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"STEWARDSHIP IN FORESTRY"

To: Dave Lorenz, Acting State Forests Division Chief

From: Paul Bell, Acting State Forester

Date: July 1, 2012

Subject: Approval of North Cascade and West Oregon Implementation Plans

This memo conveys direction related to implementation plans for approximately 85,000 acres of state-owned forest lands in the North Cascade and West Oregon districts. In January 2010 the Oregon Board of Forestry established clear direction to the Department to increase timber harvest revenue from these lands over the next ten years. In addition, the Board approved 2010 Northwest Forest Management Plan established a long-term goal of creating stands with complex forest structure across 30 to 50 percent of the landscape. Revision of these implementation plans, done according to the process defined in administrative rule, provides an opportunity to reflect this new direction in the context of these 10-year implementation plans.

The revision process for these implementation plans and Forest Land Management Classification maps included significant opportunities for public involvement, including meetings with the Forest Trust Land Advisory Committee, the State Forest Advisory Committee, three meetings open to the general public, and a 45-day written comment period. The districts reviewed and incorporated, where appropriate, the comments received on these plans and maps.

My review of these implementation plans has found them to be consistent with the Northwest Oregon State Forests Management Plan (2010) and the management activities conducted under these plans will be consistent with State Forests Division Operational Policies and strategies. Therefore, I am approving the revised Implementation Plans for North Cascade and West Oregon Districts and the revised Forest Land Management Classification maps for those districts.

West Oregon District

Implementation Plan

June 2012

This implementation plan describes the management approaches and activities that the West Oregon District will pursue in order to carry out the *Northwest Oregon State Forests Management Plan* and the Species of Concern (SOC) strategies.

The *West Oregon District Implementation Plan* guides forest management for all forest resources on West Oregon District from July 1, 2012 through June 30, 2022.

The main headings in this plan are listed below.

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Introduction

The *West Oregon District Implementation Plan* (IP) guides forest management for all forest resources on the West Oregon District beginning July 1, 2012. This implementation plan is a major revision of the plan approved by the State Forester in March 2003. It describes the operations, activities and projects that will achieve the intent of the long-range vision of the April 2010 *Northwest Oregon State Forests Management Plan* (FMP).

This IP has been developed in accordance with State Forests Policy Bulletin SFB 12-06, including a new landscape design that designates 31 percent of the district for the development of complex structure[1] over time. This change in the proportion of complex structure development is coupled with additional policy direction from the Board of Forestry regarding Species of Concern.

In addition, the policy bulletin directs an increase in the Annual Harvest Objective from 10 Million Board Feet (MMBF) per year to up to 12 MMBF per year. There is currently a total of 788 million board feet (MMBF) of standing wood volume on the district. At the end of this IP period, there will be a total of 933 MMBF. This illustrates that while the district is increasing the annual harvest volume with this IP, the volume being harvested is still less than the total amount of volume per year being grown on the district. Additional discussion of the harvest level can be found in the Proposed Management Activities section under Harvesting, while an overview of the analysis that informed this policy direction is found in Appendix A of this IP.

Approximately 10 percent of the district's stands currently have a complex structure. Some understory stands that have been partial cut in the past will be moving into the layered stand structure during this IP period. Minor amounts of existing layered stands, located outside of the landscape design for complex structure, will be harvested. Overall, the amount of layered stands on the district will increase during this IP period.

In summary, this landscape design has a twofold aim:

1. Provide better economic performance.
2. Retain benefits to fish and wildlife through more precisely targeted development of complex structure.

A more comprehensive section on aquatic habitat restoration now exists in this IP. The NW Forest Management Plan (NW FMP) establishes an Aquatic and Riparian Strategy for habitat restoration projects on State Forests (FMP 2010). State Forest's commitment to habitat restoration is further supported in the Species of Concern Policy (ODF 2010) which

[1] Complex structure refers to Layered and Older Forest Structure. See chapter 4 of the Northwest Oregon State Forest Management Plan for a description of these structure types and the landscape management strategies.

lists habitat restoration projects as an aquatic strategy. The Aquatic Resources: Habitat Restoration section of this IP provides the context and approach that State Forests will use for habitat restoration activities.

In addition, the management activities conducted under this plan will be consistent with the following State Forests Operational Policies and strategies:

1. Species of Concern Strategies[1];
2. Northern spotted owls;
3. Marbled murrelet;
4. Swiss Needle Cast Strategic Plan;
5. Forest Roads Manual.

