residues, but this is not mentioned as a requirement in IPCC carbon accounting (IPCC 2006, 2014). Other LCA components may be required for IPCC carbon accounting, but in sectors other than the forest sector. For example, methane emissions from landfills are to be included in the waste sector (IPCC 2006).

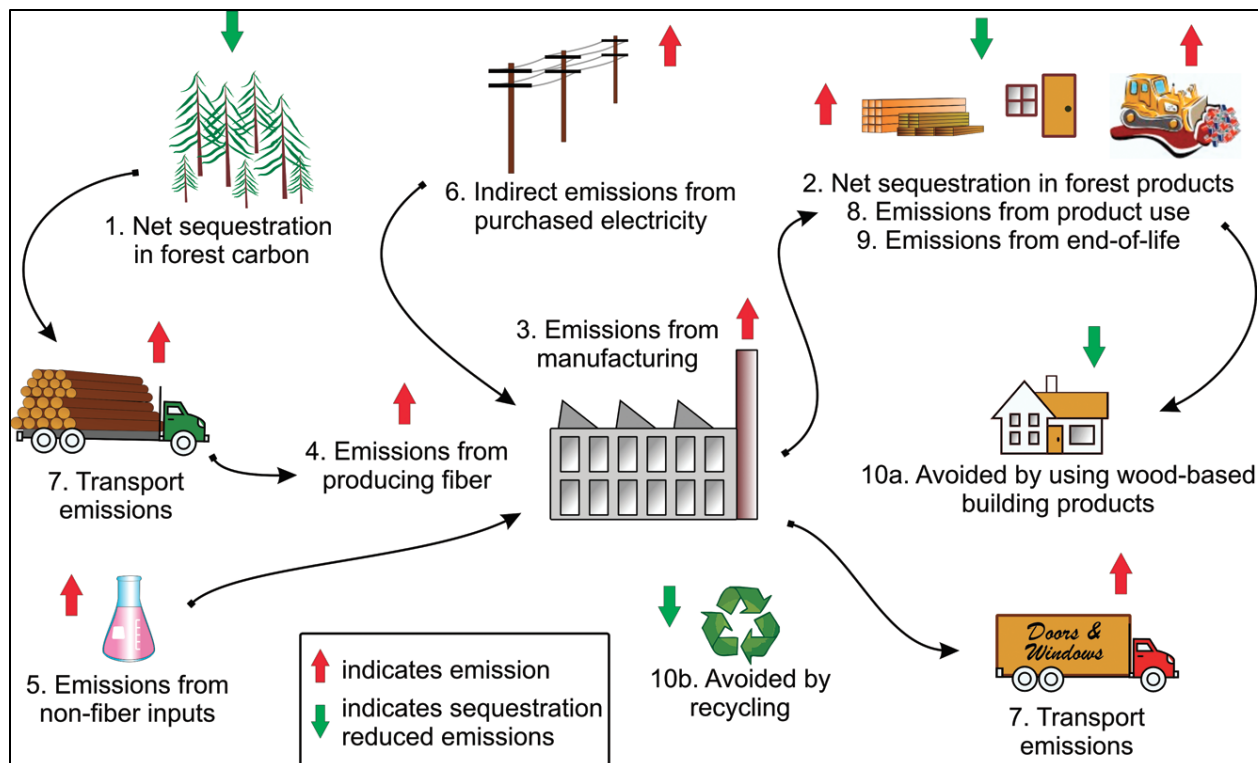


Figure 11.1: Depiction of emissions along a product's life-cycle. *Source:* Heath et al. 2010.

In order to conduct a life-cycle analysis, **life-cycle inventories** (LCI) must be conducted to actually measure and account for inputs and outputs for all stages along a product's life-cycle. LCI's can be further broken down into **attributorial** and **consequential life-cycle inventories** (ALCI and CLCI). Attributorial LCI allows for comparison of the direct impacts from substituting one product for another and can serve to pinpoint opportunities for efficiency at various stages of a product's life-cycle or along the supply chain (Brander et al. 2008). However, ALCI does not account for indirect effects from changing outputs, such as changes in carbon storage and emissions resulting from actual production changes from product substitution or indirect land-use changes in response to price (Lippke et al. 2011, Brander et al. 2008, Skog et al. 2014).

Consequential LCI's do consider indirect impacts of changing outputs, and is highly dependent on the complex intricacies of economic drivers of markets such as supply, demand, and price elasticities for the product itself, its co-products, its substitute products, as well as the inputs to make each (Brander et al. 2008). Additionally, while CLCI can address broad impacts of changing production, it is insufficient to identify opportunities for improving efficiencies in a product life-cycle, nor is it appropriate to use as an accounting method (Lippke et al. 2011, Brander et al. 2008).

Progress is being made in the international community in developing complex life-cycle based models that can account for changes in forest ecosystem and harvested wood product pools

under different forest management and climate scenarios, including effects from land-use change, disturbance, and wood material and energy substitution. The Canadian Carbon Budget Model (CBM) (Kurz et al. 2009, Smyth et al. 2014) and separate modeling efforts in Sweden (Gustavsson et al. 2017) are two examples. More recently, CBM has been successfully employed in other countries as both a comprehensive, IPCC-compliant forest carbon accounting verification tool for national GHG inventories, as well as a tool to estimate future forest carbon budgets under different forest management scenarios (Pilli et al. 2016, Kim et al. 2016, Smyth et al. 2018). The USDA Forest Service is exploring the potential use of CBM with FIA data to assess climate change mitigation options in the U.S. Forest Sector and is also evaluating use of their Integrated Terrestrial Ecosystem Carbon (InTEC) model to examine the relative effects on carbon dynamics from disturbance, climate, and atmospheric data (Dugan et al. 2017a, 2017b, 2018). The work done in this report to refine carbon calculations for various pools will only serve to enhance the information these other modeling efforts can provide.

11.5.2 Increasing HWP carbon pools

Increasing the size of the harvested wood product (HWP) pools without counter-vailing decreases in forest ecosystem carbon can also reduce net emissions to the atmosphere through increasing carbon stored in wood products and increasing avoided fossil fuel emissions from wood energy and material substitution (Malmsheimer et al. 2011, McKinley et al. 2011). While avoided emissions are discussed in more depth in section 11.6, they are integral in considering HWP carbon benefits and difficult to isolate in discussion, so they are also discussed in this section. Increases to the HWP pools can occur through continued or increased harvest following maximum sustained yield principles. Harvest can decrease stocks in forest ecosystem carbon pools, but can also promote growth by delaying the point when forests reach the **carbon sink saturation point**.

Improving growth and yield through forest management where trees are harvested can increase the amount of wood available for utilization to maximize carbon benefits (Skog et al. 2014). One LCA from Sweden found that increasing biomass production through fertilization can result in increased carbon benefits if the avoided emissions from utilizing the additional material for wood energy or material substitution occurs (Sathre et al. 2010). However, fertilization benefits need to be balanced with the emissions associated with fertilizer production and environmental impacts of increased use (Skog et al. 2014).

Increasing utilization of woody biomass, such as sub-merchantable material, logging slash and waste is another strategy to increase the HWP pools. The California timber industry already uses a substantial amount of mill residues for internal energy production, leaving little as waste. The industry also employs additional utilization of timber harvest byproducts such as bark and slash for both wood products and bioenergy (McIver et al. 2015), resulting in increases to the

HWP pools and avoided fossil fuels from wood energy substitution (discussed further in section 11.6.1). It will be important to accurately reflect this level of additional utilization in the 1504 harvested wood product carbon inventory. Despite high utilization, increasing removals of forest residuals can result in increased carbon benefits (Lippke et al. 2011, Gustavsson et al. 2017). In California, if logistics and economics allowed for it, increased removal of tops and limbs associated with timber harvest, sub-merchantable material from fuel reduction projects, or dead material from tree mortality could be possible. An upcoming USDA Forest Service logging utilization study is expected to identify the amount of additional material that is left on-site and potentially available for removal from the forest.

Whether or not increased removals occur, improving the efficiencies of removals can also increase the material available for the HWP pool. In a study from Sweden, systems that bundle slash prior to transport offsite have been found to increase efficiency by delivering more material for utilization at less cost when compared to chipping on-site, although chipping on-site might be more effective for small-scale end-users (Gustavsson et al. 2011). In 2003, the USDA Forest Service conducted several case studies to evaluate the bundling systems throughout the west, including one site on the Eldorado National Forest (Rummer et al. 2003). Production rates for removing material from the forest ranged from 6.5-10 bundles per machine hour with approximately 2.5 bone dry tons per bundle. Material was removed from landing piles at around 20 bundles per machine hour. The efficiency and cost-effectiveness depends on a variety of factors including the harvest system and the amount, distribution and condition of slash. If maximum removals of forest residuals available from forest management in California is ever achieved, harvesting a portion of the stumps from final fellings, leaving enough on-site to provide necessary soil and erosion benefits, can provide additional material for utilization if further GHG mitigation is needed (Gustavsson et al. 2017).

In addition to increasing biomass utilization in general, diversifying biomass products is a potential strategy that may improve the economics of biomass utilization and increase HWP pools. Promoting small diameter wood product development such as for laminated beams or small diameter bridges can increase the ability to utilize material typically considered sub-merchantable. Additional uses for biomass include gasification, transportation biofuels and biochemical compounds (Gustavsson et al. 2017, Skog et al. 2014). Different uses will result in different levels of benefits. For example, LCA shows that avoided fossil fuel emissions are higher when biomass energy is used to replace heat and electricity generation rather than being used for transportation fuels (Gustavsson et al. 2006). However, with advancements in wood utilization for jet fuel this may change (USDA 2016). Instead of hauling biomass to conversion facilities, another option includes producing biochar on-site and then using it on-site as a soil amendment (Skog et al. 2014, Smith et al. 2014).

Humboldt State University and its partners have completed the Waste to Wisdom project with a \$5.88 million grant from the U.S. Department of Energy's Biomass Research and Development Initiative program (W2W 2017; W2W 2018). This project addresses the financial and logistical challenges many western forests face in reducing stand densities and fuel loading by expanding research on the conversion of forest residues into bioenergy and other bio-based products. A biochar production system, a torrefier, and a briquetter are the biomass conversion technologies evaluated. These are different biomass densification technologies that can produce products that can be used for energy or in the case of biochar, as a soil amendment. Projects aimed at improving forest residue collection through sorting and management during harvesting, baling and pre-hauling options, and centrally locating processing sites were explored. Ultimately each biomass conversion system was prepared for mobile operation in the field, operational field protocols for the biomass conversion system and forest residue collection systems were developed, the systems were tested in the field, and the economic feasibility, and social, environmental and life cycle impacts were evaluated, with intention to scale up the most promising option to achieve commercialization. Biochar was found to be the most viable candidate for a transportable conversion system due to low power consumption, high allowable input moisture content and low product transportation cost, although there were benefits to use of multiple biomass conversion technologies at a single site (W2W 2018). In addition to the Waste to Wisdom effort, the California Forest Management Task Force (a continuation of the Tree Mortality Task Force) and its Wood Utilization Working Group/SB 859 Working Group are also working on facilitating biomass utilization for energy and expanding biomass markets and technologies, amongst other recommendations to the legislature (CNRA 2017). Other legislative support and research and development for biomass utilization is discussed in the California Forest Carbon Plan (FCAT 2018). Outside of California, the Bioenergy Alliance Network of the Rockies (BANR), led by Colorado State University, is investigating the use of beetle-killed trees as a sustainable feedstock to produce biofuels and biochar (BANR 2017). Additionally, the USDA Forest Service Rocky Mountain Research Station (RMRS) led a \$5.3 million Biomass Research and Development Initiative (BRDI) to explore feedstock development, biofuels and biobased products development, and biofuels development analysis (USDA FS 2016a).

Strategies aimed at increasing the use of long-term wood products, such as by promoting the use of wood in non-residential construction (discussed further in section 11.6.2) and designing products for longer useful life-spans would also increase the HWP pools. Strategies to extend the use-life of products, such as through re-use or recycling, can also increase the HWP pools (Lippke et al. 2011, Heath et al. 2010). Avoided fossil fuel emissions can occur from extending the life of wood products by increasing the wood supply available for substitution (discussed further in section 11.6), decreasing emissions compared to harvesting virgin material, increasing the carbon stored in forests from reduced harvest, and decreasing methane

emissions associated with products being placed in a SWDS (Heath et al. 2010, Smyth et al. 2014, Skog 2008, Skog et al. 2014). One LCA found that in the long-term maintaining forest in an active, sustainable harvesting cycle of new wood for construction rather than re-using old wood with no additional harvest can result in greater carbon storage through continued forest growth (Bergman et al. 2012). However, there are numerous benefits in addition to just carbon from reducing waste and re-using materials that should be considered. Consequently, through Assembly Bill 341 (Chapter 476, Statutes of 2011) the state of California has identified a general 75% recycling goal, including source reduction, recycling, and composting by 2020. The California Building Standards Commission (CBSC) Green Building Standards Code (CALGreen) has also identified a recycling or re-use goal of 50% for residential construction and demolition debris (C & D) (CBSC 2014) and 65% for non-residential C & D (CBSC 2016), with wood waste making up the majority of the C & D waste stream. One strategy to facilitate recycling or re-use is by building construction that is “designed for disassembly” so that materials can be more easily salvaged during demolition (Lippke et al. 2011).

Capturing products at the end of their useful life for use in bioenergy production can also increase the HWP pools and result in carbon benefits through wood energy substitution (discussed further in section 11.6.1). The California Department of Resources, Recycling, and Recovery (CALRecycle) has identified that in addition to direct re-use, markets for wood waste include use as feedstock for engineered wood products, landscape mulch, soil conditioner, animal bedding, compost additive, sewage sludge medium and boiler fuel (CALRecycle 2011).

When products do end up in the landfill, reducing methane emissions from landfills reduces the climate impact of wood products, such as by capturing methane from landfills before it reaches the atmosphere, with further reductions if the methane can be used in place of fossil fuels for energy production (Heath et al. 2010, Gustavsson et al. 2006). The California Air Resources Board has established regulations that require installation of methane gas collection and control systems at active, inactive, and closed municipal solid waste landfills with at least 450,000 tons of waste in-place, received after January 1, 1977 (CARB 2014). CALRecycle, in consultation with CARB, the California Energy Commission, and the California Public Utilities Commission, is also providing technical assistance and incentives to increase landfill gas recovery (CALRecycle 2013).

Other opportunities to reduce the climate impact from wood products include reducing emissions associated with manufacturing (Heath et al. 2010). LCI’s have identified that opportunities for energy conservation include low energy drying processes, low energy or faster hot-pressing processes, and low energy resin production (Puettmann and Wilson 2005, Puettmann et al. 2010). The upcoming California sawmill energy-use study will determine the percentages of renewable energy sources used compared to fossil fuel-based energy sources in

California's timber industry and can serve to identify other opportunities for energy conservation within the manufacturing process.

11.6 Wood energy and material substitution

11.6.1 Wood energy substitution

Harvested wood products used in energy production (HWP-energy pool) increase with increases to the HWP-use pool, as the generation of mill residues and byproducts such as slash and bark increases. This reflects the relationship between the HWP-energy and the byproducts of the HWP-use pools, which comprise the wood material typically burned for energy. As identified in section 11.5.2, there are a variety of ways to increase HWP pools in general. However, there are strategies that directly affect the HWP-energy pool and are subject to a variety of logistical and economic constraints surrounding biomass utilization and bioenergy production. These strategies include:

- Increasing utilization of sub-merchantable material, slash, and byproducts, which is subject to a variety of logistical and economic constraints.
- Diversifying wood products, especially for use specifically in bioenergy production (i.e., torrefied wood and briquettes discussed above).
- Capturing products at the end of their useful life for bioenergy production.

Regardless of the size of the HWP-energy pool, whenever wood is burned for energy instead of fossil fuels, actual substitution benefits can occur through avoided fossil fuel emissions. These avoided emissions occur both under business-as-usual practices (i.e., actual avoided emissions) and through changes to increase bioenergy production above business-as-usual (i.e., additional avoided emissions). The magnitude of wood energy substitution benefits depends on the type of fossil fuel substituted (Buchholz et al. 2016, Lippke et al. 2011). For example, displacing oil results in greater avoided emissions than displacing natural gas. The difficulty in establishing actual avoided emissions lies in establishing when substitution is actually occurring versus when wood bioenergy would have been the primary source of energy anyway. The difficulty in establishing additional avoided emissions lies in establishing the increase in wood use for energy over business-as-usual. In either scenario, identifying the fossil fuel actually being substituted for is another challenge. Lastly, as the share of renewable energy increases, such as from wind or solar, wood energy substitution benefits decrease. Changes in forest biomass electricity generation scenario analysis for Oregon and Washington show ample benefits of biomass electricity compared to fossil fuel electricity, especially when additional utilization of logging residues occurs (Abt et al. 2018). **Potential improvement:** A similar analysis could be conducted for the state of California.

There can be other avoided GHG emissions associated with burning wood for energy in addition to avoided fossil fuel emissions. For example, while carbon losses are established through changes in the various forest ecosystem pools, utilizing material from the forest may result in other avoided GHG emissions associated with burning material on site or from decay. Burning material at the end of its useful life for energy rather than placing it in a landfill may result in decreased methane emissions. Life-cycle analysis can be used to help identify the benefits and trade-offs associated with wood energy substitution.

In addition to the complexities in accounting for wood energy substitution, the potential to increase wood used for energy production in California has many challenges involving infrastructure, air quality, environmental justice issues and expiring power contracts. For a more detailed discussion of these challenges refer to the Forest Carbon Plan (FCAT 2018).

11.6.2 Wood material substitution

As in the case of wood energy substitution, strategies to increase the HWP pools would also increase the material available for wood material substitution. While carbon storage benefits are accounted for in the HWP-use and HWP-SWDS pools, wood material substitution benefits are incurred in the form of avoided fossil fuel emissions when wood is used instead of other, more energy-intensive materials. This is not to say that wood is the material with the greatest associated carbon benefits, as there may be less energy-intensive materials such as adobe or straw bale construction, although they may not have greater carbon benefits after carbon sequestration from tree growth is accounted for.

In terms of where one could expect benefits from material substitution, more energy-intensive materials such as concrete, steel, brick, aluminum, gypsum and plastic are common alternatives to wood in construction and packaging (Gustavsson et al. 2006, Lippke et al. 2010).

Construction represents the single largest wood products market in the U.S. (McKeever et al. 2011), so it stands to reason that it also represents the largest opportunity for wood substitution. However, with timber already comprising 90-94% of the materials in residential construction in the U.S., substitution in this arena is limited (McKeever et al. 2011, Gustavsson et al. 2006, Sathre and O'Connor 2010, Nepal et al. 2016). Expanding wood use, specifically for framing, in low-rise (i.e., less than 6 stories), non-residential buildings does represent a significant opportunity. Currently, low-rise buildings comprise the majority of non-residential buildings in the U.S., with wood wall framing in only 12% of these buildings (Nepal et al. 2016). Stores, offices, schools and other public buildings have the greatest potential and feasibility for increased wood use (Nepal et al. 2016). Additionally, substitution benefits from wood use instead of their non-wood counterpart are greatest for specific products, such as solid wood doors, railroad ties, lumber, utility poles, pine decking, cedar siding, and hardwood flooring (Bergman et al. 2014). These benefits may be even greater if lumber is green rather than kiln-

dried (Puettmann and Wilson 2005, O'Neil et al. 2013), with the latter being the case for some of the wood products produced in California (e.g., coastal redwood). Cross-laminated timber may also make it possible to increase wood-use in high-rise buildings. More specific analysis of construction in California may better identify wood material substitution opportunities within the state.

Again, as with wood energy substitution, these avoided emissions occur both under business-as-usual practices (i.e., actual avoided emissions) and through changes to increase wood use instead of more energy-intensive materials above business-as-usual (i.e., additional avoided emissions). The magnitude of wood material substitution benefits depends on the type of material and product substituted (Puettmann and Wilson 2005, Lippke et al. 2011). The difficulty in establishing actual avoided emissions lies in establishing when substitution is actually occurring versus when wood materials would have been the primary material used anyway. The difficulty in establishing additional avoided emissions lies in establishing the increase in wood used instead of more energy-intensive materials over business-as-usual. In either scenario, identifying the products actually being substituted for is another challenge.

It should also be noted that substitution benefits are unlikely to occur without policies incentivizing the use of wood products or market changes to prices that increase the demand for some goods while decreasing demand for others (Lippke et al. 2011). Consequently, strategies that encourage utilization of the least fossil-fuel intensive products, such as by revising building codes based on life-cycle analysis or by establishing prices that reflect the magnitude of carbon emissions associated with a product, could encourage substitution (Lippke et al. 2011, Kurz et al. 2016).

In substitution analysis, while ALCIs may easily address direct substitution or identify opportunities for efficiency along a product's life cycle, CLCIs may be necessary to address the complexities in substitution analysis, such as economic drivers of markets, determining the trade-offs in emissions from wood and substitution products, and indirect effects from changes in outputs of these products such as changes in land-use. For example, one CLCI found that increased international demand for wood energy shifted lumber production to the U.S., which increased the amount of timber plantations in the southern U.S., shifting the competitive advantage for softwood plywood construction from the western U.S. entirely to the South. This ultimately resulted in less harvest internationally and in the western U.S., which increased forest ecosystem carbon pools in these regions (Nepal et al. 2015). However, when looking at increased use of wood in low-rise non-residential buildings, the western U.S. ended up producing more softwood plywood than the southern and northern U.S. (Nepal et al. 2016).

11.6.3 IPCC and substitution

Numerous studies have highlighted that when forests are sustainably managed, there are substantial long-term carbon benefits from long-lived wood products when the avoided fossil fuel emissions from biomass energy or wood product (i.e., material) substitution is accounted for (Stewart and Nakamura 2012, Smyth et al. 2014, O’Neil and Lippke 2010, Lippke et al. 2008, 2010, 2011, Miner et al. 2014, Ryan et al. 2010, Gustavsson et al. 2006, 2017, Kurz et al. 2016, Perez-Garcia et al. 2005, Sathre and O’Connor 2010, Pingoud et al. 2001, Puettmann et al. 2013, Bergman et al. 2014, Winistorfer et al. 2005, Nepal et al. 2015, 2016, Puettmann and Wilson 2005, Ter-Mikaelian et al. 2008, O’Neil et al. 2013). Some studies have shown that these benefits can result in significantly less carbon emissions than scenarios without harvest by delaying when forests reach the carbon sink saturation point and by realizing avoided fossil fuel emissions from wood energy and material substitution (Bergman et al. 2012, Heath et al. 2010, Lippke et al. 2008, 2011, O’Neil and Lippke 2010, Miner et al. 2014, Gustavsson et al. 2011, 2017, Smyth et al. 2014, Kurz et al. 2016, Nepal et al. 2016). However, many of these studies are attributional life-cycle analyses, which by nature directly compare products assuming one is fully substituted for the other to calculate the difference in the carbon footprint between the two, when in reality the occurrence of substitution is subject to a variety of factors. As a result, many of these studies may overstate the substitution benefits.

Nevertheless, there is robust evidence and high agreement that wood energy and material substitution have important climate mitigation benefits (Smith et al. 2014), although currently there is no way to isolate these benefits when following IPCC accounting guidelines. Current IPCC guidance emphasizes the importance of including carbon stored in harvested wood products in greenhouse gas inventories (IPCC 2014). The IPCC also recognizes in other reports that wood energy and material substitution are important climate mitigation strategies, with benefits being the highest when wood products are long-lived and harvest by-products, wood wastes, and end-of-life products are utilized for bioenergy (Smith et al. 2014). IPCC also states that, “In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber, or energy from the forest, will generate the largest sustained mitigation benefit” (IPCC 2007a).

However, IPCC guidance also emphasizes that biogenic carbon emissions associated with burning wood for energy (i.e., the HWP-energy pool) should be considered as instant oxidation to be included in the energy sector for informational purposes only and while they are not to be counted towards total emissions (IPCC 2014), this accounting fails to capture the fossil fuel emissions reductions from burning wood for energy instead. Additionally, IPCC currently does not provide a way to directly capture the substantial benefits of substituting wood for more energy-intensive materials. Instead, emissions reductions from wood energy and material substitution are implicit in changes in emissions in other IPCC sectors and reporting categories,

such as energy and buildings. However, if overall consumption increases, the benefits from wood substitution could be diluted in the calculations. Despite IPCC recognition that wood energy and material substitution can have important climate benefits, the simplified IPCC accounting assumptions will not result in policies that best achieve long-term cumulative emissions reductions through forest management (Skog 2008, Lippke et al. 2011, Kurz et al. 2016).

Consequently, arguments have been made for inclusion of an additional pool in harvested wood product accounting, referred to as the displacement, substitution, or avoided emissions pool (O'Neil and Lippke 2010, Lippke et al. 2010, 2011, Perez-Garcia et al. 2005, Heath et al. 2010). As there is currently no IPCC guidance on inclusion of such a pool, this information could be included for informational purposes only to inform forest management policy decisions in the context of emissions reductions. Inclusion of such information will need to accurately determine actual levels of substitution and which materials and energy sources are being substituted. In addition to actual avoided fossil fuel emissions, there can be other forms of avoided emissions associated with the forest sector. Burning wood for energy can decrease other GHG emissions from burning wood in the forest or from decay. Re-using, recycling, and capturing products at the end of their life for energy production can decrease the amount of wood transferred to landfills, and therefore result in avoided landfill methane emissions. Reducing emissions associated with wood manufacturing can also decrease emissions in other sectors. Further analysis is needed to determine whether and how these avoided emissions could and should be incorporated into avoided emissions associated with the forest sector.

In addition to quantifying actual avoided emissions from current practices, further analysis could occur to identify potential additional avoided emissions resulting from future changes to policy. To fully understand trade-offs with substitution, sustainability of forest practices, indirect land-use changes, actual fossil fuel substitution, timing of mitigation benefits, and efficiency of waste and residue utilization and bioenergy systems should be considered. As there is currently no standard for evaluating the avoided fossil fuel emissions from wood energy or material substitution, life-cycle assessments can be used to evaluate potential substitution benefits and identify options with better greenhouse gas mitigation potential, such as sustainable use of biomass waste and residues. It is a future goal to provide information to the CA Board of Forestry and Fire Protection on avoided emissions to inform policy decisions. Since AB 1504 (2010) specifies that California forests are to be managed for multiple ecosystem services beyond just carbon, consideration of forest management policies that result in avoided fossil fuel emissions will need to be tempered with the need to maintain resilient, healthy forests and the objectives and constraints on different land ownerships.

12 Conclusions

As of the 2017 reporting period, California's forests remain net sinks, sequestering 27.9 MMT CO₂e per year. This value includes changes in forest ecosystem pools (29.2 MMT CO₂e per year), harvested wood product pools (0.9 MMT CO₂e per year), non-CO₂ emissions from wildfires (-0.5 MMT CO₂e per year), and forest land conversions (-1.7 MMT CO₂e per year).

The 2017 reporting period annual rate of carbon sequestration for just the forest ecosystem pools is 29.2 MMT CO₂e per year. This value is down by approximately 2.2 MMT CO₂e per year from the 2016 measurement cycle. This reduction in carbon sequestration is the result of several factors including improvements in inventory methodology but is also being driven by two complementary factors; an increased rate of tree mortality and decreased gross growth rate on live trees during the most recent measurement years. Tree mortality regardless of cause, accounted for an additional 2.5 MMT of CO₂e converted to dead wood annually. Gross growth on trees measured 10-years earlier declined by 1.2 MMT CO₂e annually further reducing the net rate of sequestration. Changes in growth, removals, mortality and flux vary in each region, displaying different patterns amongst each category. Additional work is being completed to assess these differences in more detail.

Forest ecosystem and harvested wood product carbon stocks are approximately 3.4 billion metric tons. For just the forest ecosystem, carbon stocks are approximately 3.3 billion metric tons. This is an increase of 1.2 billion metric tons of carbon stocks primarily due to the improvement of the forest soils estimates that added 1.1 billion tons of carbon stocks. Estimates of carbon on the forest floor was added in 2017 and contributed 0.1 billion tons of carbon stocks. Other notable changes with the addition of the 2017 measurements include overall live tree carbon stocks declining by 2.2 MMT C while dead tree stocks increased by 5.9 MMT C. The exchange of carbon between these pools reflects similar changes in 2017 as measured by annual net carbon flux (CO₂e). Harvested wood products contribute an additional 133.4 MMT C to the forest ecosystem carbon stocks.

In many forest types current stocking levels reflect over a century of fire suppression and may not represent stand densities that are resilient to disturbances common to California forests such as fire or pest outbreaks. Additionally, as the forests age in unharvested stands, growth rates slow. Older forests tend to store more carbon, but they might not accumulate new carbon as quickly as younger, fast-growing stands. Consequently, the stocks and flux represented in this report may not be sustainable in the future without forest management.

The data are beginning to show changes in the forest carbon flux, but it is unclear whether these will remain long-term trends. The statewide rate of annual carbon sequestration on all

forest land remaining as forest land declined by 2.2 MMT CO₂e since 2016 (Christensen et al. 2018). This reduction in carbon sequestration is the result of several factors including improvements in inventory methodology but is also being driven by two complementary factors; an increased rate of tree mortality and decreased gross growth rate on live trees during the most recent measurement years. Tree mortality regardless of cause, accounted for an additional 2.5 MMT of CO₂e converted to dead wood annually. Gross growth on trees measured 10-years earlier declined 4.3 MMT CO₂e annually further reducing the net rate of sequestration.

Forests perform a wide range of ecosystem services and are managed for a wide range of economic, ecological, and aesthetic values. Not all of these values and objectives are compatible with minimizing net carbon emissions to the atmosphere, but opportunities for integrating carbon goals with existing management goals likely exist. If mature forests are approaching carbon sink saturation due to slowing tree growth rates, or there is a need to reduce stand densities for other forest health objectives, climate mitigation strategies can aim to maximize the sum from forest ecosystem carbon stocks, harvested wood product carbon stocks, and wood material and energy substitution to maintain and enhance forest ecosystem carbon stocks while also increasing carbon benefits from harvested wood products.

The potential for forests and harvested wood products to mitigate carbon emissions can involve a variety of sectors beyond just the forest sector, such as the energy and waste sectors (Kurz et al. 2016) and extend beyond the boundaries of California. Evaluating the ecological impacts and interaction between emissions from each of these sectors and geographic areas will be key to identifying strategies that capitalize on the ability for California forests to remove carbon from the atmosphere and store it long-term within forests and wood products, as well as the potential for wood energy and material substitution to result in avoided fossil fuel emissions. New models are being developed to assess climate change mitigation options in the U.S. forest sector and could prove to be useful for leveraging California's forests for emissions reductions.

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Glossary

Afforestation: An increase in the area of forest land caused by a change in land-use; includes intentionally planted and tended lands as well as lands naturally occupied by establishing trees.

Atmospheric-flow Approach: Accounts for carbon fluxes to/from the atmosphere for lands and wood products pools, including imported wood products.

Attributional Life Cycle Inventory: Allows for comparison of the direct impacts from substituting one product for another and can serve to pinpoint opportunities for efficiency at various stages of a product's life-cycle or along the supply chain. Does not account for indirect effects from changing outputs, such as changes in carbon storage and emissions resulting from actual production changes from product substitution or indirect land-use changes in response to price fluctuations.

Biomass energy: The use of harvested wood, particularly unmerchantable residues, to meet commercial and residential energy and/or heating needs, potentially reducing the use of fossil fuels to meet those needs instead. Considered by many to be a net reduction in carbon emissions since those residues would otherwise decay and result in emissions anyway (albeit at a slower rate).

Carbon sink saturation point: The point at which annual forest emission equals uptake as forests age.

Consequential Life Cycle Inventory: Considers indirect impacts of changing outputs, and is highly dependent on the complex intricacies of economic drivers of markets such as supply, demand, and price elasticities for the product itself, its co-products, its substitute products, as well as the inputs to make each.

Culmination of mean annual increment: The point in stand development when the rate of accumulation of wood over the life of the stand reaches a maximum, calculated as the amount of wood accumulated divided by the number of years elapsed.

Decomposition: Consumption of organic matter, primarily by microbes, resulting in carbon dioxide emissions to the atmosphere.

Deforestation: A decrease in the area of forest land caused by a change in land-use; does not include areas of temporary tree mortality from logging or fire where planting or natural regeneration is expected to occur.

Discarded products disposition half-life ratio: The half-lives of wood and paper, which vary between landfills, dumps, and recovered (recycled) products.

Discarded products disposition ratios: The distribution of discarded wood and paper products into the various Discarded Product categories: Recovered (Recycled), Landfills, Dumps, Compost, and Burned Without Energy Capture.

Distribution parameter: Dataset that guides the Monte Carlo simulation that determines statistical confidence intervals around specific HWP C estimates.

End-use ratio: Yearly end-use product ratios are the distribution of primary wood products, such as lumber and non-structural panels, to end-use products, such as single family new housing and furniture manufacturing.

End use product half-life: Express the decay rate at which carbon in the products in use category passes into the Discarded Product category.

Forest land: Under the FIA definition, Land that has at least 10 percent crown cover by live tally trees of any size or has had at least 10 percent canopy cover of live tally species in the past, based on the presence of stumps, snags, or other evidence. To qualify, the area must be at least 1.0 acre in size and 120.0 feet wide. Forest land includes transition zones, such as areas between forest and non-forest lands that meet the minimal tree stocking/cover and forest areas adjacent to urban and built—up lands. Roadside, streamside, and shelterbelt strips of trees must have a width of at least 120 feet and continuous length of at least 363 feet to qualify as forest land. Unimproved roads, trails, and meadows less than 120 feet wide or less than an acre in size, and streams less than 30 feet wide in forest areas are classified as forest. Tree-covered areas in agricultural production settings, such as fruit orchards, or tree—covered areas in urban settings subjected to regular mowing, such as city parks, are not considered forest land. Per this definition, chaparral is not included in the definition for forest land unless it also meets the minimum stocking or crown cover requirements to qualify as forest land.

Forest land status: Refers to the different FIA categories of forest land (i.e., productive forest land, timberland, other forest land) including the reserve categories (i.e., reserved or unreserved), defined below.

Flux: The net change in carbon in one or more pools over a specific period of time, expressed as either a total or a rate. Often expressed as an exchange with the atmosphere, with negative numbers indicating a net removal of carbon from the atmosphere. However not all carbon exchanges occur with the atmosphere (e.g., live trees convert to dead wood when they die).

IPCC: The Intergovernmental Panel on Climate Change is a United Nations-sponsored panel of scientists that develops guidance on the conduct of carbon emissions assessments, among other things.

IPCC Production Approach:

Key category analysis: An assessment where key carbon emission categories are identified and prioritized, called for in the 2006 IPCC Guidelines.

Landfill fixed ratio: The fractions of solid wood and paper products not subject to decay in landfills and were obtained from Skog 2008.

Land status: Refers to the FIA distinction between forest land and non-forest (i.e., crops, improved pasture, residential areas, city parks, etc.) or other area (i.e., water). Also includes forest land status categories.

Leakage: Where increases in carbon stores in one region from reduced harvest are offset by decreases in carbon stores in another region from increased harvest to meet demand, resulting in no net reduction in carbon emissions to the atmosphere.

Life-cycle analysis: Comparing differences in inputs and outputs between different management and production scenarios. Can identify key trade-offs between forest management and fossil fuel-use.

Life-cycle inventory: Measures every input (energy, materials, etc.) and every output (emissions, waste, product and co-products) for every stage along a product's life-cycle.

Logging residues: Slash, such as tops and limbs, and sub-merchantable material left on-site after harvest.

Loss factor: The amount of carbon that is removed from the total carbon distributed to the HWP Products in Use pool.

Managed land: An IPCC designation of lands included in carbon emission assessments, consisting of those where human interventions and practices have affected production, ecological or social functions. In practice, the United States considers all lands except for portions of interior Alaska as "managed".

Maximum sustained yield: The management of a forest ownership or landscape to maximize wood products, usually by applying estimates of culmination of mean annual increment.

Net present value: The value of harvested wood from a stand after discounting investments in that stand at a desired rate of compound interest. Artificial regeneration and other stand management costs are usually considered as investments.

Other forest land: Forested lands not capable of producing at least 20 cubic feet of wood per acre at culmination of mean annual increment.

Permanence: Refers to the desire for increases in carbon stores to last over the long term, particularly in the calculation of carbon credits, and not result in increased risk of losses from natural disturbance.

Pool: A category containing carbon mass, e.g., live trees, down wood, harvested wood products.

Primary Product Ratios: Used to distribute timber primary products to specific primary wood products (i.e., lumber, veneer, pulp and board, bioenergy, mill residue, etc.).

Product Half-lives: The rate at which carbon in the products in-use category passes into the discarded category, representing the transition between the two pools.

Production Approach: Carbon for all California-origin timber is estimated, regardless of whether it is consumed within the state of California or is exported to other states or countries. Carbon in imported wood products is not included in the estimates to avoid double-counting with the state/country of wood origin. Similarly, importers of California-origin wood would not be able to include carbon in those wood products in their inventory to avoid double-counting.

Productive Capacity: Ability for land to grow commercial tree species.

Productive forest land: Forested lands capable of producing at least 20 cubic feet of wood per acre at culmination of mean annual increment.

Reserve status: Lands where management for the production of wood products is precluded permanently by law, including Wildernesses, National Parks, National Recreation Areas, and State Parks. In some cases, timber harvest can occur for various resource objectives (i.e., restoration, salvage, etc.).

Respiration: The process of living tissues using carbohydrates and producing carbon dioxide emissions to the atmosphere, for example leaves and roots of living trees.

Sequestration: A net increase in carbon stores in one or more pools (categories) over a specific period of time.

Substitution: Refers to the possibility that the use of wood products in construction or other products results in a net reduction of carbon emissions if the alternatives require more carbon-based energy to produce.

Stocks: The amount of carbon in one or more pools (categories) at one point in time (synonym: stores).

Stores: The amount of carbon in one or more pools (categories) at one point in time (synonym: stocks).

Timberland: Forested lands capable of producing at least 20 cubic feet of wood per acre at culmination of mean annual increment, and not reserved (i.e., where management for production of wood products is not precluded).

Timber Product Ratios: Used to distribute annual harvest volumes to specific timber product classes (i.e., sawlogs, pulpwood, fuelwood, etc.)

Wood energy substitution: When wood is burned for energy production instead of fossil fuels, resulting in avoided fossil fuel emissions.

Wood material product substitution: When wood is used instead of more fossil fuel energy-intensive materials, resulting in avoided fossil fuel emissions.

Working forests: Forests in which trees are harvested regularly.

Appendix 1: Forest carbon stock by forest type and region

A1.1 Central Coast and Interior Ranges

Table A1.1.1: Forest land carbon stocks (thousand metric tons C) by forest type and pool, 2008-2017: Central Coast and Interior Ranges

	Live Trees		Dead Trees		Roots		Understory		Down wood		Forest Floor		Soil		All pools	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>Thousand metric tons C</i>																
Softwoods:																
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	1,257	808	18	14	269	178	21	12	69	50	80	50	826	519	2,537	1,607
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	192	57	10	4	40	11	279	58	30	19	127	32	4,394	1,022	4,993	1,163
Ponderosa pine	92	58	5	4	20	13	51	33	14	11	44	26	823	487	1,034	605
Redwood	19,519	4,463	484	147	3,615	815	200	41	1,054	303	637	129	7,163	1,451	32,607	7,095
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	570	449	50	38	148	116	17	13	40	29	70	45	846	523	1,740	1,146
Total	21,631	4,555	567	153	4,092	841	569	81	1,206	309	958	151	14,054	1,980	42,912	7,472
Hardwoods:																
Alder / maple	411	368	2	2	86	78	30	18	48	36	46	32	502	348	1,111	849
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	59	40	--	--	10	7	40	21	11	8	10	6	226	126	323	175
Tanoak / laurel	8,909	2,189	449	189	1,821	436	370	63	669	181	749	143	7,941	1,486	20,796	4,312
Western oak	21,055	1,719	1,032	222	4,127	327	3,327	198	1,784	222	2,750	180	57,809	3,663	90,658	5,866
Woodland hardwoods	8	8	21	21	5	4	25	18	8	8	8	5	153	108	209	148
Exotic hardwoods	--	--	--	--	--	--	18	15	--	--	5	4	127	107	137	115
Other hardwoods	3,000	1,284	144	71	617	262	182	46	262	110	255	73	4,388	1,236	8,793	2,813
Total	33,442	3,001	1,648	301	6,665	593	3,993	218	2,782	310	3,823	239	71,146	4,123	122,026	7,696
Nonstocked	18	18			4	4	27	18	5	3	12	9	325	238	377	280
All forest types	55,090	5,353	2,216	336	10,761	1,007	4,589	234	3,993	445	4,794	280	85,524	4,542	165,315	10,535

Note: Totals may be off because of rounding

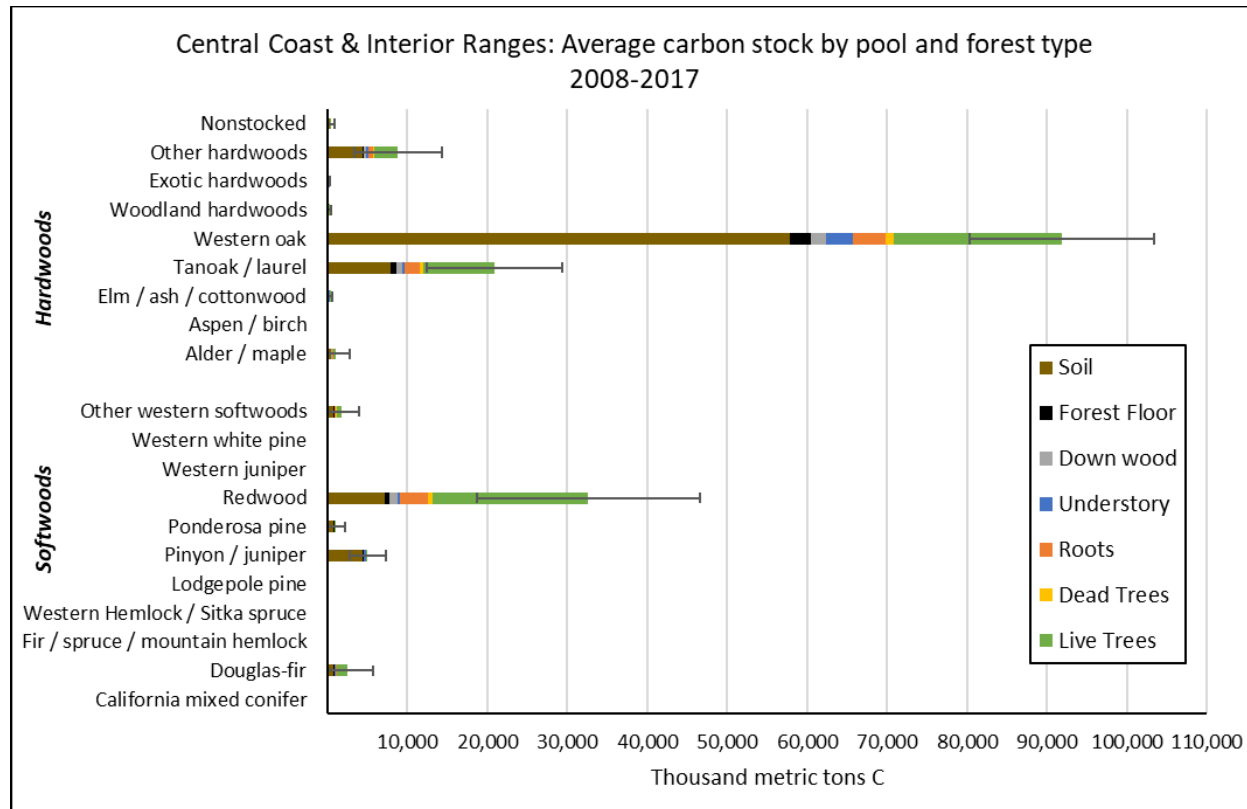


Figure A1.1.1. Central Coast and Interior Ranges: Average carbon stock by pool and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.1.1.

Table A 1.1.2: Forest land carbon stocks (thousand metric tons C) by forest type and land status, 2008-2017: Central Coast and Interior Ranges

	Unreserved Forests:				Reserved Forests:				All forest land	
	Timberland		Other Forest		Productive		Other Forest		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE		
	<i>Thousand metric tons C</i>									
Softwoods:										
California mixed conifer	--	--	--	--	--	--	--	--	--	--
Douglas-fir	2,537	1,607	--	--	--	--	--	--	2,537	1,607
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	4,321	1,091	--	--	672	404	4,993	1,163
Ponderosa pine	--	--	756	540	--	--	279	273	1,034	605
Redwood	20,160	5,006	--	--	12,448	4,856	--	--	32,607	7,095
Western juniper	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--
Other western softwoods	1,740	1,146	--	--	--	--	--	--	1,740	1,146
Total	24,437	5,369	5,077	1,216	12,448	4,856	950	487	42,912	7,472
Hardwoods:										
Alder / maple	--	--	403	317	707	788	--	--	1,111	849
Aspen / birch	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	293	170	--	--	30	40	323	175
Tanoak / laurel	5,904	2,360	5,639	1,695	5,173	2,758	4,080	1,610	20,796	4,312
Western oak	1,884	1,072	65,652	4,973	961	720	22,161	2,981	90,658	5,866
Woodland hardwoods	--	--	--	--	--	--	209	148	209	148
Exotic hardwoods	--	--	137	115	--	--	--	--	137	115
Other hardwoods	3,274	1,913	1,334	714	3,273	1,931	913	572	8,793	2,813
Total	11,062	3,218	73,458	5,317	10,114	3,439	27,392	3,477	122,026	7,696
Nonstocked	262	262	--	--	--	--	115	101	377	280
All forest types	35,761	6,243	78,535	5,448	22,562	5,806	28,457	3,513	165,315	10,535

Note: Totals may be off because of rounding

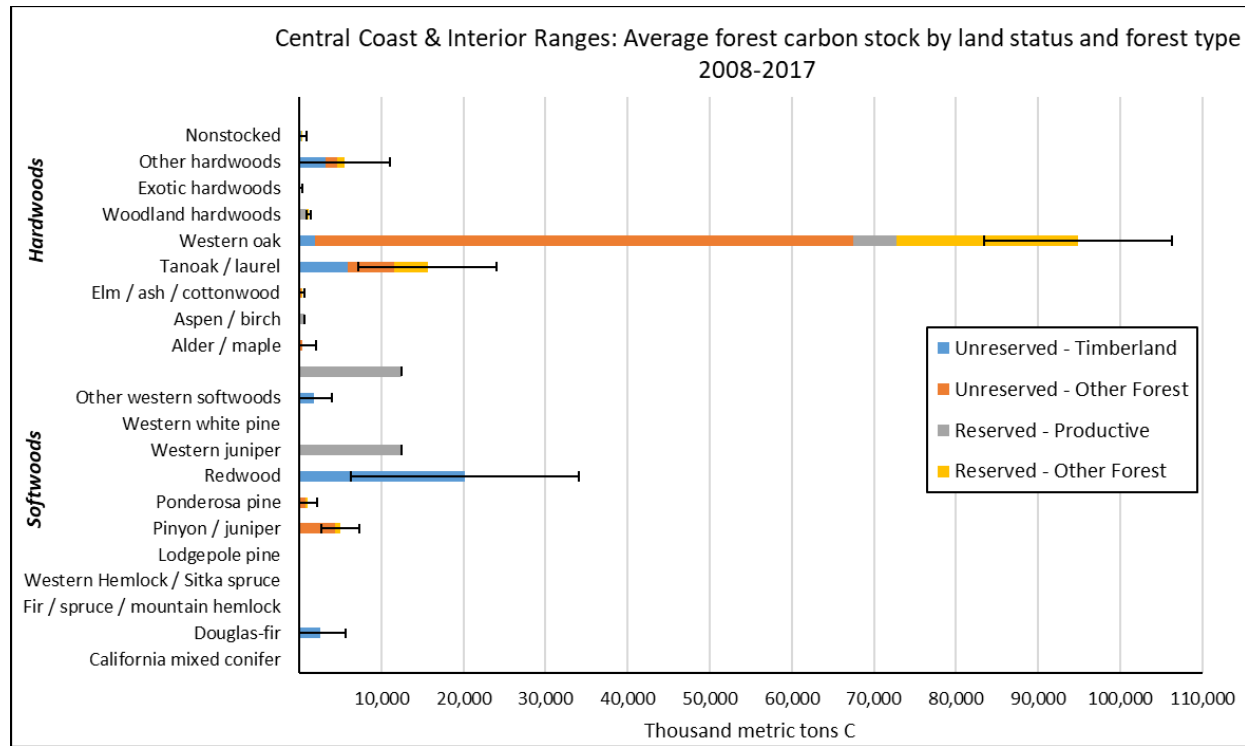


Figure A1.1.2. Central Coast and Interior Ranges: Average forest carbon stock by land status and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.1.2.

A1.2 Central Valley

Table A 1.2.1: Forest land carbon stocks (thousand metric tons C) by forest type and pool, 2008-2017: Central Valley

	Live Trees		Dead Trees		Roots		Understory		Down wood		Forest Floor		Soil		All pools	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>Thousand metric tons C</i>																
Softwoods:																
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwoods:																
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	397	298	26	19	81	60	42	22	31	24	27	19	446	289	1,029	718
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	844	278	27	14	174	56	225	50	59	28	130	34	2,902	744	4,265	1,117
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	--	--	--	--	--	--	12	12	--	--	--	--	2	2	3	3
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1,242	407	53	24	255	82	278	55	90	36	157	39	3,350	798	5,296	1,328
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types	1,242	407	53	24	255	82	278	55	90	36	157	39	3,350	798	5,296	1,328

Note: Totals may be off because of rounding

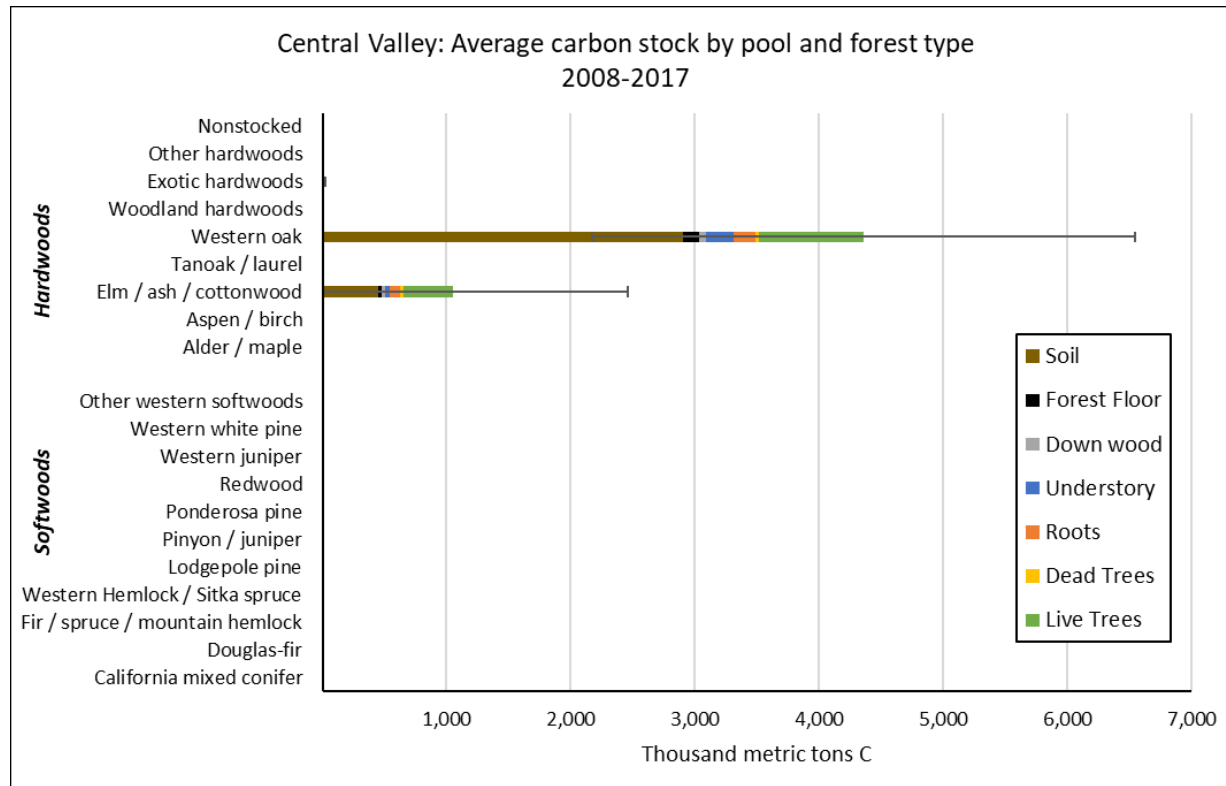


Figure A1.2.1. Central Valley: Average carbon stock by pool and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.2.1.

Table A 1.2.2: Forest land carbon stocks (thousand metric tons C) by forest type and land status, 2008-2017: Central Valley

	Unreserved Forests:				Reserved Forests:				All forest land	
	Timberland		Other Forest		Productive		Other Forest		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE		
	<i>Thousand metric tons C</i>									
Softwoods:										
California mixed conifer	--	--	--	--			--	--	--	--
Douglas-fir	--	--	--	--			--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--			--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--			--	--	--	--
Lodgepole pine	--	--	--	--			--	--	--	--
Pinyon / juniper	--	--	--	--			--	--	--	--
Ponderosa pine	--	--	--	--			--	--	--	--
Redwood	--	--	--	--			--	--	--	--
Western juniper	--	--	--	--			--	--	--	--
Western white pine	--	--	--	--			--	--	--	--
Other western softwoods	--	--	--	--			--	--	--	--
Total	--	--	--	--			--	--	--	--
Hardwoods:										
Alder / maple	--	--	--	--			--	--	--	--
Aspen / birch	--	--	--	--			--	--	--	--
Elm / ash / cottonwood	--	--	635	609			394	380	1,029	718
Tanoak / laurel	--	--	--	--			--	--	--	--
Western oak	--	--	4,227	1,116			38	38	4,265	1,117
Woodland hardwoods	--	--	--	--			--	--	--	--
Exotic hardwoods	3	3	--	--			--	--	3	3
Other hardwoods	--	--	--	--			--	--	--	--
Total	3	3	4,862	1,271			432	382	5,296	1,328
Nonstocked	--	--	--	--			--	--	--	--
All forest types	3	3	4,862	1,271			432	382	5,296	1,328

Note: Totals may be off because of rounding

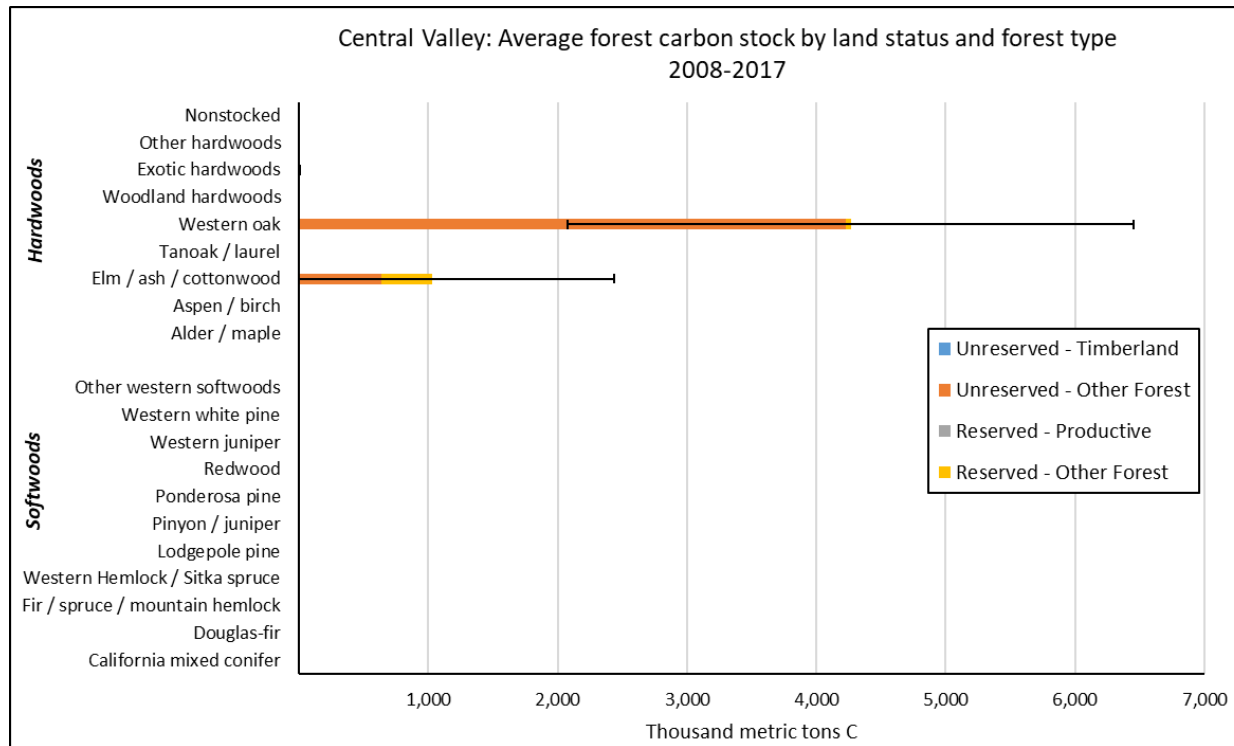


Figure A1.2.2. Central Valley: Average forest carbon stock by land status and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.2.2.

A1.3 Eastside

Table A 1.3.1: Forest land carbon stocks (thousand metric tons C) by forest type and pool, 2008-2017: Eastside

	Live Trees		Dead Trees		Roots		Understory		Down wood		Forest Floor		Soil		All pools	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>Thousand metric tons C</i>																
Softwoods:																
California mixed conifer	6,281	970	398	98	1,259	195	320	47	985	187	1,606	237	13,327	1,924	24,082	3,498
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	5,206	1,369	665	214	970	253	127	29	528	143	706	162	6,605	1,481	14,774	3,460
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	1,119	462	154	121	272	120	56	26	258	114	195	77	1,835	712	3,860	1,533
Pinyon / juniper	2,966	358	176	33	666	79	1,243	116	711	107	1,290	136	27,896	2,652	34,841	3,331
Ponderosa pine	6,406	863	146	46	1,402	190	752	104	948	176	1,574	189	18,793	2,186	29,761	3,490
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	4,945	464	126	31	885	87	3,160	252	799	120	2,083	161	47,298	3,567	58,828	4,425
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	1,265	444	111	45	311	111	90	35	201	70	353	108	3,536	1,022	5,850	1,756
Total	28,187	2,064	1,776	276	5,764	420	5,750	308	4,431	359	7,807	422	119,291	5,551	171,995	8,394
Hardwoods:																
Alder / maple	--	--	--	--	--	--	12	13	--	--	--	--	2	2	2	2
Aspen / birch	208	121	55	38	52	28	95	34	134	79	109	44	2,014	820	2,636	1,075
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	157	96	8	7	39	23	63	31	44	27	47	25	977	532	1,308	704
Woodland hardwoods	278	111	99	58	70	28	103	37	81	40	181	65	2,755	956	3,554	1,240
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	64	50	18	15	13	11	70	29	73	38	86	38	1,433	622	1,736	763
Total	707	196	180	71	175	47	344	67	333	100	424	91	7,181	1,499	9,237	1,939
Nonstocked	99	42	260	125	74	27	444	71	253	64	475	85	8,764	1,547	10,252	1,822
All forest types	28,994	2,076	2,216	311	6,013	424	6,538	328	5,016	378	8,706	439	135,236	5,923	191,485	8,776

Note: Totals may be of because of rounding

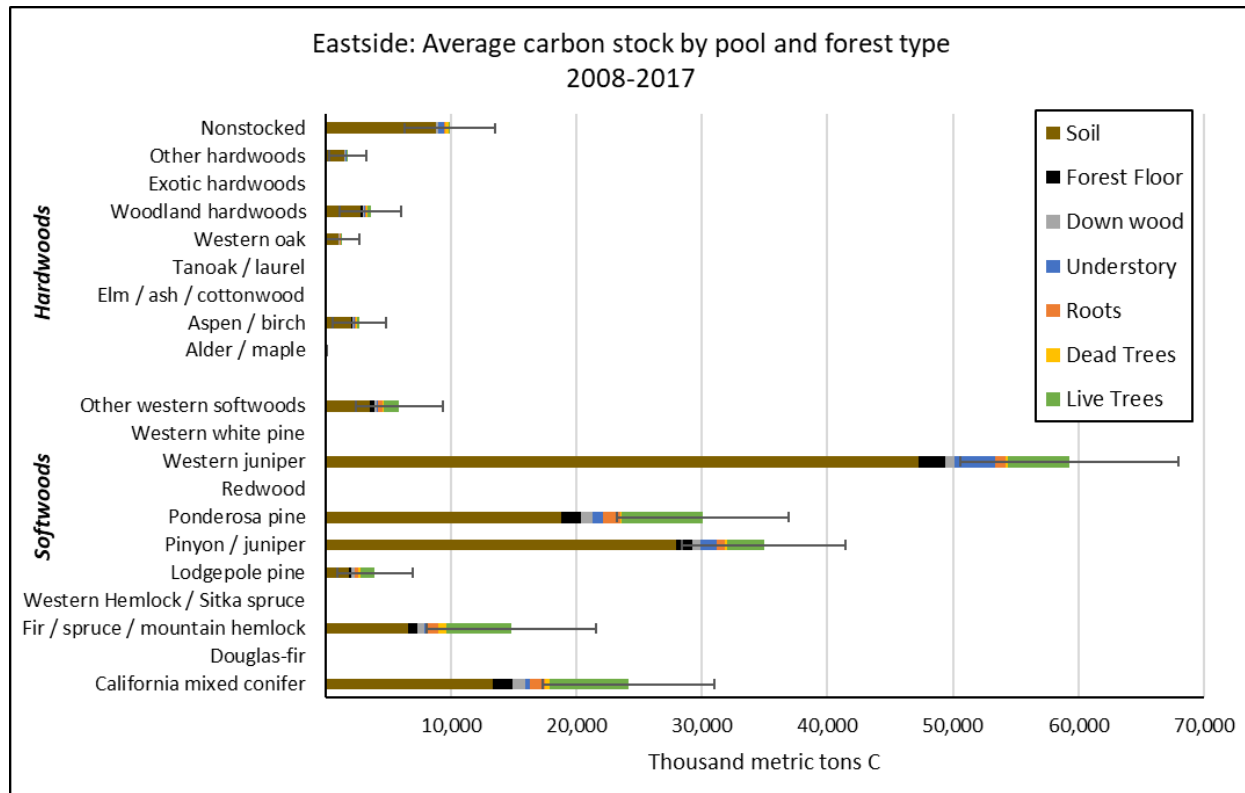


Figure A1.3.1. Eastside: Average carbon stock by pool and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.3.1.

Table A 1.3.2: Forest land carbon stocks (thousand metric tons C) by forest type and land status, 2008-2017: Eastside

	Unreserved Forests:				Reserved Forests:				All forest land	
	Timberland		Other Forest		Productive		Other Forest		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE		
	<i>Thousand metric tons C</i>									
Softwoods:										
California mixed conifer	23,266	3,440	816	654	--	--	--	--	24,082	3,498
Douglas-fir	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	10,958	2,864	--	--	3,816	1,941	--	--	14,774	3,460
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	1,816	927	2,044	1,222	--	--	--	--	3,860	1,533
Pinyon / juniper	325	325	25,523	2,851	--	--	8,993	1,780	34,841	3,331
Ponderosa pine	27,500	3,355	456	304	1,805	924	--	--	29,761	3,490
Redwood	--	--	--	--	--	--	--	--	--	--
Western juniper	6,540	1,523	51,797	4,159	--	--	491	424	58,828	4,425
Western white pine	--	--	--	--	--	--	--	--	--	--
Other western softwoods	312	320	886	624	--	--	4,652	1,610	5,850	1,756
Total	70,716	5,854	81,523	5,182	5,621	2,150	14,136	2,440	171,995	8,394
Hardwoods:										
Alder / maple	--	--	--	--	--	--	2	2	2	2
Aspen / birch	567	518	1,198	676	866	657	6	6	2,636	1,075
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--
Western oak	371	301	937	590	--	--	--	--	1,308	704
Woodland hardwoods	1,474	817	2,080	934	--	--	--	--	3,554	1,240
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--
Other hardwoods	1,513	729	224	225	--	--	--	--	1,736	763
Total	3,925	1,247	4,439	1,311	866	657	8	6	9,237	1,939
Nonstocked	7,050	1,509	2,966	993	--	--	237	241	10,252	1,822
All forest types	81,691	6,202	88,927	5,400	6,486	2,278	14,381	2,464	191,485	8,776

Note: Totals may be of because of rounding

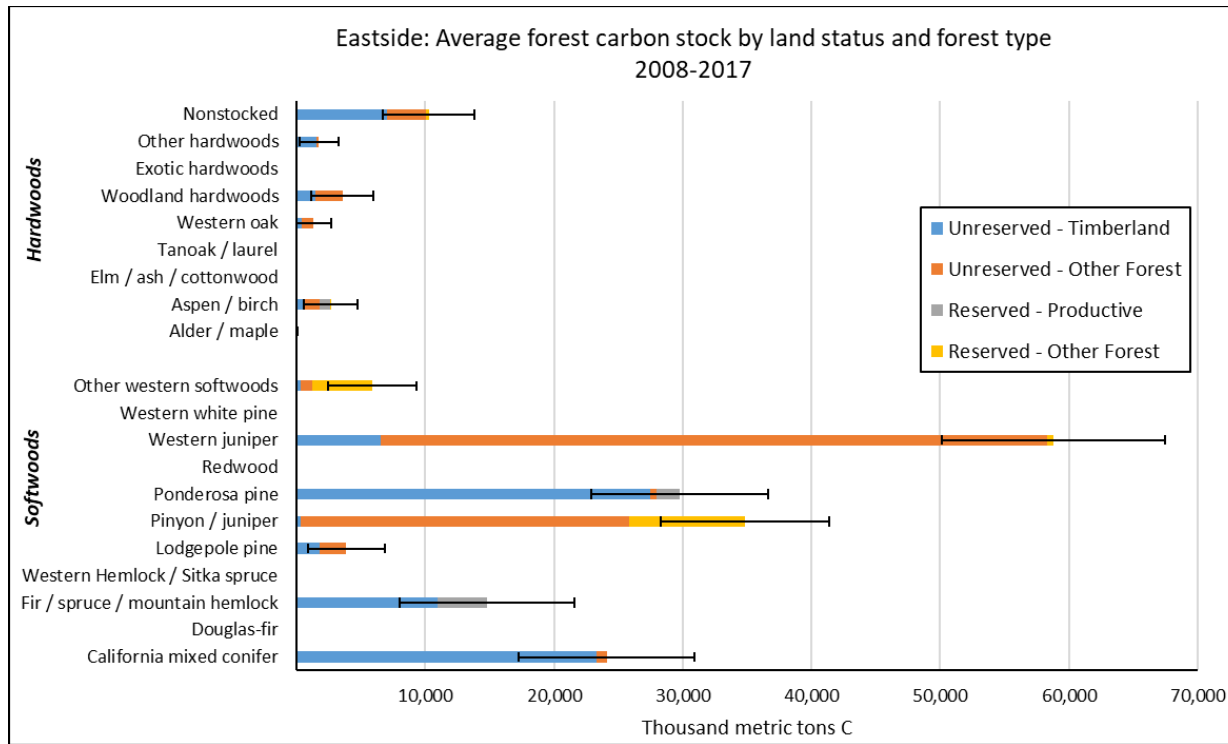


Figure A1.3.2. Eastside: Average forest carbon stock by land status and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.3.2.

A1.4 Klamath/Interior Coast Ranges

Table A 1.4.1: Forest land carbon stocks (thousand metric tons C) by forest type and pool, 2008-2017: Klamath Interior Coast Ranges

	Live Trees		Dead Trees		Roots		Understory		Down wood		Forest Floor		Soil		All pools	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>Thousand metric tons C</i>																
Softwoods:																
California mixed conifer	138,556	7,058	13,462	1,121	31,162	1,603	2,314	136	13,559	821	17,483	777	149,479	6,563	365,469	16,602
Douglas-fir	33,286	3,970	2,490	448	7,520	905	941	102	2,576	423	2,171	230	28,791	3,060	77,423	8,539
Fir / spruce / mountain hemlock	14,832	2,718	2,212	515	2,940	520	354	54	1,256	269	1,447	207	16,999	2,428	39,945	6,078
Western Hemlock / Sitka spruce	121	120	--	--	24	24	14	14	2	2	23	23	101	101	273	272
Lodgepole pine	295	161	11	8	54	28	35	18	20	11	83	41	1,362	676	1,859	925
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	5,723	1,117	361	109	1,312	257	471	70	531	125	1,016	162	10,997	1,685	20,153	3,257
Redwood	7,081	3,891	150	83	1,275	699	46	22	469	291	112	53	1,401	658	10,519	5,607
Western juniper	36	23	8	6	9	5	93	42	7	6	51	27	982	516	1,153	607
Western white pine	655	285	115	55	135	60	90	35	87	42	188	67	2,498	874	3,748	1,325
Other western softwoods	673	240	49	23	132	46	142	47	221	86	191	58	2,996	920	4,364	1,332
Total	201,258	8,980	18,858	1,276	44,560	1,944	4,500	209	18,730	991	22,765	824	215,605	7,572	524,907	19,564
Hardwoods:																
Alder / maple	3,737	1,013	231	71	807	216	251	52	830	260	366	85	5,023	1,172	11,159	2,672
Aspen / birch	12	13	--	--	2	2	12	12	2	3	16	16	292	295	333	337
Elm / ash / cottonwood	117	83	3	2	18	13	35	20	16	12	12	8	232	154	407	274
Tanoak / laurel	35,794	4,233	2,973	628	7,702	909	1,266	120	3,547	475	2,279	222	34,046	3,279	87,360	8,976
Western oak	67,758	3,920	4,970	947	14,975	873	6,653	278	6,730	526	7,589	350	141,607	6,168	248,506	11,460
Woodland hardwoods	62	40	4	4	8	6	67	28	5	3	26	17	458	297	579	348
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	5,082	1,300	587	192	1,202	306	373	66	914	314	647	128	8,462	1,636	17,153	3,488
Total	112,562	5,884	8,767	1,150	24,714	1,289	8,657	313	12,044	816	10,935	432	190,120	7,135	365,495	14,867
Nonstocked	507	231	3,514	1,036	883	251	551	82	1,086	239	701	112	11,208	1,790	18,297	3,177
All forest types	314,327	10,251	31,138	1,939	70,157	2,217	13,708	386	31,860	1,259	34,400	886	416,934	9,867	908,699	23,126

Note: Totals may be of because of rounding

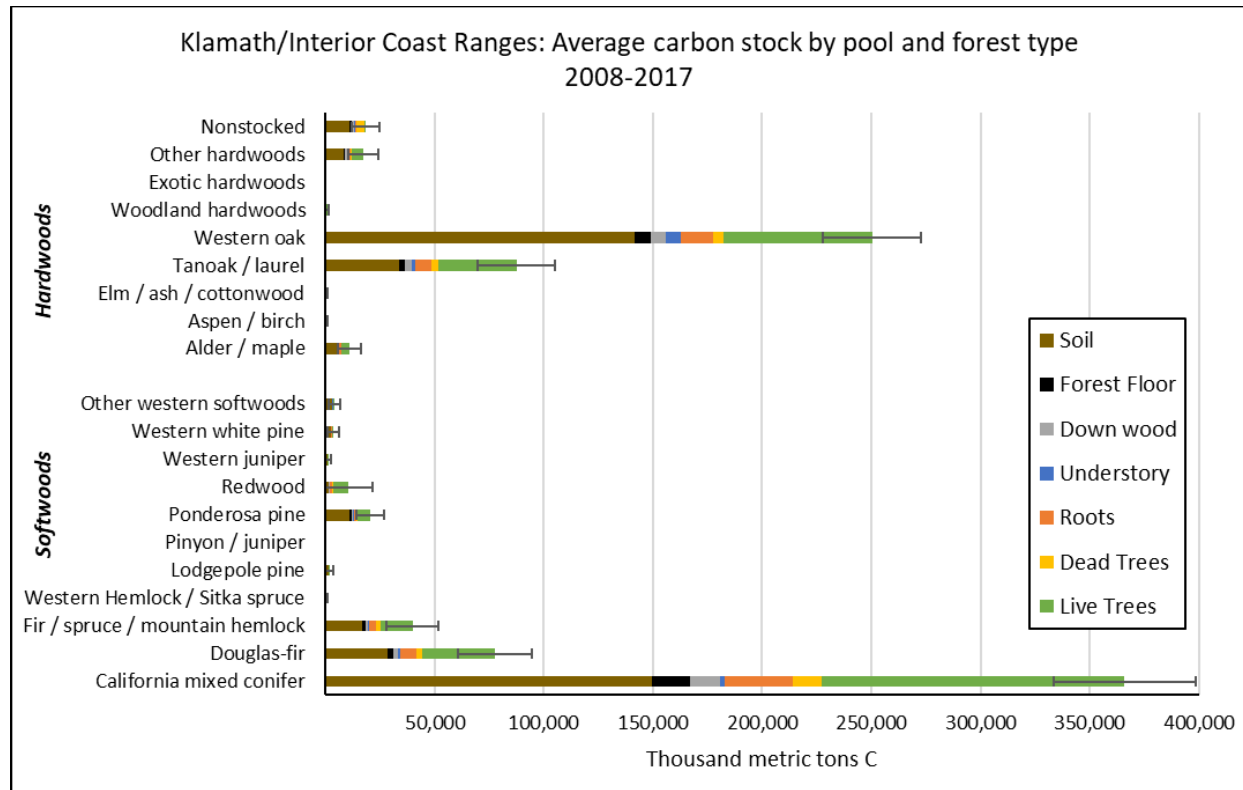


Figure A1.4.1. Klamath/Interior Coast Ranges: Average carbon stock by pool and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.4.1.

Table A 1.4.2: Forest land carbon stocks (thousand metric tons C) by forest type and land status, 2008-2017: Klamath Interior Coast Ranges

	Unreserved Forests:				Reserved Forests:				All forest land	
	Timberland		Other Forest		Productive		Other Forest		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE		
	<i>Thousand metric tons C</i>									
Softwoods:										
California mixed conifer	282,629	14,672	558	492	82,282	7,943	--	--	365,469	16,602
Douglas-fir	51,290	6,729	773	780	23,411	5,158	1,950	980	77,423	8,539
Fir / spruce / mountain hemlock	15,835	3,741	842	677	22,881	4,738	386	402	39,945	6,078
Western Hemlock / Sitka spruce	--	--	--	--	273	272	--	--	273	272
Lodgepole pine	548	526	--	--	863	607	449	459	1,859	925
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	14,813	2,673	--	--	4,775	1,812	565	434	20,153	3,257
Redwood	1,457	1,269	--	--	9,063	5,461	--	--	10,519	5,607
Western juniper	--	--	1,153	607	--	--	--	--	1,153	607
Western white pine	1,042	773	--	--	2,321	1,001	385	398	3,748	1,325
Other western softwoods	1,309	765	2,334	982	349	307	372	380	4,364	1,332
Total	368,924	16,398	5,659	1,625	146,218	11,016	4,106	1,388	524,907	19,564
Hardwoods:										
Alder / maple	6,621	1,964	755	478	3,076	1,655	707	562	11,159	2,672
Aspen / birch	--	--	--	--	--	--	333	337	333	337
Elm / ash / cottonwood	--	--	382	273	25	25	--	--	407	274
Tanoak / laurel	57,276	7,379	2,221	1,140	25,451	4,913	2,412	1,176	87,360	8,976
Western oak	96,522	8,054	117,787	7,086	13,896	3,008	20,301	3,290	248,506	11,460
Woodland hardwoods	--	--	156	97	--	--	423	335	579	348
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--
Other hardwoods	13,473	3,223	890	575	2,355	1,120	435	450	17,153	3,488
Total	173,892	11,354	122,190	7,205	44,803	5,999	24,611	3,591	365,495	14,867
Nonstocked	9,778	2,318	550	355	7,969	2,143	--	--	18,297	3,177
All forest types	552,594	19,259	128,399	7,388	198,990	11,716	28,717	3,857	908,699	23,126

Note: Totals may be off because of rounding

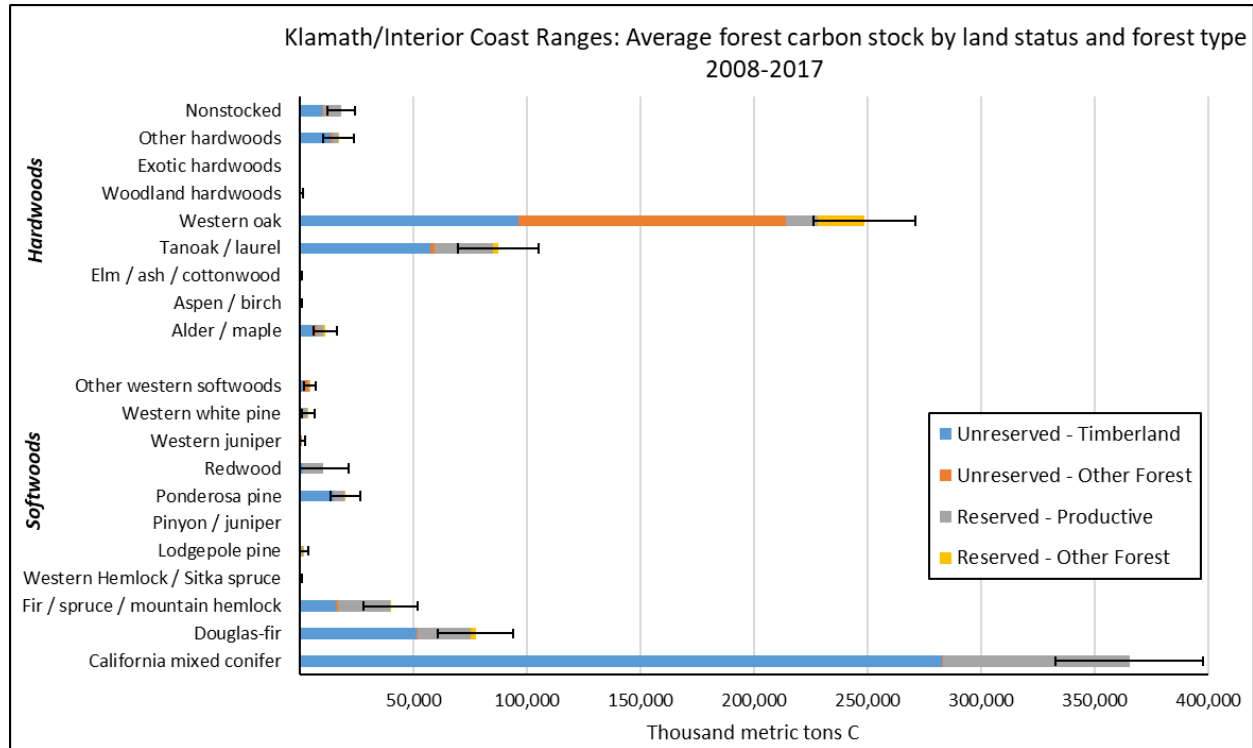


Figure A1.4.2. Klamath/Interior Coast Ranges: Average forest carbon stock by land status and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.4.2.

A1.5 North Coast

Table A 1.5.1: Forest land carbon stocks (thousand metric tons C) by forest type and pool, 2008-2017: North Coast

	Live Trees		Dead Trees		Roots		Understory		Down wood		Forest Floor		Soil		All pools	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>Thousand metric tons C</i>																
Softwoods:																
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	38,178	4,462	1,583	269	8,278	969	1,022	100	4,050	575	2,508	245	28,364	2,774	83,673	8,763
Fir / spruce / mountain hemlock	429	290	37	37	88	60	13	8	16	11	52	36	500	337	1,130	766
Western Hemlock / Sitka spruce	2,296	1,048	283	179	581	280	64	28	349	235	266	119	1,708	773	5,520	2,469
Lodgepole pine	28	28	8	8	7	8	14	12	2	2	18	17	183	173	250	240
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	58,947	8,497	2,651	562	11,856	1,645	861	85	5,397	768	2,326	225	31,872	3,075	113,689	13,415
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	452	341	19	20	110	84	45	26	122	109	64	36	930	512	1,729	1,008
Total	100,329	9,413	4,581	646	20,921	1,878	2,019	137	9,936	970	5,234	344	63,557	4,115	205,991	15,729
Hardwoods:																
Alder / maple	3,972	1,146	466	175	914	256	220	48	514	154	292	72	4,114	996	10,420	2,680
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	49,536	4,305	2,227	356	9,961	861	1,797	139	5,085	566	3,642	283	40,729	3,177	112,687	9,006
Western oak	9,731	1,438	300	81	1,977	299	815	96	633	137	840	111	15,346	1,987	29,366	3,880
Woodland hardwoods	94	85			20	18	13	11	6	6	4	4	73	66	199	181
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	3,339	1,058	53	27	694	220	145	39	180	66	285	88	3,386	989	8,045	2,388
Total	66,671	4,723	3,046	404	13,567	955	2,990	181	6,418	603	5,064	318	63,648	3,921	160,718	10,242
Nonstocked	36	25	4	3	9	5	37	21	33	25	41	24	557	332	704	411
All forest types	167,037	10,127	7,631	751	34,497	2,021	5,046	227	16,386	1,111	10,338	438	127,762	5,349	367,413	17,763

Note: Totals may be of because of rounding

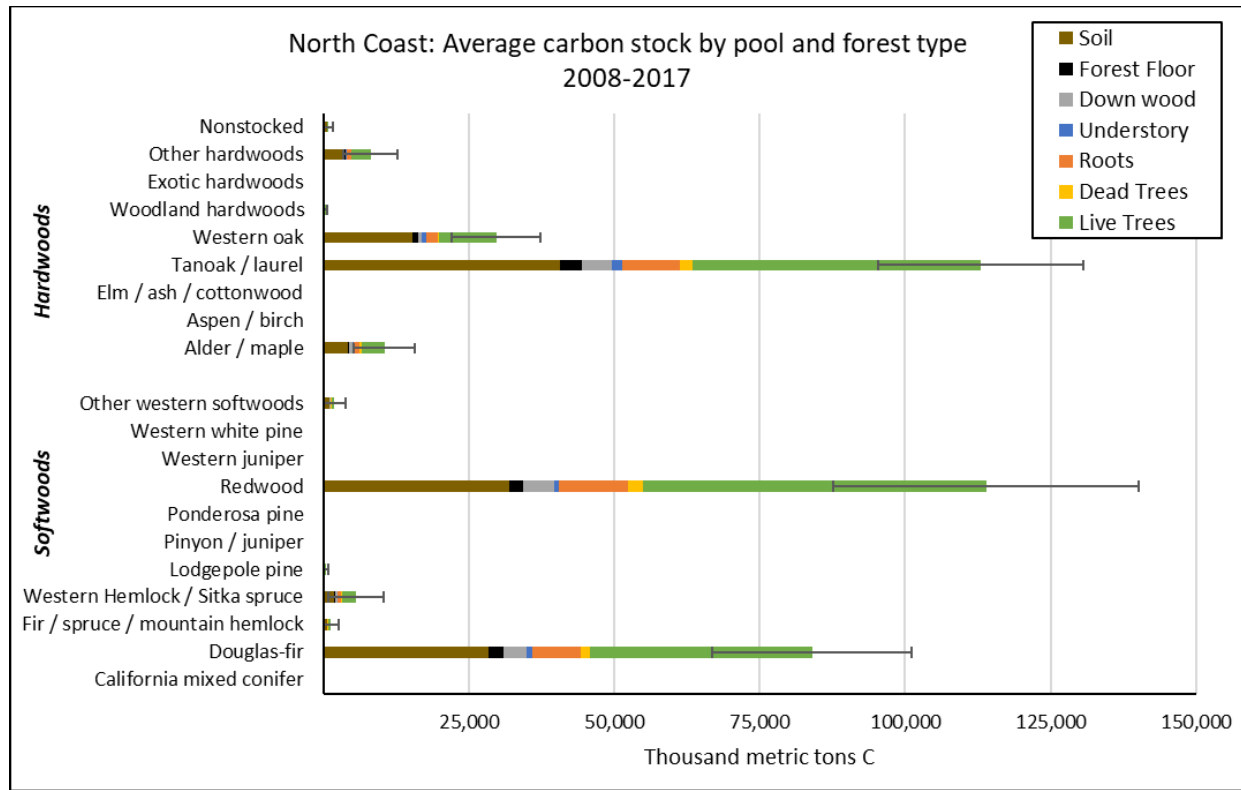


Figure A1.5.1. North Coast: Average carbon stock by pool and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.5.1.

Table A 1.5.2: Forest land carbon stocks (thousand metric tons C) by forest type and land status, 2008-2017: North Coast

	Unreserved Forests:				Reserved Forests:				All forest land	
	Timberland		Other Forest		Productive		Other Forest		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE		
	<i>Thousand metric tons C</i>									
Softwoods:										
California mixed conifer	--	--	--	--	--	--	--	--	--	--
Douglas-fir	68,387	7,594	--	--	15,286	4,485	--	--	83,673	8,763
Fir / spruce / mountain hemlock	1,130	766	--	--	--	--	--	--	1,130	766
Western Hemlock / Sitka spruce	5,520	2,469	--	--	--	--	--	--	5,520	2,469
Lodgepole pine	--	--	--	--	233	239	17	27	250	240
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--
Redwood	90,899	9,716	--	--	22,789	9,533	--	--	113,689	13,415
Western juniper	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--
Other western softwoods	839	744	--	--	342	491	548	470	1,729	1,008
Total	166,776	12,282	--	--	38,650	10,343	564	471	205,991	15,729
Hardwoods:										
Alder / maple	8,599	2,389	484	418	1,338	1,142	--	--	10,420	2,680
Aspen / birch	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	92,443	8,086	3,142	1,461	14,451	3,522	2,651	1,632	112,687	9,006
Western oak	14,478	3,001	13,070	2,264	--	--	1,818	958	29,366	3,880
Woodland hardwoods	--	--	--	--	--	--	199	181	199	181
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--
Other hardwoods	6,178	2,031	170	161	1,698	1,246	--	--	8,045	2,388
Total	121,697	9,033	16,865	2,728	17,487	3,867	4,669	1,901	160,718	10,242
Nonstocked	704	411	--	--	--	--	--	--	704	411
All forest types	289,177	14,399	16,865	2,728	56,137	10,752	5,233	1,958	367,413	17,763

Note: Totals may be of because of rounding

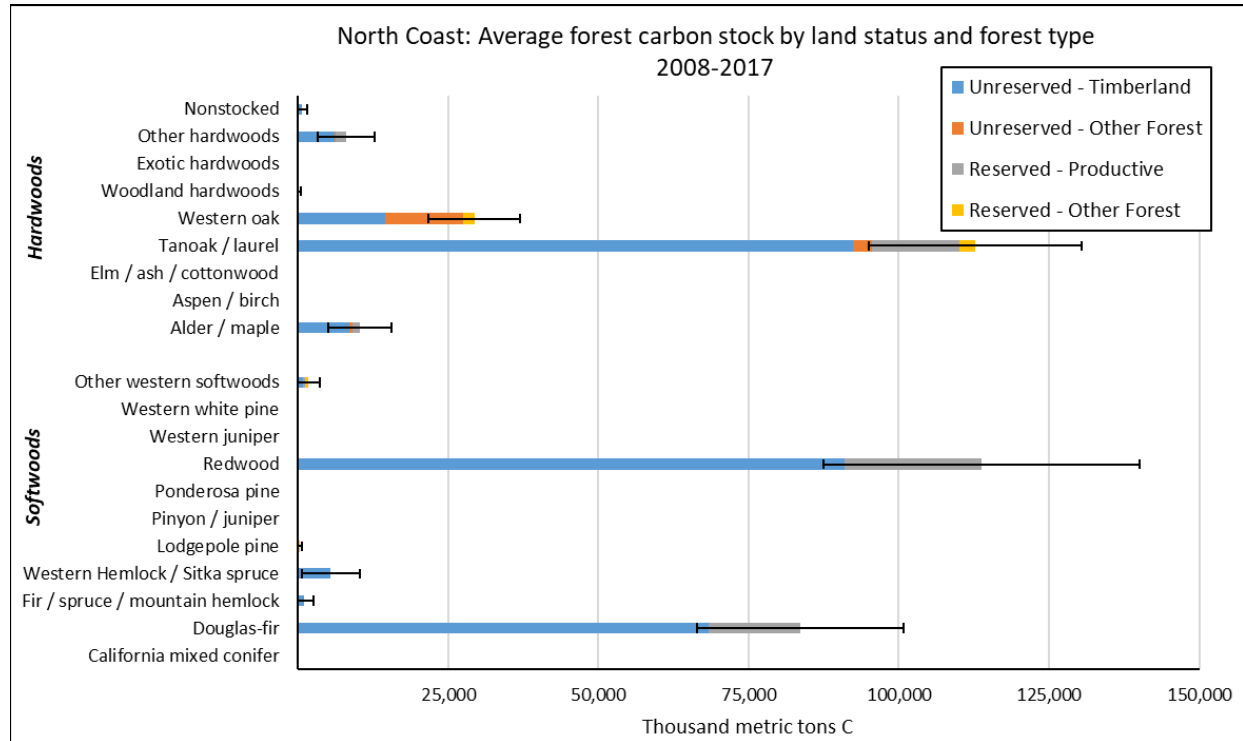


Figure A1.5.2. North Coast: Average forest carbon stock by land status and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.5.2.