The specific operations and management activities necessary to carry out this IP will be described in annual plans, beginning with the *FY 2013 West Oregon District Annual Operations Plan (*AOP*).*

1. The SOC policy will be updated to reflect strategies proposed in this IP upon implementation.

District Overview

Land Ownership

The West Oregon District currently manages 36,714 acres of state forest land in the Coast Range, generally between Corvallis and Newport. See the district overview map in the **Map Section**. This land is located on 28 separate parcels, ranging in size from 40 acres to over 12,000 acres, in Benton, Lincoln and Polk counties (see Table 1). This land base incorporates both "Board of Forestry lands" and "Common School lands". Board of Forestry lands were county lands that were deeded to the Board of Forestry. Common School lands are held by the Department of State Lands. The parcels are located as far south as "Table Mountain", as far west as Newport, north to Dallas, and east to Marys Peak. Overall, the district manages 58 square miles of forest land over a 600-square-mile area. However, about one-half of the land is located in two large blocks. The two largest land parcels roughly (12,000 acres each) are located just south of Highway 20, between Burnt Woods and Eddyville and on Green Mountain and Bonner Ridge, seven miles north of Highway 20.

Table 1. West Oregon District Acreage, by County and Fund

County	Board of Forestry	Common School	Total Acres
Benton	8,327	553	8,880
Lincoln	15,468	4,614	20,082
Polk	6,020	1,732	7,752
Total Acres	**29,815**	**6,899**	**36,714**

Because the district lands are widely scattered and fragmented, a very high proportion of state forest lands are adjacent to other landowners. Moderate to large industrial forest landowners control more than one-half of the adjacent land on the district. Most of the remaining adjacent landowners own from less than 10 acres to a few hundred acres. These small landowners often have residences on their properties and their lands are frequently used for agricultural purposes, generally sheep or cattle grazing. The Siuslaw National Forest and the Marys Peak Resource Area of the Bureau of Land Management (BLM) are immediately to the south of the largest block of district lands (located between Highway 20 and Big Elk Creek). Although the federal forest lands border district lands at only a few locations, they do provide large, contiguous areas of older forests in close proximity to state forest lands.

Forest Land Management Classification System

Background

The Forest Land Management Classification System (FLMCS) is based on OAR 629-350-005, an administrative rule on state forest management adopted by the Board of Forestry in 1998. This rules states that the state forests in the planning area (district) be classified for the purposes of implementing the plan's forest resource management strategies. The FLMCS is a method of describing the management emphasis of an area of state forest land. The management emphasis identifies the extent to which an area of land can be managed for a variety of forest resources. It also identifies when a particular forest resource may need a more focused approach in its management, or possibly an exclusive priority in its management.

The framework of the FLMCS places all state forest land within one of three land management classifications. The classifications are: (1) General Stewardship, (2) Focused Stewardship, and (3) Special Stewardship. Subclasses are assigned for the specific forest resources that require a Focused Stewardship or Special Stewardship Classification.

- General Stewardship – all forest resources are actively managed using integrated management strategies and sound conservation practices to meet forest management planning goals.
- Focused Stewardship – natural resources, social values, or administrative areas are present so that it is necessary to carry out supplemental planning or modified management practices in order to conserve those resources.
- Special Stewardship – one or more natural resources, social values, or administrative areas are present which require a level of protection that precludes the integrated management of all forest resources; lands are committed to a specific use and management activities are limited to those that are compatible with the specific use.

The stewardship class identifies the extent of management and subclass identifies the resource that the classification is intended to address: Focused Stewardship has thirteen subclasses, while Special Stewardship has 16 subclasses. Some of the subclasses identify areas for the conservation of natural resources, such as 'Aquatic and Riparian' for streams and 'Plants' for threatened and endangered plants or unique plant communities. Other subclasses identify areas for the conservation of social values, including 'Recreation' for campgrounds and day use areas. Finally, there are subclasses that identify administrative areas on the forests, such as 'Energy and Minerals' for the rock quarries that supply the surfacing of the forest roads, or 'Transmission' that identify the right-of-ways of the large power lines that cross state forests.