A1.6 Sierra/Cascades

Table A 1.6.1: Forest land carbon stocks (thousand metric tons C) by forest type and pool, 2008-2017: Sierra Cascades

	Live Trees		Dead Trees		Roots		Understory		Down wood		Forest Floor		Soil		All pools	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>Thousand metric tons C</i>																
Softwoods:																
California mixed conifer	234,121	8,688	21,809	1,496	47,568	1,758	4,581	191	25,299	1,176	36,644	1,149	265,242	8,185	634,275	20,421
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	98,656	6,888	10,582	985	18,867	1,320	1,585	97	9,403	796	10,592	628	90,015	5,296	239,402	14,855
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	29,819	2,698	3,178	386	6,880	616	868	86	3,876	501	4,944	390	45,223	3,489	94,615	7,489
Pinyon / juniper	2,168	374	179	49	490	83	789	96	708	164	687	101	14,944	1,910	19,842	2,575
Ponderosa pine	36,472	2,632	1,208	208	8,083	589	2,859	175	4,119	397	7,347	422	81,313	4,496	140,409	8,075
Redwood	28	26	--	--	6	5	10	9	41	38	11	10	169	155	260	238
Western juniper	4,284	688	213	64	805	129	1,217	149	658	142	1,379	164	23,046	2,553	31,440	3,568
Western white pine	3,134	811	445	133	719	182	144	36	327	98	646	150	5,859	1,331	11,213	2,589
Other western softwoods	4,452	803	601	153	1,056	198	728	106	910	216	1,507	196	18,030	2,236	27,116	3,478
Total	413,133	10,614	38,214	1,788	84,473	2,134	12,780	347	45,342	1,499	63,758	1,285	543,842	10,422	1,198,571	24,664
Hardwoods:																
Alder / maple	1,006	601	87	60	206	121	35	19	83	54	78	44	939	528	2,425	1,390
Aspen / birch	553	293	20	12	106	57	116	37	149	89	140	52	1,751	621	2,781	1,031
Elm / ash / cottonwood	136	112	1	1	22	18	45	22	12	9	27	20	446	316	660	475
Tanoak / laurel	3,077	1,178	72	38	605	222	179	44	391	203	320	85	3,906	1,008	8,510	2,476
Western oak	63,626	3,377	5,052	562	13,939	726	8,014	280	6,174	425	8,516	341	165,021	6,110	268,589	10,514
Woodland hardwoods	113	60	44	24	35	14	122	38	54	31	148	49	2,327	762	2,815	930
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	1,844	738	136	55	406	171	490	77	540	153	580	101	9,303	1,598	13,136	2,442
Total	70,354	3,689	5,412	569	15,318	785	9,000	298	7,402	505	9,808	371	183,693	6,431	298,916	11,145
Nonstocked	772	198	4,908	1,117	1,189	232	1,417	126	2,338	429	1,426	143	26,394	2,619	38,034	4,006
All forest types	484,260	10,657	48,534	2,117	100,981	2,140	23,197	457	55,082	1,590	74,992	1,262	753,929	11,292	1,535,521	24,957

Note: Totals may be of because of rounding

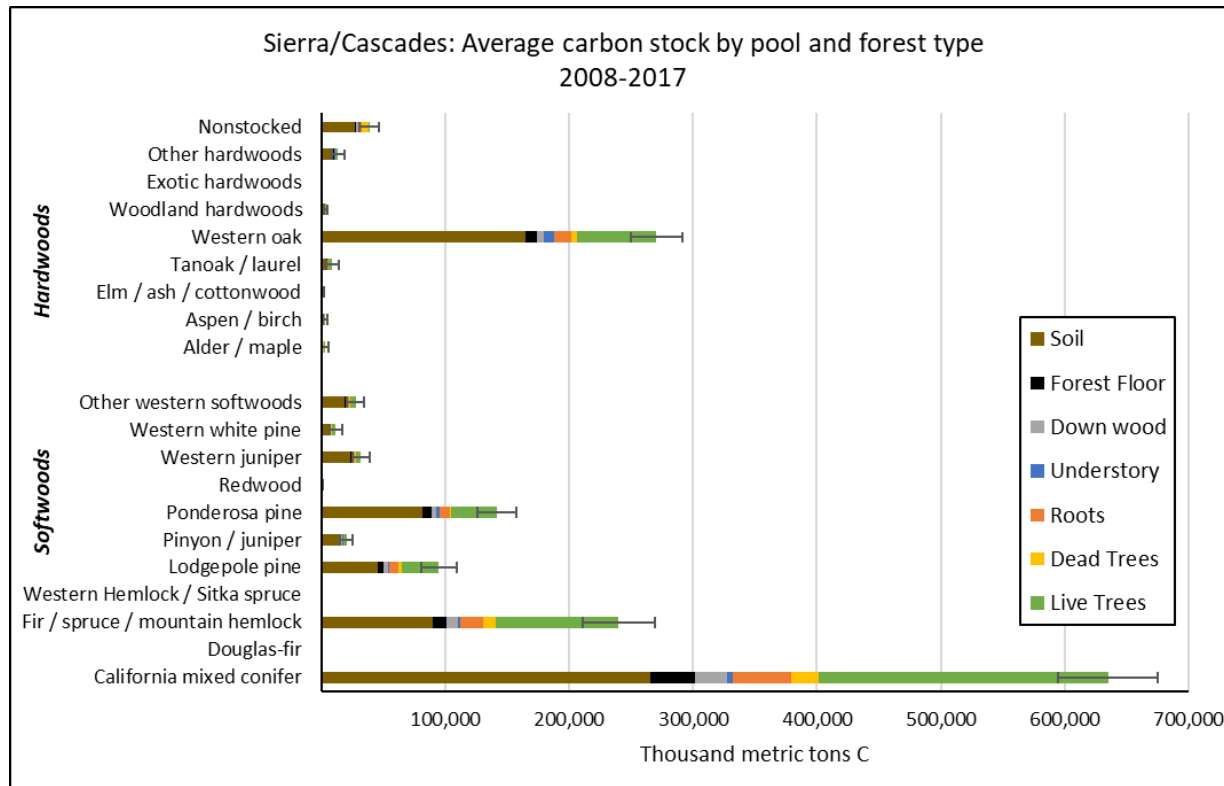


Figure A1.6.1. Sierra/Cascades: Average carbon stock by pool and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.6.1.

Table A 1.6.2: Forest land carbon stocks (thousand metric tons C) by forest type and land status, 2008-2017: Sierra Cascades

	Unreserved Forests:				Reserved Forests:				All forest land	
	Timberland		Other Forest		Productive		Other Forest		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE		
	<i>Thousand metric tons C</i>									
Softwoods:										
California mixed conifer	509,533	18,137	235	198	123,116	10,524	1,391	1,186	634,275	20,421
Douglas-fir	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	166,454	11,912	2,324	1,283	65,509	8,666	5,113	1,964	239,402	14,855
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	26,695	4,118	2,959	1,281	46,851	5,581	18,110	3,244	94,615	7,489
Pinyon / juniper	323	325	11,395	1,935	294	276	7,830	1,655	19,842	2,575
Ponderosa pine	125,488	7,577	1,852	899	11,960	2,650	1,109	647	140,409	8,075
Redwood	260	238	--	--	--	--	--	--	260	238
Western juniper	4,851	1,384	16,770	2,382	7,583	2,082	2,236	947	31,440	3,568
Western white pine	1,661	858	--	--	6,701	2,119	2,851	1,220	11,213	2,589
Other western softwoods	1,566	817	2,627	957	3,517	1,404	19,407	2,969	27,116	3,478
Total	836,830	21,015	38,162	3,757	265,532	13,959	58,047	5,232	1,198,571	24,664
Hardwoods:										
Alder / maple	2,425	1,390	--	--	--	--	--	--	2,425	1,390
Aspen / birch	556	447	391	231	460	420	1,374	796	2,781	1,031
Elm / ash / cottonwood	--	--	660	475	--	--	--	--	660	475
Tanoak / laurel	7,197	2,402	1,314	605	--	--	--	--	8,510	2,476
Western oak	81,000	6,904	163,949	7,592	9,625	2,445	14,016	2,490	268,589	10,514
Woodland hardwoods	--	--	2,308	845	--	--	507	387	2,815	930
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--
Other hardwoods	7,359	2,021	5,776	1,372	--	--	--	--	13,136	2,442
Total	98,537	7,674	174,396	7,752	10,086	2,481	15,897	2,636	298,916	11,145
Nonstocked	27,469	3,328	1,995	754	5,973	1,866	2,597	978	38,034	4,006
All forest types	962,836	21,369	214,554	8,557	281,590	14,068	76,541	5,874	1,535,521	24,957

Note: Totals may be of because of rounding

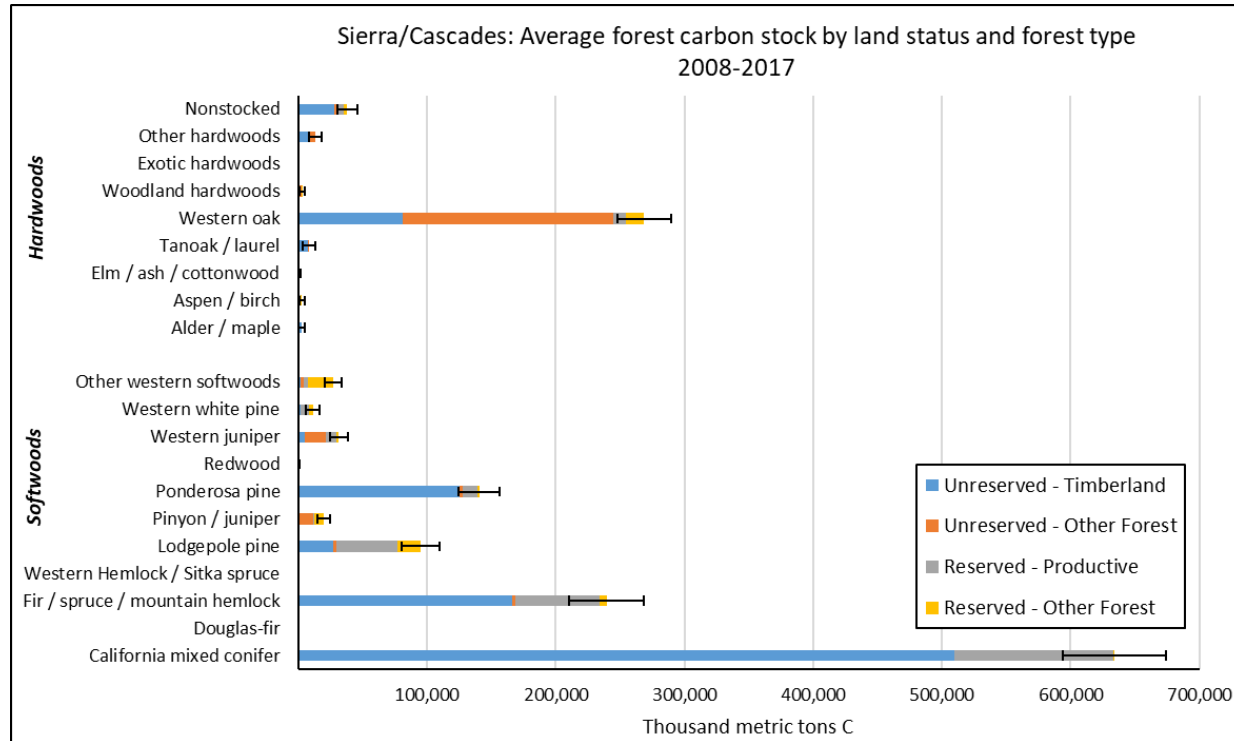


Figure A1.6.2. Sierra/Cascades: Average forest carbon stock by land status and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.6.2.

A1.7 South Coast Mountains and Deserts

Table A 1.7.1: Forest land carbon stocks (thousand metric tons C) by forest type and pool, 2008-2017: South Coast Mountains and Deserts

	Live Trees		Dead Trees		Roots		Understory		Down wood		Forest Floor		Soil		All pools	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>Thousand metric tons C</i>																
Softwoods:																
California mixed conifer	2,125	810	356	192	401	143	58	20	331	128	418	133	3,290	1,013	6,977	2,219
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	524	393	41	37	91	68	8	6	44	41	94	73	635	495	1,436	1,106
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	258	158	86	55	78	48	11	7	79	53	83	51	789	481	1,386	844
Pinyon / juniper	1,013	236	130	38	243	50	868	100	510	122	473	64	16,490	2,006	19,606	2,426
Ponderosa pine	1,065	377	50	31	247	87	54	20	144	75	209	74	2,387	846	4,142	1,437
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	309	184	36	32	62	39	17	10	37	27	57	34	839	498	1,354	808
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	80	73	--	--	9	8	16	13	7	9	24	20	465	362	595	469
Total	5,373	1,030	699	211	1,130	197	1,032	106	1,151	205	1,358	191	24,894	2,564	35,497	3,942
Hardwoods:																
Alder / maple	181	162	2	2	33	30	24	16	6	4	20	16	255	186	506	400
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	34	47	1	2	6	9	20	15	1	2	8	11	105	140	161	215
Tanoak / laurel	49	49	1	1	11	11	11	11	5	5	22	21	256	254	355	353
Western oak	6,819	1,049	1,097	242	1,521	220	1,312	126	1,303	226	1,142	129	22,815	2,377	35,574	3,855
Woodland hardwoods	333	129	37	15	62	23	216	53	112	59	137	40	2,307	635	3,103	865
Exotic hardwoods	3	3	--	--		1	11	11	6	6	4	4	85	87	104	106
Other hardwoods	87	55	2	1	20	12	49	24	7	4	46	25	862	456	1,055	551
Total	7,506	1,071	1,141	243	1,655	224	1,644	142	1,440	234	1,379	140	26,685	2,522	40,858	4,023
Nonstocked	20	13	507	275	128	67	215	49	225	100	132	33	4,314	1,048	5,507	1,392
All forest types	12,900	1,487	2,346	419	2,913	305	2,891	184	2,816	324	2,869	238	55,893	3,712	81,862	5,757

Note: Totals may be of because of rounding

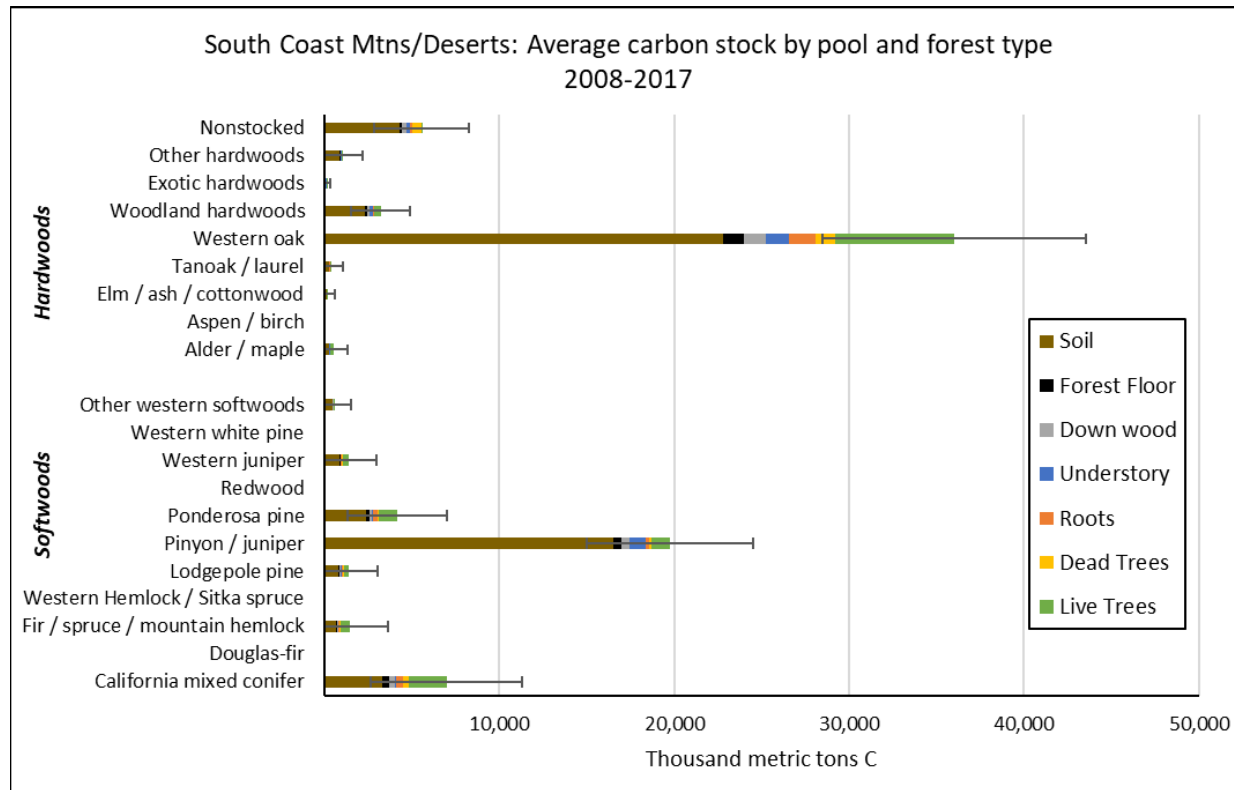


Figure A1.7.1. South Coast Mountains/Deserts: Average carbon stock by pool and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.7.1.

Table A 1.7.2: Forest land carbon stocks (thousand metric tons C) by forest type and land status, 2008-2017: South Coast Mountains and Deserts

	Unreserved Forests:				Reserved Forests:				All forest land	
	Timberland		Other Forest		Productive		Other Forest		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE		
	<i>Thousand metric tons C</i>									
Softwoods:										
California mixed conifer	2,917	1,355	--	--	4,060	1,758	--	--	6,977	2,219
Douglas-fir	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	1,436	1,106	--	--	--	--	--	--	1,436	1,106
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	1,386	844	1,386	844
Pinyon / juniper	--	--	11,392	1,834	--	--	8,215	1,593	19,606	2,426
Ponderosa pine	1,365	804	--	--	2,341	1,109	436	437	4,142	1,437
Redwood	--	--	--	--	--	--	--	--	--	--
Western juniper	954	700	401	404	--	--	--	--	1,354	808
Western white pine	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	493	452	102	126	595	469
Total	6,672	2,046	11,793	1,878	6,894	2,105	10,138	1,853	35,497	3,942
Hardwoods:										
Alder / maple	--	--	506	400	--	--	--	--	506	400
Aspen / birch	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	3	3	--	--	158	215	161	215
Tanoak / laurel	--	--	--	--	--	--	355	353	355	353
Western oak	4,716	1,510	21,287	2,843	3,110	1,269	6,461	1,637	35,574	3,855
Woodland hardwoods	--	--	2,410	751	--	--	693	431	3,103	865
Exotic hardwoods	104	106	--	--	--	--	--	--	104	106
Other hardwoods	--	--	1,055	551	--	--	--	--	1,055	551
Total	4,820	1,514	25,260	3,010	3,110	1,269	7,668	1,742	40,858	4,023
Nonstocked	1,758	814	1,654	683	1,351	805	743	406	5,507	1,392
All forest types	13,249	2,667	38,707	3,610	11,356	2,586	18,549	2,559	81,862	5,757

Note: Totals may be off because of rounding

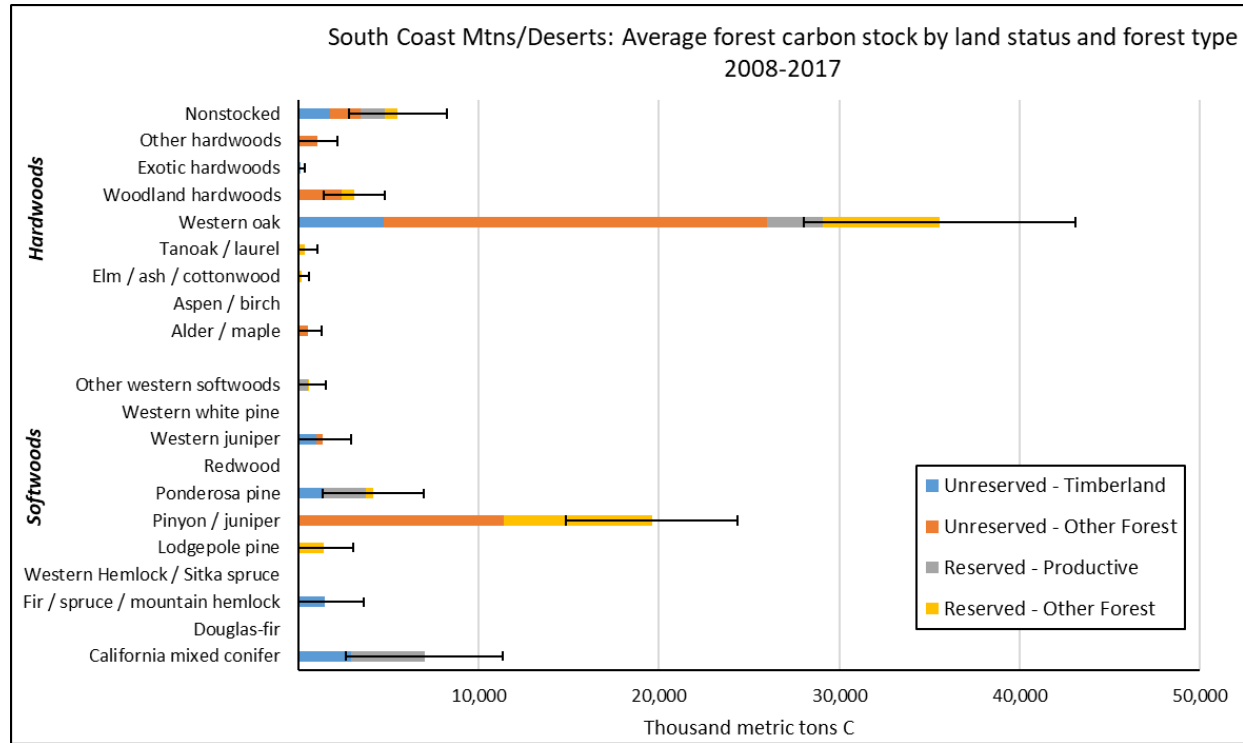


Figure A1.7.2. South Coast Mountains/Deserts: Average forest carbon stock by land status and forest type, 2008-2017 (thousand metric tons C). Error bars represent the 95% confidence interval of total stock for each forest type. Figure derived from Table A1.7.2.

Appendix 2: 2008 - 2017 California FIA forest carbon inventory tables

Flux are based on plots initially measured between 2001-2007 and re-measured between 2011-2017.

Stocks are based on 10-year averages with the current reporting period being 2008-2017.

A. Area

Sampled Area

Table A1- A8: Area of Sampled Land by Land Status and Owner Group, 2008-2017: [Region]

Table A1: Area of Sampled Land by Land Status and Ownership Group, 2008-2017: All California

Table A2: Area of Sampled Land by Land Status and Owner Group, 2008-2017: Central Coast and Interior Ranges

Table A3: Area of Sampled Land by Land Status and Owner Group, 2008-2017: Central Valley

Table A4: Area of Sampled Land by Land Status and Owner Group, 2008-2017: Eastside

Table A5: Area of Sampled Land by Land Status and Owner Group, 2008-2017: Klamath Interior Coast Ranges

Table A6: Area of Sampled Land by Land Status and Owner Group, 2008-2017: North Coast

Table A7: Area of Sampled Land by Land Status and Owner Group, 2008-2017: Sierra Cascades

Table A8: Area of Sampled Land by Land Status and Owner Group, 2008-2017: South Coast Mountains and Deserts

Forest Area for Forest Land Remaining Forest (FF)

Table A9- A16: Area of Forest Land by Owner Group and Forest Land Status, 2008-2017: [Region]

Table A9: Area of Forest Land by Owner Group and Forest Land Status, 2008-2017: All California

Table A10: Area of Forest Land by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table A11: Area of Forest Land by Owner Group and Forest Land Status, 2008-2017: Central Valley

Table A12: Area of Forest Land by Owner Group and Forest Land Status, 2008-2017: Eastside

Table A13: Area of Forest Land by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table A14: Area of Forest Land by Owner Group and Forest Land Status, 2008-2017: North Coast

Table A15: Area of Forest Land by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Table A16: Area of Forest Land by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Forest Area for Forest Land Remaining Forest (FF): By Forest Type, Owner Group and Forest Land Status

Table A17: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: All California

Table A18: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table A19: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: Central Valley

Table A20: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: Eastside

Table A21: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table A22: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: North Coast

Table A23: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Table A24: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

B. Net Carbon Flux for Forest Land Remaining Forest (FF)

Net Carbon Flux for All Pools by Owner Group

Tables B1- B8: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: [Region]

Table B1: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: All California

Table B2: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: Central Coast and Interior Ranges

Table B3: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: Central Valley

Table B4: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: Eastside

Table B5: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: Klamath Interior Coast Ranges

Table B6: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: North Coast

Table B7: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: Sierra Cascades

Table B8: Annual Net Change in Carbon Stocks on Forest Land for all Pools by Owner Group, 2001-2007 to 2011-2017: South Coast Mountains and Deserts

Disturbance Effects on Net Forest Carbon Flux

Table B9.1: Annual Net Change in Carbon Stocks for Aboveground Pools on Forest Land by Disturbance, Forest Land Status and Owner Group, 2001-2007 to 2011-2017: All California

Table B9.2: Average annual carbon (CO₂e) flux in live trees from growth, harvest, mortality, 2001-2007 to 2011-2017: COUNTY

Table B9.3: Average annual carbon (CO₂e) flux in live trees from growth, harvest, mortality, 2001-2007 to 2011-2017: NATIONAL FOREST

Table B9.4: Annual Net Change in Carbon Stocks for Aboveground Pools on Forest Land by Disturbance, Forest Land Status and Owner Group, 2001-2007 to 2011-2017: Coastal Forest Practice District

Table B9.5: Annual Net Change in Carbon Stocks for Aboveground Pools on Forest Land by Disturbance, Forest Land Status and Owner Group, 2001-2007 to 2011-2017: Northern Forest Practice District

Table B9.6: Annual Net Change in Carbon Stocks for Aboveground Pools on Forest Land by Disturbance, Forest Land Status and Owner Group, 2001-2007 to 2011-2017: Southern Forest Practice District

Table B10: Annual Net Change Per Acre in Carbon Stock for Aboveground Pools on Forest Land by Disturbance, Forest Land Status and Owner Group, 2001-2007 to 2011-2017: All California

Table B11: Annual Net Change in Carbon Stocks for Aboveground Pools on Timberland by Disturbance, Forest Land Status and Owner Group, 2001-2007 to 2011-2017: All California

Table B12: Annual Net Change Per Acre in Carbon Stock for Aboveground Pools on Timberland by Disturbance, Forest Land Status and Owner Group, 2001-2007 to 2011-2017: All California

C. Forest Carbon Stocks for Forest Land Remaining Forest (FF): by Owner Group and Forest Land Status

Aboveground Live Tree Pool

Tables C1 – C8: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, 2008-2017: [Region]

Table C1: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, 2008-2017: All California (Same as Table C9.8)

Table C2: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table C3: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, 2008-2017: Central Valley

Table C4: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, 2008-2017: Eastside

Table C5: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table C6: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, 2008-2017: North Coast

Table C7: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Table C8: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Tables C9.1 – C9.8: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, All California, (10-year averages): [Years]

Table C9.1: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, All California, (10-year averages): 2001-2010

Table C9.2: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, All California, (10-year averages): 2002-2011

Table C9.3: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, All California, (10-year averages): 2003-2012

Table C9.4: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, All California, (10-year averages): 2004-2013

Table C9.5: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, All California, (10-year averages): 2005-2014

Table C9.6: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, All California, (10-year averages): 2006-2015

Table C9.7: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, All California (10-year averages): 2007-2016

Table C9.8: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inches) by Owner Group and Forest Land Status, All California (10-year averages): 2008-2017 (Same as Table C1)

Aboveground Dead Tree Pool

Tables C10 – C17: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: [Region]

Table C10: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: All California (Same as Table C18.8)

Table C11: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table C12: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: Central Valley

Table C13: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: Eastside

Table C14: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table C15: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: North Coast

Table C16: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Table C17: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Tables C18.1 – C18.8 – Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees Foliage (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): [Years]

Table C18.1: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees Foliage (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2001-2010

Table C18.2: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees Foliage (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2002-2011

Table C18.3: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees Foliage (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2003-2012

Table C18.4: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees Foliage (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2004-2013

Table C18.5: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees Foliage (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2005-2014

Table C18.6: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees Foliage (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2006-2015

Table C18.7: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees Foliage (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2007-2016

Table C18.8: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees Foliage (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2008-2017 (Same as Table C10)

Aboveground Live Understory Vegetation Pool

Tables C19 – C26: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: [Region]

Table C19: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: All California (information from Table C19 combined with information from Table C28 in Table C27.8)

Table C20: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table C21: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: Central Valley

Table C22: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: Eastside

Table C23: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table C24: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: North Coast

Table C25: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Table C26: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Aboveground and Belowground Live Understory Vegetation, 10-Year Averages

Tables C27.1 – C27.8: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, All California (10-year averages): [Years]

Table C27.1: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, All California (10-year averages): 2001-2010

Table C27.2: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, All California (10-year averages): 2002-2011

Table C27.3: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, All California (10-year averages): 2003-2012

Table C27.4: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, All California (10-year averages): 2004-2013

Table C27.5: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, All California (10-year averages): 2005-2014

Table C27.6: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, All California (10-year averages): 2006-2015

Table C27.7: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, All California (10-year averages): 2007-2016

Table C27.8: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, All California (10-year averages): 2008-2017 (Same as Table C19 and Table C28 combined)

Belowground Live Understory Vegetation Pool

Tables C28 – C35: Belowground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: [Region]

Table C28: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: All California (information from Table C28 combined with information from Table C19 in Table C27.8)

Table C29: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table C30: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: Central Valley

Table C31: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: Eastside

Table C32: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table C33: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: North Coast

Table C34: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Table C35: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Belowground Live Tree Pool

Tables C36 - 43: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Owner Group and Forest Land Status, 2008-2017: [Region]

Table C36: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Owner Group and Forest Land Status, 2008-2017: All California (information from Table C36 combined with information from Table C45 in Table C44.8)

Table C37: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Range

Table C38: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Owner Group and Forest Land Status, 2008-2017: Central Valley

Table C39: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Owner Group and Forest Land Status, 2008-2017: Eastside

Table C40: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table C41: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Owner Group and Forest Land Status, 2008-2017: North Coast

Table C42: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Table C43: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Belowground Live and Dead Tree Pool, 10-year averages

Tables C44.1 – C44.8: Belowground Carbon, Dry Weight of Live (≥ 1 inch) and Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): [Years]

Table C44.1: Belowground Carbon, Dry Weight of Live (≥ 1 inch) and Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2001-2010

Table C44.2: Belowground Carbon, Dry Weight of Live (≥ 1 inch) and Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2002-2011

Table C44.3: Belowground Carbon, Dry Weight of Live (≥ 1 inch) and Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2003-2012

Table C44.4: Belowground Carbon, Dry Weight of Live (≥ 1 inch) and Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2004-2013

Table C44.5: Belowground Carbon, Dry Weight of Live (≥ 1 inch) and Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2005-2014

Table C44.6: Belowground Carbon, Dry Weight of Live (≥ 1 inch) and Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2006-2015

Table C44.7: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) and Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2007-2016

Table C44.8: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) and Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, All California (10-year averages): 2008-2017 (Same as Table C36 and Table C45 combined)

Belowground Dead Tree Pool

Tables C45 – 52: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: [Regions]

Table C45: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: All California (information from Table C45 combined with information from Table C36 in Table C44.8)

Table C46: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table C47: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: Central Valley

Table C48: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: Eastside

Table C49: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table C50: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: North Coast

Table C51: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Table C52: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Soil Organic Carbon Pool

Tables C53 – C60: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: [Region]

Table C53: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: All California (information duplicated in Table C61.8)

Table C54: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table C55: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: Central Valley

Table C56: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: Eastside

Table C57: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table C58: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: North Coast

Table C59: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Table C60: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Tables C61.1 – C61.8: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10 year averages): [Years]

Table C61.1: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10-year averages): 2001-2010

Table C61.2: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10-year averages): 2002-2011

Table C61.3: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10-year averages): 2003-2012

Table C61.4: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10-year averages): 2004-2013

Table C61.5: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10-year averages): 2005-2014

Table C61.6: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10-year averages): 2006-2015

Table C61.7: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10-year averages): 2007-2016

Table C61.8: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10-year averages): 2008-2017 (Same as Table C53)

Aboveground Down Dead Wood Pool

Tables C62 – C69: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2008-2017: [Region]

Table C62: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2005-2016: All California (information duplicated in Table C70.8)

Table C63: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2005-2016: Central Coast and Interior Ranges

Table C64: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2005-2016: Central Valley

Table C65: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2005-2016: Eastside

Table C66: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2005-2016: Klamath Interior Coast Ranges

Table C67: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2005-2016: North Coast

Table C68: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2005-2016: Sierra Cascades

Table C69: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2005-2016: South Coast Mountains and Deserts

Tables C70.1 – C70.8: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10-year averages): [Years]

Table C70.1: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10-year averages): 2001-2010

Table C70.2: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10-year averages): 2002-2011

Table C70.3: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10-year averages): 2003-2012

Table C70.4: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10-year averages): 2004-2013

Table C70.5: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10-year averages): 2005-2014

Table C70.6: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10-year averages): 2006-2015

Table C70.7: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10-year averages): 2007-2016

Table C70.8: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10-year averages): 2008-2017 (information duplicated in Table C62)

Forest Floor Pool

Tables C71 – C78: Forest Floor by Owner Group and Forest Land Status, 2008-2017: [Region]

Table C71: Forest Floor by Owner Group and Forest Land Status, 2008-2017: All California (same as Table C79.8)

Table C72: Forest Floor by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table C73: Forest Floor by Owner Group and Forest Land Status, 2008-2017: Central Valley

Table C74: Forest Floor by Owner Group and Forest Land Status, 2008-2017: Eastside

Table C75: Forest Floor by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table C76: Forest Floor by Owner Group and Forest Land Status, 2008-2017: North Coast

Table C77: Forest Floor by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Table C78: Forest Floor by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Tables C79.1 – C79.8: Forest Floor Pool, by Owner Group and Forest Land Status, All California (10-year averages): [Years]

Table C79.1: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2001 – 2010

Table C79.2: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2002 – 2011

Table C79.3: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2003 – 2012

Table C79.4: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2004 – 2013

Table C79.5: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2005 – 2014

Table C79.6: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2006 – 2015

Table C79.7: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2007 – 2016

Table C79.8: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2008 – 2017 (Information duplicated in Table C71)

D. Forest Carbon Stocks for Forest Land Remaining Forest (FF): by Forest Type and Forest Land Status

Aboveground Live Tree Pool

Tables D1 - D8: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inch) by Forest Type and Forest Land Status, 2008-2017: [Region]

Table D1: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inch) by Forest Type and Land Status, 2008-2017: All California

Table D2: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inch) by Forest Type and Land Status, 2008-2017: Central Coast and Interior Ranges

Table D3: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inch) by Forest Type and Land Status, 2008-2017: Central Valley

Table D4: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inch) by Forest Type and Land Status, 2008-2017: Eastside

Table D5: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inch) by Forest Type and Land Status, 2008-2017: Klamath Interior Coast Ranges

Table D6: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inch) by Forest Type and Land Status, 2008-2017: North Coast

Table D7: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inch) by Forest Type and Land Status, 2008-2017: Sierra Cascades

Table D8: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (≥ 1 inch) by Forest Type and Land Status, 2008-2017: South Coast Mountains and Deserts

Aboveground Dead Tree Pool

Tables D9 – D16: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: [Region]

Table D9: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: All California

Table D10: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table D11: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: Central Valley

Table D12: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inches) by Forest Type and Forest Land Status, 2008-2017: Eastside

Table D13: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table D14: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: North Coast

Table D15: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Table D16: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status - South Coast Mountains and Deserts

Aboveground Live Understory Vegetation Pool

Tables D17 – D24: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Forest Type and Forest Land Status, 2008-2017: [Region]

Table D17: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: All California

Table D18: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table D19: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Central Valley

Table D20: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Eastside

Table D21: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table D22: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: North Coast

Table D23: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Table D24: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Belowground Live Understory Vegetation Pool

Tables D25 - D32 – Belowground Carbon, Dry Weight of Live Understory Vegetation by Forest Type and Forest Land Status, 2008-2017: [Region]

Table D25: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: All California

Table D26: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table D27: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Central Valley

Table D28: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Eastside

Table D29: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table D30: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: North Coast

Table D31: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Table D32: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Belowground Live Tree Pool

Tables D33 – D40 – Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Forest Type and Forest Land Status, 2008-2017: [Region]

Table D33: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Forest Type and Forest Land Status, 2008-2017: All California

Table D34: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table D35: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Forest Type and Forest Land Status, 2008-2017: Central Valley

Table D36: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Forest Type and Forest Land Status, 2008-2017: Eastside

Table D37: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table D38: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Forest Type and Forest Land Status, 2008-2017: North Coast

Table D39: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Table D40: Belowground Carbon, Dry Weight of Live Trees (≥ 1 inch) by Forest Type and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Belowground Dead Tree Pool

Tables D41 - 48 – Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: [Region]

Table D41: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: All California

Table D42: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table D43: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: Central Valley

Table D44: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: Eastside

Table D45: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table D46: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: North Coast

Table D47: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Table D48: Belowground Carbon, Dry Weight of Dead Trees (≥ 5 inch) by Forest Type and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Soil Organic Carbon Pool

Tables D49 – D56 – Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: [Region]

Table D49: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: All California

Table D50: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table D51: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: Central Valley

Table D52: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: Eastside

Table D53: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table D54: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: North Coast

Table D55: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: Sierra Cascades

Table D56: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Aboveground Down Dead Wood Pool:

Tables D57 – D64 – Aboveground Carbon Mass of Down Dead Wood by Forest Type Group and Forest Land Status, 2008-2017: [Region]

Table D57: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: All California

Table D58: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table D59: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: Central Valley

Table D60: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: Eastside

Table D61: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table D62: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: North Coast

Table D63: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Table D64: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Forest Floor Pool

Tables D65 – D72 – Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: [Region]

Table D65: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: All California

Table D66: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Table D67: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: Central Valley

Table D68: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: Eastside

Table D69: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Table D70: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: North Coast

Table D71: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: Sierra Cascades

Table D72: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

E. Forest Land Conversions (LF)

Changes in Area from Forest Land-Use Conversions

Table E1: Annual Change in Forest Land Area To and From Other IPCC Land-Use Classes in California, 2001-2007 to 2011-2017

Net Forest Carbon Flux from Forest Land-Use Conversions

Table E2: Annual Change in Carbon Pools Due to Change in Land-Use Between Forest and Non-forest in California, 2001-2007 to 2011-2017

F. Net Flux from Other GHG emissions

Table F1 - Annual Net Emissions of Non-CO₂e Greenhouse Gases from Fire, 2001-2007 to 2011-2017

Table A1: Area of Sampled Land by Land Status and Owner Group, 2008-2017: All California

Land status	Ownership group									
	National forest		Other federal		State and local govt.		Private		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres									
Unreserved forest land:										
Timberland	8,825	121	307	42	150	28	7,179	119	16,462	168
Other unreserved forest land	2,383	98	1,037	72	195	33	5,098	139	8,713	185
Total, unreserved	11,208	121	1,345	83	345	43	12,277	153	25,175	202
Reserved forest land:										
Reserved productive forest land	2,787	90	1,067	63	327	35	--	--	4,181	115
Other reserved forest land	1,263	76	697	61	429	45	--	--	2,390	107
Total, reserved forest land	4,051	94	1,765	82	756	54	--	--	6,571	135
Total, forest land	15,259	122	3,110	99	1,101	61	12,277	153	31,746	200
Nonforest and other area:										
Nonforest land	5,277	113	23,763	132	2,946	90	36,179	186	68,164	212
Noncensus water	35	9	28	11	11	4	139	26	213	30
Census water	--	--	--	--	4,924	70	--	--	4,924	70
Total, nonforest and other area	5,312	113	23,791	132	7,880	108	36,318	185	73,301	201
Total, all sampled area	20,570	69	26,900	129	8,981	119	48,595	157	105,046	47

Table A2: Area of Sampled Land by Land Status and Owner Group, 2008-2017: Central Coast and Interior Ranges

Land status	Ownership group									
	National forest		Other federal		State and local govt.		Private		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres									
Unreserved forest land:										
Timberland	2	1	--	--	15	9	193	34	209	35
Other unreserved forest land	83	21	113	25	38	14	880	66	1,114	75
Total, unreserved	84	21	113	25	53	16	1,073	74	1,323	82
Reserved forest land:										
Reserved productive forest land	28	13	--	--	82	22	--	--	110	25
Other reserved forest land	130	28	17	10	229	33	--	--	377	44
Total, reserved forest land	159	31	17	10	311	37	--	--	487	49
Total, forest land	243	37	129	27	364	40	1,073	74	1,809	95
Nonforest and other area:										
Nonforest land	480	53	720	66	341	43	5,855	177	7,396	199
Noncensus water	2	2	6	5	3	2	15	8	25	9
Census water	--	--	--	--	1,004	72	--	--	1,004	72
Total, nonforest and other area	482	53	725	66	1,348	84	5,870	177	8,425	212
Total, all sampled area	725	65	855	72	1,712	94	6,943	194	10,235	234

Table A3: Area of Sampled Land by Land Status and Owner Group, 2008-2017: Central Valley

Land status	Ownership group									
	National forest		Other federal		State and local govt.		Private		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres									
Unreserved forest land:										
Timberland	--	--	--	--	--	--				
Other unreserved forest land	--	--	--	--	4	3	78	20	83	20
Total, unreserved	--	--	--	--	4	3	78	20	83	20
Reserved forest land:										
Reserved productive forest land	--	--	--	--	--	--	--	--	--	--
Other reserved forest land	--	--	1	1	5	5	--	--	6	5
Total, reserved forest land	--	--	1	1	5	5	--	--	6	5
Total, forest land	--	--	1	1	9	6	78	20	88	21
Nonforest and other area:										
Nonforest land	--	--	285	42	166	32	11,733	215	12,184	220
Noncensus water	--	--	--	--	2	2	24	12	26	13
Census water	--	--	--	--	143	30	--	--	143	30
Total, nonforest and other area	--	--	285	42	310	43	11,757	215	12,352	222
Total, all sampled area	--	--	285	42	319	44	11,835	216	12,440	223

Table A4: Area of Sampled Land by Land Status and Owner Group, 2008-2017: Eastside

Land status	Ownership group									
	National forest		Other federal		State and local govt.		Private		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres									
Unreserved forest land:										
Timberland	691	61	32	14	--	--	313	43	1,036	76
Other unreserved forest land	792	62	483	52	6	6	213	36	1,494	89
Total, unreserved	1,484	86	515	54	6	6	526	56	2,531	116
Reserved forest land:										
Reserved productive forest land	54	18	--	--	6	6	--	--	60	19
Other reserved forest land	106	26	121	27	9	8	--	--	236	39
Total, reserved forest land	160	32	121	27	15	10	--	--	296	43
Total, forest land	1,644	91	636	59	21	12	526	56	2,827	123
Nonforest and other area:										
Nonforest land	1,091	73	3,774	142	322	43	1,274	85	6,461	185
Noncensus water	--	--	6	6	--	--	6	6	12	9
Census water	--	--	--	--	276	41	--	--	276	41
Total, nonforest and other area	1,091	73	3,780	142	598	59	1,280	85	6,750	189
Total, all sampled area	2,735	113	4,416	151	619	61	1,807	102	9,576	221

Table A5: Area of Sampled Land by Land Status and Owner Group, 2008-2017: Klamath Interior Coast Ranges

Land status	Ownership group									
	National forest		Other federal		State and local govt.		Private		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres									
Unreserved forest land:										
Timberland	2,553	105	138	29	17	9	1,644	93	4,352	143
Other unreserved forest land	376	46	122	26	22	11	1,248	80	1,767	96
Total, unreserved	2,929	112	260	39	38	14	2,892	121	6,119	170
Reserved forest land:										
Reserved productive forest land	1,338	73	68	20	7	5	--	--	1,412	76
Other reserved forest land	254	38	66	19	25	12	--	--	346	45
Total, reserved forest land	1,593	80	134	28	32	14	--	--	1,758	86
Total, forest land	4,521	133	394	47	70	20	2,892	121	7,877	186
Nonforest and other area:										
Nonforest land	359	43	346	45	67	18	2,169	107	2,940	125
Noncensus water	9	4	2	2	2	2	45	14	57	15
Census water	--	--	--	--	165	31	--	--	165	31
Total, nonforest and other area	367	43	348	45	234	36	2,214	108	3,163	129
Total, all sampled area	4,889	139	741	66	304	42	5,106	162	11,040	226

Table A6: Area of Sampled Land by Land Status and Owner Group, 2008-2017: North Coast

Land status	Ownership group									
	National forest		Other federal		State and local govt.		Private		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres									
Unreserved forest land:										
Timberland	23	12	49	17	62	18	2,037	98	2,171	101
Other unreserved forest land	7	6			8	5	183	30	198	31
Total, unreserved	30	13	49	17	70	20	2,220	101	2,369	105
Reserved forest land:										
Reserved productive forest land	12	9	109	26	154	27	--	--	275	39
Other reserved forest land	--	--	7	6	48	17	--	--	54	18
Total, reserved forest land	12	9	116	26	202	32	--	--	330	42
Total, forest land	41	16	165	31	272	34	2,220	101	2,699	111
Nonforest and other area:										
Nonforest land	--	--	96	25	95	23	1,115	79	1,306	86
Noncensus water	--	--	--	--	1	2	24	11	25	11
Census water	--	--	--	--	1,042	73	--	--	1,042	73
Total, nonforest and other area	--	--	96	25	1,139	77	1,139	80	2,373	113
Total, all sampled area	41	16	261	39	1,411	84	3,359	132	5,072	161

Table A7: Area of Sampled Land by Land Status and Owner Group, 2008-2017: Sierra Cascades

Land status	Ownership group									
	National forest		Other federal		State and local govt.		Private		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres									
Unreserved forest land:										
Timberland	5,420	135	86	23	57	19	2,973	114	8,536	177
Other unreserved forest land	781	64	272	39	98	25	2,240	102	3,390	129
Total, unreserved	6,201	141	358	45	155	31	5,212	146	11,926	206
Reserved forest land:										
Reserved productive forest land	1,229	77	891	60	68	20	--	--	2,188	99
Other reserved forest land	612	56	356	46	64	19	--	--	1,032	74
Total, reserved forest land	1,841	86	1,246	72	133	28	--	--	3,220	115
Total, forest land	8,042	159	1,605	80	287	41	5,212	146	15,146	225
Nonforest and other area:										
Nonforest land	1,622	85	1,129	78	166	29	3,368	133	6,285	177
Noncensus water	22	7	8	4	3	2	13	6	47	10
Census water	--	--	--	--	287	41	--	--	287	41
Total, nonforest and other area	1,644	85	1,137	78	456	50	3,381	133	6,619	182
Total, all sampled area	9,686	172	2,742	106	744	65	8,593	192	21,765	277

Table A8: Area of Sampled Land by Land Status and Owner Group, 2008-2017: South Coast Mountains and Deserts

Land status	Ownership group									
	National forest		Other federal		State and local govt.		Private		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres									
Unreserved forest land:										
Timberland	136	28	2	2	--	--	20	10	158	30
Other unreserved forest land	344	43	48	16	18	9	256	37	666	59
Total, unreserved	481	51	50	16	18	9	275	39	824	67
Reserved forest land:										
Reserved productive forest land	125	29	--	--	10	8	--	--	135	30
Other reserved forest land	161	31	131	28	48	17	--	--	340	45
Total, reserved forest land	286	42	131	28	58	18	--	--	475	53
Total, forest land	767	66	181	32	77	20	275	39	1,299	85
Nonforest and other area:										
Nonforest land	1,726	87	17,413	169	1,789	77	10,664	221	31,592	288
Noncensus water	2	2	6	6	--	--	12	9	20	11
Census water	--	--	--	--	2,006	90	--	--	2,006	90
Total, nonforest and other area	1,728	87	17,419	168	3,795	118	10,676	221	33,619	299
Total, all sampled area	2,495	105	17,600	169	3,872	119	10,951	224	34,918	308

Table A9: Area of forest land by Owner Group and Forest Land Status, 2008-2017: All California

Owner class	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres													
USDA Forest Service:														
National Forest	8,825	121	2,383	98	11,208	121	2,787	90	1,263	76	4,051	94	15,259	122
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	8,825	121	2,383	98	11,208	121	2,787	90	1,263	76	4,051	94	15,259	122
Other federal government:														
Bureau of Land Management	287	41	901	68	1,188	79	76	22	210	36	286	42	1,474	86
Department of Defense and Energy	20	11	77	21	98	24	--	--	5	6	5	6	103	24
National Park Service	--	--	--	--	--	--	988	61	477	52	1,465	76	1,465	76
U.S. Fish and Wildlife Service	--	--	--	--	--	--	4	4	1	1	4	4	4	4
Other federal	--	--	59	18	59	18	--	--	5	3	5	3	64	18
Total	307	42	1,037	72	1,345	83	1,067	63	697	61	1,765	82	3,110	99
State and local government:														
Local	59	18	139	27	198	33	39	15	157	28	196	31	394	45
State	92	21	48	17	139	27	283	33	266	37	549	47	688	47
Other public	--	--	9	7	9	7	5	5	6	6	11	8	19	11
Total	150	28	195	33	345	43	327	35	429	45	756	54	1,101	61
Private:														
Corporate	4,444	122	856	68	5,300	136	--	--	--	--	--	--	5,300	136
Noncorporate private:														
Total, noncorporate private	2,735	112	4,242	131	6,977	161	--	--	--	--	--	--	6,977	161
All private	7,179	119	5,098	139	12,277	153	--	--	--	--	--	--	12,277	153
All owners	16,462	168	8,713	185	25,175	202	4,181	115	2,390	107	6,571	135	31,746	200

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A10: Area of forest land by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Owner class	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres													
USDA Forest Service:														
National Forest	2	1	83	21	84	21	28	13	130	28	159	31	243	37
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2	1	83	21	84	21	28	13	130	28	159	31	243	37
Other federal government:														
Bureau of Land Management	--	--	53	18	53	18	--	--	11	8	11	8	63	19
Department of Defense and Energy	--	--	49	16	49	16	--	--	--	--	--	--	49	16
National Park Service	--	--	--	--	--	--	--	--	6	6	6	6	6	6
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	11	8	11	8	--	--	--	--	--	--	11	8
Total	--	--	113	25	113	25	--	--	17	10	17	10	129	27
State and local government:														
Local	--	--	29	12	29	12	39	15	105	23	144	26	173	28
State	15	9	9	7	24	11	38	15	119	25	157	29	180	31
Other public	--	--	--	--	--	--	5	5	6	6	11	8	11	8
Total	15	9	38	14	53	16	82	22	229	33	311	37	364	40
Private:														
Corporate	38	15	148	28	186	31	--	--	--	--	--	--	186	31
Noncorporate private:														
Total, noncorporate private	154	30	733	61	887	68	--	--	--	--	--	--	887	68
All private	193	34	880	66	1,073	74	--	--	--	--	--	--	1,073	74
All owners	209	35	1,114	75	1,323	82	110	25	377	44	487	49	1,809	95

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A11: Area of forest land by Owner Group and Forest Land Status, 2008-2017: Central Valley

Owner class	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres													
USDA Forest Service:														
National Forest	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal government:														
Bureau of Land Management	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	1	1	1	1	1	1
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	1	1	1	1	1	1
State and local government:														
Local	--	--	4	3	4	3	--	--	--	--	--	--	4	3
State	--	--	--	--	--	--	--	--	5	5	5	5	5	5
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	4	3	4	3	--	--	5	5	5	5	9	6
Private:														
Corporate	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Noncorporate private:														
Total, noncorporate private			78	20	78	20	--	--	--	--	--	--	78	20
All private			78	20	78	20	--	--	--	--	--	--	78	20
All owners			83	20	83	20	--	--	6	5	6	5	88	21

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A12: Area of forest land by Owner Group and Forest Land Status, 2008-2017: Eastside

Owner class	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres													
USDA Forest Service:														
National Forest	691	61	792	62	1,484	86	54	18	106	26	160	32	1,644	91
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	691	61	792	62	1,484	86	54	18	106	26	160	32	1,644	91
Other federal government:														
Bureau of Land Management	32	14	455	51	487	52	--	--	55	19	55	19	542	55
Department of Defense and Energy	--	--	28	13	28	13	--	--	--	--	--	--	28	13
National Park Service	--	--	--	--	--	--	--	--	66	20	66	20	66	20
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	32	14	483	52	515	54	--	--	121	27	121	27	636	59
State and local government:														
Local	--	--	6	6	6	6	--	--	--	--	--	--	6	6
State	--	--	--	--	--	--	6	6	9	8	15	10	15	10
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	6	6	6	6	6	6	9	8	15	10	21	12
Private:														
Corporate	223	37	73	21	296	42	--	--	--	--	--	--	296	42
Noncorporate private:														
Total, noncorporate private	90	23	141	29	231	37	--	--	--	--	--	--	231	37
All private	313	43	213	36	526	56	--	--	--	--	--	--	526	56
All owners	1,036	76	1,494	89	2,531	116	60	19	236	39	296	43	2,827	123

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A13: Area of forest land by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Owner class	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres													
USDA Forest Service:														
National Forest	2,553	105	376	46	2,929	112	1,338	73	254	38	1,593	80	4,521	133
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2,553	105	376	46	2,929	112	1,338	73	254	38	1,593	80	4,521	133
Other federal government:														
Bureau of Land Management	138	29	114	25	253	39	7	6	23	12	29	14	282	41
Department of Defense and Energy	--	--	--	--	--	--	--	--	5	6	5	6	5	6
National Park Service	--	--	--	--	--	--	61	19	37	14	98	24	98	24
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	7	5	7	5	--	--	1	1	1	1	8	6
Total	138	29	122	26	260	39	68	20	66	19	134	28	394	47
State and local government:														
Local	8	7	11	8	19	10	--	--	6	6	6	6	25	12
State	9	6	10	7	19	9	7	5	19	11	26	13	44	16
Other public	--	--	1	1	1	1	--	--	--	--	--	--	1	1
Total	17	9	22	11	38	14	7	5	25	12	32	14	70	20
Private:														
Corporate	911	71	245	37	1,157	80	--	--	--	--	--	--	1,157	80
Noncorporate private:														
Total, noncorporate private	733	65	1,003	72	1,735	96	--	--	--	--	--	--	1,735	96
All private	1,644	93	1,248	80	2,892	121	--	--	--	--	--	--	2,892	121
All owners	4,352	143	1,767	96	6,119	170	1,412	76	346	45	1,758	86	7,877	186

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A14: Area of forest land by Owner Group and Forest Land Status, 2008-2017: North Coast

Owner class	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres													
USDA Forest Service:														
National Forest	23	12	7	6	30	13	12	9	--	--	12	9	41	16
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	23	12	7	6	30	13	12	9	--	--	12	9	41	16
Other federal government:														
Bureau of Land Management	31	14	--	--	31	14	62	20	--	--	62	20	92	24
Department of Defense and Energy	18	11	--	--	18	11	--	--	--	--	--	--	18	11
National Park Service	--	--	--	--	--	--	44	17	7	6	51	18	51	18
U.S. Fish and Wildlife Service	--	--	--	--	--	--	4	4	--	--	4	4	4	4
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	49	17			49	17	109	26	7	6	116	26	165	31
State and local government:														
Local	15	9	7	5	22	11	--	--	38	15	38	15	60	18
State	47	16	2	2	49	16	154	27	10	8	164	28	213	28
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	62	18	8	5	70	20	154	27	48	17	202	32	272	34
Private:														
Corporate	1,202	80	39	14	1,240	81	--	--	--	--	--	--	1,240	81
Noncorporate private:														
Total, noncorporate private	835	68	145	27	980	73	--	--	--	--	--	--	980	73
All private	2,037	98	183	30	2,220	101	--	--	--	--	--	--	2,220	101
All owners	2,171	101	198	31	2,369	105	275	39	54	18	330	42	2,699	111

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A15: Area of forest land by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Owner class	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres													
USDA Forest Service:														
National Forest	5,420	135	781	64	6,201	141	1,229	77	612	56	1,841	86	8,042	159
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	5,420	135	781	64	6,201	141	1,229	77	612	56	1,841	86	8,042	159
Other federal government:														
Bureau of Land Management	86	23	254	38	340	44	8	7	93	24	101	25	440	50
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	883	59	261	40	1,144	68	1,144	68
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	18	10	18	10	--	--	2	2	2	2	20	10
Total	86	23	272	39	358	45	891	60	356	46	1,246	72	1,605	80
State and local government:														
Local	36	15	63	19	99	25	--	--	5	5	5	5	104	25
State	21	11	27	13	48	17	68	20	59	19	127	27	175	32
Other public	--	--	8	7	8	7	--	--	--	--	--	--	8	7
Total	57	19	98	25	155	31	68	20	64	19	133	28	287	41
Private:														
Corporate	2,065	101	305	42	2,370	108	--	--	--	--	--	--	2,370	108
Noncorporate private:														
Total, noncorporate private	908	70	1,934	97	2,842	117	--	--	--	--	--	--	2,842	117
All private	2,973	114	2,240	102	5,212	146	--	--	--	--	--	--	5,212	146
All owners	8,536	177	3,390	129	11,926	206	2,188	99	1,032	74	3,220	115	15,146	225

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A16: Area of forest land by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Owner class	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres													
USDA Forest Service:														
National Forest	136	28	344	43	481	51	125	29	161	31	286	42	767	66
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	136	28	344	43	481	51	125	29	161	31	286	42	767	66
Other federal government:														
Bureau of Land Management	--	--	25	11	25	11	--	--	29	13	29	13	54	17
Department of Defense and Energy	2	2	--	--	2	2	--	--	--	--	--	--	2	2
National Park Service	--	--	--	--	--	--	--	--	101	24	101	24	101	24
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	23	11	23	11	--	--	1	1	1	1	24	11
Total	2	2	48	16	50	16	--	--	131	28	131	28	181	32
State and local government:														
Local	--	--	18	9	18	9	--	--	3	3	3	3	21	10
State	--	--	--	--	--	--	10	8	46	16	55	18	55	18
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	18	9	18	9	10	8	48	17	58	18	77	20
Private:														
Corporate	5	5	46	17	51	18	--	--	--	--	--	--	51	18
Noncorporate private:														
Total, noncorporate private	15	9	209	33	224	35	--	--	--	--	--	--	224	35
All private	20	10	256	37	275	39	--	--	--	--	--	--	275	39
All owners	158	30	666	59	824	67	135	30	340	45	475	53	1,299	85

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A17: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: All California

Forest type group	USDA Forest Service				Other federal				State and local government				Private corporate				Private non-corporate				All owners	
	Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres																					
Softwoods:																						
California mixed conifer	4,138	121	1,017	69	67	20	420	46	30	13	50	17	1,721	91	--	--	462	51	3	3	7,908	173
Douglas-fir	168	30	167	31	19	11	51	18	24	12	30	14	329	42	--	--	332	43	--	--	1,120	78
Fir / spruce / mountain hemlock	1,118	76	432	49	6	6	201	34	11	8	11	8	190	33	--	--	67	21	--	--	2,035	104
Western Hemlock / Sitka spruce	--	--	--	--	--	--	1	1	1	1	1	1	28	14	--	--	1	1	--	--	32	14
Lodgepole pine	222	35	485	50	--	--	234	36	9	8	6	6	31	14	--	--	29	13	--	--	1,016	74
Pinyon / juniper	11	8	723	61	--	--	558	56	--	--	81	22	--	--	41	16	--	--	120	26	1,534	91
Ponderosa pine	1,246	76	235	36	36	15	44	16	4	4	18	10	511	53	4	3	283	39	2	2	2,382	108
Redwood	3	3	16	10	--	--	31	14	38	15	65	19	403	48	--	--	217	35	--	--	774	65
Western juniper	127	27	629	58	22	11	332	43	--	--	17	11	11	6	72	21	21	11	269	40	1,499	91
Western white pine	30	13	122	27	--	--	13	9	--	--	--	--	--	--	--	--	--	--	--	--	165	31
Other western softwoods	31	13	305	41	3	2	150	29	--	--	14	9	16	10	--	--	16	10	6	6	540	55
Total	7,093	129	4,132	117	152	30	2,034	90	117	25	292	39	3,240	114	117	27	1,427	85	400	48	19,005	219
Hardwoods:																						
Alder / maple	27	12	15	8	12	7	28	13	--	--	7	6	81	21	1	1	34	14	18	8	222	34
Aspen / birch	8	6	54	17	--	--	9	7	--	--	1	1	4	4	--	--	--	--	--	--	76	20
Elm / ash / cottonwood	--	--	5	5	--	--	1	1	--	--	8	6	--	--	3	2	--	--	17	8	34	11
Tanoak / laurel	185	32	235	37	13	8	57	19	10	8	150	30	504	53	21	10	547	56	87	22	1,809	98
Western oak	915	70	1,570	90	103	25	510	52	19	10	440	44	359	46	712	62	602	58	3,570	122	8,799	192
Woodland hardwoods	20	11	67	19	--	--	56	17	--	--	9	7	--	--	--	--	--	--	29	12	181	31
Exotic hardwoods	--	--	--	--	2	2	--	--	--	--	--	--	--	--	--	--	--	--	3	2	5	3
Other hardwoods	129	26	84	22	11	8	16	10	4	4	36	15	57	17	3	3	91	23	98	23	528	54
Total	1,284	81	2,029	100	142	28	677	59	33	13	651	54	1,004	74	739	63	1,274	82	3,820	124	11,654	212
Nonstocked	448	49	273	40	14	9	91	24	--	--	7	5	199	32	--	--	34	12	22	10	1,088	77
All forest types	8,825	121	6,433	131	307	42	2,802	96	150	28	950	61	4,444	122	856	68	2,735	112	4,242	131	31,746	200

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A18: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Forest type group	USDA Forest Service				Other federal				State and local government				Private corporate				Private non-corporate				All owners	
	Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres																					
Softwoods:																						
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	14	10	--	--	15	10
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	40	15	--	--	40	15	--	--	1	1	--	--	8	7	--	--	22	11	111	25
Ponderosa pine	--	--	4	4	--	--	6	6	--	--	6	6	--	--	--	--	--	--	--	--	16	10
Redwood	--	--	16	10	--	--	--	--	7	6	27	13	7	6	--	--	86	22	--	--	143	29
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	6	6	--	--	11	8	--	--	17	11
Total	--	--	60	19	--	--	46	17	7	6	35	14	14	9	8	7	111	26	22	11	304	42
Hardwoods:																						
Alder / maple	--	--	--	--	--	--	--	--	--	--	5	5	--	--	--	--	--	--	5	4	10	7
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	1		--	--	3	2	--	--	1	1	4	2
Tanoak / laurel	2	1	16	9	--	--	1	2	6	6	57	18	17	10	14	7	12	8	35	14	159	30
Western oak	--	--	145	28	--	--	81	21	--	--	229	31	7	7	123	26	10	7	650	57	1,245	78
Woodland hardwoods	--	--	3	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	2
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	2	3	2
Other hardwoods	--	--	18	10	--	--	--	--	2	3	22	12	--	--	--	--	16	9	17	9	75	21
Total	2	1	182	32	--	--	83	21	8	7	312	37	24	12	140	27	38	14	710	60	1,499	86
Nonstocked	--	--	--	--	--	--	--	--	--	--	2	2	--	--	--	--	5	5	--	--	7	5
All forest types	2	1	242	37	--	--	129	27	15	9	349	39	38	15	148	28	154	30	733	61	1,809	95

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A19: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: Central Valley

Forest type group	USDA Forest Service				Other federal				State and local government				Private corporate				Private non-corporate				All owners	
	Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres																					
Softwoods:																						
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwoods:																						
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	5	5	--	--	--	--	--	--	7	6	12	8
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	--	--	--	--	--	--	1	1	--	--	4	3	--	--	--	--	--	--	71	19	76	19
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	1	1	--	--	9	6	--	--	--	--	--	--	78	20	88	21
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types	--	--	--	--	--	--	1	1	--	--	9	6	--	--	--	--	--	--	78	20	88	21

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A20: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: Eastside

Forest type group	USDA Forest Service				Other federal				State and local government				Private corporate				Private non-corporate				All owners	
	Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres																					
Softwoods:																						
California mixed conifer	168	31	7	6			2	2	--	--	--	--	69	20	--	--	30	14	--	--	275	40
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	73	20	22	12	--	--	--	--	--	--	5	5	8	7	--	--	9	8	--	--	117	26
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	22	11	18	11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	40	15
Pinyon / juniper	6	6	332	43	--	--	274	40	--	--	6	6	--	--	2	2	--	--	14	9	634	60
Ponderosa pine	250	36	25	12	10	7	--	--	--	--	--	--	82	22	4	3	26	11	--	--	397	46
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	72	20	405	46	22	11	276	39	--	--	9	8	2	2	66	20	5	5	118	27	975	73
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	4	4	67	21	--	--	2	2	--	--	--	--	--	--	--	--	--	--	--	--	73	21
Total	594	56	876	67	32	14	553	55	--	--	20	11	161	31	72	21	69	20	132	28	2,509	116
Hardwoods:																						
Alder / maple	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Aspen / birch	7	6	27	13	--	--	1	1	--	--	1	1	--	--	--	--	--	--	--	--	36	15
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	4	4	2	2	--	--	12	9	--	--	--	--	1	2	1	1	--	--	--	--	20	11
Woodland hardwoods	20	11	11	8	--	--	20	11	--	--	--	--	--	--	--	--	--	--	--	--	52	18
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	11	7	4	4	--	--	--	--	--	--	--	--	5	5	--	--	7	7	--	--	27	12
Total	42	15	44	16	--	--	34	14	--	--	1	1	6	5	1	1	7	7	--	--	135	28
Nonstocked	55	17	32	13	--	--	17	11	--	--	--	--	55	18	--	--	14	8	9	7	182	32
All forest types	691	61	952	70	32	14	604	57	--	--	21	12	223	37	73	21	90	23	141	29	2,827	123

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A21: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Forest type group	USDA Forest Service				Other federal				State and local government				Private corporate				Private non-corporate				All owners	
	Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres																					
Softwoods:																						
California mixed conifer	1,392	82	549	52	51	18	4	4	11	7	6	5	463	51	--	--	157	30	--	--	2,632	115
Douglas-fir	156	29	155	30	4	5	7	7	2	2	--	--	59	18	--	--	120	26	--	--	503	53
Fir / spruce / mountain hemlock	93	23	172	32	--	--	--	--	--	--	--	--	31	13	--	--	--	--	--	--	296	42
Western Hemlock / Sitka spruce	--	--	--	--	--	--	1	1	--	--	1	1	--	--	--	--	--	--	--	--	2	2
Lodgepole pine	6	6	19	11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25	13
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	95	22	45	15	10	8	5	5	--	--	--	--	38	13	--	--	26	12	--	--	218	33
Redwood	--	--	--	--	--	--	19	11	--	--	--	--	3	3	--	--	6	6	--	--	28	13
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6	6	--	--	14	8	20	10
Western white pine	12	9	35	14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	47	16
Other western softwoods	17	10	24	11	1	1	11	9	--	--	2	2	--	--	--	--	--	--	6	6	61	19
Total	1,771	91	999	66	65	20	47	17	12	7	8	6	594	58	6	6	309	42	20	11	3,832	134
Hardwoods:																						
Alder / maple	21	10	9	7	11	7	22	12	--	--	--	--	7	7	--	--	22	11	7	5	100	23
Aspen / birch	--	--	4	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	5
Elm / ash / cottonwood	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	--	--	5	3	5	3
Tanoak / laurel	173	32	207	35	3	3	6	6	--	--	3	5	62	19	--	--	155	30	16	9	626	60
Western oak	465	51	617	60	50	18	173	31	4	5	42	15	184	33	239	36	210	36	940	70	2,924	125
Woodland hardwoods	--	--	5	5	--	--	2	2	--	--	--	--	--	--	--	--	--	--	2	1	9	6
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	50	16	29	13	7	7	5	6	--	--	--	--	28	13	--	--	26	12	10	7	155	30
Total	709	61	873	70	70	20	209	34	4	5	45	16	281	41	239	36	413	49	981	71	3,824	142
Nonstocked	73	20	97	24	3	2	--	--	--	--	--	--	37	13	--	--	11	8	2	2	222	35
All forest types	2,553	105	1,969	91	138	29	255	38	17	9	53	18	911	71	245	37	733	65	1,003	72	7,877	186

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A22: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: North Coast

Forest type group	USDA Forest Service				Other federal				State and local government				Private corporate				Private non-corporate				All owners	
	Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres																					
Softwoods:																						
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	12	8	12	9	14	9	44	17	22	12	30	14	269	39	--	--	197	33	--	--	601	58
Fir / spruce / mountain hemlock	5	4	--	--	--	--	--	--	--	--	--	--	5	5	--	--	--	--	--	--	10	6
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	1	1	--	--	28	14	--	--	1	1	--	--	31	14
Lodgepole pine	--	--	--	--	--	--	4	4	--	--	--	--	--	--	--	--	--	--	--	--	4	4
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	12	9	32	14	38	15	394	48	--	--	124	26	--	--	599	58
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	1	1	--	--	12	9	1	1	--	--	5	5	--	--	19	10
Total	17	10	12	9	14	9	61	20	55	17	80	21	697	62	--	--	327	43	--	--	1,263	81
Hardwoods:																						
Alder / maple	6	6	--	--	1	1	6	6	--	--	2	2	69	19	1	1	--	--	5	5	90	22
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	10	7	49	17	5	5	84	23	389	48	7	7	368	47	23	12	936	72
Western oak	--	--	7	6	18	11	--	--	2	1	30	12	24	12	31	12	104	25	115	24	328	42
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	--	--	--	--	1	1
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	--	--	--	--	--	--	--	--	1	1	13	10	15	9	--	--	36	14	2	2	67	20
Total	6	6	7	6	29	13	55	18	8	5	131	27	497	53	39	14	508	55	145	27	1,423	87
Nonstocked	--	--	--	--	6	6	--	--	--	--	--	--	7	5	--	--	--	--	--	--	13	8
All forest types	23	12	18	11	49	17	116	26	62	18	210	32	1,202	80	39	14	835	68	145	27	2,699	111

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A23: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Forest type group	USDA Forest Service				Other federal				State and local government				Private corporate				Private non-corporate				All owners	
	Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres																					
Softwoods:																						
California mixed conifer	2,546	107	428	50	16	10	413	46	20	11	39	15	1,189	79	--	--	276	39	3	3	4,931	151
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	937	70	238	38	6	6	201	34	11	8	6	7	146	29	--	--	58	19	--	--	1,602	93
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	194	33	430	47	--	--	230	36	9	8	6	6	31	14	--	--	29	13	--	--	929	71
Pinyon / juniper	5	5	174	32	--	--	127	27	--	--	47	18	--	--	--	--	--	--	18	9	371	47
Ponderosa pine	889	66	127	27	17	10	34	14	4	4	11	8	386	46	--	--	231	35	2	2	1,701	94
Redwood	3	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	3
Western juniper	44	15	220	36	--	--	56	19	--	--	8	7	8	6	--	--	16	10	136	28	488	54
Western white pine	18	10	87	23	--	--	13	9	--	--	--	--	--	--	--	--	--	--	--	--	118	27
Other western softwoods	10	7	208	34	2	2	133	28	--	--	--	--	8	7	--	--	--	--	--	--	361	45
Total	4,646	130	1,910	91	41	16	1,208	73	43	16	117	27	1,769	94	--	--	610	58	159	30	10,504	199
Hardwoods:																						
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	5	5	--	--	12	8	--	--	17	9
Aspen / birch	2	2	22	10	--	--	8	7	--	--	--	--	4	4	--	--	--	--	--	--	36	13
Elm / ash / cottonwood	--	--	5	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	4	9	6
Tanoak / laurel	10	7	12	8	--	--	--	--	--	--	--	--	36	14	--	--	12	8	13	8	82	21
Western oak	404	48	510	53	36	15	234	36	13	9	112	26	142	30	302	41	263	38	1,682	91	3,698	135
Woodland hardwoods	--	--	34	13	--	--	6	6	--	--	--	--	--	--	--	--	--	--	12	8	52	17
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	68	19	26	12	4	4	10	8	1	1	1	1	9	6	3	3	6	6	57	18	186	32
Total	484	52	608	57	40	15	258	38	14	9	113	26	196	34	305	42	294	40	1,769	93	4,081	141
Nonstocked	290	40	104	25	5	6	52	18	--	--	--	--	100	22	--	--	4	3	6	5	562	56
All forest types	5,420	135	2,622	106	86	23	1,519	77	57	19	230	37	2,065	101	305	42	908	70	1,934	97	15,146	225

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table A24: Area of Forest Land by Forest Type, Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Forest type group	USDA Forest Service				Other federal				State and local government				Private corporate				Private non-corporate				All owners	
	Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Timberland		Other forest land		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand acres																					
Softwoods:																						
California mixed conifer	31	14	34	16	--	--	--	--	--	--	5	6	--	--	--	--	--	--	--	--	70	21
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	11	8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11	8
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	18	11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18	11
Pinyon / juniper	--	--	177	32	--	--	117	27	--	--	27	13	--	--	31	14	--	--	66	19	418	50
Ponderosa pine	12	8	34	15	--	--	--	--	--	--	--	--	5	5	--	--	--	--	--	--	51	18
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	12	8	5	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17	10
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	7	7	--	--	2	3	--	--	--	--	--	--	--	--	--	--	--	--	10	7
Total	65	20	275	41	--	--	119	27	--	--	32	14	5	5	31	14	--	--	66	19	593	60
Hardwoods:																						
Alder / maple	--	--	5	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	4
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	3	4	--	--	--	--	--	--	--	--	3	4
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	7	7	--	--	--	--	--	--	--	--	7	7
Western oak	42	15	289	39	--	--	10	7	--	--	23	10	--	--	15	10	15	9	112	23	506	52
Woodland hardwoods	--	--	14	9	--	--	28	11	--	--	7	7	--	--	--	--	--	--	15	8	64	18
Exotic hardwoods	--	--	--	--	2	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	2
Other hardwoods	--	--	7	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11	7	18	10
Total	42	15	315	41	2	2	38	13	--	--	40	14	--	--	15	10	15	9	138	26	605	56
Nonstocked	29	13	40	15	--	--	22	12	--	--	4	5	--	--	--	--	--	--	6	4	101	24
All forest types	136	28	630	59	2	2	179	32	--	--	77	20	5	5	46	17	15	9	209	33	1,299	85

Note: Totals may be off because of rounding; data subject to sampling error; SE = standard error; -- = less than 500 acre were estimated.

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table B1: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: All California

	Public						Private				Total		Total	
	National forest		Other federal		State and local govt.		Corporate		Non Corporate		Total	SE	Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons CO2 equivalent per year</i>													
Standing Live tree														
Mortality	-26,162	1,340	-3,451	652	-1,252	277	-3,733	284	-4,438	323	-8,172	408	-39,037	1,562
Cut	-1,751	329	-6	6	-119	120	-10,616	1,134	-1,313	294	-11,929	1,158	-13,805	1,210
Gross Growth	31,611	572	4,031	311	3,122	301	19,114	757	13,154	654	32,267	779	71,031	992
Net	3,698	1,463	574	661	1,751	350	4,764	1,277	7,402	638	12,166	1,413	18,189	2,165
Foliage	254	75	33	29	84	17	265	66	328	30	593	71	964	109
Roots														
Live	893	291	137	116	344	69	1,012	263	1,390	132	2,402	291	3,775	433
Dead	820	202	38	92	-14	34	17	55	130	56	147	79	991	238
Standing Dead	5,194	971	509	534	-40	131	459	216	871	234	1,330	318	6,992	1,159
Dead Woody Debris	69	636	318	284	114	137	-1,685	484		302	-1,686	570	-1,184	910
Understory Vegetation														
Above Ground	-45	51	5	26	-17	7	27	41	-53	19	-26	45	-84	73
Below Ground	-5	6	1	3	-2	1	3	5	-6	2	-3	5	-9	8
Total (excluding soils)	10,877	1,321	1,614	603	2,220	433	4,861	1,705	10,061	792	14,923	1,867	29,634	2,394
Forest Floor	-40	132	-26	57	5	17	-16	93	169	58	152	110	92	182
Soils	-534	234	4	94	-58	44	-92	243	111	111	19	267	-569	371
Total (including soils and forest floor)	10,303	1,419	1,592	638	2,167	436	4,753	1,780	10,341	816	15,094	1,945	29,156	2,519

Table B2: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: Central Coast and Interior Ranges

	National forest		Public Other federal		State and local govt.		Corporate		Private Non Corporate		Total		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons CO2 equivalent per year</i>													
Standing Live tree														
Mortality	-386	183	-48	49	-317	91	-82	33	-708	138	-789	141	-1,541	253
Cut	--	--	--	--	-3	3	--	--	-196	93	-196	93	-199	93
Gross Growth	153	60	53	24	882	215	376	110	1,647	295	2,022	313	3,110	386
Net	-233	151	4	31	563	183	294	101	743	220	1,037	241	1,371	341
Foliage	-5	4	1		24	8	7	4	27	10	34	11	53	14
Roots														
Live	-31	24	4	5	103	38	32	18	86	39	118	43	194	63
Dead	31	24	2	3	17	12	2	5	42	15	45	15	95	31
Standing Dead	150	114	7	10	50	29	17	23	221	67	238	71	446	138
Dead Woody Debris	-79	33	40	29	107	59	-61	73	106	132	45	151	113	168
Understory Vegetation														
Above Ground	2	1			-5	3	-1	1	1	1		2	-3	4
Below Ground					-1									
Total (excluding soils)	-165	119	58	21	858	245	290	127	1,227	331	1,517	354	2,268	448
Forest Floor	1	7	1	2	-4	9	2	6	41	13	43	14	40	18
Soils	-4	12	1	2	-13	23	-8	7	21	37	14	38	-3	46
Total (including soils and forest floor)	-168	121	60	22	840	239	284	128	1,289	335	1,573	358	2,306	448

Table B3: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: Central Valley

	Public						Private				Total		Total			
	National forest		Other federal		State and local govt.		Corporate		Non Corporate		Total	SE	Total	SE		
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE		
	<i>thousand metric tons CO2 equivalent per year</i>															
Standing Live tree																
Mortality					-12	13					-35	21	-35	21	-48	25
Cut					--	--					-5	5	-5	5	-5	5
Gross Growth					13	10					70	38	70	38	83	39
Net					1	7					30	23	30	23	31	24
Foliage											1		1			1
Roots																
Live						1					6	4	6	4	6	5
Dead					2	2					4	2	4	2	6	3
Standing Dead					7	7					14	9	14	9	21	11
Dead Woody Debris					5	4					10	8	10	8	16	9
Understory Vegetation																
Above Ground																
Below Ground																
Total (excluding soils)					14	11					64	33	64	33	79	35
Forest Floor					1	1					1	1	1	1	2	1
Soils											1	1	1	1	1	1
Total (including soils and forest floor)					15	11					66	34	66	34	81	36

Table B4: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: Eastside

	Public						Private				Total		Total	
	National forest		Other federal		State and local govt.		Corporate		Non Corporate		Total	SE	Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons CO2 equivalent per year</i>													
Standing Live tree														
Mortality	-568	115	-12	6			-234	103	-16	10	-250	103	-831	155
Cut	-172	88	--	--	--	--	-267	99	-75	35	-343	104	-515	137
Gross Growth	1,180	135	119	20	18	18	412	100	121	41	533	108	1,850	178
Net	440	151	107	20	18	18	-89	128	29	24	-60	131	505	204
Foliage	28	9	7	1	1	1	-4	7	3	1	-1	7	35	12
Roots														
Live	99	33	20	4	3	3	-13	25	7	5	-6	25	116	42
Dead	-37	26	-4	2	-1	2	14	11	-5	4	9	12	-34	29
Standing Dead	-123	119	-16	9	-6	8	71	54	-20	18	50	57	-95	132
Dead Woody Debris	-143	107	76	55	-6	7	-23	59	-25	27	-48	65	-120	138
Understory Vegetation														
Above Ground	-36	21	17	24	-1	1	3	13	-18	12	-15	18	-35	36
Below Ground	-4	2	2	3				1	-2	1	-2	2	-4	4
Total (excluding soils)	225	226	208	67	7	6	-42	158	-30	45	-72	165	368	289
Forest Floor	14	28	-10	12	2	3	-20	18	-2	12	-22	21	-16	37
Soils	-84	50	-62	62			-18	20	1	17	-18	26	-163	84
Total (including soils and forest floor)	155	254	136	90	9	8	-80	170	-32	55	-112	178	188	324

Table B5: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: Klamath Interior Coast Ranges

	Public						Private				Total		Total	
	National forest		Other federal		State and local govt.		Corporate		Non Corporate		Total	SE	Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons CO2 equivalent per year</i>													
Standing Live tree														
Mortality	-10,676	1,064	-406	144	-105	74	-1,029	171	-1,159	153	-2,188	227	-13,374	1,099
Cut	-170	82	-6	6	-1	1	-1,973	499	-147	56	-2,121	502	-2,297	508
Gross Growth	11,521	515	971	220	123	46	3,671	352	3,795	371	7,466	495	20,081	749
Net	675	1,055	560	156	17	76	669	552	2,489	314	3,158	633	4,410	1,243
Foliage	40	56	25	9	3	2	23	31	107	14	130	34	199	66
Roots														
Live	137	218	115	36	7	12	142	119	476	63	618	135	877	259
Dead	502	154	8	15	2	2	20	25	-3	28	17	38	529	159
Standing Dead	2,748	715	58	46	28	19	176	105	52	116	228	156	3,061	734
Dead Woody Debris	-253	363	-59	149	10	24	-119	227	93	137	-25	266	-327	474
Understory Vegetation														
Above Ground	-26	24	-10	5	-2	1	26	16	-33	9	-7	19	-46	31
Below Ground	-3	3	-1	1			3	2	-4	1	-1	2	-5	3
Total (excluding soils)	3,820	854	695	214	65	59	939	664	3,179	415	4,118	781	8,698	1,178
Forest Floor	62	63	32	22	7	4	19	49	94	33	113	59	213	89
Soils	-258	147	2	46	3	2	84	79	96	57	179	97	-74	183
Total (including soils and forest floor)	3,624	911	729	229	75	61	1,042	718	3,368	440	4,410	840	8,837	1,262

Table B6: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: North Coast

	National forest		Public Other federal		State and local govt.		Corporate		Private Non Corporate		Total		Total	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons CO2 equivalent per year</i>													
Standing Live tree														
Mortality	-64	38	-105	44	-590	254	-963	132	-635	105	-1,599	165	-2,357	308
Cut	--	--	--	--	-112	120	-3,507	799	-380	238	-3,887	832	-3,999	840
Gross Growth	214	112	605	179	1,436	274	7,423	671	3,812	438	11,234	764	13,490	830
Net	151	85	500	159	735	295	2,952	883	2,797	433	5,749	976	7,135	1,033
Foliage	3	5	19	9	35	15	181	45	128	20	310	49	367	52
Roots														
Live	15	18	74	36	149	58	627	185	559	88	1,185	203	1,423	215
Dead	8	5	-22	16	-12	25	-2	40	-20	18	-22	44	-48	53
Standing Dead	33	21	-67	62	-71	107	205	140	48	62	252	153	148	198
Dead Woody Debris	11	46	42	56	-15	107	-941	360	-253	154	-1,195	391	-1,157	412
Understory Vegetation														
Above Ground		1		1	-4	2	-25	8	-6	2	-31	8	-35	8
Below Ground							-3	1	-1		-3	1	-4	1
Total (excluding soils)	220	126	546	198	816	359	2,995	1,268	3,251	500	6,246	1,357	7,828	1,421
Forest Floor	2	1	-3	3	-4	7	16	15	37	12	52	19	47	21
Soils			-4	4	11	12	-18	104	4	69	-14	125	-7	126
Total (including soils and forest floor)	222	127	539	198	822	363	2,992	1,290	3,292	504	6,284	1,380	7,867	1,443

Table B7: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: Sierra Cascades

	Public						Private				Total		Total	
	National forest		Other federal		State and local govt.		Corporate		Non Corporate		Total	SE	Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons CO2 equivalent per year</i>													
Standing Live tree														
Mortality	-13,397	909	-2,833	642	-186	53	-1,426	179	-1,789	240	-3,215	294	-19,630	1,147
Cut	-1,368	305	--	--	-3	3	-4,868	693	-491	132	-5,359	702	-6,729	765
Gross Growth	18,120	608	2,276	208	623	159	7,215	488	3,618	315	10,833	546	31,853	833
Net	3,356	969	-556	610	435	133	921	725	1,338	318	2,259	791	5,494	1,401
Foliage	221	48	-18	26	22	7	56	36	64	16	120	39	345	68
Roots														
Live	825	184	-67	101	86	26	218	142	266	71	484	159	1,328	265
Dead	286	125	54	89	-13	16	-17	26	111	42	94	49	422	162
Standing Dead	2,238	632	526	528	-18	44	-8	113	538	180	530	213	3,275	851
Dead Woody Debris	347	501	187	223	-18	29	-549	210	17	169	-532	270	-16	612
Understory Vegetation														
Above Ground	1	39	-2	7	-7	6	24	35	4	10	28	36	19	54
Below Ground		4		1	-1	1	3	4		1	3	4	2	6
Total (excluding soils)	7,275	983	124	520	486	150	647	905	2,338	388	2,985	984	10,870	1,488
Forest Floor	-43	109	-43	51	5	10	-33	76		42	-34	87	-115	149
Soils	-148	171	70	52	-59	35	-130	203	-12	52	-142	210	-279	279
Total (including soils and forest floor)	7,083	1,052	151	550	432	156	484	971	2,326	405	2,810	1,052	10,476	1,589

Table B8: Annual Net Change in Carbon Stocks on Forest Land for All Pools by Owner Group, 2001-2007 to 2011-2017: South Coast Mountains and Deserts

	Public						Private				Total		Total	
	National forest		Other federal		State and local govt.		Corporate		Non Corporate		Total	SE	Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons CO2 equivalent per year</i>													
Standing Live tree														
Mortality	-1,071	262	-48	39	-43	26	--	--	-95	39	-95	39	-1,257	269
Cut	-42	33	--	--	--	--	--	--	-20	15	-20	15	-62	37
Gross Growth	422	74	7	5	26	20	18	14	91	29	109	32	564	83
Net	-691	233	-41	38	-17	26	18	14	-24	39	-6	41	-755	241
Foliage	-33	11	-1	1		1	1	1	-1	1		2	-35	11
Roots														
Live	-152	49	-9	7	-3	6	6	4	-10	11	-4	12	-169	51
Dead	31	33		7	-8	11				5		5	22	36
Standing Dead	148	145		28	-29	50	-1	1	19	24	18	24	137	158
Dead Woody Debris	186	87	32	29	31	45	8	6	50	44	59	44	307	112
Understory Vegetation														
Above Ground	14	7	1	1	1	1							15	7
Below Ground	2	1											2	1
Total (excluding soils)	-497	209	-17	36	-27	36	32	22	33	66	65	69	-477	226
Forest Floor	-76	29	-2	2		5			-1	4	-1	4	-79	30
Soils	-39	30	-4	4			-1			2	-1	2	-44	30
Total (including soils and forest floor)	-612	233	-23	37	-26	36	32	22	31	69	63	72	-600	250

Table B9.1: Annual Net Change in Carbon Stocks for Aboveground Pools on Forest Land by Disturbance, Forest Land Status and Owner Group, 2001-2007 to 2011-2017: All California

	USDA Forest Service								Other Public				Private				Total		Total	
	Timberland		Reserved		Low productive, unreserved		Total		Other federal		State and local govt.		Corporate		Non Corporate					
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE		
	<i>thousand metric tons CO2 equivalent per year</i>																			
Cut																				
Mortality	-160	68	-6	7	--	--	-167	69	--	--	-4	3	-387	73	-219	72	-606	101	-776	122
Cut	-977	219	-3	4	--	--	-980	219	-6	6	--	--	-8,788	1,052	-869	276	-9,657	1,078	-10,643	1,100
Gross Growth	1,082	182	15	16	--	--	1,097	182	14	14	3	3	3,667	356	941	224	4,607	410	5,721	450
Net Live	-55	156	6	6	--	--	-50	156	8	8	--	--	-5,508	911	-147	237	-5,656	942	-5,698	955
Standing Dead Change	-144	72	--	--	--	--	-144	72	--	--	3	3	-103	81	66	61	-37	102	-178	125
Dead Woody Debris Change	-75	74	-2	2	--	--	-77	74	4	5	9	8	-596	307	22	136	-573	336	-656	344
Total Net ¹	-301	250	5	5	--	--	-296	250	14	15	-6	5	-7,487	1,280	-98	317	-7,585	1,320	-7,874	1,343
Cut and Fire																				
Mortality	-298	132	--	--	--	--	-298	132	--	--	-18	20	-452	156	-33	34	-485	159	-801	208
Cut	-507	238	--	--	--	--	-507	238	--	--	-112	120	-1,008	402	--	--	-1,008	402	-1,627	483
Gross Growth	225	72	--	--	--	--	225	72	--	--	60	65	192	64	5	5	197	64	482	116
Net Live	-579	255	--	--	--	--	-579	255	--	--	-70	75	-1,269	441	-28	28	-1,296	442	-1,946	516
Standing Dead Change	44	61	--	--	--	--	44	61	--	--	-1	1	85	65	-8	8	78	65	121	89
Dead Woody Debris Change	-53	41	--	--	--	--	-53	41	--	--	13	14	95	110	-8	8	87	110	47	118
Total Net ¹	-700	312	--	--	--	--	-700	312	--	--	-70	75	-1,350	472	-49	50	-1,399	474	-2,169	573
Fire																				
Mortality	-6,483	875	-5,286	933	-640	171	-12,409	1,287	-1,252	457	-217	117	-316	104	-482	135	-798	170	-14,676	1,381
Cut	-27	20	--	--	-2	2	-29	20	--	--	--	--	-15	13	-41	25	-55	28	-85	34
Gross Growth	2,066	232	1,227	181	150	44	3,444	298	504	122	46	29	178	61	262	76	440	98	4,434	337
Net Live	-4,444	771	-4,059	852	-492	151	-8,994	1,157	-748	407	-171	91	-153	84	-260	107	-413	136	-10,326	1,237
Standing Dead Change	2,625	584	2,136	571	65	103	4,826	822	188	362	61	36	11	69	91	63	102	94	5,177	904
Dead Woody Debris Change	-339	202	33	158	-1	48	-306	262	-85	96	13	37	-114	53	134	83	19	98	-359	298
Total Net ¹	-2,654	535	-2,375	563	-542	175	-5,571	794	-791	418	-122	94	-276	145	-76	103	-353	178	-6,836	920
Insect and Disease																				
Mortality	-2,936	337	-896	219	-156	75	-3,988	407	-1,153	471	-194	90	-389	89	-451	130	-841	157	-6,176	647
Cut	-74	35	--	--	--	--	-74	35	--	--	--	--	-47	20	-34	22	-80	30	-154	46
Gross Growth	4,325	358	843	158	79	27	5,246	392	547	125	323	127	1,185	218	878	200	2,063	293	8,180	517
Net Live	1,316	310	-54	173	-77	57	1,185	360	-605	415	129	82	749	165	393	167	1,142	234	1,850	606
Standing Dead Change	26	236	55	117	53	53	134	269	607	363	-97	107	-33	45	82	108	49	117	693	479
Dead Woody Debris Change	315	235	341	212	6	36	662	319	154	102	46	87	-92	67	-25	53	-118	85	745	356
Total Net ¹	1,982	380	365	218	-27	48	2,320	441	147	133	96	167	785	191	556	178	1,341	259	3,904	553
Other cut and weather																				
Mortality	-821	202	-330	134	-110	48	-1,262	245	-43	24	-6	5	-236	91	-501	151	-737	176	-2,048	303
Cut	-113	58	-15	12	--	--	-128	59	--	--	-3	3	-240	92	-166	67	-405	114	-536	128
Gross Growth	1,097	188	311	87	80	35	1,488	208	99	54	37	39	798	194	738	155	1,536	247	3,161	329
Net Live	163	169	-34	101	-31	24	98	199	56	51	28	35	322	149	72	170	394	226	577	307
Standing Dead Change	322	156	68	142	63	36	453	214	11	8	-8	15	40	20	276	123	316	125	772	248
Dead Woody Debris Change	-8	127	80	62	23	32	94	145	13	22	42	34	-251	146	199	110	-52	183	97	237
Total Net ¹	554	174	112	110	58	37	724	208	91	68	66	44	182	196	625	182	807	267	1,688	348
Less than 25% disturbed																				
Mortality	-5,554	429	-2,158	253	-327	64	-8,038	494	-1,003	193	-813	247	-1,952	181	-2,753	209	-4,705	266	-14,559	640
Cut	-31	15	-1	1	-1	1	-34	15	--	--	-4	3	-519	124	-204	69	-723	141	-761	142
Gross Growth	14,670	562	4,536	346	904	126	20,110	625	2,867	302	2,652	315	13,095	730	10,329	596	23,424	824	49,053	1,092
Net Live	9,084	549	2,378	318	576	116	12,038	625	1,863	275	1,835	315	10,623	657	7,372	531	17,995	761	33,733	1,052
Standing Dead Change	355	299	-388	244	-87	51	-121	388	-297	161	1	64	460	170	363	145	823	223	407	481
Dead Woody Debris Change	-274	355	28	265	-5	88	-251	452	232	243	10	92	-727	319	-322	226	-1,049	390	-1,057	651
Total Net ¹	11,384	687	2,455	440	562	142	14,401	804	2,153	392	2,256	364	13,008	878	9,104	680	22,111	1,015	40,921	1,382
Total																				
Mortality	-16,252	974	-8,677	933	-1,233	202	-26,162	1,340	-3,451	652	-1,252	277	-3,733	284	-4,438	323	-8,172	408	-39,037	1,562
Cut	-1,729	329	-19	12	-4	2	-1,751	329	-6	6	-119	120	-10,616	1,134	-1,313	294	-11,929	1,158	-13,805	1,210
Gross Growth	23,465	551	6,933	350	1,213	140	31,611	572	4,031	311	3,122	301	19,114	757	13,154	654	32,267	779	71,031	992
Net Live	5,485	1,093	-1,764	954	-23	202	3,698	1,463	574	661	1,751	350	4,764	1,277	7,402	638	12,166	1,413	18,189	2,165
Standing Dead Change	3,227	715	1,872	648	94	132	5,194	971	509	534	-40	131	459	216	871	234	1,330	318	6,992	1,159
Dead Woody Debris Change	-434	497	480	382	23	111	69	636	318	284	114	137	-1,685	484	302	226	-1,686	570	-1,184	910
Total Net ¹	10,264	1,061	562	774	51	234	10,877	1,321	1,614	603	2,220	433	4,861	1,705	10,061	792	14,923	1,867	29,634	2,394

¹ Total Net value includes change from roots and understory vegetation which are not enumerated in this table.

Table B9.2: Average annual carbon (CO2e) flux in live trees from growth, harvest, mortality, 2001-2007 to 2011-2017: COUNTY

County	Standing Live																All Pools	
	Gross Growth		Harvest		Fire killed		Cut and fire		Insects and disease		Natural/other		Total Mortality		Net Flux		Net Flux	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	Thousand Metric Tons CO2 equivalent per year																	
Alameda	128	45	-6	5	--	--	--	--	--	--	-41	23	-41	23	81	34	94	49
Alpine	524	100	--	--	-9	9	--	--	-196	70	-164	58	-369	89	155	65	223	149
Amador	453	134	-46	28	-46	38	-107	113	-3	3	-177	73	-333	140	73	144	34	158
Butte	1,757	285	-337	161	-165	84	-56	49	-33	15	-457	103	-712	144	708	277	915	348
Calaveras	1,269	244	-294	118	-50	45	--	--	-17	13	-355	186	-421	191	553	249	737	253
Colusa	159	47	-1	1	-228	150	--	--	--	--	-79	41	-306	156	-148	139	-22	78
Contra Costa	66	29	-7	7	--	--	--	--	--	--	-22	16	-22	16	37	24	55	33
Del Norte	2,612	393	-479	285	-285	162	--	--	-19	8	-756	257	-1,061	303	1,072	413	960	511
El Dorado	2,736	329	-502	222	-330	193	-96	88	-282	82	-638	110	-1,346	251	889	368	1,449	437
Fresno	1,800	225	-34	19	-297	218	-49	37	-133	65	-1,222	261	-1,702	350	64	334	853	279
Glenn	386	96	-1	1	-145	121	--	--	-10	8	-95	41	-250	128	135	108	111	148
Humboldt	9,200	740	-2,589	682	-210	126	--	--	-49	29	-1,631	213	-1,890	249	4,721	838	4,694	1,277
Imperial			--	--	--	--	--	--	--	--	--	--	--	--	--	--	-1	1
Inyo	98	17	--	--	--	--	--	--			-26	11	-26	11	72	15	-5	52
Kern	397	84	--	--	-79	55	--	--	-22	15	-256	83	-357	100	40	105	71	168
Lake	690	139	-11	8	--	--	--	--	-6	8	-221	125	-227	125	452	158	484	176
Lassen	1,730	193	-577	153	-131	73	-16	15	-76	32	-316	73	-539	109	634	199	427	314
Los Angeles	80	29	--	--	-185	116	--	--	--	--	-24	18	-209	117	-129	101	-57	97
Madera	1,244	209	-37	24	-160	155	--	--	-481	207	-622	190	-1,264	320	-56	283	769	287
Marin	325	155	-2	3	--	--	--	--	-72	62	-21	15	-93	64	229	145	230	140
Mariposa	1,320	206	-60	45	-562	231	--	--	-257	134	-360	115	-1,180	287	81	245	548	287
Mendocino	6,516	562	-1,420	477	-260	126	-18	20	-166	62	-813	119	-1,257	185	3,839	638	4,838	793
Merced	8	6	--	--	--	--	--	--	--	--	--	--	--	--	8	6	2	13
Modoc	1,359	167	-425	116	-72	61	-123	82	-137	51	-180	53	-512	126	422	168	378	224
Mono	343	62	-10	8	-41	29	--	--	-107	62	-119	33	-266	76	67	77	176	143
Monterey	400	93	-1	1	-426	189	--	--	--	--	-172	80	-598	205	-199	164	24	142
Napa	377	107	-4	4	-81	72	--	--	--	--	-154	60	-235	93	138	105	271	112
Nevada	1,080	191	-231	114	--	--	--	--	-187	87	-186	67	-373	110	477	167	706	205
Placer	1,976	267	-379	220	-108	63	-8	8	-282	100	-508	122	-905	170	691	282	1,051	399
Plumas	3,979	363	-855	291	-1,760	522	-101	58	-494	132	-627	105	-2,982	551	141	605	502	683
Riverside	80	35	--	--	-5	6	--	--	-82	51	-12	12	-99	52	-19	33	33	55
Sacramento	6	5	--	--	--	--	--	--	--	--	-1	1	-1	1	5	4	6	5
San Benito	124	52	--	--	--	--	--	--	--	--	-40	23	-40	23	84	49	123	51
Bernardino	187	52	-42	33	-195	127	-16	17	-16	12	-148	62	-376	143	-230	141	-299	161
San Diego	51	22	-15	15	-66	38	--	--	--	--	-26	17	-92	42	-56	46	-91	58
San Joaquin	29	29	-5	5	--	--	--	--	--	--	-17	17	-17	17	7	8	25	22
Obispo	169	35	--	--	--	--	--	--	--	--	-107	43	-107	43	62	32	215	54
San Mateo	538	191	-65	52	--	--	--	--	-33	44	-156	67	-189	83	285	149	561	221
Santa Barbara	83	33	--	--	-268	168	--	--	--	--	-72	29	-340	171	-257	144	-173	129
Santa Clara	322	89	--	--	-23	27	--	--	--	--	-112	44	-136	52	186	65	235	63
Santa Cruz	1,308	306	-120	77	-8	8	--	--	-88	56	-261	78	-357	97	831	244	974	349
Shasta	4,691	384	-1,743	443	-636	206	-182	90	-230	71	-1,105	195	-2,153	304	796	542	1,793	634
Sierra	1,329	196	-449	188	-89	91	--	--	-180	54	-178	50	-447	117	433	194	108	316
Siskiyou	6,980	447	-1,628	449	-3,144	792	-12	11	-510	127	-1,350	171	-5,015	813	337	899	1,792	878
Solano	11	9	--	--	--	--	--	--	--	--	--	--	--	--	11	9	10	8
Sonoma	1,246	221	-35	27	--	--	--	--	-182	81	-159	45	-341	92	870	171	1,114	257
Stanislaus	31	11	--	--	-7	6	--	--	--	--	-13	10	-20	12	11	8	9	32
Sutter	23	21	--	--	--	--	--	--	--	--	-1	1	-1	1	22	21	27	25
Tehama	1,691	221	-298	156	-381	184	--	--	-186	72	-579	144	-1,146	242	248	242	383	343
Trinity	4,769	377	-841	295	-2,414	640	-15	14	-213	85	-1,394	203	-4,036	666	-108	683	1,201	650
Tulare	1,588	209	-4	4	-687	268	--	--	-265	123	-566	117	-1,518	315	66	295	460	302
Tuolumne	2,171	260	-221	98	-985	449	-1	1	-1,158	494	-627	155	-2,771	682	-821	623	-208	523
Ventura	64	20	-4	4	-140	75	--	--	--	--	-23	15	-163	77	-103	68	-59	57
Yolo	23	9	--	--	--	--	--	--	--	--	-14	12	-14	12	9	9	20	9
Yuba	505	142	-49	42	--	--	--	--	--	--	-182	62	-182	62	274	104	381	171
All counties	71,031	992	-13,805	1,210	-14,676	1,381	-801	208	-6,176	647	-17,383	698	-39,037	1,562	18,189	2,165	29,156	2,519

Table B9.3: Average annual carbon (CO2e) flux in live trees from growth, harvest, mortality, 2001-2007 to 2011-2017: NATIONAL FOREST

	Standing Live														All Pools				
	Gross Growth		Harvest		Fire killed		Cut and fire		Insects and disease		Natural/other		Total Mortality		Net Flux		Net Flux		
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	
	<i>Thousand Metric Tons CO2 equivalent per year</i>																		
Region 5																			
Angeles	93	33	--	--	-185	116	--	--	--	--	-24	18	-209	117	-116	102	-54	98	
Cleveland	9	7	--	--	-7	7	--	--	--	--	--	--	-7	7	2	9	5	15	
Eldorado	1,954	273	-254	208	-366	196	-115	114	-203	63	-454	101	-1,138	255	562	349	808	411	
Inyo	510	98	-10	8	-2	3	--	--	-59	37	-206	58	-267	69	234	81	219	206	
Klamath	2,820	274	-109	67	-2,747	778	-10	11	-306	101	-799	141	-3,862	793	-1,152	745	228	500	
Lake Tahoe Basin	282	95	-35	33	--	--	-7	7	-104	54	-73	62	-185	82	62	75	-68	108	
Lassen	2,445	274	-342	136	-863	353	-41	25	-303	102	-752	161	-1,959	398	144	389	379	468	
Los Padres	300	72	--	--	-778	254	--	--	--	--	-88	31	-866	256	-566	215	-333	189	
Mendocino	1,761	218	-15	9	-1,145	489	--	--	-127	61	-519	146	-1,791	512	-45	475	282	405	
Modoc	1,130	144	-108	56	-11	8	-42	44	-180	59	-235	68	-467	100	554	119	449	171	
Plumas	3,019	311	-150	72	-1,466	452	--	--	-297	94	-486	94	-2,250	469	619	470	1,044	483	
San Bernardino	193	54	-42	33	-154	121	-16	17	-91	52	-135	60	-395	145	-244	137	-336	156	
Sequoia	1,247	192	-10	6	-673	259	--	--	-73	48	-636	168	-1,382	311	-144	298	273	300	
Shasta-Trinity	4,960	380	-234	91	-1,776	450	-2	2	-231	85	-1,474	208	-3,483	489	1,243	476	2,704	478	
Sierra	2,315	271	-46	27	-511	274	-49	37	-519	209	-1,412	283	-2,491	447	-222	402	914	338	
Six Rivers	3,396	357	-62	59	-1,058	294	-15	14	-138	73	-814	159	-2,025	339	1,309	369	1,422	510	
Stanislaus	2,006	253	-42	25	-504	221	--	--	-630	218	-691	230	-1,825	382	139	321	657	296	
Tahoe	2,471	282	-291	143	-116	93	--	--	-572	140	-441	102	-1,130	195	1,051	244	1,319	356	
Toiyabe	357	65	--	--	-49	31	--	--	-153	68	-118	45	-320	87	37	77	52	119	
Total	31,266	568	-1,749	329	-12,409	1,287	-298	132	-3,987	407	-9,357	537	-26,051	1,340	3,466	1,459	9,962	1,414	
Region 6																			
Rogue River / Siskiyou	345	84	-3	5	--	--	--	--	-1	2	-110	49	-111	49	232	94	342	117	
Total	345	84	-3	5	--	--	--	--	-1	2	-110	49	-111	49	232	94	342	117	
All National Forests	31,611	572	-1,751	329	-12,409	1,287	-298	132	-3,988	407	-9,467	539	-26,162	1,340	3,698	1,463	10,303	1,419	

Table B9.4: Annual Net Change in Carbon Stocks for Aboveground Pools on Forest Land by Disturbance, Forest Land Status and Owner Group, 2001-2007 to 2011-2017: Coastal Forest Practice District

	USDA Forest Service								Other Public				Private				Total				
	Timberland		Reserved		Low productive, unreserved		Total		Other federal		State and local govt.		Corporate		Non Corporate						
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE					
<i>thousand metric tons CO2 equivalent per year</i>																					
Cut																					
Mortality	--	--	--	--	--	--	--	--	--	--	--	--	--	-119	37	-113	46	-233	59	-233	59
Cut	--	--	--	--	--	--	--	--	--	--	--	--	--	-3,452	810	-524	254	-3,976	845	-3,976	845
Gross Growth	--	--	--	--	--	--	--	--	--	--	--	--	--	1,091	226	525	184	1,616	289	1,616	289
Net Live	--	--	--	--	--	--	--	--	--	--	--	--	--	-2,480	692	-113	223	-2,593	726	-2,593	726
Standing Dead Change	--	--	--	--	--	--	--	--	--	--	--	--	--	-5	63	30	33	24	72	24	72
Dead Woody Debris Change	--	--	--	--	--	--	--	--	--	--	--	--	--	-419	275	-54	110	-473	297	-473	297
Total Net ¹	--	--	--	--	--	--	--	--	--	--	--	--	--	-3,535	1,023	-168	284	-3,703	1,062	-3,703	1,062
Cut and Fire																					
Mortality	--	--	--	--	--	--	--	--	--	--	-18	20	--	--	--	--	--	--	--	-18	20
Cut	--	--	--	--	--	--	--	--	--	--	-112	120	--	--	--	--	--	--	--	-112	120
Gross Growth	--	--	--	--	--	--	--	--	--	--	60	65	--	--	--	--	--	--	--	60	65
Net Live	--	--	--	--	--	--	--	--	--	--	-70	75	--	--	--	--	--	--	--	-70	75
Standing Dead Change	--	--	--	--	--	--	--	--	--	--	-1	1	--	--	--	--	--	--	--	-1	1
Dead Woody Debris Change	--	--	--	--	--	--	--	--	--	--	13	14	9	8	--	--	9	8	22	16	16
Total Net ¹	--	--	--	--	--	--	--	--	--	--	-70	75	9	9	--	--	9	9	-60	75	75
Fire																					
Mortality	-314	139	-285	162	--	--	-599	213	--	--	-79	84	-79	59	-54	39	-133	70	-811	240	
Cut	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-1	1	-1	1	-1	1	1
Gross Growth	144	57	132	60	--	--	276	83	--	--	25	27	40	34	76	43	116	55	417	103	
Net Live	-170	99	-153	119	--	--	-323	155	--	--	-54	58	-39	25	21	43	-17	50	-394	173	
Standing Dead Change	59	49	-5	58	--	--	54	76	--	--	10	11	29	29	16	10	45	30	109	83	
Dead Woody Debris Change	60	49	55	65	--	--	115	82	--	--	-25	27	-47	35	38	34	-9	49	80	99	
Total Net ¹	-113	61	-156	141	--	--	-268	154	--	--	-79	85	-58	41	86	50	28	65	-319	187	
Insect and Disease																					
Mortality	-26	24	-18	8	--	--	-44	25	-33	44	-134	83	-113	48	-207	84	-320	97	-531	136	
Cut	--	--	--	--	--	--	--	--	--	--	--	--	-16	14	-16	13	-31	19	-31	19	19
Gross Growth	78	46	68	34	--	--	146	57	8	11	105	68	289	136	458	173	747	220	1,006	237	
Net Live	52	32	50	27	--	--	102	42	-25	33	-28	22	160	92	235	135	396	164	444	173	
Standing Dead Change	-1	2	-9	7	--	--	-9	7	6	7	-78	102	3	23	32	28	35	36	-47	109	
Dead Woody Debris Change	-10	7	-23	26	--	--	-33	27	17	22	68	81	1	10	21	39	22	41	74	96	
Total Net ¹	43	31	33	20	--	--	77	37	-5	7	-52	132	211	126	341	148	552	194	571	238	
Other cut and weather																					
Mortality	-75	46	-15	13	--	--	-90	47	--	--	--	--	-98	68	-51	31	-149	75	-240	89	
Cut	--	--	--	--	--	--	--	--	--	--	--	--	-142	84	-50	29	-193	89	-193	89	
Gross Growth	172	84	25	19	--	--	197	86	--	--	--	--	341	140	267	115	608	180	805	200	
Net Live	97	63	10	7	--	--	107	63	--	--	--	--	100	102	166	78	266	128	373	143	
Standing Dead Change	24	20	7	5	--	--	31	20	--	--	--	--	16	9	7	5	23	10	54	23	
Dead Woody Debris Change	17	18	3	3	--	--	20	19	--	--	--	--	-39	52	48	48	9	71	29	73	
Total Net ¹	166	85	21	16	--	--	188	87	--	--	--	--	105	144	264	121	368	188	556	207	
Less than 25% disturbed																					
Mortality	-494	130	-267	91	--	--	-760	158	-282	109	-597	244	-878	127	-949	133	-1,827	179	-3,467	357	
Cut	--	--	--	--	--	--	--	--	--	--	-3	3	-291	103	-72	46	-362	112	-366	113	
Gross Growth	1,370	237	986	211	--	--	2,355	314	1,051	254	1,979	307	6,877	654	5,145	511	12,022	782	17,407	925	
Net Live	876	197	719	175	--	--	1,594	262	769	191	1,378	302	5,708	576	4,124	445	9,833	692	13,574	816	
Standing Dead Change	9	72	45	45	--	--	54	85	-83	66	32	40	248	132	115	66	363	148	366	187	
Dead Woody Debris Change	-83	66	-85	68	--	--	-169	95	-84	153	-51	74	-485	272	-301	159	-786	315	-1,090	370	
Total Net ¹	1,025	235	808	217	--	--	1,833	318	730	256	1,695	350	6,949	779	4,889	547	11,838	913	16,095	1,054	
Total																					
Mortality	-909	195	-585	185	--	--	-1,494	268	-316	119	-828	265	-1,287	164	-1,375	169	-2,662	229	-5,299	455	
Cut	--	--	--	--	--	--	--	--	--	--	-115	120	-3,900	831	-663	260	-4,563	866	-4,678	874	
Gross Growth	1,764	259	1,210	221	--	--	2,975	336	1,059	255	2,169	307	8,638	701	6,471	569	15,109	835	21,312	975	
Net Live	855	232	625	216	--	--	1,480	316	744	193	1,226	331	3,450	921	4,434	521	7,884	1,046	11,334	1,154	
Standing Dead Change	91	89	38	74	--	--	129	116	-77	67	-37	110	292	151	198	80	490	171	505	244	
Dead Woody Debris Change	-16	85	-50	104	--	--	-66	134	-68	155	5	114	-981	389	-247	206	-1,228	441	-1,358	499	
Total Net ¹	1,122	258	707	261	--	--	1,829	366	725	255	1,493	415	3,681	1,308	5,411	642	9,093	1,450	13,140	1,569	

¹Total Net value includes change from roots and understory vegetation which are not enumerated in this table.

Table B9.5: Annual Net Change in Carbon Stocks for Aboveground Pools on Forest Land by Disturbance, Forest Land Status and Owner Group, 2001-2007 to 2011-2017: Northern Forest Practice District

	USDA Forest Service								Other Public				Private				Total			
	Timberland		Reserved		Low productive, unreserved		Total		Other federal		State and local govt.		Corporate		Non Corporate					
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE		
<i>thousand metric tons CO2 equivalent per year</i>																				
Cut																				
Mortality	-98	45	--	--	--	--	-98	45	--	--	--	--	-226	59	-21	10	-247	60	-345	75
Cut	-903	216	--	--	--	--	-903	216	-6	6	--	--	-4,649	669	-296	108	-4,944	675	-5,853	709
Gross Growth	826	162	--	--	--	--	826	162	14	14	--	--	2,194	266	277	97	2,471	281	3,311	324
Net Live	-175	142	--	--	--	--	-175	142	8	8	--	--	-2,680	583	-40	73	-2,720	588	-2,887	605
Standing Dead Change	-80	39	--	--	--	--	-80	39	--	--	--	--	-85	49	-20	17	-105	51	-185	65
Dead Woody Debris Change	-9	55	--	--	--	--	-9	55	4	5	--	--	-185	129	-5	26	-190	131	-195	143
Total Net ¹	-299	223	--	--	--	--	-299	223	14	15	--	--	-3,526	765	-90	96	-3,616	772	-3,901	804
Cut and Fire																				
Mortality	-118	54	--	--	--	--	-118	54	--	--	--	--	-362	129	-33	34	-395	133	-513	144
Cut	-395	232	--	--	--	--	-395	232	--	--	--	--	-987	402	--	--	-987	402	-1,382	464
Gross Growth	123	51	--	--	--	--	123	51	--	--	--	--	139	49	5	5	145	50	268	71
Net Live	-390	228	--	--	--	--	-390	228	--	--	--	--	-1,210	433	-28	28	-1,238	434	-1,627	490
Standing Dead Change	36	48	--	--	--	--	36	48	--	--	--	--	78	64	-8	8	70	65	106	81
Dead Woody Debris Change	-46	35	--	--	--	--	-46	35	--	--	--	--	86	110	-8	8	78	110	33	115
Total Net ¹	-479	287	--	--	--	--	-479	287	--	--	--	--	-1,299	461	-49	50	-1,347	464	-1,826	545
Fire																				
Mortality	-5,004	805	-3,359	842	-255	112	-8,618	1,170	-189	107	-81	72	-233	87	-184	83	-417	120	-9,304	1,183
Cut	-15	15	--	--	-2	2	-17	15	--	--	--	--	-15	13	-25	20	-39	24	-56	28
Gross Growth	1,647	215	823	162	84	30	2,554	271	201	76	10	9	134	52	127	57	261	77	3,027	292
Net Live	-3,371	713	-2,537	773	-174	97	-6,081	1,055	13	71	-70	63	-113	80	-81	48	-195	93	-6,334	1,064
Standing Dead Change	1,963	520	1,402	516	36	47	3,401	734	45	33	20	18	-18	63	9	47	-9	79	3,456	739
Dead Woody Debris Change	-256	181	35	126	15	30	-206	222	21	29	23	20	-68	40	62	64	-6	75	-168	237
Total Net ¹	-2,009	500	-1,405	502	-160	95	-3,574	714	84	67	-39	34	-218	140	-28	74	-246	158	-3,775	735
Insect and Disease																				
Mortality	-1,837	237	-274	97	-10	10	-2,121	256	-109	45	-6	8	-271	75	-100	30	-371	81	-2,607	272
Cut	-58	31	--	--	--	--	-58	31	--	--	--	--	-31	14	--	--	-31	14	-89	34
Gross Growth	2,946	298	340	109	21	15	3,306	318	124	58	14	18	843	169	256	67	1,098	181	4,542	369
Net Live	1,051	219	66	73	10	16	1,127	231	15	48	8	11	540	134	156	51	696	143	1,846	276
Standing Dead Change	-138	154	37	64	-1	8	-103	167	41	18	4	5	-8	30	-11	44	-19	53	-77	176
Dead Woody Debris Change	316	162	38	56	-30	30	325	174	-13	26			-121	61	-29	29	-150	68	162	189
Total Net ¹	1,468	292	173	83	-16	27	1,625	304	65	57	14	19	523	141	158	82	681	162	2,386	350
Other cut and weather																				
Mortality	-232	85	-27	14	--	--	-258	86		1	-1	1	-136	60	-2	1	-138	60	-397	105
Cut	-92	54	-13	12	--	--	-104	55	--	--	-3	3	-97	38	-57	50	-154	63	-261	84
Gross Growth	608	144	45	23	3	2	655	145	51	50	33	39	446	135	131	54	577	145	1,316	215
Net Live	285	103	5	28	3	2	292	107	50	50	30	35	213	108	72	58	285	123	658	174
Standing Dead Change	-41	59	-60	57			-102	82	4	4	-12	14	25	18	-9	6	17	19	-93	86
Dead Woody Debris Change	36	120	33	32	-3	4	66	124	-5	6			-198	136	4	28	-195	139	-134	187
Total Net ¹	327	142	-31	63	-1	5	295	154	63	62	21	25	83	132	81	83	164	156	543	230
Less than 25% disturbed																				
Mortality	-3,432	298	-901	167	-124	38	-4,458	342	-351	145	-104	34	-957	131	-928	121	-1,885	176	-6,798	413
Cut	-28	15	--	--	-1	1	-30	15			-1	1	-146	45	-35	21	-181	49	-212	52
Gross Growth	10,013	493	1,614	211	527	97	12,154	531	686	133	346	96	5,294	404	3,184	295	8,478	479	21,664	730
Net Live	6,553	438	712	167	402	80	7,667	469	335	153	241	84	4,191	358	2,221	252	6,412	424	14,655	652
Standing Dead Change	20	199	-283	193	-56	27	-320	279	107	56	30	16	152	104	21	110	174	151	-9	323
Dead Woody Debris Change	-137	316	131	104	-31	72	-38	340	106	51	-36	19	-138	159	35	124	-103	202	-71	399
Total Net ¹	7,939	587	677	293	357	99	8,972	654	669	155	294	97	5,210	463	2,782	361	7,991	571	17,926	884
Total																				
Mortality	-10,720	858	-4,561	838	-390	118	-15,671	1,201	-649	185	-191	80	-2,186	226	-1,268	162	-3,454	274	-19,965	1,246
Cut	-1,491	322	-13	12	-4	2	-1,507	322	-6	6	-4	3	-5,925	778	-412	124	-6,337	785	-7,853	849
Gross Growth	16,164	548	2,821	241	635	103	19,619	587	1,076	166	403	105	9,051	495	3,980	323	13,031	549	34,129	814
Net Live	3,953	934	-1,753	807	241	127	2,441	1,239	421	183	208	112	941	837	2,301	282	3,241	883	6,311	1,536
Standing Dead Change	1,759	583	1,095	557	-22	55	2,832	808	197	66	41	28	145	150	-18	129	127	198	3,198	835
Dead Woody Debris Change	-96	421	237	171	-48	83	93	462	113	65	-13	28	-624	279	58	147	-566	316	-373	564
Total Net ¹	6,947	923	-586	602	179	140	6,540	1,106	895	187	291	107	773	1,041	2,854	407	3,628	1,119	11,353	1,586

¹ Total Net value includes change from roots and understory vegetation which are not enumerated in this table.

Table B9.6: Annual Net Change in Carbon Stocks for Aboveground Pools on Forest Land by Disturbance, Forest Land Status and Owner Group, 2001-2007 to 2011-2017: Southern Forest Practice District

	USDA Forest Service						Other Public				Private				Total		Total			
	Timberland		Reserved		Low productive, unreserved		Total		Other federal		State and local govt.		Corporate						Non Corporate	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE		
<i>thousand metric tons CO2 equivalent per year</i>																				
Cut																				
Mortality	-62	52	-6	7	--	--	-68	52	--	--	-4	3	-41	24	-85	55	-126	60	-198	80
Cut	-74	35	-3	4	--	--	-77	35	--	--	--	--	-687	244	-49	24	-736	245	-814	248
Gross Growth	256	85	15	16	--	--	271	86	--	--	3	3	381	119	139	87	520	147	794	173
Net Live	120	64	6	6	--	--	125	65	--	--	--	--	-348	195	5	32	-343	198	-218	208
Standing Dead Change	-65	60	--	--	--	--	-65	60	--	--	3	3	-13	14	57	48	44	50	-18	79
Dead Woody Debris Change	-66	50	-2	2	--	--	-68	50	--	--	9	8	9	45	80	75	89	88	12	101
Total Net ¹	-3	112	5	5	--	--	2	112	--	--	-6	5	-426	225	160	104	-265	249	-269	272
Cut and Fire																				
Mortality	-180	121	--	--	--	--	-180	121	--	--	--	--	-90	88	--	--	-90	88	-270	149
Cut	-111	53	--	--	--	--	-111	53	--	--	--	--	-21	19	--	--	-21	19	-133	56
Gross Growth	102	52	--	--	--	--	102	52	--	--	--	--	53	41	--	--	53	41	154	66
Net Live	-190	115	--	--	--	--	-190	115	--	--	--	--	-59	85	--	--	-59	85	-249	143
Standing Dead Change	9	37	--	--	--	--	9	37	--	--	--	--	7	7	--	--	7	7	16	38
Dead Woody Debris Change	-7	22	--	--	--	--	-7	22	--	--	--	--	1	--	--	--	1	--	-7	22
Total Net ¹	-221	124	--	--	--	--	-221	124	--	--	--	--	-61	98	--	--	-61	98	-282	158
Fire																				
Mortality	-1,165	344	-1,642	420	-385	130	-3,191	557	-1,063	448	-58	37	-4	4	-244	99	-248	100	-4,561	723
Cut	-13	13	--	--	--	--	-13	13	--	--	--	--	--	--	-15	15	-15	15	-28	20
Gross Growth	275	79	273	75	67	33	614	113	302	99	11	6	3	3	60	25	63	25	990	152
Net Live	-903	295	-1,369	371	-318	116	-2,590	486	-761	403	-47	33	-1	1	-200	86	-201	86	-3,598	638
Standing Dead Change	603	272	739	241	30	92	1,372	375	143	360	31	29	--	--	66	41	66	41	1,613	522
Dead Woody Debris Change	-143	76	-57	66	-16	38	-216	107	-106	91	16	16	1	1	33	40	34	40	-272	148
Total Net ¹	-532	188	-814	239	-382	147	-1,728	338	-875	413	-4	22	-1	1	-134	53	-135	53	-2,742	536
Insect and Disease																				
Mortality	-1,073	247	-605	201	-146	75	-1,823	326	-1,011	467	-55	37	-5	5	-144	96	-150	96	-3,038	579
Cut	-16	16	--	--	--	--	-16	16	--	--	--	--	--	--	-18	18	-18	18	-34	24
Gross Growth	1,302	212	435	117	58	23	1,794	243	415	112	204	108	53	35	164	75	217	83	2,631	300
Net Live	213	217	-170	156	-88	55	-44	273	-595	410	149	77	48	35	2	84	50	91	-441	507
Standing Dead Change	165	178	27	98	54	53	247	210	560	362	-23	35	-29	25	61	94	32	98	817	432
Dead Woody Debris Change	9	170	325	203	35	20	370	266	151	96	-22	28	28	25	-17	22	11	33	509	286
Total Net ¹	471	244	158	201	-11	40	618	319	86	121	134	94	51	33	58	58	108	66	947	360
Other cut and weather																				
Mortality	-515	178	-289	133	-110	48	-914	227	-42	24	-5	5	-2	2	-448	148	-450	148	-1,411	272
Cut	-21	20	-2	2	--	--	-23	20	--	--	--	--	--	--	-59	33	-59	33	-82	39
Gross Growth	317	91	242	82	77	35	636	126	48	20	4	2	11	8	340	90	351	90	1,039	157
Net Live	-219	118	-49	97	-33	24	-301	154	6	11	-2	5	9	7	-166	140	-157	140	-454	209
Standing Dead Change	339	143	122	130	64	36	524	196	6	7	4	4	-2	2	278	123	277	123	812	232
Dead Woody Debris Change	-62	37	44	52	26	32	8	72	18	21	42	34	-13	14	147	94	134	95	202	126
Total Net ¹	60	56	121	90	59	37	241	111	28	27	45	36	-5	10	280	106	274	107	588	161
Less than 25% disturbed																				
Mortality	-1,628	304	-990	180	-202	52	-2,820	356	-370	80	-111	34	-117	37	-875	121	-992	126	-4,294	387
Cut	-3	3	-1	1	--	--	-4	3	--	--	--	--	-82	53	-98	48	-180	71	-183	71
Gross Growth	3,287	334	1,937	214	377	82	5,601	398	1,130	151	328	92	924	204	2,000	221	2,923	298	9,981	525
Net Live	1,656	326	947	212	175	84	2,777	395	760	145	216	87	724	188	1,027	205	1,751	276	5,504	510
Standing Dead Change	326	210	-149	144	-31	43	146	259	-321	133	-61	47	59	26	227	67	286	72	50	303
Dead Woody Debris Change	-54	149	-17	233	27	52	-44	282	211	182	97	50	-105	41	-55	103	-160	111	103	357
Total Net ¹	2,420	366	969	251	206	102	3,595	453	755	263	267	105	849	216	1,433	263	2,282	339	6,899	632
Total																				
Mortality	-4,622	553	-3,531	501	-843	165	-8,997	756	-2,486	633	-234	62	-260	99	-1,796	239	-2,056	258	-13,772	1,020
Cut	-238	70	-6	4	--	--	-244	70	--	--	--	--	-791	261	-239	67	-1,030	269	-1,274	278
Gross Growth	5,538	406	2,901	253	579	97	9,017	474	1,896	191	550	139	1,425	243	2,702	264	4,127	354	15,591	632
Net Live	677	526	-636	470	-265	157	-223	723	-590	593	316	120	373	286	668	277	1,041	399	545	1,027
Standing Dead Change	1,377	417	739	327	117	120	2,233	542	389	526	-45	66	23	40	690	179	713	183	3,289	780
Dead Woody Debris Change	-322	250	293	325	72	74	43	416	273	227	123	70	-80	70	188	165	108	179	547	512
Total Net ¹	2,196	514	440	411	-127	188	2,508	683	-5	512	436	145	406	326	1,796	312	2,202	450	5,141	975

¹ Total Net value includes change from roots and understory vegetation which are not enumerated in this table.

Table B11: Annual Net Change in Carbon Stocks for Aboveground Pools on Timberland by Disturbance, and Owner Group, 2001-2007 to 2011-2017: All California

	USDA Forest Service		Other Public				Private				Total		Total	
			Other federal		State and local govt.		Corporate		Non Corporate					
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons CO2 equivalent per year</i>														
Cut														
Mortality	-160	68	--	--	--	--	-387	73	-186	70	-573	100	-733	121
Cut	-977	219	-6	6	--	--	-8,788	1,052	-791	274	-9,579	1,078	-10,562	1,100
Gross Growth	1,082	182	13	14	--	--	3,667	356	876	222	4,543	409	5,637	449
Net Live	-55	156	7	8	--	--	-5,508	911	-101	235	-5,609	941	-5,657	954
Standing Dead Change	-144	72	--	--	--	--	-103	81	70	61	-33	102	-177	124
Dead Woody Debris Change	-75	74	4	5	--	--	-596	307	24	136	-572	336	-643	344
Total Net ¹	-301	250	13	15	--	--	-7,487	1,280	-19	315	-7,505	1,319	-7,793	1,343
Cut and Fire														
Mortality	-298	132	--	--	-18	20	-452	156	-33	34	-485	159	-801	208
Cut	-507	238	--	--	-112	120	-1,008	402	--	--	-1,008	402	-1,627	483
Gross Growth	225	72	--	--	60	65	192	64	5	5	197	64	482	116
Net Live	-579	255	--	--	-70	75	-1,269	441	-28	28	-1,296	442	-1,946	516
Standing Dead Change	44	61	--	--	-1	1	85	65	-8	8	78	65	121	89
Dead Woody Debris Change	-53	41	--	--	13	14	95	110	-8	8	87	110	47	118
Total Net ¹	-700	312	--	--	-70	75	-1,350	472	-49	50	-1,399	474	-2,169	573
Fire														
Mortality	-6,483	875	-33	22	--	--	-308	104	-171	92	-479	139	-6,994	886
Cut	-27	20	--	--	--	--	-15	13	-26	20	-40	24	-67	31
Gross Growth	2,066	232	42	27	--	--	170	61	152	65	322	90	2,430	250
Net Live	-4,444	771	10	27	--	--	-153	84	-45	75	-197	112	-4,631	780
Standing Dead Change	2,625	584	--	--	--	--	10	69	53	43	63	82	2,688	590
Dead Woody Debris Change	-339	202	12	12	--	--	-114	53	16	27	-98	59	-425	211
Total Net ¹	-2,654	535	24	26	--	--	-277	145	33	80	-243	166	-2,873	561
Insect and Disease														
Mortality	-2,936	337	-18	15	-47	54	-343	86	-391	128	-733	154	-3,734	374
Cut	-74	35	--	--	--	--	-47	20	-34	22	-80	30	-154	46
Gross Growth	4,325	358	14	11	48	48	1,104	214	768	196	1,873	288	6,260	462
Net Live	1,316	310	-4	4	1	14	715	164	344	166	1,059	232	2,372	387
Standing Dead Change	26	236	11	9	-44	64	-31	41	68	106	37	114	29	270
Dead Woody Debris Change	315	235	-14	11	60	80	-94	67	-32	50	-126	83	236	262
Total Net ¹	1,982	380	-6	4	16	19	747	189	468	173	1,215	254	3,207	457
Other cut and weather														
Mortality	-821	202	--	1	--	--	-206	87	-114	50	-320	100	-1,142	225
Cut	-113	58	--	--	--	--	-219	90	-153	67	-372	112	-485	126
Gross Growth	1,097	188	47	50	--	--	784	194	557	149	1,341	242	2,486	311
Net Live	163	169	47	50	--	--	358	146	290	110	649	182	858	254
Standing Dead Change	322	156	4	4	--	--	32	18	-12	13	20	23	345	158
Dead Woody Debris Change	-8	127	-6	6	--	--	-279	144	131	104	-148	178	-162	219
Total Net ¹	554	174	59	62	--	--	194	195	478	176	672	263	1,285	321
Less than 25% disturbed														
Mortality	-5,554	429	-147	59	-68	29	-1,757	173	-1,487	167	-3,244	231	-9,014	491
Cut	-31	15	--	--	-3	3	-443	112	-119	51	-562	122	-597	123
Gross Growth	14,670	562	558	145	827	221	12,346	724	7,411	570	19,757	815	35,811	1,013
Net Live	9,084	549	411	121	755	204	10,146	650	5,804	493	15,950	737	26,201	940
Standing Dead Change	355	299	26	21	-22	15	406	167	173	98	580	193	939	358
Dead Woody Debris Change	-274	355	83	55	-56	35	-747	316	-275	202	-1,021	374	-1,269	520
Total Net ¹	11,384	687	619	165	838	232	12,387	870	7,093	631	19,480	985	32,321	1,225
Total														
Mortality	-16,252	974	-198	63	-133	64	-3,453	278	-2,382	248	-5,835	354	-22,418	1,038
Cut	-1,729	329	-6	6	-115	120	-10,520	1,134	-1,122	288	-11,642	1,157	-13,492	1,209
Gross Growth	23,465	551	674	156	935	230	18,262	753	9,770	634	28,032	784	53,106	973
Net Live	5,485	1,093	470	133	687	223	4,289	1,273	6,266	584	10,555	1,386	17,196	1,781
Standing Dead Change	3,227	715	41	23	-67	66	399	213	344	163	743	268	3,945	767
Dead Woody Debris Change	-434	497	80	58	17	88	-1,735	481	-144	270	-1,878	551	-2,216	749
Total Net ¹	10,264	1,061	710	178	784	250	4,215	1,699	8,005	746	12,220	1,843	23,978	2,144

¹ Total Net value includes change from roots and understory vegetation which are not enumerated in this table.

Table B12: Annual Net Change Per Acre in Carbon Stock for Aboveground Pools on Timberland by Disturbance, and Owner Group, 2001-2007 to 2011-2017: All California

	USDA Forest Service		Other Public				Corporate		Private		Total		Total	
	Mean	SE	Mean	SE	State and local govt.		Mean	SE	Non Corporate		Mean	SE	Mean	SE
					Mean	SE			Mean	SE				
<i>metric tons CO2 equivalent per year and acre</i>														
Cut														
Mortality	-0.0181	0.0077	--	--	--	--	-0.0820	0.0152	-0.0778	0.0290	-0.0806	0.0140	-0.0449	0.0074
Cut	-0.1104	0.0247	-0.0273	0.0273	--	--	-1.8638	0.2156	-0.3311	0.1135	-1.3483	0.1502	-0.6467	0.0670
Gross Growth	0.1223	0.0205	0.0612	0.0612	--	--	0.7776	0.0722	0.3667	0.0910	0.6394	0.0569	0.3452	0.0273
Net Live	-0.0063	0.0176	0.0338	0.0338	--	--	-1.1682	0.1896	-0.0422	0.0984	-0.7895	0.1319	-0.3464	0.0583
Standing Dead Change	-0.0163	0.0081	--	--	--	--	-0.0219	0.0172	0.0293	0.0253	-0.0047	0.0143	-0.0109	0.0076
Dead Woody Debris Change	-0.0085	0.0084	0.0196	0.0196	--	--	-0.1263	0.0649	0.0099	0.0568	-0.0805	0.0473	-0.0394	0.0211
Total Net ¹	-0.0341	0.0282	0.0631	0.0631	--	--	-1.5878	0.2664	-0.0078	0.1316	-1.0564	0.1848	-0.4772	0.0820
Cut and Fire														
Mortality	-0.0337	0.0149	--	--	-0.1072	0.1072	-0.0959	0.0329	-0.0138	0.0138	-0.0683	0.0224	-0.0491	0.0127
Cut	-0.0573	0.0269	--	--	-0.6600	0.6600	-0.2138	0.0851	--	--	-0.1419	0.0566	-0.0996	0.0295
Gross Growth	0.0255	0.0082	--	--	0.3545	0.3545	0.0407	0.0135	0.0022	0.0022	0.0277	0.0090	0.0295	0.0071
Net Live	-0.0655	0.0288	--	--	-0.4127	0.4127	-0.2691	0.0933	-0.0116	0.0116	-0.1825	0.0622	-0.1191	0.0316
Standing Dead Change	0.0050	0.0069	--	--	-0.0047	0.0047	0.0181	0.0137	-0.0032	0.0032	0.0109	0.0091	0.0074	0.0054
Dead Woody Debris Change	-0.0060	0.0046	--	--	0.0755	0.0755	0.0202	0.0233	-0.0034	0.0034	0.0123	0.0155	0.0029	0.0072
Total Net ¹	-0.0791	0.0353	--	--	-0.4117	0.4117	-0.2864	0.0997	-0.0203	0.0203	-0.1969	0.0667	-0.1328	0.0351
Fire														
Mortality	-0.7327	0.0986	-0.1559	0.1035	--	--	-0.0652	0.0220	-0.0717	0.0384	-0.0674	0.0195	-0.4283	0.0542
Cut	-0.0031	0.0022	--	--	--	--	-0.0031	0.0031	-0.0107	0.0085	-0.0056	0.0034	-0.0041	0.0019
Gross Growth	0.2336	0.0261	0.2011	0.1249	--	--	0.0359	0.0130	0.0636	0.0272	0.0453	0.0126	0.1488	0.0153
Net Live	-0.5022	0.0870	0.0451	0.1273	--	--	-0.0324	0.0177	-0.0187	0.0314	-0.0278	0.0158	-0.2836	0.0477
Standing Dead Change	0.2967	0.0660	0.0022	0.0022	--	--	0.0021	0.0147	0.0222	0.0181	0.0089	0.0115	0.1646	0.0361
Dead Woody Debris Change	-0.0383	0.0229	0.0562	0.0593	--	--	-0.0243	0.0111	0.0069	0.0114	-0.0138	0.0083	-0.0260	0.0129
Total Net ¹	-0.3000	0.0603	0.1151	0.1211	--	--	-0.0587	0.0308	0.0140	0.0334	-0.0342	0.0233	-0.1759	0.0343
Insect and Disease														
Mortality	-0.3318	0.0377	-0.0855	0.0855	-0.2752	0.3114	-0.0727	0.0180	-0.1635	0.0531	-0.1032	0.0215	-0.2286	0.0228
Cut	-0.0083	0.0039	--	--	--	--	-0.0099	0.0043	-0.0141	0.0092	-0.0113	0.0042	-0.0094	0.0028
Gross Growth	0.4889	0.0396	0.0649	0.0649	0.2836	0.2733	0.2342	0.0449	0.3216	0.0807	0.2636	0.0403	0.3833	0.0280
Net Live	0.1487	0.0349	-0.0207	0.0207	0.0084	0.0841	0.1516	0.0344	0.1440	0.0689	0.1491	0.0325	0.1452	0.0236
Standing Dead Change	0.0029	0.0267	0.0507	0.0507	-0.2618	0.3694	-0.0066	0.0088	0.0284	0.0443	0.0052	0.0160	0.0018	0.0165
Dead Woody Debris Change	0.0357	0.0265	-0.0657	0.0657	0.3553	0.4603	-0.0199	0.0141	-0.0135	0.0211	-0.0178	0.0117	0.0144	0.0160
Total Net ¹	0.2240	0.0427	-0.0262	0.0262	0.0937	0.1095	0.1584	0.0397	0.1959	0.0717	0.1710	0.0357	0.1964	0.0279
Other cut and weather														
Mortality	-0.0928	0.0228	-0.0023	0.0023	--	--	-0.0437	0.0184	-0.0478	0.0207	-0.0451	0.0141	-0.0699	0.0138
Cut	-0.0128	0.0065	--	--	--	--	-0.0465	0.0191	-0.0639	0.0278	-0.0524	0.0157	-0.0297	0.0077
Gross Growth	0.1240	0.0212	0.2254	0.2254	--	--	0.1662	0.0407	0.2332	0.0617	0.1887	0.0341	0.1522	0.0190
Net Live	0.0184	0.0191	0.2231	0.2231	--	--	0.0760	0.0308	0.1215	0.0460	0.0913	0.0257	0.0526	0.0155
Standing Dead Change	0.0364	0.0177	0.0197	0.0197	--	--	0.0068	0.0039	-0.0052	0.0054	0.0027	0.0032	0.0212	0.0097
Dead Woody Debris Change	-0.0010	0.0144	-0.0266	0.0266	--	--	-0.0592	0.0304	0.0550	0.0436	-0.0208	0.0250	-0.0099	0.0134
Total Net ¹	0.0626	0.0197	0.2798	0.2798	--	--	0.0412	0.0413	0.2000	0.0734	0.0946	0.0370	0.0787	0.0197
Less than 25% disturbed														
Mortality	-0.6278	0.0478	-0.6976	0.2401	-0.4019	0.1422	-0.3727	0.0352	-0.6224	0.0619	-0.4567	0.0314	-0.5519	0.0295
Cut	-0.0035	0.0017	--	--	-0.0199	0.0166	-0.0939	0.0235	-0.0499	0.0214	-0.0791	0.0172	-0.0365	0.0075
Gross Growth	1.6581	0.0600	2.6466	0.4335	4.8720	0.8077	2.6184	0.1353	3.1015	0.1723	2.7808	0.1057	2.1927	0.0578
Net Live	1.0268	0.0607	1.9490	0.4206	4.4502	0.7672	2.1518	0.1244	2.4292	0.1597	2.2451	0.0975	1.6042	0.0552
Standing Dead Change	0.0401	0.0338	0.1243	0.0935	-0.1272	0.0866	0.0861	0.0353	0.0726	0.0409	0.0816	0.0271	0.0575	0.0219
Dead Woody Debris Change	-0.0310	0.0402	0.3955	0.2539	-0.3328	0.1988	-0.1584	0.0668	-0.1150	0.0840	-0.1438	0.0525	-0.0777	0.0318
Total Net ¹	1.2867	0.0761	2.9384	0.5323	4.9369	0.8951	2.6271	0.1701	2.9684	0.2133	2.7419	0.1325	1.9790	0.0724
Total														
Mortality	-1.8369	0.1076	-0.9414	0.2463	-0.7843	0.3304	-0.7323	0.0547	-0.9970	0.0903	-0.8213	0.0475	-1.3726	0.0622
Cut	-0.1954	0.0371	-0.0273	0.0273	-0.6799	0.6941	-2.2310	0.2308	-0.4696	0.1183	-1.6386	0.1610	-0.8261	0.0736
Gross Growth	2.6523	0.0513	3.1992	0.3693	5.5101	0.7046	3.8730	0.1161	4.0889	0.1587	3.9456	0.0912	3.2516	0.0497
Net Live	0.6199	0.1232	2.2304	0.4233	4.0459	1.0119	0.9097	0.2693	2.6223	0.2016	1.4856	0.1938	1.0529	0.1084
Standing Dead Change	0.3648	0.0808	0.1969	0.0981	-0.3936	0.3745	0.0845	0.0451	0.1441	0.0682	0.1046	0.0377	0.2416	0.0470
Dead Woody Debris Change	-0.0490	0.0562	0.3789	0.2716	0.0980	0.5183	-0.3679	0.1013	-0.0601	0.1130	-0.2644	0.0773	-0.1357	0.0459
Total Net ¹	1.1602	0.1191	3.3702	0.5080	4.6189	1.1108	0.8939	0.3603	3.3502	0.2614	1.7200	0.2586	1.4681	0.1306

¹ Total Net value includes change from roots and understory vegetation which are not enumerated in this table.

Table C1: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: All California

*information duplicated in Table C9.8

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	383,952	8,128	25,373	2,053	409,325	7,939	129,909	6,141	16,859	1,656	146,768	6,103	556,093	9,074
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	383,952	8,128	25,373	2,053	409,325	7,939	129,909	6,141	16,859	1,656	146,768	6,103	556,093	9,074
Other federal government:														
Bureau of Land Management	10,554	2,143	6,078	863	16,632	2,296	3,474	1,145	1,293	310	4,766	1,186	21,398	2,556
Department of Defense and Energy	297	210	801	280	1,097	350	--	--	145	150	145	150	1,242	380
National Park Service	--	--	--	--	--	--	59,078	5,739	6,901	1,243	65,978	5,805	65,978	5,805
U.S. Fish and Wildlife Service	--	--	--	--	--	--	28	28	14	14	41	31	41	31
Other federal	--	--	369	148	369	148	--	--	66	53	66	53	434	157
Total	10,850	2,149	7,247	915	18,097	2,320	62,579	5,798	8,417	1,277	70,996	5,854	89,094	5,965
State and local government:														
Local	3,481	1,327	2,099	534	5,581	1,433	3,745	1,510	3,222	750	6,967	1,648	12,548	2,178
State	7,381	1,966	715	408	8,097	1,975	30,027	6,586	4,464	1,143	34,491	6,653	42,587	6,243
Other public	--	--	22	20	22	20	326	363	38	42	365	365	387	366
Total	10,863	2,361	2,837	672	13,700	2,429	34,098	6,739	7,724	1,347	41,822	6,818	55,522	6,533
Private:														
Corporate	162,641	6,188	13,546	1,443	176,188	6,296	--	--	--	--	--	--	176,188	6,296
Noncorporate private:														
Total, noncorporate private	131,759	6,827	55,193	2,375	186,952	6,989	--	--	--	--	--	--	186,952	6,989
All private	294,400	7,471	68,740	2,684	363,140	7,404	--	--	--	--	--	--	363,140	7,404
All owners	700,065	11,235	104,196	3,550	804,262	11,046	226,586	10,793	33,001	2,484	259,587	10,848	1,063,849	13,954

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C2: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	6	5	682	344	687	344	3,609	2,369	1,937	690	5,546	2,481	6,234	2,505
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	6	5	682	344	687	344	3,609	2,369	1,937	690	5,546	2,481	6,234	2,505
Other federal government:														
Bureau of Land Management	--	--	140	56	140	56	--	--	13	9	13	9	153	57
Department of Defense and Energy	--	--	694	273	694	273	--	--	--	--	--	--	694	273
National Park Service	--	--	--	--	--	--	--	--	189	210	189	210	189	210
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	47	52	47	52	--	--	--	--	--	--	47	52
Total	--	--	882	282	882	282	--	--	202	210	202	210	1,083	352
State and local government:														
Local	--	--	619	298	619	298	3,745	1,510	2,434	672	6,179	1,614	6,798	1,638
State	1,429	944	89	57	1,517	960	5,262	2,366	1,944	516	7,206	2,421	8,723	2,579
Other public	--	--	--	--	--	--	326	363	38	42	365	365	365	365
Total	1,429	944	708	303	2,136	1,005	9,333	2,814	4,417	828	13,750	2,898	15,886	3,013
Private:														
Corporate	2,766	1,189	3,657	873	6,423	1,474	--	--	--	--	--	--	6,423	1,474
Noncorporate private:														
Total, noncorporate private	14,166	3,052	11,299	1,144	25,465	3,243	--	--	--	--	--	--	25,465	3,243
All private	16,932	3,262	14,956	1,428	31,888	3,543	--	--	--	--	--	--	31,888	3,543
All owners	18,366	3,420	17,226	1,525	35,593	3,729	12,942	3,679	6,556	1,091	19,498	3,817	55,090	5,353

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C3: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: Central Valley

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal government:														
Bureau of Land Management	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	14	14	14	14	14	14
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	14	14	14	14	14	14
State and local government:														
Local	--	--	81	72	81	72	--	--	--	--	--	--	81	72
State	--	--	--	--	--	--	--	--	145	148	145	148	145	148
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	81	72	81	72	--	--	145	148	145	148	226	165
Private:														
Corporate	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Noncorporate private:														
Total, noncorporate private	--	--	1,002	372	1,002	372	--	--	--	--	--	--	1,002	372
All private	--	--	1,002	372	1,002	372	--	--	--	--	--	--	1,002	372
All owners	--	--	1,083	379	1,083	379	--	--	159	149	159	149	1,242	407

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C4: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: Eastside

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	13,038	1,501	4,521	577	17,559	1,607	1,837	855	1,281	435	3,118	957	20,678	1,869
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	13,038	1,501	4,521	577	17,559	1,607	1,837	855	1,281	435	3,118	957	20,678	1,869
Other federal government:														
Bureau of Land Management	413	195	1,802	261	2,215	324	--	--	343	138	343	138	2,558	348
Department of Defense and Energy	--	--	106	64	106	64	--	--	--	--	--	--	106	64
National Park Service	--	--	--	--	--	--	--	--	371	145	371	145	371	145
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	413	195	1,909	267	2,321	329	--	--	714	199	714	199	3,035	376
State and local government:														
Local	--	--	52	53	52	53	--	--	--	--	--	--	52	53
State	--	--	--	--	--	--	175	194	53	46	228	200	228	200
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	52	53	52	53	175	194	53	46	228	200	280	207
Private:														
Corporate	2,672	584	291	103	2,963	593	--	--	--	--	--	--	2,963	593
Noncorporate private:														
Total, noncorporate private	1,468	455	569	158	2,037	484	--	--	--	--	--	--	2,037	484
All private	4,140	737	861	189	5,001	762	--	--	--	--	--	--	5,001	762
All owners	17,591	1,700	7,343	666	24,933	1,824	2,012	877	2,049	480	4,060	998	28,994	2,076

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C5: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	135,251	6,926	8,212	1,429	143,463	6,996	64,954	4,387	4,136	881	69,089	4,442	212,552	8,080
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	135,251	6,926	8,212	1,429	143,463	6,996	64,954	4,387	4,136	881	69,089	4,442	212,552	8,080
Other federal government:														
Bureau of Land Management	5,211	1,322	2,072	589	7,283	1,452	435	431	366	228	802	488	8,085	1,529
Department of Defense and Energy	--	--	--	--	--	--	--	--	145	150	145	150	145	150
National Park Service	--	--	--	--	--	--	8,691	3,916	660	365	9,351	3,934	9,351	3,934
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	30	19	30	19	--	--	16	18	16	18	46	26
Total	5,211	1,322	2,102	589	7,313	1,452	9,126	3,932	1,187	456	10,313	3,960	17,627	4,185
State and local government:														
Local	479	403	164	111	643	417	--	--	105	108	105	108	747	431
State	482	294	51	49	533	299	525	458	469	312	993	606	1,526	676
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	961	499	214	121	1,176	513	525	458	573	330	1,098	616	2,273	802
Private:														
Corporate	29,018	2,759	3,843	699	32,861	2,855	--	--	--	--	--	--	32,861	2,855
Noncorporate private:														
Total, noncorporate private	33,995	3,627	15,019	1,328	49,014	3,847	--	--	--	--	--	--	49,014	3,847
All private	63,013	4,432	18,862	1,490	81,875	4,654	--	--	--	--	--	--	81,875	4,654
All owners	204,436	8,374	29,390	2,157	233,826	8,570	74,605	5,905	5,896	1,045	80,501	5,978	314,327	10,251

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C6: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: North Coast

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	1,549	944	53	51	1,603	946	2,166	1,679	--	--	2,166	1,679	3,768	1,925
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1,549	944	53	51	1,603	946	2,166	1,679	--	--	2,166	1,679	3,768	1,925
Other federal government:														
Bureau of Land Management	2,556	1,465	--	--	2,556	1,465	2,759	1,031	--	--	2,759	1,031	5,316	1,791
Department of Defense and Energy	293	209	--	--	293	209	--	--	--	--	--	--	293	209
National Park Service	--	--	--	--	--	--	5,713	2,640	136	105	5,849	2,641	5,849	2,641
U.S. Fish and Wildlife Service	--	--	--	--	--	--	28	28	--	--	28	28	28	28
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2,850	1,480	--	--	2,850	1,480	8,500	2,818	136	105	8,636	2,815	11,486	3,162
State and local government:														
Local	1,509	1,065	22	22	1,531	1,066	--	--	680	318	680	318	2,211	1,112
State	4,104	1,555	12	11	4,116	1,555	20,221	6,586	1,016	937	21,237	6,653	25,353	6,519
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	5,614	1,885	34	25	5,647	1,885	20,221	6,586	1,697	989	21,918	6,660	27,565	6,611
Private:														
Corporate	66,909	5,176	1,105	417	68,014	5,192	--	--	--	--	--	--	68,014	5,192
Noncorporate private:														
Total, noncorporate private	52,112	4,944	4,092	923	56,204	5,016	--	--	--	--	--	--	56,204	5,016
All private	119,021	6,751	5,197	1,009	124,218	6,801	--	--	--	--	--	--	124,218	6,801
All owners	129,034	7,200	5,284	1,011	134,318	7,247	30,886	7,358	1,833	995	32,719	7,423	167,037	10,127

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C7: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	231,330	7,850	9,429	1,301	240,759	7,819	55,065	4,688	8,039	1,147	63,104	4,725	303,863	8,866
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	231,330	7,850	9,429	1,301	240,759	7,819	55,065	4,688	8,039	1,147	63,104	4,725	303,863	8,866
Other federal government:														
Bureau of Land Management	2,374	868	2,025	591	4,399	1,053	279	250	537	162	816	298	5,215	1,087
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	44,673	3,975	5,377	1,158	50,051	4,073	50,051	4,073
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	174	96	174	96	--	--	48	50	48	50	222	109
Total	2,374	868	2,199	598	4,572	1,056	44,953	3,981	5,962	1,168	50,915	4,076	55,487	4,134
State and local government:														
Local	1,493	681	989	405	2,482	804	--	--	--	--	--	--	2,482	804
State	1,367	860	564	401	1,930	935	3,685	1,518	699	254	4,384	1,532	6,315	1,725
Other public	--	--	22	20	22	20	--	--	--	--	--	--	22	20
Total	2,859	1,096	1,575	570	4,434	1,233	3,685	1,518	699	254	4,384	1,532	8,819	1,903
Private:														
Corporate	61,139	3,928	4,527	818	65,666	3,991	--	--	--	--	--	--	65,666	3,991
Noncorporate private:														
Total, noncorporate private	29,757	2,669	20,668	1,410	50,424	2,960	--	--	--	--	--	--	50,424	2,960
All private	90,895	4,480	25,195	1,596	116,090	4,610	--	--	--	--	--	--	116,090	4,610
All owners	327,458	9,059	38,398	2,210	365,856	9,109	103,703	6,334	14,701	1,656	118,404	6,422	484,260	10,657

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C8: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	2,778	792	2,476	466	5,254	923	2,279	719	1,466	454	3,745	846	8,999	1,251
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2,778	792	2,476	466	5,254	923	2,279	719	1,466	454	3,745	846	8,999	1,251
Other federal government:														
Bureau of Land Management	--	--	38	27	38	27	--	--	34	23	34	23	72	35
Department of Defense and Energy	3	3	--	--	3	3	--	--	--	--	--	--	3	3
National Park Service	--	--	--	--	--	--	--	--	167	67	167	67	167	67
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	117	98	117	98	--	--	1	1	1	1	119	98
Total	3	3	156	101	159	101	--	--	203	70	203	70	362	123
State and local government:														
Local	--	--	173	111	173	111	--	--	3	3	3	3	176	111
State	--	--	--	--	--	--	160	211	137	75	297	223	297	223
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	173	111	173	111	160	211	140	75	300	223	473	249
Private:														
Corporate	138	136	123	75	261	155	--	--	--	--	--	--	261	155
Noncorporate private:														
Total, noncorporate private	261	203	2,545	701	2,806	739	--	--	--	--	--	--	2,806	739
All private	399	244	2,668	705	3,067	755	--	--	--	--	--	--	3,067	755
All owners	3,180	829	5,473	857	8,653	1,201	2,439	749	1,808	465	4,247	878	12,900	1,487

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C9.1: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2001 - 2010

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	373,849	8,877	29,602	2,074	403,450	8,840	121,333	6,844	17,210	1,732	138,542	6,990	541,993	8,812
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	373,849	8,877	29,602	2,074	403,450	8,840	121,333	6,844	17,210	1,732	138,542	6,990	541,993	8,812
Other federal government:														
Bureau of Land Management	10,193	1,809	5,994	820	16,187	1,961	1,000	511	1,244	246	2,245	567	18,432	2,022
Department of Defense and Energy	137	150	753	260	889	300	--	--	--	--	--	--	889	300
National Park Service	--	--	--	--	--	--	56,194	6,096	6,207	1,056	62,402	6,034	62,402	6,034
U.S. Fish and Wildlife Service	--	--	--	--	--	--	58	71	2	2	60	71	60	71
Other federal	--	--	610	285	610	285	1,262	909	349	280	1,611	950	2,222	992
Total	10,330	1,815	7,357	897	17,687	1,991	58,514	6,161	7,803	1,112	66,318	6,095	84,004	6,288
State and local government:														
Local	1,710	911	1,988	567	3,699	1,082	2,576	1,180	3,866	850	6,442	1,449	10,141	1,805
State	6,348	1,898	572	292	6,920	1,919	31,706	7,542	5,079	1,232	36,785	7,633	43,705	7,684
Other public	--	--	22	20	22	20	447	400	40	38	487	402	508	403
Total	8,058	2,101	2,583	638	10,641	2,199	34,729	7,640	8,985	1,489	43,714	7,769	54,355	7,882
Private:														
Corporate	139,808	5,665	6,745	894	146,553	5,710	--	--	--	--	--	--	146,553	5,710
Noncorporate private:														
Total, noncorporate private	136,572	6,591	61,819	2,531	198,390	6,824	--	--	--	--	--	--	198,390	6,824
All private	276,380	7,125	68,564	2,626	344,943	7,154	--	--	--	--	--	--	344,943	7,154
All owners	668,616	11,576	108,105	3,499	776,721	11,570	214,576	11,485	33,998	2,537	248,574	11,615	1,025,295	14,010

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C9.2: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2002 - 2011

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	380,191	9,035	29,240	2,099	409,431	9,002	123,054	6,951	17,513	1,770	140,567	7,099	549,998	8,999
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	380,191	9,035	29,240	2,099	409,431	9,002	123,054	6,951	17,513	1,770	140,567	7,099	549,998	8,999
Other federal government:														
Bureau of Land Management	10,220	1,820	5,917	816	16,137	1,975	1,021	532	1,275	251	2,296	587	18,433	2,042
Department of Defense and Energy	150	156	780	259	930	303	--	--	--	--	--	--	930	303
National Park Service	--	--	--	--	--	--	57,347	6,161	6,331	1,068	63,678	6,096	63,678	6,096
U.S. Fish and Wildlife Service	--	--	--	--	--	--	58	71	2	2	60	71	60	71
Other federal	--	--	606	284	606	284	1,256	907	351	281	1,607	948	2,213	990
Total	10,370	1,826	7,303	893	17,673	2,005	59,681	6,226	7,959	1,124	67,640	6,158	85,313	6,353
State and local government:														
Local	1,616	926	2,020	573	3,636	1,097	2,640	1,217	3,919	863	6,558	1,486	10,194	1,844
State	6,332	1,891	669	382	7,001	1,928	32,172	7,571	5,340	1,264	37,512	7,667	44,512	7,724
Other public	--	--	23	20	23	20	460	406	32	37	493	408	515	409
Total	7,948	2,102	2,711	689	10,659	2,214	35,272	7,674	9,291	1,522	44,562	7,809	55,221	7,931
Private:														
Corporate	137,062	5,645	8,697	1,112	145,759	5,718	--	--	--	--	--	--	145,759	5,718
Noncorporate private:														
Total, noncorporate private	138,397	6,690	59,900	2,464	198,297	6,912	--	--	--	--	--	--	198,297	6,912
All private	275,458	7,262	68,598	2,631	344,056	7,288	--	--	--	--	--	--	344,056	7,288
All owners	673,968	11,698	107,852	3,524	781,819	11,689	218,007	11,621	34,763	2,587	252,769	11,754	1,034,589	14,120

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C9.3: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2003 - 2012

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	377,970	7,980	26,957	2,018	404,927	7,803	126,839	6,058	18,631	1,821	145,470	6,031	550,397	8,811
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	377,970	7,980	26,957	2,018	404,927	7,803	126,839	6,058	18,631	1,821	145,470	6,031	550,397	8,811
Other federal government:														
Bureau of Land Management	10,886	1,879	6,199	867	17,084	2,053	1,319	630	1,067	258	2,386	681	19,470	2,142
Department of Defense and Energy	257	200	710	248	966	319	--	--	142	147	142	147	1,109	351
National Park Service	--	--	--	--	--	--	57,324	5,580	6,549	1,169	63,872	5,627	63,872	5,627
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	651	286	651	286	540	571	368	291	909	640	1,559	698
Total	11,142	1,884	7,559	941	18,701	2,084	59,183	5,580	8,126	1,221	67,309	5,623	86,010	5,698
State and local government:														
Local	1,803	990	1,748	506	3,551	1,120	3,189	1,354	3,481	785	6,670	1,519	10,221	1,874
State	6,502	1,876	717	420	7,219	1,881	29,192	6,658	4,658	1,147	33,850	6,722	41,069	6,342
Other public	--	--	23	20	23	20	308	356	38	41	345	358	368	359
Total	8,305	2,113	2,487	658	10,792	2,182	32,689	6,785	8,177	1,360	40,866	6,861	51,658	6,550
Private:														
Corporate	138,858	5,529	8,913	1,134	147,771	5,608	--	--	--	--	--	--	147,771	5,608
Noncorporate private:														
Total, noncorporate private	141,064	6,814	58,289	2,420	199,353	6,973	--	--	--	--	--	--	199,353	6,973
All private	279,922	7,111	67,202	2,609	347,124	7,062	--	--	--	--	--	--	347,124	7,062
All owners	677,339	10,791	104,206	3,480	781,545	10,623	218,711	10,661	34,934	2,576	253,645	10,710	1,035,190	13,525

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C9.4: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2004 - 2013

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	381,415	8,037	26,395	2,021	407,810	7,857	127,014	6,138	18,548	1,839	145,562	6,096	553,373	8,911
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	381,415	8,037	26,395	2,021	407,810	7,857	127,014	6,138	18,548	1,839	145,562	6,096	553,373	8,911
Other federal government:														
Bureau of Land Management	10,901	1,906	6,227	871	17,128	2,078	1,707	714	1,174	267	2,881	762	20,009	2,190
Department of Defense and Energy	257	200	728	252	984	322	--	--	142	147	142	147	1,127	354
National Park Service	--	--	--	--	--	--	58,486	5,664	6,766	1,204	65,252	5,723	65,252	5,723
U.S. Fish and Wildlife Service	--	--	--	--	--	--	28	28	14	14	42	32	42	32
Other federal	--	--	483	157	483	157	--	--	79	54	79	54	562	166
Total	11,158	1,910	7,437	916	18,595	2,098	60,220	5,673	8,176	1,227	68,396	5,724	86,991	5,795
State and local government:														
Local	1,877	1,022	1,884	520	3,761	1,155	3,381	1,344	3,452	764	6,832	1,511	10,593	1,894
State	6,811	1,959	717	420	7,528	1,961	29,069	6,664	4,652	1,156	33,720	6,729	41,249	6,332
Other public	--	--	23	20	23	20	333	371	38	41	370	373	393	374
Total	8,688	2,200	2,624	668	11,312	2,267	32,782	6,787	8,141	1,358	40,923	6,865	52,235	6,544
Private:														
Corporate	142,964	5,664	9,804	1,223	152,769	5,751	--	--	--	--	--	--	152,769	5,751
Noncorporate private:														
Total, noncorporate private	142,251	6,926	57,721	2,372	199,973	7,066	--	--	--	--	--	--	199,973	7,066
All private	285,216	7,243	67,525	2,602	352,741	7,173	--	--	--	--	--	--	352,741	7,173
All owners	686,477	10,943	103,981	3,472	790,458	10,761	220,017	10,757	34,865	2,590	254,882	10,803	1,045,340	13,672

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C9.5: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2005 - 2014

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	383,675	8,009	26,274	2,040	409,949	7,818	129,836	6,208	18,523	1,843	148,358	6,143	558,307	8,940
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	383,675	8,009	26,274	2,040	409,949	7,818	129,836	6,208	18,523	1,843	148,358	6,143	558,307	8,940
Other federal government:														
Bureau of Land Management	11,531	2,231	6,334	885	17,865	2,381	2,207	812	1,159	267	3,365	855	21,230	2,497
Department of Defense and Energy	257	200	762	279	1,019	343	--	--	142	147	142	147	1,161	373
National Park Service	--	--	--	--	--	--	59,328	5,722	6,776	1,218	66,103	5,782	66,103	5,782
U.S. Fish and Wildlife Service	--	--	--	--	--	--	28	28	14	14	41	31	41	31
Other federal	--	--	482	157	482	157	--	--	79	54	79	54	561	166
Total	11,787	2,237	7,578	936	19,365	2,404	61,562	5,737	8,169	1,241	69,731	5,787	89,096	5,905
State and local government:														
Local	2,649	1,138	2,037	531	4,687	1,263	3,384	1,344	3,441	754	6,825	1,498	11,512	1,953
State	7,233	1,982	770	422	8,002	1,991	28,984	6,468	4,672	1,153	33,655	6,534	41,658	6,134
Other public	--	--	22	20	22	20	333	371	38	41	370	373	393	373
Total	9,882	2,276	2,830	678	12,712	2,349	32,700	6,593	8,151	1,353	40,851	6,670	53,562	6,368
Private:														
Corporate	144,722	5,665	10,804	1,278	155,526	5,762	--	--	--	--	--	--	155,526	5,762
Noncorporate private:														
Total, noncorporate private	139,978	6,842	58,362	2,398	198,340	6,992	--	--	--	--	--	--	198,340	6,992
All private	284,700	7,145	69,166	2,635	353,866	7,076	--	--	--	--	--	--	353,866	7,076
All owners	690,044	10,941	105,847	3,514	795,891	10,753	224,098	10,710	34,843	2,597	258,941	10,742	1,054,832	13,632

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C9.6: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2006 - 2015

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	385,079	8,046	25,740	2,028	410,819	7,858	130,176	6,189	17,456	1,709	147,632	6,136	558,451	8,969
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	385,079	8,046	25,740	2,028	410,819	7,858	130,176	6,189	17,456	1,709	147,632	6,136	558,451	8,969
Other federal government:														
Bureau of Land Management	11,455	2,183	6,142	871	17,597	2,329	2,852	1,055	1,299	314	4,151	1,100	21,748	2,548
Department of Defense and Energy	257	200	791	281	1,047	345	--	--	145	150	145	150	1,192	376
National Park Service	--	--	--	--	--	--	59,901	5,744	6,716	1,214	66,617	5,807	66,617	5,807
U.S. Fish and Wildlife Service	--	--	--	--	--	--	28	28	14	14	41	31	41	31
Other federal	--	--	498	158	498	158	--	--	80	55	80	55	578	167
Total	11,712	2,188	7,431	924	19,142	2,352	62,781	5,790	8,254	1,249	71,035	5,845	90,177	5,937
State and local government:														
Local	2,590	1,123	2,089	537	4,679	1,253	3,524	1,409	3,371	750	6,895	1,554	11,573	1,990
State	7,823	2,071	607	398	8,431	2,076	29,409	6,499	4,666	1,162	34,076	6,566	42,506	6,177
Other public	--	--	22	20	22	20	326	363	38	41	364	366	386	366
Total	10,413	2,345	2,719	669	13,132	2,414	33,259	6,637	8,075	1,359	41,334	6,714	54,466	6,413
Private:														
Corporate	152,156	5,956	12,276	1,375	164,432	6,067	--	--	--	--	--	--	164,432	6,067
Noncorporate private:														
Total, noncorporate private	136,913	6,780	56,579	2,373	193,492	6,928	--	--	--	--	--	--	193,492	6,928
All private	289,069	7,284	68,855	2,651	357,924	7,209	--	--	--	--	--	--	357,924	7,209
All owners	696,272	11,050	104,745	3,513	801,017	10,857	226,216	10,754	33,785	2,512	260,001	10,796	1,061,018	13,733

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C9.7: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2007 - 2016

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	385,136	8,094	24,929	2,003	410,065	7,907	130,657	6,171	17,172	1,678	147,828	6,125	557,893	9,046
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	385,136	8,094	24,929	2,003	410,065	7,907	130,657	6,171	17,172	1,678	147,828	6,125	557,893	9,046
Other federal government:														
Bureau of Land Management	10,611	2,143	6,157	874	16,769	2,296	3,498	1,148	1,291	311	4,789	1,189	21,558	2,556
Department of Defense and Energy	297	210	807	281	1,104	351	--	--	156	156	156	156	1,260	384
National Park Service	--	--	--	--	--	--	60,639	5,796	6,782	1,219	67,422	5,858	67,422	5,858
U.S. Fish and Wildlife Service	--	--	--	--	--	--	28	28	14	14	41	31	41	31
Other federal	--	--	440	153	440	153	--	--	84	56	84	56	524	163
Total	10,908	2,150	7,404	926	18,313	2,320	64,165	5,853	8,328	1,254	72,492	5,905	90,805	6,005
State and local government:														
Local	3,424	1,318	2,132	537	5,556	1,427	3,586	1,443	3,368	751	6,954	1,586	12,511	2,127
State	7,392	1,968	710	407	8,102	1,977	29,845	6,583	4,670	1,154	34,515	6,647	42,617	6,240
Other public	--	--	22	20	22	20	326	363	37	40	363	366	386	366
Total	10,816	2,358	2,864	674	13,680	2,427	33,758	6,724	8,075	1,353	41,832	6,798	55,513	6,514
Private:														
Corporate	158,252	6,120	12,810	1,391	171,062	6,225	--	--	--	--	--	--	171,062	6,225
Noncorporate private:														
Total, noncorporate private	133,508	6,804	56,084	2,396	189,592	6,966	--	--	--	--	--	--	189,592	6,966
All private	291,760	7,408	68,894	2,677	360,654	7,337	--	--	--	--	--	--	360,654	7,337
All owners	698,620	11,170	104,092	3,519	802,712	10,979	228,579	10,830	33,575	2,490	262,153	10,874	1,064,865	13,892

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C9.8: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2008 - 2017

*information duplicated in Table C1

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	383,952	8,128	25,373	2,053	409,325	7,939	129,909	6,141	16,859	1,656	146,768	6,103	556,093	9,074
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	383,952	8,128	25,373	2,053	409,325	7,939	129,909	6,141	16,859	1,656	146,768	6,103	556,093	9,074
Other federal government:														
Bureau of Land Management	10,554	2,143	6,078	863	16,632	2,296	3,474	1,145	1,293	310	4,766	1,186	21,398	2,556
Department of Defense and Energy	297	210	801	280	1,097	350	--	--	145	150	145	150	1,242	380
National Park Service	--	--	--	--	--	--	59,078	5,739	6,901	1,243	65,978	5,805	65,978	5,805
U.S. Fish and Wildlife Service	--	--	--	--	--	--	28	28	14	14	41	31	41	31
Other federal	--	--	369	148	369	148	--	--	66	53	66	53	434	157
Total	10,850	2,149	7,247	915	18,097	2,320	62,579	5,798	8,417	1,277	70,996	5,854	89,094	5,965
State and local government:														
Local	3,481	1,327	2,099	534	5,581	1,433	3,745	1,510	3,222	750	6,967	1,648	12,548	2,178
State	7,381	1,966	715	408	8,097	1,975	30,027	6,586	4,464	1,143	34,491	6,653	42,587	6,243
Other public	--	--	22	20	22	20	326	363	38	42	365	365	387	366
Total	10,863	2,361	2,837	672	13,700	2,429	34,098	6,739	7,724	1,347	41,822	6,818	55,522	6,533
Private:														
Corporate	162,641	6,188	13,546	1,443	176,188	6,296	--	--	--	--	--	--	176,188	6,296
Noncorporate private:														
Total, noncorporate private	131,759	6,827	55,193	2,375	186,952	6,989	--	--	--	--	--	--	186,952	6,989
All private	294,400	7,471	68,740	2,684	363,140	7,404	--	--	--	--	--	--	363,140	7,404
All owners	700,065	11,235	104,196	3,550	804,262	11,046	226,586	10,793	33,001	2,484	259,587	10,848	1,063,849	13,954

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C10: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: All California

**information duplicated in Table C18.8*

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	40,534	1,915	2,281	299	42,815	1,922	19,329	1,419	2,415	343	21,745	1,432	64,560	2,354
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	40,534	1,915	2,281	299	42,815	1,922	19,329	1,419	2,415	343	21,745	1,432	64,560	2,354
Other federal government:														
Bureau of Land Management	373	101	290	60	663	117	337	167	86	27	423	169	1,086	204
Department of Defense and Energy	--	--	18	9	18	9	--	--	--	--	--	--	18	9
National Park Service	--	--	--	--	--	--	9,354	1,286	581	138	9,935	1,291	9,935	1,291
U.S. Fish and Wildlife Service	--	--	--	--	--	--	8	8	--	--	8	8	8	8
Other federal	--	--	60	44	60	44	--	--	1	1	1	1	61	44
Total	373	101	368	75	741	125	9,699	1,291	667	140	10,367	1,297	11,108	1,292
State and local government:														
Local	147	63	50	20	197	66	140	76	115	49	255	90	453	112
State	298	158	33	19	330	159	1,030	220	218	77	1,248	231	1,578	257
Other public	--	--	--	--	--	--	2	2	--	--	2	2	2	2
Total	445	170	83	27	528	172	1,172	231	334	91	1,505	246	2,033	278
Private:														
Corporate	8,685	704	453	78	9,138	707	--	--	--	--	--	--	9,138	707
Noncorporate private:														
Total, noncorporate private	4,870	443	2,425	290	7,295	524	--	--	--	--	--	--	7,295	524
All private	13,555	799	2,878	299	16,433	842	--	--	--	--	--	--	16,433	842
All owners	54,907	2,078	5,610	430	60,517	2,101	30,200	1,933	3,416	382	33,617	1,947	94,134	2,807

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C11: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	6	5	77	37	82	37	12	11	537	256	550	256	632	258
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	6	5	77	37	82	37	12	11	537	256	550	256	632	258
Other federal government:														
Bureau of Land Management	--	--	4	3	4	3	--	--	--	--	--	--	4	3
Department of Defense and Energy	--	--	10	7	10	7	--	--	--	--	--	--	10	7
National Park Service	--	--	--	--	--	--	--	--	23	25	23	25	23	25
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	14	8	14	8	--	--	23	25	23	25	37	26
State and local government:														
Local	--	--	19	16	19	16	140	76	78	44	218	88	237	89
State	14	12	1	1	15	12	60	29	60	37	120	47	135	48
Other public	--	--	--	--	--	--	2	2	--	--	2	2	2	2
Total	14	12	20	16	34	20	203	81	138	58	341	99	374	100
Private:														
Corporate	46	23	117	45	164	50	--	--	--	--	--	--	164	50
Noncorporate private:														
Total, noncorporate private	540	149	469	106	1,009	182	--	--	--	--	--	--	1,009	182
All private	586	151	586	115	1,173	188	--	--	--	--	--	--	1,173	188
All owners	606	151	697	122	1,303	193	215	82	698	263	913	275	2,216	336

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C12: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: Central Valley

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal government:														
Bureau of Land Management	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
State and local government:														
Local	--	--	8	9	8	9	--	--	--	--	--	--	8	9
State	--	--	--	--	--	--	--	--	11	12	11	12	11	12
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	8	9	8	9	--	--	11	12	11	12	20	14
Private:														
Corporate	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Noncorporate private:														
Total, noncorporate private	--	--	33	19	33	19	--	--	--	--	--	--	33	19
All private	--	--	33	19	33	19	--	--	--	--	--	--	33	19
All owners	--	--	41	21	41	21	--	--	11	12	11	12	53	24

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C13: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: Eastside