Major Change to FLMCS

The district's initial draft of the land classification was completed in 2003 and subject to public review. This revision of the West Oregon District IP includes a Major Change to the FLMCS (as described in the OAR) for the district. The following classifications have been updated:

- Aquatic and Riparian Habitat – Additional Focused and Special Stewardship areas have been identified as the result of surveys have identified additional fish bearing and perennial streams. In addition, areas of Focused Stewardship have been added as result of incorporating three Aquatic Anchors as a Species of Concern Strategy.
- Research and Monitoring – Minor additions have been made to more accurately reflect ongoing research.
- Wildlife Habitat – Areas have been added to Special Stewardship as the result establishing 12 new Marbled Murrelet Management Areas based on survey results. Areas have also been added to Focused and Special Stewardship due to the identification of additional northern spotted owl activity centers through surveys. Finally, additional Focused Stewardship areas have been identified because two Terrestrial Anchor Sites have been established as a Species of Concern Strategy.

Summarizing the acres in FLMCS can be confusing because there can overlap between Special and Focused Stewardship Classification; overlap between subclasses; and overlap within a subclass. However, there is no overlap of the General Stewardship classification.

Due the presence of multiple resources, a single acre may have multiple stewardship classifications. As an extreme example consider a cultural resource site classified as 'Special Stewardship – Cultural' that occurs within a riparian area with a 'Focused Stewardship – Aquatic and Riparian' that is in a Marbled Murrelet Management Areas that is classified as 'Special Stewardship – Wildlife' and is near a northern spotted owl activity center, so it has a 'Focused Stewardship – Wildlife'. The single acre in this example has four resources present, so it has four classifications, and would be counted as four acres in a summary.

Table 2 summarizes the FLMCS on West Oregon District by Stewardship Class and Fund. The overlap within the Special and Focused Stewardship classifications have been eliminated in this table, so the table shows the total area covered or the "foot print" of each of these classifications. This table still includes overlap between Focused and Special Classification.

Table 2. West Oregon District Acres, by Stewardship Class and Fund

Classification	Board of Forestry	Common School	Total Acres
Special	3,566	1,392	4,959
Focused	26,257	6,623	32,880
General	10,907	2,285	13,192

Table 3 lists the total acres in the Focused and Special Stewardship classes by subclasses. In this table none of the overlap between and within the classes and subclasses has been removed, so the total acres in the table are more than the total acres in the district. The subclasses in Table 3 have been grouped to show those that are for the conservation of natural resources, those that are for the conservation of social values, and those that are for the administration or management of the forest.

In the context of management over the life of this implementation plan, the most intensive management and nearly all harvesting will be occurring on those lands classified as General Stewardship. Some harvesting will occur on lands classified as Focused Stewardship, mostly through partial cuts. Finally, very little harvesting is anticipated from lands classified as Special Stewardship; however, the range of conditions present on these lands will cover either end of the spectrum. Lands classified as Special Stewardship in the Aquatic and Riparian or Wildlife subclass will be or have the goal of becoming complex forest structures, while Special Stewardship lands with an Energy and Minerals subclass are likely to be rock pits and will be maintained in a non-forest condition.

Table 3. West Oregon District Acres, Focused and Special Stewardship Subclasses

	Acres Focused	Acres Special
Conservation of Natural Resource		
Aquatic and Riparian Habitat		
Riparian Management Areas	7,481	2,578
Aquatic Anchors	11,455	0
Domestic Water Use	39	0
Operationally Limited	0	112
Plants	22	0
Wildlife Habitat	10,600	1,890
Conservation of Social Values		
Cultural Resources	12	5
Recreation	258	31
Visual	2,729	14

	Acres Focused	Acres Special
Administrative Areas for Forest Management and "Non-Forest" Uses		
Administrative Sites	0	0
Deeds	0	6
Easements	68	102
Energy and Minerals	0	0
Research/Monitoring	81	168
Transmission	192	54

Four maps of the FLMCS can be found in the map section of this document. In addition, GIS data is available upon request. Neither the maps or the GIS data made available to the public will show the locations of cultural resources or the specific location of threatened and endangered species due to the highly sensitive nature of these resources.

History

During the mid to late 1800s, a series of wildfires burned through most of the forests that now comprise the state forest land on the district. Nearly all of the lands in Lincoln County and more than half of the lands in Polk County burned, while some of the lands in Benton County also burned. Widespread homesteading began at about this same time, and continued in the Coast Range through the 1930s. During this time period, grazing and timber harvesting were the primary activities. After the 1930s, many of the homesteads were abandoned, and the pastures and cutover lands slowly returned to forest. The abandoned homesteads were forfeited to the counties for back taxes and eventually turned over to the Board of Forestry for management.