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	1,165	247	341	127	1,506	278	148	69	114	43	262	81	1,768	289
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1,165	247	341	127	1,506	278	148	69	114	43	262	81	1,768	289
Other federal government:														
Bureau of Land Management	11	6	83	28	94	28	--	--	16	9	16	9	110	29
Department of Defense and Energy	--	--	8	5	8	5	--	--	--	--	--	--	8	5
National Park Service	--	--	--	--	--	--	--	--	8	5	8	5	8	5
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	11	6	91	28	102	29	--	--	24	10	24	10	126	30
State and local government:														
Local	--	--	--	--	--	--	--	--	--	--	--	--	--	--
State	--	--	--	--	--	--	39	44	--	--	39	44	39	44
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	39	44	--	--	39	44	39	44
Private:														
Corporate	226	100	1	1	226	100	--	--	--	--	--	--	226	100
Noncorporate private:														
Total, noncorporate private	46	18	11	9	57	20	--	--	--	--	--	--	57	20
All private	271	101	12	9	283	102	--	--	--	--	--	--	283	102
All owners	1,447	267	445	131	1,892	297	187	82	138	44	325	93	2,216	311

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C14: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	14,583	1,414	478	121	15,061	1,416	11,322	1,244	424	119	11,746	1,247	26,807	1,880
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	14,583	1,414	478	121	15,061	1,416	11,322	1,244	424	119	11,746	1,247	26,807	1,880
Other federal government:														
Bureau of Land Management	276	95	74	37	350	101	6	6	--	--	6	6	356	102
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	287	117	14	11	302	118	302	118
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	1	1	1	1	1	1
Total	276	95	74	37	350	101	293	118	15	11	308	118	658	154
State and local government:														
Local	2	2	--	--	2	2	--	--	13	14	13	14	15	15
State	26	29	11	9	37	30	4	4	52	42	56	42	93	52
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	29	29	11	9	39	31	4	4	65	44	69	44	109	54
Private:														
Corporate	1,825	385	125	44	1,950	388	--	--	--	--	--	--	1,950	388
Noncorporate private:														
Total, noncorporate private	1,217	211	397	64	1,614	222	--	--	--	--	--	--	1,614	222
All private	3,042	437	522	78	3,564	444	--	--	--	--	--	--	3,564	444
All owners	17,929	1,484	1,085	149	19,014	1,488	11,619	1,250	505	128	12,124	1,253	31,138	1,939

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C15: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: North Coast

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	130	77	9	9	139	78	91	75	--	--	91	75	230	108
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	130	77	9	9	139	78	91	75	--	--	91	75	230	108
Other federal government:														
Bureau of Land Management	25	21	--	--	25	21	308	165	--	--	308	165	333	166
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	694	397	--	--	694	397	694	397
U.S. Fish and Wildlife Service	--	--	--	--	--	--	8	8	--	--	8	8	8	8
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	25	21	--	--	25	21	1,010	429	--	--	1,010	429	1,034	430
State and local government:														
Local	60	50	4	4	64	50	--	--	11	6	11	6	75	50
State	90	42	--	--	90	42	699	211	11	10	709	212	800	208
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	150	65	4	4	154	65	699	211	21	12	720	212	874	214
Private:														
Corporate	3,807	524	38	20	3,845	524	--	--	--	--	--	--	3,845	524
Noncorporate private:														
Total, noncorporate private	1,587	239	60	26	1,647	241	--	--	--	--	--	--	1,647	241
All private	5,394	567	98	33	5,492	568	--	--	--	--	--	--	5,492	568
All owners	5,699	576	111	34	5,810	577	1,800	485	21	12	1,821	485	7,631	751

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C16: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	24,125	1,449	1,048	228	25,173	1,460	6,949	803	1,091	187	8,040	816	33,213	1,649
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	24,125	1,449	1,048	228	25,173	1,460	6,949	803	1,091	187	8,040	816	33,213	1,649
Other federal government:														
Bureau of Land Management	61	31	122	39	183	50	23	24	64	26	87	35	271	61
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	8,373	1,246	501	135	8,874	1,252	8,874	1,252
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	12	8	12	8	--	--	--	--	--	--	12	8
Total	61	31	134	40	195	51	8,397	1,246	565	137	8,962	1,252	9,157	1,251
State and local government:														
Local	85	39	12	6	97	39	--	--	--	--	--	--	97	39
State	167	153	21	16	189	154	199	82	31	18	229	83	418	171
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	252	158	34	17	286	158	199	82	31	18	229	83	515	176
Private:														
Corporate	2,781	315	168	42	2,948	317	--	--	--	--	--	--	2,948	317
Noncorporate private:														
Total, noncorporate private	1,403	282	1,298	257	2,701	380	--	--	--	--	--	--	2,701	380
All private	4,184	416	1,466	260	5,649	487	--	--	--	--	--	--	5,649	487
All owners	28,622	1,514	2,681	348	31,303	1,546	15,544	1,485	1,687	232	17,231	1,497	48,534	2,117

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C17: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	526	221	328	84	854	236	807	319	249	89	1,056	330	1,910	406
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	526	221	328	84	854	236	807	319	249	89	1,056	330	1,910	406
Other federal government:														
Bureau of Land Management	--	--	7	4	7	4	--	--	6	4	6	4	12	6
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	35	14	35	14	35	14
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	48	43	48	43	--	--	--	--	--	--	48	43
Total	--	--	55	43	55	43	--	--	41	15	41	15	95	46
State and local government:														
Local	--	--	7	6	7	6	--	--	13	13	13	13	20	14
State	--	--	--	--	--	--	28	26	54	48	82	53	82	53
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	7	6	7	6	28	26	67	49	95	55	102	55
Private:														
Corporate	--	--	5	3	5	3	--	--	--	--	--	--	5	3
Noncorporate private:														
Total, noncorporate private	77	47	157	55	234	73	--	--	--	--	--	--	234	73
All private	77	47	161	55	239	73	--	--	--	--	--	--	239	73
All owners	603	226	551	110	1,154	251	835	320	357	103	1,192	335	2,346	419

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C18.1: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2001 - 2010

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	33,913	1,661	2,473	298	36,386	1,678	14,503	1,171	1,871	285	16,374	1,199	52,760	1,927
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	33,913	1,661	2,473	298	36,386	1,678	14,503	1,171	1,871	285	16,374	1,199	52,760	1,927
Other federal government:														
Bureau of Land Management	561	207	407	73	968	219	127	117	198	80	325	142	1,294	260
Department of Defense and Energy	--	--	13	9	13	9	--	--	--	--	--	--	13	9
National Park Service	--	--	--	--	--	--	7,513	953	661	156	8,174	946	8,174	946
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	7	5	7	5	130	124	9	8	140	124	147	125
Total	561	207	427	73	988	219	7,771	963	868	174	8,639	957	9,627	977
State and local government:														
Local	183	129	36	17	219	130	110	67	71	35	181	76	401	150
State	289	157	23	12	312	158	1,464	346	215	78	1,679	353	1,991	383
Other public	--	--	--	--	--	--	3	2	1	1	3	3	3	3
Total	472	203	60	21	531	204	1,577	352	287	85	1,864	360	2,395	410
Private:														
Corporate	7,254	675	158	37	7,411	676	--	--	--	--	--	--	7,411	676
Noncorporate private:														
Total, noncorporate private	5,281	540	1,871	239	7,152	588	--	--	--	--	--	--	7,152	588
All private	12,535	837	2,029	242	14,563	866	--	--	--	--	--	--	14,563	866
All owners	47,481	1,882	4,988	391	52,469	1,910	23,850	1,548	3,026	345	26,877	1,567	79,345	2,346

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C18.2: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2002 - 2011

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	35,706	1,715	2,476	304	38,182	1,731	14,780	1,186	1,976	313	16,756	1,220	54,938	1,976
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	35,706	1,715	2,476	304	38,182	1,731	14,780	1,186	1,976	313	16,756	1,220	54,938	1,976
Other federal government:														
Bureau of Land Management	562	207	376	65	939	216	128	116	163	66	291	134	1,230	253
Department of Defense and Energy	--	--	19	10	19	10	--	--	--	--	--	--	19	10
National Park Service	--	--	--	--	--	--	7,541	954	669	156	8,210	947	8,210	947
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	7	5	7	5	131	125	9	8	141	125	148	125
Total	562	207	402	66	964	216	7,801	965	841	169	8,642	958	9,606	979
State and local government:														
Local	67	36	38	17	105	40	115	68	74	35	189	77	295	86
State	286	157	23	12	309	157	1,530	349	266	95	1,796	360	2,105	389
Other public	--	--	--	--	--	--	3	2	1	1	4	3	4	3
Total	354	161	61	21	414	162	1,648	355	341	101	1,989	368	2,404	397
Private:														
Corporate	7,408	679	236	54	7,644	680	--	--	--	--	--	--	7,644	680
Noncorporate private:														
Total, noncorporate private	5,412	550	1,689	182	7,100	576	--	--	--	--	--	--	7,100	576
All private	12,820	846	1,925	189	14,745	861	--	--	--	--	--	--	14,745	861
All owners	49,442	1,927	4,863	364	54,305	1,949	24,229	1,560	3,158	370	27,387	1,585	81,692	2,379

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C18.3: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2003 - 2012

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	36,306	1,709	2,334	279	38,640	1,719	15,615	1,122	2,094	325	17,709	1,143	56,349	2,026
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	36,306	1,709	2,334	279	38,640	1,719	15,615	1,122	2,094	325	17,709	1,143	56,349	2,026
Other federal government:														
Bureau of Land Management	686	261	408	71	1,093	268	157	127	134	58	291	139	1,385	302
Department of Defense and Energy	--	--	17	10	17	10	--	--	--	--	--	--	17	10
National Park Service	--	--	--	--	--	--	7,626	949	677	164	8,303	959	8,303	959
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	51	42	51	42	114	121	10	9	124	121	175	128
Total	686	261	476	83	1,162	272	7,898	959	821	173	8,719	971	9,880	987
State and local government:														
Local	72	37	38	18	110	41	138	76	65	32	203	82	313	92
State	323	172	19	11	342	172	1,378	322	229	89	1,607	332	1,949	349
Other public	--	--	--	--	--	--	2	2	1	1	3	2	3	2
Total	395	176	57	21	452	177	1,518	330	295	94	1,813	341	2,265	359
Private:														
Corporate	7,498	652	204	48	7,702	653	--	--	--	--	--	--	7,702	653
Noncorporate private:														
Total, noncorporate private	5,370	541	1,644	176	7,014	566	--	--	--	--	--	--	7,014	566
All private	12,868	819	1,848	182	14,715	835	--	--	--	--	--	--	14,715	835
All owners	50,254	1,915	4,714	344	54,969	1,931	25,032	1,512	3,209	379	28,241	1,536	83,209	2,409

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C18.4: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2004 - 2013

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	36,365	1,716	2,283	274	38,648	1,725	16,201	1,184	2,217	334	18,418	1,204	57,066	2,065
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	36,365	1,716	2,283	274	38,648	1,725	16,201	1,184	2,217	334	18,418	1,204	57,066	2,065
Other federal government:														
Bureau of Land Management	687	262	375	68	1,061	268	163	128	140	58	304	141	1,365	302
Department of Defense and Energy	--	--	17	9	17	9	--	--	--	--	--	--	17	9
National Park Service	--	--	--	--	--	--	7,966	976	687	164	8,653	986	8,653	986
U.S. Fish and Wildlife Service	--	--	--	--	--	--	8	8	--	--	8	8	8	8
Other federal	--	--	51	42	51	42	--	--	1	1	1	1	52	42
Total	687	262	442	80	1,129	271	8,137	982	828	174	8,965	993	10,094	1,008
State and local government:														
Local	72	37	38	18	110	41	138	76	72	35	210	83	320	93
State	287	157	19	11	306	157	1,249	306	216	89	1,465	317	1,771	331
Other public	--	--	--	--	--	--	2	2	1	1	3	2	3	2
Total	360	161	57	21	416	162	1,389	314	289	95	1,678	326	2,094	342
Private:														
Corporate	7,587	655	236	52	7,823	657	--	--	--	--	--	--	7,823	657
Noncorporate private:														
Total, noncorporate private	4,736	424	1,722	177	6,458	456	--	--	--	--	--	--	6,458	456
All private	12,322	751	1,958	184	14,281	768	--	--	--	--	--	--	14,281	768
All owners	49,734	1,893	4,740	340	54,474	1,908	25,727	1,570	3,334	388	29,061	1,593	83,535	2,427

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C18.5: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2005 - 2014

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	36,903	1,763	2,058	237	38,961	1,766	16,592	1,188	2,118	324	18,709	1,202	57,670	2,104
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	36,903	1,763	2,058	237	38,961	1,766	16,592	1,188	2,118	324	18,709	1,202	57,670	2,104
Other federal government:														
Bureau of Land Management	683	262	351	65	1,034	267	169	128	85	28	254	131	1,288	297
Department of Defense and Energy	--	--	17	9	17	9	--	--	--	--	--	--	17	9
National Park Service	--	--	--	--	--	--	8,081	974	642	157	8,723	983	8,723	983
U.S. Fish and Wildlife Service	--	--	--	--	--	--	8	8	--	--	8	8	8	8
Other federal	--	--	51	43	51	43	--	--	1	1	1	1	52	43
Total	683	262	418	78	1,102	270	8,258	980	727	159	8,985	989	10,087	1,003
State and local government:														
Local	101	44	47	20	148	48	138	76	69	35	207	83	355	96
State	296	158	19	11	314	159	1,283	308	232	90	1,515	319	1,829	333
Other public	--	--	--	--	--	--	2	2	1	1	3	2	3	2
Total	397	164	65	23	462	166	1,423	317	302	96	1,725	328	2,187	345
Private:														
Corporate	7,891	674	218	50	8,108	675	--	--	--	--	--	--	8,108	675
Noncorporate private:														
Total, noncorporate private	4,646	416	1,731	178	6,377	449	--	--	--	--	--	--	6,377	449
All private	12,537	763	1,949	184	14,486	780	--	--	--	--	--	--	14,486	780
All owners	50,520	1,939	4,490	310	55,010	1,950	26,273	1,572	3,147	373	29,420	1,590	84,430	2,462

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C18.6: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2006 - 2015

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	37,244	1,760	2,194	272	39,438	1,767	17,590	1,241	2,125	326	19,715	1,252	59,153	2,132
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	37,244	1,760	2,194	272	39,438	1,767	17,590	1,241	2,125	326	19,715	1,252	59,153	2,132
Other federal government:														
Bureau of Land Management	682	263	323	63	1,005	267	187	130	88	30	275	133	1,280	298
Department of Defense and Energy	--	--	17	9	17	9	--	--	--	--	--	--	17	9
National Park Service	--	--	--	--	--	--	8,175	986	658	159	8,833	996	8,833	996
U.S. Fish and Wildlife Service	--	--	--	--	--	--	8	8	--	--	8	8	8	8
Other federal	--	--	51	43	51	43	--	--	1	1	1	1	52	43
Total	682	263	391	76	1,073	271	8,370	992	747	161	9,117	1,002	10,190	1,015
State and local government:														
Local	101	44	51	20	152	49	139	76	79	35	218	84	370	96
State	301	158	20	11	321	158	1,291	308	258	97	1,550	320	1,870	333
Other public	--	--	--	--	--	--	2	2	1	1	3	2	3	2
Total	402	164	71	23	473	165	1,432	316	339	103	1,770	330	2,243	345
Private:														
Corporate	8,118	654	320	63	8,438	656	--	--	--	--	--	--	8,438	656
Noncorporate private:														
Total, noncorporate private	4,716	424	1,828	186	6,544	459	--	--	--	--	--	--	6,544	459
All private	12,834	749	2,148	195	14,981	769	--	--	--	--	--	--	14,981	769
All owners	51,162	1,930	4,803	343	55,965	1,944	27,392	1,620	3,210	378	30,603	1,636	86,567	2,486

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C18.7: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2007 - 2016

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	38,627	1,821	2,205	287	40,832	1,829	18,502	1,359	2,375	341	20,877	1,370	61,708	2,251
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	38,627	1,821	2,205	287	40,832	1,829	18,502	1,359	2,375	341	20,877	1,370	61,708	2,251
Other federal government:														
Bureau of Land Management	362	101	303	61	665	117	339	167	89	30	428	170	1,093	204
Department of Defense and Energy	--	--	18	9	18	9	--	--	--	--	--	--	18	9
National Park Service	--	--	--	--	--	--	8,172	897	628	142	8,800	905	8,800	905
U.S. Fish and Wildlife Service	--	--	--	--	--	--	8	8	--	--	8	8	8	8
Other federal	--	--	60	44	60	44	--	--	1	1	1	1	61	44
Total	362	101	381	76	743	125	8,519	905	718	145	9,237	912	9,980	908
State and local government:														
Local	151	65	52	20	203	68	143	78	116	50	259	93	462	115
State	298	158	34	19	332	159	1,152	274	267	98	1,419	288	1,751	304
Other public	--	--	--	--	--	--	2	2	1	1	3	2	3	2
Total	449	171	85	28	535	173	1,298	283	383	110	1,681	301	2,215	323
Private:														
Corporate	8,303	685	397	73	8,701	687	--	--	--	--	--	--	8,701	687
Noncorporate private:														
Total, noncorporate private	4,548	406	1,937	172	6,485	437	--	--	--	--	--	--	6,485	437
All private	12,851	767	2,335	186	15,186	783	--	--	--	--	--	--	15,186	783
All owners	52,290	1,979	5,006	351	57,295	1,993	28,319	1,657	3,475	386	31,794	1,672	89,090	2,550

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C18.8: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2008 - 2017

**information duplicated in Table C10*

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	40,534	1,915	2,281	299	42,815	1,922	19,329	1,419	2,415	343	21,745	1,432	64,560	2,354
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	40,534	1,915	2,281	299	42,815	1,922	19,329	1,419	2,415	343	21,745	1,432	64,560	2,354
Other federal government:														
Bureau of Land Management	373	101	290	60	663	117	337	167	86	27	423	169	1,086	204
Department of Defense and Energy	--	--	18	9	18	9	--	--	--	--	--	--	18	9
National Park Service	--	--	--	--	--	--	9,354	1,286	581	138	9,935	1,291	9,935	1,291
U.S. Fish and Wildlife Service	--	--	--	--	--	--	8	8	--	--	8	8	8	8
Other federal	--	--	60	44	60	44	--	--	1	1	1	1	61	44
Total	373	101	368	75	741	125	9,699	1,291	667	140	10,367	1,297	11,108	1,292
State and local government:														
Local	147	63	50	20	197	66	140	76	115	49	255	90	453	112
State	298	158	33	19	330	159	1,030	220	218	77	1,248	231	1,578	257
Other public	--	--	--	--	--	--	2	2	--	--	2	2	2	2
Total	445	170	83	27	528	172	1,172	231	334	91	1,505	246	2,033	278
Private:														
Corporate	8,685	704	453	78	9,138	707	--	--	--	--	--	--	9,138	707
Noncorporate private:														
Total, noncorporate private	4,870	443	2,425	290	7,295	524	--	--	--	--	--	--	7,295	524
All private	13,555	799	2,878	299	16,433	842	--	--	--	--	--	--	16,433	842
All owners	54,907	2,078	5,610	430	60,517	2,101	30,200	1,933	3,416	382	33,617	1,947	94,134	2,807

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C19: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: All California

*information combined with information from Table C28 in Table C27.8

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	7,751.77	159.56	4,210.83	194.05	11,962.60	217.25	2,391.85	102.95	1,733.23	116.54	4,125.08	135.61	16,087.68	238.73
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	7,751.77	159.56	4,210.83	194.05	11,962.60	217.25	2,391.85	102.95	1,733.23	116.54	4,125.08	135.61	16,087.68	238.73
Other federal government:														
Bureau of Land Management	339.06	52.30	1,773.63	149.11	2,112.69	156.57	90.15	26.91	334.91	56.75	425.05	62.80	2,537.74	163.91
Department of Defense and Energy	30.93	16.81	119.92	32.52	150.85	36.61	--	--	8.02	8.30	8.02	8.30	158.87	37.54
National Park Service	--	--	--	--	--	--	737.09	55.61	641.29	75.76	1,378.38	90.96	1,378.38	90.96
U.S. Fish and Wildlife Service	--	--	--	--	--	--	4.51	4.61	0.81	0.83	5.32	4.69	5.32	4.69
Other federal	--	--	95.16	28.84	95.16	28.84	--	--	6.89	4.07	6.89	4.07	102.05	29.12
Total	369.99	54.39	1,988.71	153.52	2,358.70	161.25	831.74	59.76	991.92	92.46	1,823.66	105.48	4,182.37	174.90
State and local government:														
Local	53.92	18.28	212.56	41.62	266.48	46.17	47.32	18.64	244.06	45.32	291.37	47.39	557.85	65.71
State	82.96	20.68	83.58	29.06	166.55	35.43	315.56	41.45	408.72	57.11	724.28	68.39	890.82	70.87
Other public	--	--	13.91	11.48	13.91	11.48	6.98	7.77	8.95	9.68	15.92	12.41	29.84	16.91
Total	136.88	27.42	310.05	51.97	446.94	59.15	369.85	45.35	661.73	70.27	1,031.58	79.74	1,478.51	92.59
Private:														
Corporate	4,826.38	169.26	1,355.68	110.16	6,182.06	197.17	--	--	--	--	--	--	6,182.06	197.17
Noncorporate private:														
Total, noncorporate private	3,047.26	135.80	6,733.00	215.25	9,780.26	240.70	--	--	--	--	--	--	9,780.26	240.70
All private	7,873.64	179.05	8,088.68	229.20	15,962.32	258.04	--	--	--	--	--	--	15,962.32	258.04
All owners	16,132.28	241.99	14,598.28	337.24	30,730.56	367.51	3,593.45	127.21	3,386.87	164.28	6,980.32	188.73	37,710.88	383.66

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C20: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	2.45	2.25	130.15	33.24	132.60	33.31	34.77	17.13	202.14	43.65	236.92	46.43	369.52	57.14
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2.45	2.25	130.15	33.24	132.60	33.31	34.77	17.13	202.14	43.65	236.92	46.43	369.52	57.14
Other federal government:														
Bureau of Land Management	--	--	88.05	30.20	88.05	30.20	--	--	17.12	12.51	17.12	12.51	105.17	32.69
Department of Defense and Energy	--	--	74.77	24.31	74.77	24.31	--	--	--	--	--	--	74.77	24.31
National Park Service	--	--	--	--	--	--	--	--	8.49	9.46	8.49	9.46	8.49	9.46
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	17.51	13.49	17.51	13.49	--	--	0.29	0.32	0.29	0.32	17.79	13.49
Total	--	--	180.33	40.82	180.33	40.82	--	--	25.90	15.68	25.90	15.68	206.23	43.72
State and local government:														
Local	--	--	43.65	17.63	43.65	17.63	47.32	18.64	155.28	34.33	202.60	37.01	246.25	40.59
State	16.57	10.32	18.46	14.81	35.03	18.37	45.20	18.93	179.48	37.68	224.68	41.94	259.71	45.70
Other public	--	--	--	--	--	--	6.98	7.77	8.95	9.68	15.92	12.41	15.92	12.41
Total	16.57	10.32	62.11	23.02	78.68	25.46	99.49	27.55	343.71	49.25	443.20	53.80	521.88	58.23
Private:														
Corporate	52.00	21.08	219.72	41.14	271.71	46.17	--	--	--	--	--	--	271.71	46.17
Noncorporate private:														
Total, noncorporate private	155.18	31.48	1,118.43	92.89	1,273.62	97.63	--	--	--	--	--	--	1,273.62	97.63
All private	207.18	37.74	1,338.15	100.61	1,545.33	107.01	--	--	--	--	--	--	1,545.33	107.01
All owners	226.21	39.25	1,710.74	115.81	1,936.95	121.89	134.27	32.44	571.75	67.38	706.02	72.43	2,642.97	140.61

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C21: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: Central Valley

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal government:														
Bureau of Land Management	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	0.81	0.83	0.81	0.83	0.81	0.83
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	0.81	0.83	0.81	0.83	0.81	0.83
State and local government:														
Local	--	--	6.61	4.59	6.61	4.59	--	--	--	--	--	--	6.61	4.59
State	--	--	--	--	--	--	--	--	7.58	6.88	7.58	6.88	7.58	6.88
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	6.61	4.59	6.61	4.59	--	--	7.58	6.88	7.58	6.88	14.19	8.27
Private:														
Corporate	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Noncorporate private:														
Total, noncorporate private	0.11	0.12	119.51	30.72	119.63	30.72	--	--	--	--	--	--	119.63	30.72
All private	0.11	0.12	119.51	30.72	119.63	30.72	--	--	--	--	--	--	119.63	30.72
All owners	0.11	0.12	126.13	31.06	126.24	31.06	--	--	8.39	6.93	8.39	6.93	134.63	31.82

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C22: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: Eastside

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	734.39	75.59	1,623.37	144.90	2,357.76	161.30	46.16	18.01	134.19	40.77	180.35	44.39	2,538.11	167.12
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	734.39	75.59	1,623.37	144.90	2,357.76	161.30	46.16	18.01	134.19	40.77	180.35	44.39	2,538.11	167.12
Other federal government:														
Bureau of Land Management	45.52	22.47	1,050.70	129.99	1,096.23	131.78	--	--	88.72	30.17	88.72	30.17	1,184.94	134.09
Department of Defense and Energy	--	--	45.01	21.70	45.01	21.70	--	--	--	--	--	--	45.01	21.70
National Park Service	--	--	--	--	--	--	--	--	106.36	32.36	106.36	32.36	106.36	32.36
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	45.52	22.47	1,095.71	131.34	1,141.23	133.11	--	--	195.07	44.07	195.07	44.07	1,336.31	138.05
State and local government:														
Local	--	--	9.78	9.86	9.78	9.86	--	--	--	--	--	--	9.78	9.86
State	--	--	--	--	--	--	4.96	5.52	16.09	13.89	21.04	14.95	21.04	14.95
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	9.78	9.86	9.78	9.86	4.96	5.52	16.09	13.89	21.04	14.95	30.82	17.91
Private:														
Corporate	302.06	59.37	158.04	46.67	460.10	75.96	--	--	--	--	--	--	460.10	75.96
Noncorporate private:														
Total, noncorporate private	90.28	23.82	317.17	72.10	407.45	76.15	--	--	--	--	--	--	407.45	76.15
All private	392.34	63.60	475.21	85.55	867.55	106.97	--	--	--	--	--	--	867.55	106.97
All owners	1,172.26	101.79	3,204.06	213.84	4,376.32	235.35	51.12	18.84	345.34	61.62	396.46	64.32	4,772.78	242.55

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C23: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	2,315.23	111.80	557.16	68.75	2,872.40	127.86	1,266.02	85.76	379.68	57.87	1,645.69	100.54	4,518.09	157.87
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2,315.23	111.80	557.16	68.75	2,872.40	127.86	1,266.02	85.76	379.68	57.87	1,645.69	100.54	4,518.09	157.87
Other federal government:														
Bureau of Land Management	152.88	34.15	176.14	39.39	329.01	52.69	5.43	5.38	33.77	17.50	39.20	18.31	368.21	55.68
Department of Defense and Energy	--	--	--	--	--	--	--	--	8.02	8.30	8.02	8.30	8.02	8.30
National Park Service	--	--	--	--	--	--	74.95	24.14	56.28	21.50	131.23	32.84	131.23	32.84
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	11.55	8.59	11.55	8.59	--	--	1.74	1.92	1.74	1.92	13.28	8.80
Total	152.88	34.15	187.68	40.32	340.56	53.38	80.38	24.65	99.80	29.00	180.18	38.50	520.74	64.35
State and local government:														
Local	2.84	2.39	16.67	11.54	19.51	11.78	--	--	9.26	8.89	9.26	8.89	28.77	14.76
State	9.02	7.12	20.90	14.23	29.91	15.91	3.56	2.67	28.24	15.92	31.80	16.53	61.71	22.95
Other public	--	--	1.33	1.21	1.33	1.21	--	--	--	--	--	--	1.33	1.21
Total	11.86	7.51	38.89	18.35	50.75	19.83	3.56	2.67	37.50	18.23	41.06	18.77	91.81	27.21
Private:														
Corporate	984.99	87.57	380.03	58.21	1,365.03	104.58	--	--	--	--	--	--	1,365.03	104.58
Noncorporate private:														
Total, noncorporate private	863.33	81.04	1,535.65	110.64	2,398.98	135.80	--	--	--	--	--	--	2,398.98	135.80
All private	1,848.32	115.73	1,915.68	123.60	3,764.00	166.57	--	--	--	--	--	--	3,764.00	166.57
All owners	4,328.29	164.82	2,699.42	148.16	7,027.71	217.30	1,349.96	89.31	516.97	67.24	1,866.93	109.31	8,894.65	239.29

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C24: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: North Coast

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	23.60	12.55	9.99	9.59	33.59	15.80	12.42	9.40	--	--	12.42	9.40	46.01	18.38
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	23.60	12.55	9.99	9.59	33.59	15.80	12.42	9.40	--	--	12.42	9.40	46.01	18.38
Other federal government:														
Bureau of Land Management	39.46	17.32	--	--	39.46	17.32	80.98	26.17	--	--	80.98	26.17	120.43	31.70
Department of Defense and Energy	27.23	16.38	0.15	0.16	27.38	16.39	--	--	--	--	--	--	27.38	16.39
National Park Service	--	--	--	--	--	--	48.33	18.97	10.05	9.73	58.38	20.90	58.38	20.90
U.S. Fish and Wildlife Service	--	--	--	--	--	--	4.51	4.61	--	--	4.51	4.61	4.51	4.61
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	66.69	23.84	0.15	0.16	66.84	23.85	133.81	32.21	10.05	9.73	143.87	32.91	210.71	40.50
State and local government:														
Local	14.11	8.01	10.75	7.73	24.86	13.20	--	--	65.90	27.14	65.90	27.14	90.75	30.18
State	45.46	15.87	2.73	2.47	48.19	16.06	201.67	38.27	13.54	10.78	215.21	39.76	263.40	38.76
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	59.57	17.78	13.48	8.11	73.05	20.79	201.67	38.27	79.44	29.20	281.11	48.14	354.16	49.02
Private:														
Corporate	1,447.20	98.56	57.12	21.05	1,504.31	100.62	--	--	--	--	--	--	1,504.31	100.62
Noncorporate private:														
Total, noncorporate private	1,055.23	88.47	214.33	39.62	1,269.56	96.41	--	--	--	--	--	--	1,269.56	96.41
All private	2,502.43	124.36	271.45	44.63	2,773.87	130.88	--	--	--	--	--	--	2,773.87	130.88
All owners	2,652.28	127.96	295.06	46.35	2,947.35	135.04	347.90	50.87	89.49	30.78	437.40	59.04	3,384.75	145.16

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C25: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	4,520.03	145.08	1,345.14	121.74	5,865.17	179.55	890.62	67.21	784.37	82.46	1,674.99	100.62	7,540.16	202.22
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	4,520.03	145.08	1,345.14	121.74	5,865.17	179.55	890.62	67.21	784.37	82.46	1,674.99	100.62	7,540.16	202.22
Other federal government:														
Bureau of Land Management	101.21	28.50	417.38	64.94	518.59	70.46	3.74	3.20	148.81	38.57	152.55	38.71	671.14	78.94
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	613.81	49.86	297.91	52.71	911.72	70.58	911.72	70.58
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	28.76	15.28	28.76	15.28	--	--	2.73	2.83	2.73	2.83	31.49	15.54
Total	101.21	28.50	446.15	66.54	547.35	71.93	617.55	49.93	449.45	64.34	1,067.00	78.85	1,614.35	100.94
State and local government:														
Local	36.97	16.26	96.82	30.14	133.79	34.50	--	--	9.24	7.98	9.24	7.98	143.03	35.35
State	11.91	6.09	41.50	20.57	53.41	21.37	49.65	16.01	90.52	28.57	140.17	32.80	193.58	38.54
Other public	--	--	12.58	11.42	12.58	11.42	--	--	--	--	--	--	12.58	11.42
Total	48.88	17.36	150.90	38.19	199.78	42.07	49.65	16.01	99.76	29.67	149.41	33.76	349.19	53.40
Private:														
Corporate	2,037.80	129.16	466.02	63.46	2,503.82	142.87	--	--	--	--	--	--	2,503.82	142.87
Noncorporate private:														
Total, noncorporate private	860.37	75.17	3,100.76	160.46	3,961.13	174.57	--	--	--	--	--	--	3,961.13	174.57
All private	2,898.17	143.31	3,566.78	168.26	6,464.95	212.97	--	--	--	--	--	--	6,464.95	212.97
All owners	7,568.29	205.19	5,508.97	220.42	13,077.25	287.79	1,557.81	85.08	1,333.59	108.62	2,891.40	131.78	15,968.65	309.79

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C26: Aboveground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	156.06	34.55	545.02	67.70	701.08	76.07	141.86	34.58	232.85	46.97	374.71	57.34	1,075.80	94.73
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	156.06	34.55	545.02	67.70	701.08	76.07	141.86	34.58	232.85	46.97	374.71	57.34	1,075.80	94.73
Other federal government:														
Bureau of Land Management	--	--	41.35	18.45	41.35	18.45	--	--	46.49	21.07	46.49	21.07	87.84	27.96
Department of Defense and Energy	3.70	3.78	--	--	3.70	3.78	--	--	--	--	--	--	3.70	3.78
National Park Service	--	--	--	--	--	--	--	--	162.20	39.28	162.20	39.28	162.20	39.28
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	37.34	18.51	37.34	18.51	--	--	2.14	2.19	2.14	2.19	39.48	18.64
Total	3.70	3.78	78.69	26.14	82.39	26.41	--	--	210.83	44.43	210.83	44.43	293.22	51.60
State and local government:														
Local	--	--	28.29	14.40	28.29	14.40	--	--	4.38	4.30	4.38	4.30	32.66	14.95
State	--	--	--	--	--	--	10.52	8.65	73.28	26.61	83.80	27.88	83.80	27.88
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	28.29	14.40	28.29	14.40	10.52	8.65	77.65	26.95	88.18	28.21	116.46	31.60
Private:														
Corporate	2.33	2.29	74.76	27.79	77.08	27.88	--	--	--	--	--	--	77.08	27.88
Noncorporate private:														
Total, noncorporate private	22.75	13.93	327.15	51.98	349.90	54.26	--	--	--	--	--	--	349.90	54.26
All private	25.08	14.12	401.90	58.90	426.98	60.96	--	--	--	--	--	--	426.98	60.96
All owners	184.84	37.52	1,053.90	94.23	1,238.74	101.67	152.39	35.64	521.33	70.05	673.72	77.83	1,912.45	127.52

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C27.1: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, All California (10 year averages): 2001 - 2010

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	8,768.23	195.43	5,850.31	243.56	14,618.54	274.97	2,449.18	123.75	1,899.31	130.25	4,348.49	172.12	18,967.03	260.35
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	8,768.23	195.43	5,850.31	243.56	14,618.54	274.97	2,449.18	123.75	1,899.31	130.25	4,348.49	172.12	18,967.03	260.35
Other federal government:														
Bureau of Land Management	395.48	59.65	2,206.59	161.30	2,602.07	166.88	26.54	13.18	490.88	64.16	517.42	65.46	3,119.49	174.95
Department of Defense and Energy	9.73	10.69	119.69	33.47	129.42	35.14	--	--	--	--	--	--	129.42	35.14
National Park Service	--	--	--	--	--	--	765.61	59.97	762.16	84.29	1,527.77	96.39	1,527.77	96.39
U.S. Fish and Wildlife Service	--	--	--	--	--	--	6.01	7.39	6.10	6.20	12.11	9.65	12.11	9.65
Other federal	--	--	178.65	45.48	178.65	45.48	10.08	7.36	28.11	14.86	38.19	16.57	216.84	48.39
Total	405.21	60.60	2,504.93	169.49	2,910.14	174.73	808.25	61.77	1,287.25	104.28	2,095.50	114.05	5,005.63	197.73
State and local government:														
Local	47.68	19.80	185.54	40.73	233.23	45.56	38.64	17.55	325.08	55.90	363.73	58.30	596.95	73.63
State	105.77	28.80	80.75	29.07	186.52	40.78	395.47	57.98	492.71	69.08	888.18	88.69	1,074.71	95.30
Other public	--	--	14.45	12.54	14.45	12.54	10.62	9.52	21.44	15.78	32.06	18.43	46.51	22.29
Total	153.46	34.92	280.74	51.55	434.20	62.31	444.74	61.27	839.23	89.06	1,283.97	106.14	1,718.16	120.41
Private:														
Corporate	5,017.88	182.73	844.11	91.52	5,861.98	201.05	--	--	--	--	--	--	5,861.98	201.05
Noncorporate private:														
Total, noncorporate private	4,110.40	163.75	8,889.44	258.37	12,999.84	287.46	--	--	--	--	--	--	12,999.84	287.46
All private	9,128.28	197.91	9,733.54	264.07	18,861.82	290.26	--	--	--	--	--	--	18,861.82	290.26
All owners	18,455.17	282.49	18,369.52	395.73	36,824.69	429.03	3,702.17	149.75	4,025.79	187.08	7,727.96	228.78	44,552.65	426.38

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C27.2: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, All California (10 year averages): 2002 - 2011

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	8,780.29	197.53	5,655.69	243.96	14,435.98	278.48	2,462.18	124.66	1,879.78	129.65	4,341.96	172.31	18,777.94	265.42
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	8,780.29	197.53	5,655.69	243.96	14,435.98	278.48	2,462.18	124.66	1,879.78	129.65	4,341.96	172.31	18,777.94	265.42
Other federal government:														
Bureau of Land Management	393.59	59.58	2,164.17	159.39	2,557.76	165.18	26.39	13.16	482.93	63.72	509.33	65.03	3,067.08	173.30
Department of Defense and Energy	14.19	11.81	142.71	36.79	156.90	38.62	--	--	--	--	--	--	156.90	38.62
National Park Service	--	--	--	--	--	--	770.94	60.06	757.96	83.30	1,528.91	95.42	1,528.91	95.42
U.S. Fish and Wildlife Service	--	--	--	--	--	--	6.01	7.39	6.04	6.17	12.05	9.63	12.05	9.63
Other federal	--	--	178.32	45.50	178.32	45.50	10.02	7.33	27.86	14.79	37.89	16.50	216.21	48.38
Total	407.78	60.74	2,485.21	168.34	2,892.98	173.82	813.37	61.86	1,274.80	103.72	2,088.17	113.45	4,981.15	196.64
State and local government:														
Local	34.10	14.91	186.90	40.76	221.00	43.65	37.81	17.34	319.44	55.19	357.25	57.56	578.25	71.90
State	107.24	28.77	80.08	28.93	187.32	40.66	403.37	58.36	519.71	70.83	923.09	90.42	1,110.41	96.88
Other public	--	--	14.73	12.78	14.73	12.78	10.94	9.66	8.60	9.84	19.54	13.79	34.27	18.80
Total	141.35	32.37	281.70	51.57	423.05	60.94	452.13	61.60	847.75	89.31	1,299.87	106.59	1,722.93	120.26
Private:														
Corporate	4,961.94	185.25	1,000.81	99.25	5,962.75	206.46	--	--	--	--	--	--	5,962.75	206.46
Noncorporate private:														
Total, noncorporate private	4,036.63	162.19	8,620.22	255.49	12,656.86	285.20	--	--	--	--	--	--	12,656.86	285.20
All private	8,998.57	201.92	9,621.04	262.63	18,619.61	292.79	--	--	--	--	--	--	18,619.61	292.79
All owners	18,327.98	284.23	18,043.64	393.86	36,371.62	429.58	3,727.68	150.66	4,002.33	186.49	7,730.01	228.78	44,101.63	426.44

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C27.3: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, All California (10 year averages): 2003 - 2012

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	8,825.40	186.94	5,264.09	232.75	14,089.49	260.10	2,564.74	115.79	1,948.38	124.83	4,513.12	147.29	18,602.61	277.47
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	8,825.40	186.94	5,264.09	232.75	14,089.49	260.10	2,564.74	115.79	1,948.38	124.83	4,513.12	147.29	18,602.61	277.47
Other federal government:														
Bureau of Land Management	427.22	62.77	2,142.02	173.41	2,569.24	182.73	35.74	17.04	403.22	65.41	438.96	67.58	3,008.20	189.54
Department of Defense and Energy	22.20	14.91	126.72	35.33	148.92	38.34	--	--	8.75	9.06	8.75	9.06	157.67	39.40
National Park Service	--	--	--	--	--	--	787.80	60.78	719.44	85.32	1,507.24	101.50	1,507.24	101.50
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	205.89	48.89	205.89	48.89	3.88	4.10	32.69	17.16	36.58	17.64	242.47	51.96
Total	449.42	63.84	2,474.63	181.35	2,924.05	190.36	827.43	62.10	1,164.10	105.75	1,991.53	117.88	4,915.58	204.07
State and local government:														
Local	44.54	19.07	177.21	40.45	221.75	44.98	44.94	19.67	308.61	54.48	353.55	56.82	575.30	71.86
State	96.98	26.98	89.41	32.07	186.40	41.50	365.36	49.04	480.22	65.10	845.57	78.74	1,031.97	82.32
Other public	--	--	14.92	12.77	14.92	12.77	7.31	8.46	10.09	10.93	17.40	13.82	32.32	18.82
Total	141.52	32.88	281.54	53.16	423.06	62.42	417.61	52.57	798.91	81.39	1,216.52	92.84	1,639.59	104.26
Private:														
Corporate	5,079.77	187.27	1,022.21	100.72	6,101.98	208.76	--	--	--	--	--	--	6,101.98	208.76
Noncorporate private:														
Total, noncorporate private	4,014.93	162.48	8,465.24	258.08	12,480.17	286.70	--	--	--	--	--	--	12,480.17	286.70
All private	9,094.70	201.90	9,487.45	267.32	18,582.14	297.97	--	--	--	--	--	--	18,582.14	297.97
All owners	18,511.04	277.83	17,507.71	396.98	36,018.74	430.99	3,809.78	141.35	3,911.39	182.15	7,721.17	209.03	43,739.91	444.79

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C27.4: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, All California (10 year averages): 2004 - 2013

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	8,687.24	181.84	5,111.75	227.50	13,798.99	252.47	2,543.69	114.01	1,911.01	125.02	4,454.70	146.63	18,253.69	270.90
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	8,687.24	181.84	5,111.75	227.50	13,798.99	252.47	2,543.69	114.01	1,911.01	125.02	4,454.70	146.63	18,253.69	270.90
Other federal government:														
Bureau of Land Management	421.54	62.53	2,062.31	168.60	2,483.86	178.11	46.15	19.31	424.92	66.93	471.07	69.64	2,954.93	185.67
Department of Defense and Energy	22.20	14.91	127.97	35.58	150.17	38.57	--	--	8.75	9.06	8.75	9.06	158.92	39.62
National Park Service	--	--	--	--	--	--	793.88	61.32	695.80	84.02	1,489.68	100.68	1,489.68	100.68
U.S. Fish and Wildlife Service	--	--	--	--	--	--	5.01	5.13	0.93	0.94	5.94	5.21	5.94	5.21
Other federal	--	--	198.79	47.94	198.79	47.94	--	--	24.61	15.19	24.61	15.19	223.40	50.28
Total	443.74	63.61	2,389.08	176.54	2,832.82	185.75	845.04	63.40	1,155.00	105.41	2,000.05	118.26	4,832.87	199.86
State and local government:														
Local	45.24	19.20	184.02	40.68	229.26	45.25	56.18	22.06	307.05	53.82	363.23	56.38	592.49	71.70
State	96.93	26.96	89.37	32.06	186.30	41.47	355.22	47.92	477.33	65.79	832.54	78.62	1,018.84	82.20
Other public	--	--	16.45	12.84	16.45	12.84	7.91	8.81	10.09	10.93	18.00	14.04	34.44	19.02
Total	142.17	32.93	289.84	53.34	432.01	62.60	419.30	52.68	794.46	81.60	1,213.76	92.56	1,645.77	104.08
Private:														
Corporate	5,097.17	187.54	1,101.76	106.74	6,198.93	211.91	--	--	--	--	--	--	6,198.93	211.91
Noncorporate private:														
Total, noncorporate private	3,885.20	159.98	8,185.54	252.06	12,070.74	280.87	--	--	--	--	--	--	12,070.74	280.87
All private	8,982.38	201.18	9,287.30	263.24	18,269.68	294.73	--	--	--	--	--	--	18,269.68	294.73
All owners	18,255.54	274.35	17,077.96	389.23	35,333.50	422.93	3,808.04	140.55	3,860.47	182.31	7,668.51	208.93	43,002.01	437.33

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C27.5: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, All California (10 year averages): 2005 - 2014

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	8,690.17	179.54	4,990.09	224.83	13,680.26	248.69	2,594.41	115.67	1,858.55	124.88	4,452.97	147.29	18,133.23	269.15
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	8,690.17	179.54	4,990.09	224.83	13,680.26	248.69	2,594.41	115.67	1,858.55	124.88	4,452.97	147.29	18,133.23	269.15
Other federal government:														
Bureau of Land Management	403.96	61.17	1,986.92	161.73	2,390.88	171.23	59.44	21.87	385.23	64.08	444.67	67.69	2,835.54	178.57
Department of Defense and Energy	22.21	14.90	123.89	35.16	146.10	38.19	--	--	8.75	9.05	8.75	9.05	154.85	39.25
National Park Service	--	--	--	--	--	--	797.05	60.97	685.25	83.05	1,482.30	99.76	1,482.30	99.76
U.S. Fish and Wildlife Service	--	--	--	--	--	--	5.01	5.13	0.93	0.93	5.94	5.21	5.94	5.21
Other federal	--	--	198.22	47.84	198.22	47.84	--	--	24.61	15.18	24.61	15.18	222.84	50.19
Total	426.17	62.48	2,309.03	169.94	2,735.20	179.20	861.50	63.79	1,104.77	103.29	1,966.27	116.43	4,701.47	193.57
State and local government:														
Local	53.91	20.12	193.64	41.45	247.56	46.34	56.23	22.07	297.04	53.06	353.27	55.68	600.83	71.88
State	99.31	26.66	91.23	32.07	190.54	41.46	353.83	47.53	472.08	65.16	825.91	77.89	1,016.44	81.64
Other public	--	--	15.55	12.77	15.55	12.77	7.91	8.81	10.09	10.92	18.00	14.03	33.55	18.97
Total	153.22	33.23	300.42	53.92	453.64	63.36	417.97	52.33	779.20	80.81	1,197.17	91.71	1,650.82	103.96
Private:														
Corporate	5,108.90	187.23	1,203.78	110.66	6,312.68	213.54	--	--	--	--	--	--	6,312.68	213.54
Noncorporate private:														
Total, noncorporate private	3,796.86	158.19	8,017.13	249.97	11,813.99	278.80	--	--	--	--	--	--	11,813.99	278.80
All private	8,905.76	200.24	9,220.91	261.71	18,126.67	292.90	--	--	--	--	--	--	18,126.67	292.90
All owners	18,175.32	272.14	16,820.45	383.98	34,995.77	416.78	3,873.89	141.95	3,742.52	180.66	7,616.41	208.03	42,612.18	432.54

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C27.6: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, All California (10 year averages): 2006 - 2015

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	8,685.70	179.91	4,803.88	221.31	13,489.57	246.09	2,642.32	116.20	1,889.11	127.66	4,531.43	150.01	18,021.00	269.25
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	8,685.70	179.91	4,803.88	221.31	13,489.57	246.09	2,642.32	116.20	1,889.11	127.66	4,531.43	150.01	18,021.00	269.25
Other federal government:														
Bureau of Land Management	386.94	58.50	1,986.13	165.05	2,373.07	173.69	68.73	23.71	374.61	63.09	443.34	67.38	2,816.41	180.87
Department of Defense and Energy	22.21	14.90	123.56	34.99	145.77	38.03	--	--	8.91	9.22	8.91	9.22	154.68	39.13
National Park Service	--	--	--	--	--	--	788.79	59.51	691.32	83.40	1,480.11	99.39	1,480.11	99.39
U.S. Fish and Wildlife Service	--	--	--	--	--	--	5.01	5.13	0.93	0.93	5.94	5.21	5.94	5.21
Other federal	--	--	201.76	48.01	201.76	48.01	--	--	24.67	15.19	24.67	15.19	226.43	50.35
Total	409.16	59.86	2,311.45	173.21	2,720.61	181.65	862.52	62.88	1,100.44	102.89	1,962.97	115.58	4,683.57	195.48
State and local government:														
Local	52.47	20.07	209.32	43.66	261.79	48.26	51.76	20.40	287.17	52.35	338.93	54.36	600.72	72.12
State	95.82	23.62	87.10	31.65	182.92	39.23	353.98	47.56	462.87	64.44	816.85	77.34	999.77	80.04
Other public	--	--	15.50	12.76	15.50	12.76	7.75	8.63	10.09	10.92	17.84	13.92	33.34	18.88
Total	148.29	30.79	311.91	55.39	460.21	63.36	413.49	51.66	760.13	79.77	1,173.62	90.46	1,633.82	102.93
Private:														
Corporate	5,198.93	186.55	1,368.07	117.95	6,567.00	216.31	--	--	--	--	--	--	6,567.00	216.31
Noncorporate private:														
Total, noncorporate private	3,684.97	156.92	7,718.54	245.89	11,403.50	275.38	--	--	--	--	--	--	11,403.50	275.38
All private	8,883.90	199.99	9,086.60	259.37	17,970.50	290.99	--	--	--	--	--	--	17,970.50	290.99
All owners	18,127.05	271.21	16,513.84	382.34	34,640.89	415.05	3,918.33	141.71	3,749.68	182.06	7,668.01	209.12	42,308.90	432.45

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C27.7: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, All California (10 year averages): 2007 - 2016

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	8,656.09	178.64	4,657.28	215.51	13,313.37	242.28	2,659.13	115.71	1,928.99	129.67	4,588.12	151.53	17,901.49	266.74
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	8,656.09	178.64	4,657.28	215.51	13,313.37	242.28	2,659.13	115.71	1,928.99	129.67	4,588.12	151.53	17,901.49	266.74
Other federal government:														
Bureau of Land Management	366.72	57.15	1,988.59	167.05	2,355.31	175.06	100.53	29.94	379.36	63.62	479.90	70.30	2,835.21	183.02
Department of Defense and Energy	34.50	18.73	133.25	36.17	167.75	40.73	--	--	9.63	9.60	9.63	9.60	177.38	41.85
National Park Service	--	--	--	--	--	--	793.99	59.54	703.97	84.11	1,497.96	99.91	1,497.96	99.91
U.S. Fish and Wildlife Service	--	--	--	--	--	--	5.01	5.13	0.93	0.93	5.94	5.21	5.94	5.21
Other federal	--	--	170.73	41.77	170.73	41.77	--	--	24.91	15.22	24.91	15.22	195.64	44.45
Total	401.22	59.53	2,292.57	173.86	2,693.79	182.08	899.53	64.34	1,118.80	103.97	2,018.34	117.17	4,712.13	196.82
State and local government:														
Local	61.24	21.04	236.93	46.49	298.17	51.81	51.84	20.41	285.21	52.24	337.05	54.25	635.22	74.46
State	92.40	23.03	93.32	32.39	185.72	39.48	348.31	46.15	467.11	64.68	815.42	76.85	1,001.14	79.66
Other public	--	--	15.48	12.76	15.48	12.76	7.75	8.63	9.93	10.75	17.68	13.79	33.16	18.79
Total	153.64	31.00	345.73	58.00	499.37	66.19	407.91	50.38	762.25	79.92	1,170.15	90.02	1,669.52	104.27
Private:														
Corporate	5,306.18	188.43	1,437.98	120.23	6,744.15	218.50	--	--	--	--	--	--	6,744.15	218.50
Noncorporate private:														
Total, noncorporate private	3,484.82	151.98	7,579.44	242.81	11,064.26	270.99	--	--	--	--	--	--	11,064.26	270.99
All private	8,791.00	199.36	9,017.42	257.34	17,808.42	289.15	--	--	--	--	--	--	17,808.42	289.15
All owners	18,001.95	270.00	16,313.00	377.92	34,314.95	411.76	3,966.57	141.46	3,810.04	184.15	7,776.61	210.90	42,091.56	430.01

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C27.8: Aboveground and Belowground Carbon, Dry Weight of Live Understory Vegetation by Owner Group and Forest Land Status, All California (10 year averages): 2008 - 2017

*information combined from Table C19 and Table C28

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	8,613.08	177.29	4,678.70	215.61	13,291.78	241.39	2,657.61	114.39	1,925.81	129.49	4,583.42	150.68	17,875.20	265.25
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	8,613.08	177.29	4,678.70	215.61	13,291.78	241.39	2,657.61	114.39	1,925.81	129.49	4,583.42	150.68	17,875.20	265.25
Other federal government:														
Bureau of Land Management	376.73	58.11	1,970.70	165.68	2,347.43	173.97	100.16	29.90	372.12	63.06	472.28	69.78	2,819.72	182.12
Department of Defense and Energy	34.37	18.68	133.25	36.13	167.61	40.68	--	--	8.91	9.22	8.91	9.22	176.52	41.71
National Park Service	--	--	--	--	--	--	818.99	61.79	712.54	84.18	1,531.53	101.07	1,531.53	101.07
U.S. Fish and Wildlife Service	--	--	--	--	--	--	5.01	5.12	0.90	0.92	5.91	5.21	5.91	5.21
Other federal	--	--	105.73	32.04	105.73	32.04	--	--	7.66	4.52	7.66	4.52	113.39	32.36
Total	411.10	60.44	2,209.68	170.58	2,620.78	179.17	924.16	66.40	1,102.13	102.73	2,026.29	117.20	4,647.07	194.34
State and local government:														
Local	59.91	20.31	236.17	46.24	296.09	51.30	52.57	20.71	271.17	50.35	323.75	52.65	619.84	73.01
State	92.18	22.97	92.87	32.29	185.05	39.37	350.62	46.06	454.13	63.45	804.75	75.99	989.81	78.74
Other public	--	--	15.46	12.76	15.46	12.76	7.75	8.63	9.94	10.76	17.69	13.79	33.15	18.79
Total	152.09	30.47	344.50	57.75	496.60	65.72	410.94	50.39	735.25	78.08	1,146.20	88.60	1,642.79	102.87
Private:														
Corporate	5,362.64	188.06	1,506.31	122.40	6,868.95	219.08	--	--	--	--	--	--	6,868.95	219.08
Noncorporate private:														
Total, noncorporate private	3,385.84	150.89	7,481.11	239.16	10,866.96	267.44	--	--	--	--	--	--	10,866.96	267.44
All private	8,748.48	198.95	8,987.43	254.67	17,735.91	286.71	--	--	--	--	--	--	17,735.91	286.71
All owners	17,924.76	268.88	16,220.31	374.71	34,145.07	408.34	3,992.72	141.34	3,763.19	182.53	7,755.91	209.70	41,900.98	426.29

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C28: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: All California

*information combined with information from Table C19 in Table C27.8

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	861.31	17.73	467.87	21.56	1,329.18	24.14	265.76	11.44	192.58	12.95	458.34	15.07	1,787.52	26.53
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	861.31	17.73	467.87	21.56	1,329.18	24.14	265.76	11.44	192.58	12.95	458.34	15.07	1,787.52	26.53
Other federal government:														
Bureau of Land Management	37.67	5.81	197.07	16.57	234.74	17.40	10.02	2.99	37.21	6.31	47.23	6.98	281.97	18.21
Department of Defense and Energy	3.44	1.87	13.32	3.61	16.76	4.07	--	--	0.89	0.92	0.89	0.92	17.65	4.17
National Park Service	--	--	--	--	--	--	81.90	6.18	71.25	8.42	153.15	10.11	153.15	10.11
U.S. Fish and Wildlife Service	--	--	--	--	--	--	0.50	0.51	0.09	0.09	0.59	0.52	0.59	0.52
Other federal	--	--	10.57	3.20	10.57	3.20	--	--	0.77	0.45	0.77	0.45	11.34	3.24
Total	41.11	6.04	220.97	17.06	262.08	17.92	92.42	6.64	110.21	10.27	202.63	11.72	464.71	19.43
State and local government:														
Local	5.99	2.03	23.62	4.62	29.61	5.13	5.26	2.07	27.12	5.04	32.37	5.27	61.98	7.30
State	9.22	2.30	9.29	3.23	18.51	3.94	35.06	4.61	45.41	6.35	80.48	7.60	98.98	7.87
Other public	--	--	1.55	1.28	1.55	1.28	0.78	0.86	0.99	1.08	1.77	1.38	3.32	1.88
Total	15.21	3.05	34.45	5.77	49.66	6.57	41.09	5.04	73.53	7.81	114.62	8.86	164.28	10.29
Private:														
Corporate	536.26	18.81	150.63	12.24	686.90	21.91	--	--	--	--	--	--	686.90	21.91
Noncorporate private:														
Total, noncorporate private	338.58	15.09	748.11	23.92	1,086.70	26.74	--	--	--	--	--	--	1,086.70	26.74
All private	874.85	19.89	898.74	25.47	1,773.59	28.67	--	--	--	--	--	--	1,773.59	28.67
All owners	1,792.48	26.89	1,622.03	37.47	3,414.51	40.83	399.27	14.13	376.32	18.25	775.59	20.97	4,190.10	42.63

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C29: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	0.27	0.25	14.46	3.69	14.73	3.70	3.86	1.90	22.46	4.85	26.32	5.16	41.06	6.35
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	0.27	0.25	14.46	3.69	14.73	3.70	3.86	1.90	22.46	4.85	26.32	5.16	41.06	6.35
Other federal government:														
Bureau of Land Management	--	--	9.78	3.36	9.78	3.36	--	--	1.90	1.39	1.90	1.39	11.69	3.63
Department of Defense and Energy	--	--	8.31	2.70	8.31	2.70	--	--	--	--	--	--	8.31	2.70
National Park Service	--	--	--	--	--	--	--	--	0.94	1.05	0.94	1.05	0.94	1.05
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	1.95	1.50	1.95	1.50	--	--	0.03	0.04	0.03	0.04	1.98	1.50
Total	--	--	20.04	4.54	20.04	4.54	--	--	2.88	1.74	2.88	1.74	22.91	4.86
State and local government:														
Local	--	--	4.85	1.96	4.85	1.96	5.26	2.07	17.25	3.81	22.51	4.11	27.36	4.51
State	1.84	1.15	2.05	1.65	3.89	2.04	5.02	2.10	19.94	4.19	24.96	4.66	28.86	5.08
Other public	--	--	--	--	--	--	0.78	0.86	0.99	1.08	1.77	1.38	1.77	1.38
Total	1.84	1.15	6.90	2.56	8.74	2.83	11.05	3.06	38.19	5.47	49.24	5.98	57.99	6.47
Private:														
Corporate	5.78	2.34	24.41	4.57	30.19	5.13	--	--	--	--	--	--	30.19	5.13
Noncorporate private:														
Total, noncorporate private	17.24	3.50	124.27	10.32	141.51	10.85	--	--	--	--	--	--	141.51	10.85
All private	23.02	4.19	148.68	11.18	171.70	11.89	--	--	--	--	--	--	171.70	11.89
All owners	25.13	4.36	190.08	12.87	215.22	13.54	14.92	3.60	63.53	7.49	78.45	8.05	293.66	15.62

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C30: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: Central Valley

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal government:														
Bureau of Land Management	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	0.09	0.09	0.09	0.09	0.09	0.09
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	0.09	0.09	0.09	0.09	0.09	0.09
State and local government:														
Local	--	--	0.73	0.51	0.73	0.51	--	--	--	--	--	--	0.73	0.51
State	--	--	--	--	--	--	--	--	0.84	0.76	0.84	0.76	0.84	0.76
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	0.73	0.51	0.73	0.51	--	--	0.84	0.76	0.84	0.76	1.58	0.92
Private:														
Corporate	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Noncorporate private:														
Total, noncorporate private	0.01	0.01	13.28	3.41	13.29	3.41	--	--	--	--	--	--	13.29	3.41
All private	0.01	0.01	13.28	3.41	13.29	3.41	--	--	--	--	--	--	13.29	3.41
All owners	0.01	0.01	14.01	3.45	14.03	3.45	--	--	0.93	0.77	0.93	0.77	14.96	3.54

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C31: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: Eastside

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	81.60	8.40	180.37	16.10	261.97	17.92	5.13	2.00	14.91	4.53	20.04	4.93	282.01	18.57
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	81.60	8.40	180.37	16.10	261.97	17.92	5.13	2.00	14.91	4.53	20.04	4.93	282.01	18.57
Other federal government:														
Bureau of Land Management	5.06	2.50	116.74	14.44	121.80	14.64	--	--	9.86	3.35	9.86	3.35	131.66	14.90
Department of Defense and Energy	--	--	5.00	2.41	5.00	2.41	--	--	--	--	--	--	5.00	2.41
National Park Service	--	--	--	--	--	--	--	--	11.82	3.60	11.82	3.60	11.82	3.60
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	5.06	2.50	121.75	14.59	126.80	14.79	--	--	21.67	4.90	21.67	4.90	148.48	15.34
State and local government:														
Local	--	--	1.09	1.10	1.09	1.10	--	--	--	--	--	--	1.09	1.10
State	--	--	--	--	--	--	0.55	0.61	1.79	1.54	2.34	1.66	2.34	1.66
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	1.09	1.10	1.09	1.10	0.55	0.61	1.79	1.54	2.34	1.66	3.42	1.99
Private:														
Corporate	33.56	6.60	17.56	5.19	51.12	8.44	--	--	--	--	--	--	51.12	8.44
Noncorporate private:														
Total, noncorporate private	10.03	2.65	35.24	8.01	45.27	8.46	--	--	--	--	--	--	45.27	8.46
All private	43.59	7.07	52.80	9.51	96.39	11.89	--	--	--	--	--	--	96.39	11.89
All owners	130.25	11.31	356.01	23.76	486.26	26.15	5.68	2.09	38.37	6.85	44.05	7.15	530.31	26.95

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C32: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	257.25	12.42	61.91	7.64	319.16	14.21	140.67	9.53	42.19	6.43	182.85	11.17	502.01	17.54
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	257.25	12.42	61.91	7.64	319.16	14.21	140.67	9.53	42.19	6.43	182.85	11.17	502.01	17.54
Other federal government:														
Bureau of Land Management	16.99	3.79	19.57	4.38	36.56	5.85	0.60	0.60	3.75	1.94	4.36	2.03	40.91	6.19
Department of Defense and Energy	--	--	--	--	--	--	--	--	0.89	0.92	0.89	0.92	0.89	0.92
National Park Service	--	--	--	--	--	--	8.33	2.68	6.25	2.39	14.58	3.65	14.58	3.65
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	1.28	0.95	1.28	0.95	--	--	0.19	0.21	0.19	0.21	1.48	0.98
Total	16.99	3.79	20.85	4.48	37.84	5.93	8.93	2.74	11.09	3.22	20.02	4.28	57.86	7.15
State and local government:														
Local	0.32	0.27	1.85	1.28	2.17	1.31	--	--	1.03	0.99	1.03	0.99	3.20	1.64
State	1.00	0.79	2.32	1.58	3.32	1.77	0.40	0.30	3.14	1.77	3.53	1.84	6.86	2.55
Other public	--	--	0.15	0.13	0.15	0.13	--	--	--	--	--	--	0.15	0.13
Total	1.32	0.83	4.32	2.04	5.64	2.20	0.40	0.30	4.17	2.03	4.56	2.09	10.20	3.02
Private:														
Corporate	109.44	9.73	42.23	6.47	151.67	11.62	--	--	--	--	--	--	151.67	11.62
Noncorporate private:														
Total, noncorporate private	95.93	9.00	170.63	12.29	266.55	15.09	--	--	--	--	--	--	266.55	15.09
All private	205.37	12.86	212.85	13.73	418.22	18.51	--	--	--	--	--	--	418.22	18.51
All owners	480.92	18.31	299.94	16.46	780.86	24.14	150.00	9.92	57.44	7.47	207.44	12.15	988.29	26.59

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C33: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: North Coast

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	2.62	1.39	1.11	1.07	3.73	1.76	1.38	1.04	--	--	1.38	1.04	5.11	2.04
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2.62	1.39	1.11	1.07	3.73	1.76	1.38	1.04	--	--	1.38	1.04	5.11	2.04
Other federal government:														
Bureau of Land Management	4.38	1.92	--	--	4.38	1.92	9.00	2.91	--	--	9.00	2.91	13.38	3.52
Department of Defense and Energy	3.03	1.82	0.02	0.02	3.04	1.82	--	--	--	--	--	--	3.04	1.82
National Park Service	--	--	--	--	--	--	5.37	2.11	1.12	1.08	6.49	2.32	6.49	2.32
U.S. Fish and Wildlife Service	--	--	--	--	--	--	0.50	0.51	--	--	0.50	0.51	0.50	0.51
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	7.41	2.65	0.02	0.02	7.43	2.65	14.87	3.58	1.12	1.08	15.99	3.66	23.41	4.50
State and local government:														
Local	1.57	0.89	1.19	0.86	2.76	1.47	--	--	7.32	3.02	7.32	3.02	10.08	3.35
State	5.05	1.76	0.30	0.27	5.35	1.78	22.41	4.25	1.50	1.20	23.91	4.42	29.27	4.31
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	6.62	1.98	1.50	0.90	8.12	2.31	22.41	4.25	8.83	3.24	31.23	5.35	39.35	5.45
Private:														
Corporate	160.80	10.95	6.35	2.34	167.15	11.18	--	--	--	--	--	--	167.15	11.18
Noncorporate private:														
Total, noncorporate private	117.25	9.83	23.81	4.40	141.06	10.71	--	--	--	--	--	--	141.06	10.71
All private	278.05	13.82	30.16	4.96	308.21	14.54	--	--	--	--	--	--	308.21	14.54
All owners	294.70	14.22	32.78	5.15	327.48	15.00	38.66	5.65	9.94	3.42	48.60	6.56	376.08	16.13

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C34: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	502.23	16.12	149.46	13.53	651.69	19.95	98.96	7.47	87.15	9.16	186.11	11.18	837.79	22.47
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	502.23	16.12	149.46	13.53	651.69	19.95	98.96	7.47	87.15	9.16	186.11	11.18	837.79	22.47
Other federal government:														
Bureau of Land Management	11.25	3.17	46.38	7.22	57.62	7.83	0.42	0.36	16.53	4.29	16.95	4.30	74.57	8.77
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	68.20	5.54	33.10	5.86	101.30	7.84	101.30	7.84
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	3.20	1.70	3.20	1.70	--	--	0.30	0.31	0.30	0.31	3.50	1.73
Total	11.25	3.17	49.57	7.39	60.82	7.99	68.62	5.55	49.94	7.15	118.56	8.76	179.37	11.22
State and local government:														
Local	4.11	1.81	10.76	3.35	14.87	3.83	--	--	1.03	0.89	1.03	0.89	15.89	3.93
State	1.32	0.68	4.61	2.29	5.93	2.37	5.52	1.78	10.06	3.17	15.57	3.64	21.51	4.28
Other public	--	--	1.40	1.27	1.40	1.27	--	--	--	--	--	--	1.40	1.27
Total	5.43	1.93	16.77	4.24	22.20	4.67	5.52	1.78	11.08	3.30	16.60	3.75	38.80	5.93
Private:														
Corporate	226.42	14.35	51.78	7.05	278.20	15.87	--	--	--	--	--	--	278.20	15.87
Noncorporate private:														
Total, noncorporate private	95.60	8.35	344.53	17.83	440.13	19.40	--	--	--	--	--	--	440.13	19.40
All private	322.02	15.92	396.31	18.70	718.33	23.66	--	--	--	--	--	--	718.33	23.66
All owners	840.92	22.80	612.11	24.49	1,453.03	31.98	173.09	9.45	148.18	12.07	321.27	14.64	1,774.29	34.42

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C35: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	17.34	3.84	60.56	7.52	77.90	8.45	15.76	3.84	25.87	5.22	41.63	6.37	119.53	10.53
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	17.34	3.84	60.56	7.52	77.90	8.45	15.76	3.84	25.87	5.22	41.63	6.37	119.53	10.53
Other federal government:														
Bureau of Land Management	--	--	4.59	2.05	4.59	2.05	--	--	5.17	2.34	5.17	2.34	9.76	3.11
Department of Defense and Energy	0.41	0.42	--	--	0.41	0.42	--	--	--	--	--	--	0.41	0.42
National Park Service	--	--	--	--	--	--	--	--	18.02	4.36	18.02	4.36	18.02	4.36
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	4.15	2.06	4.15	2.06	--	--	0.24	0.24	0.24	0.24	4.39	2.07
Total	0.41	0.42	8.74	2.90	9.15	2.93	--	--	23.43	4.94	23.43	4.94	32.58	5.73
State and local government:														
Local	--	--	3.14	1.60	3.14	1.60	--	--	0.49	0.48	0.49	0.48	3.63	1.66
State	--	--	--	--	--	--	1.17	0.96	8.14	2.96	9.31	3.10	9.31	3.10
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	3.14	1.60	3.14	1.60	1.17	0.96	8.63	2.99	9.80	3.13	12.94	3.51
Private:														
Corporate	0.26	0.25	8.31	3.09	8.56	3.10	--	--	--	--	--	--	8.56	3.10
Noncorporate private:														
Total, noncorporate private	2.53	1.55	36.35	5.78	38.88	6.03	--	--	--	--	--	--	38.88	6.03
All private	2.79	1.57	44.66	6.54	47.44	6.77	--	--	--	--	--	--	47.44	6.77
All owners	20.54	4.17	117.10	10.47	137.64	11.30	16.93	3.96	57.93	7.78	74.86	8.65	212.49	14.17

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C36: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: All California

*information combined with information from Table C45 in Table C44.8

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	72,933	1,563	5,020	413	77,953	1,528	24,374	1,135	3,386	333	27,760	1,131	105,713	1,723
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	72,933	1,563	5,020	413	77,953	1,528	24,374	1,135	3,386	333	27,760	1,131	105,713	1,723
Other federal government:														
Bureau of Land Management	2,168	447	1,210	177	3,378	478	692	228	272	66	964	237	4,342	528
Department of Defense and Energy	56	40	165	57	221	69	--	--	24	25	24	25	244	74
National Park Service	--	--	--	--	--	--	10,747	1,006	1,368	244	12,115	1,022	12,115	1,022
U.S. Fish and Wildlife Service	--	--	--	--	--	--	5	5	3	3	8	6	8	6
Other federal	--	--	69	27	69	27	--	--	12	10	12	10	81	29
Total	2,224	448	1,444	187	3,668	483	11,443	1,019	1,679	252	13,122	1,033	16,790	1,072
State and local government:														
Local	623	224	420	109	1,042	249	718	289	581	135	1,299	312	2,341	398
State	1,439	383	145	84	1,584	385	5,652	1,200	858	224	6,510	1,214	8,094	1,135
Other public	--	--	5	4	5	4	69	77	8	9	77	77	82	77
Total	2,062	442	569	137	2,631	457	6,439	1,231	1,447	258	7,886	1,247	10,518	1,188
Private:														
Corporate	31,241	1,193	2,561	270	33,802	1,212	--	--	--	--	--	--	33,802	1,212
Noncorporate private:														
Total, noncorporate private	25,893	1,330	10,708	462	36,601	1,360	--	--	--	--	--	--	36,601	1,360
All private	57,134	1,447	13,269	518	70,403	1,432	--	--	--	--	--	--	70,403	1,432
All owners	134,353	2,171	20,301	699	154,654	2,135	42,256	1,958	6,512	490	48,769	1,972	203,423	2,612

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C37: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	1	1	126	62	127	62	605	396	356	123	961	418	1,088	423
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1	1	126	62	127	62	605	396	356	123	961	418	1,088	423
Other federal government:														
Bureau of Land Management	--	--	30	12	30	12	--	--	3	2	3	2	32	12
Department of Defense and Energy	--	--	142	56	142	56	--	--	--	--	--	--	142	56
National Park Service	--	--	--	--	--	--	--	--	37	41	37	41	37	41
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	8	9	8	9	--	--	--	--	--	--	8	9
Total	--	--	180	57	180	57	--	--	40	41	40	41	219	70
State and local government:														
Local	--	--	127	61	127	61	718	289	433	119	1,151	305	1,278	311
State	279	184	17	11	297	187	992	441	359	93	1,352	451	1,648	483
Other public	--	--	--	--	--	--	69	77	8	9	77	77	77	77
Total	279	184	144	62	423	197	1,779	530	801	148	2,580	543	3,003	567
Private:														
Corporate	515	221	630	149	1,145	266	--	--	--	--	--	--	1,145	266
Noncorporate private:														
Total, noncorporate private	2,650	563	2,102	213	4,752	599	--	--	--	--	--	--	4,752	599
All private	3,164	602	2,732	258	5,897	652	--	--	--	--	--	--	5,897	652
All owners	3,445	634	3,182	278	6,627	689	2,384	662	1,196	195	3,580	686	10,207	974

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C38: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: Central Valley

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal government:														
Bureau of Land Management	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	3	3	3	3	3	3
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	3	3	3	3	3	3
State and local government:														
Local	--	--	16	14	16	14	--	--	--	--	--	--	16	14
State	--	--	--	--	--	--	--	--	27	27	27	27	27	27
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	16	14	16	14	--	--	27	27	27	27	42	31
Private:														
Corporate	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Noncorporate private:														
Total, noncorporate private	--	--	196	71	196	71	--	--	--	--	--	--	196	71
All private	--	--	196	71	196	71	--	--	--	--	--	--	196	71
All owners	--	--	212	72	212	72	--	--	29	27	29	27	241	77

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C39: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: Eastside

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	2,488	276	851	114	3,339	298	317	141	289	100	606	172	3,945	344
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2,488	276	851	114	3,339	298	317	141	289	100	606	172	3,945	344
Other federal government:														
Bureau of Land Management	84	40	334	50	417	64	--	--	71	29	71	29	489	69
Department of Defense and Energy	--	--	23	13	23	13	--	--	--	--	--	--	23	13
National Park Service	--	--	--	--	--	--	--	--	77	29	77	29	77	29
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	84	40	356	52	440	65	--	--	149	41	149	41	589	75
State and local government:														
Local	--	--	12	12	12	12	--	--	--	--	--	--	12	12
State	--	--	--	--	--	--	28	31	8	7	36	32	36	32
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	12	12	12	12	28	31	8	7	36	32	48	34
Private:														
Corporate	513	112	49	18	562	113	--	--	--	--	--	--	562	113
Noncorporate private:														
Total, noncorporate private	284	89	99	28	382	93	--	--	--	--	--	--	382	93
All private	797	142	147	33	944	146	--	--	--	--	--	--	944	146
All owners	3,369	315	1,366	131	4,735	341	345	144	446	108	792	180	5,526	385

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C40: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	27,154	1,405	1,673	290	28,827	1,420	12,532	851	826	180	13,358	863	42,185	1,620
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	27,154	1,405	1,673	290	28,827	1,420	12,532	851	826	180	13,358	863	42,185	1,620
Other federal government:														
Bureau of Land Management	1,067	272	433	124	1,500	300	97	96	76	48	173	107	1,673	318
Department of Defense and Energy	--	--	--	--	--	--	--	--	24	25	24	25	24	25
National Park Service	--	--	--	--	--	--	1,585	693	120	64	1,705	696	1,705	696
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	7	4	7	4	--	--	3	3	3	3	9	5
Total	1,067	272	440	124	1,507	300	1,682	698	223	84	1,905	703	3,412	758
State and local government:														
Local	99	83	28	19	127	85	--	--	21	21	21	21	147	88
State	102	62	11	10	114	63	115	101	88	57	203	128	317	143
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	201	104	40	22	241	106	115	101	109	61	224	130	465	168
Private:														
Corporate	5,785	554	781	143	6,566	574	--	--	--	--	--	--	6,566	574
Noncorporate private:														
Total, noncorporate private	6,898	744	2,990	265	9,888	787	--	--	--	--	--	--	9,888	787
All private	12,683	902	3,772	299	16,454	947	--	--	--	--	--	--	16,454	947
All owners	41,105	1,702	5,924	437	47,029	1,742	14,329	1,104	1,158	208	15,487	1,120	62,516	2,031

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C41: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: North Coast

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	301	197	9	9	310	197	460	354	--	--	460	354	769	405
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	301	197	9	9	310	197	460	354	--	--	460	354	769	405
Other federal government:														
Bureau of Land Management	529	311	--	--	529	311	535	200	--	--	535	200	1,064	370
Department of Defense and Energy	56	40	--	--	56	40	--	--	--	--	--	--	56	40
National Park Service	--	--	--	--	--	--	1,075	469	25	19	1,100	469	1,100	469
U.S. Fish and Wildlife Service	--	--	--	--	--	--	5	5	--	--	5	5	5	5
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	585	314	--	--	585	314	1,615	506	25	19	1,640	506	2,224	591
State and local government:														
Local	243	166	4	4	247	166	--	--	127	61	127	61	374	177
State	821	310	1	1	822	310	3,804	1,201	204	189	4,008	1,216	4,830	1,191
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1,064	352	5	4	1,069	352	3,804	1,201	331	198	4,135	1,217	5,204	1,204
Private:														
Corporate	12,995	1,004	198	75	13,193	1,006	--	--	--	--	--	--	13,193	1,006
Noncorporate private:														
Total, noncorporate private	10,149	955	792	178	10,940	969	--	--	--	--	--	--	10,940	969
All private	23,144	1,306	990	192	24,134	1,315	--	--	--	--	--	--	24,134	1,315
All owners	25,093	1,398	1,004	193	26,097	1,406	5,879	1,350	356	199	6,234	1,365	32,331	1,911

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C42: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	42,490	1,440	1,889	262	44,379	1,436	10,067	833	1,613	233	11,681	843	56,059	1,616
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	42,490	1,440	1,889	262	44,379	1,436	10,067	833	1,613	233	11,681	843	56,059	1,616
Other federal government:														
Bureau of Land Management	489	178	406	119	894	214	60	54	115	36	175	64	1,069	222
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	8,087	690	1,077	230	9,164	714	9,164	714
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	35	20	35	20	--	--	9	10	9	10	45	22
Total	489	178	441	120	930	215	8,147	692	1,201	233	9,348	715	10,278	732
State and local government:														
Local	281	125	205	84	486	153	--	--	--	--	--	--	486	153
State	237	148	115	83	352	167	689	288	143	53	833	291	1,185	322
Other public	--	--	5	4	5	4	--	--	--	--	--	--	5	4
Total	518	193	325	118	843	226	689	288	143	53	833	291	1,675	356
Private:														
Corporate	11,401	733	877	159	12,278	746	--	--	--	--	--	--	12,278	746
Noncorporate private:														
Total, noncorporate private	5,865	522	4,084	282	9,949	582	--	--	--	--	--	--	9,949	582
All private	17,265	848	4,962	317	22,227	876	--	--	--	--	--	--	22,227	876
All owners	60,762	1,674	7,616	442	68,378	1,687	18,903	1,120	2,958	333	21,861	1,142	90,239	1,948

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C43: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	498	139	473	89	971	166	393	116	302	92	694	147	1,665	221
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	498	139	473	89	971	166	393	116	302	92	694	147	1,665	221
Other federal government:														
Bureau of Land Management	--	--	8	5	8	5	--	--	7	4	7	4	14	7
Department of Defense and Energy		1	--	--		1	--	--	--	--	--	--		1
National Park Service	--	--	--	--	--	--	--	--	32	12	32	12	32	12
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	19	16	19	16	--	--					20	16
Total		1	27	16	27	16	--	--	39	13	39	13	66	21
State and local government:														
Local	--	--	28	18	28	18	--	--	1	1	1	1	29	18
State	--	--	--	--	--	--	23	30	28	15	51	33	51	33
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	28	18	28	18	23	30	28	15	52	33	80	38
Private:														
Corporate	32	32	26	14	58	35	--	--	--	--	--	--	58	35
Noncorporate private:														
Total, noncorporate private	49	38	445	127	493	135	--	--	--	--	--	--	493	135
All private	81	50	470	128	551	139	--	--	--	--	--	--	551	139
All owners	580	148	998	158	1,577	218	416	120	369	94	785	151	2,362	265

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C44.1: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) and Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2001 - 2010

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	79,305	1,859	6,619	459	85,924	1,851	26,253	1,437	3,861	364	30,114	1,465	116,038	1,805
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	79,305	1,859	6,619	459	85,924	1,851	26,253	1,437	3,861	364	30,114	1,465	116,038	1,805
Other federal government:														
Bureau of Land Management	2,199	386	1,309	177	3,508	420	244	123	315	58	559	136	4,067	436
Department of Defense and Energy	26	28	158	53	184	60	--	--	--	--	--	--	184	60
National Park Service	--	--	--	--	--	--	11,895	1,186	1,423	237	13,318	1,170	13,318	1,170
U.S. Fish and Wildlife Service	--	--	--	--	--	--	13	16			13	16	13	16
Other federal	--	--	118	57	118	57	274	197	76	62	350	206	469	214
Total	2,225	387	1,585	192	3,810	425	12,426	1,203	1,814	249	14,240	1,185	18,050	1,231
State and local government:														
Local	329	158	410	119	739	199	539	249	741	162	1,280	296	2,019	356
State	1,334	399	118	60	1,453	403	6,315	1,415	1,078	255	7,393	1,436	8,846	1,450
Other public	--	--	5	4	5	4	95	85	9	9	104	86	109	86
Total	1,663	428	533	133	2,196	449	6,950	1,438	1,828	300	8,778	1,466	10,974	1,491
Private:														
Corporate	28,810	1,174	1,381	183	30,191	1,183	--	--	--	--	--	--	30,191	1,183
Noncorporate private:														
Total, noncorporate private	28,341	1,358	12,639	512	40,981	1,402	--	--	--	--	--	--	40,981	1,402
All private	57,151	1,472	14,020	532	71,172	1,474	--	--	--	--	--	--	71,172	1,474
All owners	140,344	2,409	22,758	735	163,102	2,405	45,628	2,267	7,503	533	53,132	2,291	216,234	2,775

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C44.2: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) and Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2002 - 2011

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	80,880	1,892	6,536	463	87,417	1,885	26,669	1,461	3,964	374	30,633	1,490	118,049	1,842
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	80,880	1,892	6,536	463	87,417	1,885	26,669	1,461	3,964	374	30,633	1,490	118,049	1,842
Other federal government:														
Bureau of Land Management	2,203	388	1,279	175	3,482	422	252	130	312	57	564	142	4,046	441
Department of Defense and Energy	28	30	166	53	194	61	--	--	--	--	--	--	194	61
National Park Service	--	--	--	--	--	--	12,119	1,199	1,442	239	13,561	1,182	13,561	1,182
U.S. Fish and Wildlife Service	--	--	--	--	--	--	13	16			13	16	13	16
Other federal	--	--	117	57	117	57	273	197	76	63	349	206	467	214
Total	2,231	389	1,563	190	3,794	428	12,657	1,216	1,831	251	14,488	1,198	18,282	1,244
State and local government:														
Local	300	152	419	121	719	196	549	254	750	164	1,298	302	2,017	359
State	1,332	397	139	79	1,470	405	6,416	1,421	1,130	260	7,545	1,442	9,016	1,457
Other public	--	--	5	4	5	4	98	87	7	8	106	87	110	87
Total	1,632	425	562	144	2,194	449	7,063	1,445	1,887	306	8,949	1,473	11,143	1,499
Private:														
Corporate	28,371	1,177	1,737	219	30,108	1,190	--	--	--	--	--	--	30,108	1,190
Noncorporate private:														
Total, noncorporate private	28,668	1,378	12,207	498	40,875	1,420	--	--	--	--	--	--	40,875	1,420
All private	57,039	1,505	13,944	530	70,983	1,505	--	--	--	--	--	--	70,983	1,505
All owners	141,782	2,437	22,606	738	164,387	2,432	46,389	2,296	7,682	544	54,070	2,321	218,458	2,798

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C44.3: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) and Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2003 - 2012

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	80,445	1,679	6,000	437	86,445	1,640	27,445	1,231	4,236	387	31,681	1,218	118,125	1,814
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	80,445	1,679	6,000	437	86,445	1,640	27,445	1,231	4,236	387	31,681	1,218	118,125	1,814
Other federal government:														
Bureau of Land Management	2,378	404	1,346	188	3,725	442	311	147	260	60	571	159	4,295	465
Department of Defense and Energy	48	38	150	51	198	63	--	--	23	24	23	24	221	68
National Park Service	--	--	--	--	--	--	12,095	1,096	1,472	259	13,567	1,110	13,567	1,110
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	136	58	136	58	122	128	80	65	202	144	338	154
Total	2,427	404	1,632	203	4,059	448	12,527	1,097	1,835	270	14,363	1,111	18,421	1,127
State and local government:														
Local	342	164	364	108	706	198	657	280	669	150	1,326	309	2,031	364
State	1,368	392	148	87	1,516	393	5,837	1,233	971	235	6,808	1,248	8,324	1,163
Other public	--	--	5	4	5	4	66	76	9	9	74	76	79	77
Total	1,710	424	516	138	2,226	439	6,560	1,263	1,649	273	8,209	1,279	10,434	1,206
Private:														
Corporate	28,711	1,150	1,773	221	30,484	1,163	--	--	--	--	--	--	30,484	1,163
Noncorporate private:														
Total, noncorporate private	29,105	1,397	11,849	488	40,954	1,427	--	--	--	--	--	--	40,954	1,427
All private	57,816	1,469	13,622	524	71,438	1,456	--	--	--	--	--	--	71,438	1,456
All owners	142,397	2,250	21,771	723	164,167	2,211	46,532	2,074	7,720	544	54,252	2,082	218,419	2,695

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C44.4: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) and Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2004 - 2013

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	81,090	1,690	5,870	437	86,960	1,650	27,624	1,243	4,258	393	31,881	1,226	118,841	1,831
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	81,090	1,690	5,870	437	86,960	1,650	27,624	1,243	4,258	393	31,881	1,226	118,841	1,831
Other federal government:														
Bureau of Land Management	2,383	410	1,347	189	3,729	447	386	161	282	61	668	172	4,397	474
Department of Defense and Energy	48	38	153	52	202	64	--	--	23	24	23	24	225	68
National Park Service	--	--	--	--	--	--	12,376	1,115	1,524	267	13,901	1,131	13,901	1,131
U.S. Fish and Wildlife Service	--	--	--	--	--	--	7	8	3	3	10	8	10	8
Other federal	--	--	102	31	102	31	--	--	15	10	15	10	118	33
Total	2,431	410	1,602	198	4,033	451	12,770	1,117	1,848	272	14,617	1,132	18,651	1,147
State and local government:														
Local	353	168	392	110	745	203	692	278	663	147	1,355	307	2,101	366
State	1,394	400	148	87	1,542	400	5,773	1,232	959	235	6,732	1,246	8,274	1,161
Other public	--	--	5	4	5	4	71	79	9	9	80	80	84	80
Total	1,748	432	544	140	2,292	447	6,537	1,261	1,631	272	8,167	1,277	10,459	1,204
Private:														
Corporate	29,541	1,178	1,959	239	31,500	1,193	--	--	--	--	--	--	31,500	1,193
Noncorporate private:														
Total, noncorporate private	29,157	1,411	11,737	480	40,894	1,437	--	--	--	--	--	--	40,894	1,437
All private	58,697	1,488	13,696	523	72,394	1,471	--	--	--	--	--	--	72,394	1,471
All owners	143,966	2,274	21,712	721	165,679	2,232	46,930	2,091	7,736	549	54,666	2,098	220,345	2,720

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C44.5: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) and Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2005 - 2014

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	81,745	1,689	5,768	436	87,513	1,646	28,293	1,258	4,214	392	32,507	1,236	120,020	1,841
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	81,745	1,689	5,768	436	87,513	1,646	28,293	1,258	4,214	392	32,507	1,236	120,020	1,841
Other federal government:														
Bureau of Land Management	2,531	485	1,351	190	3,882	517	496	182	264	60	760	192	4,642	544
Department of Defense and Energy	48	38	162	58	210	69	--	--	23	24	23	24	234	73
National Park Service	--	--	--	--	--	--	12,522	1,113	1,509	267	14,031	1,130	14,031	1,130
U.S. Fish and Wildlife Service	--	--	--	--	--	--	7	8	3	3	10	8	10	8
Other federal	--	--	102	31	102	31	--	--	15	10	15	10	117	32
Total	2,579	486	1,615	200	4,194	521	13,026	1,117	1,814	272	14,840	1,132	19,034	1,161
State and local government:														
Local	498	192	420	112	918	224	693	278	659	144	1,352	304	2,271	376
State	1,476	405	158	87	1,634	406	5,797	1,223	964	234	6,761	1,237	8,395	1,151
Other public	--	--	5	4	5	4	71	79	9	9	80	80	84	80
Total	1,974	446	583	142	2,557	462	6,561	1,251	1,632	270	8,193	1,267	10,750	1,197
Private:														
Corporate	29,947	1,176	2,127	248	32,073	1,193	--	--	--	--	--	--	32,073	1,193
Noncorporate private:														
Total, noncorporate private	28,676	1,391	11,817	483	40,493	1,419	--	--	--	--	--	--	40,493	1,419
All private	58,623	1,464	13,943	528	72,566	1,446	--	--	--	--	--	--	72,566	1,446
All owners	144,922	2,276	21,908	725	166,830	2,232	47,879	2,094	7,661	548	55,540	2,097	222,370	2,723

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C44.6: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) and Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2006 - 2015

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	82,029	1,690	5,675	434	87,704	1,647	28,520	1,251	4,027	374	32,547	1,233	120,251	1,840
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	82,029	1,690	5,675	434	87,704	1,647	28,520	1,251	4,027	374	32,547	1,233	120,251	1,840
Other federal government:														
Bureau of Land Management	2,516	475	1,311	187	3,827	506	629	229	294	69	923	239	4,751	553
Department of Defense and Energy	48	38	168	58	216	70	--	--	24	25	24	25	240	74
National Park Service	--	--	--	--	--	--	12,645	1,117	1,503	268	14,148	1,135	14,148	1,135
U.S. Fish and Wildlife Service	--	--	--	--	--	--	7	8	3	3	10	8	10	8
Other federal	--	--	105	31	105	31	--	--	16	10	16	10	121	33
Total	2,564	475	1,584	198	4,149	510	13,281	1,128	1,839	275	15,121	1,144	19,269	1,167
State and local government:														
Local	486	190	432	114	919	223	730	295	637	142	1,366	319	2,285	388
State	1,589	420	130	83	1,719	421	5,892	1,230	966	236	6,858	1,244	8,577	1,161
Other public	--	--	5	4	5	4	70	77	9	9	78	78	83	78
Total	2,076	459	566	141	2,642	474	6,692	1,262	1,611	271	8,303	1,278	10,945	1,209
Private:														
Corporate	31,460	1,233	2,404	265	33,865	1,252	--	--	--	--	--	--	33,865	1,252
Noncorporate private:														
Total, noncorporate private	28,120	1,381	11,456	478	39,576	1,409	--	--	--	--	--	--	39,576	1,409
All private	59,581	1,493	13,860	529	73,441	1,474	--	--	--	--	--	--	73,441	1,474
All owners	146,250	2,292	21,686	723	167,935	2,247	48,493	2,102	7,478	537	55,970	2,108	223,906	2,739

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C44.7: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) and Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2007 - 2016

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	82,171	1,697	5,487	431	87,658	1,653	28,783	1,245	4,024	371	32,807	1,228	120,465	1,850
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	82,171	1,697	5,487	431	87,658	1,653	28,783	1,245	4,024	371	32,807	1,228	120,465	1,850
Other federal government:														
Bureau of Land Management	2,281	462	1,307	188	3,588	496	792	249	293	69	1,085	259	4,673	552
Department of Defense and Energy	56	40	171	58	228	71	--	--	26	26	26	26	253	75
National Park Service	--	--	--	--	--	--	12,761	1,123	1,509	266	14,270	1,140	14,270	1,140
U.S. Fish and Wildlife Service	--	--	--	--	--	--	7	8	3	3	10	8	10	8
Other federal	--	--	97	30	97	30	--	--	16	11	16	11	113	32
Total	2,337	463	1,575	198	3,912	500	13,560	1,135	1,847	273	15,407	1,150	19,319	1,175
State and local government:														
Local	649	233	442	114	1,091	260	742	302	643	144	1,385	326	2,477	416
State	1,520	404	152	85	1,672	405	5,911	1,241	968	235	6,879	1,255	8,551	1,168
Other public	--	--	5	4	5	4	70	77	9	9	78	78	83	78
Total	2,169	464	599	142	2,768	479	6,722	1,274	1,620	271	8,342	1,289	11,110	1,224
Private:														
Corporate	32,635	1,263	2,516	270	35,151	1,281	--	--	--	--	--	--	35,151	1,281
Noncorporate private:														
Total, noncorporate private	27,384	1,381	11,347	481	38,730	1,411	--	--	--	--	--	--	38,730	1,411
All private	60,019	1,513	13,863	534	73,882	1,494	--	--	--	--	--	--	73,882	1,494
All owners	146,696	2,311	21,523	725	168,219	2,265	49,066	2,110	7,491	533	56,556	2,116	224,775	2,761

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C44.8: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) and Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, All California (10 year averages): 2008 - 2017

**information combined from Table C36 and Table C45*

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	82,332	1,700	5,582	442	87,915	1,655	28,794	1,242	3,971	367	32,765	1,228	120,679	1,849
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	82,332	1,700	5,582	442	87,915	1,655	28,794	1,242	3,971	367	32,765	1,228	120,679	1,849
Other federal government:														
Bureau of Land Management	2,273	463	1,289	185	3,561	496	786	249	293	69	1,079	258	4,640	552
Department of Defense and Energy	56	40	170	58	226	70	--	--	24	25	24	25	250	75
National Park Service	--	--	--	--	--	--	12,722	1,122	1,516	269	14,238	1,139	14,238	1,139
U.S. Fish and Wildlife Service	--	--	--	--	--	--	7	8	3	3	10	8	10	8
Other federal	--	--	84	29	84	29	--	--	13	10	13	10	97	31
Total	2,329	464	1,543	196	3,872	501	13,516	1,134	1,847	275	15,363	1,149	19,235	1,175
State and local government:														
Local	657	234	435	113	1,092	261	765	311	614	143	1,379	335	2,471	423
State	1,518	403	153	85	1,671	405	5,923	1,242	910	230	6,833	1,257	8,504	1,170
Other public	--	--	5	4	5	4	70	77	8	9	78	78	82	78
Total	2,175	464	593	142	2,768	479	6,757	1,277	1,533	267	8,290	1,293	11,057	1,229
Private:														
Corporate	33,525	1,274	2,670	281	36,195	1,293	--	--	--	--	--	--	36,195	1,293
Noncorporate private:														
Total, noncorporate private	27,098	1,386	11,312	482	38,410	1,418	--	--	--	--	--	--	38,410	1,418
All private	60,623	1,523	13,983	540	74,606	1,504	--	--	--	--	--	--	74,606	1,504
All owners	147,459	2,319	21,701	735	169,160	2,272	49,067	2,109	7,351	530	56,418	2,117	225,577	2,768

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C45: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: All California

**information combined with information from Table C36 in Table C44.8*

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
USDA Forest Service:														
National Forest	9,400	433	563	71	9,962	435	4,420	315	585	78	5,005	317	14,967	528
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	9,400	433	563	71	9,962	435	4,420	315	585	78	5,005	317	14,967	528
Other federal government:														
Bureau of Land Management	105	28	79	18	183	33	95	44	20	6	115	45	299	55
Department of Defense and Energy	--	--	5	3	5	3	--	--	--	--	--	--	5	3
National Park Service	--	--	--	--	--	--	1,976	250	147	35	2,123	252	2,123	252
U.S. Fish and Wildlife Service	--	--	--	--	--	--	2	2	--	--	2	2	2	2
Other federal	--	--	15	11	15	11	--	--	--	--	--	--	15	11
Total	105	28	99	21	204	35	2,073	252	168	36	2,241	254	2,445	253
State and local government:														
Local	34	14	16	7	50	16	47	24	33	16	80	29	130	33
State	78	31	8	5	86	31	270	57	52	18	323	59	409	60
Other public	--	--	--	--	--	--	1	1	--	--	1	1	1	1
Total	113	34	24	9	136	35	318	62	86	24	404	66	540	68
Private:														
Corporate	2,284	186	109	18	2,393	186	--	--	--	--	--	--	2,393	186
Noncorporate private:														
Total, noncorporate private	1,205	104	605	68	1,810	123	--	--	--	--	--	--	1,810	123
All private	3,489	205	714	70	4,203	214	--	--	--	--	--	--	4,203	214
All owners	13,106	479	1,399	102	14,505	485	6,811	408	839	89	7,649	411	22,154	621

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C46: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	1	1	17	8	19	8	3	2	119	54	122	54	140	55
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1	1	17	8	19	8	3	2	119	54	122	54	140	55
Other federal government:														
Bureau of Land Management	--	--	1	1	1	1	--	--	--	--	--	--	1	1
Department of Defense and Energy	--	--	4	3	4	3	--	--	--	--	--	--	4	3
National Park Service	--	--	--	--	--	--	--	--	7	8	7	8	7	8
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	5	3	5	3	--	--	7	8	7	8	12	9
State and local government:														
Local	--	--	8	7	8	7	47	24	24	15	71	29	79	30
State	3	2			3	2	14	8	16	10	30	12	33	12
Other public	--	--	--	--	--	--	1	1	--	--	1	1	1	1
Total	3	2	8	7	11	7	62	26	40	18	102	31	113	32
Private:														
Corporate	10	5	26	10	35	11	--	--	--	--	--	--	35	11
Noncorporate private:														
Total, noncorporate private	131	34	122	26	253	43	--	--	--	--	--	--	253	43
All private	141	34	148	28	288	44	--	--	--	--	--	--	288	44
All owners	145	34	178	30	323	45	64	26	167	58	231	63	554	78

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C47: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: Central Valley

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal government:														
Bureau of Land Management	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
State and local government:														
Local	--	--	2	2	2	2	--	--	--	--	--	--	2	2
State	--	--	--	--	--	--	--	--	3	3	3	3	3	3
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	2	2	2	2	--	--	3	3	3	3	5	4
Private:														
Corporate	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Noncorporate private:														
Total, noncorporate private	--	--	9	5	9	5	--	--	--	--	--	--	9	5
All private	--	--	9	5	9	5	--	--	--	--	--	--	9	5
All owners	--	--	11	6	11	6	--	--	3	3	3	3	14	6

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C48: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: Eastside

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	245	50	82	31	327	59	33	16	28	11	61	19	388	62
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	245	50	82	31	327	59	33	16	28	11	61	19	388	62
Other federal government:														
Bureau of Land Management	3	1	19	6	22	6	--	--	4	2	4	2	25	7
Department of Defense and Energy	--	--	2	1	2	1	--	--	--	--	--	--	2	1
National Park Service	--	--	--	--	--	--	--	--	2	1	2	1	2	1
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	3	1	21	6	23	6	--	--	5	2	5	2	29	7
State and local government:														
Local	--	--	--	--	--	--	--	--	--	--	--	--	--	--
State	--	--	--	--	--	--	8	9	--	--	8	9	8	9
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	8	9	--	--	8	9	8	9
Private:														
Corporate	48	21			48	21	--	--	--	--	--	--	48	21
Noncorporate private:														
Total, noncorporate private	11	4	3	2	14	5	--	--	--	--	--	--	14	5
All private	59	21	3	2	62	21	--	--	--	--	--	--	62	21
All owners	307	55	105	32	412	63	42	19	33	11	75	22	487	67

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C49: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	3,647	343	121	28	3,769	343	2,661	282	103	28	2,764	283	6,533	443
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	3,647	343	121	28	3,769	343	2,661	282	103	28	2,764	283	6,533	443
Other federal government:														
Bureau of Land Management	79	26	27	14	106	30	4	4	--	--	4	4	110	30
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	69	27	4	3	73	27	73	27
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	79	26	27	14	106	30	73	27	4	3	77	27	183	40
State and local government:														
Local	1	1	--	--	1	1	--	--	4	4	4	4	5	4
State	6	7	3	3	9	7	1	1	6	5	7	5	16	9
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	7	7	3	3	10	7	1	1	9	6	11	6	21	10
Private:														
Corporate	449	86	35	12	483	86	--	--	--	--	--	--	483	86
Noncorporate private:														
Total, noncorporate private	318	55	103	17	421	58	--	--	--	--	--	--	421	58
All private	766	101	138	20	904	103	--	--	--	--	--	--	904	103
All owners	4,499	359	289	37	4,789	360	2,735	283	117	29	2,852	284	7,641	456

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C50: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: North Coast

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	28	18	2	2	30	18	24	21	--	--	24	21	54	28
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	28	18	2	2	30	18	24	21	--	--	24	21	54	28
Other federal government:														
Bureau of Land Management	7	6	--	--	7	6	85	44	--	--	85	44	92	44
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	192	115	--	--	192	115	192	115
U.S. Fish and Wildlife Service	--	--	--	--	--	--	2	2	--	--	2	2	2	2
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	7	6	--	--	7	6	279	123	--	--	279	123	287	123
State and local government:														
Local	12	10	1	1	13	10	--	--	3	1	3	1	16	10
State	45	23	--	--	45	23	195	56	3	3	198	56	244	57
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	57	25	1	1	58	25	195	56	6	4	201	56	259	57
Private:														
Corporate	1,130	155	10	5	1,140	155	--	--	--	--	--	--	1,140	155
Noncorporate private:														
Total, noncorporate private	411	60	15	6	426	60	--	--	--	--	--	--	426	60
All private	1,541	164	26	8	1,566	164	--	--	--	--	--	--	1,566	164
All owners	1,633	167	28	8	1,661	167	499	137	6	4	505	137	2,166	214

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C51: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	5,359	308	263	54	5,622	310	1,512	167	267	45	1,779	170	7,401	349
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	5,359	308	263	54	5,622	310	1,512	167	267	45	1,779	170	7,401	349
Other federal government:														
Bureau of Land Management	16	8	30	9	46	12	6	6	15	6	21	8	67	15
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	1,715	228	126	34	1,841	230	1,841	230
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	3	2	3	2	--	--	--	--	--	--	3	2
Total	16	8	33	9	49	12	1,721	228	141	34	1,862	230	1,911	230
State and local government:														
Local	21	10	4	2	25	10	--	--	--	--	--	--	25	10
State	24	22	5	4	29	22	46	19	9	6	55	19	84	29
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	45	24	9	4	54	24	46	19	9	6	55	19	109	30
Private:														
Corporate	648	72	37	9	685	72	--	--	--	--	--	--	685	72
Noncorporate private:														
Total, noncorporate private	318	60	317	60	635	84	--	--	--	--	--	--	635	84
All private	966	92	354	60	1,320	109	--	--	--	--	--	--	1,320	109
All owners	6,386	322	659	82	7,045	330	3,279	283	417	57	3,696	287	10,741	429

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C52: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
USDA Forest Service:														
National Forest	119	50	77	19	196	54	186	74	68	24	253	78	450	94
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	119	50	77	19	196	54	186	74	68	24	253	78	450	94
Other federal government:														
Bureau of Land Management	--	--	1	1	1	1	--	--	2	1	2	1	3	1
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	8	4	8	4	8	4
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	12	11	12	11	--	--	--	--	--	--	12	11
Total	--	--	13	11	13	11	--	--	10	4	10	4	23	11
State and local government:														
Local	--	--	1	1	1	1	--	--	3	3	3	3	4	3
State	--	--	--	--	--	--	6	5	15	13	21	14	21	14
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	1	1	1	1	6	5	18	13	24	14	25	14
Private:														
Corporate	--	--	1	1	1	1	--	--	--	--	--	--	1	1
Noncorporate private:														
Total, noncorporate private	17	10	35	13	52	16	--	--	--	--	--	--	52	16
All private	17	10	36	13	53	16	--	--	--	--	--	--	53	16
All owners	136	51	128	25	264	57	192	74	95	28	287	79	551	98

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C53: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: All California

*information duplicated in Table C61.8

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	468,814.77	6,602.69	111,521.22	4,721.87	580,335.99	6,416.94	149,669.10	4,837.32	62,387.36	3,817.62	212,056.47	4,983.09	792,392.46	6,542.17
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	468,814.77	6,602.69	111,521.22	4,721.87	580,335.99	6,416.94	149,669.10	4,837.32	62,387.36	3,817.62	212,056.47	4,983.09	792,392.46	6,542.17
Other federal government:														
Bureau of Land Management	14,120.88	2,050.82	42,496.56	3,264.16	56,617.44	3,798.72	3,916.58	1,167.41	8,585.64	1,478.56	12,502.23	1,883.57	69,119.67	4,100.10
Department of Defense and Energy	810.67	445.19	3,491.97	941.86	4,302.65	1,041.76	--	--	237.93	246.15	237.93	246.15	4,540.58	1,070.44
National Park Service	--	--	--	--	--	--	51,631.00	3,181.14	21,986.32	2,430.78	73,617.31	3,804.58	73,617.31	3,804.58
U.S. Fish and Wildlife Service	--	--	--	--	--	--	167.33	171.18	19.48	19.85	186.80	172.32	186.80	172.32
Other federal	--	--	2,285.67	696.52	2,285.67	696.52	--	--	169.51	103.17	169.51	103.17	2,455.19	704.12
Total	14,931.55	2,085.80	48,274.21	3,411.66	63,205.76	3,936.01	55,714.91	3,268.93	30,998.88	2,766.54	86,713.79	3,995.14	149,919.55	4,807.58
State and local government:														
Local	3,038.45	962.88	5,784.10	1,144.20	8,822.56	1,511.96	2,034.12	763.61	7,525.22	1,370.78	9,559.34	1,498.77	18,381.89	2,116.36
State	4,757.39	1,126.24	2,164.65	760.31	6,922.03	1,340.15	13,872.57	1,616.40	11,144.25	1,551.99	25,016.82	2,144.56	31,938.85	2,109.51
Other public	--	--	395.16	322.48	395.16	322.48	261.45	291.11	252.25	272.96	513.70	399.06	908.86	513.08
Total	7,795.84	1,474.02	8,343.91	1,409.28	16,139.75	2,038.11	16,168.14	1,768.15	18,921.72	1,986.66	35,089.85	2,482.68	51,229.60	2,818.12
Private:														
Corporate	226,147.25	6,325.40	38,817.38	3,120.10	264,964.62	6,868.21	--	--	--	--	--	--	264,964.62	6,868.21
Noncorporate private:														
Total, noncorporate private	134,333.85	5,546.42	185,789.01	5,810.79	320,122.87	7,510.76	--	--	--	--	--	--	320,122.87	7,510.76
All private	360,481.10	6,134.46	224,606.39	6,242.65	585,087.49	7,322.44	--	--	--	--	--	--	585,087.49	7,322.44
All owners	852,023.26	8,935.50	392,745.73	8,542.72	1,244,768.99	10,023.97	221,552.15	6,084.04	112,307.96	5,108.75	333,860.11	6,811.11	1,578,629.09	9,908.18

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C54: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	80.73	73.97	3,283.08	857.97	3,363.81	860.84	1,395.49	653.52	6,676.92	1,429.83	8,072.41	1,564.89	11,436.22	1,786.04
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	80.73	73.97	3,283.08	857.97	3,363.81	860.84	1,395.49	653.52	6,676.92	1,429.83	8,072.41	1,564.89	11,436.22	1,786.04
Other federal government:														
Bureau of Land Management	--	--	2,510.11	858.04	2,510.11	858.04	--	--	362.07	267.16	362.07	267.16	2,872.18	898.59
Department of Defense and Energy	--	--	2,414.54	788.52	2,414.54	788.52	--	--	--	--	--	--	2,414.54	788.52
National Park Service	--	--	--	--	--	--	--	--	291.68	324.78	291.68	324.78	291.68	324.78
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	428.39	333.14	428.39	333.14	--	--	5.53	6.13	5.53	6.13	433.92	333.20
Total	--	--	5,353.04	1,204.48	5,353.04	1,204.48	--	--	659.29	420.59	659.29	420.59	6,012.33	1,275.71
State and local government:														
Local	--	--	1,267.53	527.86	1,267.53	527.86	2,034.12	763.61	4,950.31	1,097.19	6,984.42	1,253.43	8,251.96	1,350.62
State	763.71	456.37	446.26	330.55	1,209.97	584.56	2,102.15	855.32	5,009.39	1,046.79	7,111.53	1,342.52	8,321.51	1,458.88
Other public	--	--	--	--	--	--	261.45	291.11	252.25	272.96	513.70	399.06	513.70	399.06
Total	763.71	456.37	1,713.79	622.80	2,477.51	787.61	4,397.71	1,178.01	10,211.95	1,461.29	14,609.66	1,770.36	17,087.16	1,898.34
Private:														
Corporate	1,976.59	772.65	6,909.93	1,305.29	8,886.52	1,515.07	--	--	--	--	--	--	8,886.52	1,515.07
Noncorporate private:														
Total, noncorporate private	8,001.71	1,563.78	34,099.91	2,851.57	42,101.63	3,226.93	--	--	--	--	--	--	42,101.63	3,226.93
All private	9,978.30	1,737.05	41,009.84	3,104.18	50,988.14	3,534.30	--	--	--	--	--	--	50,988.14	3,534.30
All owners	10,822.74	1,799.10	51,359.75	3,492.18	62,182.49	3,908.78	5,793.20	1,347.14	17,548.16	2,078.83	23,341.36	2,389.36	85,523.85	4,542.16

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C55: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: Central Valley

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal government:														
Bureau of Land Management	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	19.48	19.85	19.48	19.85	19.48	19.85
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	19.48	19.85	19.48	19.85	19.48	19.85
State and local government:														
Local	--	--	158.11	109.62	158.11	109.62	--	--	--	--	--	--	158.11	109.62
State	--	--	--	--	--	--	--	--	179.60	164.60	179.60	164.60	179.60	164.60
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	158.11	109.62	158.11	109.62	--	--	179.60	164.60	179.60	164.60	337.71	197.76
Private:														
Corporate	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Noncorporate private:														
Total, noncorporate private	2.32	2.38	2,990.78	773.40	2,993.10	773.40	--	--	--	--	--	--	2,993.10	773.40
All private	2.32	2.38	2,990.78	773.40	2,993.10	773.40	--	--	--	--	--	--	2,993.10	773.40
All owners	2.32	2.38	3,148.90	780.94	3,151.22	780.94	--	--	199.08	165.79	199.08	165.79	3,350.29	798.35

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C56: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: Eastside

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	33,926.41	2,996.47	36,588.30	2,899.34	70,514.72	4,105.46	2,922.28	1,002.27	4,768.84	1,187.36	7,691.11	1,538.65	78,205.83	4,376.05
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	33,926.41	2,996.47	36,588.30	2,899.34	70,514.72	4,105.46	2,922.28	1,002.27	4,768.84	1,187.36	7,691.11	1,538.65	78,205.83	4,376.05
Other federal government:														
Bureau of Land Management	1,627.25	702.77	22,684.48	2,537.56	24,311.73	2,626.04	--	--	2,433.43	831.78	2,433.43	831.78	26,745.16	2,717.82
Department of Defense and Energy	--	--	1,073.51	518.17	1,073.51	518.17	--	--	--	--	--	--	1,073.51	518.17
National Park Service	--	--	--	--	--	--	--	--	2,713.42	834.52	2,713.42	834.52	2,713.42	834.52
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1,627.25	702.77	23,758.00	2,577.48	25,385.25	2,664.63	--	--	5,146.85	1,173.49	5,146.85	1,173.49	30,532.10	2,841.30
State and local government:														
Local	--	--	232.03	234.03	232.03	234.03	--	--	--	--	--	--	232.03	234.03
State	--	--	--	--	--	--	334.95	372.95	394.24	340.52	729.19	505.02	729.19	505.02
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	232.03	234.03	232.03	234.03	334.95	372.95	394.24	340.52	729.19	505.02	961.22	556.61
Private:														
Corporate	10,678.44	1,756.75	3,630.06	1,034.92	14,308.50	2,053.80	--	--	--	--	--	--	14,308.50	2,053.80
Noncorporate private:														
Total, noncorporate private	4,225.21	1,061.09	7,003.27	1,465.54	11,228.48	1,825.54	--	--	--	--	--	--	11,228.48	1,825.54
All private	14,903.65	2,033.92	10,633.33	1,784.68	25,536.98	2,725.66	--	--	--	--	--	--	25,536.98	2,725.66
All owners	50,457.32	3,706.83	71,211.66	4,281.12	121,668.98	5,619.34	3,257.22	1,069.41	10,309.92	1,703.78	13,567.15	1,999.89	135,236.13	5,922.75

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C57: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	142,662.77	5,926.92	19,516.82	2,402.68	162,179.59	6,244.19	76,456.07	4,168.70	14,190.71	2,162.21	90,646.78	4,555.42	252,826.37	7,454.41
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	142,662.77	5,926.92	19,516.82	2,402.68	162,179.59	6,244.19	76,456.07	4,168.70	14,190.71	2,162.21	90,646.78	4,555.42	252,826.37	7,454.41
Other federal government:														
Bureau of Land Management	6,858.50	1,471.81	5,252.36	1,192.70	12,110.85	1,904.12	276.48	273.98	1,083.97	574.41	1,360.45	636.40	13,471.30	2,004.42
Department of Defense and Energy	--	--	--	--	--	--	--	--	237.93	246.15	237.93	246.15	237.93	246.15
National Park Service	--	--	--	--	--	--	2,942.74	927.76	1,928.41	745.43	4,871.15	1,207.62	4,871.15	1,207.62
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	263.13	195.34	263.13	195.34	--	--	43.36	48.01	43.36	48.01	306.49	201.15
Total	6,858.50	1,471.81	5,515.49	1,208.57	12,373.98	1,914.10	3,219.22	962.48	3,293.67	973.91	6,512.89	1,384.49	18,886.87	2,310.33
State and local government:														
Local	441.33	370.64	545.53	396.36	986.86	542.66	--	--	270.37	255.09	270.37	255.09	1,257.23	599.57
State	475.41	311.71	497.26	363.83	972.67	479.09	367.13	305.11	881.69	499.05	1,248.82	632.70	2,221.49	793.63
Other public	--	--	42.32	38.41	42.32	38.41	--	--	--	--	--	--	42.32	38.41
Total	916.74	484.29	1,085.11	539.04	2,001.85	724.64	367.13	305.11	1,152.06	560.46	1,519.19	682.19	3,521.03	994.41
Private:														
Corporate	48,156.10	3,800.76	11,265.40	1,714.78	59,421.49	4,156.11	--	--	--	--	--	--	59,421.49	4,156.11
Noncorporate private:														
Total, noncorporate private	37,771.04	3,379.29	44,507.23	3,233.88	82,278.27	4,638.49	--	--	--	--	--	--	82,278.27	4,638.49
All private	85,927.14	4,895.72	55,772.63	3,622.12	141,699.77	6,004.20	--	--	--	--	--	--	141,699.77	6,004.20
All owners	236,365.14	7,842.06	81,890.05	4,545.04	318,255.18	8,887.10	80,042.42	4,289.27	18,636.43	2,436.61	98,678.86	4,809.75	416,934.04	9,866.90

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C58: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: North Coast

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	1,241.40	642.04	379.38	364.17	1,620.78	738.13	715.61	528.44	--	--	715.61	528.44	2,336.39	907.17
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1,241.40	642.04	379.38	364.17	1,620.78	738.13	715.61	528.44	--	--	715.61	528.44	2,336.39	907.17
Other federal government:														
Bureau of Land Management	1,401.41	627.78	--	--	1,401.41	627.78	3,285.26	1,091.63	--	--	3,285.26	1,091.63	4,686.67	1,263.91
Department of Defense and Energy	725.33	436.56	3.92	4.27	729.24	436.58	--	--	--	--	--	--	729.24	436.58
National Park Service	--	--	--	--	--	--	2,200.62	837.47	344.19	331.21	2,544.81	890.38	2,544.81	890.38
U.S. Fish and Wildlife Service	--	--	--	--	--	--	167.33	171.18	--	--	167.33	171.18	167.33	171.18
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2,126.74	764.65	3.92	4.27	2,130.65	764.67	5,653.22	1,372.87	344.19	331.21	5,997.40	1,389.91	8,128.06	1,571.16
State and local government:														
Local	773.44	457.42	301.69	214.30	1,075.13	542.83	--	--	1,924.57	753.52	1,924.57	753.52	2,999.70	928.69
State	2,338.25	809.98	73.16	66.40	2,411.40	812.70	7,077.33	1,253.91	390.16	309.85	7,467.49	1,294.90	9,878.89	1,317.07
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	3,111.69	930.22	374.84	224.35	3,486.53	977.31	7,077.33	1,253.91	2,314.73	814.74	9,392.06	1,497.92	12,878.59	1,606.22
Private:														
Corporate	56,819.89	3,805.99	1,753.63	646.06	58,573.52	3,858.91	--	--	--	--	--	--	58,573.52	3,858.91
Noncorporate private:														
Total, noncorporate private	39,052.02	3,201.80	6,793.79	1,261.16	45,845.81	3,423.36	--	--	--	--	--	--	45,845.81	3,423.36
All private	95,871.91	4,657.71	8,547.42	1,409.02	104,419.33	4,829.79	--	--	--	--	--	--	104,419.33	4,829.79
All owners	102,351.73	4,833.47	9,305.57	1,472.20	111,657.30	5,020.81	13,446.16	1,932.34	2,658.92	879.49	16,105.07	2,109.96	127,762.37	5,349.34

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C59: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	284,496.13	7,204.58	37,158.31	3,066.71	321,654.44	7,428.79	62,218.72	3,937.79	29,554.12	2,709.05	91,772.83	4,376.92	413,427.27	8,313.49
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	284,496.13	7,204.58	37,158.31	3,066.71	321,654.44	7,428.79	62,218.72	3,937.79	29,554.12	2,709.05	91,772.83	4,376.92	413,427.27	8,313.49
Other federal government:														
Bureau of Land Management	4,233.72	1,115.47	11,114.38	1,696.83	15,348.10	2,023.25	354.84	310.03	3,476.35	908.36	3,831.20	959.81	19,179.30	2,202.44
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	46,487.63	3,110.60	12,975.26	1,971.82	59,462.90	3,549.70	59,462.90	3,549.70
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	771.18	416.64	771.18	416.64	--	--	76.82	79.47	76.82	79.47	848.00	424.15
Total	4,233.72	1,115.47	11,885.56	1,742.55	16,119.29	2,061.15	46,842.47	3,121.08	16,528.44	2,141.69	63,370.91	3,626.25	79,490.19	3,940.43
State and local government:														
Local	1,823.68	761.93	2,597.99	806.34	4,421.67	1,116.56	--	--	258.68	223.43	258.68	223.43	4,680.35	1,136.77
State	1,180.01	640.33	1,147.97	577.97	2,327.98	853.66	3,552.57	1,052.69	2,513.96	799.09	6,066.53	1,313.76	8,394.52	1,526.09
Other public	--	--	352.84	320.25	352.84	320.25	--	--	--	--	--	--	352.84	320.25
Total	3,003.69	995.27	4,098.80	1,041.21	7,102.49	1,439.19	3,552.57	1,052.69	2,772.64	829.74	6,325.22	1,332.63	13,427.71	1,926.83
Private:														
Corporate	108,342.48	5,367.30	13,317.32	1,831.81	121,659.80	5,627.62	--	--	--	--	--	--	121,659.80	5,627.62
Noncorporate private:														
Total, noncorporate private	44,634.16	3,471.49	81,289.90	4,118.41	125,924.07	5,274.19	--	--	--	--	--	--	125,924.07	5,274.19
All private	152,976.65	5,951.89	94,607.22	4,386.29	247,583.87	7,034.90	--	--	--	--	--	--	247,583.87	7,034.90
All owners	444,710.20	9,345.73	147,749.89	5,694.72	592,460.08	10,352.95	112,613.77	5,124.47	48,855.20	3,548.71	161,468.96	5,814.19	753,929.04	11,292.43

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C60: Soil Organic Carbon by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	6,407.34	1,343.56	14,595.32	1,825.51	21,002.66	2,264.59	5,960.93	1,363.82	7,196.79	1,414.82	13,157.71	1,935.66	34,160.37	2,963.30
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	6,407.34	1,343.56	14,595.32	1,825.51	21,002.66	2,264.59	5,960.93	1,363.82	7,196.79	1,414.82	13,157.71	1,935.66	34,160.37	2,963.30
Other federal government:														
Bureau of Land Management	--	--	935.24	431.51	935.24	431.51	--	--	1,229.81	567.39	1,229.81	567.39	2,165.05	711.54
Department of Defense and Energy	85.34	87.23	--	--	85.34	87.23	--	--	--	--	--	--	85.34	87.23
National Park Service	--	--	--	--	--	--	--	--	3,733.36	909.74	3,733.36	909.74	3,733.36	909.74
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	822.97	403.38	822.97	403.38	--	--	43.80	44.77	43.80	44.77	866.78	405.86
Total	85.34	87.23	1,758.21	590.64	1,843.55	597.02	--	--	5,006.97	1,068.84	5,006.97	1,068.84	6,850.53	1,221.99
State and local government:														
Local	--	--	681.22	340.09	681.22	340.09	--	--	121.29	119.20	121.29	119.20	802.51	358.23
State	--	--	--	--	--	--	438.45	338.97	1,775.21	647.38	2,213.66	724.78	2,213.66	724.78
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	681.22	340.09	681.22	340.09	438.45	338.97	1,896.50	658.26	2,334.94	734.51	3,016.17	807.56
Private:														
Corporate	173.75	171.23	1,941.05	734.42	2,114.80	754.12	--	--	--	--	--	--	2,114.80	754.12
Noncorporate private:														
Total, noncorporate private	647.38	389.66	9,104.12	1,466.22	9,751.50	1,533.34	--	--	--	--	--	--	9,751.50	1,533.34
All private	821.13	425.62	11,045.16	1,638.82	11,866.30	1,707.74	--	--	--	--	--	--	11,866.30	1,707.74
All owners	7,313.82	1,412.06	28,079.92	2,537.08	35,393.74	2,909.56	6,399.37	1,405.32	14,100.26	1,891.39	20,499.63	2,329.94	55,893.37	3,712.36

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C61.1: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10 year averages): 2001 - 2010

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	465,218.34	7,227.47	138,491.38	5,226.96	603,709.72	7,512.16	138,859.43	5,919.40	60,737.42	3,959.75	199,596.85	6,805.96	803,306.57	5,476.23
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	465,218.34	7,227.47	138,491.38	5,226.96	603,709.72	7,512.16	138,859.43	5,919.40	60,737.42	3,959.75	199,596.85	6,805.96	803,306.57	5,476.23
Other federal government:														
Bureau of Land Management	14,720.59	2,079.36	49,000.48	3,370.46	63,721.08	3,810.47	1,244.16	592.33	10,936.81	1,456.42	12,180.96	1,570.25	75,902.04	4,015.84
Department of Defense and Energy	234.71	257.80	3,167.75	882.00	3,402.46	918.90	--	--	--	--	--	--	3,402.46	918.90
National Park Service	--	--	--	--	--	--	47,767.55	3,042.15	22,783.24	2,341.29	70,550.79	3,266.55	70,550.79	3,266.55
U.S. Fish and Wildlife Service	--	--	--	--	--	--	210.90	259.36	145.68	148.15	356.58	298.69	356.58	298.69
Other federal	--	--	3,820.89	953.17	3,820.89	953.17	688.50	494.36	754.89	419.32	1,443.39	646.97	5,264.28	1,151.51
Total	14,955.30	2,095.28	55,989.13	3,568.66	70,944.43	3,976.31	49,911.10	3,109.81	34,620.62	2,730.97	84,531.72	3,547.80	155,476.15	4,939.15
State and local government:														
Local	1,805.31	683.64	4,646.75	1,036.22	6,452.06	1,248.80	1,793.01	787.97	9,058.03	1,541.51	10,851.04	1,721.50	17,303.10	2,114.95
State	4,673.17	1,195.70	1,870.47	689.17	6,543.64	1,375.78	14,882.39	1,995.55	12,359.68	1,733.57	27,242.07	2,591.05	33,785.71	2,831.87
Other public	--	--	359.93	316.48	359.93	316.48	358.33	320.99	461.06	341.89	819.39	468.96	1,179.31	565.76
Total	6,478.47	1,371.71	6,877.15	1,282.94	13,355.63	1,878.16	17,033.73	2,165.83	21,878.77	2,316.28	38,912.49	3,104.83	52,268.12	3,521.46
Private:														
Corporate	209,528.33	6,280.51	22,239.00	2,390.05	231,767.33	6,604.92	--	--	--	--	--	--	231,767.33	6,604.92
Noncorporate private:														
Total, noncorporate private	162,890.64	6,016.26	217,851.15	6,181.15	380,741.79	7,997.93	--	--	--	--	--	--	380,741.79	7,997.93
All private	372,418.97	6,286.28	240,090.15	6,358.63	612,509.12	7,461.53	--	--	--	--	--	--	612,509.12	7,461.53
All owners	859,071.09	9,691.36	441,447.81	8,938.42	1,300,518.90	11,006.49	205,804.26	6,967.75	117,236.81	5,299.76	323,041.07	8,174.62	1,623,559.96	9,865.35

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C61.2: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10 year averages): 2002 - 2011

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	468,684.38	7,418.28	133,214.32	5,187.24	601,898.71	7,729.48	139,598.77	5,966.06	60,756.52	3,971.27	200,355.29	6,846.56	802,254.00	5,842.70
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	468,684.38	7,418.28	133,214.32	5,187.24	601,898.71	7,729.48	139,598.77	5,966.06	60,756.52	3,971.27	200,355.29	6,846.56	802,254.00	5,842.70
Other federal government:														
Bureau of Land Management	14,621.67	2,075.03	48,182.16	3,336.40	62,803.83	3,787.46	1,232.68	589.62	10,878.43	1,467.02	12,111.11	1,579.11	74,914.94	4,000.74
Department of Defense and Energy	329.72	280.55	3,663.85	942.01	3,993.57	982.38	--	--	--	--	--	--	3,993.57	982.38
National Park Service	--	--	--	--	--	--	48,288.30	3,065.75	22,755.29	2,325.36	71,043.59	3,261.04	71,043.59	3,261.04
U.S. Fish and Wildlife Service	--	--	--	--	--	--	210.90	259.36	144.32	147.45	355.22	298.35	355.22	298.35
Other federal	--	--	3,809.41	952.04	3,809.41	952.04	686.37	493.83	751.10	419.14	1,437.48	646.43	5,246.88	1,150.28
Total	14,951.39	2,093.91	55,655.42	3,551.50	70,606.80	3,969.67	50,418.25	3,132.22	34,529.14	2,731.25	84,947.39	3,552.34	155,554.19	4,943.85
State and local government:														
Local	1,528.65	618.48	4,679.13	1,037.96	6,207.78	1,214.93	1,766.52	783.38	8,910.33	1,523.86	10,676.84	1,703.97	16,884.62	2,081.31
State	4,700.05	1,193.02	1,855.92	686.41	6,555.97	1,371.97	15,049.04	1,999.46	12,948.61	1,768.33	27,997.65	2,620.35	34,553.62	2,859.41
Other public	--	--	368.63	322.42	368.63	322.42	369.14	325.80	217.98	249.40	587.11	410.30	955.75	521.83
Total	6,228.69	1,338.04	6,903.69	1,284.78	13,132.38	1,855.32	17,184.70	2,168.55	22,076.91	2,320.15	39,261.60	3,110.33	52,393.98	3,519.47
Private:														
Corporate	205,863.30	6,289.77	26,359.68	2,596.25	232,222.98	6,676.80	--	--	--	--	--	--	232,222.98	6,676.80
Noncorporate private:														
Total, noncorporate private	160,614.18	5,999.66	211,544.12	6,117.23	372,158.30	7,974.81	--	--	--	--	--	--	372,158.30	7,974.81
All private	366,477.47	6,446.89	237,903.80	6,338.98	604,381.27	7,611.49	--	--	--	--	--	--	604,381.27	7,611.49
All owners	856,341.94	9,752.24	433,677.23	8,877.24	1,290,019.16	11,041.10	207,201.71	7,018.83	117,362.57	5,310.36	324,564.29	8,211.68	1,614,583.45	9,874.65

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C61.3: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10 year averages): 2003 - 2012

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	472,160.29	6,641.32	124,869.63	4,952.33	597,029.92	6,508.19	145,059.19	4,891.45	63,673.82	3,800.87	208,733.01	5,018.09	805,762.93	6,434.54
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	472,160.29	6,641.32	124,869.63	4,952.33	597,029.92	6,508.19	145,059.19	4,891.45	63,673.82	3,800.87	208,733.01	5,018.09	805,762.93	6,434.54
Other federal government:														
Bureau of Land Management	15,886.75	2,192.56	46,635.58	3,472.43	62,522.33	4,044.74	1,476.17	665.03	9,165.42	1,514.34	10,641.59	1,653.58	73,163.92	4,238.27
Department of Defense and Energy	521.64	355.73	3,280.76	907.44	3,802.40	974.66	--	--	233.58	241.86	233.58	241.86	4,035.98	1,004.22
National Park Service	--	--	--	--	--	--	50,335.15	3,174.08	22,028.90	2,440.53	72,364.04	3,804.10	72,364.04	3,804.10
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	4,450.96	1,040.23	4,450.96	1,040.23	332.87	351.47	859.74	462.05	1,192.60	580.54	5,643.56	1,189.83
Total	16,408.39	2,203.87	54,367.30	3,672.66	70,775.69	4,212.99	52,144.18	3,196.49	32,287.63	2,808.14	84,431.82	3,978.89	155,207.51	4,978.16
State and local government:														
Local	1,795.53	698.61	4,347.82	1,005.70	6,143.35	1,231.95	1,910.11	807.78	8,455.71	1,460.92	10,365.81	1,621.45	16,509.16	2,016.56
State	4,467.51	1,138.42	2,021.72	738.06	6,489.23	1,329.06	13,878.34	1,627.27	11,889.17	1,612.37	25,767.51	2,179.19	32,256.74	2,154.32
Other public	--	--	372.44	322.26	372.44	322.26	246.65	285.26	255.71	276.94	502.36	397.58	874.80	511.78
Total	6,263.03	1,329.02	6,741.99	1,287.94	13,005.02	1,835.10	16,035.10	1,775.98	20,600.59	2,074.09	36,635.69	2,552.85	49,640.71	2,748.64
Private:														
Corporate	209,644.04	6,331.48	26,523.71	2,593.53	236,167.75	6,713.34	--	--	--	--	--	--	236,167.75	6,713.34
Noncorporate private:														
Total, noncorporate private	161,449.39	5,986.09	206,717.77	6,074.63	368,167.16	7,899.65	--	--	--	--	--	--	368,167.16	7,899.65
All private	371,093.43	6,219.51	233,241.48	6,355.38	604,334.91	7,436.67	--	--	--	--	--	--	604,334.91	7,436.67
All owners	865,925.14	9,034.69	419,220.41	8,830.54	1,285,145.55	10,255.17	213,238.46	6,095.80	116,562.05	5,147.82	329,800.51	6,846.88	1,614,946.06	10,002.28

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C61.4: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10 year averages): 2004 - 2013

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	470,336.57	6,616.84	122,024.13	4,919.17	592,360.70	6,481.95	144,704.57	4,853.78	63,206.91	3,859.41	207,911.47	4,998.97	800,272.18	6,467.28
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	470,336.57	6,616.84	122,024.13	4,919.17	592,360.70	6,481.95	144,704.57	4,853.78	63,206.91	3,859.41	207,911.47	4,998.97	800,272.18	6,467.28
Other federal government:														
Bureau of Land Management	15,723.34	2,192.86	45,382.33	3,415.37	61,105.67	3,996.25	1,750.91	708.07	9,657.38	1,548.04	11,408.30	1,701.94	72,513.96	4,204.67
Department of Defense and Energy	521.64	355.73	3,319.70	915.83	3,841.33	982.47	--	--	233.58	241.86	233.58	241.86	4,074.92	1,011.80
National Park Service	--	--	--	--	--	--	50,353.88	3,171.30	21,697.76	2,438.05	72,051.63	3,803.79	72,051.63	3,803.79
U.S. Fish and Wildlife Service	--	--	--	--	--	--	167.44	171.38	19.98	20.13	187.42	172.56	187.42	172.56
Other federal	--	--	4,261.17	1,007.87	4,261.17	1,007.87	--	--	517.74	315.34	517.74	315.34	4,778.91	1,056.05
Total	16,244.97	2,204.18	52,963.20	3,610.95	69,208.18	4,161.37	52,272.23	3,198.54	32,126.44	2,808.51	84,398.67	3,986.49	153,606.85	4,928.95
State and local government:														
Local	1,839.06	708.86	4,542.21	1,015.27	6,381.27	1,245.58	2,008.87	757.90	8,459.83	1,459.14	10,468.70	1,573.82	16,849.97	1,991.82
State	4,484.14	1,141.11	2,020.65	737.86	6,504.79	1,331.28	13,826.81	1,625.78	11,796.49	1,623.64	25,623.30	2,178.59	32,128.09	2,150.54
Other public	--	--	415.85	324.39	415.85	324.39	266.78	297.32	255.71	276.94	522.50	406.32	938.35	519.93
Total	6,323.20	1,335.93	6,978.71	1,295.81	13,301.92	1,845.64	16,102.47	1,777.53	20,512.03	2,084.65	36,614.49	2,544.69	49,916.41	2,745.84
Private:														
Corporate	211,001.96	6,335.10	27,943.19	2,665.12	238,945.14	6,739.80	--	--	--	--	--	--	238,945.14	6,739.80
Noncorporate private:														
Total, noncorporate private	157,324.93	5,924.48	201,624.50	6,020.35	358,949.43	7,837.04	--	--	--	--	--	--	358,949.43	7,837.04
All private	368,326.88	6,197.98	229,567.69	6,323.57	597,894.57	7,410.64	--	--	--	--	--	--	597,894.57	7,410.64
All owners	861,231.64	9,013.33	411,533.73	8,768.35	1,272,765.37	10,217.74	213,079.26	6,068.40	115,845.38	5,197.85	328,924.64	6,839.95	1,601,690.01	9,994.37

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C61.5: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10 year averages): 2005 - 2014

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	471,419.62	6,602.68	119,095.47	4,867.57	590,515.09	6,444.38	147,102.56	4,871.64	61,775.37	3,845.27	208,877.93	4,957.58	799,393.02	6,505.48
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	471,419.62	6,602.68	119,095.47	4,867.57	590,515.09	6,444.38	147,102.56	4,871.64	61,775.37	3,845.27	208,877.93	4,957.58	799,393.02	6,505.48
Other federal government:														
Bureau of Land Management	15,249.45	2,160.70	44,566.86	3,359.92	59,816.31	3,933.87	2,486.48	908.47	8,750.20	1,477.34	11,236.67	1,733.97	71,052.99	4,156.37
Department of Defense and Energy	521.91	355.54	3,197.14	901.38	3,719.05	968.95	--	--	233.58	241.71	233.58	241.71	3,952.63	998.64
National Park Service	--	--	--	--	--	--	50,946.24	3,171.47	21,414.18	2,414.70	72,360.42	3,790.79	72,360.42	3,790.79
U.S. Fish and Wildlife Service	--	--	--	--	--	--	167.38	171.24	19.98	20.11	187.36	172.42	187.36	172.42
Other federal	--	--	4,249.69	1,006.05	4,249.69	1,006.05	--	--	517.88	315.15	517.88	315.15	4,767.57	1,054.26
Total	15,771.36	2,179.59	52,013.69	3,556.69	67,785.05	4,104.57	53,600.09	3,237.47	30,935.82	2,758.51	84,535.91	3,969.89	152,320.97	4,871.65
State and local government:														
Local	2,646.20	890.65	4,769.84	1,031.89	7,416.04	1,369.77	2,010.71	758.24	8,214.89	1,438.98	10,225.60	1,555.39	17,641.63	2,058.77
State	4,679.41	1,153.28	2,084.19	739.93	6,763.60	1,351.67	13,810.57	1,622.82	11,737.46	1,615.16	25,548.03	2,171.27	32,311.62	2,157.67
Other public	--	--	397.47	322.88	397.47	322.88	266.78	297.13	255.71	276.77	522.50	406.06	919.96	518.79
Total	7,325.60	1,450.49	7,251.50	1,309.59	14,577.10	1,945.54	16,088.06	1,774.81	20,208.06	2,069.55	36,296.12	2,531.76	50,873.22	2,804.35
Private:														
Corporate	212,457.02	6,340.92	30,713.17	2,780.93	243,170.19	6,787.26	--	--	--	--	--	--	243,170.19	6,787.26
Noncorporate private:														
Total, noncorporate private	152,064.14	5,810.08	197,757.99	5,985.63	349,822.13	7,758.04	--	--	--	--	--	--	349,822.13	7,758.04
All private	364,521.16	6,164.63	228,471.16	6,304.77	592,992.32	7,371.79	--	--	--	--	--	--	592,992.32	7,371.79
All owners	859,037.74	8,999.48	406,831.82	8,712.89	1,265,869.56	10,163.19	216,790.71	6,102.48	112,919.25	5,154.67	329,709.96	6,795.95	1,595,579.52	9,997.05

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C61.6: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10 year averages): 2006 - 2015

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	471,721.67	6,606.80	114,185.21	4,773.29	585,906.88	6,408.17	148,340.17	4,852.38	61,846.67	3,821.97	210,186.84	4,956.06	796,093.72	6,520.03
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	471,721.67	6,606.80	114,185.21	4,773.29	585,906.88	6,408.17	148,340.17	4,852.38	61,846.67	3,821.97	210,186.84	4,956.06	796,093.72	6,520.03
Other federal government:														
Bureau of Land Management	14,982.02	2,116.48	43,239.91	3,290.52	58,221.93	3,853.30	2,856.65	979.82	8,628.61	1,477.20	11,485.25	1,772.26	69,707.18	4,101.54
Department of Defense and Energy	521.91	355.56	3,207.57	902.93	3,729.48	970.40	--	--	237.93	246.23	237.93	246.23	3,967.41	1,001.15
National Park Service	--	--	--	--	--	--	50,883.34	3,158.35	21,619.07	2,434.65	72,502.41	3,804.00	72,502.41	3,804.00
U.S. Fish and Wildlife Service	--	--	--	--	--	--	167.38	171.25	19.98	20.12	187.36	172.43	187.36	172.43
Other federal	--	--	4,328.82	1,010.60	4,328.82	1,010.60	--	--	519.28	315.54	519.28	315.54	4,848.10	1,058.72
Total	15,503.93	2,135.75	50,776.30	3,496.53	66,280.23	4,032.08	53,907.36	3,241.20	31,024.87	2,773.63	84,932.23	3,988.41	151,212.46	4,837.19
State and local government:														
Local	2,517.26	880.36	5,165.34	1,088.20	7,682.59	1,405.05	1,997.12	752.05	7,960.11	1,421.22	9,957.22	1,535.95	17,639.82	2,067.50
State	4,927.02	1,176.96	1,993.94	734.89	6,920.96	1,369.02	13,790.08	1,619.57	11,508.68	1,596.90	25,298.76	2,156.77	32,219.72	2,142.73
Other public	--	--	396.17	322.63	396.17	322.63	261.45	291.21	255.71	276.79	517.16	401.77	913.33	515.27
Total	7,444.28	1,461.69	7,555.44	1,351.50	14,999.72	1,981.33	16,048.64	1,769.05	19,724.50	2,043.87	35,773.14	2,508.33	50,772.86	2,798.96
Private:														
Corporate	216,782.29	6,300.00	35,202.95	2,989.26	251,985.24	6,820.17	--	--	--	--	--	--	251,985.24	6,820.17
Noncorporate private:														
Total, noncorporate private	147,141.73	5,756.33	190,458.58	5,887.41	337,600.31	7,676.33	--	--	--	--	--	--	337,600.31	7,676.33
All private	363,924.01	6,156.72	225,661.54	6,264.66	589,585.55	7,347.64	--	--	--	--	--	--	589,585.55	7,347.64
All owners	858,593.89	8,962.78	398,178.49	8,619.36	1,256,772.38	10,075.25	218,296.18	6,083.93	112,596.05	5,138.20	330,892.22	6,798.40	1,587,664.60	9,950.63

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C61.7: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10 year averages): 2007 - 2016

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	470,656.86	6,609.83	111,072.97	4,715.97	581,729.83	6,423.93	149,469.09	4,841.45	62,743.87	3,842.81	212,212.95	4,971.64	793,942.79	6,564.05
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	470,656.86	6,609.83	111,072.97	4,715.97	581,729.83	6,423.93	149,469.09	4,841.45	62,743.87	3,842.81	212,212.95	4,971.64	793,942.79	6,564.05
Other federal government:														
Bureau of Land Management	13,943.67	2,036.20	42,706.04	3,271.34	56,649.71	3,797.50	3,946.81	1,171.50	8,724.92	1,486.14	12,671.73	1,892.04	69,321.44	4,096.33
Department of Defense and Energy	813.79	446.38	3,493.23	943.08	4,307.02	1,043.37	--	--	257.07	256.40	257.07	256.40	4,564.09	1,074.42
National Park Service	--	--	--	--	--	--	51,300.24	3,164.14	21,909.00	2,447.69	73,209.24	3,809.64	73,209.24	3,809.64
U.S. Fish and Wildlife Service	--	--	--	--	--	--	167.33	171.26	19.98	20.12	187.31	172.44	187.31	172.44
Other federal	--	--	3,627.39	887.34	3,627.39	887.34	--	--	525.46	316.44	525.46	316.44	4,152.85	942.08
Total	14,757.46	2,071.67	49,826.67	3,459.61	64,584.13	3,970.55	55,414.38	3,252.33	31,436.43	2,792.36	86,850.80	3,998.25	151,434.93	4,835.41
State and local government:														
Local	3,004.65	956.21	5,811.31	1,150.52	8,815.96	1,512.77	2,002.46	753.42	7,912.73	1,418.76	9,915.19	1,534.29	18,731.14	2,140.73
State	4,764.39	1,127.82	2,174.03	762.28	6,938.41	1,342.58	13,739.57	1,617.91	11,615.46	1,602.42	25,355.04	2,161.65	32,293.45	2,128.00
Other public	--	--	395.74	322.60	395.74	322.60	261.45	291.27	251.72	272.52	513.16	398.88	908.90	513.00
Total	7,769.04	1,470.88	8,381.07	1,415.46	16,150.11	2,040.27	16,003.48	1,768.09	19,779.90	2,047.15	35,783.39	2,512.52	51,933.49	2,842.31
Private:														
Corporate	221,690.24	6,333.78	36,950.22	3,046.67	258,640.47	6,856.55	--	--	--	--	--	--	258,640.47	6,856.55
Noncorporate private:														
Total, noncorporate private	139,816.70	5,623.52	187,521.36	5,838.24	327,338.07	7,572.48	--	--	--	--	--	--	327,338.07	7,572.48
All private	361,506.95	6,140.34	224,471.59	6,241.00	585,978.54	7,322.59	--	--	--	--	--	--	585,978.54	7,322.59
All owners	854,690.30	8,943.39	393,752.30	8,556.92	1,248,442.60	10,040.58	220,886.95	6,078.43	113,960.20	5,165.11	334,847.14	6,815.36	1,583,289.75	9,934.45

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C61.8: Soil Organic Carbon by Owner Group and Forest Land Status, All California (10 year averages): 2008 - 2017

*information duplicated in Table C53

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	468,814.77	6,602.69	111,521.22	4,721.87	580,335.99	6,416.94	149,669.10	4,837.32	62,387.36	3,817.62	212,056.47	4,983.09	792,392.46	6,542.17
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	468,814.77	6,602.69	111,521.22	4,721.87	580,335.99	6,416.94	149,669.10	4,837.32	62,387.36	3,817.62	212,056.47	4,983.09	792,392.46	6,542.17
Other federal government:														
Bureau of Land Management	14,120.88	2,050.82	42,496.56	3,264.16	56,617.44	3,798.72	3,916.58	1,167.41	8,585.64	1,478.56	12,502.23	1,883.57	69,119.67	4,100.10
Department of Defense and Energy	810.67	445.19	3,491.97	941.86	4,302.65	1,041.76	--	--	237.93	246.15	237.93	246.15	4,540.58	1,070.44
National Park Service	--	--	--	--	--	--	51,631.00	3,181.14	21,986.32	2,430.78	73,617.31	3,804.58	73,617.31	3,804.58
U.S. Fish and Wildlife Service	--	--	--	--	--	--	167.33	171.18	19.48	19.85	186.80	172.32	186.80	172.32
Other federal	--	--	2,285.67	696.52	2,285.67	696.52	--	--	169.51	103.17	169.51	103.17	2,455.19	704.12
Total	14,931.55	2,085.80	48,274.21	3,411.66	63,205.76	3,936.01	55,714.91	3,268.93	30,998.88	2,766.54	86,713.79	3,995.14	149,919.55	4,807.58
State and local government:														
Local	3,038.45	962.88	5,784.10	1,144.20	8,822.56	1,511.96	2,034.12	763.61	7,525.22	1,370.78	9,559.34	1,498.77	18,381.89	2,116.36
State	4,757.39	1,126.24	2,164.65	760.31	6,922.03	1,340.15	13,872.57	1,616.40	11,144.25	1,551.99	25,016.82	2,144.56	31,938.85	2,109.51
Other public	--	--	395.16	322.48	395.16	322.48	261.45	291.11	252.25	272.96	513.70	399.06	908.86	513.08
Total	7,795.84	1,474.02	8,343.91	1,409.28	16,139.75	2,038.11	16,168.14	1,768.15	18,921.72	1,986.66	35,089.85	2,482.68	51,229.60	2,818.12
Private:														
Corporate	226,147.25	6,325.40	38,817.38	3,120.10	264,964.62	6,868.21	--	--	--	--	--	--	264,964.62	6,868.21
Noncorporate private:														
Total, noncorporate private	134,333.85	5,546.42	185,789.01	5,810.79	320,122.87	7,510.76	--	--	--	--	--	--	320,122.87	7,510.76
All private	360,481.10	6,134.46	224,606.39	6,242.65	585,087.49	7,322.44	--	--	--	--	--	--	585,087.49	7,322.44
All owners	852,023.26	8,935.50	392,745.73	8,542.72	1,244,768.99	10,023.97	221,552.15	6,084.04	112,307.96	5,108.75	333,860.11	6,811.11	1,578,629.09	9,908.18

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C62: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2008-2017: All California

*information duplicated in Table C70.8

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	39,409.55	1,167.10	4,018.57	349.40	43,428.12	1,180.65	13,272.15	873.62	2,872.54	306.69	16,144.69	895.67	59,572.81	1,439.96
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	39,409.55	1,167.10	4,018.57	349.40	43,428.12	1,180.65	13,272.15	873.62	2,872.54	306.69	16,144.69	895.67	59,572.81	1,439.96
Other federal government:														
Bureau of Land Management	765.99	147.02	1,007.70	139.38	1,773.69	201.03	275.70	106.90	444.12	143.53	719.83	178.95	2,493.51	265.23
Department of Defense and Energy	26.57	16.66	77.17	40.22	103.73	43.53	--	--	4.02	4.16	4.02	4.16	107.75	43.73
National Park Service	--	--	--	--	--	--	6,651.86	695.81	1,312.66	291.27	7,964.51	743.85	7,964.51	743.85
U.S. Fish and Wildlife Service	--	--	--	--	--	--	1.57	1.60	--	--	1.57	1.60	1.57	1.60
Other federal	--	--	36.42	18.69	36.42	18.69	--	--	1.37	1.04	1.37	1.04	37.80	18.71
Total	792.56	147.73	1,121.28	145.62	1,913.84	204.97	6,929.13	697.55	1,762.17	322.19	8,691.30	756.57	10,605.15	759.12
State and local government:														
Local	326.16	220.67	264.30	96.87	590.46	240.94	92.20	39.96	207.78	68.96	299.98	79.13	890.44	253.32
State	429.54	133.46	36.49	18.44	466.04	133.27	2,183.70	398.02	498.96	127.88	2,682.65	412.10	3,148.69	389.09
Other public	--	--	0.25	0.22	0.25	0.22	16.64	18.53	2.19	2.37	18.83	18.68	19.08	18.68
Total	755.70	256.43	301.04	98.61	1,056.74	273.98	2,292.54	398.35	708.93	144.77	3,001.47	417.40	4,058.21	450.86
Private:														
Corporate	23,746.38	1,102.51	1,115.63	148.32	24,862.01	1,108.69	--	--	--	--	--	--	24,862.01	1,108.69
Noncorporate private:														
Total, noncorporate private	11,077.34	736.87	5,069.19	333.68	16,146.53	800.61	--	--	--	--	--	--	16,146.53	800.61
All private	34,823.72	1,187.71	6,184.82	359.79	41,008.54	1,213.55	--	--	--	--	--	--	41,008.54	1,213.55
All owners	75,781.53	1,677.78	11,625.72	529.16	87,407.24	1,709.51	22,493.82	1,185.88	5,343.64	467.08	27,837.46	1,241.66	115,244.70	2,034.31

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C63: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	0.01	0.01	71.56	32.95	71.56	32.95	185.12	110.45	201.24	84.88	386.35	165.67	457.92	168.91
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	0.01	0.01	71.56	32.95	71.56	32.95	185.12	110.45	201.24	84.88	386.35	165.67	457.92	168.91
Other federal government:														
Bureau of Land Management	--	--	38.07	22.58	38.07	22.58	--	--	0.33	0.33	0.33	0.33	38.39	22.58
Department of Defense and Energy	--	--	63.23	39.13	63.23	39.13	--	--	--	--	--	--	63.23	39.13
National Park Service	--	--	--	--	--	--	--	--	105.23	117.17	105.23	117.17	105.23	117.17
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	12.04	11.94	12.04	11.94	--	--	--	--	--	--	12.04	11.94
Total	--	--	113.33	46.69	113.33	46.69	--	--	105.56	117.17	105.56	117.17	218.89	126.13
State and local government:														
Local	--	--	133.50	86.59	133.50	86.59	92.20	39.96	158.25	66.78	250.45	77.23	383.95	115.93
State	48.01	50.12	3.85	3.36	51.86	50.24	250.39	128.96	222.35	92.61	472.74	158.61	524.60	166.20
Other public	--	--	--	--	--	--	16.64	18.53	2.19	2.37	18.83	18.68	18.83	18.68
Total	48.01	50.12	137.35	86.65	185.36	100.11	359.23	136.16	382.80	114.02	742.03	176.58	927.38	201.41
Private:														
Corporate	304.04	169.05	238.83	68.50	542.87	182.39	--	--	--	--	--	--	542.87	182.39
Noncorporate private:														
Total, noncorporate private	867.25	248.94	979.13	143.77	1,846.38	286.23	--	--	--	--	--	--	1,846.38	286.23
All private	1,171.29	299.83	1,217.96	158.13	2,389.25	338.02	--	--	--	--	--	--	2,389.25	338.02
All owners	1,219.30	303.90	1,540.19	189.08	2,759.50	356.99	544.35	175.33	689.59	182.93	1,233.94	267.43	3,993.43	444.77

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C64: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2008-2017: Central Valley

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal government:														
Bureau of Land Management	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
State and local government:														
Local	--	--	6.76	6.92	6.76	6.92	--	--	--	--	--	--	6.76	6.92
State	--	--	--	--	--	--	--	--	10.47	10.68	10.47	10.68	10.47	10.68
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	6.76	6.92	6.76	6.92	--	--	10.47	10.68	10.47	10.68	17.23	12.72
Private:														
Corporate	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Noncorporate private:														
Total, noncorporate private	--	--	72.99	33.91	72.99	33.91	--	--	--	--	--	--	72.99	33.91
All private	--	--	72.99	33.91	72.99	33.91	--	--	--	--	--	--	72.99	33.91
All owners	--	--	79.75	34.61	79.75	34.61	--	--	10.47	10.68	10.47	10.68	90.22	36.22

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C65: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2008-2017: Eastside

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	1,766.50	231.07	1,070.69	161.42	2,837.19	280.34	265.60	120.82	227.00	74.38	492.60	141.22	3,329.79	313.53
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1,766.50	231.07	1,070.69	161.42	2,837.19	280.34	265.60	120.82	227.00	74.38	492.60	141.22	3,329.79	313.53
Other federal government:														
Bureau of Land Management	133.12	90.15	389.08	75.66	522.20	117.37	--	--	48.18	24.58	48.18	24.58	570.39	119.30
Department of Defense and Energy	--	--	13.94	9.30	13.94	9.30	--	--	--	--	--	--	13.94	9.30
National Park Service	--	--	--	--	--	--	--	--	62.43	24.95	62.43	24.95	62.43	24.95
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	133.12	90.15	403.02	76.09	536.14	117.65	--	--	110.61	34.85	110.61	34.85	646.76	121.44
State and local government:														
Local	--	--	12.30	12.40	12.30	12.40	--	--	--	--	--	--	12.30	12.40
State	--	--	--	--	--	--	19.72	21.96	0.39	0.34	20.11	21.96	20.11	21.96
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	12.30	12.40	12.30	12.40	19.72	21.96	0.39	0.34	20.11	21.96	32.41	25.22
Private:														
Corporate	676.65	143.26	61.48	28.98	738.13	146.29	--	--	--	--	--	--	738.13	146.29
Noncorporate private:														
Total, noncorporate private	238.16	85.16	31.08	10.81	269.24	85.91	--	--	--	--	--	--	269.24	85.91
All private	914.81	165.59	92.56	30.70	1,007.37	168.55	--	--	--	--	--	--	1,007.37	168.55
All owners	2,814.43	299.42	1,578.57	181.49	4,393.00	348.77	285.32	122.80	338.01	82.14	623.33	147.10	5,016.33	377.80

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C66: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	12,872.21	797.84	1,009.48	234.84	13,881.69	824.94	6,400.76	558.50	533.37	145.30	6,934.13	573.02	20,815.83	993.91
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	12,872.21	797.84	1,009.48	234.84	13,881.69	824.94	6,400.76	558.50	533.37	145.30	6,934.13	573.02	20,815.83	993.91
Other federal government:														
Bureau of Land Management	382.88	96.88	159.11	62.38	541.99	116.13	16.06	15.92	33.79	22.73	49.85	27.75	591.84	119.33
Department of Defense and Energy	--	--	--	--	--	--	--	--	4.02	4.16	4.02	4.16	4.02	4.16
National Park Service	--	--	--	--	--	--	772.74	338.31	172.32	86.62	945.06	349.45	945.06	349.45
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	0.03	0.02	0.03	0.02	--	--	0.68	0.75	0.68	0.75	0.71	0.75
Total	382.88	96.88	159.13	62.38	542.02	116.13	788.80	338.54	210.81	89.65	999.61	350.43	1,541.62	367.20
State and local government:														
Local	0.92	0.77	3.34	2.27	4.26	2.40	--	--	6.33	7.01	6.33	7.01	10.59	7.41
State	23.97	17.95	9.94	7.38	33.91	19.41	30.68	29.39	71.39	52.22	102.06	60.04	135.97	63.10
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	24.89	17.97	13.28	7.72	38.17	19.56	30.68	29.39	77.72	52.69	108.39	60.45	146.56	63.51
Private:														
Corporate	5,023.23	571.71	293.00	85.84	5,316.23	577.57	--	--	--	--	--	--	5,316.23	577.57
Noncorporate private:														
Total, noncorporate private	2,646.81	328.96	1,392.68	203.92	4,039.49	385.15	--	--	--	--	--	--	4,039.49	385.15
All private	7,670.04	647.97	1,685.68	220.69	9,355.72	681.88	--	--	--	--	--	--	9,355.72	681.88
All owners	20,950.02	1,031.51	2,867.57	328.05	23,817.60	1,075.24	7,220.24	653.32	821.90	178.68	8,042.14	673.98	31,859.73	1,258.90

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C67: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2008-2017: North Coast

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	57.02	33.88	1.81	1.74	58.83	33.92	81.21	72.93	--	--	81.21	72.93	140.04	80.32
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	57.02	33.88	1.81	1.74	58.83	33.92	81.21	72.93	--	--	81.21	72.93	140.04	80.32
Other federal government:														
Bureau of Land Management	83.50	42.14	--	--	83.50	42.14	253.58	105.60	--	--	253.58	105.60	337.08	113.77
Department of Defense and Energy	20.24	15.35	--	--	20.24	15.35	--	--	--	--	--	--	20.24	15.35
National Park Service	--	--	--	--	--	--	390.72	199.30	3.50	3.00	394.22	199.31	394.22	199.31
U.S. Fish and Wildlife Service	--	--	--	--	--	--	1.57	1.60	--	--	1.57	1.60	1.57	1.60
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	103.74	44.85	--	--	103.74	44.85	645.87	225.16	3.50	3.00	649.37	225.07	753.11	228.64
State and local government:														
Local	241.36	217.48	2.66	2.04	244.02	217.49	--	--	41.37	15.85	41.37	15.85	285.39	218.07
State	274.32	115.53	--	--	274.32	115.53	1,408.10	376.41	37.75	35.62	1,445.85	378.09	1,720.17	373.14
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	515.68	246.26	2.66	2.04	518.34	246.27	1,408.10	376.41	79.12	38.99	1,487.22	378.42	2,005.57	431.49
Private:														
Corporate	9,105.87	889.75	49.71	22.56	9,155.58	889.90	--	--	--	--	--	--	9,155.58	889.90
Noncorporate private:														
Total, noncorporate private	4,099.20	513.78	233.00	59.49	4,332.20	516.79	--	--	--	--	--	--	4,332.20	516.79
All private	13,205.07	997.12	282.71	63.52	13,487.78	998.10	--	--	--	--	--	--	13,487.78	998.10
All owners	13,881.51	1,027.74	287.19	63.58	14,168.69	1,028.69	2,135.18	444.63	82.62	39.11	2,217.80	446.28	16,386.50	1,110.93

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C68: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	24,247.70	1,041.79	1,267.44	187.35	25,515.14	1,048.55	6,028.09	738.27	1,423.49	224.60	7,451.59	761.04	32,966.73	1,283.00
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	24,247.70	1,041.79	1,267.44	187.35	25,515.14	1,048.55	6,028.09	738.27	1,423.49	224.60	7,451.59	761.04	32,966.73	1,283.00
Other federal government:														
Bureau of Land Management	166.49	52.29	389.92	96.45	556.41	108.90	6.06	4.64	307.17	130.24	313.23	130.33	869.64	169.06
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	5,488.40	610.53	888.86	248.79	6,377.26	650.91	6,377.26	650.91
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	9.85	8.68	9.85	8.68	--	--	0.69	0.72	0.69	0.72	10.54	8.71
Total	166.49	52.29	399.78	96.66	566.27	109.03	5,494.45	610.52	1,196.72	279.03	6,691.17	662.66	7,257.44	664.17
State and local government:														
Local	83.88	37.38	84.38	37.79	168.26	53.18	--	--	0.44	0.38	0.44	0.38	168.70	53.18
State	83.25	53.58	22.70	16.56	105.95	55.41	372.42	152.39	101.18	51.87	473.60	159.75	579.55	165.86
Other public	--	--	0.25	0.22	0.25	0.22	--	--	--	--	--	--	0.25	0.22
Total	167.13	65.33	107.32	41.26	274.45	76.80	372.42	152.39	101.63	51.87	474.04	159.75	748.50	174.17
Private:														
Corporate	8,627.16	573.66	435.29	91.95	9,062.45	579.80	--	--	--	--	--	--	9,062.45	579.80
Noncorporate private:														
Total, noncorporate private	3,083.30	382.58	1,963.86	197.93	5,047.16	427.91	--	--	--	--	--	--	5,047.16	427.91
All private	11,710.47	664.54	2,399.14	215.48	14,109.61	689.53	--	--	--	--	--	--	14,109.61	689.53
All owners	36,291.79	1,234.84	4,173.67	303.53	40,465.46	1,256.24	11,894.97	969.76	2,721.84	361.70	14,616.80	1,021.10	55,082.27	1,590.46

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C69: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	466.11	138.09	597.60	110.25	1,063.71	176.34	311.38	104.77	487.43	132.35	798.81	167.45	1,862.51	242.36
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	466.11	138.09	597.60	110.25	1,063.71	176.34	311.38	104.77	487.43	132.35	798.81	167.45	1,862.51	242.36
Other federal government:														
Bureau of Land Management	--	--	31.52	22.45	31.52	22.45	--	--	54.66	50.71	54.66	50.71	86.18	55.46
Department of Defense and Energy	6.33	6.47	--	--	6.33	6.47	--	--	--	--	--	--	6.33	6.47
National Park Service	--	--	--	--	--	--	--	--	80.31	42.17	80.31	42.17	80.31	42.17
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	14.50	11.46	14.50	11.46	--	--	0.00	0.00	0.00	0.00	14.51	11.46
Total	6.33	6.47	46.02	25.21	52.35	26.02	--	--	134.97	64.46	134.97	64.46	187.33	69.51
State and local government:														
Local	--	--	21.37	15.98	21.37	15.98	--	--	1.38	1.36	1.38	1.36	22.75	16.00
State	--	--	--	--	--	--	102.38	89.00	55.43	33.75	157.81	95.04	157.81	95.04
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	21.37	15.98	21.37	15.98	102.38	89.00	56.82	33.78	159.20	95.05	180.56	96.37
Private:														
Corporate	9.43	9.29	37.32	19.25	46.75	21.38	--	--	--	--	--	--	46.75	21.38
Noncorporate private:														
Total, noncorporate private	142.60	90.32	396.47	109.73	539.07	178.34	--	--	--	--	--	--	539.07	178.34
All private	152.04	90.80	433.78	111.40	585.82	179.62	--	--	--	--	--	--	585.82	179.62
All owners	624.47	165.39	1,098.77	159.32	1,723.24	253.38	413.76	137.47	679.22	151.04	1,092.98	203.05	2,816.23	324.10

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C70.1: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10 year averages): 2001 - 2010

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	40,004.09	1,147.85	4,943.43	371.42	44,947.52	1,170.85	11,508.35	746.01	2,561.38	258.37	14,069.73	784.83	59,017.25	1,224.01
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	40,004.09	1,147.85	4,943.43	371.42	44,947.52	1,170.85	11,508.35	746.01	2,561.38	258.37	14,069.73	784.83	59,017.25	1,224.01
Other federal government:														
Bureau of Land Management	729.78	124.86	997.50	121.77	1,727.29	172.36	50.02	24.16	378.44	95.79	428.46	98.69	2,155.75	195.57
Department of Defense and Energy	10.05	11.04	49.20	21.12	59.25	23.83	--	--	--	--	--	--	59.25	23.83
National Park Service	--	--	--	--	--	--	6,344.55	734.86	932.87	167.47	7,277.41	732.51	7,277.41	732.51
U.S. Fish and Wildlife Service	--	--	--	--	--	--	10.55	12.97	--	--	10.55	12.97	10.55	12.97
Other federal	--	--	57.25	24.60	57.25	24.60	125.37	110.65	28.62	24.06	153.99	113.08	211.24	115.72
Total	739.83	125.34	1,103.96	125.33	1,843.79	174.77	6,530.48	739.92	1,339.92	193.55	7,870.41	741.87	9,714.20	755.01
State and local government:														
Local	167.86	71.33	190.93	71.79	358.79	101.22	106.33	53.94	276.35	71.43	382.68	89.32	741.46	134.53
State	552.68	164.50	43.85	19.97	596.53	165.59	2,427.59	433.98	410.73	95.88	2,838.32	442.55	3,434.86	457.38
Other public	--	--	0.24	0.22	0.24	0.22	22.80	20.43	10.89	8.73	33.70	22.22	33.94	22.22
Total	720.53	179.05	235.02	74.50	955.56	193.78	2,556.73	437.70	697.98	119.50	3,254.70	451.47	4,210.26	476.07
Private:														
Corporate	25,599.19	1,213.00	540.60	79.08	26,139.80	1,215.58	--	--	--	--	--	--	26,139.80	1,215.58
Noncorporate private:														
Total, noncorporate private	13,647.87	799.64	5,546.89	296.58	19,194.76	839.30	--	--	--	--	--	--	19,194.76	839.30
All private	39,247.06	1,283.15	6,087.49	303.49	45,334.56	1,292.81	--	--	--	--	--	--	45,334.56	1,292.81
All owners	80,711.52	1,725.96	12,369.89	499.29	93,081.42	1,750.70	20,595.56	1,116.40	4,599.28	343.83	25,194.84	1,148.24	118,276.26	1,922.70

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C70.2: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10 year averages): 2002 - 2011

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	40,415.29	1,167.25	4,769.25	373.08	45,184.55	1,190.42	11,545.90	751.13	2,514.34	258.54	14,060.24	789.61	59,244.79	1,248.66
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	40,415.29	1,167.25	4,769.25	373.08	45,184.55	1,190.42	11,545.90	751.13	2,514.34	258.54	14,060.24	789.61	59,244.79	1,248.66
Other federal government:														
Bureau of Land Management	728.71	124.29	981.68	123.69	1,710.39	173.87	47.49	22.58	426.74	110.85	474.22	113.04	2,184.61	204.68
Department of Defense and Energy	16.54	13.03	49.50	20.78	66.04	24.52	--	--	--	--	--	--	66.04	24.52
National Park Service	--	--	--	--	--	--	6,613.91	759.34	944.59	170.11	7,558.49	756.24	7,558.49	756.24
U.S. Fish and Wildlife Service	--	--	--	--	--	--	10.55	12.97	--	--	10.55	12.97	10.55	12.97
Other federal	--	--	56.78	24.50	56.78	24.50	125.96	111.10	28.73	24.16	154.70	113.53	211.48	116.15
Total	745.25	124.97	1,087.96	127.10	1,833.21	176.38	6,797.91	764.15	1,400.05	202.52	8,197.96	765.24	10,031.18	778.26
State and local government:														
Local	292.74	203.06	224.13	93.47	516.87	223.55	109.56	54.31	262.55	71.08	372.11	89.26	888.98	240.45
State	551.45	163.88	41.60	18.51	593.05	164.80	2,411.66	433.92	432.27	97.62	2,843.93	442.94	3,436.98	459.07
Other public	--	--	0.25	0.22	0.25	0.22	23.49	20.73	6.78	7.75	30.27	22.14	30.52	22.14
Total	844.19	260.77	265.98	95.28	1,110.17	277.56	2,544.72	437.71	701.60	120.58	3,246.32	451.82	4,356.48	517.67
Private:														
Corporate	24,519.39	1,231.46	699.50	109.75	25,218.90	1,233.13	--	--	--	--	--	--	25,218.90	1,233.13
Noncorporate private:														
Total, noncorporate private	13,677.71	805.25	5,565.38	317.25	19,243.10	851.78	--	--	--	--	--	--	19,243.10	851.78
All private	38,197.11	1,313.57	6,264.89	331.26	44,461.99	1,325.50	--	--	--	--	--	--	44,461.99	1,325.50
All owners	80,201.84	1,766.96	12,388.09	521.37	92,589.93	1,794.05	20,888.53	1,137.61	4,615.99	349.47	25,504.52	1,168.38	118,094.44	1,973.84

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C70.3: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10 year averages): 2003 - 2012

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	39,821.12	1,081.19	4,524.87	362.29	44,346.00	1,097.44	12,196.51	702.01	2,673.65	267.30	14,870.16	721.18	59,216.16	1,256.25
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	39,821.12	1,081.19	4,524.87	362.29	44,346.00	1,097.44	12,196.51	702.01	2,673.65	267.30	14,870.16	721.18	59,216.16	1,256.25
Other federal government:														
Bureau of Land Management	797.55	130.27	1,024.13	133.55	1,821.68	184.63	73.40	36.78	350.11	103.31	423.51	109.65	2,245.19	211.80
Department of Defense and Energy	24.93	16.07	45.61	20.29	70.54	25.88	--	--	3.95	4.09	3.95	4.09	74.48	26.20
National Park Service	--	--	--	--	--	--	6,582.13	729.20	1,048.87	218.01	7,631.00	752.04	7,631.00	752.04
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	68.11	27.57	68.11	27.57	100.56	106.18	31.29	25.08	131.85	109.11	199.96	112.32
Total	822.48	130.73	1,137.85	137.17	1,960.33	187.00	6,756.09	732.17	1,434.22	239.57	8,190.31	759.86	10,150.64	757.61
State and local government:														
Local	272.76	213.53	210.59	92.35	483.35	232.66	108.91	53.44	242.34	66.31	351.25	83.90	834.59	244.83
State	517.57	157.75	44.31	19.76	561.88	157.65	2,145.11	383.00	426.74	100.86	2,571.85	389.74	3,133.73	371.78
Other public	--	--	0.25	0.22	0.25	0.22	15.70	18.16	7.95	8.61	23.65	20.10	23.90	20.10
Total	790.33	264.22	255.14	94.44	1,045.47	279.84	2,269.72	384.70	677.03	119.63	2,946.76	395.52	3,992.23	432.18
Private:														
Corporate	24,119.88	1,184.35	635.40	97.87	24,755.28	1,186.54	--	--	--	--	--	--	24,755.28	1,186.54
Noncorporate private:														
Total, noncorporate private	13,637.90	815.75	5,550.92	332.31	19,188.82	863.65	--	--	--	--	--	--	19,188.82	863.65
All private	37,757.78	1,278.74	6,186.32	343.44	43,944.10	1,292.04	--	--	--	--	--	--	43,944.10	1,292.04
All owners	79,191.71	1,684.95	12,104.18	524.50	91,295.89	1,709.22	21,222.33	1,084.08	4,784.90	378.17	26,007.23	1,118.69	117,303.13	1,953.38

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C70.4: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10 year averages): 2004 - 2013

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	39,836.41	1,094.66	4,466.97	361.37	44,303.38	1,110.43	12,454.59	757.75	2,724.51	274.63	15,179.10	774.58	59,482.48	1,301.64
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	39,836.41	1,094.66	4,466.97	361.37	44,303.38	1,110.43	12,454.59	757.75	2,724.51	274.63	15,179.10	774.58	59,482.48	1,301.64
Other federal government:														
Bureau of Land Management	773.05	126.64	985.54	132.33	1,758.59	181.23	79.05	37.35	372.75	106.11	451.80	112.48	2,210.39	210.34
Department of Defense and Energy	24.93	16.07	38.87	15.55	63.80	22.36	--	--	3.95	4.09	3.95	4.09	67.75	22.73
National Park Service	--	--	--	--	--	--	6,350.17	648.03	1,051.13	220.35	7,401.30	675.36	7,401.30	675.36
U.S. Fish and Wildlife Service	--	--	--	--	--	--	1.57	1.61	--	--	1.57	1.61	1.57	1.61
Other federal	--	--	64.50	26.10	64.50	26.10	--	--	6.27	4.31	6.27	4.31	70.77	26.46
Total	797.97	127.12	1,088.92	135.14	1,886.89	183.05	6,430.78	647.04	1,434.10	241.68	7,864.88	680.06	9,751.77	678.59
State and local government:														
Local	288.98	222.27	207.39	91.87	496.37	240.52	105.39	46.00	229.95	64.96	335.34	77.53	831.72	252.38
State	513.80	150.23	44.29	19.76	558.10	150.15	2,091.79	380.26	420.17	101.38	2,511.95	386.95	3,070.05	367.28
Other public	--	--	0.25	0.22	0.25	0.22	16.98	18.93	7.95	8.61	24.94	20.80	25.19	20.80
Total	802.78	266.88	251.93	93.97	1,054.72	282.21	2,214.16	381.91	658.07	119.43	2,872.23	392.67	3,926.95	431.90
Private:														
Corporate	23,733.94	1,164.29	709.88	108.34	24,443.82	1,166.61	--	--	--	--	--	--	24,443.82	1,166.61
Noncorporate private:														
Total, noncorporate private	13,229.55	797.35	5,349.94	328.45	18,579.49	845.41	--	--	--	--	--	--	18,579.49	845.41
All private	36,963.49	1,254.07	6,059.82	342.45	43,023.31	1,267.92	--	--	--	--	--	--	43,023.31	1,267.92
All owners	78,400.66	1,676.17	11,867.63	522.59	90,268.29	1,700.57	21,099.54	1,066.44	4,816.68	384.63	25,916.21	1,102.05	116,184.50	1,942.28

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C70.5: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10 year averages): 2005 - 2014

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	39,424.59	1,104.32	4,226.41	347.05	43,650.99	1,116.98	13,024.41	779.10	2,814.28	295.68	15,838.68	796.78	59,489.67	1,325.62
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	39,424.59	1,104.32	4,226.41	347.05	43,650.99	1,116.98	13,024.41	779.10	2,814.28	295.68	15,838.68	796.78	59,489.67	1,325.62
Other federal government:														
Bureau of Land Management	770.63	127.99	956.79	129.68	1,727.41	180.36	118.34	48.23	414.73	125.31	533.07	134.26	2,260.48	221.40
Department of Defense and Energy	24.94	16.06	36.29	15.65	61.23	22.42	--	--	3.95	4.08	3.95	4.08	65.18	22.79
National Park Service	--	--	--	--	--	--	6,363.26	645.01	1,013.69	213.00	7,376.95	670.37	7,376.95	670.37
U.S. Fish and Wildlife Service	--	--	--	--	--	--	1.57	1.61	--	--	1.57	1.61	1.57	1.61
Other federal	--	--	64.50	26.09	64.50	26.09	--	--	6.27	4.31	6.27	4.31	70.76	26.44
Total	795.57	128.56	1,057.57	132.53	1,853.15	182.29	6,483.17	644.17	1,438.63	244.06	7,921.80	678.38	9,774.94	676.38
State and local government:														
Local	321.64	223.59	215.48	92.43	537.12	241.95	105.57	46.10	198.03	59.72	303.61	74.62	840.73	252.96
State	491.47	147.29	44.55	19.74	536.03	147.21	2,147.95	388.27	427.40	101.16	2,575.35	394.52	3,111.37	375.48
Other public	--	--	0.25	0.22	0.25	0.22	16.98	18.92	7.95	8.61	24.94	20.78	25.18	20.78
Total	813.12	266.35	260.28	94.51	1,073.40	281.89	2,270.50	389.85	633.39	116.97	2,903.89	399.66	3,977.28	439.23
Private:														
Corporate	23,299.71	1,144.92	771.45	109.90	24,071.16	1,147.46	--	--	--	--	--	--	24,071.16	1,147.46
Noncorporate private:														
Total, noncorporate private	13,003.92	813.30	5,257.28	329.44	18,261.20	860.98	--	--	--	--	--	--	18,261.20	860.98
All private	36,303.63	1,254.36	6,028.73	343.40	42,332.36	1,268.44	--	--	--	--	--	--	42,332.36	1,268.44
All owners	77,336.90	1,683.62	11,572.99	512.68	88,909.89	1,705.65	21,778.08	1,082.83	4,886.29	400.66	26,664.37	1,119.20	115,574.26	1,960.63

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C70.6: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10 year averages): 2006 - 2015

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	39,086.97	1,111.16	4,015.23	343.19	43,102.19	1,124.47	13,138.60	806.97	2,748.71	291.54	15,887.32	825.22	58,989.51	1,348.83
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	39,086.97	1,111.16	4,015.23	343.19	43,102.19	1,124.47	13,138.60	806.97	2,748.71	291.54	15,887.32	825.22	58,989.51	1,348.83
Other federal government:														
Bureau of Land Management	851.66	157.69	966.15	132.28	1,817.80	203.94	179.87	81.05	411.43	125.32	591.30	149.24	2,409.10	249.53
Department of Defense and Energy	24.94	16.06	37.01	15.69	61.95	22.45	--	--	4.02	4.16	4.02	4.16	65.97	22.83
National Park Service	--	--	--	--	--	--	6,459.69	671.97	1,143.43	245.77	7,603.12	706.95	7,603.12	706.95
U.S. Fish and Wildlife Service	--	--	--	--	--	--	1.57	1.61	--	--	1.57	1.61	1.57	1.61
Other federal	--	--	65.92	26.52	65.92	26.52	--	--	6.28	4.31	6.28	4.31	72.20	26.87
Total	876.60	158.15	1,069.08	135.26	1,945.68	205.68	6,641.13	674.17	1,565.16	272.93	8,206.29	717.41	10,151.97	720.55
State and local government:														
Local	317.61	219.33	239.46	94.75	557.06	238.92	87.62	35.01	192.17	59.78	279.78	68.51	836.85	248.32
State	432.77	131.79	39.86	19.08	472.63	131.88	2,150.17	391.16	510.40	131.12	2,660.57	406.01	3,133.20	387.29
Other public	--	--	0.25	0.22	0.25	0.22	16.64	18.53	7.95	8.61	24.59	20.44	24.84	20.44
Total	750.38	254.39	279.57	96.65	1,029.94	271.51	2,254.43	391.60	710.51	143.72	2,964.94	409.89	3,994.88	447.01
Private:														
Corporate	24,262.83	1,177.74	979.31	137.34	25,242.15	1,182.75	--	--	--	--	--	--	25,242.15	1,182.75
Noncorporate private:														
Total, noncorporate private	12,257.77	770.44	5,168.57	330.26	17,426.35	828.57	--	--	--	--	--	--	17,426.35	828.57
All private	36,520.61	1,264.47	6,147.89	352.61	42,668.50	1,284.55	--	--	--	--	--	--	42,668.50	1,284.55
All owners	77,234.55	1,694.58	11,511.76	517.14	88,746.31	1,721.36	22,034.17	1,121.46	5,024.38	423.73	27,058.55	1,165.09	115,804.86	1,998.35