Common School Lands were given to Oregon at the time of statehood by the federal government for the purpose of supporting public schools. Originally, these lands were managed by local school superintendents, and were sold, harvested, or traded as was necessary for the local school district. Later, Common School Lands came under the control of the State Land Board. When the Oregon Department of Forestry (ODF) began to manage Common School forest land for the State Land Board, these lands were in a condition similar to the Board of Forestry lands—pastures and cutover lands that were slowly returning to forest.

The Department of Forestry began active management of these lands in the mid-1950s. Since then, management activities have included clear cutting, thinning, converting of brush fields to conifer stands and frequent salvaging of wind-thrown and standing dead trees. Reforestation, pre-commercial thinning, and vegetation management are also common activities. Fertilization and pruning have been conducted in the past. In support of

these management activities, roads have been constructed and improved throughout the district to the extent that most of the lands are now easily accessible.

During the 1980's, the West Oregon District was managed under a different Forest management plan. During this period harvest levels were determined by an "area regulation" management approach. This approach planned harvest levels across multiple districts for the same period. During this time the West Oregon District had a preponderance of mature stands which allowed for higher harvest levels then would have occurred had the district been managed under its own harvest level objective. The higher harvest level in the 1980's had a significant impact and is a major factor of the stand age distribution the district manages today.

Physical Elements

Geology and Soils

The geology of the district is dominated by sedimentary rock, mostly sandstones and siltstones, deposited over igneous rocks of an older submarine volcanic terrain. The deposition of these sedimentary rocks also occurred beneath an ancestral ocean.

The rugged topography is a result of the wet climate combined with the forces of ongoing tectonic uplift and stream down-cutting. These forces make the Coast Range inherently prone to landslides.

Forest landslides that result in debris slides (shallow landslides) are the current dominant geologic process on this landscape, however deep-seated landslides – both ancient and recent - also continue to influence the surficial geology of the area.

1. Shallow landslides
    - typically less than 10 feet deep and often much less than one acre in size
    - primarily occur on steep slopes (greater than 60%) with shallow soils
    - movement is usually rapid (feet per second)
    - often form debris flows that can increase orders of magnitude in volume and travel long distances (1000's of feet), especially when they enter steep, confined channels
    - generally hard to predict at a site-specific level, but often originate in headwalls or in or alongside steep gullies which don't normally flow water. These landforms can be identified and evaluated for their potential to be affected by a proposed harvest. Often the locations of previous slides can be an indication of future problems. These sites can be identified by old slide scarps, bare soil or young alder, and the presence of slide debris at the base of the steep slope. Periods of intense rainfall or rain-on-snow events, blow-down, can trigger shallow landslides. Poorly drained roads and steep slopes in very young stands (<10 years old) can have a higher frequency of shallow landslides.

2. Deep-seated landslides
    - typically at least 10 feet deep and up to 100's of acres in size
    - primarily occur on gentle to moderate slopes, often with deep soils
    - movement is usually slow (inches a day) and intermittent with years going by in between episodes of movement
    - many are ancient features that have not experienced movement for hundreds or thousands of years and are relatively stable though loading by stockpiling aggregate or wasting excess fill from road-building or slide cleanup can initiate new movement
    - debris flows can occur on the margins of these landslides, especially where there are critical slope breaks with steeper topography and/or confined channels below
    - are often identifiable on soil, geologic, topographic or LIDAR-generated maps and movement is often a reactivation of a pre-existing landslide feature, however movement may still be hard to predict at a site-specific level.

Deep-seated landslides are common on those portions of the West Oregon District dominated by weak marine sedimentary rocks. Shallow landslides are common on those portions of the district dominated by steep slopes. The risks associated with active management in a landslide prone landscape are mitigated using the processes described in the Aquatic and Riparian Strategy 6 in the FMP and the "Landslides and Public Safety" sections of the FPA. The ODF geotechnical specialist can be consulted when district personnel need additional perspective on layout of timber sale boundaries or road construction. Additional consultation could reduce risk to the Aquatic environment and public safety for proposed activities involving:

- stockpiling aggregate and wasting material
- laying out harvest on or near headwalls or on steep open slopes
- laying out harvests on steep slopes near or above RMA's where a landslide could deliver debris to an RMA or Type-F stream
- in situations where ground cracking or slumping is observed
- where road construction will create fills or cuts on steep ground
- when forest roads have been impacted by landslides, and
- when public roads, structures, or homes are located below proposed harvest units with steep ground.

The soils on the district range from approximately 40 to over 60 inches in depth, and are generally considered very productive. Approximately 87 percent of the acres are classified as Low Site I or High Site II (Douglas-Fir 50 -Year Site Index).

Most soils covering District land are formed directly from the geologic formations at depth. Those formed from the underlying marine sediments tend to be silty, clayey and cohesive, holding moisture for longer periods of time. Soils formed from the igneous

formations tend to be sandy, gravelly and non-cohesive, draining much faster after rainfall events.

Topography

The district's topography has gentle to steep slopes, with some areas having narrow ridges and deep V-shaped valleys. The lands range in elevation from a few feet above sea level to approximately 2,200 feet. The streams are actively down-cutting many of the valleys. Approximately 62% of the district is below 1000 feet, 37% lies between 1000 and 2000 feet, and 1% lies between 2000 and 3000 feet. Approximately 53% of the landscape has gentle to moderate slopes (slopes of less than 40%), while 37% is classified as steep (slopes of 40 to 65%). The remainder (10%) is classified as precipitous (slope of greater than 65%). These conditions are important factors in formulating land management decisions.

Water

The rivers on the district flow into two major drainage regions, the Northern Oregon Coastal (73%) and the Willamette (27%). The rivers that drain into the Northern Oregon Coastal Basin are the Siletz, and Yaquina,. The Luckiamute and Marys rivers flow into the Willamette Basin.

There are 4 registered domestic water rights on state forest land and 12 more domestic water rights within 1,000 feet of these lands. In addition to these, the District is aware of several unregistered water rights.

Climate

District lands are located in the transition area between the coastal and Willamette Valley climate zones. The climate is relatively mild throughout the year, with cool, wet winters, and warm, dry summers. Over 50 percent of the rainfall occurs from December through February. The average monthly high temperature at Newport is about 65 degrees during the summer; the average monthly low temperature is about 38 degrees in the winter. In Corvallis, these temperatures are 80 and 34 degrees, respectively. Daily maximum temperatures exceed 90 degrees only about 5 to 15 days per year in the Willamette Valley, while below zero temperatures occur only once every 25 years. These temperature extremes are even less frequent closer to the coast.

Precipitation on the district is very closely related to elevation, with the lower elevations receiving about 50 inches per year, ranging up to nearly 200 inches per year at the higher elevations. The winter months have precipitation totals exceeding 10 inches per month, while the totals for summer months are frequently less than 1 inch. Very little of the precipitation falls as snow (yearly snowfall averages about 10 inches). While ice storms rarely occur, they have a high potential for causing severe damage to the forest by breaking the tops and limbs out of trees.

Generally, strong winds precede winter storms. These strong winds, with speeds sometimes equivalent to hurricanes, have the potential to cause great damage to the forest by breaking the tops and limbs out of individual trees or by blowing down large swaths of the forest.

Natural Disturbances

Natural disturbances such as wildfire, windstorms, floods, landslides, and insect and disease outbreaks have influenced and will continue to influence the forest condition. These disturbances often result in increased forest diversity and complexity. Laminated root rot disease (*Phellinus weirii*), Swiss Needle Cast (*Phaeocryptopus gaumanni*), flooding and windstorms are the most common of these disturbances in the West Oregon District. Forest management will reduce the impact of epidemic natural disturbances, but endemic levels will continue to result in increased forest diversity and complexity.

Biological Elements

Vegetation

The forests on the district are primarily comprised of Douglas-fir, red alder and bigleaf maple. Western hemlock is common on lands over 1,500 feet in elevation and on coastal parcels. Sitka spruce, grand fir, and western red cedar are also present on state forest lands, but in very low numbers. Red alder dominates stands in riparian areas and some upland sites. In the upland red alder stands, the canopy cover will be comprised of mostly red alder trees mixed with only a few large Douglas-fir. Lodgepole pine is present on one tract very close to the coast. In addition, Port Orford cedar, western white pine, and ponderosa pine have been planted on the district. The most common understory species are salal, sword fern, vine maple, elderberry, and salmonberry.