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C70.7: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10 year averages): 2007 - 2016

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	38,804.74	1,117.87	3,988.58	347.63	42,793.31	1,132.99	13,098.66	837.51	2,898.64	307.15	15,997.30	859.78	58,790.61	1,378.09
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	38,804.74	1,117.87	3,988.58	347.63	42,793.31	1,132.99	13,098.66	837.51	2,898.64	307.15	15,997.30	859.78	58,790.61	1,378.09
Other federal government:														
Bureau of Land Management	757.46	147.48	973.00	132.35	1,730.46	196.78	276.23	106.96	407.47	134.94	683.70	172.19	2,414.16	257.58
Department of Defense and Energy	26.56	16.66	77.47	40.25	104.03	43.56	--	--	4.34	4.33	4.34	4.33	108.38	43.77
National Park Service	--	--	--	--	--	--	6,398.88	666.68	1,327.42	292.49	7,726.30	717.41	7,726.30	717.41
U.S. Fish and Wildlife Service	--	--	--	--	--	--	1.57	1.61	--	--	1.57	1.61	1.57	1.61
Other federal	--	--	47.03	19.55	47.03	19.55	--	--	6.33	4.31	6.33	4.31	53.36	20.02
Total	784.02	148.19	1,097.50	139.05	1,881.52	200.89	6,676.68	669.48	1,745.57	319.87	8,422.25	730.00	10,303.77	733.40
State and local government:														
Local	327.49	220.91	270.25	98.43	597.74	241.79	93.02	39.84	181.86	58.59	274.87	70.09	872.61	251.45
State	429.80	133.54	35.70	18.24	465.49	133.32	2,189.90	392.95	525.12	132.16	2,715.02	408.19	3,180.52	384.85
Other public	--	--	0.25	0.22	0.25	0.22	16.64	18.54	7.82	8.47	24.46	20.38	24.71	20.38
Total	757.29	256.67	306.20	100.10	1,063.48	274.75	2,299.56	393.49	714.81	144.18	3,014.36	411.97	4,077.84	446.26
Private:														
Corporate	24,041.50	1,156.87	1,021.07	138.69	25,062.57	1,161.97	--	--	--	--	--	--	25,062.57	1,161.97
Noncorporate private:														
Total, noncorporate private	11,682.31	748.22	5,211.99	339.04	16,894.31	812.45	--	--	--	--	--	--	16,894.31	812.45
All private	35,723.82	1,235.50	6,233.06	361.24	41,956.88	1,259.82	--	--	--	--	--	--	41,956.88	1,259.82
All owners	76,069.86	1,678.40	11,625.33	527.49	87,695.19	1,709.96	22,074.90	1,141.57	5,359.01	465.55	27,433.91	1,198.12	115,129.10	2,009.30

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C70.8: Aboveground Carbon Mass of Down Dead Wood, by Owner Group and Forest Land Status, All California (10 year averages): 2008 - 2017

*information duplicated in Table C62

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	39,409.55	1,167.10	4,018.57	349.40	43,428.12	1,180.65	13,272.15	873.62	2,872.54	306.69	16,144.69	895.67	59,572.81	1,439.96
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	39,409.55	1,167.10	4,018.57	349.40	43,428.12	1,180.65	13,272.15	873.62	2,872.54	306.69	16,144.69	895.67	59,572.81	1,439.96
Other federal government:														
Bureau of Land Management	765.99	147.02	1,007.70	139.38	1,773.69	201.03	275.70	106.90	444.12	143.53	719.83	178.95	2,493.51	265.23
Department of Defense and Energy	26.57	16.66	77.17	40.22	103.73	43.53	--	--	4.02	4.16	4.02	4.16	107.75	43.73
National Park Service	--	--	--	--	--	--	6,651.86	695.81	1,312.66	291.27	7,964.51	743.85	7,964.51	743.85
U.S. Fish and Wildlife Service	--	--	--	--	--	--	1.57	1.60	--	--	1.57	1.60	1.57	1.60
Other federal	--	--	36.42	18.69	36.42	18.69	--	--	1.37	1.04	1.37	1.04	37.80	18.71
Total	792.56	147.73	1,121.28	145.62	1,913.84	204.97	6,929.13	697.55	1,762.17	322.19	8,691.30	756.57	10,605.15	759.12
State and local government:														
Local	326.16	220.67	264.30	96.87	590.46	240.94	92.20	39.96	207.78	68.96	299.98	79.13	890.44	253.32
State	429.54	133.46	36.49	18.44	466.04	133.27	2,183.70	398.02	498.96	127.88	2,682.65	412.10	3,148.69	389.09
Other public	--	--	0.25	0.22	0.25	0.22	16.64	18.53	2.19	2.37	18.83	18.68	19.08	18.68
Total	755.70	256.43	301.04	98.61	1,056.74	273.98	2,292.54	398.35	708.93	144.77	3,001.47	417.40	4,058.21	450.86
Private:														
Corporate	23,746.38	1,102.51	1,115.63	148.32	24,862.01	1,108.69	--	--	--	--	--	--	24,862.01	1,108.69
Noncorporate private:														
Total, noncorporate private	11,077.34	736.87	5,069.19	333.68	16,146.53	800.61	--	--	--	--	--	--	16,146.53	800.61
All private	34,823.72	1,187.71	6,184.82	359.79	41,008.54	1,213.55	--	--	--	--	--	--	41,008.54	1,213.55
All owners	75,781.53	1,677.78	11,625.72	529.16	87,407.24	1,709.51	22,493.82	1,185.88	5,343.64	467.08	27,837.46	1,241.66	115,244.70	2,034.31

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C71: Forest Floor by Owner Group and Forest Land Status, 2008-2017: All California

*information duplicated in Table C79.8

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	49,987.35	770.93	5,862.33	281.31	55,849.68	727.32	14,740.39	518.58	4,119.42	279.54	18,859.81	506.65	74,709.48	748.42
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	49,987.35	770.93	5,862.33	281.31	55,849.68	727.32	14,740.39	518.58	4,119.42	279.54	18,859.81	506.65	74,709.48	748.42
Other federal government:														
Bureau of Land Management	1,234.67	196.83	1,864.30	155.19	3,098.97	248.35	351.60	106.37	445.87	89.33	797.46	138.89	3,896.43	276.91
Department of Defense and Energy	44.81	24.73	148.96	41.52	193.77	48.33	--	--	16.02	16.58	16.02	16.58	209.79	51.09
National Park Service	--	--	--	--	--	--	6,582.52	434.60	1,560.11	204.54	8,142.63	462.85	8,142.63	462.85
U.S. Fish and Wildlife Service	--	--	--	--	--	--	16.90	17.29	1.05	1.07	17.94	17.32	17.94	17.32
Other federal	--	--	88.71	27.11	88.71	27.11	--	--	8.16	6.01	8.16	6.01	96.87	27.77
Total	1,279.49	197.92	2,101.96	160.90	3,381.45	252.42	6,951.01	438.29	2,031.20	217.61	8,982.21	465.91	12,363.66	475.57
State and local government:														
Local	296.61	100.50	286.34	60.35	582.95	118.56	163.25	62.38	398.53	79.25	561.79	97.73	1,144.74	152.90
State	484.87	120.40	114.67	42.33	599.54	125.98	1,351.12	165.01	560.00	87.37	1,911.11	179.91	2,510.65	175.61
Other public	--	--	8.55	6.61	8.55	6.61	24.13	26.87	17.05	18.45	41.19	32.60	49.74	33.26
Total	781.48	156.37	409.57	73.95	1,191.05	172.63	1,538.50	174.53	975.59	114.67	2,514.09	197.60	3,705.14	221.37
Private:														
Corporate	22,695.96	687.76	1,836.31	158.05	24,532.27	695.13	--	--	--	--	--	--	24,532.27	695.13
Noncorporate private:														
Total, noncorporate private	12,405.56	550.65	8,540.05	287.65	20,945.61	589.37	--	--	--	--	--	--	20,945.61	589.37
All private	35,101.52	671.75	10,376.36	314.13	45,477.89	656.87	--	--	--	--	--	--	45,477.89	656.87
All owners	87,149.84	1,012.72	18,750.22	453.21	105,900.06	972.03	23,229.90	699.56	7,126.21	371.98	30,356.10	713.10	136,256.17	1,005.45

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C72: Forest Floor by Owner Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	4.94	4.52	137.71	38.68	142.65	38.92	106.67	51.96	367.75	80.17	474.42	96.61	617.06	104.16
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	4.94	4.52	137.71	38.68	142.65	38.92	106.67	51.96	367.75	80.17	474.42	96.61	617.06	104.16
Other federal government:														
Bureau of Land Management	--	--	79.28	28.83	79.28	28.83	--	--	8.99	6.54	8.99	6.54	88.27	29.56
Department of Defense and Energy	--	--	99.93	32.62	99.93	32.62	--	--	--	--	--	--	99.93	32.62
National Park Service	--	--	--	--	--	--	--	--	19.31	21.51	19.31	21.51	19.31	21.51
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	15.95	13.17	15.95	13.17	--	--	0.17	0.19	0.17	0.19	16.12	13.17
Total	--	--	195.15	45.19	195.15	45.19	--	--	28.48	22.48	28.48	22.48	223.63	50.47
State and local government:														
Local	--	--	87.87	39.85	87.87	39.85	163.25	62.38	263.50	63.05	426.75	85.12	514.62	93.36
State	71.91	43.53	21.15	15.65	93.06	47.33	176.40	72.10	291.02	65.92	467.42	97.10	560.48	107.31
Other public	--	--	--	--	--	--	24.13	26.87	17.05	18.45	41.19	32.60	41.19	32.60
Total	71.91	43.53	109.02	42.81	180.93	61.88	363.79	98.60	571.57	89.50	935.36	127.90	1,116.29	139.03
Private:														
Corporate	165.56	67.06	363.42	70.59	528.98	97.29	--	--	--	--	--	--	528.98	97.29
Noncorporate private:														
Total, noncorporate private	663.18	131.26	1,644.64	146.11	2,307.82	194.03	--	--	--	--	--	--	2,307.82	194.03
All private	828.74	146.73	2,008.06	160.87	2,836.80	215.89	--	--	--	--	--	--	2,836.80	215.89
All owners	905.59	153.36	2,449.94	176.72	3,355.53	232.30	470.46	111.45	967.79	121.59	1,438.25	161.07	4,793.78	280.00

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C73: Forest Floor by Owner Group and Forest Land Status, 2008-2017: Central Valley

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal government:														
Bureau of Land Management	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	1.05	1.07	1.05	1.07	1.05	1.07
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	1.05	1.07	1.05	1.07	1.05	1.07
State and local government:														
Local	--	--	8.38	6.16	8.38	6.16	--	--	--	--	--	--	8.38	6.16
State	--	--	--	--	--	--	--	--	9.15	8.20	9.15	8.20	9.15	8.20
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	8.38	6.16	8.38	6.16	--	--	9.15	8.20	9.15	8.20	17.53	10.25
Private:														
Corporate	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Noncorporate private:														
Total, noncorporate private	0.12	0.13	138.43	37.75	138.55	37.75	--	--	--	--	--	--	138.55	37.75
All private	0.12	0.13	138.43	37.75	138.55	37.75	--	--	--	--	--	--	138.55	37.75
All owners	0.12	0.13	146.81	38.24	146.93	38.24	--	--	10.20	8.27	10.20	8.27	157.12	39.13

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C74: Forest Floor by Owner Group and Forest Land Status, 2008-2017: Eastside

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	2,956.70	278.16	1,820.11	162.72	4,776.82	320.25	268.34	99.22	392.02	108.33	660.36	145.81	5,437.17	351.34
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2,956.70	278.16	1,820.11	162.72	4,776.82	320.25	268.34	99.22	392.02	108.33	660.36	145.81	5,437.17	351.34
Other federal government:														
Bureau of Land Management	101.33	46.24	981.03	119.49	1,082.36	127.80	--	--	138.41	52.14	138.41	52.14	1,220.77	135.45
Department of Defense and Energy	--	--	48.86	25.77	48.86	25.77	--	--	--	--	--	--	48.86	25.77
National Park Service	--	--	--	--	--	--	--	--	135.52	47.33	135.52	47.33	135.52	47.33
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	101.33	46.24	1,029.89	121.67	1,131.22	129.84	--	--	273.93	70.21	273.93	70.21	1,405.15	143.68
State and local government:														
Local	--	--	12.83	12.94	12.83	12.94	--	--	--	--	--	--	12.83	12.94
State	--	--	--	--	--	--	33.10	36.85	17.12	14.79	50.22	39.71	50.22	39.71
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	12.83	12.94	12.83	12.94	33.10	36.85	17.12	14.79	50.22	39.71	63.05	41.77
Private:														
Corporate	947.02	166.19	170.08	49.88	1,117.10	174.20	--	--	--	--	--	--	1,117.10	174.20
Noncorporate private:														
Total, noncorporate private	398.66	109.84	284.64	60.82	683.31	126.35	--	--	--	--	--	--	683.31	126.35
All private	1,345.68	197.65	454.72	78.26	1,800.40	213.49	--	--	--	--	--	--	1,800.40	213.49
All owners	4,403.72	345.88	3,317.56	218.42	7,721.27	407.71	301.43	105.84	683.07	129.94	984.51	166.64	8,705.78	438.66

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C75: Forest Floor by Owner Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	13,806.86	603.92	1,080.60	136.55	14,887.46	610.37	6,589.35	371.27	785.80	120.87	7,375.15	382.71	22,262.62	698.89
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	13,806.86	603.92	1,080.60	136.55	14,887.46	610.37	6,589.35	371.27	785.80	120.87	7,375.15	382.71	22,262.62	698.89
Other federal government:														
Bureau of Land Management	646.40	150.74	309.21	71.17	955.61	168.11	41.37	41.00	56.81	30.95	98.18	51.37	1,053.79	175.53
Department of Defense and Energy	--	--	--	--	--	--	--	--	16.02	16.58	16.02	16.58	16.02	16.58
National Park Service	--	--	--	--	--	--	249.67	79.86	100.35	38.67	350.02	89.29	350.02	89.29
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	8.20	6.30	8.20	6.30	--	--	1.68	1.86	1.68	1.86	9.88	6.57
Total	646.40	150.74	317.41	71.45	963.81	168.23	291.04	89.04	174.86	52.26	465.90	103.73	1,429.71	194.76
State and local government:														
Local	72.85	61.19	21.06	16.21	93.92	63.30	--	--	10.23	9.82	10.23	9.82	104.14	64.05
State	47.34	28.98	24.89	18.14	72.23	34.19	58.04	45.61	37.71	25.82	95.76	57.48	167.99	66.88
Other public	--	--	1.41	1.28	1.41	1.28	--	--	--	--	--	--	1.41	1.28
Total	120.19	67.70	47.37	24.35	167.56	71.95	58.04	45.61	47.94	27.63	105.99	58.31	273.54	92.59
Private:														
Corporate	4,699.85	385.94	531.40	85.84	5,231.25	394.81	--	--	--	--	--	--	5,231.25	394.81
Noncorporate private:														
Total, noncorporate private	3,226.25	304.31	1,976.50	154.98	5,202.75	339.54	--	--	--	--	--	--	5,202.75	339.54
All private	7,926.09	474.98	2,507.90	175.67	10,434.00	501.82	--	--	--	--	--	--	10,434.00	501.82
All owners	22,499.54	787.72	3,953.28	235.36	26,452.83	812.04	6,938.44	385.01	1,008.60	134.55	7,947.04	401.26	34,399.86	886.47

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C76: Forest Floor by Owner Group and Forest Land Status, 2008-2017: North Coast

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	93.18	49.56	22.22	21.33	115.41	53.95	51.71	39.08	--	--	51.71	39.08	167.12	66.57
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	93.18	49.56	22.22	21.33	115.41	53.95	51.71	39.08	--	--	51.71	39.08	167.12	66.57
Other federal government:														
Bureau of Land Management	118.41	52.55	--	--	118.41	52.55	242.96	78.82	--	--	242.96	78.82	361.37	95.13
Department of Defense and Energy	40.47	24.33	0.18	0.19	40.65	24.33	--	--	--	--	--	--	40.65	24.33
National Park Service	--	--	--	--	--	--	182.88	70.15	25.03	23.61	207.91	73.35	207.91	73.35
U.S. Fish and Wildlife Service	--	--	--	--	--	--	16.90	17.29	--	--	16.90	17.29	16.90	17.29
Other federal	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	158.89	57.91	0.18	0.19	159.06	57.91	442.73	106.04	25.03	23.61	467.76	107.20	626.82	120.98
State and local government:														
Local	56.60	33.15	13.89	9.99	70.49	36.98	--	--	112.86	46.88	112.86	46.88	183.35	59.71
State	205.13	69.42	2.05	1.87	207.19	69.44	611.96	108.53	38.14	31.49	650.10	113.12	857.28	113.84
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	261.74	76.93	15.94	10.16	277.68	78.68	611.96	108.53	151.00	56.48	762.96	122.44	1,040.63	128.02
Private:														
Corporate	4,738.83	323.11	89.05	33.56	4,827.89	324.74	--	--	--	--	--	--	4,827.89	324.74
Noncorporate private:														
Total, noncorporate private	3,285.40	270.37	390.63	77.15	3,676.03	280.00	--	--	--	--	--	--	3,676.03	280.00
All private	8,024.23	394.25	479.68	83.83	8,503.91	400.58	--	--	--	--	--	--	8,503.91	400.58
All owners	8,538.03	407.27	518.03	87.08	9,056.06	414.23	1,106.40	156.61	176.03	61.21	1,282.43	167.29	10,338.49	437.81

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C77: Forest Floor by Owner Group and Forest Land Status, 2008-2017: Sierra Cascades

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	32,585.75	870.32	2,143.82	195.06	34,729.57	868.28	7,269.40	488.13	2,208.69	225.61	9,478.09	504.69	44,207.66	968.13
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	32,585.75	870.32	2,143.82	195.06	34,729.57	868.28	7,269.40	488.13	2,208.69	225.61	9,478.09	504.69	44,207.66	968.13
Other federal government:														
Bureau of Land Management	368.53	110.62	464.07	75.18	832.60	133.73	67.27	58.50	214.87	65.34	282.14	87.70	1,114.74	157.81
Department of Defense and Energy	--	--	--	--	--	--	--	--	--	--	--	--	--	--
National Park Service	--	--	--	--	--	--	6,149.97	437.81	1,184.11	192.82	7,334.08	465.25	7,334.08	465.25
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	30.24	15.44	30.24	15.44	--	--	5.45	5.64	5.45	5.64	35.69	16.44
Total	368.53	110.62	494.31	76.58	862.84	134.43	6,217.24	440.89	1,404.43	201.86	7,621.67	470.02	8,484.51	475.33
State and local government:														
Local	167.15	72.50	108.35	34.04	275.51	81.11	--	--	7.84	6.77	7.84	6.77	283.35	81.36
State	160.49	91.02	66.58	34.93	227.07	96.55	434.51	132.32	97.92	32.57	532.43	135.69	759.49	161.55
Other public	--	--	7.14	6.48	7.14	6.48	--	--	--	--	--	--	7.14	6.48
Total	327.65	116.36	182.07	49.16	509.72	126.19	434.51	132.32	105.76	33.26	540.27	135.86	1,049.99	180.92
Private:														
Corporate	12,121.07	634.53	631.64	95.62	12,752.70	639.08	--	--	--	--	--	--	12,752.70	639.08
Noncorporate private:														
Total, noncorporate private	4,793.20	405.90	3,704.08	197.43	8,497.28	444.26	--	--	--	--	--	--	8,497.28	444.26
All private	16,914.27	704.58	4,335.72	214.29	21,249.99	715.66	--	--	--	--	--	--	21,249.99	715.66
All owners	50,196.20	1,118.97	7,155.92	302.61	57,352.11	1,124.76	13,921.14	670.25	3,718.88	304.41	17,640.03	701.47	74,992.14	1,262.25

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C78: Forest Floor by Owner Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	539.91	132.58	657.86	88.38	1,197.77	159.38	454.91	118.93	365.17	79.72	820.08	141.93	2,017.85	212.75
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	539.91	132.58	657.86	88.38	1,197.77	159.38	454.91	118.93	365.17	79.72	820.08	141.93	2,017.85	212.75
Other federal government:														
Bureau of Land Management	--	--	30.70	13.60	30.70	13.60	--	--	26.79	12.65	26.79	12.65	57.49	18.56
Department of Defense and Energy	4.34	4.44	--	--	4.34	4.44	--	--	--	--	--	--	4.34	4.44
National Park Service	--	--	--	--	--	--	--	--	95.79	27.78	95.79	27.78	95.79	27.78
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	34.32	16.85	34.32	16.85	--	--	0.85	0.86	0.85	0.86	35.17	16.87
Total	4.34	4.44	65.02	21.65	69.37	22.10	--	--	123.43	30.34	123.43	30.34	192.79	37.49
State and local government:														
Local	--	--	33.96	18.37	33.96	18.37	--	--	4.11	4.04	4.11	4.04	38.07	18.72
State	--	--	--	--	--	--	37.11	37.36	68.94	29.56	106.04	47.30	106.04	47.30
Other public	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	33.96	18.37	33.96	18.37	37.11	37.36	73.04	29.84	110.15	47.48	144.11	50.79
Private:														
Corporate	23.63	23.29	50.72	20.73	74.36	31.18	--	--	--	--	--	--	74.36	31.18
Noncorporate private:														
Total, noncorporate private	38.75	25.72	401.13	73.78	439.88	79.80	--	--	--	--	--	--	439.88	79.80
All private	62.38	34.70	451.85	76.62	514.24	85.67	--	--	--	--	--	--	514.24	85.67
All owners	606.64	137.12	1,208.69	119.99	1,815.33	182.91	492.02	124.66	561.64	90.37	1,053.66	152.70	2,868.99	237.63

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C79.1: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2001 - 2010

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	49,168.62	841.97	7,388.03	320.62	56,556.65	827.07	13,760.28	622.30	3,953.72	279.61	17,714.01	659.05	74,270.66	669.20
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	49,168.62	841.97	7,388.03	320.62	56,556.65	827.07	13,760.28	622.30	3,953.72	279.61	17,714.01	659.05	74,270.66	669.20
Other federal government:														
Bureau of Land Management	1,290.62	199.53	2,163.87	162.89	3,454.49	250.44	143.82	67.24	542.20	90.03	686.01	112.24	4,140.50	268.44
Department of Defense and Energy	12.37	13.59	149.50	42.74	161.87	44.85	--	--	--	--	--	--	161.87	44.85
National Park Service	--	--	--	--	--	--	6,117.15	414.52	1,555.51	188.32	7,672.66	393.32	7,672.66	393.32
U.S. Fish and Wildlife Service	--	--	--	--	--	--	17.51	21.53	3.18	3.24	20.69	21.77	20.69	21.77
Other federal	--	--	164.37	43.34	164.37	43.34	81.82	60.35	45.25	31.79	127.07	68.05	291.45	80.66
Total	1,302.98	200.00	2,477.74	172.14	3,780.73	255.71	6,360.30	420.09	2,146.14	208.99	8,506.44	404.28	12,287.17	458.52
State and local government:														
Local	168.68	67.55	243.03	57.24	411.71	89.50	152.59	66.40	498.24	92.61	650.83	113.17	1,062.54	143.55
State	463.85	125.08	94.39	35.76	558.24	129.85	1,414.91	197.32	655.43	100.46	2,070.33	218.23	2,628.57	244.89
Other public	--	--	7.55	6.42	7.55	6.42	33.07	29.63	20.22	17.56	53.29	34.44	60.84	35.03
Total	632.53	140.94	344.97	67.76	977.50	156.63	1,600.57	209.96	1,173.89	136.22	2,774.46	245.58	3,751.96	281.69
Private:														
Corporate	20,543.77	655.36	1,045.65	119.21	21,589.42	659.28	--	--	--	--	--	--	21,589.42	659.28
Noncorporate private:														
Total, noncorporate private	15,010.49	602.25	9,798.51	303.38	24,809.00	638.26	--	--	--	--	--	--	24,809.00	638.26
All private	35,554.25	655.03	10,844.16	314.49	46,398.41	639.68	--	--	--	--	--	--	46,398.41	639.68
All owners	86,658.39	1,075.90	21,054.90	481.12	107,713.29	1,058.19	21,721.15	774.21	7,273.75	373.77	28,994.91	803.79	136,708.20	997.19

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C79.2: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2002 - 2011

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	49,647.73	864.58	7,129.29	317.81	56,777.03	851.23	13,738.36	620.28	3,980.66	283.11	17,719.02	658.00	74,496.05	698.53
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	49,647.73	864.58	7,129.29	317.81	56,777.03	851.23	13,738.36	620.28	3,980.66	283.11	17,719.02	658.00	74,496.05	698.53
Other federal government:														
Bureau of Land Management	1,282.83	199.33	2,110.05	159.69	3,392.88	249.00	142.48	66.92	551.76	91.41	694.24	113.16	4,087.12	267.63
Department of Defense and Energy	17.24	14.74	165.58	43.95	182.81	46.33	--	--	--	--	--	--	182.81	46.33
National Park Service	--	--	--	--	--	--	6,209.08	420.18	1,561.98	188.32	7,771.05	397.77	7,771.05	397.77
U.S. Fish and Wildlife Service	--	--	--	--	--	--	17.51	21.53	3.15	3.22	20.66	21.77	20.66	21.77
Other federal	--	--	163.67	43.25	163.67	43.25	81.78	60.43	45.30	31.92	127.08	68.17	290.75	80.72
Total	1,300.07	199.88	2,439.30	169.44	3,739.37	254.64	6,450.83	425.62	2,162.20	209.67	8,613.03	408.85	12,352.40	462.52
State and local government:														
Local	148.04	63.79	243.36	57.25	391.41	86.59	150.36	66.02	497.26	92.95	647.61	113.25	1,039.02	141.85
State	465.17	124.77	95.38	36.79	560.56	129.82	1,442.82	198.43	698.54	105.71	2,141.36	221.83	2,701.92	248.29
Other public	--	--	7.64	6.54	7.64	6.54	34.07	30.07	14.48	16.56	48.55	34.33	56.19	34.95
Total	613.22	138.90	346.39	68.35	959.61	155.05	1,627.25	210.96	1,210.27	140.00	2,837.52	248.59	3,797.12	283.83
Private:														
Corporate	20,098.33	654.35	1,240.18	131.64	21,338.51	659.93	--	--	--	--	--	--	21,338.51	659.93
Noncorporate private:														
Total, noncorporate private	14,850.27	601.52	9,470.49	298.50	24,320.76	637.74	--	--	--	--	--	--	24,320.76	637.74
All private	34,948.60	669.95	10,710.67	313.34	45,659.27	657.43	--	--	--	--	--	--	45,659.27	657.43
All owners	86,509.62	1,081.50	20,625.65	476.93	107,135.27	1,063.89	21,816.44	776.19	7,353.13	378.15	29,169.57	806.40	136,304.84	998.59

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C79.3: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2003 - 2012

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:	50,009.50	772.40	6,643.37	301.99	56,652.86	732.11	14,312.13	521.42	4,222.01	281.54	18,534.14	511.21	75,187.00	740.78
National Forest														
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	50,009.50	772.40	6,643.37	301.99	56,652.86	732.11	14,312.13	521.42	4,222.01	281.54	18,534.14	511.21	75,187.00	740.78
Other federal government:														
Bureau of Land Management	1,386.62	208.38	2,055.68	168.63	3,442.30	265.53	167.21	74.47	458.69	96.66	625.90	122.00	4,068.20	285.38
Department of Defense and Energy	27.34	18.71	148.14	42.33	175.47	46.28	--	--	15.73	16.29	15.73	16.29	191.20	49.06
National Park Service	--	--	--	--	--	--	6,487.69	440.52	1,552.71	202.23	8,040.39	467.15	8,040.39	467.15
U.S. Fish and Wildlife Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other federal	--	--	185.32	45.49	185.32	45.49	47.52	50.17	49.34	33.28	96.86	60.21	282.17	75.22
Total	1,413.95	208.59	2,389.14	177.39	3,803.09	270.67	6,702.42	442.28	2,076.46	219.79	8,778.88	471.11	12,581.97	488.61
State and local government:														
Local	169.67	69.45	228.93	56.55	398.60	90.48	169.00	70.71	467.22	89.65	636.22	111.37	1,034.82	142.11
State	449.75	121.29	104.45	39.96	554.20	125.58	1,339.72	164.22	616.35	93.27	1,956.06	181.00	2,510.26	179.06
Other public	--	--	7.77	6.54	7.77	6.54	22.76	26.33	16.98	18.39	39.75	32.12	47.51	32.77
Total	619.42	139.37	341.15	69.53	960.57	154.53	1,531.48	175.16	1,100.54	124.54	2,632.03	202.33	3,592.60	214.14
Private:														
Corporate	20,463.61	668.88	1,230.43	129.76	21,694.04	674.12	--	--	--	--	--	--	21,694.04	674.12
Noncorporate private:														
Total, noncorporate private	14,994.37	600.77	9,322.84	298.11	24,317.22	634.64	--	--	--	--	--	--	24,317.22	634.64
All private	35,457.99	669.27	10,553.27	315.31	46,011.26	654.71	--	--	--	--	--	--	46,011.26	654.71
All owners	87,500.86	1,010.95	19,926.93	472.10	107,427.79	976.20	22,546.03	705.06	7,399.02	377.67	29,945.05	721.27	137,372.83	1,004.35

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C79.4: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2004 - 2013

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	49,953.30	768.31	6,413.45	293.65	56,366.75	726.17	14,387.05	523.66	4,245.76	288.38	18,632.81	512.35	74,999.56	742.55
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	49,953.30	768.31	6,413.45	293.65	56,366.75	726.17	14,387.05	523.66	4,245.76	288.38	18,632.81	512.35	74,999.56	742.55
Other federal government:														
Bureau of Land Management	1,339.44	202.15	2,002.11	165.86	3,341.56	258.86	197.39	78.90	482.12	98.07	679.51	125.85	4,021.07	280.53
Department of Defense and Energy	27.34	18.71	144.05	40.89	171.38	44.96	--	--	15.73	16.29	15.73	16.29	187.11	47.82
National Park Service	--	--	--	--	--	--	6,501.09	440.33	1,565.92	204.87	8,067.01	468.48	8,067.01	468.48
U.S. Fish and Wildlife Service	--	--	--	--	--	--	16.91	17.31	1.07	1.08	17.98	17.34	17.98	17.34
Other federal	--	--	171.53	41.32	171.53	41.32	--	--	17.10	9.73	17.10	9.73	188.64	42.45
Total	1,366.78	202.37	2,317.69	173.36	3,684.47	263.48	6,715.39	441.72	2,081.95	221.08	8,797.34	471.76	12,481.81	484.63
State and local government:														
Local	174.50	70.74	242.92	57.67	417.42	92.18	164.28	63.81	455.21	85.62	619.49	103.56	1,036.91	137.64
State	460.48	125.07	104.39	39.95	564.88	129.21	1,342.50	165.33	602.94	91.18	1,945.44	180.23	2,510.31	179.24
Other public	--	--	9.22	6.66	9.22	6.66	24.62	27.44	16.98	18.39	41.60	33.03	50.83	33.70
Total	634.98	143.27	356.54	70.45	991.52	158.45	1,531.40	175.52	1,075.13	120.57	2,606.53	200.17	3,598.05	213.64
Private:														
Corporate	20,684.74	671.92	1,287.11	132.94	21,971.85	677.18	--	--	--	--	--	--	21,971.85	677.18
Noncorporate private:														
Total, noncorporate private	14,741.36	600.85	9,150.11	295.48	23,891.47	634.26	--	--	--	--	--	--	23,891.47	634.26
All private	35,426.10	673.33	10,437.23	313.96	45,863.32	657.79	--	--	--	--	--	--	45,863.32	657.79
All owners	87,381.15	1,011.36	19,524.91	464.68	106,906.06	974.48	22,633.84	706.49	7,402.85	382.27	30,036.68	722.04	136,942.75	1,007.30

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C79.5: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2005 - 2014

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	50,010.34	766.44	6,284.95	292.44	56,295.29	723.64	14,618.10	526.06	4,159.42	288.49	18,777.52	511.12	75,072.81	744.67
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	50,010.34	766.44	6,284.95	292.44	56,295.29	723.64	14,618.10	526.06	4,159.42	288.49	18,777.52	511.12	75,072.81	744.67
Other federal government:														
Bureau of Land Management	1,313.04	201.60	1,950.75	161.24	3,263.80	255.63	246.84	87.47	432.30	87.29	679.14	123.56	3,942.94	276.37
Department of Defense and Energy	27.35	18.70	141.05	40.84	168.40	44.91	--	--	15.73	16.28	15.73	16.28	184.13	47.77
National Park Service	--	--	--	--	--	--	6,634.63	444.35	1,549.93	203.95	8,184.56	471.28	8,184.56	471.28
U.S. Fish and Wildlife Service	--	--	--	--	--	--	16.90	17.29	1.07	1.08	17.98	17.33	17.98	17.33
Other federal	--	--	171.17	41.26	171.17	41.26	--	--	17.11	9.72	17.11	9.72	188.28	42.39
Total	1,340.39	202.10	2,262.97	169.04	3,603.37	260.61	6,898.37	446.46	2,016.14	216.13	8,914.51	472.67	12,517.88	482.21
State and local government:														
Local	263.53	92.44	253.10	58.26	516.63	110.02	164.47	63.87	448.27	85.03	612.74	102.98	1,129.37	149.82
State	479.24	126.22	107.53	40.03	586.78	130.74	1,340.51	164.94	605.98	91.68	1,946.49	180.18	2,533.27	180.21
Other public	--	--	8.60	6.62	8.60	6.62	24.62	27.42	16.98	18.38	41.60	33.01	50.21	33.67
Total	742.77	156.07	369.24	70.98	1,112.01	170.62	1,529.60	175.16	1,071.23	120.79	2,600.84	199.98	3,712.84	222.58
Private:														
Corporate	21,028.23	677.77	1,421.74	139.36	22,449.97	684.02	--	--	--	--	--	--	22,449.97	684.02
Noncorporate private:														
Total, noncorporate private	14,131.89	583.66	9,055.21	295.39	23,187.10	619.70	--	--	--	--	--	--	23,187.10	619.70
All private	35,160.12	670.46	10,476.95	315.06	45,637.07	655.59	--	--	--	--	--	--	45,637.07	655.59
All owners	87,253.62	1,011.18	19,394.12	463.38	106,647.73	973.23	23,046.08	711.15	7,246.79	379.60	30,292.87	721.71	136,940.60	1,010.46

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C79.6: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2006 - 2015

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	50,171.03	768.24	6,017.79	285.21	56,188.81	724.42	14,672.68	522.07	4,151.92	286.55	18,824.61	510.03	75,013.42	745.86
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	50,171.03	768.24	6,017.79	285.21	56,188.81	724.42	14,672.68	522.07	4,151.92	286.55	18,824.61	510.03	75,013.42	745.86
Other federal government:														
Bureau of Land Management	1,348.23	207.16	1,885.70	155.62	3,233.92	256.27	268.94	90.29	440.74	88.52	709.68	126.42	3,943.60	278.34
Department of Defense and Energy	27.35	18.70	142.26	41.10	169.61	45.15	--	--	16.02	16.58	16.02	16.58	185.63	48.10
National Park Service	--	--	--	--	--	--	6,652.50	444.59	1,557.10	204.59	8,209.60	472.92	8,209.60	472.92
U.S. Fish and Wildlife Service	--	--	--	--	--	--	16.90	17.29	1.07	1.08	17.98	17.33	17.98	17.33
Other federal	--	--	173.25	41.34	173.25	41.34	--	--	17.21	9.78	17.21	9.78	190.45	42.49
Total	1,375.58	207.64	2,201.20	163.89	3,576.78	261.36	6,938.34	447.00	2,032.14	217.19	8,970.48	474.63	12,547.26	484.76
State and local government:														
Local	252.09	91.68	264.52	59.20	516.61	109.86	159.56	61.24	434.49	83.98	594.05	100.50	1,110.66	148.03
State	502.24	128.40	102.57	39.91	604.81	132.89	1,339.07	164.57	595.20	91.06	1,934.27	179.66	2,539.08	180.89
Other public	--	--	8.58	6.61	8.58	6.61	24.13	26.88	16.98	18.38	41.11	32.56	49.69	33.23
Total	754.33	157.29	375.67	71.68	1,130.00	172.08	1,522.76	173.88	1,046.67	119.76	2,569.43	198.38	3,699.43	221.84
Private:														
Corporate	21,643.52	682.84	1,648.98	150.39	23,292.50	690.46	--	--	--	--	--	--	23,292.50	690.46
Noncorporate private:														
Total, noncorporate private	13,640.76	576.07	8,741.43	291.22	22,382.20	612.19	--	--	--	--	--	--	22,382.20	612.19
All private	35,284.29	674.93	10,390.41	314.47	45,674.70	659.94	--	--	--	--	--	--	45,674.70	659.94
All owners	87,585.22	1,013.80	18,985.07	456.91	106,570.29	973.63	23,133.78	707.75	7,230.73	378.59	30,364.52	721.68	136,934.81	1,011.66

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C79.7: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2007 - 2016

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
USDA Forest Service:														
National Forest	50,161.98	770.64	5,853.37	281.56	56,015.36	727.51	14,756.40	520.96	4,157.51	281.55	18,913.91	507.79	74,929.26	748.30
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	50,161.98	770.64	5,853.37	281.56	56,015.36	727.51	14,756.40	520.96	4,157.51	281.55	18,913.91	507.79	74,929.26	748.30
Other federal government:														
Bureau of Land Management	1,231.09	197.42	1,865.41	154.76	3,096.49	248.48	357.30	107.79	442.16	88.52	799.46	139.46	3,895.96	277.08
Department of Defense and Energy	45.01	24.81	149.09	41.58	194.09	48.42	--	--	17.31	17.27	17.31	17.27	211.40	51.41
National Park Service	--	--	--	--	--	--	6,652.41	437.10	1,572.67	205.44	8,225.09	465.71	8,225.09	465.71
U.S. Fish and Wildlife Service	--	--	--	--	--	--	16.90	17.29	1.07	1.08	17.97	17.33	17.97	17.33
Other federal	--	--	159.68	39.57	159.68	39.57	--	--	17.65	9.92	17.65	9.92	177.33	40.79
Total	1,276.09	198.52	2,174.18	162.88	3,450.27	254.08	7,026.61	440.74	2,050.86	217.96	9,077.48	468.15	12,527.75	478.28
State and local government:														
Local	292.46	99.61	288.79	60.91	581.25	118.11	160.18	61.45	437.13	84.53	597.31	101.06	1,178.56	154.60
State	485.57	120.55	114.45	42.10	600.02	126.06	1,341.06	165.38	597.03	91.10	1,938.09	180.49	2,538.11	176.24
Other public	--	--	8.57	6.61	8.57	6.61	24.13	26.88	16.72	18.10	40.85	32.41	49.41	33.07
Total	778.03	155.92	411.80	74.27	1,189.83	172.37	1,525.38	174.70	1,050.87	120.20	2,576.25	199.44	3,766.08	222.59
Private:														
Corporate	22,120.99	682.88	1,744.42	153.77	23,865.41	690.33	--	--	--	--	--	--	23,865.41	690.33
Noncorporate private:														
Total, noncorporate private	13,055.09	567.18	8,640.81	289.91	21,695.90	604.49	--	--	--	--	--	--	21,695.90	604.49
All private	35,176.08	671.97	10,385.23	314.36	45,561.31	656.37	--	--	--	--	--	--	45,561.31	656.37
All owners	87,392.19	1,012.36	18,824.58	454.20	106,216.77	971.68	23,308.39	702.85	7,259.24	375.40	30,567.63	715.82	136,784.40	1,005.00

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table C79.8: Forest Floor by Owner Group and Forest Land Status, All California (10 year averages): 2008 - 2017

*information duplicated in Table C71

Ownership group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
USDA Forest Service:														
National Forest	49,987.35	770.93	5,862.33	281.31	55,849.68	727.32	14,740.39	518.58	4,119.42	279.54	18,859.81	506.65	74,709.48	748.42
National Grasslands	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Forest Service	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	49,987.35	770.93	5,862.33	281.31	55,849.68	727.32	14,740.39	518.58	4,119.42	279.54	18,859.81	506.65	74,709.48	748.42
Other federal government:														
Bureau of Land Management	1,234.67	196.83	1,864.30	155.19	3,098.97	248.35	351.60	106.37	445.87	89.33	797.46	138.89	3,896.43	276.91
Department of Defense and Energy	44.81	24.73	148.96	41.52	193.77	48.33	--	--	16.02	16.58	16.02	16.58	209.79	51.09
National Park Service	--	--	--	--	--	--	6,582.52	434.60	1,560.11	204.54	8,142.63	462.85	8,142.63	462.85
U.S. Fish and Wildlife Service	--	--	--	--	--	--	16.90	17.29	1.05	1.07	17.94	17.32	17.94	17.32
Other federal	--	--	88.71	27.11	88.71	27.11	--	--	8.16	6.01	8.16	6.01	96.87	27.77
Total	1,279.49	197.92	2,101.96	160.90	3,381.45	252.42	6,951.01	438.29	2,031.20	217.61	8,982.21	465.91	12,363.66	475.57
State and local government:														
Local	296.61	100.50	286.34	60.35	582.95	118.56	163.25	62.38	398.53	79.25	561.79	97.73	1,144.74	152.90
State	484.87	120.40	114.67	42.33	599.54	125.98	1,351.12	165.01	560.00	87.37	1,911.11	179.91	2,510.65	175.61
Other public	--	--	8.55	6.61	8.55	6.61	24.13	26.87	17.05	18.45	41.19	32.60	49.74	33.26
Total	781.48	156.37	409.57	73.95	1,191.05	172.63	1,538.50	174.53	975.59	114.67	2,514.09	197.60	3,705.14	221.37
Private:														
Corporate	22,695.96	687.76	1,836.31	158.05	24,532.27	695.13	--	--	--	--	--	--	24,532.27	695.13
Noncorporate private:														
Total, noncorporate private	12,405.56	550.65	8,540.05	287.65	20,945.61	589.37	--	--	--	--	--	--	20,945.61	589.37
All private	35,101.52	671.75	10,376.36	314.13	45,477.89	656.87	--	--	--	--	--	--	45,477.89	656.87
All owners	87,149.84	1,012.72	18,750.22	453.21	105,900.06	972.03	23,229.90	699.56	7,126.21	371.98	30,356.10	713.10	136,256.17	1,005.45

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D1: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Forest Type and Land Status, 2008-2017: All California

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	301,298	8,873	300	181	301,598	8,874	78,843	5,452	641	547	79,485	5,470	381,083	10,090
Douglas-fir	54,174	4,930	282	284	54,456	4,938	17,968	3,382	297	170	18,265	3,386	72,721	5,949
Fir / spruce / mountain hemlock	77,872	5,656	794	507	78,666	5,678	39,532	4,818	1,449	642	40,981	4,858	119,647	7,446
Western Hemlock / Sitka spruce	2,296	1,048	--	--	2,296	1,048	121	120	--	--	121	120	2,417	1,054
Lodgepole pine	8,315	1,393	1,481	539	9,796	1,486	16,822	2,188	4,902	1,020	21,723	2,326	31,519	2,741
Pinyon / juniper	81	64	3,880	425	3,961	430	17	16	2,361	351	2,378	351	6,339	550
Ponderosa pine	42,583	2,704	462	216	43,045	2,711	6,269	1,206	444	206	6,713	1,222	49,758	2,961
Redwood	55,672	5,841	--	--	55,672	5,841	29,902	8,449	--	--	29,902	8,449	85,574	10,184
Western juniper	2,114	407	5,357	473	7,471	618	1,796	566	306	122	2,102	578	9,573	845
Western white pine	592	285	--	--	592	285	2,582	762	615	278	3,198	811	3,789	859
Other western softwoods	1,562	613	730	230	2,292	655	986	402	4,213	799	5,199	888	7,491	1,103
Total	546,559	11,207	13,286	1,054	559,845	11,199	194,838	10,732	15,229	1,574	210,067	10,755	769,911	14,629
Hardwoods:														
Alder / maple	6,403	1,346	585	268	6,988	1,373	2,302	981	16	18	2,318	981	9,306	1,686
Aspen / birch	302	203	92	39	393	207	41	28	340	239	380	240	774	317
Elm / ash / cottonwood	--	--	559	296	559	296	--	--	184	155	184	155	743	334
Tanoak / laurel	71,536	5,399	3,725	947	75,261	5,465	19,284	3,180	2,821	1,156	22,105	3,368	97,366	6,380
Western oak	64,098	4,147	84,368	3,285	148,466	5,122	7,535	1,338	13,989	1,548	21,524	2,030	169,989	5,457
Woodland hardwoods	139	84	501	149	640	171	--	--	247	110	247	110	888	203
Exotic hardwoods	3	3	--	--	3	3	--	--	--	--	--	--	3	3
Other hardwoods	9,944	1,949	1,080	253	11,024	1,965	2,231	1,075	161	150	2,392	1,086	13,416	2,230
Total	152,426	6,918	90,908	3,419	243,334	7,429	31,392	3,656	17,758	1,956	49,150	4,086	292,484	8,325
Nonstocked	1,080	214	3	3	1,083	214	356	222	14	13	370	223	1,453	309
All forest types	700,065	11,235	104,196	3,550	804,262	11,046	226,586	10,793	33,001	2,484	259,587	10,848	1,063,849	13,954

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D2: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Forest Type and Land Status, 2008-2017: Central Coast and Interior Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	1,257	808	--	--	1,257	808	--	--	--	--	--	--	1,257	808
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	175	56	175	56	--	--	17	10	17	10	192	57
Ponderosa pine	--	--	42	30	42	30	--	--	50	49	50	49	92	58
Redwood	11,433	2,920	--	--	11,433	2,920	8,086	3,252	--	--	8,086	3,252	19,519	4,463
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	570	449	--	--	570	449	--	--	--	--	--	--	570	449
Total	13,260	3,057	218	64	13,477	3,058	8,086	3,252	67	50	8,153	3,252	21,631	4,555
Hardwoods:														
Alder / maple	--	--	85	63	85	63	326	363	--	--	326	363	411	368
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	54	39	54	39	--	--	5	6	5	6	59	40
Tanoak / laurel	2,904	1,186	1,721	568	4,625	1,313	3,003	1,643	1,281	610	4,284	1,753	8,909	2,189
Western oak	733	417	14,909	1,411	15,643	1,472	233	198	5,179	896	5,412	907	21,055	1,719
Woodland hardwoods	--	--	--	--	--	--	--	--	8	8	8	8	8	8
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	1,451	932	240	119	1,691	938	1,293	913	16	13	1,309	913	3,000	1,284
Total	5,089	1,564	17,009	1,524	22,097	2,169	4,856	1,879	6,489	1,090	11,344	2,134	33,442	3,001
Nonstocked	18	18	--	--	18	18	--	--	--	--	--	--	18	18
All forest types	18,366	3,420	17,226	1,525	35,593	3,729	12,942	3,679	6,556	1,091	19,498	3,817	55,090	5,353

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D3: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Forest Type and Land Status, 2008-2017: Central Valley

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	252	258	252	258	--	--	145	148	145	148	397	298
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	--	--	831	278	831	278	--	--	14	14	14	14	844	278
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	1,083	379	1,083	379	--	--	159	149	159	149	1,242	407
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types	--	--	1,083	379	1,083	379	--	--	159	149	159	149	1,242	407

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D4: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Forest Type and Land Status, 2008-2017: Eastside

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	6,081	956	200	168	6,281	970	--	--	--	--	--	--	6,281	970
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	3,684	1,085	--	--	3,684	1,085	1,522	834	--	--	1,522	834	5,206	1,369
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	476	248	643	390	1,119	462	--	--	--	--	--	--	1,119	462
Pinyon / juniper	22	21	1,999	287	2,021	287	--	--	945	220	945	220	2,966	358
Ponderosa pine	5,840	823	105	70	5,945	825	462	253	--	--	462	253	6,406	863
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	936	233	3,955	403	4,892	462	--	--	53	46	53	46	4,945	464
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	64	65	150	110	214	128	--	--	1,051	425	1,051	425	1,265	444
Total	17,102	1,689	7,053	657	24,155	1,812	1,984	872	2,049	480	4,032	993	28,187	2,064
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	125	114	56	33	180	118	28	25	--	--	28	25	208	121
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	65	55	92	78	157	96	--	--	--	--	--	--	157	96
Woodland hardwoods	139	84	139	72	278	111	--	--	--	--	--	--	278	111
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	63	50	1	1	64	50	--	--	--	--	--	--	64	50
Total	392	160	287	111	679	195	28	25	--	--	28	25	707	196
Nonstocked	97	42	3	3	99	42	--	--	--	--	--	--	99	42
All forest types	17,591	1,700	7,343	666	24,933	1,824	2,012	877	2,049	480	4,060	998	28,994	2,076

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D5: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Forest Type and Land Status, 2008-2017: Klamath Interior Coast Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	107,324	6,289	67	62	107,390	6,289	31,166	3,286	--	--	31,166	3,286	138,556	7,058
Douglas-fir	22,213	3,130	282	284	22,494	3,142	10,495	2,441	297	170	10,791	2,446	33,286	3,970
Fir / spruce / mountain hemlock	5,942	1,657	181	201	6,123	1,667	8,661	2,147	48	50	8,709	2,147	14,832	2,718
Western Hemlock / Sitka spruce	--	--	--	--	--	--	121	120	--	--	121	120	121	120
Lodgepole pine	135	129	--	--	135	129	90	64	70	72	160	96	295	161
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	3,708	828	--	--	3,708	828	1,886	739	128	126	2,015	750	5,723	1,117
Redwood	771	715	--	--	771	715	6,310	3,825	--	--	6,310	3,825	7,081	3,891
Western juniper	--	--	36	23	36	23	--	--	--	--	--	--	36	23
Western white pine	273	225	--	--	273	225	357	174	26	27	383	176	655	285
Other western softwoods	217	150	366	178	584	233	62	55	27	27	89	61	673	240
Total	140,582	7,101	932	397	141,515	7,102	59,148	5,666	595	232	59,743	5,670	201,258	8,980
Hardwoods:														
Alder / maple	2,155	684	239	189	2,394	709	1,327	723	16	18	1,343	723	3,737	1,013
Aspen / birch	--	--	--	--	--	--	--	--	12	13	12	13	12	13
Elm / ash / cottonwood	--	--	117	83	117	83	--	--	--	--	--	--	117	83
Tanoak / laurel	24,880	3,614	665	351	25,545	3,630	9,918	2,184	331	281	10,249	2,202	35,794	4,233
Western oak	32,098	3,094	27,192	2,081	59,291	3,694	3,700	934	4,767	966	8,467	1,346	67,758	3,920
Woodland hardwoods	--	--	34	31	34	31	--	--	28	25	28	25	62	40
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	4,540	1,277	210	145	4,750	1,285	187	131	145	150	332	199	5,082	1,300
Total	63,673	4,900	28,458	2,122	92,131	5,290	15,131	2,457	5,300	1,017	20,431	2,657	112,562	5,884
Nonstocked	181	63	--	--	181	63	326	222	--	--	326	222	507	231
All forest types	204,436	8,374	29,390	2,157	233,826	8,570	74,605	5,905	5,896	1,045	80,501	5,978	314,327	10,251

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D6: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Forest Type and Land Status, 2008-2017: North Coast

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	30,704	3,797	--	--	30,704	3,797	7,474	2,400	--	--	7,474	2,400	38,178	4,462
Fir / spruce / mountain hemlock	429	290	--	--	429	290	--	--	--	--	--	--	429	290
Western Hemlock / Sitka spruce	2,296	1,048	--	--	2,296	1,048	--	--	--	--	--	--	2,296	1,048
Lodgepole pine	--	--	--	--	--	--	28	28	--	--	28	28	28	28
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	43,441	5,108	--	--	43,441	5,108	15,506	6,947	--	--	15,506	6,947	58,947	8,497
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	311	286	--	--	311	286	116	185	25	22	141	186	452	341
Total	77,181	6,310	--	--	77,181	6,310	23,123	7,252	25	22	23,148	7,252	100,329	9,413
Hardwoods:														
Alder / maple	3,243	1,000	80	79	3,323	1,003	649	554	--	--	649	554	3,972	1,146
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	40,705	3,827	1,309	674	42,014	3,878	6,363	1,684	1,159	940	7,522	1,925	49,536	4,305
Western oak	5,339	1,193	3,836	748	9,176	1,403	--	--	555	315	555	315	9,731	1,438
Woodland hardwoods	--	--	--	--	--	--	--	--	94	85	94	85	94	85
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	2,530	888	58	55	2,588	890	751	572	--	--	751	572	3,339	1,058
Total	51,817	4,171	5,284	1,011	57,101	4,273	7,763	1,836	1,808	995	9,571	2,083	66,671	4,723
Nonstocked	36	25	--	--	36	25	--	--	--	--	--	--	36	25
All forest types	129,034	7,200	5,284	1,011	134,318	7,247	30,886	7,358	1,833	995	32,719	7,423	167,037	10,127

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D7: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Forest Type and Land Status, 2008-2017: Sierra Cascades

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	186,993	7,650	34	28	187,027	7,650	46,453	4,546	641	547	47,094	4,568	234,121	8,688
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	67,293	5,344	613	465	67,906	5,364	29,349	4,316	1,401	640	30,750	4,361	98,656	6,888
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	7,704	1,366	838	376	8,542	1,413	16,704	2,187	4,573	1,007	21,277	2,321	29,819	2,698
Pinyon / juniper	59	60	1,044	263	1,103	270	17	16	1,048	258	1,065	259	2,168	374
Ponderosa pine	32,636	2,473	315	202	32,951	2,481	3,379	891	142	92	3,521	895	36,472	2,632
Redwood	28	26	--	--	28	26	--	--	--	--	--	--	28	26
Western juniper	954	293	1,280	236	2,235	376	1,796	566	253	113	2,049	577	4,284	688
Western white pine	319	175	--	--	319	175	2,226	742	590	277	2,815	792	3,134	811
Other western softwoods	400	256	213	98	614	274	728	345	3,110	678	3,838	755	4,452	803
Total	296,388	8,919	4,336	726	300,724	8,933	100,650	6,302	11,759	1,486	112,409	6,376	413,133	10,614
Hardwoods:														
Alder / maple	1,006	601	--	--	1,006	601	--	--	--	--	--	--	1,006	601
Aspen / birch	177	169	36	21	213	170	13	12	327	238	340	239	553	293
Elm / ash / cottonwood	--	--	136	112	136	112	--	--	--	--	--	--	136	112
Tanoak / laurel	3,047	1,178	30	16	3,077	1,178	--	--	--	--	--	--	3,077	1,178
Western oak	24,746	2,530	33,298	2,086	58,044	3,210	3,015	894	2,567	702	5,582	1,134	63,626	3,377
Woodland hardwoods	--	--	79	48	79	48	--	--	34	37	34	37	113	60
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	1,361	722	484	153	1,844	738	--	--	--	--	--	--	1,844	738
Total	30,337	2,934	34,061	2,093	64,398	3,530	3,028	894	2,928	741	5,956	1,158	70,354	3,689
Nonstocked	733	198	--	--	733	198	24	11	14	13	38	17	772	198
All forest types	327,458	9,059	38,398	2,210	365,856	9,109	103,703	6,334	14,701	1,656	118,404	6,422	484,260	10,657

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D8: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Live Trees Including Foliage (>= 1 inch) by Forest Type and Land Status, 2008-2017: South Coast Mountains and Deserts

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	900	511	--	--	900	511	1,225	628	--	--	1,225	628	2,125	810
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	524	393	--	--	524	393	--	--	--	--	--	--	524	393
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	258	158	258	158	258	158
Pinyon / juniper	--	--	661	205	661	205	--	--	351	118	351	118	1,013	236
Ponderosa pine	399	236	--	--	399	236	542	266	124	124	666	293	1,065	377
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	223	163	85	86	309	184	--	--	--	--	--	--	309	184
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	80	73	--	--	80	73	80	73
Total	2,046	705	747	222	2,793	739	1,847	679	734	233	2,581	718	5,373	1,030
Hardwoods:														
Alder / maple	--	--	181	162	181	162	--	--	--	--	--	--	181	162
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	34	47	34	47	34	47
Tanoak / laurel	--	--	--	--	--	--	--	--	49	49	49	49	49	49
Western oak	1,116	437	4,209	802	5,325	926	587	302	907	394	1,494	494	6,819	1,049
Woodland hardwoods	--	--	249	117	249	117	--	--	84	53	84	53	333	129
Exotic hardwoods	3	3	--	--	3	3	--	--	--	--	--	--	3	3
Other hardwoods	--	--	87	55	87	55	--	--	--	--	--	--	87	55
Total	1,119	437	4,726	827	5,845	947	587	302	1,074	403	1,661	502	7,506	1,071
Nonstocked	15	12			15	12	5	5	--	--	5	5	20	13
All forest types	3,180	829	5,473	857	8,653	1,201	2,439	749	1,808	465	4,247	878	12,900	1,487

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D9: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: All California

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	23,369	1,200	17	10	23,386	1,200	12,628	1,397	11	9	12,639	1,397	36,025	1,819
Douglas-fir	2,653	386	26	26	2,679	387	1,393	350	19	14	1,412	350	4,091	521
Fir / spruce / mountain hemlock	7,738	757	39	20	7,777	757	5,626	830	135	63	5,760	832	13,538	1,124
Western Hemlock / Sitka spruce	283	179	--	--	283	179	--	--	--	--	--	--	283	179
Lodgepole pine	930	205	204	126	1,134	241	1,766	312	535	123	2,302	331	3,436	408
Pinyon / juniper	12	12	299	55	311	56	5	6	180	40	184	40	495	69
Ponderosa pine	1,327	191	94	90	1,421	211	294	113	54	28	349	117	1,770	241
Redwood	2,292	417	--	--	2,292	417	993	412	--	--	993	412	3,285	585
Western juniper	87	38	149	32	236	50	147	60	--	--	147	60	383	78
Western white pine	163	87	--	--	163	87	304	95	94	63	398	114	560	143
Other western softwoods	88	44	114	75	202	87	142	74	487	122	629	142	830	166
Total	38,942	1,470	942	185	39,884	1,478	23,298	1,655	1,514	197	24,812	1,660	64,695	2,180
Hardwoods:														
Alder / maple	553	150	22	17	575	151	193	127	19	16	212	128	787	198
Aspen / birch	7	7	7	6	15	9	46	37	14	11	60	39	75	40
Elm / ash / cottonwood	--	--	18	15	18	15	--	--	13	12	13	12	31	19
Tanoak / laurel	3,323	481	239	103	3,563	492	1,812	531	348	183	2,160	562	5,723	746
Western oak	5,395	933	4,137	373	9,532	1,001	1,627	493	1,327	260	2,954	553	12,486	1,142
Woodland hardwoods	73	56	93	30	167	64	--	--	40	24	40	24	206	68
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	698	193	74	28	772	195	164	88	3	3	167	89	939	214
Total	10,050	1,074	4,591	389	14,641	1,135	3,843	737	1,762	318	5,605	798	20,246	1,384
Nonstocked	5,915	1,248	77	29	5,992	1,248	3,059	914	140	81	3,200	917	9,192	1,549
All forest types	54,907	2,078	5,610	430	60,517	2,101	30,200	1,933	3,416	382	33,617	1,947	94,134	2,807

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D10: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	18	14	--	--	18	14	--	--	--	--	--	--	18	14
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	10	4	10	4	--	--		1		1	10	4
Ponderosa pine	--	--	1	1	1	1	--	--	4	4	4	4	5	4
Redwood	378	131	--	--	378	131	106	68	--	--	106	68	484	147
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	50	38	--	--	50	38	--	--	--	--	--	--	50	38
Total	446	137	11	4	457	137	106	68	4	4	110	68	567	153
Hardwoods:														
Alder / maple	--	--	--	--	--	--	2	2	--	--	2	2	2	2
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	58	27	103	71	160	76	49	29	240	171	289	173	449	189
Western oak	12	11	579	99	591	99	11	11	430	198	441	199	1,032	222
Woodland hardwoods	--	--	--	--	--	--	--	--	21	21	21	21	21	21
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	90	60	5	3	94	60	47	39	3	3	50	39	144	71
Total	160	67	686	122	846	139	109	49	694	263	802	268	1,648	301
Nonstocked			--	--			--	--	--	--	--	--		
All forest types	606	151	697	122	1,303	193	215	82	698	263	913	275	2,216	336

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D11: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: Central Valley

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	15	15	15	15	--	--	11	12	11	12	26	19
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	--	--	27	14	27	14	--	--	--	--	--	--	27	14
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	41	21	41	21	--	--	11	12	11	12	53	24
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types	--	--	41	21	41	21	--	--	11	12	11	12	53	24

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D12: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: Eastside

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	393	98	5	5	398	98	--	--	--	--	--	--	398	98
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	542	202	--	--	542	202	124	70	--	--	124	70	665	214
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	12	7	142	121	154	121	--	--	--	--	--	--	154	121
Pinyon / juniper	--	--	131	29	131	29	--	--	45	15	45	15	176	33
Ponderosa pine	128	44	1	1	129	44	17	11	--	--	17	11	146	46
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	23	11	103	29	126	31	--	--	--	--	--	--	126	31
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	19	19	19	19	--	--	93	41	93	41	111	45
Total	1,097	229	401	129	1,498	263	141	71	138	44	279	84	1,776	276
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	7	7	1	1	9	7	46	37	--	--	46	37	55	38
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	8	7	--	--	8	7	--	--	--	--	--	--	8	7
Woodland hardwoods	73	56	26	15	99	58	--	--	--	--	--	--	99	58
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	18	15	--	--	18	15	--	--	--	--	--	--	18	15
Total	107	59	27	15	134	61	46	37	--	--	46	37	180	71
Nonstocked	243	124	17	16	260	125	--	--	--	--	--	--	260	125
All forest types	1,447	267	445	131	1,892	297	187	82	138	44	325	93	2,216	311

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D13: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	8,565	744	8	8	8,573	744	4,888	839	--	--	4,888	839	13,462	1,121
Douglas-fir	1,426	320	26	26	1,452	321	1,019	313	19	14	1,038	313	2,490	448
Fir / spruce / mountain hemlock	660	216	14	12	675	217	1,537	467	1	1	1,537	467	2,212	515
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	1	1	--	--	1	1	7	8	2	2	10	8	11	8
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	259	99	--	--	259	99	72	42	30	23	102	48	361	109
Redwood	28	29	--	--	28	29	122	78	--	--	122	78	150	83
Western juniper	--	--	8	6	8	6	--	--	--	--	--	--	8	6
Western white pine	52	46	--	--	52	46	60	28	4	4	64	29	115	55
Other western softwoods	33	21	14	9	48	23	1	1	--	--	1	1	49	23
Total	11,025	836	71	32	11,096	836	7,706	969	56	28	7,762	969	18,858	1,276
Hardwoods:														
Alder / maple	111	44	18	17	130	47	82	51	19	16	101	53	231	71
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	3	2	3	2	--	--	--	--	--	--	3	2
Tanoak / laurel	1,584	384	61	61	1,645	388	1,235	490	93	65	1,328	494	2,973	628
Western oak	2,872	839	918	131	3,790	848	846	410	333	96	1,180	421	4,970	947
Woodland hardwoods	--	--	--	--	--	--	--	--	4	4	4	4	4	4
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	469	175	4	3	473	175	114	80	--	--	114	80	587	192
Total	5,036	939	1,004	145	6,040	948	2,278	641	449	118	2,727	652	8,767	1,150
Nonstocked	1,869	844	10	10	1,879	844	1,635	601	--	--	1,635	601	3,514	1,036
All forest types	17,929	1,484	1,085	149	19,014	1,488	11,619	1,250	505	128	12,124	1,253	31,138	1,939

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D14: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: North Coast

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	1,209	218	--	--	1,209	218	374	159	--	--	374	159	1,583	269
Fir / spruce / mountain hemlock	37	37	--	--	37	37	--	--	--	--	--	--	37	37
Western Hemlock / Sitka spruce	283	179	--	--	283	179	--	--	--	--	--	--	283	179
Lodgepole pine	--	--	--	--	--	--	8	8	--	--	8	8	8	8
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	1,886	397	--	--	1,886	397	765	400	--	--	765	400	2,651	562
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	5	5	--	--	5	5	12	19	2	2	14	19	19	20
Total	3,420	486	--	--	3,420	486	1,159	429	2	2	1,161	429	4,581	646
Hardwoods:														
Alder / maple	355	131	2	2	357	131	109	116	--	--	109	116	466	175
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	1,649	292	36	24	1,685	293	528	204	14	11	542	205	2,227	356
Western oak	222	77	72	24	295	81	--	--	5	5	5	5	300	81
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	50	27	--	--	50	27	3	3	--	--	3	3	53	27
Total	2,276	328	111	34	2,387	329	640	234	19	12	659	234	3,046	404
Nonstocked	4	3	--	--	4	3	--	--	--	--	--	--	4	3
All forest types	5,699	576	111	34	5,810	577	1,800	485	21	12	1,821	485	7,631	751

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D15: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	14,360	1,011	4	3	14,364	1,011	7,435	1,128	11	9	7,446	1,128	21,809	1,496
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	6,458	702	25	17	6,483	702	3,965	691	134	63	4,099	694	10,582	985
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	917	205	62	34	979	208	1,751	312	447	112	2,198	327	3,178	386
Pinyon / juniper	12	12	68	32	80	34	5	6	95	35	99	36	179	49
Ponderosa pine	909	156	92	90	1,001	180	186	104	21	15	206	105	1,208	208
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	29	17	37	13	66	21	147	60	--	--	147	60	213	64
Western white pine	111	74	--	--	111	74	244	91	90	62	334	111	445	133
Other western softwoods	--	--	81	72	81	72	128	72	392	115	520	135	601	153
Total	22,796	1,213	368	126	23,165	1,219	13,861	1,337	1,189	184	15,050	1,345	38,214	1,788
Hardwoods:														
Alder / maple	87	60	--	--	87	60	--	--	--	--	--	--	87	60
Aspen / birch	--	--	6	6	6	6	--	--	14	11	14	11	20	12
Elm / ash / cottonwood	--	--	1	1	1	1	--	--	--	--	--	--	1	1
Tanoak / laurel	33	15	39	35	72	38	--	--	--	--	--	--	72	38
Western oak	2,043	384	2,130	321	4,173	499	532	235	348	119	879	263	5,052	562
Woodland hardwoods	--	--	43	24	43	24	--	--	1	1	1	1	44	24
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	72	47	64	28	136	55	--	--	--	--	--	--	136	55
Total	2,234	392	2,284	324	4,518	507	532	235	362	119	894	263	5,412	569
Nonstocked	3,592	901	28	18	3,620	901	1,152	655	136	81	1,288	660	4,908	1,117
All forest types	28,622	1,514	2,681	348	31,303	1,546	15,544	1,485	1,687	232	17,231	1,497	48,534	2,117

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D16: Aboveground Carbon, Dry Weight (Regional Biomass Method) of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	51	28	--	--	51	28	305	190	--	--	305	190	356	192
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	41	37	--	--	41	37	--	--	--	--	--	--	41	37
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	86	55	86	55	86	55
Pinyon / juniper	--	--	90	36	90	36	--	--	39	12	39	12	130	38
Ponderosa pine	30	30	--	--	30	30	20	10	--	--	20	10	50	31
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	35	32	1	1	36	32	--	--	--	--	--	--	36	32
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	158	64	91	36	249	73	324	190	125	56	450	198	699	211
Hardwoods:														
Alder / maple	--	--	2	2	2	2	--	--	--	--	--	--	2	2
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	1	2	1	2	1	2
Tanoak / laurel	--	--	--	--	--	--	--	--	1	1	1	1	1	1
Western oak	238	137	410	103	648	172	238	146	211	86	449	169	1,097	242
Woodland hardwoods	--	--	24	11	24	11	--	--	14	11	14	11	37	15
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	--	--	2	1	2	1	--	--	--	--	--	--	2	1
Total	238	137	437	103	675	172	238	146	227	86	465	169	1,141	243
Nonstocked	207	168	23	13	230	168	273	218	4	3	277	218	507	275
All forest types	603	226	551	110	1,154	251	835	320	357	103	1,192	335	2,346	419

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D17: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: All California

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	4,229.7556	142.1972	16.5386	7.5980	4,246.2943	142.3255	827.1325	55.7117	4.6591	3.9706	831.7915	55.8146	5,078.0858	151.0481
Douglas-fir	930.1227	73.2775	6.1417	6.1960	936.2645	73.5232	220.3905	37.0311	30.4203	15.3961	250.8109	40.0826	1,187.0753	83.3641
Fir / spruce / mountain hemlock	1,008.7887	63.9407	30.8841	14.1711	1,039.6728	65.3333	407.6162	41.1989	40.0410	14.1116	447.6572	43.3927	1,487.3299	78.2592
Western Hemlock / Sitka spruce	33.0376	14.8999	--	--	33.0376	14.8999	1.8557	1.8469	--	--	1.8557	1.8469	34.8933	15.0080
Lodgepole pine	222.0382	38.7490	24.4294	8.5222	246.4677	39.5990	249.4448	31.9562	200.4001	38.2573	449.8449	48.8453	696.3126	62.7376
Pinyon / juniper	17.0764	12.2267	1,630.6856	118.1675	1,647.7620	118.7732	10.1455	9.4680	816.6746	88.5179	826.8201	88.9752	2,474.5821	146.2985
Ponderosa pine	2,113.5082	127.7122	78.0758	32.4523	2,191.5840	131.4565	159.5982	26.9869	32.0332	13.4184	191.6314	29.9602	2,383.2154	134.6564
Redwood	611.7598	56.9936	--	--	611.7598	56.9936	119.4161	29.5819	--	--	119.4161	29.5819	731.1759	63.7938
Western juniper	251.8852	48.5659	3,008.0547	224.6478	3,259.9399	229.0251	94.8242	29.7888	85.4279	35.9314	180.2520	46.3454	3,440.1920	233.3604
Western white pine	24.3635	11.9815	--	--	24.3635	11.9815	74.1189	21.2994	38.2171	16.8963	112.3361	27.1789	136.6995	29.6993
Other western softwoods	61.4703	20.8029	183.4152	56.1285	244.8854	59.8596	49.3566	17.6589	420.0385	68.3852	469.3951	70.2581	714.2805	92.1334
Total	9,503.8062	199.9483	4,978.2252	253.7223	14,482.0313	312.8693	2,213.8993	90.0479	1,667.9118	122.3107	3,881.8110	145.0761	18,363.8424	334.8066
Hardwoods:														
Alder / maple	225.9105	41.7328	35.6599	13.0036	261.5704	43.6890	50.3124	20.8793	15.8806	12.6789	66.1931	24.4274	327.7634	50.0395
Aspen / birch	18.2593	10.8297	38.6601	17.3970	56.9193	20.4924	31.4111	18.5874	32.2165	15.2246	63.6276	24.0267	120.5469	31.5788
Elm / ash / cottonwood	--	--	38.3521	14.7526	38.3521	14.7526	0.9675	0.9587	12.2396	8.8393	13.2070	8.8911	51.5591	17.2237
Tanoak / laurel	1,827.1138	118.8127	204.4890	40.7869	2,031.6028	124.7934	464.8481	63.9460	144.7023	36.4628	609.5505	73.1752	2,641.1532	143.5402
Western oak	2,958.6723	154.9779	8,631.0790	235.0189	11,589.7513	271.2372	430.2972	61.5496	1,319.3228	102.0956	1,749.6200	117.0299	13,339.3713	290.8599
Woodland hardwoods	30.6182	16.9131	210.1079	42.8243	240.7261	46.0178	--	--	49.1296	17.8175	49.1296	17.8175	289.8557	49.3430
Exotic hardwoods	3.8098	3.7808	4.4446	3.7328	8.2544	5.3130	--	--	--	--	--	--	8.2544	5.3130
Other hardwoods	442.6561	60.2796	234.4225	44.5958	677.0787	74.7782	102.1934	32.3271	34.2776	18.2324	136.4709	36.9459	813.5496	83.3742
Total	5,507.0400	198.4438	9,397.2150	243.0863	14,904.2550	295.3762	1,080.0297	96.6463	1,607.7690	112.5733	2,687.7987	143.3681	17,592.0537	320.3219
Nonstocked	1,121.4370	97.3596	222.8402	44.4847	1,344.2772	106.6648	299.5173	53.8728	111.1899	31.8784	410.7072	62.4379	1,754.9844	123.5232
All forest types	16,132.2831	241.9904	14,598.2804	337.2414	30,730.5635	367.5076	3,593.4462	127.2050	3,386.8707	164.2807	6,980.3170	188.7294	37,710.8805	383.6610

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D18: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	14.8171	9.3785	--	--	14.8171	9.3785	--	--	--	--	--	--	14.8171	9.3785
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	152.2267	37.7291	152.2267	37.7291	--	--	27.4482	16.3124	27.4482	16.3124	179.6749	41.1013
Ponderosa pine	--	--	28.7203	20.5039	28.7203	20.5039	--	--	2.9967	2.9372	2.9967	2.9372	31.7170	20.7132
Redwood	85.6265	20.5235	--	--	85.6265	20.5235	36.4078	13.6269	--	--	36.4078	13.6269	122.0343	24.8669
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	15.2223	11.4886	--	--	15.2223	11.4886	--	--	--	--	--	--	15.2223	11.4886
Total	115.6659	25.2642	180.9470	42.9252	296.6129	49.8081	36.4078	13.6269	30.4448	16.5747	66.8526	21.4572	363.4655	54.3365
Hardwoods:														
Alder / maple	--	--	7.4794	5.5968	7.4794	5.5968	6.9755	7.7670	--	--	6.9755	7.7670	14.4549	9.5734
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	6.1652	3.6979	6.1652	3.6979	--	--	0.5960	0.8128	0.5960	0.8128	6.7612	3.7861
Tanoak / laurel	51.2679	20.0561	87.9315	25.7321	139.1994	32.5354	34.6878	17.7604	57.9535	22.0879	92.6413	28.3427	231.8407	43.1430
Western oak	25.5672	14.4357	1,398.4957	103.1698	1,424.0630	104.1715	19.3753	13.4334	447.7106	58.2760	467.0859	58.8210	1,891.1488	118.8224
Woodland hardwoods	--	--	--	--	--	--	--	--	5.0599	3.5743	5.0599	3.5743	5.0599	3.5743
Exotic hardwoods	--	--	4.4446	3.7328	4.4446	3.7328	--	--	--	--	--	--	4.4446	3.7328
Other hardwoods	25.9355	14.1922	25.2756	14.0728	51.2111	19.5932	36.8205	19.7890	26.2585	16.2356	63.0790	25.3522	114.2901	31.9549
Total	102.7706	28.4595	1,529.7921	107.8208	1,632.5626	111.2014	97.8591	30.0964	537.5785	65.0425	635.4376	69.5002	2,268.0003	130.0224
Nonstocked	7.7718	7.7528	--	--	7.7718	7.7528	--	--	3.7288	3.2843	3.7288	3.2843	11.5006	8.4198
All forest types	226.2083	39.2522	1,710.7390	115.8087	1,936.9473	121.8916	134.2669	32.4427	571.7522	67.3765	706.0191	72.4290	2,642.9664	140.6147

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D19: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Central Valley

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	10.6963	9.2332	10.6963	9.2332	--	--	7.5767	6.8784	7.5767	6.8784	18.2730	11.5137
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	--	--	115.4310	29.6557	115.4310	29.6557	--	--	0.8143	0.8300	0.8143	0.8300	116.2453	29.6673
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	0.1125	0.1153	--	--	0.1125	0.1153	--	--	--	--	--	--	0.1125	0.1153
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	0.1125	0.1153	126.1273	31.0561	126.2398	31.0562	--	--	8.3910	6.9283	8.3910	6.9283	134.6308	31.8196
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types	0.1125	0.1153	126.1273	31.0561	126.2398	31.0562	--	--	8.3910	6.9283	8.3910	6.9283	134.6308	31.8196

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D20: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Eastside

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	197.2712	30.7606	5.2162	3.7792	202.4873	30.9757	--	--	--	--	--	--	202.4873	30.9757
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	66.1448	16.7810	--	--	66.1448	16.7810	17.7065	8.5308	--	--	17.7065	8.5308	83.8513	18.8249
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	16.1438	8.7981	8.1906	4.8369	24.3344	10.0400	--	--	--	--	--	--	24.3344	10.0400
Pinyon / juniper	9.7405	9.7349	745.2896	82.3328	755.0301	82.8866	--	--	267.2615	51.9154	267.2615	51.9154	1,022.2917	96.4236
Ponderosa pine	423.4338	67.0793	4.7684	3.5624	428.2022	67.1561	14.9709	7.9742	--	--	14.9709	7.9742	443.1731	67.6155
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	169.2654	43.1155	2,237.2407	196.5382	2,406.5061	200.7256	--	--	16.0859	13.8939	16.0859	13.8939	2,422.5921	201.1651
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	2.7589	2.8315	8.7609	6.1980	11.5198	6.8142	--	--	53.6892	27.9645	53.6892	27.9645	65.2089	28.7828
Total	884.7584	87.7436	3,009.4664	210.4332	3,894.2248	227.0072	32.6774	11.6774	337.0366	60.8400	369.7141	61.8488	4,263.9388	234.0165
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	0.0790	0.0814	0.0790	0.0814	0.0790	0.0814
Aspen / birch	9.9301	9.0627	29.2411	16.4032	39.1712	18.7403	18.4384	14.3211	0.1661	0.1712	18.6045	14.3221	57.7757	23.5865
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	7.7311	6.4294	23.5066	14.1889	31.2377	16.8499	--	--	--	--	--	--	31.2377	16.8499
Woodland hardwoods	30.6182	16.9131	49.8216	22.0741	80.4398	27.7989	--	--	--	--	--	--	80.4398	27.7989
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	38.5810	18.3004	6.4126	6.4414	44.9935	19.4009	--	--	--	--	--	--	44.9935	19.4009
Total	86.8604	27.2625	108.9818	31.5171	195.8422	42.1459	18.4384	14.3211	0.2451	0.1889	18.6835	14.3224	214.5257	44.5130
Nonstocked	200.6426	42.3111	85.6148	28.3920	286.2573	50.9315	--	--	8.0626	8.1903	8.0626	8.1903	294.3199	51.5859
All forest types	1,172.2614	101.7891	3,204.0630	213.8418	4,376.3243	235.3537	51.1158	18.8366	345.3443	61.6236	396.4602	64.3151	4,772.7845	242.5547

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D21: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	1,292.7575	77.1774	7.8669	5.9178	1,300.6244	77.4344	291.6061	32.1497	--	--	291.6061	32.1497	1,592.2305	83.6425
Douglas-fir	361.8897	46.1610	6.1417	6.1960	368.0315	46.5529	132.4251	28.1296	30.4203	15.3961	162.8454	32.0403	530.8769	56.3618
Fir / spruce / mountain hemlock	100.4852	23.2492	8.9107	6.9376	109.3960	24.2233	118.4051	23.6832	4.4364	4.6226	122.8415	24.0576	232.2375	34.1399
Western Hemlock / Sitka spruce	--	--	--	--	--	--	1.8557	1.8469	--	--	1.8557	1.8469	1.8557	1.8469
Lodgepole pine	5.1305	4.9248	--	--	5.1305	4.9248	19.4323	13.6601	6.1911	6.3413	25.6234	15.0603	30.7539	15.8450
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	164.1420	30.5873	--	--	164.1420	30.5873	21.6702	7.7209	6.4211	4.2995	28.0914	8.8373	192.2333	31.8079
Redwood	8.3038	5.9555	--	--	8.3038	5.9555	21.1314	12.7023	--	--	21.1314	12.7023	29.4352	14.0291
Western juniper	--	--	53.9581	29.4648	53.9581	29.4648	--	--	--	--	--	--	53.9581	29.4648
Western white pine	7.5150	5.8114	--	--	7.5150	5.8114	43.1167	18.8958	11.5592	11.9668	54.6759	22.3664	62.1909	23.1061
Other western softwoods	18.9675	12.1649	59.3505	25.8824	78.3180	28.5987	4.6930	4.1330	8.8413	9.0366	13.5342	9.9369	91.8522	30.2337
Total	1,959.1913	97.6595	136.2280	40.7321	2,095.4193	105.6362	654.3356	52.8445	67.8695	24.0577	722.2051	57.9876	2,817.6243	119.3067
Hardwoods:														
Alder / maple	89.9754	26.5038	11.0648	6.9712	101.0402	27.4053	31.8894	16.8477	15.8016	12.6786	47.6911	21.0854	148.7312	34.5781
Aspen / birch	--	--	--	--	--	--	--	--	7.0913	7.1746	7.0913	7.1746	7.0913	7.1746
Elm / ash / cottonwood	--	--	6.8416	4.8232	6.8416	4.8232	0.9675	0.9587	--	--	0.9675	0.9587	7.8090	4.9176
Tanoak / laurel	571.2829	69.0214	32.2165	16.1125	603.4994	70.7954	269.2669	48.6134	43.6741	20.6166	312.9410	52.6929	916.4404	87.8605
Western oak	1,345.8749	106.9466	2,473.6264	140.7581	3,819.5014	174.9998	207.0799	43.4298	363.7786	56.3676	570.8585	71.1457	4,390.3599	188.0200
Woodland hardwoods	--	--	3.4544	2.0457	3.4544	2.0457	--	--	10.7366	8.9838	10.7366	8.9838	14.1909	9.2138
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	162.3696	36.9699	16.8023	10.7803	179.1719	38.4484	46.5093	21.8175	8.0190	8.2960	54.5283	23.3416	233.7002	44.9790
Total	2,169.5028	133.0691	2,544.0060	142.0533	4,713.5088	192.1051	555.7129	69.7625	449.1013	62.7957	1,004.8142	92.8843	5,718.3230	211.6336
Nonstocked	199.5998	41.4316	19.1855	12.2652	218.7853	43.2090	139.9139	36.5562	--	--	139.9139	36.5562	358.6992	56.5983
All forest types	4,328.2938	164.8180	2,699.4195	148.1556	7,027.7133	217.3026	1,349.9624	89.3092	516.9708	67.2440	1,866.9332	109.3101	8,894.6465	239.2883

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D22: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: North Coast

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	553.4159	57.5562	--	--	553.4159	57.5562	87.9654	24.4368	--	--	87.9654	24.4368	641.3814	62.2476
Fir / spruce / mountain hemlock	6.3244	4.2275	--	--	6.3244	4.2275	--	--	--	--	--	--	6.3244	4.2275
Western Hemlock / Sitka spruce	33.0376	14.8999	--	--	33.0376	14.8999	--	--	--	--	--	--	33.0376	14.8999
Lodgepole pine	--	--	--	--	--	--	4.5075	4.6112	0.5100	0.8159	5.0175	4.6828	5.0175	4.6828
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	513.4849	53.4213	--	--	513.4849	53.4213	61.8770	23.5604	--	--	61.8770	23.5604	575.3619	57.9489
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	2.8111	2.0374	--	--	2.8111	2.0374	2.3504	2.3530	22.9842	19.7414	25.3347	19.8811	28.1457	19.9853
Total	1,109.0739	77.9065	--	--	1,109.0739	77.9065	156.7003	33.3625	23.4942	19.7582	180.1946	38.8116	1,289.2685	85.9708
Hardwoods:														
Alder / maple	112.0639	29.6595	9.1598	7.6365	121.2238	30.6186	11.4475	9.5799	--	--	11.4475	9.5799	132.6713	32.0763
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	1,120.0293	95.0941	43.5408	19.4003	1,163.5701	96.8401	160.8934	37.9641	32.8129	17.6868	193.7063	41.6757	1,357.2764	104.7287
Western oak	213.8648	43.2884	239.8947	41.3931	453.7595	59.9469	--	--	31.2138	15.5230	31.2138	15.5230	484.9733	62.3743
Woodland hardwoods	--	--	--	--	--	--	--	--	1.9714	1.7893	1.9714	1.7893	1.9714	1.7893
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	75.6500	24.5259	2.4692	2.3470	78.1192	24.6380	18.8636	13.7234	--	--	18.8636	13.7234	96.9828	28.2022
Total	1,521.6081	109.5054	295.0645	46.3517	1,816.6726	118.1456	191.2045	41.2937	65.9981	23.6000	257.2026	47.1795	2,073.8752	126.5452
Nonstocked	21.6027	12.8786	--	--	21.6027	12.8786	--	--	--	--	--	--	21.6027	12.8786
All forest types	2,652.2847	127.9629	295.0645	46.3517	2,947.3492	135.0411	347.9049	50.8693	89.4923	30.7790	437.3972	59.0394	3,384.7464	145.1645

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D23: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	2,717.1207	125.3500	3.4556	2.9028	2,720.5763	125.3747	507.0090	46.0625	4.6591	3.9706	511.6681	46.1869	3,232.2444	132.3233
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	829.0561	57.8145	21.9733	12.3568	851.0294	59.0235	271.5046	33.9409	35.6045	13.3330	307.1091	36.3907	1,158.1386	69.1676
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	200.7639	37.4781	16.2388	7.0508	217.0027	38.0881	225.5050	28.6110	183.4512	37.3205	408.9562	46.0199	625.9589	59.5964
Pinyon / juniper	7.3359	7.3976	344.3107	56.9476	351.6466	57.4164	10.1455	9.4680	236.9031	49.2138	247.0486	50.0951	598.6951	75.9629
Ponderosa pine	1,517.1669	108.0247	44.5872	24.9008	1,561.7541	110.6292	98.4016	21.4281	20.3005	12.1470	118.7021	24.5455	1,680.4562	113.2875
Redwood	4.3445	3.9806	--	--	4.3445	3.9806	--	--	--	--	--	--	4.3445	3.9806
Western juniper	73.1534	21.4215	712.0099	108.9635	785.1634	110.8948	94.8242	29.7888	69.3420	33.1365	164.1661	44.2137	949.3295	119.2987
Western white pine	16.8485	10.4777	--	--	16.8485	10.4777	31.0023	9.8583	26.6579	11.9282	57.6602	15.4599	74.5087	18.6760
Other western softwoods	21.7106	11.8654	115.3038	49.4249	137.0143	50.8292	36.3594	16.1078	330.5045	58.4783	366.8639	60.2434	503.8782	78.6737
Total	5,387.5005	170.2435	1,257.8793	134.5975	6,645.3798	213.4861	1,274.7516	71.3387	907.4228	90.7036	2,182.1743	110.6027	8,827.5541	237.5561
Hardwoods:														
Alder / maple	23.8712	13.3710	--	--	23.8712	13.3710	--	--	--	--	--	--	23.8712	13.3710
Aspen / birch	8.3292	5.9287	9.4190	5.8199	17.7482	8.3079	12.9726	11.8489	24.9591	13.4281	37.9318	17.9084	55.6799	19.7416
Elm / ash / cottonwood	--	--	14.5255	9.7692	14.5255	9.7692	--	--	--	--	--	--	14.5255	9.7692
Tanoak / laurel	84.5337	26.1380	40.8002	19.3744	125.3339	32.5187	--	--	--	--	--	--	125.3339	32.5187
Western oak	1,278.8016	104.1775	3,895.9539	171.5160	5,174.7555	196.8313	141.5110	34.3225	319.7464	53.7498	461.2575	63.9787	5,636.0130	205.6282
Woodland hardwoods	--	--	72.0893	25.9180	72.0893	25.9180	--	--	12.5759	9.1773	12.5759	9.1773	84.6652	27.4948
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	140.1201	33.9638	154.5575	37.2303	294.6775	50.3801	--	--	--	--	--	--	294.6775	50.3801
Total	1,535.6557	112.9077	4,187.3455	177.1714	5,723.0012	205.8659	154.4837	36.3102	357.2815	56.0627	511.7651	66.9899	6,234.7663	215.1008
Nonstocked	645.1306	74.4683	63.7426	23.6507	708.8732	78.0142	128.5754	35.8926	68.8820	25.7604	197.4574	44.1205	906.3305	89.5998
All forest types	7,568.2867	205.1928	5,508.9673	220.4207	13,077.2541	287.7902	1,557.8107	85.0761	1,333.5862	108.6223	2,891.3969	131.7845	15,968.6509	309.7942

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D24: Aboveground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		All forest land	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	22.6062	11.4162	--	--	22.6062	11.4162	28.5174	13.9635	--	--	28.5174	13.9635	51.1235	18.0363
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	6.7781	4.9619	--	--	6.7781	4.9619	--	--	--	--	--	--	6.7781	4.9619
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	10.2478	6.2523	10.2478	6.2523	10.2478	6.2523
Pinyon / juniper	--	--	388.8586	60.5221	388.8586	60.5221	--	--	285.0618	53.3797	285.0618	53.3797	673.9205	80.5904
Ponderosa pine	8.7655	5.1733	--	--	8.7655	5.1733	24.5555	12.5610	2.3149	2.3214	26.8703	12.7737	35.6359	13.7815
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	9.4664	6.9218	4.8459	4.8867	14.3123	8.4730	--	--	--	--	--	--	14.3123	8.4730
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	5.9537	5.4550	4.0193	5.0029	9.9731	7.4018	9.9731	7.4018
Total	47.6162	15.1439	393.7046	60.7191	441.3208	62.5176	59.0266	19.4389	301.6438	53.9722	360.6704	57.3661	801.9911	84.7417
Hardwoods:														
Alder / maple	--	--	7.9558	5.5547	7.9558	5.5547	--	--	--	--	--	--	7.9558	5.5547
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	0.1235	0.1172	0.1235	0.1172	--	--	4.0669	5.5463	4.0669	5.5463	4.1904	5.5475
Tanoak / laurel	--	--	--	--	--	--	--	--	10.2618	10.1878	10.2618	10.1878	10.2618	10.1878
Western oak	86.8326	27.0901	484.1705	61.4177	571.0031	67.7422	62.3310	24.8365	156.0590	39.0025	218.3900	45.6910	789.3932	81.4276
Woodland hardwoods	--	--	84.7426	25.9768	84.7426	25.9768	--	--	18.7859	11.6857	18.7859	11.6857	103.5284	28.4801
Exotic hardwoods	3.6973	3.7790	--	--	3.6973	3.7790	--	--	--	--	--	--	3.6973	3.7790
Other hardwoods	--	--	28.9054	15.6958	28.9054	15.6958	--	--	--	--	--	--	28.9054	15.6958
Total	90.5299	27.3524	605.8978	68.5677	696.4278	74.3476	62.3310	24.8365	189.1736	42.3356	251.5046	48.5672	947.9324	88.4829
Nonstocked	46.6896	20.9945	54.2973	21.8040	100.9870	30.1945	31.0280	17.4300	30.5165	16.5970	61.5445	24.0679	162.5315	38.6131
All forest types	184.8358	37.5182	1,053.8997	94.2282	1,238.7355	101.6663	152.3856	35.6402	521.3339	70.0487	673.7195	77.8322	1,912.4550	127.5180

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D25: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: All California

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	469.9728	15.7997	1.8376	0.8442	471.8104	15.8139	91.9036	6.1902	0.5177	0.4412	92.4212	6.2016	564.2316	16.7831
Douglas-fir	103.3470	8.1420	0.6824	0.6884	104.0294	8.1692	24.4878	4.1146	3.3800	1.7107	27.8679	4.4536	131.8973	9.2627
Fir / spruce / mountain hemlock	112.0876	7.1045	3.4316	1.5746	115.5192	7.2593	45.2907	4.5777	4.4490	1.5680	49.7397	4.8214	165.2589	8.6955
Western Hemlock / Sitka spruce	3.6708	1.6555	--	--	3.6708	1.6555	0.2062	0.2052	--	--	0.2062	0.2052	3.8770	1.6675
Lodgepole pine	24.6709	4.3054	2.7144	0.9469	27.3853	4.3999	27.7161	3.5507	22.2667	4.2508	49.9827	5.4272	77.3680	6.9708
Pinyon / juniper	1.8974	1.3585	181.1870	13.1297	183.0844	13.1970	1.1273	1.0520	90.7415	9.8353	91.8687	9.8861	274.9531	16.2554
Ponderosa pine	234.8342	14.1902	8.6751	3.6058	243.5093	14.6063	17.7331	2.9985	3.5592	1.4909	21.2924	3.3289	264.8017	14.9618
Redwood	67.9733	6.3326	--	--	67.9733	6.3326	13.2685	3.2869	--	--	13.2685	3.2869	81.2418	7.0882
Western white pine	2.7071	1.3313	--	--	2.7071	1.3313	8.2354	2.3666	4.2463	1.8774	12.4818	3.0199	15.1888	3.2999
Other western softwoods	34.8173	5.8670	354.6077	25.6347	389.4250	26.1861	16.0201	3.8286	56.1629	8.5466	72.1830	9.2906	461.6080	27.6341
Total	1,055.9784	22.2165	553.1358	28.1914	1,609.1142	34.7632	245.9888	10.0053	185.3234	13.5901	431.3121	16.1196	2,040.4263	37.2007
Hardwoods:														
Alder / maple	25.1012	4.6370	3.9622	1.4448	29.0634	4.8543	5.5903	2.3199	1.7645	1.4088	7.3548	2.7142	36.4182	5.5599
Aspen / birch	2.0288	1.2033	4.2956	1.9330	6.3244	2.2769	3.4901	2.0653	3.5796	1.6916	7.0697	2.6696	13.3941	3.5088
Elm / ash / cottonwood	--	--	4.2613	1.6392	4.2613	1.6392	0.1075	0.1065	1.3600	0.9821	1.4674	0.9879	5.7288	1.9137
Tanoak / laurel	203.0127	13.2014	22.7210	4.5319	225.7337	13.8659	51.6498	7.1051	16.0780	4.0514	67.7278	8.1306	293.4615	15.9489
Western oak	328.7413	17.2198	959.0086	26.1132	1,287.7500	30.1375	47.8108	6.8388	146.5914	11.3440	194.4022	13.0033	1,482.1522	32.3178
Woodland hardwoods	3.4020	1.8792	23.3453	4.7582	26.7473	5.1131	--	--	5.4588	1.9797	5.4588	1.9797	32.2062	5.4826
Exotic hardwoods	0.4233	0.4201	0.4938	0.4148	0.9172	0.5903	--	--	--	--	--	--	0.9172	0.5903
Other hardwoods	49.1840	6.6977	26.0469	4.9551	75.2310	8.3087	11.3548	3.5919	3.8086	2.0258	15.1634	4.1051	90.3944	9.2638
Total	611.8933	22.0493	1,044.1349	27.0096	1,656.0282	32.8196	120.0033	10.7385	178.6410	12.5081	298.6443	15.9298	1,954.6724	35.5913
Nonstocked	124.6039	10.8177	24.7600	4.9427	149.3639	11.8516	33.2796	5.9859	12.3544	3.5420	45.6341	6.9375	194.9979	13.7248
All forest types	1,792.4756	26.8878	1,622.0306	37.4713	3,414.5062	40.8342	399.2717	14.1339	376.3188	18.2534	775.5904	20.9699	4,190.0967	42.6290

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D26: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	1.6463	1.0421	--	--	1.6463	1.0421	--	--	--	--	--	--	1.6463	1.0421
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	16.9140	4.1921	16.9140	4.1921	--	--	3.0498	1.8125	3.0498	1.8125	19.9638	4.5668
Ponderosa pine	--	--	3.1911	2.2782	3.1911	2.2782	--	--	0.3330	0.3264	0.3330	0.3264	3.5241	2.3015
Redwood	9.5141	2.2804	--	--	9.5141	2.2804	4.0453	1.5141	--	--	4.0453	1.5141	13.5594	2.7630
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	1.6914	1.2765	--	--	1.6914	1.2765	--	--	--	--	--	--	1.6914	1.2765
Total	12.8518	2.8071	20.1052	4.7695	32.9570	5.5342	4.0453	1.5141	3.3828	1.8416	7.4281	2.3841	40.3850	6.0374
Hardwoods:														
Alder / maple	--	--	0.8310	0.6219	0.8310	0.6219	0.7751	0.8630	--	--	0.7751	0.8630	1.6061	1.0637
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	0.6850	0.4109	0.6850	0.4109	--	--	0.0662	0.0903	0.0662	0.0903	0.7512	0.4207
Tanoak / laurel	5.6964	2.2285	9.7702	2.8591	15.4666	3.6150	3.8542	1.9734	6.4393	2.4542	10.2935	3.1492	25.7601	4.7937
Western oak	2.8408	1.6040	155.3884	11.4633	158.2292	11.5746	2.1528	1.4926	49.7456	6.4751	51.8984	6.5357	210.1277	13.2025
Woodland hardwoods	--	--	--	--	--	--	--	--	0.5622	0.3971	0.5622	0.3971	0.5622	0.3971
Exotic hardwoods	--	--	0.4938	0.4148	0.4938	0.4148	--	--	--	--	--	--	0.4938	0.4148
Other hardwoods	2.8817	1.5769	2.8084	1.5636	5.6901	2.1770	4.0912	2.1988	2.9176	1.8040	7.0088	2.8169	12.6989	3.5505
Total	11.4190	3.1622	169.9769	11.9801	181.3958	12.3557	10.8732	3.3440	59.7310	7.2269	70.6042	7.7222	252.0000	14.4469
Nonstocked	0.8635	0.8614	--	--	0.8635	0.8614	--	--	0.4143	0.3649	0.4143	0.3649	1.2778	0.9355
All forest types	25.1343	4.3614	190.0821	12.8676	215.2163	13.5435	14.9185	3.6047	63.5280	7.4863	78.4466	8.0477	293.6629	15.6239

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D27: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Central Valley

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	1.1885	1.0259	1.1885	1.0259	--	--	0.8419	0.7643	0.8419	0.7643	2.0303	1.2793
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	--	--	12.8257	3.2951	12.8257	3.2951	--	--	0.0905	0.0922	0.0905	0.0922	12.9162	3.2964
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	0.0125	0.0128	--	--	0.0125	0.0128	--	--	--	--	--	--	0.0125	0.0128
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	0.0125	0.0128	14.0141	3.4507	14.0266	3.4507	--	--	0.9323	0.7698	0.9323	0.7698	14.9590	3.5355
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types	0.0125	0.0128	14.0141	3.4507	14.0266	3.4507	--	--	0.9323	0.7698	0.9323	0.7698	14.9590	3.5355

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D28: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Eastside

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	21.9190	3.4178	0.5796	0.4199	22.4986	3.4417	--	--	--	--	--	--	22.4986	3.4417
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	7.3494	1.8646	--	--	7.3494	1.8646	1.9674	0.9479	--	--	1.9674	0.9479	9.3168	2.0917
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	1.7938	0.9776	0.9101	0.5374	2.7038	1.1156	--	--	--	--	--	--	2.7038	1.1156
Pinyon / juniper	1.0823	1.0817	82.8098	9.1481	83.8921	9.2096	--	--	29.6957	5.7684	29.6957	5.7684	113.5878	10.7137
Ponderosa pine	47.0482	7.4533	0.5298	0.3958	47.5780	7.4618	1.6634	0.8860	--	--	1.6634	0.8860	49.2414	7.5128
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	19.1138	4.8009	249.5557	21.8406	268.6695	22.3063	--	--	7.7528	3.4695	7.7528	3.4695	276.4223	22.5686
Total	98.3065	9.7493	334.3850	23.3815	432.6915	25.2230	3.6308	1.2975	37.4485	6.7600	41.0793	6.8721	473.7708	26.0018
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	0.0088	0.0090	0.0088	0.0090	0.0088	0.0090
Aspen / birch	1.1033	1.0070	3.2490	1.8226	4.3523	2.0822	2.0487	1.5912	0.0185	0.0190	2.0672	1.5913	6.4195	2.6207
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	0.8590	0.7144	2.6118	1.5765	3.4709	1.8722	--	--	--	--	--	--	3.4709	1.8722
Woodland hardwoods	3.4020	1.8792	5.5357	2.4527	8.9378	3.0888	--	--	--	--	--	--	8.9378	3.0888
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	4.2868	2.0334	0.7125	0.7157	4.9993	2.1557	--	--	--	--	--	--	4.9993	2.1557
Total	9.6511	3.0292	12.1091	3.5019	21.7602	4.6829	2.0487	1.5912	0.0272	0.0210	2.0759	1.5914	23.8362	4.9459
Nonstocked	22.2936	4.7012	9.5127	3.1547	31.8063	5.6590	--	--	0.8958	0.9100	0.8958	0.9100	32.7022	5.7318
All forest types	130.2512	11.3099	356.0068	23.7602	486.2580	26.1504	5.6795	2.0930	38.3715	6.8471	44.0511	7.1461	530.3091	26.9505

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D29: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	143.6397	8.5753	0.8741	0.6575	144.5138	8.6038	32.4007	3.5722	--	--	32.4007	3.5722	176.9145	9.2936
Douglas-fir	40.2100	5.1290	0.6824	0.6884	40.8924	5.1725	14.7139	3.1255	3.3800	1.7107	18.0939	3.5600	58.9863	6.2624
Fir / spruce / mountain hemlock	11.1650	2.5832	0.9901	0.7708	12.1551	2.6915	13.1561	2.6315	0.4929	0.5136	13.6491	2.6731	25.8042	3.7933
Western Hemlock / Sitka spruce	--	--	--	--	--	--	0.2062	0.2052	--	--	0.2062	0.2052	0.2062	0.2052
Lodgepole pine	0.5701	0.5472	--	--	0.5701	0.5472	2.1591	1.5178	0.6879	0.7046	2.8470	1.6734	3.4171	1.7606
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	18.2380	3.3986	--	--	18.2380	3.3986	2.4078	0.8579	0.7135	0.4777	3.1213	0.9819	21.3592	3.5342
Redwood	0.9226	0.6617	--	--	0.9226	0.6617	2.3479	1.4114	--	--	2.3479	1.4114	3.2706	1.5588
Western white pine	0.8350	0.6457	--	--	0.8350	0.6457	4.7907	2.0995	1.2844	1.3296	6.0751	2.4852	6.9101	2.5673
Other western softwoods	2.1075	1.3517	12.5898	4.3569	14.6973	4.5617	0.5214	0.4592	0.9824	1.0041	1.5038	1.1041	16.2011	4.6886
Total	217.6879	10.8511	15.1364	4.5258	232.8243	11.7374	72.7039	5.8716	7.5410	2.6731	80.2450	6.4431	313.0693	13.2563
Hardwoods:														
Alder / maple	9.9973	2.9449	1.2294	0.7746	11.2267	3.0450	3.5433	1.8720	1.7557	1.4087	5.2990	2.3428	16.5257	3.8420
Aspen / birch	--	--	--	--	--	--	--	--	0.7879	0.7972	0.7879	0.7972	0.7879	0.7972
Elm / ash / cottonwood	--	--	0.7602	0.5359	0.7602	0.5359	0.1075	0.1065	--	--	0.1075	0.1065	0.8677	0.5464
Tanoak / laurel	63.4759	7.6690	3.5796	1.7903	67.0555	7.8662	29.9185	5.4015	4.8527	2.2907	34.7712	5.8548	101.8267	9.7623
Western oak	149.5417	11.8830	274.8474	15.6398	424.3891	19.4444	23.0089	4.8255	40.4198	6.2631	63.4287	7.9051	487.8178	20.8911
Woodland hardwoods	--	--	0.3838	0.2273	0.3838	0.2273	--	--	1.1930	0.9982	1.1930	0.9982	1.5768	1.0238
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	18.0411	4.1078	1.8669	1.1978	19.9080	4.2720	5.1677	2.4242	0.8910	0.9218	6.0587	2.5935	25.9667	4.9977
Total	241.0559	14.7855	282.6673	15.7837	523.7232	21.3450	61.7458	7.7514	49.9001	6.9773	111.6460	10.3205	635.3692	23.5148
Nonstocked	22.1777	4.6035	2.1317	1.3628	24.3094	4.8010	15.5460	4.0618	--	--	15.5460	4.0618	39.8554	6.2887
All forest types	480.9215	18.3131	299.9355	16.4617	780.8570	24.1447	149.9958	9.9232	57.4412	7.4716	207.4369	12.1456	988.2939	26.5876

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D30: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: North Coast

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	61.4907	6.3951	--	--	61.4907	6.3951	9.7739	2.7152	--	--	9.7739	2.7152	71.2646	6.9164
Fir / spruce / mountain hemlock	0.7027	0.4697	--	--	0.7027	0.4697	--	--	--	--	--	--	0.7027	0.4697
Western Hemlock / Sitka spruce	3.6708	1.6555	--	--	3.6708	1.6555	--	--	--	--	--	--	3.6708	1.6555
Lodgepole pine	--	--	--	--	--	--	0.5008	0.5124	0.0567	0.0907	0.5575	0.5203	0.5575	0.5203
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	57.0539	5.9357	--	--	57.0539	5.9357	6.8752	2.6178	--	--	6.8752	2.6178	63.9291	6.4388
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	0.3123	0.2264	--	--	0.3123	0.2264	0.2612	0.2614	2.5538	2.1935	2.8150	2.2090	3.1273	2.2206
Total	123.2305	8.6563	--	--	123.2305	8.6563	17.4112	3.7069	2.6105	2.1954	20.0216	4.3124	143.2521	9.5523
Hardwoods:														
Alder / maple	12.4516	3.2955	1.0178	0.8485	13.4693	3.4021	1.2720	1.0644	--	--	1.2720	1.0644	14.7413	3.5640
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	124.4477	10.5660	4.8379	2.1556	129.2856	10.7600	17.8770	4.2182	3.6459	1.9652	21.5229	4.6306	150.8085	11.6365
Western oak	23.7627	4.8098	26.6550	4.5992	50.4177	6.6608	--	--	3.4682	1.7248	3.4682	1.7248	53.8859	6.9305
Woodland hardwoods	--	--	--	--	--	--	--	--	0.2190	0.1988	0.2190	0.1988	0.2190	0.1988
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	8.4056	2.7251	0.2744	0.2608	8.6799	2.7376	2.0960	1.5248	--	--	2.0960	1.5248	10.7759	3.1336
Total	169.0676	12.1673	32.7849	5.1502	201.8525	13.1273	21.2449	4.5882	7.3331	2.6222	28.5781	5.2422	230.4306	14.0606
Nonstocked	2.4003	1.4310	--	--	2.4003	1.4310	--	--	--	--	--	--	2.4003	1.4310
All forest types	294.6983	14.2181	32.7849	5.1502	327.4833	15.0046	38.6561	5.6521	9.9436	3.4199	48.5997	6.5599	376.0830	16.1294

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D31: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	301.9022	13.9278	0.3840	0.3225	302.2862	13.9305	56.3343	5.1181	0.5177	0.4412	56.8520	5.1319	359.1382	14.7026
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	92.1174	6.4238	2.4415	1.3730	94.5588	6.5582	30.1672	3.7712	3.9561	1.4814	34.1232	4.0434	128.6821	7.6853
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	22.3071	4.1642	1.8043	0.7834	24.1114	4.2320	25.0561	3.1790	20.3835	4.1467	45.4395	5.1133	69.5510	6.6218
Pinyon / juniper	0.8151	0.8220	38.2567	6.3275	39.0718	6.3796	1.1273	1.0520	26.3225	5.4682	27.4498	5.5661	66.5216	8.4403
Ponderosa pine	168.5741	12.0027	4.9541	2.7668	173.5282	12.2921	10.9335	2.3809	2.2556	1.3497	13.1891	2.7273	186.7174	12.5875
Redwood	0.4827	0.4423	--	--	0.4827	0.4423	--	--	--	--	--	--	0.4827	0.4423
Western white pine	1.8721	1.1642	--	--	1.8721	1.1642	3.4447	1.0954	2.9620	1.3253	6.4067	1.7178	8.2787	2.0751
Other western softwoods	10.5404	2.7209	91.9237	13.2768	102.4642	13.5367	14.5760	3.7440	44.4274	7.4311	59.0033	8.2391	161.4675	15.8242
Total	598.6111	18.9159	139.7643	14.9553	738.3754	23.7207	141.6390	7.9265	100.8247	10.0782	242.4637	12.2892	980.8391	26.3951
Hardwoods:														
Alder / maple	2.6524	1.4857	--	--	2.6524	1.4857	--	--	--	--	--	--	2.6524	1.4857
Aspen / birch	0.9255	0.6587	1.0466	0.6467	1.9720	0.9231	1.4414	1.3165	2.7732	1.4920	4.2146	1.9898	6.1867	2.1935
Elm / ash / cottonwood	--	--	1.6140	1.0855	1.6140	1.0855	--	--	--	--	--	--	1.6140	1.0855
Tanoak / laurel	9.3926	2.9042	4.5334	2.1527	13.9260	3.6132	--	--	--	--	--	--	13.9260	3.6132
Western oak	142.0890	11.5753	432.8837	19.0573	574.9727	21.8701	15.7234	3.8136	35.5274	5.9722	51.2508	7.1087	626.2235	22.8476
Woodland hardwoods	--	--	8.0099	2.8798	8.0099	2.8798	--	--	1.3973	1.0197	1.3973	1.0197	9.4072	3.0550
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	15.5689	3.7738	17.1730	4.1367	32.7419	5.5978	--	--	--	--	--	--	32.7419	5.5978
Total	170.6284	12.5453	465.2605	19.6857	635.8889	22.8740	17.1649	4.0345	39.6979	6.2292	56.8628	7.4433	692.7517	23.9001
Nonstocked	71.6811	8.2742	7.0825	2.6279	78.7636	8.6682	14.2861	3.9881	7.6535	2.8623	21.9397	4.9023	100.7032	9.9555
All forest types	840.9205	22.7992	612.1073	24.4912	1,453.0278	31.9767	173.0900	9.4529	148.1762	12.0691	321.2662	14.6427	1,774.2940	34.4216

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D32: Belowground Carbon, Dry Weight of Live Understory Vegetation, by Forest Type and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	2.5118	1.2685	--	--	2.5118	1.2685	3.1686	1.5515	--	--	3.1686	1.5515	5.6804	2.0040
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	0.7531	0.5513	--	--	0.7531	0.5513	--	--	--	--	--	--	0.7531	0.5513
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	1.1386	0.6947	1.1386	0.6947	1.1386	0.6947
Pinyon / juniper	--	--	43.2064	6.7247	43.2064	6.7247	--	--	31.6735	5.9311	31.6735	5.9311	74.8799	8.9545
Ponderosa pine	0.9739	0.5748	--	--	0.9739	0.5748	2.7284	1.3957	0.2572	0.2579	2.9856	1.4193	3.9595	1.5313
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	1.0518	0.7691	0.5384	0.5430	1.5903	0.9414	0.6615	0.6061	0.4466	0.5559	1.1081	0.8224	2.6984	1.2501
Total	5.2907	1.6827	43.7449	6.7466	49.0356	6.9464	6.5585	2.1599	33.5159	5.9969	40.0744	6.3740	89.1100	9.4157
Hardwoods:														
Alder / maple	--	--	0.8840	0.6172	0.8840	0.6172	--	--	--	--	--	--	0.8840	0.6172
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	0.0137	0.0130	0.0137	0.0130	--	--	0.4519	0.6162	0.4519	0.6162	0.4656	0.6164
Tanoak / laurel	--	--	--	--	--	--	--	--	1.1402	1.1320	1.1402	1.1320	1.1402	1.1320
Western oak	9.6481	3.0100	53.7967	6.8242	63.4448	7.5269	6.9257	2.7596	17.3399	4.3336	24.2656	5.0768	87.7103	9.0475
Woodland hardwoods	--	--	9.4158	2.8863	9.4158	2.8863	--	--	2.0873	1.2984	2.0873	1.2984	11.5032	3.1644
Exotic hardwoods	0.4108	0.4199	--	--	0.4108	0.4199	--	--	--	--	--	--	0.4108	0.4199
Other hardwoods	--	--	3.2117	1.7440	3.2117	1.7440	--	--	--	--	--	--	3.2117	1.7440
Total	10.0589	3.0392	67.3220	7.6186	77.3808	8.2608	6.9257	2.7596	21.0193	4.7040	27.9450	5.3964	105.3258	9.8314
Nonstocked	5.1877	2.3327	6.0330	2.4227	11.2208	3.3549	3.4475	1.9367	3.3907	1.8441	6.8383	2.6742	18.0590	4.2903
All forest types	20.5373	4.1687	117.0999	10.4698	137.6372	11.2962	16.9317	3.9600	57.9259	7.7832	74.8577	8.6480	212.4948	14.1686

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D33: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Forest Type and Forest Land Status, 2008-2017: All California

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	57,432	1,714	63	38	57,495	1,714	14,543	994	107	91	14,650	997	72,145	1,923
Douglas-fir	11,123	1,018	52	52	11,175	1,019	3,736	705	52	30	3,788	705	14,963	1,232
Fir / spruce / mountain hemlock	13,061	962	143	94	13,205	966	6,595	809	258	116	6,852	817	20,057	1,261
Western Hemlock / Sitka spruce	499	228	--	--	499	228	24	24	--	--	24	24	523	230
Lodgepole pine	1,620	271	298	109	1,918	290	3,508	453	1,032	217	4,540	484	6,459	560
Pinyon / juniper	18	14	809	87	826	88	4	4	495	73	499	73	1,325	113
Ponderosa pine	9,071	584	99	49	9,171	586	1,349	257	97	44	1,446	261	10,616	639
Redwood	10,470	1,090	--	--	10,470	1,090	5,315	1,506	--	--	5,315	1,506	15,784	1,842
Western juniper	400	77	912	83	1,312	112	305	95	52	22	357	97	1,669	149
Western white pine	111	54	--	--	111	54	497	149	120	54	617	158	728	167
Other western softwoods	331	136	125	40	456	142	197	89	890	178	1,087	198	1,542	244
Total	104,137	2,149	2,501	203	106,638	2,148	36,072	1,940	3,103	323	39,175	1,947	145,813	2,728
Hardwoods:														
Alder / maple	1,220	256	107	48	1,327	261	460	196	3	4	463	196	1,789	326
Aspen / birch	57	38	15	7	72	38	7	5	63	45	70	45	142	59
Elm / ash / cottonwood	--	--	94	53	94	53	--	--	34	28	34	28	127	60
Tanoak / laurel	13,747	1,049	726	181	14,473	1,061	3,720	618	528	224	4,248	654	18,721	1,240
Western oak	12,899	836	16,571	651	29,470	1,026	1,510	268	2,705	297	4,214	397	33,684	1,090
Woodland hardwoods	23	14	82	24	105	28	--	--	49	22	49	22	155	36
Exotic hardwoods		1	--	--		1	--	--	--	--	--	--		1
Other hardwoods	2,056	404	205	48	2,261	407	430	213	26	25	457	214	2,717	457
Total	30,002	1,367	17,800	674	47,802	1,468	6,127	715	3,407	376	9,534	797	57,336	1,641
Nonstocked	214	44			215	44	58	34	2	2	60	35	275	56
All forest types	134,353	2,171	20,301	699	154,654	2,135	42,256	1,958	6,512	490	48,769	1,972	203,423	2,612

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D34: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	264	174	--	--	264	174	--	--	--	--	--	--	264	174
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	34	10	34	10	--	--	4	2	4	2	38	11
Ponderosa pine	--	--	8	6	8	6	--	--	11	10	11	10	19	12
Redwood	2,074	528	--	--	2,074	528	1,421	566	--	--	1,421	566	3,494	791
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	131	103	--	--	131	103	--	--	--	--	--	--	131	103
Total	2,469	565	42	12	2,511	565	1,421	566	14	11	1,435	566	3,946	816
Hardwoods:														
Alder / maple	--	--	16	12	16	12	69	77	--	--	69	77	85	78
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	9	7	9	7	--	--	1	1	1	1	10	7
Tanoak / laurel	552	225	343	111	895	250	590	323	226	108	816	340	1,711	422
Western oak	140	80	2,732	255	2,872	267	47	40	951	161	998	163	3,870	311
Woodland hardwoods	--	--	--	--	--	--	--	--	1	1	1	1	1	1
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	280	175	40	20	320	176	258	182	2	2	260	182	580	248
Total	972	296	3,140	278	4,112	403	963	371	1,182	195	2,145	412	6,257	568
Nonstocked	4	4	--	--	4	4	--	--	--	--	--	--	4	4
All forest types	3,445	634	3,182	278	6,627	689	2,384	662	1,196	195	3,580	686	10,207	974

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D35: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Forest Type and Forest Land Status, 2008-2017: Central Valley

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		All forest land	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	46	48	46	48	--	--	27	27	27	27	73	55
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	--	--	165	54	165	54	--	--	3	3	3	3	168	54
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	212	72	212	72	--	--	29	27	29	27	241	77
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types	--	--	212	72	212	72	--	--	29	27	29	27	241	77

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D36: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Forest Type and Forest Land Status, 2008-2017: Eastside

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	1,133	178	42	35	1,174	181	--	--	--	--	--	--	1,174	181
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	594	176	--	--	594	176	239	132	--	--	239	132	833	220
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	105	55	129	80	234	97	--	--	--	--	--	--	234	97
Pinyon / juniper	5	5	422	60	426	60	--	--	198	45	198	45	624	75
Ponderosa pine	1,245	176	20	13	1,264	177	101	55	--	--	101	55	1,366	185
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	185	46	663	70	848	83	--	--	8	7	8	7	856	84
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	10	10	33	24	43	26	--	--	240	98	240	98	283	101
Total	3,275	313	1,309	129	4,584	338	341	143	446	108	787	179	5,371	382
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	26	24	9	5	35	25	4	4	--	--	4	4	40	25
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	14	12	23	19	37	22	--	--	--	--	--	--	37	22
Woodland hardwoods	23	14	25	13	48	19	--	--	--	--	--	--	48	19
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	10	8			10	8	--	--	--	--	--	--	10	8
Total	73	31	57	24	130	39	4	4	--	--	4	4	135	39
Nonstocked	20	8			21	8	--	--	--	--	--	--	21	8
All forest types	3,369	315	1,366	131	4,735	341	345	144	446	108	792	180	5,526	385

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D37: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	21,669	1,285	14	13	21,683	1,285	6,105	647	--	--	6,105	647	27,788	1,431
Douglas-fir	4,602	652	52	52	4,653	654	2,164	503	52	30	2,216	504	6,870	823
Fir / spruce / mountain hemlock	983	277	29	35	1,012	278	1,438	361	9	9	1,447	361	2,459	456
Western Hemlock / Sitka spruce	--	--	--	--	--	--	24	24	--	--	24	24	24	24
Lodgepole pine	22	21	--	--	22	21	17	12	12	13	29	17	51	28
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	774	175	--	--	774	175	406	160	27	27	434	163	1,208	239
Redwood	134	129	--	--	134	129	1,110	672	--	--	1,110	672	1,243	684
Western juniper	--	--	7	4	7	4	--	--	--	--	--	--	7	4
Western white pine	53	44	--	--	53	44	53	26	4	4	57	26	110	51
Other western softwoods	42	29	58	29	99	41	14	12	6	6	19	13	119	43
Total	28,278	1,445	159	70	28,437	1,445	11,332	1,056	110	44	11,442	1,057	39,879	1,768
Hardwoods:														
Alder / maple	433	137	42	33	474	141	257	140	3	4	260	140	735	199
Aspen / birch	--	--	--	--	--	--	--	--	2	2	2	2	2	2
Elm / ash / cottonwood	--	--	17	12	17	12	--	--	--	--	--	--	17	12
Tanoak / laurel	4,892	721	128	66	5,020	723	1,920	425	60	50	1,981	427	7,000	838
Western oak	6,508	632	5,533	425	12,041	754	741	188	953	195	1,694	271	13,735	799
Woodland hardwoods	--	--	1	1	1	1	--	--	6	5	6	5	7	6
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	961	273	44	30	1,005	274	27	19	24	25	51	31	1,055	276
Total	12,794	991	5,765	432	18,558	1,071	2,945	479	1,048	203	3,993	520	22,552	1,184
Nonstocked	34	12	--	--	34	12	52	34	--	--	52	34	86	36
All forest types	41,105	1,702	5,924	437	47,029	1,742	14,329	1,104	1,158	208	15,487	1,120	62,516	2,031

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D38: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Forest Type and Forest Land Status, 2008-2017: North Coast

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	6,257	778	--	--	6,257	778	1,572	505	--	--	1,572	505	7,829	921
Fir / spruce / mountain hemlock	78	52	--	--	78	52	--	--	--	--	--	--	78	52
Western Hemlock / Sitka spruce	499	228	--	--	499	228	--	--	--	--	--	--	499	228
Lodgepole pine	--	--	--	--	--	--	5	5	--	--	5	5	5	5
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	8,257	962	--	--	8,257	962	2,784	1,250	--	--	2,784	1,250	11,041	1,554
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	71	66	--	--	71	66	28	45	5	5	34	45	105	80
Total	15,162	1,230	--	--	15,162	1,230	4,389	1,329	5	5	4,395	1,329	19,557	1,771
Hardwoods:														
Alder / maple	598	186	16	16	614	187	134	113	--	--	134	113	748	218
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	7,730	730	247	127	7,977	740	1,210	324	231	189	1,441	375	9,418	825
Western oak	1,073	241	728	144	1,801	279	--	--	100	59	100	59	1,901	286
Woodland hardwoods	--	--	--	--	--	--	--	--	20	18	20	18	20	18
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	523	185	12	12	535	185	146	112	--	--	146	112	681	217
Total	9,923	802	1,004	193	10,927	821	1,489	355	350	199	1,840	407	12,767	910
Nonstocked	7	5	--	--	7	5	--	--	--	--	--	--	7	5
All forest types	25,093	1,398	1,004	193	26,097	1,406	5,879	1,350	356	199	6,234	1,365	32,331	1,911

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D39: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	34,475	1,420	7	6	34,482	1,420	8,268	799	107	91	8,375	802	42,858	1,592
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	11,323	912	114	88	11,438	916	4,918	726	249	116	5,166	735	16,604	1,170
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	1,493	264	169	75	1,662	274	3,486	452	966	215	4,452	483	6,114	551
Pinyon / juniper	13	13	215	53	228	55	4	4	218	54	222	54	450	77
Ponderosa pine	6,969	536	71	47	7,040	538	718	187	32	21	750	188	7,790	569
Redwood	6	5	--	--	6	5	--	--	--	--	--	--	6	5
Western juniper	173	54	230	44	403	69	305	95	44	21	349	97	751	119
Western white pine	58	32	--	--	58	32	443	146	117	54	560	156	618	159
Other western softwoods	78	51	34	16	112	54	146	75	638	149	784	166	896	174
Total	54,587	1,641	841	142	55,428	1,644	18,288	1,112	2,371	302	20,659	1,131	76,087	1,931
Hardwoods:														
Alder / maple	190	113	--	--	190	113	--	--	--	--	--	--	190	113
Aspen / birch	30	29	6	4	37	29	2	2	61	45	63	45	100	53
Elm / ash / cottonwood	--	--	21	18	21	18	--	--	--	--	--	--	21	18
Tanoak / laurel	573	219	8	4	581	219	--	--	--	--	--	--	581	219
Western oak	4,952	501	6,633	419	11,585	639	609	179	516	134	1,125	223	12,710	672
Woodland hardwoods	--	--	17	9	17	9	--	--	8	8	8	8	25	12
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	283	156	90	28	372	159	--	--	--	--	--	--	372	159
Total	6,029	578	6,775	420	12,803	699	611	179	585	142	1,196	228	13,999	730
Nonstocked	147	41	--	--	147	41	5	2	2	2	7	3	154	41
All forest types	60,762	1,674	7,616	442	68,378	1,687	18,903	1,120	2,958	333	21,861	1,142	90,239	1,948

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D40: Belowground Carbon, Dry Weight of Live Trees (>= 1 inch) by Forest Type and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	156	88	--	--	156	88	170	84	--	--	170	84	325	122
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	83	62	--	--	83	62	--	--	--	--	--	--	83	62
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	54	33	54	33	54	33
Pinyon / juniper	--	--	138	40	138	40	--	--	75	25	75	25	213	47
Ponderosa pine	84	50	--	--	84	50	123	61	27	27	150	66	233	83
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	43	31	12	12	55	34	--	--	--	--	--	--	55	34
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	9	8	--	--	9	8	9	8
Total	366	123	150	42	516	130	302	103	156	50	458	114	973	173
Hardwoods:														
Alder / maple	--	--	33	29	33	29	--	--	--	--	--	--	33	29
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	6	8	6	8	6	8
Tanoak / laurel	--	--	--	--	--	--	--	--	10	10	10	10	10	10
Western oak	211	82	757	148	967	171	113	58	182	78	296	97	1,263	197
Woodland hardwoods	--	--	39	18	39	18	--	--	14	9	14	9	53	20
Exotic hardwoods	--	1	--	--	--	1	--	--	--	--	--	--	--	1
Other hardwoods	--	--	19	12	19	12	--	--	--	--	--	--	19	12
Total	211	82	848	152	1,059	175	113	58	213	80	326	98	1,385	200
Nonstocked	3	2			3	2	1	1	--	--	1	1	4	2
All forest types	580	148	998	158	1,577	218	416	120	369	94	785	151	2,362	265

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D41: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: All California

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
<i>thousand metric tons C</i>														
Softwoods:														
California mixed conifer	5,464	265	5	3	5,469	265	2,773	287	2	2	2,775	287	8,245	386
Douglas-fir	729	104	6	6	735	104	363	88	5	4	368	88	1,104	136
Fir / spruce / mountain hemlock	1,675	167	9	5	1,684	167	1,182	174	32	15	1,214	174	2,898	241
Western Hemlock / Sitka spruce	82	60	--	--	82	60	--	--	--	--	--	--	82	60
Lodgepole pine	223	50	50	31	273	59	425	74	135	31	560	79	833	98
Pinyon / juniper	3	3	69	12	72	13	1	1	41	8	42	9	114	15
Ponderosa pine	345	50	22	21	367	54	67	22	13	7	80	23	447	59
Redwood	669	116	--	--	669	116	298	124	--	--	298	124	967	169
Western juniper	21	8	35	7	56	11	36	14	--	--	36	14	92	18
Western white pine	29	16	--	--	29	16	74	23	22	15	97	28	125	32
Other western softwoods	27	14	29	19	56	24	37	19	129	33	167	38	223	45
Total	9,268	340	225	45	9,492	342	5,256	356	381	50	5,637	358	15,129	484
Hardwoods:														
Alder / maple	202	58	7	5	208	58	44	25	5	4	48	25	257	63
Aspen / birch	2	2	1	1	4	2	10	8	5	4	15	9	19	9
Elm / ash / cottonwood	--	--	5	5	5	5	--	--	3	3	3	3	9	6
Tanoak / laurel	790	106	55	24	845	108	453	123	81	39	534	128	1,379	168
Western oak	1,329	220	1,046	89	2,375	236	373	105	320	60	693	120	3,068	264
Woodland hardwoods	15	11	22	7	38	13	--	--	9	5	9	5	46	14
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	179	51	17	7	196	51	38	20	1	1	38	20	234	55
Total	2,517	254	1,155	92	3,671	269	918	163	423	71	1,341	177	5,012	321
Nonstocked	1,321	282	20	8	1,341	282	636	181	35	20	671	182	2,013	336
All forest types	13,106	479	1,399	102	14,505	485	6,811	408	839	89	7,649	411	22,154	621

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D42: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	5	4	--	--	5	4	--	--	--	--	--	--	5	4
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	3	1	3	1	--	--	--	--	--	--	3	1
Ponderosa pine	--	--	--	--	--	--	--	--	1	1	1	1	1	1
Redwood	83	27	--	--	83	27	38	23	--	--	38	23	120	35
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	17	13	--	--	17	13	--	--	--	--	--	--	17	13
Total	104	30	3	1	107	30	38	23	1	1	39	23	146	38
Hardwoods:														
Alder / maple	--	--	--	--	--	--	1	1	--	--	1	1	1	1
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	15	7	26	17	41	19	12	8	57	36	69	37	110	42
Western oak	2	2	149	25	151	25	2	2	104	45	106	45	257	51
Woodland hardwoods	--	--	--	--	--	--	--	--	4	4	4	4	4	4
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	23	16	1	1	24	16	12	10	1	1	12	10	37	18
Total	40	17	176	30	216	35	27	12	166	58	192	59	408	69
Nonstocked			--	--			--	--	--	--	--	--		
All forest types	145	34	178	30	323	45	64	26	167	58	231	63	554	78

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D43: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: Central Valley

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	4	5	4	5	--	--	3	3	3	3	8	6
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	--	--	6	3	6	3	--	--	--	--	--	--	6	3
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	11	6	11	6	--	--	3	3	3	3	14	6
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types	--	--	11	6	11	6	--	--	3	3	3	3	14	6

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D44: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: Eastside

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	84	21	1	1	85	21	--	--	--	--	--	--	85	21
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	109	40	--	--	109	40	27	16	--	--	27	16	137	43
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	3	2	35	29	37	29	--	--	--	--	--	--	37	29
Pinyon / juniper	--	--	31	7	31	7	--	--	10	3	10	3	42	8
Ponderosa pine	32	11			32	11	4	3	--	--	4	3	36	11
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	6	3	23	6	29	7	--	--	--	--	--	--	29	7
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	5	5	5	5	--	--	23	11	23	11	28	12
Total	234	47	95	31	329	56	31	16	33	11	65	20	394	60
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	2	2			2	2	10	8	--	--	10	8	13	8
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	2	2	--	--	2	2	--	--	--	--	--	--	2	2
Woodland hardwoods	15	11	7	4	22	12	--	--	--	--	--	--	22	12
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	3	3	--	--	3	3	--	--	--	--	--	--	3	3
Total	23	12	7	4	29	13	10	8	--	--	10	8	40	15
Nonstocked	50	25	4	4	54	26	--	--	--	--	--	--	54	26
All forest types	307	55	105	32	412	63	42	19	33	11	75	22	487	67

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D45: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	2,189	190	3	3	2,192	190	1,181	199	--	--	1,181	199	3,374	275
Douglas-fir	381	84	6	6	387	84	258	78	5	4	263	78	650	115
Fir / spruce / mountain hemlock	143	46	3	3	147	46	334	105			334	105	481	114
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine			--	--			2	2	1	1	2	2	3	2
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	76	29	--	--	76	29	20	11	8	6	28	12	104	31
Redwood	6	7	--	--	6	7	25	16	--	--	25	16	32	17
Western juniper	--	--	2	1	2	1	--	--	--	--	--	--	2	1
Western white pine	8	6	--	--	8	6	16	8	1	1	17	8	24	10
Other western softwoods	9	6	4	2	13	6			--	--			13	6
Total	2,813	212	18	8	2,831	212	1,837	228	14	7	1,851	228	4,682	310
Hardwoods:														
Alder / maple	38	15	5	5	43	15	24	15	5	4	29	16	72	22
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	1	1	1	1	--	--	--	--	--	--	1	1
Tanoak / laurel	361	80	13	13	374	81	308	113	19	13	328	113	702	139
Western oak	719	198	249	34	969	201	193	86	78	22	271	89	1,240	220
Woodland hardwoods	--	--	--	--	--	--	--	--	1	1	1	1	1	1
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	121	46	1	1	122	46	25	17	--	--	25	17	147	49
Total	1,239	219	269	37	1,508	222	551	142	103	26	653	145	2,162	264
Nonstocked	447	203	2	2	450	203	348	130	--	--	348	130	797	241
All forest types	4,499	359	289	37	4,789	360	2,735	283	117	29	2,852	284	7,641	456

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D46: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: North Coast

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	344	61	--	--	344	61	105	42	--	--	105	42	449	74
Fir / spruce / mountain hemlock	10	10	--	--	10	10	--	--	--	--	--	--	10	10
Western Hemlock / Sitka spruce	82	60	--	--	82	60	--	--	--	--	--	--	82	60
Lodgepole pine	--	--	--	--	--	--	2	2	--	--	2	2	2	2
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	580	113	--	--	580	113	235	121	--	--	235	121	815	165
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	1	1	--	--	1	1	3	5	1		4	5	5	6
Total	1,018	141	--	--	1,018	141	346	128	1		347	128	1,365	189
Hardwoods:														
Alder / maple	147	55	1	1	148	55	18	19	--	--	18	19	166	58
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	399	69	8	5	407	70	133	48	4	3	137	48	544	85
Western oak	56	18	19	6	75	19	--	--	1	1	1	1	76	19
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	12	6	--	--	12	6	1	1	--	--	1	1	13	6
Total	614	90	28	8	642	90	152	52	5	4	158	52	800	104
Nonstocked	2	1	--	--	2	1	--	--	--	--	--	--	2	1
All forest types	1,633	167	28	8	1,661	167	499	137	6	4	505	137	2,166	214

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D47: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	3,180	205	1	1	3,181	205	1,527	211	2	2	1,530	211	4,711	290
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	1,405	157	6	4	1,411	157	821	140	32	15	852	140	2,263	210
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	220	50	15	9	235	51	421	74	110	27	531	78	766	93
Pinyon / juniper	3	3	15	7	18	7	1	1	21	7	22	7	40	10
Ponderosa pine	229	39	22	21	251	44	37	19	5	4	42	19	292	48
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	8	4	10	3	18	5	36	14	--	--	36	14	54	15
Western white pine	21	15	--	--	21	15	59	22	22	15	80	27	101	31
Other western softwoods	--	--	20	18	20	18	34	19	106	31	140	36	160	41
Total	5,066	256	89	30	5,155	257	2,934	259	298	47	3,232	262	8,386	361
Hardwoods:														
Alder / maple	17	12	--	--	17	12	--	--	--	--	--	--	17	12
Aspen / birch	--	--	1	1	1	1	--	--	5	4	5	4	6	4
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	15	7	9	8	24	10	--	--	--	--	--	--	24	10
Western oak	496	89	527	75	1,024	116	125	51	80	26	205	58	1,229	129
Woodland hardwoods	--	--	10	5	10	5	--	--	--	--	--	--	10	5
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	19	13	15	7	34	15	--	--	--	--	--	--	34	15
Total	547	91	562	76	1,109	118	125	51	85	27	210	58	1,319	131
Nonstocked	773	192	8	6	782	192	220	114	35	20	254	116	1,036	224
All forest types	6,386	322	659	82	7,045	330	3,279	283	417	57	3,696	287	10,741	429

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D48: Belowground Carbon, Dry Weight of Dead Trees (>= 5 inch) by Forest Type and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons C</i>													
Softwoods:														
California mixed conifer	11	7	--	--	11	7	64	40	--	--	64	40	76	40
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	7	6	--	--	7	6	--	--	--	--	--	--	7	6
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	24	16	24	16	24	16
Pinyon / juniper	--	--	20	8	20	8	--	--	10	3	10	3	30	8
Ponderosa pine	8	8	--	--	8	8	6	3	--	--	6	3	14	8
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	6	6			7	6	--	--	--	--	--	--	7	6
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	33	13	20	8	53	15	70	40	34	16	104	43	157	46
Hardwoods:														
Alder / maple	--	--	1	1	1	1	--	--	--	--	--	--	1	1
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	54	31	95	24	148	39	53	33	57	23	110	40	258	56
Woodland hardwoods	--	--	6	3	6	3	--	--	3	3	3	3	9	4
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	54	31	102	24	156	39	53	33	61	23	114	40	270	56
Nonstocked	49	38	6	3	55	39	69	55			69	55	124	67
All forest types	136	51	128	25	264	57	192	74	95	28	287	79	551	98

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D49: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: All California

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	349,367.54	8,667.42	1,026.00	520.65	350,393.55	8,676.51	80,422.67	4,627.07	521.73	444.63	80,944.40	4,644.10	431,337.94	9,559.05
Douglas-fir	43,480.87	3,449.14	367.22	370.47	43,848.10	3,467.80	12,685.92	2,125.61	1,447.32	723.36	14,133.24	2,244.33	57,981.34	4,110.61
Fir / spruce / mountain hemlock	78,000.95	4,852.71	1,919.98	820.34	79,920.93	4,913.65	31,764.87	3,178.34	3,069.87	1,074.19	34,834.75	3,342.19	114,755.68	5,930.29
Western Hemlock / Sitka spruce	1,708.13	772.52	--	--	1,708.13	772.52	101.04	100.57	--	--	101.04	100.57	1,809.18	778.72
Lodgepole pine	14,808.83	2,102.56	2,462.01	852.24	17,270.84	2,256.95	20,791.99	2,368.09	11,329.54	1,839.21	32,121.53	2,880.93	49,392.37	3,640.58
Pinyon / juniper	479.31	343.17	42,838.27	3,141.13	43,317.59	3,159.10	236.71	220.91	20,169.30	2,214.10	20,406.01	2,223.95	63,723.60	3,811.39
Ponderosa pine	99,775.51	4,827.94	2,105.23	745.51	101,880.75	4,875.41	10,856.89	1,751.07	1,575.61	609.42	12,432.49	1,847.36	114,313.24	5,194.03
Redwood	34,878.80	3,176.72	--	--	34,878.80	3,176.72	5,725.81	1,296.98	--	--	5,725.81	1,296.98	40,604.61	3,411.93
Western juniper	8,611.44	1,510.00	56,942.38	3,903.68	65,553.82	4,156.64	4,520.89	1,214.33	2,090.13	803.18	6,611.02	1,449.74	72,164.84	4,392.63
Western white pine	1,503.06	650.26	--	--	1,503.06	650.26	4,780.33	1,207.07	2,074.16	811.57	6,854.48	1,453.37	8,357.54	1,591.71
Other western softwoods	3,171.16	934.51	4,229.03	1,083.39	7,400.19	1,430.75	2,821.84	929.68	16,581.20	2,167.08	19,403.04	2,333.48	26,803.23	2,733.64
Total	635,785.62	9,580.87	111,890.13	5,120.58	747,675.75	10,450.72	174,708.96	5,825.75	58,858.86	3,801.64	233,567.83	6,467.09	981,243.57	11,371.02
Hardwoods:														
Alder / maple	7,551.77	1,404.49	1,158.34	438.77	8,710.10	1,470.76	1,613.43	669.21	512.58	408.05	2,126.01	783.80	10,836.11	1,666.13
Aspen / birch	661.75	398.37	1,300.89	593.59	1,962.64	714.88	1,039.14	612.44	1,055.22	508.58	2,094.36	796.07	4,057.00	1,069.94
Elm / ash / cottonwood	--	--	1,129.55	440.99	1,129.55	440.99	22.31	22.11	304.05	216.57	326.36	217.70	1,455.91	491.77
Tanoak / laurel	59,033.24	3,888.69	6,414.19	1,269.58	65,447.44	4,065.68	16,501.89	2,295.58	4,928.41	1,257.50	21,430.30	2,602.01	86,877.74	4,791.45
Western oak	99,087.29	5,226.74	251,694.91	7,005.42	350,782.19	8,408.03	14,498.02	2,079.91	41,195.41	3,220.23	55,693.43	3,762.70	406,475.62	9,075.39
Woodland hardwoods	1,108.70	612.41	5,543.55	1,165.57	6,652.25	1,315.70	--	--	1,421.08	514.82	1,421.08	514.82	8,073.32	1,412.76
Exotic hardwoods	87.67	87.26	127.11	106.75	214.78	137.88	--	--	--	--	--	--	214.78	137.88
Other hardwoods	15,681.31	2,151.34	7,162.88	1,353.59	22,844.19	2,533.70	3,937.85	1,241.70	1,050.39	574.89	4,988.24	1,363.22	27,832.43	2,875.43
Total	183,211.71	6,679.02	274,531.42	7,255.53	457,743.14	9,273.60	37,612.64	3,387.70	50,467.14	3,576.58	88,079.77	4,756.19	545,822.91	10,167.64
Nonstocked	33,025.93	2,879.94	6,324.18	1,288.85	39,350.11	3,144.63	9,230.55	1,675.75	2,981.96	864.39	12,212.51	1,881.74	51,562.61	3,662.85
All forest types	852,023.26	8,935.50	392,745.73	8,542.72	1,244,768.99	10,023.97	221,552.15	6,084.04	112,307.96	5,108.75	333,860.11	6,811.11	1,578,629.09	9,908.18

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D50: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	826.44	519.41	--	--	826.44	519.41	--	--	--	--	--	--	826.44	519.41
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	3,791.74	955.94	3,791.74	955.94	--	--	602.34	362.83	602.34	362.83	4,394.07	1,022.41
Ponderosa pine	--	--	627.68	448.11	627.68	448.11	--	--	195.76	191.88	195.76	191.88	823.44	487.46
Redwood	4,981.16	1,198.03	--	--	4,981.16	1,198.03	2,182.19	803.76	--	--	2,182.19	803.76	7,163.36	1,450.57
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	846.27	522.55	--	--	846.27	522.55	--	--	--	--	--	--	846.27	522.55
Total	6,653.87	1,402.89	4,419.42	1,055.38	11,073.29	1,755.53	2,182.19	803.76	798.10	410.44	2,980.29	902.49	14,053.58	1,979.67
Hardwoods:														
Alder / maple	--	--	241.00	190.23	241.00	190.23	261.45	291.11	--	--	261.45	291.11	502.45	347.76
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	203.85	122.09	203.85	122.09	--	--	22.16	30.22	22.16	30.22	226.01	125.77
Tanoak / laurel	1,900.71	747.14	2,892.66	848.52	4,793.37	1,127.71	1,290.52	662.48	1,856.80	705.17	3,147.32	967.55	7,940.69	1,485.66
Western oak	885.55	502.47	42,530.28	3,163.16	43,415.84	3,202.72	591.47	428.27	13,801.33	1,812.15	14,392.80	1,827.96	57,808.64	3,663.49
Woodland hardwoods	--	--	--	--	--	--	--	--	153.18	108.31	153.18	108.31	153.18	108.31
Exotic hardwoods	--	--	127.11	106.75	127.11	106.75	--	--	--	--	--	--	127.11	106.75
Other hardwoods	1,162.18	636.08	945.43	534.13	2,107.60	814.48	1,467.57	786.43	812.46	519.53	2,280.03	935.11	4,387.64	1,236.08
Total	3,948.44	1,100.98	46,940.33	3,335.69	50,888.77	3,498.94	3,611.01	1,124.35	16,645.93	2,032.61	20,256.94	2,246.27	71,145.71	4,122.98
Nonstocked	220.43	219.89	--	--	220.43	219.89	--	--	104.13	91.72	104.13	91.72	324.56	238.25
All forest types	10,822.74	1,799.10	51,359.75	3,492.18	62,182.49	3,908.78	5,793.20	1,347.14	17,548.16	2,078.83	23,341.36	2,389.36	85,523.85	4,542.16

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D51: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: Central Valley

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	266.73	237.26	266.73	237.26	--	--	179.60	164.60	179.60	164.60	446.33	288.77
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	--	--	2,882.16	744.12	2,882.16	744.12	--	--	19.48	19.85	19.48	19.85	2,901.64	744.38
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	2.32	2.38	--	--	2.32	2.38	--	--	--	--	--	--	2.32	2.38
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	2.32	2.38	3,148.90	780.94	3,151.22	780.94	--	--	199.08	165.79	199.08	165.79	3,350.29	798.35
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types	2.32	2.38	3,148.90	780.94	3,151.22	780.94	--	--	199.08	165.79	199.08	165.79	3,350.29	798.35

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D52: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: Eastside

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	12,869.06	1,893.58	458.28	351.88	13,327.34	1,924.14	--	--	--	--	--	--	13,327.34	1,924.14
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	5,003.82	1,263.15	--	--	5,003.82	1,263.15	1,601.28	772.86	--	--	1,601.28	772.86	6,605.10	1,480.83
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	970.34	500.34	865.03	505.91	1,835.37	711.54	--	--	--	--	--	--	1,835.37	711.54
Pinyon / juniper	273.31	273.15	20,641.26	2,297.27	20,914.57	2,312.86	--	--	6,981.60	1,368.61	6,981.60	1,368.61	27,896.17	2,652.44
Ponderosa pine	17,478.09	2,116.49	291.32	196.48	17,769.41	2,124.73	1,023.29	517.09	--	--	1,023.29	517.09	18,792.70	2,185.51
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	4,808.00	1,130.47	42,095.70	3,384.49	46,903.70	3,551.61	--	--	394.24	340.52	394.24	340.52	47,297.95	3,567.04
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	218.59	224.35	594.65	419.11	813.24	475.38	--	--	2,723.23	904.95	2,723.23	904.95	3,536.47	1,022.21
Total	41,621.21	3,334.16	64,946.24	4,087.96	106,567.44	5,249.45	2,624.58	929.89	10,099.08	1,680.84	12,723.65	1,910.90	119,291.10	5,550.86
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	1.86	1.92	1.86	1.92	1.86	1.92
Aspen / birch	366.62	334.59	1,009.55	568.37	1,376.16	659.54	632.65	487.07	5.54	5.71	638.19	487.10	2,014.35	819.92
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	243.45	205.76	733.62	449.94	977.07	532.13	--	--	--	--	--	--	977.07	532.13
Woodland hardwoods	1,108.70	612.41	1,646.50	733.83	2,755.20	955.52	--	--	--	--	--	--	2,755.20	955.52
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	1,226.74	586.37	205.99	206.92	1,432.73	621.80	--	--	--	--	--	--	1,432.73	621.80
Total	2,945.51	933.68	3,595.66	1,048.85	6,541.17	1,417.24	632.65	487.07	7.40	6.01	640.05	487.10	7,181.22	1,498.61
Nonstocked	5,890.60	1,246.63	2,669.77	892.61	8,560.37	1,532.64	--	--	203.45	206.67	203.45	206.67	8,763.82	1,546.51
All forest types	50,457.32	3,706.83	71,211.66	4,281.12	121,668.98	5,619.34	3,257.22	1,069.41	10,309.92	1,703.78	13,567.15	1,999.89	135,236.13	5,922.75

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D53: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	117,029.21	5,851.86	416.11	361.99	117,445.32	5,863.83	32,033.24	3,016.21	--	--	32,033.24	3,016.21	149,478.56	6,562.95
Douglas-fir	18,793.93	2,406.61	367.22	370.47	19,161.15	2,433.50	8,182.46	1,727.18	1,447.32	723.36	9,629.79	1,871.35	28,790.94	3,059.78
Fir / spruce / mountain hemlock	6,839.17	1,525.54	556.26	430.03	7,395.42	1,581.27	9,308.19	1,821.78	295.86	308.27	9,604.05	1,842.06	16,999.48	2,427.68
Western Hemlock / Sitka spruce	--	--	--	--	--	--	101.04	100.57	--	--	101.04	100.57	101.04	100.57
Lodgepole pine	353.47	339.29	--	--	353.47	339.29	675.09	474.63	333.21	341.29	1,008.29	584.60	1,361.76	675.93
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	8,637.94	1,489.85	--	--	8,637.94	1,489.85	2,042.37	757.03	316.51	222.68	2,358.89	789.10	10,996.83	1,684.79
Redwood	457.72	353.17	--	--	457.72	353.17	942.91	555.59	--	--	942.91	555.59	1,400.63	658.34
Western juniper	--	--	981.69	515.60	981.69	515.60	--	--	--	--	--	--	981.69	515.60
Western white pine	558.58	406.88	--	--	558.58	406.88	1,622.72	700.97	317.20	328.38	1,939.92	774.07	2,498.50	874.00
Other western softwoods	842.96	492.54	1,668.59	699.94	2,511.55	855.87	191.09	168.29	293.27	299.75	484.36	343.76	2,995.90	919.67
Total	153,512.97	6,564.37	3,989.87	1,099.29	157,502.84	6,638.71	55,099.12	3,726.39	3,003.37	1,022.05	58,102.49	3,858.83	215,605.34	7,571.58
Hardwoods:														
Alder / maple	3,187.59	942.43	324.21	205.98	3,511.81	964.68	1,000.93	526.34	510.71	408.05	1,511.64	665.99	5,023.44	1,172.24
Aspen / birch	--	--	--	--	--	--	--	--	291.90	295.33	291.90	295.33	291.90	295.33
Elm / ash / cottonwood	--	--	210.12	152.03	210.12	152.03	22.31	22.11	--	--	22.31	22.11	232.43	153.63
Tanoak / laurel	20,934.83	2,541.40	1,132.44	561.29	22,067.28	2,600.47	10,233.29	1,851.29	1,745.63	826.65	11,978.92	2,023.45	34,046.19	3,278.87
Western oak	46,688.59	3,730.22	75,110.26	4,356.31	121,798.84	5,673.72	7,310.17	1,536.38	12,497.66	1,962.10	19,807.83	2,492.08	141,606.68	6,167.98
Woodland hardwoods	--	--	108.62	64.97	108.62	64.97	--	--	349.24	289.90	349.24	289.90	457.86	297.09
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	5,891.54	1,346.49	545.38	337.05	6,436.92	1,386.50	1,787.13	832.88	237.93	246.15	2,025.06	868.50	8,461.98	1,636.05
Total	76,702.55	4,724.28	77,431.03	4,403.81	154,133.58	6,370.18	20,353.83	2,560.83	15,633.06	2,213.10	35,986.89	3,351.15	190,120.47	7,135.15
Nonstocked	6,149.61	1,287.68	469.14	300.57	6,618.76	1,322.29	4,589.48	1,207.23	--	--	4,589.48	1,207.23	11,208.23	1,790.49
All forest types	236,365.14	7,842.06	81,890.05	4,545.04	318,255.18	8,887.10	80,042.42	4,289.27	18,636.43	2,436.61	98,678.86	4,809.75	416,934.04	9,866.90

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D54: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: North Coast

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	23,860.50	2,485.70	--	--	23,860.50	2,485.70	4,503.46	1,259.93	--	--	4,503.46	1,259.93	28,363.96	2,773.93
Fir / spruce / mountain hemlock	500.46	336.87	--	--	500.46	336.87	--	--	--	--	--	--	500.46	336.87
Western Hemlock / Sitka spruce	1,708.13	772.52	--	--	1,708.13	772.52	--	--	--	--	--	--	1,708.13	772.52
Lodgepole pine	--	--	--	--	--	--	167.33	171.18	15.46	24.72	182.78	172.95	182.78	172.95
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	29,271.09	2,963.39	--	--	29,271.09	2,963.39	2,600.70	879.03	--	--	2,600.70	879.03	31,871.79	3,074.65
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	319.83	260.96	--	--	319.83	260.96	162.38	215.80	447.81	384.62	610.19	441.03	930.02	512.45
Total	55,660.01	3,854.33	--	--	55,660.01	3,854.33	7,433.87	1,525.06	463.26	385.42	7,897.13	1,576.34	63,557.15	4,114.57
Hardwoods:														
Alder / maple	3,425.26	909.51	337.94	281.92	3,763.20	951.90	351.06	293.36	--	--	351.06	293.36	4,114.26	995.91
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	33,391.42	2,859.93	1,289.21	574.39	34,680.63	2,911.23	4,978.08	1,198.17	1,070.17	579.80	6,048.25	1,321.39	40,728.88	3,177.43
Western oak	6,704.66	1,366.61	7,588.64	1,324.79	14,293.30	1,902.28	--	--	1,052.65	533.34	1,052.65	533.34	15,345.95	1,986.97
Woodland hardwoods	--	--	--	--	--	--	--	--	72.84	66.11	72.84	66.11	72.84	66.11
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	2,612.99	849.00	89.77	85.33	2,702.76	853.28	683.15	499.44	--	--	683.15	499.44	3,385.90	988.70
Total	46,134.32	3,350.28	9,305.57	1,472.20	55,439.89	3,634.97	6,012.29	1,322.21	2,195.66	790.54	8,207.94	1,525.72	63,647.83	3,921.46
Nonstocked	557.39	331.95	--	--	557.39	331.95	--	--	--	--	--	--	557.39	331.95
All forest types	102,351.73	4,833.47	9,305.57	1,472.20	111,657.30	5,020.81	13,446.16	1,932.34	2,658.92	879.49	16,105.07	2,109.96	127,762.37	5,349.34

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D55: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: Sierra Cascades

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	218,046.63	7,490.16	151.61	127.36	218,198.24	7,492.23	46,522.24	3,729.23	521.73	444.63	47,043.96	3,750.33	265,242.20	8,185.09
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	65,022.27	4,468.56	1,363.72	698.59	66,385.99	4,518.51	20,855.40	2,595.27	2,774.01	1,029.00	23,629.41	2,785.34	90,015.40	5,295.63
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	13,485.02	2,018.18	1,596.98	690.03	15,082.01	2,124.89	19,949.58	2,317.65	10,191.57	1,752.49	30,141.14	2,790.87	45,223.15	3,489.01
Pinyon / juniper	206.00	207.74	8,934.52	1,489.09	9,140.53	1,503.25	236.71	220.91	5,566.52	1,167.21	5,803.23	1,187.40	14,943.76	1,910.13
Ponderosa pine	72,926.77	4,241.85	1,186.23	562.47	74,113.01	4,272.66	6,390.22	1,347.35	810.26	469.66	7,200.48	1,422.99	81,313.49	4,496.27
Redwood	168.82	154.68	--	--	168.82	154.68	--	--	--	--	--	--	168.82	154.68
Western juniper	3,242.31	917.94	13,587.19	1,928.59	16,829.50	2,130.70	4,520.89	1,214.33	1,695.89	727.42	6,216.78	1,409.19	23,046.28	2,552.52
Western white pine	944.48	507.23	--	--	944.48	507.23	3,157.61	983.91	1,756.96	742.17	4,914.57	1,231.06	5,859.04	1,331.46
Other western softwoods	943.51	489.78	1,965.80	716.34	2,909.30	867.77	2,091.02	818.47	13,029.62	1,920.27	15,120.64	2,062.40	18,029.94	2,235.75
Total	374,985.82	8,938.85	28,786.06	2,751.63	403,771.88	9,254.29	103,723.66	5,004.57	36,346.56	3,101.56	140,070.22	5,561.32	543,842.10	10,422.24
Hardwoods:														
Alder / maple	938.91	527.91	--	--	938.91	527.91	--	--	--	--	--	--	938.91	527.91
Aspen / birch	295.14	216.21	291.34	171.88	586.48	276.20	406.49	371.28	757.78	414.04	1,164.27	556.13	1,750.75	620.94
Elm / ash / cottonwood	--	--	446.28	316.48	446.28	316.48	--	--	--	--	--	--	446.28	316.48
Tanoak / laurel	2,806.29	872.45	1,099.88	507.03	3,906.16	1,008.47	--	--	--	--	--	--	3,906.16	1,008.47
Western oak	42,009.88	3,441.60	108,939.94	4,867.09	150,949.82	5,834.38	4,705.89	1,139.21	9,364.88	1,581.08	14,070.76	1,953.86	165,020.58	6,110.03
Woodland hardwoods	--	--	1,929.55	703.30	1,929.55	703.30	--	--	397.88	294.18	397.88	294.18	2,327.43	762.34
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	4,787.86	1,172.53	4,514.71	1,085.88	9,302.57	1,597.60	--	--	--	--	--	--	9,302.57	1,597.60
Total	50,838.07	3,759.13	117,221.70	5,032.35	168,059.77	6,142.11	5,112.37	1,198.19	10,520.54	1,657.57	15,632.91	2,050.16	183,692.69	6,430.90
Nonstocked	18,886.30	2,184.28	1,742.13	656.84	20,628.43	2,277.26	3,777.73	1,062.11	1,988.10	745.31	5,765.83	1,295.98	26,394.25	2,619.43
All forest types	444,710.20	9,345.73	147,749.89	5,694.72	592,460.08	10,352.95	112,613.77	5,124.47	48,855.20	3,548.71	161,468.96	5,814.19	753,929.04	11,292.43

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D56: Soil Organic Carbon by Forest Type Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	1,422.65	627.58	--	--	1,422.65	627.58	1,867.20	794.64	--	--	1,867.20	794.64	3,289.84	1,012.58
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	635.24	495.19	--	--	635.24	495.19	--	--	--	--	--	--	635.24	495.19
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	789.31	480.80	789.31	480.80	789.31	480.80
Pinyon / juniper	--	--	9,470.75	1,500.23	9,470.75	1,500.23	--	--	7,018.84	1,336.41	7,018.84	1,336.41	16,489.59	2,006.28
Ponderosa pine	732.71	437.93	--	--	732.71	437.93	1,401.00	678.09	253.07	253.79	1,654.07	724.03	2,386.78	846.17
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	561.13	411.61	277.79	280.13	838.92	497.90	--	--	--	--	--	--	838.92	497.90
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	377.35	345.74	87.27	108.63	464.62	362.40	464.62	362.40
Total	3,351.72	999.19	9,748.55	1,526.16	13,100.27	1,821.38	3,645.54	1,089.71	8,148.50	1,442.88	11,794.04	1,808.14	24,894.31	2,563.94
Hardwoods:														
Alder / maple	--	--	255.18	185.53	255.18	185.53	--	--	--	--	--	--	255.18	185.53
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	2.57	2.44	2.57	2.44	--	--	102.29	139.50	102.29	139.50	104.86	139.52
Tanoak / laurel	--	--	--	--	--	--	--	--	255.82	253.97	255.82	253.97	255.82	253.97
Western oak	2,555.15	798.17	13,910.01	1,793.48	16,465.16	1,981.52	1,890.49	751.58	4,459.42	1,114.65	6,349.91	1,327.26	22,815.07	2,377.38
Woodland hardwoods	--	--	1,858.88	569.61	1,858.88	569.61	--	--	447.95	279.92	447.95	279.92	2,306.83	634.58
Exotic hardwoods	85.34	87.23	--	--	85.34	87.23	--	--	--	--	--	--	85.34	87.23
Other hardwoods	--	--	861.61	456.05	861.61	456.05	--	--	--	--	--	--	861.61	456.05
Total	2,640.50	802.92	16,888.23	1,940.34	19,528.73	2,116.22	1,890.49	751.58	5,265.47	1,185.22	7,155.97	1,387.06	26,684.70	2,521.62
Nonstocked	1,321.59	603.15	1,443.14	593.25	2,764.73	844.10	863.34	494.80	686.28	375.61	1,549.62	621.22	4,314.36	1,048.06
All forest types	7,313.82	1,412.06	28,079.92	2,537.08	35,393.74	2,909.56	6,399.37	1,405.32	14,100.26	1,891.39	20,499.63	2,329.94	55,893.37	3,712.36

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D57: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: All California

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	31,291.05	1,165.79	64.54	44.28	31,355.59	1,166.40	8,796.46	756.44	22.17	18.89	8,818.63	756.30	40,174.21	1,371.89
Douglas-fir	5,307.92	600.04	9.64	9.72	5,317.56	600.10	1,363.67	381.48	13.18	7.58	1,376.84	381.55	6,694.40	709.59
Fir / spruce / mountain hemlock	7,508.36	610.93	68.97	37.45	7,577.34	611.90	3,456.57	567.77	213.94	152.32	3,670.51	587.68	11,247.85	846.96
Western Hemlock / Sitka spruce	348.78	235.28	--	--	348.78	235.28	2.48	2.47	--	--	2.48	2.47	351.26	235.29
Lodgepole pine	1,441.28	264.53	193.39	89.08	1,634.67	278.16	1,874.82	406.66	726.04	168.24	2,600.86	434.53	4,235.53	515.32
Pinyon / juniper	12.30	12.16	1,253.07	168.79	1,265.38	169.23	7.70	6.61	686.04	152.19	693.74	152.32	1,959.12	226.50
Ponderosa pine	4,778.84	383.43	50.21	22.18	4,829.05	383.77	878.23	242.97	48.81	25.06	927.05	244.25	5,756.09	453.60
Redwood	5,505.13	764.50	--	--	5,505.13	764.50	1,456.28	420.50	--	--	1,456.28	420.50	6,961.42	868.81
Western juniper	327.73	76.14	829.08	117.73	1,156.80	139.55	291.22	120.04	52.38	34.60	343.60	124.92	1,500.41	187.28
Western white pine	139.71	65.39	--	--	139.71	65.39	195.36	67.16	78.67	51.72	274.04	84.67	413.75	106.94
Other western softwoods	284.82	131.49	114.01	36.70	398.84	136.52	213.81	93.17	889.04	210.64	1,102.86	229.86	1,501.69	267.24
Total	56,945.93	1,553.59	2,582.91	231.03	59,528.84	1,562.02	18,536.61	1,120.35	2,730.27	345.42	21,266.89	1,159.21	80,795.72	1,900.17
Hardwoods:														
Alder / maple	910.91	220.12	138.31	78.63	1,049.22	233.74	324.75	181.12	106.31	90.36	431.07	202.41	1,480.28	309.10
Aspen / birch	18.75	11.67	60.72	30.51	79.47	32.66	93.66	74.80	111.91	86.73	205.57	114.53	285.04	119.09
Elm / ash / cottonwood	--	--	59.68	27.15	59.68	27.15	--	--	11.70	10.78	11.70	10.78	71.38	29.21
Tanoak / laurel	7,435.22	692.91	382.34	120.86	7,817.56	702.33	1,605.05	316.02	274.55	103.93	1,879.60	332.12	9,697.16	774.33
Western oak	6,564.74	525.55	7,792.33	447.79	14,357.07	686.71	657.55	145.38	1,712.16	249.96	2,369.71	287.36	16,726.78	740.19
Woodland hardwoods	15.44	9.83	142.20	49.40	157.64	50.36	--	--	108.89	60.36	108.89	60.36	266.53	78.61
Exotic hardwoods	6.33	6.47	0.03	0.03	6.36	6.47	--	--	--	--	--	--	6.36	6.47
Other hardwoods	1,573.16	361.08	249.27	74.04	1,822.43	368.35	139.83	65.96	13.16	8.20	152.99	66.43	1,975.43	374.03
Total	16,524.56	947.79	8,824.88	477.51	25,349.44	1,047.87	2,820.84	404.71	2,338.68	304.59	5,159.52	502.25	30,508.97	1,151.83
Nonstocked	2,311.04	329.04	217.92	65.09	2,528.97	335.27	1,136.36	358.79	274.69	113.36	1,411.05	376.17	3,940.01	503.87
All forest types	75,781.53	1,677.78	11,625.72	529.16	87,407.24	1,709.51	22,493.82	1,185.88	5,343.64	467.08	27,837.46	1,241.66	115,244.70	2,034.31

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D58: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	68.83	50.06	--	--	68.83	50.06	--	--	--	--	--	--	68.83	50.06
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	29.20	18.78	29.20	18.78	--	--	0.53	0.39	0.53	0.39	29.72	18.78
Ponderosa pine	--	--	13.57	10.97	13.57	10.97	--	--	0.41	0.40	0.41	0.40	13.98	10.98
Redwood	682.20	253.52	--	--	682.20	253.52	371.45	166.86	--	--	371.45	166.86	1,053.65	303.50
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	39.67	29.03	--	--	39.67	29.03	--	--	--	--	--	--	39.67	29.03
Total	790.69	259.73	42.77	21.75	833.46	260.64	371.45	166.86	0.94	0.56	372.38	166.86	1,205.85	309.47
Hardwoods:														
Alder / maple	--	--	31.05	31.43	31.05	31.43	16.64	18.53	--	--	16.64	18.53	47.69	36.48
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	10.74	8.47	10.74	8.47	--	--	0.13	0.17	0.13	0.17	10.87	8.48
Tanoak / laurel	230.76	121.97	188.96	87.60	419.72	150.08	62.43	35.72	187.16	95.60	249.59	102.06	669.31	181.48
Western oak	34.64	25.22	1,240.34	160.98	1,274.99	162.94	28.19	21.33	481.01	151.42	509.19	152.60	1,784.18	222.12
Woodland hardwoods	--	--	--	--	--	--	--	--	8.25	7.85	8.25	7.85	8.25	7.85
Exotic hardwoods	--	--	0.03	0.03	0.03	0.03	--	--	--	--	--	--	0.03	0.03
Other hardwoods	160.98	101.58	26.30	16.69	187.28	102.27	65.64	42.45	9.14	7.07	74.78	42.98	262.07	110.04
Total	426.38	160.61	1,497.43	187.83	1,923.81	246.40	172.90	60.72	685.68	182.69	858.58	190.91	2,782.39	310.22
Nonstocked	2.23	2.22	--	--	2.23	2.22	--	--	2.97	2.62	2.97	2.62	5.20	3.43
All forest types	1,219.30	303.90	1,540.19	189.08	2,759.50	356.99	544.35	175.33	689.59	182.93	1,233.94	267.43	3,993.43	444.77

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D59: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: Central Valley

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	20.50	21.01	20.50	21.01	--	--	10.47	10.68	10.47	10.68	30.98	23.56
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	--	--	59.24	27.51	59.24	27.51	--	--	--	--	--	--	59.24	27.51
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	79.75	34.61	79.75	34.61	--	--	10.47	10.68	10.47	10.68	90.22	36.22
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types	--	--	79.75	34.61	79.75	34.61	--	--	10.47	10.68	10.47	10.68	90.22	36.22

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D60: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: Eastside

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total		Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	941.51	182.89	43.66	41.90	985.17	187.43	--	--	--	--	--	--	985.17	187.43
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	423.50	123.00	--	--	423.50	123.00	104.87	73.51	--	--	104.87	73.51	528.37	143.29
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	138.94	80.02	119.54	81.80	258.49	114.43	--	--	--	--	--	--	258.49	114.43
Pinyon / juniper	0.25	0.25	564.28	99.59	564.53	99.59	--	--	146.96	42.01	146.96	42.01	711.49	107.26
Ponderosa pine	848.36	164.01	10.05	8.03	858.42	164.18	89.12	62.99	--	--	89.12	62.99	947.54	175.70
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	160.57	54.10	637.84	107.72	798.41	120.19	--	--	0.39	0.34	0.39	0.34	798.80	120.19
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	4.26	4.37	15.31	15.34	19.57	15.95	--	--	181.82	67.98	181.82	67.98	201.39	69.83
Total	2,517.40	290.46	1,390.69	172.59	3,908.09	336.88	193.99	96.80	329.17	79.80	523.16	124.95	4,431.25	358.68
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	3.27	2.98	39.04	26.04	42.31	26.21	91.33	74.77	--	--	91.33	74.77	133.64	79.23
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	15.00	12.59	29.34	22.77	44.35	26.60	--	--	--	--	--	--	44.35	26.60
Woodland hardwoods	15.44	9.83	65.81	38.55	81.26	39.78	--	--	--	--	--	--	81.26	39.78
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	73.02	38.29	0.30	0.30	73.32	38.29	--	--	--	--	--	--	73.32	38.29
Total	106.73	41.56	134.50	51.77	241.23	66.60	91.33	74.77	--	--	91.33	74.77	332.56	100.13
Nonstocked	190.31	57.68	53.38	25.62	243.68	63.11	--	--	8.84	8.98	8.84	8.98	252.52	63.74
All forest types	2,814.43	299.42	1,578.57	181.49	4,393.00	348.77	285.32	122.80	338.01	82.14	623.33	147.10	5,016.33	377.80

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D61: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	10,487.18	715.69	4.81	4.80	10,491.99	715.70	3,067.02	406.86	--	--	3,067.02	406.86	13,559.01	821.00
Douglas-fir	1,991.97	373.45	9.64	9.72	2,001.61	373.55	561.13	198.68	13.18	7.58	574.31	198.82	2,575.92	422.90
Fir / spruce / mountain hemlock	525.24	139.76	7.18	9.59	532.43	139.93	718.23	229.81	5.69	5.92	723.92	229.87	1,256.35	269.11
Western Hemlock / Sitka spruce	--	--	--	--	--	--	2.48	2.47	--	--	2.48	2.47	2.48	2.47
Lodgepole pine	8.89	8.53	--	--	8.89	8.53	9.10	6.40	2.35	2.40	11.44	6.83	20.33	10.93
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	420.05	114.45	--	--	420.05	114.45	92.37	47.03	18.83	15.25	111.20	49.44	531.24	124.66
Redwood	14.71	14.19	--	--	14.71	14.19	454.57	290.86	--	--	454.57	290.86	469.28	291.20
Western juniper	--	--	7.21	6.38	7.21	6.38	--	--	--	--	--	--	7.21	6.38
Western white pine	32.57	32.71	--	--	32.57	32.71	53.70	27.13	0.89	0.92	54.59	27.15	87.17	42.43
Other western softwoods	83.60	59.45	58.58	27.29	142.17	65.41	58.34	51.38	20.78	21.24	79.12	55.60	221.29	85.59
Total	13,564.20	816.12	87.42	31.54	13,651.62	816.28	5,016.95	569.30	61.70	28.51	5,078.65	569.97	18,730.28	990.77
Hardwoods:														
Alder / maple	366.54	151.84	87.80	70.69	454.34	167.49	269.09	177.64	106.31	90.36	375.41	199.30	829.75	260.33
Aspen / birch	--	--	--	--	--	--	--	--	2.50	2.53	2.50	2.53	2.50	2.53
Elm / ash / cottonwood	--	--	16.46	12.11	16.46	12.11	--	--	--	--	--	--	16.46	12.11
Tanoak / laurel	2,512.49	397.63	96.18	72.31	2,608.67	404.02	906.19	250.43	31.95	16.79	938.15	250.94	3,546.82	475.10
Western oak	3,191.89	382.55	2,519.09	308.43	5,710.99	488.48	406.17	130.22	612.81	150.40	1,018.98	199.49	6,729.97	526.30
Woodland hardwoods	--	--	2.06	1.86	2.06	1.86	--	--	2.60	1.85	2.60	1.85	4.66	2.62
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	816.77	308.73	37.95	32.30	854.71	310.37	54.78	48.14	4.02	4.16	58.81	48.32	913.52	314.11
Total	6,887.70	653.16	2,759.53	325.94	9,647.23	726.33	1,636.25	334.04	760.19	175.94	2,396.44	377.12	12,043.67	815.83
Nonstocked	498.12	145.22	20.62	20.79	518.74	146.70	567.04	189.12	--	--	567.04	189.12	1,085.79	239.34
All forest types	20,950.02	1,031.51	2,867.57	328.05	23,817.60	1,075.24	7,220.24	653.32	821.90	178.68	8,042.14	673.98	31,859.73	1,258.90

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D62: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: North Coast

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	3,247.12	474.98	--	--	3,247.12	474.98	802.53	326.09	--	--	802.53	326.09	4,049.66	574.71
Fir / spruce / mountain hemlock	16.31	11.29	--	--	16.31	11.29	--	--	--	--	--	--	16.31	11.29
Western Hemlock / Sitka spruce	348.78	235.28	--	--	348.78	235.28	--	--	--	--	--	--	348.78	235.28
Lodgepole pine	--	--	--	--	--	--	1.57	1.60	--	--	1.57	1.60	1.57	1.60
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	4,767.15	724.78	--	--	4,767.15	724.78	630.27	264.23	--	--	630.27	264.23	5,397.42	768.34
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	106.91	108.93	--	--	106.91	108.93	5.96	6.23	8.98	7.72	14.94	9.91	121.85	109.39
Total	8,486.28	889.22	--	--	8,486.28	889.22	1,440.33	404.69	8.98	7.72	1,449.32	404.77	9,935.59	970.39
Hardwoods:														
Alder / maple	461.46	150.54	13.67	13.44	475.14	151.14	39.02	30.08	--	--	39.02	30.08	514.16	154.06
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	4,312.83	533.13	85.29	41.39	4,398.12	534.39	636.43	189.96	50.26	36.80	686.69	193.40	5,084.81	566.42
Western oak	428.04	128.19	187.90	46.57	615.93	136.17	--	--	16.90	9.03	16.90	9.03	632.84	136.73
Woodland hardwoods	--	--	--	--	--	--	--	--	6.47	5.87	6.47	5.87	6.47	5.87
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	160.03	64.06	0.33	0.31	160.35	64.06	19.40	15.86	--	--	19.40	15.86	179.76	66.00
Total	5,362.35	567.09	287.19	63.58	5,649.54	569.78	694.85	201.70	73.63	38.34	768.48	205.20	6,418.03	603.42
Nonstocked	32.88	24.74	--	--	32.88	24.74	--	--	--	--	--	--	32.88	24.74
All forest types	13,881.51	1,027.74	287.19	63.58	14,168.69	1,028.69	2,135.18	444.63	82.62	39.11	2,217.80	446.28	16,386.50	1,110.93

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D63: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: Sierra Cascades

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	19,697.60	990.73	16.06	13.49	19,713.67	990.99	5,563.20	656.25	22.17	18.89	5,585.37	656.08	25,299.04	1,175.63
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	6,499.26	586.09	61.79	36.20	6,561.05	587.10	2,633.47	517.81	208.26	152.21	2,841.72	539.54	9,402.77	795.96
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	1,293.45	252.29	73.85	35.62	1,367.29	254.64	1,864.16	406.74	645.02	160.89	2,509.17	432.17	3,876.47	501.14
Pinyon / juniper	12.06	12.16	374.36	119.09	386.42	119.70	7.70	6.61	314.18	112.17	321.88	112.35	708.30	164.06
Ponderosa pine	3,490.01	331.69	26.58	17.52	3,516.60	331.90	586.58	218.73	15.84	14.34	602.42	219.19	4,119.01	397.18
Redwood	41.07	37.63	--	--	41.07	37.63	--	--	--	--	--	--	41.07	37.63
Western juniper	130.88	46.71	183.73	47.63	314.61	66.61	291.22	120.04	51.99	34.60	343.21	124.92	657.83	141.57
Western white pine	107.14	56.62	--	--	107.14	56.62	141.66	61.45	77.78	51.71	219.44	80.21	326.58	98.18
Other western softwoods	50.39	32.06	40.12	19.18	90.52	37.36	149.43	77.47	670.49	198.38	819.92	212.55	910.44	215.80
Total	31,321.86	1,163.45	776.49	139.73	32,098.36	1,168.95	11,237.42	929.10	2,005.73	320.26	13,243.15	972.81	45,341.50	1,499.00
Hardwoods:														
Alder / maple	82.90	54.39	--	--	82.90	54.39	--	--	--	--	--	--	82.90	54.39
Aspen / birch	15.48	11.28	21.68	15.91	37.16	19.50	2.33	2.13	109.41	86.69	111.75	86.72	148.91	88.89
Elm / ash / cottonwood	--	--	11.98	8.78	11.98	8.78	--	--	--	--	--	--	11.98	8.78
Tanoak / laurel	379.14	203.09	11.91	6.80	391.05	203.20	--	--	--	--	--	--	391.05	203.20
Western oak	2,607.57	325.65	3,070.32	258.83	5,677.89	411.43	164.25	56.52	331.51	97.72	495.76	112.80	6,173.65	425.30
Woodland hardwoods	--	--	35.43	23.72	35.43	23.72	--	--	18.25	20.38	18.25	20.38	53.68	31.27
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	362.37	139.24	177.88	64.45	540.25	153.44	--	--	--	--	--	--	540.25	153.44
Total	3,447.46	410.67	3,329.20	268.20	6,776.66	485.68	166.59	56.56	459.17	131.84	625.76	143.39	7,402.42	505.15
Nonstocked	1,522.46	287.29	67.98	38.47	1,590.45	289.82	490.96	295.28	256.94	112.88	747.90	316.11	2,338.35	428.86
All forest types	36,291.79	1,234.84	4,173.67	303.53	40,465.46	1,256.24	11,894.97	969.76	2,721.84	361.70	14,616.80	1,021.10	55,082.27	1,590.46