The District Plant List (Table 4) includes endangered, threatened, candidate, and special concern plants that are, or have the potential to be found, on the district. This list is an expanded version of the list found in the *Northwest Oregon State Forests Management Plan* (pg 2-62*)*. There are no known occurrences of these species on state forest lands on this district, but each has habitat requirements that may occur on these lands.

Table 4. West Oregon District Endangered, Threatened or Candidate Plant Species

Genus	Species	Subspecies	Common name[1]	Status	Potential to be present
Threatened and Endangered Plants					
Aster	*vialis*		Wayside aster	ST	✔
Castilleja	*levisecta*		Golden Indian-paintbrush	SE, FT	✔
Cordylanthus	*maritimus*	*palustris*	**Salt-marsh bird's beak**	SE	✔
Erigeron	*decumbens*		Willamette daisy	SE, FE	✔
Lupinus	*sulphureus*	*kincaidii*	**Kincaids lupine**	ST, FT	✔
Candidate Plants					
Cimicifuga	*elata*		Tall bugbane	SC	✔
Erythronium	*Elegans*		Coast Range Fawn Lilly	SP	✔
Montia	*howellii*		Howell's montia	SC	✔
Sidalcea	*hirtipes*		**Bristly-stemmed sidalcea**	SC	✔

[1]Plant names in bold are on the NW FMP list of plants.

Status:
SE – State Endangered
ST – State Threatened
SC – State Candidate
SP – Special Concern
FE – Federal Endangered
FT – Federal Threatened

Forest Health

Laminated root rot, a native fungal disease, is present in 5 to 10 percent of the stands throughout the district. The greatest concentrations are found in the Luckiamute and Marys River basins. This disease infects several conifer species, but it can be fatal to Douglas-fir and grand fir. Where laminated root rot is suspected the district conducts surveys through coordination with the agency's Insect and Disease staff. Where root rot infection areas are identified, the disease susceptible species are removed and the area is reforested with disease resistant species.

Swiss needle cast is a native fungal disease of Douglas-fir that had historically caused little damage. In the mid-1980s, the disease began to spread and become more severe. This

disease, which causes the premature shedding of needles, has resulted in severe growth reductions in some stands, particularly plantations between 10 and 30 years old. In addition to the growth loss, there is concern that this disease will limit the development of complex forest structures in severely infected stands. Currently, approximately 31 percent of the stands on the West Oregon District are infected with Swiss needle cast, however none of the stands are considered to be severely infected according to the 2011 aerial survey. The district will perform its management in accordance with the "State Forest Strategic Plan for Swiss Needle Cast".

Fish and Wildlife

The West Oregon District provides habitats for most native species found in forests in the Oregon Coast Range (Johnson and O'Neil 2001). Appendix E [of the FMP] contains lists of native fish and wildlife species, with scientific names, that are currently known, or are likely, to exist within the area covered by the NWFMP. The Oregon Conservation Strategy (ODFW 2006) provides a list of species of concern for each georegion of the state. Many of the species listed as "Conservation Species" for the Coast Range georegion are likely to be present on the West Oregon District. In addition, many game and furbearer species occur on the district. Some of the most common game species are black-tailed deer, Roosevelt elk, and black bear. Also common are beavers, mountain beavers, cougars, bobcats, and coyotes.

Of the many wildlife species potentially found on the West Oregon District, northern spotted owls and marbled murrelets are listed as threatened under both the federal and state Endangered Species Acts. The northern spotted owl was listed as threatened by the USFWS in 1990. The West Oregon District has conducted a northern spotted owl survey program since 1990. Currently, there are three known spotted owl sites on the district. One site is classified as "pair status" and the other two are classified as "resident single". There are three additional known spotted owl sites near state forest lands that affect management practices on the district.

The marbled murrelet was listed as threatened in 1992 by the U.S. Fish and Wildlife Service (USFWS) within Washington, Oregon, and California. Surveys for marbled murrelets have been conducted since 1992. To date, surveys have resulted in the establishment of 16 Marbled Murrelet Management Areas (MMMAs) averaging 113 acres in size.