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D64: Aboveground Carbon Mass of Down Dead Wood, by Forest Type and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	164.76	101.01	--	--	164.76	101.01	166.24	77.86	--	--	166.24	77.86	331.00	127.53
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	44.04	40.89	--	--	44.04	40.89	--	--	--	--	--	--	44.04	40.89
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	78.68	52.76	78.68	52.76	78.68	52.76
Pinyon / juniper	--	--	285.24	75.68	285.24	75.68	--	--	224.37	95.42	224.37	95.42	509.61	121.74
Ponderosa pine	20.42	12.63	--	--	20.42	12.63	110.16	72.75	13.73	13.77	123.90	74.04	144.31	75.11
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	36.27	26.56	0.30	0.30	36.57	26.56	--	--	--	--	--	--	36.57	26.56
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	0.08	0.07	6.97	8.68	7.05	8.68	7.05	8.68
Total	265.50	112.83	285.54	75.68	551.03	135.82	276.47	106.40	323.75	110.11	600.23	153.12	1,151.26	204.66
Hardwoods:														
Alder / maple	--	--	5.79	4.05	5.79	4.05	--	--	--	--	--	--	5.79	4.05
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	1.10	1.50	1.10	1.50	1.10	1.50
Tanoak / laurel	--	--	--	--	--	--	--	--	5.17	5.13	5.17	5.13	5.17	5.13
Western oak	287.60	114.43	686.09	133.20	973.69	205.80	58.94	29.42	269.93	88.56	328.86	93.20	1,302.56	225.81
Woodland hardwoods	--	--	38.90	19.72	38.90	19.72	--	--	73.33	55.93	73.33	55.93	112.23	59.31
Exotic hardwoods	6.33	6.47	--	--	6.33	6.47	--	--	--	--	--	--	6.33	6.47
Other hardwoods	--	--	6.51	3.90	6.51	3.90	--	--	--	--	--	--	6.51	3.90
Total	293.93	114.61	737.29	134.67	1,031.22	206.86	58.94	29.42	349.52	104.88	408.46	108.83	1,439.68	233.62
Nonstocked	65.05	39.49	75.94	40.95	140.99	56.68	78.35	82.11	5.94	4.52	84.29	82.23	225.28	99.87
All forest types	624.47	165.39	1,098.77	159.32	1,723.24	253.38	413.76	137.47	679.22	151.04	1,092.98	203.05	2,816.23	324.10

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D65: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: All California

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	45,422.12	1,139.35	115.62	60.95	45,537.74	1,140.31	10,533.00	631.85	80.21	68.36	10,613.21	634.75	56,150.95	1,263.22
Douglas-fir	3,711.21	293.70	23.69	23.90	3,734.90	294.60	941.18	157.66	82.88	41.46	1,024.07	162.96	4,758.97	334.96
Fir / spruce / mountain hemlock	8,837.91	552.83	157.47	71.86	8,995.38	556.88	3,597.95	370.47	298.30	106.90	3,896.24	384.47	12,891.62	674.85
Western Hemlock / Sitka spruce	266.04	118.86	--	--	266.04	118.86	22.90	22.79	--	--	22.90	22.79	288.94	120.94
Lodgepole pine	1,474.33	215.09	287.98	100.62	1,762.31	235.98	2,481.43	285.35	1,078.87	189.07	3,560.30	326.91	5,322.61	401.04
Pinyon / juniper	23.59	17.04	1,671.32	137.27	1,694.91	138.29	12.21	12.66	869.42	112.72	881.63	113.40	2,576.54	176.34
Ponderosa pine	8,937.58	451.95	143.47	51.83	9,081.05	454.21	989.88	163.02	119.57	47.64	1,109.45	169.44	10,190.50	482.72
Redwood	2,608.75	238.33	--	--	2,608.75	238.33	477.26	109.26	--	--	477.26	109.26	3,086.01	260.80
Western juniper	502.95	91.50	2,553.79	180.13	3,056.73	200.42	382.42	105.52	130.84	51.37	513.26	116.98	3,570.00	231.44
Western white pine	138.84	59.48	--	--	138.84	59.48	507.16	133.20	188.53	75.36	695.69	152.91	834.52	164.02
Other western softwoods	234.17	71.26	302.49	79.62	536.66	106.85	248.14	84.86	1,424.24	196.93	1,672.38	212.31	2,209.04	237.50
Total	72,157.48	1,134.61	5,255.84	271.22	77,413.31	1,143.63	20,193.53	712.47	4,272.86	320.97	24,466.39	739.16	101,879.70	1,258.38
Hardwoods:														
Alder / maple	552.75	103.49	90.71	34.56	643.46	109.06	129.71	55.38	29.60	23.16	159.31	60.03	802.77	124.46
Aspen / birch	54.50	33.05	68.10	29.97	122.61	44.62	54.16	31.66	88.29	44.41	142.46	54.54	265.06	70.47
Elm / ash / cottonwood	--	--	64.91	27.77	64.91	27.77	1.44	1.43	18.43	14.00	19.88	14.07	84.79	31.13
Tanoak / laurel	4,925.10	323.95	546.38	109.97	5,471.48	339.70	1,181.02	166.40	358.59	91.81	1,539.61	188.76	7,011.09	385.50
Western oak	6,310.43	340.21	11,709.37	352.70	18,019.80	470.25	914.63	133.98	2,079.95	170.30	2,994.59	213.19	21,014.39	509.11
Woodland hardwoods	64.64	35.73	336.08	75.91	400.72	83.85	--	--	102.27	38.97	102.27	38.97	502.99	92.46
Exotic hardwoods	4.46	4.44	5.01	4.21	9.48	6.12	--	--	--	--	--	--	9.48	6.12
Other hardwoods	1,174.08	165.47	398.83	74.73	1,572.91	181.16	271.05	87.71	55.65	29.60	326.70	92.26	1,899.61	203.12
Total	13,085.96	482.78	13,219.40	379.64	26,305.36	576.79	2,552.02	234.08	2,732.79	203.94	5,284.81	300.72	31,590.17	634.88
Nonstocked	1,906.40	167.99	274.99	57.94	2,181.39	177.24	484.34	91.62	120.56	37.10	604.90	98.53	2,786.29	202.74
All forest types	87,149.84	1,012.72	18,750.22	453.21	105,900.06	972.03	23,229.90	699.56	7,126.21	371.98	30,356.10	713.10	136,256.17	1,005.45

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D66: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: Central Coast and Interior Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	80.00	49.99	--	--	80.00	49.99	--	--	--	--	--	--	80.00	49.99
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	109.46	29.65	109.46	29.65	--	--	17.05	10.69	17.05	10.69	126.51	31.52
Ponderosa pine	--	--	30.45	21.75	30.45	21.75	--	--	13.87	13.60	13.87	13.60	44.32	25.65
Redwood	434.33	104.69	--	--	434.33	104.69	202.87	74.87	--	--	202.87	74.87	637.20	129.42
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	70.08	44.64	--	--	70.08	44.64	--	--	--	--	--	--	70.08	44.64
Total	584.41	123.97	139.91	36.76	724.32	129.30	202.87	74.87	30.92	17.30	233.79	76.84	958.11	151.02
Hardwoods:														
Alder / maple	--	--	22.05	17.49	22.05	17.49	24.13	26.87	--	--	24.13	26.87	46.18	32.06
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	8.91	5.37	8.91	5.37	--	--	0.95	1.30	0.95	1.30	9.86	5.53
Tanoak / laurel	186.34	75.42	267.28	79.09	453.61	108.99	127.07	65.71	168.43	64.63	295.50	92.17	749.11	142.72
Western oak	48.31	27.09	1,958.13	150.54	2,006.43	152.96	26.96	19.97	716.81	97.05	743.78	97.87	2,750.21	180.04
Woodland hardwoods	--	--	--	--	--	--	--	--	7.64	5.40	7.64	5.40	7.64	5.40
Exotic hardwoods	--	--	5.01	4.21	5.01	4.21	--	--	--	--	--	--	5.01	4.21
Other hardwoods	77.53	43.38	48.66	26.13	126.19	49.86	89.43	48.59	39.63	24.52	129.05	53.90	255.24	72.94
Total	312.18	91.03	2,310.03	173.03	2,622.21	194.29	267.59	86.33	933.47	120.34	1,201.05	143.96	3,823.26	239.31
Nonstocked	9.00	8.98	--	--	9.00	8.98	--	--	3.40	3.00	3.40	3.00	12.40	9.46
All forest types	905.59	153.36	2,449.94	176.72	3,355.53	232.30	470.46	111.45	967.79	121.59	1,438.25	161.07	4,793.78	280.00

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D67: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: Central Valley

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	18.34	16.87	18.34	16.87	--	--	9.15	8.20	9.15	8.20	27.48	18.76
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	--	--	128.47	34.33	128.47	34.33	--	--	1.05	1.07	1.05	1.07	129.52	34.34
Woodland hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Exotic hardwoods	0.12	0.13	--	--	0.12	0.13	--	--	--	--	--	--	0.12	0.13
Other hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	0.12	0.13	146.81	38.24	146.93	38.24	--	--	10.20	8.27	10.20	8.27	157.12	39.13
Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--
All forest types	0.12	0.13	146.81	38.24	146.93	38.24	--	--	10.20	8.27	10.20	8.27	157.12	39.13

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D68: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: Eastside

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	1,545.60	232.39	60.74	49.17	1,606.34	237.30	--	--	--	--	--	--	1,606.34	237.30
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	529.35	134.40	--	--	529.35	134.40	177.03	89.75	--	--	177.03	89.75	706.38	161.62
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	92.82	47.61	101.73	60.89	194.55	77.29	--	--	--	--	--	--	194.55	77.29
Pinyon / juniper	14.11	14.10	906.34	110.56	920.45	111.42	--	--	369.24	80.30	369.24	80.30	1,289.69	135.72
Ponderosa pine	1,458.93	182.76	22.94	15.19	1,481.87	183.33	92.03	47.72	--	--	92.03	47.72	1,573.89	189.35
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	233.06	54.82	1,832.88	151.53	2,065.94	160.32	--	--	17.12	14.79	17.12	14.79	2,083.06	160.98
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	12.27	12.59	60.11	42.44	72.38	44.27	--	--	280.53	98.25	280.53	98.25	352.92	107.77
Total	3,886.14	332.16	2,984.74	205.75	6,870.88	390.30	269.06	101.65	666.90	128.02	935.96	162.73	7,806.84	421.56
Hardwoods:														
Alder / maple	--	--	--	--	--	--	--	--	0.08	0.08	0.08	0.08	0.08	0.08
Aspen / birch	25.79	23.53	50.63	28.14	76.42	36.68	32.37	24.62	0.21	0.22	32.59	24.62	109.00	44.18
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western oak	14.16	11.35	33.28	19.64	47.44	24.75	--	--	--	--	--	--	47.44	24.75
Woodland hardwoods	64.64	35.73	116.01	54.73	180.64	65.34	--	--	--	--	--	--	180.64	65.34
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	77.16	36.54	9.24	9.28	86.40	37.70	--	--	--	--	--	--	86.40	37.70
Total	181.74	57.36	209.16	65.12	390.90	87.31	32.37	24.62	0.29	0.23	32.66	24.62	423.57	90.71
Nonstocked	335.83	71.61	123.66	42.27	459.49	83.13	--	--	15.88	16.13	15.88	16.13	475.37	84.68
All forest types	4,403.72	345.88	3,317.56	218.42	7,721.27	407.71	301.43	105.84	683.07	129.94	984.51	166.64	8,705.78	438.66

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D69: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: Klamath Interior Coast Ranges

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
thousand metric tons C														
Softwoods:														
California mixed conifer	13,929.07	703.07	37.07	32.76	13,966.14	703.96	3,516.68	339.04	--	--	3,516.68	339.04	17,482.82	776.97
Douglas-fir	1,480.71	189.41	23.69	23.90	1,504.40	190.82	583.91	123.57	82.88	41.46	666.79	130.27	2,171.19	230.36
Fir / spruce / mountain hemlock	630.91	140.87	40.50	32.13	671.41	144.16	753.94	147.35	21.84	22.76	775.79	148.69	1,447.20	207.10
Western Hemlock / Sitka spruce	--	--	--	--	--	--	22.90	22.79	--	--	22.90	22.79	22.90	22.79
Lodgepole pine	21.83	20.95	--	--	21.83	20.95	40.26	28.32	21.20	21.72	61.46	35.69	83.29	41.38
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	754.96	136.55	--	--	754.96	136.55	231.69	84.69	29.23	22.11	260.92	87.52	1,015.88	162.11
Redwood	36.14	27.80	--	--	36.14	27.80	75.40	44.63	--	--	75.40	44.63	111.53	52.58
Western juniper	--	--	50.52	26.66	50.52	26.66	--	--	--	--	--	--	50.52	26.66
Western white pine	57.58	41.88	--	--	57.58	41.88	111.42	48.00	19.25	19.93	130.67	51.97	188.25	66.69
Other western softwoods	60.60	35.82	98.25	41.14	158.85	54.55	16.15	14.23	16.03	16.38	32.18	21.69	191.03	58.48
Total	16,971.79	742.79	250.03	71.27	17,221.82	745.03	5,352.35	371.64	190.44	64.11	5,542.79	376.79	22,764.61	824.45
Hardwoods:														
Alder / maple	229.78	67.27	26.66	17.10	256.44	69.41	80.37	43.30	29.53	23.16	109.90	49.10	366.34	85.02
Aspen / birch	--	--	--	--	--	--	--	--	15.94	16.12	15.94	16.12	15.94	16.12
Elm / ash / cottonwood	--	--	10.54	8.03	10.54	8.03	1.44	1.43	--	--	1.44	1.43	11.98	8.16
Tanoak / laurel	1,477.73	180.35	88.71	44.50	1,566.43	185.51	630.27	116.22	82.20	40.45	712.46	122.89	2,278.90	221.57
Western oak	2,949.02	239.78	3,515.49	218.32	6,464.50	320.90	470.25	99.07	654.39	105.42	1,124.64	144.67	7,589.15	350.40
Woodland hardwoods	--	--	5.72	3.41	5.72	3.41	--	--	20.09	16.94	20.09	16.94	25.81	17.28
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	493.51	114.67	28.76	17.79	522.26	115.94	108.34	51.06	16.02	16.58	124.36	53.68	646.62	127.77
Total	5,150.03	322.07	3,675.87	223.80	8,825.90	386.95	1,290.67	164.10	818.16	118.33	2,108.84	200.49	10,934.74	432.17
Nonstocked	377.72	78.50	27.38	17.79	405.11	80.49	295.41	77.70	--	--	295.41	77.70	700.52	111.87
All forest types	22,499.54	787.72	3,953.28	235.36	26,452.83	812.04	6,938.44	385.01	1,008.60	134.55	7,947.04	401.26	34,399.86	886.47

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D70: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: North Coast

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Douglas-fir	2,150.50	224.72	--	--	2,150.50	224.72	357.28	99.61	--	--	357.28	99.61	2,507.78	244.51
Fir / spruce / mountain hemlock	52.30	35.99	--	--	52.30	35.99	--	--	--	--	--	--	52.30	35.99
Western Hemlock / Sitka spruce	266.04	118.86	--	--	266.04	118.86	--	--	--	--	--	--	266.04	118.86
Lodgepole pine	--	--	--	--	--	--	16.90	17.29	0.85	1.36	17.75	17.34	17.75	17.34
Pinyon / juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ponderosa pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood	2,127.08	216.15	--	--	2,127.08	216.15	198.99	68.13	--	--	198.99	68.13	2,326.07	225.41
Western juniper	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	21.17	17.49	--	--	21.17	17.49	11.05	14.35	31.88	27.38	42.93	30.92	64.11	35.52
Total	4,617.08	325.73	--	--	4,617.08	325.73	584.22	119.32	32.73	27.42	616.95	122.59	5,234.03	343.97
Hardwoods:														
Alder / maple	245.09	66.10	21.86	18.81	266.95	68.71	25.21	21.69	--	--	25.21	21.69	292.16	72.04
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanoak / laurel	3,012.03	257.75	119.60	53.60	3,131.63	262.66	423.69	101.06	86.43	46.46	510.11	110.76	3,641.75	283.13
Western oak	416.98	84.87	370.58	65.97	787.56	107.32	--	--	52.91	28.71	52.91	28.71	840.47	111.35
Woodland hardwoods	--	--	--	--	--	--	--	--	3.97	3.60	3.97	3.60	3.97	3.60
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	206.22	69.12	5.98	5.69	212.20	69.35	73.28	53.37	--	--	73.28	53.37	285.48	87.51
Total	3,880.32	283.32	518.03	87.08	4,398.34	294.69	522.18	114.62	143.30	54.73	665.48	126.19	5,063.82	318.28
Nonstocked	40.63	23.89	--	--	40.63	23.89	--	--	--	--	--	--	40.63	23.89
All forest types	8,538.03	407.27	518.03	87.08	9,056.06	414.23	1,106.40	156.61	176.03	61.21	1,282.43	167.29	10,338.49	437.81

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D71: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: Sierra Cascades

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	29,761.67	1,033.78	17.81	14.96	29,779.49	1,034.09	6,784.52	555.14	80.21	68.36	6,864.73	558.44	36,644.22	1,148.61
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	7,531.82	519.08	116.97	64.28	7,648.79	522.69	2,666.97	336.35	276.45	104.45	2,943.42	351.46	10,592.21	628.05
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	1,359.68	209.06	186.25	80.63	1,545.93	223.18	2,424.27	283.71	973.32	181.58	3,397.59	321.86	4,943.52	389.61
Pinyon / juniper	9.48	9.56	361.25	67.96	370.72	68.62	12.21	12.66	304.17	72.90	316.38	73.98	687.10	100.73
Ponderosa pine	6,641.81	401.92	90.08	44.52	6,731.90	403.91	554.84	120.92	60.45	36.57	615.30	126.10	7,347.19	422.32
Redwood	11.21	10.27	--	--	11.21	10.27	--	--	--	--	--	--	11.21	10.27
Western juniper	232.16	68.13	651.12	94.79	883.28	116.37	382.42	105.52	113.72	49.19	496.14	116.04	1,379.42	164.24
Western white pine	81.26	42.24	--	--	81.26	42.24	395.74	124.34	169.28	72.68	565.02	143.89	646.28	149.96
Other western softwoods	70.04	36.62	144.12	53.79	214.17	65.07	199.96	80.15	1,092.90	168.87	1,292.86	184.75	1,507.03	195.81
Total	45,699.15	1,124.74	1,567.60	168.90	47,266.75	1,132.09	13,420.94	671.27	3,070.50	289.96	16,491.44	702.58	63,758.19	1,284.85
Hardwoods:														
Alder / maple	77.88	44.05	--	--	77.88	44.05	--	--	--	--	--	--	77.88	44.05
Aspen / birch	28.72	23.20	17.47	10.36	46.19	25.41	21.79	19.90	72.15	41.38	93.94	45.92	140.13	52.48
Elm / ash / cottonwood	--	--	27.03	19.83	27.03	19.83	--	--	--	--	--	--	27.03	19.83
Tanoak / laurel	249.01	78.68	70.79	32.70	319.80	85.17	--	--	--	--	--	--	319.80	85.17
Western oak	2,723.83	229.24	5,021.05	241.03	7,744.88	324.36	317.40	78.87	453.34	82.65	770.74	114.25	8,515.62	341.15
Woodland hardwoods	--	--	113.82	41.26	113.82	41.26	--	--	34.23	25.72	34.23	25.72	148.05	48.62
Exotic hardwoods	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	319.66	80.03	260.15	62.11	579.81	101.28	--	--	--	--	--	--	579.81	101.28
Total	3,399.09	258.07	5,510.32	253.24	8,909.41	352.48	339.19	81.34	559.71	95.60	898.91	125.54	9,808.32	371.39
Nonstocked	1,097.96	128.48	78.00	29.97	1,175.96	131.77	161.01	46.56	88.66	32.67	249.67	56.82	1,425.63	143.48
All forest types	50,196.20	1,118.97	7,155.92	302.61	57,352.11	1,124.76	13,921.14	670.25	3,718.88	304.41	17,640.03	701.47	74,992.14	1,262.25

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table D72: Forest Floor by Forest Type Group and Forest Land Status, 2008-2017: South Coast Mountains and Deserts

Forest type group	Unreserved forests						Reserved forests						All forest land	
	Timberland		Other forest		Total		Productive		Other forest		Total			
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	thousand metric tons C													
Softwoods:														
California mixed conifer	185.77	85.00	--	--	185.77	85.00	231.80	102.55	--	--	231.80	102.55	417.57	133.20
Douglas-fir	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fir / spruce / mountain hemlock	93.53	73.12	--	--	93.53	73.12	--	--	--	--	--	--	93.53	73.12
Western Hemlock / Sitka spruce	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lodgepole pine	--	--	--	--	--	--	--	--	83.50	51.07	83.50	51.07	83.50	51.07
Pinyon / juniper	--	--	294.28	51.42	294.28	51.42	--	--	178.96	38.96	178.96	38.96	473.24	64.47
Ponderosa pine	81.88	48.01	--	--	81.88	48.01	111.32	54.31	16.01	16.06	127.33	56.63	209.22	74.25
Redwood	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Western juniper	37.72	27.68	19.28	19.44	56.99	33.82	--	--	--	--	--	--	56.99	33.82
Western white pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other western softwoods	--	--	--	--	--	--	20.97	19.22	2.90	3.61	23.87	19.55	23.87	19.55
Total	398.91	124.95	313.56	54.97	712.46	136.40	364.09	116.41	281.37	66.02	645.45	133.83	1,357.92	191.05
Hardwoods:														
Alder / maple	--	--	20.13	15.57	20.13	15.57	--	--	--	--	--	--	20.13	15.57
Aspen / birch	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Elm / ash / cottonwood	--	--	0.10	0.10	0.10	0.10	--	--	8.33	11.36	8.33	11.36	8.43	11.36
Tanoak / laurel	--	--	--	--	--	--	--	--	21.53	21.38	21.53	21.38	21.53	21.38
Western oak	158.14	52.63	682.38	95.77	840.52	110.97	100.02	42.26	201.45	52.21	301.47	66.48	1,141.99	128.90
Woodland hardwoods	--	--	100.53	32.61	100.53	32.61	--	--	36.34	22.99	36.34	22.99	136.87	39.89
Exotic hardwoods	4.34	4.44	--	--	4.34	4.44	--	--	--	--	--	--	4.34	4.44
Other hardwoods	--	--	46.04	24.95	46.04	24.95	--	--	--	--	--	--	46.04	24.95
Total	162.48	52.82	849.18	104.98	1,011.66	119.04	100.02	42.26	267.66	61.97	367.68	74.39	1,379.34	139.86
Nonstocked	45.26	20.97	45.95	19.29	91.21	28.42	27.92	15.71	12.61	6.38	40.52	16.96	131.73	33.10
All forest types	606.64	137.12	1,208.69	119.99	1,815.33	182.91	492.02	124.66	561.64	90.37	1,053.66	152.70	2,868.99	237.63

Note: Totals may be off because of rounding

Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table E1: Annual change in forest land area to/from other IPCC landuse classes in California, 2001-7 to 2011-17.

	Timberland¹		Other forest²		Reserved		All forest land	
	Total	SE	Total	SE	Total	SE	Total	SE
	<i>Acres per year</i>							
Forest to nonforest:								
Cropland	1,032	850	3,504	1,541	--	--	4,536	1,759
Developed	8,710	2,167	5,535	1,522	517	310	14,762	2,664
Grassland	1,019	978	5,510	2,141	718	718	7,247	2,461
Other					8	8	8	8
Water	775	559	107	80	129	124	1,011	578
Total	11,537	2,591	14,657	3,052	1,371	793	27,564	4,078
Nonforest to forest:								
Cropland	172	113	--	--	--	--	172	113
Developed	2,965	682	914	339	46	35	3,925	762
Grassland	3,255	1,258	3,201	1,405	201	124	6,657	1,888
Other	--	--	142	147	--	--	142	147
Water	18	19	275	235	--	--	293	236
Total	6,411	1,436	4,532	1,471	247	129	11,190	2,056
Net change to forest land:								
Cropland	-859	857	-3,504	1,541	--	--	-4,364	1,763
Developed	-5,745	2,272	-4,621	1,546	-471	312	-10,837	2,767
Grassland	2,236	1,600	-2,309	2,561	-517	729	-590	3,106
Other	--	--	142	147	-8	8	134	147
Water	-757	559	168	248	-129	124	-717	624
Total	-5,126	2,975	-10,124	3,384	-1,125	803	-16,375	4,577

Note: Totals may be off because of rounding

¹ Forest land that is capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

² Forest land that is not capable of producing in excess of 20 cubic feet per acre per year of wood at culmination of mean annual increment.

Table E2: Annual change in carbon pools due to change in land use between forest and nonforest in California, 2001-7 to 2011-17

	Forest to nonforest		Nonforest to forest		Net change	
	Total	SE	Total	SE	Total	SE
Carbon pool	<i>Thousand metric tons CO2 equivalent per year</i>					
Live tree	-2,018	343	1,044	210	-974	403
Standing dead	-198	120	33	9	-165	120
Down wood	-232	54	56	22	-175	59
Understory veg	-281	43	123	22	-157	49
Litter	-467	70	270	44	-197	83
Soil*	0		0		0	
All pools	-3,196	473	1,528	264	-1,668	543

* No changes in landuse involved cultivated land so soil organic carbon change was assumed to be zero (Ogle et al. 2003)

Table F1 - Annual Net Emissions of Non-CO2e Greenhouse Gases from Fire, 2001-2007 to 2011-2017: All California

	Public						Private				Total		Total	
	National Forest		Other Federal		State and local govt.		Corporate		Non Corporate		Total	SE	Total	SE
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
	<i>thousand metric tons CO2 equivalent per year</i>													
Cut and Fire														
CO2	-700	312	--	--	-70	75	-1,350	472	-49	50	-1,399	474	-2,169	573
CH4	-22	10	--	--	-2	2	-43	15	-2	2	-45	15	-69	18
N2O	-15	7	--	--	-1	2	-29	10	-1	1	-30	10	-46	12
Fire														
CO2	-5,571	794	-791	418	-122	94	-276	145	-76	103	-353	178	-6,836	920
CH4	-178	25	-25	13	-4	3	-9	5	-2	3	-11	6	-219	29
N2O	-118	17	-17	9	-3	2	-6	3	-2	2	-7	4	-144	19
Total Fire														
CO2	-6,271	852	-791	418	-192	119	-1,627	492	-125	136	-1,752	511	-9,005	1,084
CH4	-201	27	-25	13	-6	4	-52	16	-4	4	-56	16	-288	35
N2O	-132	18	-17	9	-4	3	-34	10	-3	3	-37	11	-190	23

Appendix 3: Harvested wood product carbon model inputs; calculations

Table 3.1: California Harvest Data, 1952-2017 (mbf)

Year	Private	USFS	BLM	State & Other		All Owners
				Public	Tribal	
2017	1,363,244	309,533	470	22,709	0	1,695,956
2016	1,283,000	336,000	0	61,820	6,556	1,687,376
2015	1,386,000	288,000	1,568	18,620	9,000	1,703,188
2014	1,231,000	235,000	50	16,470	11,917	1,494,437
2013	1,423,000	303,000	2,000	30,173	8,860	1,767,033
2012	1,157,000	247,000	600	24,580	8,000	1,437,180
2011	1,130,000	300,490	3,000	19,780	11,371	1,464,641
2010	1,025,000	265,000	2,000	1,000	9,764	1,302,764
2009	745,000	163,000	2,190	1,000	3,905	915,095
2008	1,273,000	205,000	5,000	1,000	13,513	1,497,513
2007	1,439,000	308,000	9,000	1,000	19,300	1,776,300
2006	1,430,000	338,000	0	1,000	5,600	1,774,600
2005	1,496,000	381,000	890	1,000	10,564	1,889,454
2004	1,593,000	264,000	705	1,000	16,582	1,875,287
2003	1,509,000	284,000	859	1,000	17,854	1,812,713
2002	1,521,000	299,000	1,134	4,000	13,619	1,838,753
2001	1,476,000	262,000	800	3,000	10,000	1,751,800
2000	1,701,000	368,000	8,000	16,000	19,000	2,112,000
1999	1,903,000	433,000	1,000	26,000	15,000	2,378,000
1998	1,836,000	453,000	1,000	30,000	16,000	2,336,000
1997	2,042,000	548,000	5,000	48,000	15,000	2,658,000
1996	1,985,000	458,000	12,000	55,000	13,000	2,523,000
1995	1,929,000	544,000	6,000	40,000	16,000	2,535,000
1994	1,980,000	808,000	19,000	17,000	15,000	2,839,000
1993	2,263,000	739,000	8,000	34,000	13,000	3,057,000
1992	2,124,000	1,026,000	9,000	23,000	32,000	3,214,000
1991	2,065,000	1,336,000	11,000	38,000	24,000	3,474,000
1990	2,673,000	1,530,000	10,000	24,000	14,000	4,251,000
1989	2,638,000	2,024,000	12,000	37,000	11,000	4,722,000
1988	2,598,000	2,181,000	16,000	31,000	14,000	4,840,000
1987	2,582,000	1,969,000	15,000	42,000	41,000	4,649,000
1986	2,313,000	1,963,000	27,000	29,000	27,000	4,359,000
1985	2,172,000	1,826,000	17,000	36,000	5,000	4,056,000
1984	2,093,000	1,559,000	7,000	34,000	21,000	3,714,000
1983	1,890,000	1,676,000	25,000	43,000	14,000	3,648,000
1982	1,501,000	937,000	9,000	42,000	8,000	2,497,000
1981	1,722,000	1,093,000	7,000	15,000	22,000	2,859,000
1980	1,863,000	1,508,000	8,000	20,000	42,000	3,441,000
1979	2,265,000	1,727,000	18,000	26,000	48,000	4,084,000
1978	2,783,000	1,798,000	8,000	28,000	47,000	4,664,000
1977	2,964,000	1,738,000	19,000	28,000	38,000	4,787,000
1976	2,757,000	1,890,000	6,000	40,000	38,000	4,731,000
1975	2,712,000	1,523,000	46,000	35,000	18,000	4,334,000
1974	2,862,000	1,735,000	16,000	40,000	51,000	4,704,000
1973	2,813,000	2,014,000	12,000	33,000	51,000	4,923,000
1972	3,220,000	2,215,000	19,000	37,000	66,000	5,557,000
1971	2,594,000	2,063,000	24,000	39,000	70,000	4,790,000
1970	2,624,000	1,841,000	39,000	34,000	28,000	4,566,000
1969	2,879,000	2,001,000	27,000	40,000	54,000	5,001,000
1968	2,945,000	2,364,000	36,000	48,000	79,000	5,472,000
1967	3,057,000	1,895,000	34,000	35,000	41,000	5,062,000
1966	2,967,000	1,931,000	33,000	32,000	45,000	5,008,000
1965	3,215,000	1,917,000	55,000	31,000	53,000	5,271,000
1964	3,504,000	1,864,000	34,000	25,000	49,000	5,476,000
1963	3,688,000	1,661,000	36,000	22,000	54,000	5,461,000
1962	4,053,000	1,376,000	29,000	34,000	47,000	5,539,000
1961	3,847,000	1,378,000	33,000	29,000	55,000	5,342,000
1960	3,699,000	1,330,000	32,000	28,000	48,000	5,137,000
1959	4,293,000	1,475,000	41,000	27,000	50,000	5,886,000
1958	4,470,000	1,114,000	23,000	30,000	38,000	5,675,000
1957	4,356,000	918,000	10,000	27,000	36,000	5,347,000
1956	4,687,000	1,096,000	26,000	24,000	29,000	5,862,000
1955	4,928,000	1,027,000	13,000	14,000	33,000	6,015,000
1954	4,789,000	757,000	13,000	16,000	25,000	5,600,000
1953	5,317,000	633,000	7,000	18,000	15,000	5,990,000
1952	4,398,000	613,000	6,000	14,000	26,000	5,057,000

Table 3.3: California Primary Product Ratios

Primary			1907	1906
Product ID	Timber Product	Primary Product		
1	hardwood, sawtimber	fuelwood and other	0.3026	0.3026
2	hardwood, sawtimber	lumber	0.3224	0.3224
3	hardwood, sawtimber	non-structural panels	0.0520	0.0520
4	hardwood, sawtimber	oriented strandboard (OSB)	0.0000	0.0000
5	hardwood, sawtimber	other industrial products	0.0773	0.0773
6	hardwood, sawtimber	plywood	0.0497	0.0497
7	hardwood, sawtimber	wood pulp	0.1960	0.1960
8	softwood, sawtimber	fuelwood and other	0.3026	0.3026
9	softwood, sawtimber	lumber	0.3224	0.3224
10	softwood, sawtimber	non-structural panels	0.0520	0.0520
11	softwood, sawtimber	oriented strandboard (OSB)	0.0000	0.0000
12	softwood, sawtimber	other industrial products	0.0773	0.0773
13	softwood, sawtimber	plywood	0.0497	0.0497
14	softwood, sawtimber	wood pulp	0.1960	0.1960
15	hardwood, pulpwood	fuelwood and other	0.0138	0.0138
16	hardwood, pulpwood	lumber	0.0000	0.0000
17	hardwood, pulpwood	non-structural panels	0.2054	0.2054
18	hardwood, pulpwood	oriented strandboard (OSB)	0.0000	0.0000
19	hardwood, pulpwood	other industrial products	0.0069	0.0069
20	hardwood, pulpwood	plywood	0.0000	0.0000
21	hardwood, pulpwood	wood pulp	0.7739	0.7739
22	softwood, pulpwood	fuelwood and other	0.0138	0.0138
23	softwood, pulpwood	lumber	0.0000	0.0000
24	softwood, pulpwood	non-structural panels	0.2054	0.2054
25	softwood, pulpwood	oriented strandboard (OSB)	0.0000	0.0000
26	softwood, pulpwood	other industrial products	0.0069	0.0069
27	softwood, pulpwood	plywood	0.0000	0.0000
28	softwood, pulpwood	wood pulp	0.7739	0.7739
29	hardwood, poles	hardwood, poles	1.0000	1.0000
30	softwood, poles	softwood, poles	1.0000	1.0000
31	hardwood, pilings	hardwood, pilings	1.0000	1.0000
32	softwood, pilings	softwood, pilings	1.0000	1.0000
33	hardwood, mine props	hardwood, mine props	1.0000	1.0000
34	softwood, mine props	softwood, mine props	1.0000	1.0000
35	hardwood, posts	hardwood, posts	1.0000	1.0000
36	softwood, posts	softwood, posts	1.0000	1.0000
37	hardwood, fuelwood	hardwood, fuelwood	1.0000	1.0000
38	softwood, fuelwood	softwood, fuelwood	1.0000	1.0000
39	hardwood, non-sawtimber	hardwood, non-sawtimber	1.0000	1.0000
40	softwood, non-sawtimber	softwood, non-sawtimber	1.0000	1.0000
41	hardwood, ties	hardwood, ties	1.0000	1.0000
42	softwood, ties	softwood, ties	1.0000	1.0000
43	hardwood, coop bolts	hardwood, coop bolts	1.0000	1.0000
44	softwood, coop bolts	softwood, coop bolts	1.0000	1.0000
45	hardwood, acid/dist.	hardwood, acid/dist.	1.0000	1.0000
46	softwood, acid/dist.	softwood, acid/dist.	1.0000	1.0000
47	hardwood, float logs	hardwood, float logs	1.0000	1.0000
48	softwood, float logs	softwood, float logs	1.0000	1.0000
49	hardwood, trap float	hardwood, trap float	1.0000	1.0000
50	softwood, trap float	softwood, trap float	1.0000	1.0000
51	hardwood, misc-conv.	hardwood, misc-conv.	1.0000	1.0000
52	softwood, misc-conv.	softwood, misc-conv.	1.0000	1.0000
53	hardwood, nav stores	hardwood, nav stores	1.0000	1.0000
54	softwood, nav stores	softwood, nav stores	1.0000	1.0000
55	hardwood, cull logs	hardwood, cull logs	1.0000	1.0000
56	softwood, cull logs	softwood, cull logs	1.0000	1.0000
57	hardwood, sm rnd wd	hardwood, sm rnd wd	1.0000	1.0000
58	softwood, sm rnd wd	softwood, sm rnd wd	1.0000	1.0000
59	hardwood, grn bio cv	hardwood, grn bio cv	1.0000	1.0000
60	softwood, grn bio cv	softwood, grn bio cv	1.0000	1.0000
61	hardwood, dry bio cv	hardwood, dry bio cv	1.0000	1.0000
62	softwood, dry bio cv	softwood, dry bio cv	1.0000	1.0000
63	hardwood, sp wood pr	hardwood, sp wood pr	1.0000	1.0000
64	softwood, sp wood pr	softwood, sp wood pr	1.0000	1.0000

Table 3.4: End-use Product Ratios – refer to
Appendix_3_PSW_HWP_C_model_inputs_1504_03january2019.xlsx

Table 3.5: Product end-use half-lives

End Use				End Use Half Life (yrs)
ID	Timber Product	Primary Product	End Use Product	
1	hardwood, sawtimber	fuelwood and other	fuelwood and other	0
2	hardwood, sawtimber	lumber	manufacturing, other manufacturing	12
3	hardwood, sawtimber	lumber	rail and railcar, n/a	12
4	hardwood, sawtimber	lumber	packaging and shipping, n/a	6
5	hardwood, sawtimber	lumber	manufacturing, furniture	30
6	hardwood, sawtimber	lumber	other, n/a	12
7	hardwood, sawtimber	lumber	new nonresidential, other	67
8	hardwood, sawtimber	lumber	new nonresidential, new nonres buildings	67
9	hardwood, sawtimber	lumber	residential r and r, n/a	30
10	hardwood, sawtimber	lumber	new housing, manufactured housing	12
11	hardwood, sawtimber	lumber	new housing, single family	100
12	hardwood, sawtimber	lumber	new housing, multifamily	70
13	hardwood, sawtimber	non-structural panels	manufacturing, other manufacturing	12
14	hardwood, sawtimber	non-structural panels	new housing, multifamily	70
15	hardwood, sawtimber	non-structural panels	new housing, single family	100
16	hardwood, sawtimber	non-structural panels	residential r and r, n/a	30
17	hardwood, sawtimber	non-structural panels	new nonresidential, new nonres buildings	67
18	hardwood, sawtimber	non-structural panels	new nonresidential, other	67
19	hardwood, sawtimber	non-structural panels	rail and railcar, n/a	12
20	hardwood, sawtimber	non-structural panels	manufacturing, furniture	30
21	hardwood, sawtimber	non-structural panels	new housing, manufactured housing	12
22	hardwood, sawtimber	non-structural panels	packaging and shipping, n/a	6
23	hardwood, sawtimber	non-structural panels	other, n/a	12
24	hardwood, sawtimber	oriented strandboard (OSB)	new housing, multifamily	70
25	hardwood, sawtimber	oriented strandboard (OSB)	rail and railcar, n/a	12
26	hardwood, sawtimber	oriented strandboard (OSB)	new housing, single family	100
27	hardwood, sawtimber	oriented strandboard (OSB)	new housing, manufactured housing	12
28	hardwood, sawtimber	oriented strandboard (OSB)	manufacturing, furniture	30
29	hardwood, sawtimber	oriented strandboard (OSB)	new nonresidential, new nonres buildings	67
30	hardwood, sawtimber	oriented strandboard (OSB)	manufacturing, other manufacturing	12
31	hardwood, sawtimber	oriented strandboard (OSB)	packaging and shipping, n/a	6
32	hardwood, sawtimber	oriented strandboard (OSB)	other, n/a	12
33	hardwood, sawtimber	oriented strandboard (OSB)	residential r and r, n/a	30
34	hardwood, sawtimber	oriented strandboard (OSB)	new nonresidential, other	67
35	hardwood, sawtimber	other industrial products	other industrial products	12
36	hardwood, sawtimber	plywood	new housing, manufactured housing	12
37	hardwood, sawtimber	plywood	new housing, multifamily	70
38	hardwood, sawtimber	plywood	residential r and r, n/a	30
39	hardwood, sawtimber	plywood	new nonresidential, new nonres buildings	67
40	hardwood, sawtimber	plywood	new nonresidential, other	67
41	hardwood, sawtimber	plywood	rail and railcar, n/a	12
42	hardwood, sawtimber	plywood	manufacturing, furniture	30
43	hardwood, sawtimber	plywood	manufacturing, other manufacturing	12
44	hardwood, sawtimber	plywood	packaging and shipping, n/a	6
45	hardwood, sawtimber	plywood	other, n/a	12
46	hardwood, sawtimber	plywood	new housing, single family	100
47	hardwood, sawtimber	wood pulp	wood pulp	2.6
48	softwood, sawtimber	fuelwood and other	fuelwood and other	0
49	softwood, sawtimber	lumber	residential r and r, n/a	30
50	softwood, sawtimber	lumber	packaging and shipping, n/a	6
51	softwood, sawtimber	lumber	manufacturing, other manufacturing	12
52	softwood, sawtimber	lumber	manufacturing, furniture	30
53	softwood, sawtimber	lumber	rail and railcar, n/a	12
54	softwood, sawtimber	lumber	new nonresidential, new nonres buildings	67
55	softwood, sawtimber	lumber	other, n/a	12

Table 3.5: Product end-use half-lives

End Use				End Use Half Life (yrs)
ID	Timber Product	Primary Product	End Use Product	
56	softwood, sawtimber	lumber	new housing, multifamily	70
57	softwood, sawtimber	lumber	new housing, manufactured housing	12
58	softwood, sawtimber	lumber	new housing, single family	100
59	softwood, sawtimber	lumber	new nonresidential, other	67
60	softwood, sawtimber	non-structural panels	manufacturing, other manufacturing	12
61	softwood, sawtimber	non-structural panels	other, n/a	12
62	softwood, sawtimber	non-structural panels	new housing, single family	100
63	softwood, sawtimber	non-structural panels	rail and railcar, n/a	12
64	softwood, sawtimber	non-structural panels	packaging and shipping, n/a	6
65	softwood, sawtimber	non-structural panels	new housing, manufactured housing	12
66	softwood, sawtimber	non-structural panels	residential r and r, n/a	30
67	softwood, sawtimber	non-structural panels	new nonresidential, other	67
68	softwood, sawtimber	non-structural panels	manufacturing, furniture	30
69	softwood, sawtimber	non-structural panels	new housing, multifamily	70
70	softwood, sawtimber	non-structural panels	new nonresidential, new nonres buildings	67
71	softwood, sawtimber	oriented strandboard (OSB)	rail and railcar, n/a	12
72	softwood, sawtimber	oriented strandboard (OSB)	new nonresidential, other	67
73	softwood, sawtimber	oriented strandboard (OSB)	new housing, manufactured housing	12
74	softwood, sawtimber	oriented strandboard (OSB)	residential r and r, n/a	30
75	softwood, sawtimber	oriented strandboard (OSB)	new nonresidential, new nonres buildings	67
76	softwood, sawtimber	oriented strandboard (OSB)	other, n/a	12
77	softwood, sawtimber	oriented strandboard (OSB)	packaging and shipping, n/a	6
78	softwood, sawtimber	oriented strandboard (OSB)	new housing, multifamily	70
79	softwood, sawtimber	oriented strandboard (OSB)	new housing, single family	100
80	softwood, sawtimber	oriented strandboard (OSB)	manufacturing, other manufacturing	12
81	softwood, sawtimber	oriented strandboard (OSB)	manufacturing, furniture	30
82	softwood, sawtimber	other industrial products	other industrial products	12
83	softwood, sawtimber	plywood	residential r and r, n/a	30
84	softwood, sawtimber	plywood	manufacturing, furniture	30
85	softwood, sawtimber	plywood	new housing, single family	100
86	softwood, sawtimber	plywood	new housing, multifamily	70
87	softwood, sawtimber	plywood	manufacturing, other manufacturing	12
88	softwood, sawtimber	plywood	other, n/a	12
89	softwood, sawtimber	plywood	rail and railcar, n/a	12
90	softwood, sawtimber	plywood	new nonresidential, new nonres buildings	67
91	softwood, sawtimber	plywood	new housing, manufactured housing	12
92	softwood, sawtimber	plywood	packaging and shipping, n/a	6
93	softwood, sawtimber	plywood	new nonresidential, other	67
94	softwood, sawtimber	wood pulp	wood pulp	2.6
95	hardwood, pulpwood	fuelwood and other	fuelwood and other	0
96	hardwood, pulpwood	lumber	rail and railcar, n/a	12
97	hardwood, pulpwood	lumber	packaging and shipping, n/a	6
98	hardwood, pulpwood	lumber	other, n/a	12
99	hardwood, pulpwood	lumber	manufacturing, furniture	30
100	hardwood, pulpwood	lumber	new housing, multifamily	70
101	hardwood, pulpwood	lumber	new nonresidential, other	67
102	hardwood, pulpwood	lumber	new housing, single family	100
103	hardwood, pulpwood	lumber	new nonresidential, new nonres buildings	67
104	hardwood, pulpwood	lumber	new housing, manufactured housing	12
105	hardwood, pulpwood	lumber	residential r and r, n/a	30
106	hardwood, pulpwood	lumber	manufacturing, other manufacturing	12
107	hardwood, pulpwood	non-structural panels	manufacturing, other manufacturing	12
108	hardwood, pulpwood	non-structural panels	new housing, multifamily	70
109	hardwood, pulpwood	non-structural panels	other, n/a	12
110	hardwood, pulpwood	non-structural panels	residential r and r, n/a	30

Table 3.5: Product end-use half-lives

End Use				End Use Half Life (yrs)
ID	Timber Product	Primary Product	End Use Product	
111	hardwood, pulpwood	non-structural panels	new nonresidential, new nonres buildings	67
112	hardwood, pulpwood	non-structural panels	packaging and shipping, n/a	6
113	hardwood, pulpwood	non-structural panels	new nonresidential, other	67
114	hardwood, pulpwood	non-structural panels	new housing, single family	100
115	hardwood, pulpwood	non-structural panels	new housing, manufactured housing	12
116	hardwood, pulpwood	non-structural panels	manufacturing, furniture	30
117	hardwood, pulpwood	non-structural panels	rail and railcar, n/a	12
118	hardwood, pulpwood	oriented strandboard (OSB)	manufacturing, other manufacturing	12
119	hardwood, pulpwood	oriented strandboard (OSB)	packaging and shipping, n/a	6
120	hardwood, pulpwood	oriented strandboard (OSB)	other, n/a	12
121	hardwood, pulpwood	oriented strandboard (OSB)	manufacturing, furniture	30
122	hardwood, pulpwood	oriented strandboard (OSB)	rail and railcar, n/a	12
123	hardwood, pulpwood	oriented strandboard (OSB)	new nonresidential, new nonres buildings	67
124	hardwood, pulpwood	oriented strandboard (OSB)	new housing, single family	100
125	hardwood, pulpwood	oriented strandboard (OSB)	new housing, manufactured housing	12
126	hardwood, pulpwood	oriented strandboard (OSB)	residential r and r, n/a	30
127	hardwood, pulpwood	oriented strandboard (OSB)	new nonresidential, other	67
128	hardwood, pulpwood	oriented strandboard (OSB)	new housing, multifamily	70
129	hardwood, pulpwood	other industrial products	other industrial products	12
130	hardwood, pulpwood	plywood	residential r and r, n/a	30
131	hardwood, pulpwood	plywood	packaging and shipping, n/a	6
132	hardwood, pulpwood	plywood	new housing, manufactured housing	12
133	hardwood, pulpwood	plywood	new housing, single family	100
134	hardwood, pulpwood	plywood	new housing, multifamily	70
135	hardwood, pulpwood	plywood	other, n/a	12
136	hardwood, pulpwood	plywood	manufacturing, other manufacturing	12
137	hardwood, pulpwood	plywood	rail and railcar, n/a	12
138	hardwood, pulpwood	plywood	new nonresidential, new nonres buildings	67
139	hardwood, pulpwood	plywood	manufacturing, furniture	30
140	hardwood, pulpwood	plywood	new nonresidential, other	67
141	hardwood, pulpwood	wood pulp	wood pulp	2.6
142	softwood, pulpwood	fuelwood and other	fuelwood and other	0
143	softwood, pulpwood	lumber	residential r and r, n/a	30
144	softwood, pulpwood	lumber	manufacturing, furniture	30
145	softwood, pulpwood	lumber	new housing, manufactured housing	12
146	softwood, pulpwood	lumber	new housing, multifamily	70
147	softwood, pulpwood	lumber	new nonresidential, new nonres buildings	67
148	softwood, pulpwood	lumber	new nonresidential, other	67
149	softwood, pulpwood	lumber	manufacturing, other manufacturing	12
150	softwood, pulpwood	lumber	packaging and shipping, n/a	6
151	softwood, pulpwood	lumber	other, n/a	12
152	softwood, pulpwood	lumber	new housing, single family	100
153	softwood, pulpwood	lumber	rail and railcar, n/a	12
154	softwood, pulpwood	non-structural panels	new housing, single family	100
155	softwood, pulpwood	non-structural panels	manufacturing, furniture	30
156	softwood, pulpwood	non-structural panels	other, n/a	12
157	softwood, pulpwood	non-structural panels	packaging and shipping, n/a	6
158	softwood, pulpwood	non-structural panels	new nonresidential, new nonres buildings	67
159	softwood, pulpwood	non-structural panels	manufacturing, other manufacturing	12
160	softwood, pulpwood	non-structural panels	new nonresidential, other	67
161	softwood, pulpwood	non-structural panels	residential r and r, n/a	30
162	softwood, pulpwood	non-structural panels	new housing, multifamily	70
163	softwood, pulpwood	non-structural panels	rail and railcar, n/a	12
164	softwood, pulpwood	non-structural panels	new housing, manufactured housing	12
165	softwood, pulpwood	oriented strandboard (OSB)	manufacturing, furniture	30

Table 3.5: Product end-use half-lives

End Use				End Use Half Life (yrs)
ID	Timber Product	Primary Product	End Use Product	
166	softwood, pulpwood	oriented strandboard (OSB)	manufacturing, other manufacturing	12
167	softwood, pulpwood	oriented strandboard (OSB)	new nonresidential, other	67
168	softwood, pulpwood	oriented strandboard (OSB)	new housing, single family	100
169	softwood, pulpwood	oriented strandboard (OSB)	new housing, multifamily	70
170	softwood, pulpwood	oriented strandboard (OSB)	new housing, manufactured housing	12
171	softwood, pulpwood	oriented strandboard (OSB)	residential r and r, n/a	30
172	softwood, pulpwood	oriented strandboard (OSB)	rail and railcar, n/a	12
173	softwood, pulpwood	oriented strandboard (OSB)	packaging and shipping, n/a	6
174	softwood, pulpwood	oriented strandboard (OSB)	other, n/a	12
175	softwood, pulpwood	oriented strandboard (OSB)	new nonresidential, new nonres buildings	67
176	softwood, pulpwood	other industrial products	other industrial products	12
177	softwood, pulpwood	plywood	rail and railcar, n/a	12
178	softwood, pulpwood	plywood	new nonresidential, other	67
179	softwood, pulpwood	plywood	other, n/a	12
180	softwood, pulpwood	plywood	manufacturing, other manufacturing	12
181	softwood, pulpwood	plywood	new nonresidential, new nonres buildings	67
182	softwood, pulpwood	plywood	packaging and shipping, n/a	6
183	softwood, pulpwood	plywood	new housing, manufactured housing	12
184	softwood, pulpwood	plywood	new housing, multifamily	70
185	softwood, pulpwood	plywood	new housing, single family	100
186	softwood, pulpwood	plywood	manufacturing, furniture	30
187	softwood, pulpwood	plywood	residential r and r, n/a	30
188	softwood, pulpwood	wood pulp	wood pulp	2.6
189	hardwood, poles	hardwood, poles	hardwood, poles	12
190	softwood, poles	softwood, poles	softwood, poles	12
191	hardwood, pilings	hardwood, pilings	hardwood, pilings	12
192	softwood, pilings	softwood, pilings	softwood, pilings	12
193	hardwood, mine props	hardwood, mine props	hardwood, mine props	12
194	softwood, mine props	softwood, mine props	softwood, mine props	12
195	hardwood, posts	hardwood, posts	hardwood, posts	12
196	softwood, posts	softwood, posts	softwood, posts	12
197	hardwood, fuelwood	hardwood, fuelwood	hardwood, fuelwood	0
198	softwood, fuelwood	softwood, fuelwood	softwood, fuelwood	0
199	hardwood, non-sawtimber	hardwood, non-sawtimber	hardwood, non-sawtimber	12
200	softwood, non-sawtimber	softwood, non-sawtimber	softwood, non-sawtimber	12
201	hardwood, ties	hardwood, ties	hardwood, ties	12
202	softwood, ties	softwood, ties	softwood, ties	12
203	hardwood, coop bolts	hardwood, coop bolts	hardwood, coop bolts	12
204	softwood, coop bolts	softwood, coop bolts	softwood, coop bolts	12
205	hardwood, acid/dist.	hardwood, acid/dist.	hardwood, acid/dist.	12
206	softwood, acid/dist.	softwood, acid/dist.	softwood, acid/dist.	12
207	hardwood, float logs	hardwood, float logs	hardwood, float logs	12
208	softwood, float logs	softwood, float logs	softwood, float logs	12
209	hardwood, trap float	hardwood, trap float	hardwood, trap float	12
210	softwood, trap float	softwood, trap float	softwood, trap float	12
211	hardwood, misc-conv.	hardwood, misc-conv.	hardwood, misc-conv.	12
212	softwood, misc-conv.	softwood, misc-conv.	softwood, misc-conv.	12
213	hardwood, nav stores	hardwood, nav stores	hardwood, nav stores	12
214	softwood, nav stores	softwood, nav stores	softwood, nav stores	12
215	hardwood, cull logs	hardwood, cull logs	hardwood, cull logs	12
216	softwood, cull logs	softwood, cull logs	softwood, cull logs	12
217	hardwood, sm rnd wd	hardwood, sm rnd wd	hardwood, sm rnd wd	12
218	softwood, sm rnd wd	softwood, sm rnd wd	softwood, sm rnd wd	12
219	hardwood, grn bio cv	hardwood, grn bio cv	hardwood, grn bio cv	12
220	softwood, grn bio cv	softwood, grn bio cv	softwood, grn bio cv	12

Table 3.5: Product end-use half-lives

End Use				End Use Half Life (yrs)
ID	Timber Product	Primary Product	End Use Product	
221	hardwood, dry bio cv	hardwood, dry bio cv	hardwood, dry bio cv	12
222	softwood, dry bio cv	softwood, dry bio cv	softwood, dry bio cv	12
223	hardwood, sp wood pr	hardwood, sp wood pr	hardwood, sp wood pr	12
224	softwood, sp wood pr	softwood, sp wood pr	softwood, sp wood pr	12

Table 3.6: Discarded disposition ratios:

Disposition ID	Discard Type	Discard Destination	1996	1995	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978	1977	1976
1	paper	Burned	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.21	0.21	0.21	0.21
2	paper	Recycled	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.15	0.15	0.15	0.15
3	paper	Composted	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	paper	Landfills	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.21	0.21	0.21	0.21
5	paper	Dumps	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.43	0.43	0.43	0.43
6	wood	Burned	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.21	0.21	0.21	0.21
7	wood	Recycled	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	wood	Composted	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	wood	Landfills	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.26	0.26	0.26	0.26
10	wood	Dumps	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.53	0.53	0.53	0.53

Table 3.6: Discarded disposition ratios:

Disposition ID	Discard Type	Discard Destination	1975	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956	1955
1	paper	Burned	0.21	0.21	0.21	0.21	0.21	0.21	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.3	0.3	0.3	0.3	0.3
2	paper	Recycled	0.15	0.15	0.15	0.15	0.15	0.15	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0	0	0	0	0
3	paper	Composted	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	paper	Landfills	0.21	0.21	0.21	0.21	0.21	0.21	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.07	0.07	0.07	0.07	0.07
5	paper	Dumps	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.63	0.63	0.63	0.63	0.63
6	wood	Burned	0.21	0.21	0.21	0.21	0.21	0.21	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.3	0.3	0.3	0.3	0.3
7	wood	Recycled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	wood	Composted	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	wood	Landfills	0.26	0.26	0.26	0.26	0.26	0.26	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.07	0.07	0.07	0.07	0.07
10	wood	Dumps	0.53	0.53	0.53	0.53	0.53	0.53	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.63	0.63	0.63	0.63	0.63

Table 3.7: Discarded product half-lives; landfill fixed ratios

Type ID	Discard Type	Landfill Fixed Ratio	Landfill Half Life	Dump Half Life	Recycled Half Life
0	paper	0.44	14.5	8.25	2.6
1	wood	0.77	29	16.5	2.6

Table 3.8: HWP C model distribution parameters for Monte Carlo Analysis

Parameter ID	Parameter Name	First Year	Last Year	Min Value	Peak Value	Max Value
0	CCF to MgC conversion factors	n/a	n/a	0.95	1	1.05
1	Harvest	1906	1945	0.7	1	1.3
1		1946	1979	0.8	1	1.2
1		1980	2100	0.85	1	1.15
2	Timber product ratios	1906	1945	0.7	1	1.3
2		1946	1979	0.8	1	1.2
2		1980	2100	0.85	1	1.15
3	Primary product ratios	1906	1949	0.7	1	1.3
3		1950	1979	0.8	1	1.2
3		1980	2100	0.85	1	1.15
4	End use product ratios	n/a	n/a	0.85	1	1.15
5	Product half lives	n/a	n/a	0.85	1	1.15
6	Discarded disposition ratios (paper)	n/a	n/a	0.85	1	1.15
7	Discarded disposition ratios (wood)	n/a	n/a	0.85	1	1.15
8	Landfill decay limits (paper)	n/a	n/a	0.85	1	1.15
9	Landfill decay limits (wood)	n/a	n/a	0.85	1	1.15
10	Landfill half lives (paper)	n/a	n/a	0.85	1	1.15
11	Landfill half lives (wood)	n/a	n/a	0.85	1	1.15
12	Dump half lives (paper)	n/a	n/a	0.85	1	1.15
13	Dump half lives (wood)	n/a	n/a	0.85	1	1.15
14	Recovered half lives (paper)	n/a	n/a	0.85	1	1.15
15	Recovered half lives (wood)	n/a	n/a	0.85	1	1.15
16	Burned with energy capture ratio	n/a	n/a	0.85	1	1.15

Table 3.9: CCF to Metric Tons C conversion

CCF to Metric Tons C	Timber Product	Primary Product	Conversion Factor
1	hardwood, sawtimber	fuelwood and other	0.91
2	hardwood, sawtimber	lumber	0.91
3	hardwood, sawtimber	non-structural panels	0.87
4	hardwood, sawtimber	oriented strandboard (OSB)	0.87
5	hardwood, sawtimber	other industrial products	0.91
6	hardwood, sawtimber	plywood	0.91
7	hardwood, sawtimber	wood pulp	0.91
8	softwood, sawtimber	fuelwood and other	0.74
9	softwood, sawtimber	lumber	0.74
10	softwood, sawtimber	non-structural panels	0.71
11	softwood, sawtimber	oriented strandboard (OSB)	0.87
12	softwood, sawtimber	other industrial products	0.74
13	softwood, sawtimber	plywood	0.75
14	softwood, sawtimber	wood pulp	0.74
15	hardwood, pulpwood	fuelwood and other	0.91
16	hardwood, pulpwood	lumber	0.91
17	hardwood, pulpwood	non-structural panels	0.91
18	hardwood, pulpwood	oriented strandboard (OSB)	0.87
19	hardwood, pulpwood	other industrial products	0.91
20	hardwood, pulpwood	plywood	0.91
21	hardwood, pulpwood	wood pulp	0.74
22	softwood, pulpwood	fuelwood and other	0.74
23	softwood, pulpwood	lumber	0.74
24	softwood, pulpwood	non-structural panels	0.71
25	softwood, pulpwood	oriented strandboard (OSB)	0.87
26	softwood, pulpwood	other industrial products	0.74
27	softwood, pulpwood	plywood	0.74
28	softwood, pulpwood	wood pulp	0.74
29	hardwood, poles	hardwood, poles	0.91
30	softwood, poles	softwood, poles	0.74
31	hardwood, pilings	hardwood, pilings	0.91
32	softwood, pilings	softwood, pilings	0.74
33	hardwood, mine props	hardwood, mine props	0.91
34	softwood, mine props	softwood, mine props	0.74
35	hardwood, posts	hardwood, posts	0.91
36	softwood, posts	softwood, posts	0.74
37	hardwood, fuelwood	hardwood, fuelwood	0.91
38	softwood, fuelwood	softwood, fuelwood	0.74
39	hardwood, non-sawtimber	hardwood, non-sawtimber	0.91
40	softwood, non-sawtimber	softwood, non-sawtimber	0.74
41	hardwood, ties	hardwood, ties	0.91
42	softwood, ties	softwood, ties	0.74
43	hardwood, coop bolts	hardwood, coop bolts	0.91
44	softwood, coop bolts	softwood, coop bolts	0.74
45	hardwood, acid/dist.	hardwood, acid/dist.	0.91

Table 3.9: CCF to Metric Tons C conversion

CCF to Metric Tons C	Timber Product	Primary Product	Conversion Factor
46	softwood, acid/dist.	softwood, acid/dist.	0.74
47	hardwood, float logs	hardwood, float logs	0.91
48	softwood, float logs	softwood, float logs	0.74
49	hardwood, trap float	hardwood, trap float	0.91
50	softwood, trap float	softwood, trap float	0.74
51	hardwood, misc-conv.	hardwood, misc-conv.	0.91
52	softwood, misc-conv.	softwood, misc-conv.	0.74
53	hardwood, nav stores	hardwood, nav stores	0.91
54	softwood, nav stores	softwood, nav stores	0.74
55	hardwood, cull logs	hardwood, cull logs	0.91
56	softwood, cull logs	softwood, cull logs	0.74
57	hardwood, sm rnd wd	hardwood, sm rnd wd	0.91
58	softwood, sm rnd wd	softwood, sm rnd wd	0.74
59	hardwood, grn bio cv	hardwood, grn bio cv	0.91
60	softwood, grn bio cv	softwood, grn bio cv	0.74
61	hardwood, dry bio cv	hardwood, dry bio cv	0.91
62	softwood, dry bio cv	softwood, dry bio cv	0.74
63	hardwood, sp wood pr	hardwood, sp wood pr	0.91
64	softwood, sp wood pr	softwood, sp wood pr	0.74

Table 3.10: This table shows primary products for each timber product.

Timber Product ID	Timber Product	Primary Product ID	Primary Product
1	hardwood, sawtimber	1	fuelwood and other
1	hardwood, sawtimber	2	lumber
1	hardwood, sawtimber	3	non-structural panels
1	hardwood, sawtimber	4	oriented strandboard (OSB)
1	hardwood, sawtimber	5	other industrial products
1	hardwood, sawtimber	6	plywood
1	hardwood, sawtimber	7	wood pulp
2	softwood, sawtimber	8	fuelwood and other
2	softwood, sawtimber	9	lumber
2	softwood, sawtimber	10	non-structural panels
2	softwood, sawtimber	11	oriented strandboard (OSB)
2	softwood, sawtimber	12	other industrial products
2	softwood, sawtimber	13	plywood
2	softwood, sawtimber	14	wood pulp
3	hardwood, pulpwood	15	fuelwood and other
3	hardwood, pulpwood	16	lumber
3	hardwood, pulpwood	17	non-structural panels
3	hardwood, pulpwood	18	oriented strandboard (OSB)
3	hardwood, pulpwood	19	other industrial products
3	hardwood, pulpwood	20	plywood
3	hardwood, pulpwood	21	wood pulp
4	softwood, pulpwood	22	fuelwood and other
4	softwood, pulpwood	23	lumber
4	softwood, pulpwood	24	non-structural panels
4	softwood, pulpwood	25	oriented strandboard (OSB)
4	softwood, pulpwood	26	other industrial products
4	softwood, pulpwood	27	plywood
4	softwood, pulpwood	28	wood pulp
5	hardwood, poles	29	hardwood, poles
6	softwood, poles	30	softwood, poles
7	hardwood, pilings	31	hardwood, pilings
8	softwood, pilings	32	softwood, pilings
9	hardwood, mine props	33	hardwood, mine props
10	softwood, mine props	34	softwood, mine props
11	hardwood, posts	35	hardwood, posts
12	softwood, posts	36	softwood, posts
13	hardwood, fuelwood	37	hardwood, fuelwood
14	softwood, fuelwood	38	softwood, fuelwood

Timber Product ID	Timber Product	Primary Product ID	Primary Product
15	hardwood, non-sawtimber	39	hardwood, non-sawtimber
16	softwood, non-sawtimber	40	softwood, non-sawtimber
17	hardwood, ties	41	hardwood, ties
18	softwood, ties	42	softwood, ties
19	hardwood, coop bolts	43	hardwood, coop bolts
20	softwood, coop bolts	44	softwood, coop bolts
21	hardwood, acid/dist.	45	hardwood, acid/dist.
22	softwood, acid/dist.	46	softwood, acid/dist.
23	hardwood, float logs	47	hardwood, float logs
24	softwood, float logs	48	softwood, float logs
25	hardwood, trap float	49	hardwood, trap float
26	softwood, trap float	50	softwood, trap float
27	hardwood, misc-conv.	51	hardwood, misc-conv.
28	softwood, misc-conv.	52	softwood, misc-conv.
29	hardwood, nav stores	53	hardwood, nav stores
30	softwood, nav stores	54	softwood, nav stores
31	hardwood, cull logs	55	hardwood, cull logs
32	softwood, cull logs	56	softwood, cull logs
33	hardwood, sm rnd wd	57	hardwood, sm rnd wd
34	softwood, sm rnd wd	58	softwood, sm rnd wd
35	hardwood, grn bio cv	59	hardwood, grn bio cv
36	softwood, grn bio cv	60	softwood, grn bio cv
37	hardwood, dry bio cv	61	hardwood, dry bio cv
38	softwood, dry bio cv	62	softwood, dry bio cv
39	hardwood, sp wood pr	63	hardwood, sp wood pr
40	softwood, sp wood pr	64	softwood, sp wood pr

Table 3.11: This table shows end use products for each primary product.

Primary Product ID	Primary Product	End Use ID	End Use Product
1	fuelwood and other	1	fuelwood and other
2	lumber	2	manufacturing, other manufacturing
2	lumber	3	rail and railcar, n/a
2	lumber	4	packaging and shipping, n/a
2	lumber	5	manufacturing, furniture
2	lumber	6	other, n/a
2	lumber	7	new nonresidential, other
2	lumber	8	new nonresidential, new nonres buildings
2	lumber	9	residential r and r, n/a
2	lumber	10	new housing, manufactured housing
2	lumber	11	new housing, single family
2	lumber	12	new housing, multifamily
3	non-structural panels	13	manufacturing, other manufacturing
3	non-structural panels	14	new housing, multifamily
3	non-structural panels	15	new housing, single family
3	non-structural panels	16	residential r and r, n/a
3	non-structural panels	17	new nonresidential, new nonres buildings
3	non-structural panels	18	new nonresidential, other
3	non-structural panels	19	rail and railcar, n/a
3	non-structural panels	20	manufacturing, furniture
3	non-structural panels	21	new housing, manufactured housing
3	non-structural panels	22	packaging and shipping, n/a
3	non-structural panels	23	other, n/a
4	oriented strandboard (OSB)	24	new housing, multifamily
4	oriented strandboard (OSB)	25	rail and railcar, n/a
4	oriented strandboard (OSB)	26	new housing, single family
4	oriented strandboard (OSB)	27	new housing, manufactured housing
4	oriented strandboard (OSB)	28	manufacturing, furniture
4	oriented strandboard (OSB)	29	new nonresidential, new nonres buildings
4	oriented strandboard (OSB)	30	manufacturing, other manufacturing
4	oriented strandboard (OSB)	31	packaging and shipping, n/a
4	oriented strandboard (OSB)	32	other, n/a
4	oriented strandboard (OSB)	33	residential r and r, n/a
4	oriented strandboard (OSB)	34	new nonresidential, other
5	other industrial products	35	other industrial products
6	plywood	36	new housing, manufactured housing

Primary Product ID	Primary Product	End Use ID	End Use Product
6	plywood	37	new housing, multifamily
6	plywood	38	residential r and r, n/a
6	plywood	39	new nonresidential, new nonres buildings
6	plywood	40	new nonresidential, other
6	plywood	41	rail and railcar, n/a
6	plywood	42	manufacturing, furniture
6	plywood	43	manufacturing, other manufacturing
6	plywood	44	packaging and shipping, n/a
6	plywood	45	other, n/a
6	plywood	46	new housing, single family
7	wood pulp	47	wood pulp
8	fuelwood and other	48	fuelwood and other
9	lumber	49	residential r and r, n/a
9	lumber	50	packaging and shipping, n/a
9	lumber	51	manufacturing, other manufacturing
9	lumber	52	manufacturing, furniture
9	lumber	53	rail and railcar, n/a
9	lumber	54	new nonresidential, new nonres buildings
9	lumber	55	other, n/a
9	lumber	56	new housing, multifamily
9	lumber	57	new housing, manufactured housing
9	lumber	58	new housing, single family
9	lumber	59	new nonresidential, other
10	non-structural panels	60	manufacturing, other manufacturing
10	non-structural panels	61	other, n/a
10	non-structural panels	62	new housing, single family
10	non-structural panels	63	rail and railcar, n/a
10	non-structural panels	64	packaging and shipping, n/a
10	non-structural panels	65	new housing, manufactured housing
10	non-structural panels	66	residential r and r, n/a
10	non-structural panels	67	new nonresidential, other
10	non-structural panels	68	manufacturing, furniture
10	non-structural panels	69	new housing, multifamily
10	non-structural panels	70	new nonresidential, new nonres buildings
11	oriented strandboard (OSB)	71	rail and railcar, n/a
11	oriented strandboard (OSB)	72	new nonresidential, other
11	oriented strandboard (OSB)	73	new housing, manufactured housing

Primary Product ID	Primary Product	End Use ID	End Use Product
11	oriented strandboard (OSB)	74	residential r and r, n/a
11	oriented strandboard (OSB)	75	new nonresidential, new nonres buildings
11	oriented strandboard (OSB)	76	other, n/a
11	oriented strandboard (OSB)	77	packaging and shipping, n/a
11	oriented strandboard (OSB)	78	new housing, multifamily
11	oriented strandboard (OSB)	79	new housing, single family
11	oriented strandboard (OSB)	80	manufacturing, other manufacturing
11	oriented strandboard (OSB)	81	manufacturing, furniture
12	other industrial products	82	other industrial products
13	plywood	83	residential r and r, n/a
13	plywood	84	manufacturing, furniture
13	plywood	85	new housing, single family
13	plywood	86	new housing, multifamily
13	plywood	87	manufacturing, other manufacturing
13	plywood	88	other, n/a
13	plywood	89	rail and railcar, n/a
13	plywood	90	new nonresidential, new nonres buildings
13	plywood	91	new housing, manufactured housing
13	plywood	92	packaging and shipping, n/a
13	plywood	93	new nonresidential, other
14	wood pulp	94	wood pulp
15	fuelwood and other	95	fuelwood and other
16	lumber	96	rail and railcar, n/a
16	lumber	97	packaging and shipping, n/a
16	lumber	98	other, n/a
16	lumber	99	manufacturing, furniture
16	lumber	100	new housing, multifamily
16	lumber	101	new nonresidential, other
16	lumber	102	new housing, single family
16	lumber	103	new nonresidential, new nonres buildings
16	lumber	104	new housing, manufactured housing
16	lumber	105	residential r and r, n/a
16	lumber	106	manufacturing, other manufacturing
17	non-structural panels	107	manufacturing, other manufacturing
17	non-structural panels	108	new housing, multifamily
17	non-structural panels	109	other, n/a
17	non-structural panels	110	residential r and r, n/a

Primary Product ID	Primary Product	End Use ID	End Use Product
17	non-structural panels	111	new nonresidential, new nonres buildings
17	non-structural panels	112	packaging and shipping, n/a
17	non-structural panels	113	new nonresidential, other
17	non-structural panels	114	new housing, single family
17	non-structural panels	115	new housing, manufactured housing
17	non-structural panels	116	manufacturing, furniture
17	non-structural panels	117	rail and railcar, n/a
18	oriented strandboard (OSB)	118	manufacturing, other manufacturing
18	oriented strandboard (OSB)	119	packaging and shipping, n/a
18	oriented strandboard (OSB)	120	other, n/a
18	oriented strandboard (OSB)	121	manufacturing, furniture
18	oriented strandboard (OSB)	122	rail and railcar, n/a
18	oriented strandboard (OSB)	123	new nonresidential, new nonres buildings
18	oriented strandboard (OSB)	124	new housing, single family
18	oriented strandboard (OSB)	125	new housing, manufactured housing
18	oriented strandboard (OSB)	126	residential r and r, n/a
18	oriented strandboard (OSB)	127	new nonresidential, other
18	oriented strandboard (OSB)	128	new housing, multifamily
19	other industrial products	129	other industrial products
20	plywood	130	residential r and r, n/a
20	plywood	131	packaging and shipping, n/a
20	plywood	132	new housing, manufactured housing
20	plywood	133	new housing, single family
20	plywood	134	new housing, multifamily
20	plywood	135	other, n/a
20	plywood	136	manufacturing, other manufacturing
20	plywood	137	rail and railcar, n/a
20	plywood	138	new nonresidential, new nonres buildings
20	plywood	139	manufacturing, furniture
20	plywood	140	new nonresidential, other
21	wood pulp	141	wood pulp
22	fuelwood and other	142	fuelwood and other
23	lumber	143	residential r and r, n/a
23	lumber	144	manufacturing, furniture
23	lumber	145	new housing, manufactured housing
23	lumber	146	new housing, multifamily
23	lumber	147	new nonresidential, new nonres buildings

Primary Product ID	Primary Product	End Use ID	End Use Product
23	lumber	148	new nonresidential, other
23	lumber	149	manufacturing, other manufacturing
23	lumber	150	packaging and shipping, n/a
23	lumber	151	other, n/a
23	lumber	152	new housing, single family
23	lumber	153	rail and railcar, n/a
24	non-structural panels	154	new housing, single family
24	non-structural panels	155	manufacturing, furniture
24	non-structural panels	156	other, n/a
24	non-structural panels	157	packaging and shipping, n/a
24	non-structural panels	158	new nonresidential, new nonres buildings
24	non-structural panels	159	manufacturing, other manufacturing
24	non-structural panels	160	new nonresidential, other
24	non-structural panels	161	residential r and r, n/a
24	non-structural panels	162	new housing, multifamily
24	non-structural panels	163	rail and railcar, n/a
24	non-structural panels	164	new housing, manufactured housing
25	oriented strandboard (OSB)	165	manufacturing, furniture
25	oriented strandboard (OSB)	166	manufacturing, other manufacturing
25	oriented strandboard (OSB)	167	new nonresidential, other
25	oriented strandboard (OSB)	168	new housing, single family
25	oriented strandboard (OSB)	169	new housing, multifamily
25	oriented strandboard (OSB)	170	new housing, manufactured housing
25	oriented strandboard (OSB)	171	residential r and r, n/a
25	oriented strandboard (OSB)	172	rail and railcar, n/a
25	oriented strandboard (OSB)	173	packaging and shipping, n/a
25	oriented strandboard (OSB)	174	other, n/a
25	oriented strandboard (OSB)	175	new nonresidential, new nonres buildings
26	other industrial products	176	other industrial products
27	plywood	177	rail and railcar, n/a
27	plywood	178	new nonresidential, other
27	plywood	179	other, n/a
27	plywood	180	manufacturing, other manufacturing
27	plywood	181	new nonresidential, new nonres buildings
27	plywood	182	packaging and shipping, n/a
27	plywood	183	new housing, manufactured housing
27	plywood	184	new housing, multifamily

Primary Product ID	Primary Product	End Use ID	End Use Product
27	plywood	185	new housing, single family
27	plywood	186	manufacturing, furniture
27	plywood	187	residential r and r, n/a
28	wood pulp	188	wood pulp
29	hardwood, poles	189	hardwood, poles
30	softwood, poles	190	softwood, poles
31	hardwood, pilings	191	hardwood, pilings
32	softwood, pilings	192	softwood, pilings
33	hardwood, mine props	193	hardwood, mine props
34	softwood, mine props	194	softwood, mine props
35	hardwood, posts	195	hardwood, posts
36	softwood, posts	196	softwood, posts
37	hardwood, fuelwood	197	hardwood, fuelwood
38	softwood, fuelwood	198	softwood, fuelwood
39	hardwood, non-sawtimber	199	hardwood, non-sawtimber
40	softwood, non-sawtimber	200	softwood, non-sawtimber
41	hardwood, ties	201	hardwood, ties
42	softwood, ties	202	softwood, ties
43	hardwood, coop bolts	203	hardwood, coop bolts
44	softwood, coop bolts	204	softwood, coop bolts
45	hardwood, acid/dist.	205	hardwood, acid/dist.
46	softwood, acid/dist.	206	softwood, acid/dist.
47	hardwood, float logs	207	hardwood, float logs
48	softwood, float logs	208	softwood, float logs
49	hardwood, trap float	209	hardwood, trap float
50	softwood, trap float	210	softwood, trap float
51	hardwood, misc-conv.	211	hardwood, misc-conv.
52	softwood, misc-conv.	212	softwood, misc-conv.
53	hardwood, nav stores	213	hardwood, nav stores
54	softwood, nav stores	214	softwood, nav stores
55	hardwood, cull logs	215	hardwood, cull logs
56	softwood, cull logs	216	softwood, cull logs
57	hardwood, sm rnd wd	217	hardwood, sm rnd wd
58	softwood, sm rnd wd	218	softwood, sm rnd wd
59	hardwood, grn bio cv	219	hardwood, grn bio cv
60	softwood, grn bio cv	220	softwood, grn bio cv
61	hardwood, dry bio cv	221	hardwood, dry bio cv
62	softwood, dry bio cv	222	softwood, dry bio cv
63	hardwood, sp wood pr	223	hardwood, sp wood pr
64	softwood, sp wood pr	224	softwood, sp wood pr

Table 3.12: Disposition of HWP C for all years. This table shows the fate of all carbon removed from the ecosystem by harvesting.

Inventory year	Emitted with energy capture (metric ton CO ₂ e) ^a	Emitted without energy capture (metric ton CO ₂ e) ^a	Products in use (metric ton)	SWDS (metric ton)	Total in HWP pool ^b (metric ton)
1953	6,891,031	381,168	3,984,943	-	3,984,943
1954	15,053,434	1,280,396	8,336,770	230,879	8,567,649
1955	22,684,395	2,664,183	12,013,700	734,412	12,748,112
1956	30,880,865	4,530,600	15,751,124	1,433,718	17,184,843
1957	38,868,846	6,851,565	19,119,936	2,286,817	21,406,752
1958	46,155,052	9,576,781	21,877,795	3,247,031	25,124,826
1959	53,888,213	12,704,043	24,758,655	4,263,970	29,022,626
1960	61,908,899	16,232,248	27,667,761	5,327,633	32,995,394
1961	68,908,943	20,172,812	29,851,958	6,432,296	36,284,254
1962	76,188,335	24,537,345	32,294,090	7,322,666	39,616,756
1963	83,736,173	29,291,884	34,784,541	8,221,757	43,006,298
1964	91,177,723	34,391,730	37,110,235	9,133,537	46,243,772
1965	98,639,713	39,802,291	39,365,380	10,049,601	49,414,981
1966	105,822,355	45,485,463	41,381,310	10,965,626	52,346,935
1967	112,646,615	51,393,193	43,136,527	11,873,419	55,009,946
1968	119,544,459	57,514,919	44,895,366	12,759,597	57,654,963
1969	127,000,998	63,862,044	46,939,897	13,632,761	60,572,658
1970	132,479,288	70,420,973	48,887,049	14,508,602	63,395,651
1971	137,481,062	76,161,434	50,391,467	15,380,546	65,772,013
1972	142,728,215	82,068,768	52,039,002	16,538,136	68,577,138
1973	148,815,569	88,177,447	54,309,842	17,693,389	72,003,231
1974	153,430,435	94,467,437	56,148,602	18,878,570	75,027,172
1975	157,840,009	100,930,394	57,744,400	20,062,489	77,806,889
1976	161,902,741	107,539,832	58,976,545	21,235,064	80,211,609
1977	166,337,625	114,305,004	60,563,243	22,377,098	82,940,341
1978	171,671,989	121,208,685	61,950,001	23,510,368	85,460,369
1979	176,869,288	128,207,802	63,252,324	24,625,844	87,878,168
1980	181,420,269	135,260,390	64,078,978	25,694,013	89,772,991
1981	185,734,929	141,081,763	64,773,349	26,693,344	91,466,692
1982	189,319,821	146,880,976	65,016,314	27,928,290	92,944,605
1983	192,450,802	152,625,793	64,975,487	29,098,089	94,073,576
1984	198,171,223	158,318,421	65,820,231	30,195,810	96,016,042
1985	203,995,137	163,953,985	66,719,585	31,297,208	98,016,793
1986	210,355,342	169,544,974	67,921,210	32,410,288	100,331,498

Inventory year	Emitted with energy capture (metric ton CO ₂ e) ^a	Emitted without energy capture (metric ton CO ₂ e) ^a	Products in use (metric ton)	SWDS (metric ton)	Total in HWP pool ^b (metric ton)
1987	216,666,465	175,110,949	69,499,547	33,554,285	103,053,832
1988	223,397,462	180,665,965	71,307,730	34,754,841	106,062,571
1989	230,404,995	186,229,163	73,235,465	36,009,242	109,244,707
1990	237,574,946	191,806,224	74,909,331	37,326,158	112,235,489
1991	244,891,273	198,345,287	76,670,310	38,683,591	115,353,902
1992	250,870,318	204,911,132	77,785,042	39,621,596	117,406,638
1993	256,401,881	211,454,921	78,630,481	40,554,838	119,185,320
1994	260,290,295	217,957,678	79,671,889	41,482,736	121,154,625
1995	263,901,420	224,437,893	80,400,038	42,418,528	122,818,566
1996	268,104,755	230,859,773	80,528,879	43,388,835	123,917,714
1997	272,288,192	237,140,593	80,761,118	44,362,896	125,124,014
1998	276,695,475	243,267,917	81,200,104	45,286,631	126,486,735
1999	280,568,844	249,217,382	81,358,055	46,185,542	127,543,597
2000	284,511,853	254,996,505	81,618,619	47,050,952	128,669,571
2001	288,013,803	260,890,976	81,652,928	47,901,672	129,554,599
2002	291,800,018	266,661,122	81,275,533	48,542,699	129,818,232
2003	295,774,167	272,204,241	81,076,267	49,141,885	130,218,152
2004	299,692,035	277,631,610	80,901,596	49,744,851	130,646,447
2005	303,745,145	282,878,612	80,837,280	50,312,157	131,149,437
2006	307,828,876	287,945,893	80,827,860	50,875,753	131,703,613
2007	311,664,369	292,831,580	80,750,592	51,440,696	132,191,288
2008	318,013,698	297,537,409	80,529,571	52,004,397	132,533,968
2009	323,366,512	302,069,347	80,110,589	52,563,202	132,673,791
2010	326,637,490	306,416,547	79,245,849	53,114,937	132,360,786
2011	331,294,180	310,630,581	78,743,395	53,642,072	132,385,466
2012	336,529,493	314,722,670	78,406,165	54,181,755	132,587,920
2013	341,666,649	318,698,498	78,069,992	54,731,949	132,801,941
2014	347,982,853	322,588,424	78,025,876	55,287,066	133,312,942
2015	353,324,672	326,377,453	77,768,409	55,864,087	133,632,496
2016	359,412,664	330,093,437	77,697,059	56,440,165	134,137,224
2017	365,444,137	333,737,339	77,621,397	57,032,821	134,654,218
2018 ^c	371,506,279	337,316,698	77,559,925	57,635,099	135,195,025

^a Reporting units, CO₂ equivalents, are not consistent with IPCC methodology. HWP C emissions were converted to CO₂ equivalents at the request of the California Board of Forestry and Fire Protection.

^b Sum of Products in use and SWDS.

^c Although no records are entered for 2018, the cumulative dispositions from prior year harvests are estimated for 2018.

Table 3.13: Average annual HWP C flux by owner and pool for 2017 California AB 1504 ten-year reporting intervals and the 2017 reporting period.

	2002-2012	2003-2013	2004-2014	2005-2015	2006-2016	2007-2017	2008-2018	2017 reporting period average
<i>Metric tons CO₂e</i>								
Private:								
Products in use	-39,438	-129,087	-139,483	-245,477	-277,230	-324,602	-303,072	-208,341
SWDS	1,538,163	1,530,727	1,523,766	1,531,368	1,538,442	1,550,960	1,564,370	1,539,685
<i>Total</i>	<i>1,498,725</i>	<i>1,401,640</i>	<i>1,384,283</i>	<i>1,285,891</i>	<i>1,261,212</i>	<i>1,226,358</i>	<i>1,261,298</i>	<i>1,331,344</i>
USFS:								
Products in use	-955,358	-923,344	-874,085	-844,053	-841,946	-814,292	-776,623	-861,386
SWDS	496,197	486,455	476,474	472,435	469,809	467,011	466,297	476,383
<i>Total</i>	<i>-459,160</i>	<i>-436,889</i>	<i>-397,610</i>	<i>-371,618</i>	<i>-372,137</i>	<i>-347,280</i>	<i>-310,326</i>	<i>-385,003</i>
BLM:								
Products in use	-13,407	-12,901	-11,934	-11,572	-10,860	-10,373	-12,496	-11,935
SWDS	4,231	4,162	4,072	4,064	4,054	4,077	4,105	4,109
<i>Total</i>	<i>-9,176</i>	<i>-8,739</i>	<i>-7,862</i>	<i>-7,508</i>	<i>-6,806</i>	<i>-6,296</i>	<i>-8,392</i>	<i>-7,825</i>
State and other public:								
Products in use	-39,600	-31,235	-20,557	-14,483	-8,088	11,011	17,600	-12,193
SWDS	15,847	15,031	14,526	14,547	14,642	14,954	16,207	15,108
<i>Total</i>	<i>-23,754</i>	<i>-16,204</i>	<i>-6,031</i>	<i>64</i>	<i>6,554</i>	<i>25,965</i>	<i>33,807</i>	<i>2,915</i>
Tribal:								
Products in use	-4,299	-5,734	-8,371	-9,668	-9,835	-9,116	-14,361	-8,769
SWDS	13,216	13,315	13,307	13,293	13,337	13,443	13,612	13,360
<i>Total</i>	<i>8,917</i>	<i>7,581</i>	<i>4,935</i>	<i>3,625</i>	<i>3,501</i>	<i>4,327</i>	<i>-749</i>	<i>4,591</i>
All owners:								
Products in use	-1,052,102	-1,102,301	-1,054,431	-1,125,253	-1,147,960	-1,147,372	-1,088,870	-1,102,613
SWDS	2,067,654	2,049,690	2,032,146	2,035,708	2,040,284	2,050,446	2,064,591	2,048,645
<i>Total</i>	<i>1,015,552</i>	<i>947,389</i>	<i>977,715</i>	<i>910,455</i>	<i>892,324</i>	<i>903,074</i>	<i>975,721</i>	<i>946,033</i>

Table 3.14: Average annual timber harvest between 2001 to 2017 weighted by the proportion of FIA plots remeasured each year.

Harvest year	Harvest (mbf Scribner)	Timber product output (MT C)	Weight value	Weighted harvest values	
				mbf Scribner	MT C
2001	1,751,800	2,788,949	1/77	22,751	36,220
2002	1,838,753	2,927,226	2/77	47,760	76,032
2003	1,812,713	2,885,759	3/77	70,625	112,432
2004	1,875,287	2,985,609	4/77	97,418	155,097
2005	1,889,454	3,008,052	5/77	122,692	195,328
2006	1,774,600	2,825,202	6/77	138,281	220,146
2007	1,776,300	3,317,489	7/77	161,482	301,590
2008	1,497,513	2,796,902	7/77	136,138	254,264
2009	915,095	1,709,183	7/77	83,190	155,380
2010	1,302,764	2,433,257	7/77	118,433	221,205
2011	1,464,641	2,735,606	7/77	133,149	248,691
2012	1,437,180	2,684,315	6/77	111,988	209,167
2013	1,767,033	3,300,403	5/77	114,742	214,312
2014	1,494,437	2,791,258	4/77	77,633	145,000
2015	1,703,188	3,181,156	3/77	66,358	123,941
2016	1,687,376	3,151,622	2/77	43,828	81,860
2017	1,695,956	3,167,648	1/77	22,751	36,220
				Weighted average (sum of weighted values)	
				1,568,492	2,791,804