The integrated forest management strategies, as well as the aquatic and riparian strategies, of the *Northwest Oregon State Forests Management Plan*, will contribute to diverse habitats that are likely to accommodate most native wildlife species and contribute to the maintenance and restoration of habitat. Protection measures for the northern spotted owl are described in the *State Forest Division Operational Policies for: Northern Spotted Owls 1.2 (2011).* Protection measures for marbled murrelets are described in *State Forest Division Operational Policies for Marbled Murrelets 1.1 (2010).*

The streams, rivers, lakes, and other water bodies on the West Oregon District provide habitat for a variety of fish and other aquatic species. There are approximately 82 miles of fish bearing streams on ODF ownership within the district. Native salmonid species that have been confirmed on the West Oregon District include Chinook salmon, coho salmon, steelhead trout, and coastal cutthroat trout. Protection measures for fish habitat are described in the Aquatic and riparian strategies in the *NW State Forests Management Plan (2010)* and *State Forests Species of Concern Operational Policy (2012).*

Species of Concern

Opportunities for additional conservation measures for "species of concern" have been identified on the West Oregon District. Species of Concern Strategies, adopted in 2012, specifically identify fish and wildlife species of concern on the West Oregon District (Table 5: List of SOC). Species of concern include those on federal or state ESA lists, state sensitive species, and Oregon Conservation Strategy species for the Coast Range ecoregion. Strategies in addition to the *NW State Forests Management Plan (2010)* to address these species are identified in policy. These strategies include:

- Identification of Terrestrial Anchor (TA) Sites which are areas intended to benefit terrestrial wildlife species of concern, especially those associated with older forest or interior habitat conditions, sensitive to forest fragmentation, or do not readily disperse across younger forest conditions. Management within TAs is intended to be limited, to emulate natural small-scale disturbance patterns, and to minimize short-term negative impacts to habitat. Harvest will likely be limited to thinning projects with some small retention cuts. ODF biologists will be involved in development of management prescriptions within TAs.
- Identification of Aquatic Anchor (AA) watersheds with a heightened focus on conservation for salmon and/or aquatic amphibian species of concern. Riparian management strategies beyond those described in the FMP will be applied within AAs.
- Strategies for northern spotted owls and marbled murrelets are described in State Forest Division Operational Policies 1.1 and 1.2 (ODF 2010 and ODF 2011, respectively).
- Site-specific Strategies apply for a subset of Species of Concern. The species & types of sites that will be addressed on a site-specific basis include: bald eagle nesting and roosting sites, peregrine falcon nest sites, band-tailed pigeon mineral springs, great-blue heron nesting rookeries, northern goshawk nest sites, osprey nest sites, and Townsend's big eared bat roosting sites (particularly caves and mines). Where known sites exist, plans will be developed to address protection of habitat and/or prevention of disturbance.
- Additional strategies exist for stream restoration projects and creation of snags in some regeneration harvest areas.

Table 5. List of Fish and Wildlife Species of Concern for West Oregon District.

#	Species	Reason Included	Regulatory Status
	AMPHIBIANS		
1	Clouded salamander	Strategy Species	SSV
2	Coastal tailed frog	Strategy Species	Fsoc, SSV
3	Southern torrent salamander	Strategy Species	Fsoc, SSV
4	Western toad	Strategy Species	SSV
	REPTILES		
5	Northwestern pond turtle	Strategy Species	Fsoc, SSC
	BIRDS		
6	American peregrine falcon	Strategy Species	SSV
7	Bald eagle	Strategy Species	ST
8	Band-tailed pigeon	Strategy Species	Fsoc
9	Great-blue heron	Protected by FPA	FPA
10	Little willow flycatcher	Strategy Species	Fsoc, SSV
11	Marbled murrelet	Strategy Species	FT, ST
12	Northern goshawk	Strategy Species	Fsoc
13	Northern spotted owl	Strategy Species	FT, ST
14	Olive-sided flycatcher	Strategy Species	Fsoc, SSV
15	Osprey	Protected by FPA	FPA
16	Purple martin	ODFW Sensitive	Fsoc, SSC
17	Western bluebird	ODFW Sensitive	SSV
	MAMMALS		
18	American marten	Strategy Species	SSV[2]
19	California myotis	Strategy Species	SSV
20	Fringed myotis	Strategy Species	Fsoc, SSV
21	Hoary Bat	Strategy Species	SSV
22	Long-legged myotis	Strategy Species	Fsoc, SSV
23	Silver-haired bat	Strategy Species	Fsoc, SSV
24	Townsend's big-eared bat	Strategy Species	Fsoc, SSC
25	Red tree vole	Strategy Species	FCa, SSV
	FISH		
26	Chinook, Coastal, Spring	ODFW Sensitive	SSC
27	Chinook, Coastal, Fall	ODFW Input	none
28	Chum, Coastal	Strategy Species	SSC
29	Coastal Cutthroat, Oregon Coast	Strategy Species	none

#	Species	Reason Included	Regulatory Status
30	Coastal Cutthroat, Willamette (Upper Willamette)	Strategy Species	none
31	Coho, Coastal	Strategy Species	FT, SSV
32	Lamprey, Western Brook	Strategy Species	Fsoc, SSV
33	Lamprey, Pacific	Strategy Species	Fsoc, SSV
34	Lamprey, River	Federal SOC	Fsoc
35	Steelhead, Coastal, Winter	Strategy Species	SSV
36	Steelhead, Coastal, Summer	Strategy Species	SSV
37	Steelhead, Willamette (Upper Willamette), Winter	Strategy Species	FT, SSV
38	Oregon Chub	Strategy Species	FT, SSC

Regulatory Status:
Fsoc – Federal Species of Concern
FCa – Federal Candidate
FPA – Forest Practices Act
FT – Federal Threatened
SSC – State Sensitive Critical
SSV – State Sensitive Vulnerable
Strategy Species are those identified in The Oregon Conservation Strategy (ODFW, 2006)
http://www.dfw.state.or.us/conservationstrategy/docs/document_pdf/Foreword.pdf

Aquatic Anchors

Rock Creek and Wolf Creek

Rock Creek and Wolf Creek watersheds are designated as Aquatic Anchors (AAs). Strategies within the AA's are intended to lower short term risk to fish and amphibians while landscape strategies foster the development of properly functioning aquatic systems and suitable habitat forest-wide and over the long-term.

Rock Creek and Wolf Creek watersheds (See map section) were selected through a collaborative effort with ODFW District Fish Biologist, State Forests Aquatic Specialist, district forester, and district staff. The main reasons for selecting these two watersheds were because coho, Chinook, and steelhead are well distributed throughout the watersheds. Also a relatively high percentage of ODF ownership means that ODF management has a higher likelihood of influencing watershed process. These watersheds have high quality aquatic habitat and meet landscape design principles described in the landscape design section of this document.

In these two Aquatic Anchors additional restrictions beyond the FMP aquatic and riparian strategies will apply. These additional restrictions include, when clearcut harvesting, establish wider no-harvest buffers along streams. For all fish streams there will be 100-ft no-harvest buffers. For small non-fish streams that are perennial, debris flow, or high energy, there will be a 50-ft no harvest buffers. Small seasonal non-fish streams do not get the extended buffers.

Another conservation strategy for Aquatic Anchors is to designate large percentages of these watersheds for growing complex structure. Watersheds with more complex forest structure are beneficial for watershed processes that influence stream flow, stream temperature, large wood recruitment and sediment routing.

Table 6: Characteristics of West Oregon Aquatic Anchors

Watershed Characteristics	Wolf Creek	Rock Creek	Upper Yaquina
Aquatic Anchor Acres	3,791acres	13,161acres	11,008 acres
Percent ODF Ownership	84%	36%	32%
Percent of ODF Ownership Designated for Complex Structure	42%	36%	44%
Fish Distribution			
Coho	5miles	20 miles	0.55miles
Steelhead	5 miles	20 miles	0.55 miles
Chinook	2 miles	1 mile	0 miles

Upper Yaquina Amphibian Emphasis Aquatic Anchor

Young Creek-Upper Yaquina (Upper Yaquina) has been designated as an Amphibian Emphasis Aquatic Anchor (Amphibian AA). For the Upper Yaquina a series of waterfalls, chutes, and steep channel segments create barriers for anadromous fish reducing the contributions to habitat for these species. Regardless, Upper Yaquina watershed is likely to provide high quality habitat for Amphibian Species of Concern.

A large percent of the Upper Yaquina Amphibian Emphasis AA has been designated for management to complex forest structure. When more of a watershed is managed for complex structure it will influence watershed processes that benefit amphibian habitat. This is particularly valuable for amphibians associated with Small Type N streams that otherwise would have narrower buffers in stands managed for simpler stand structures. Furthermore, in the Amphibian Emphasis AA we will increase no-harvest boundaries on most Small Type N streams (50’ no harvest buffers) when clearcut harvesting. These wider no-cut harvest boundaries will further reduce the potential for short term risks to amphibian habitat.

Terrestrial Anchor
Two terrestrial anchors (TAs) have been designated for the West Oregon District. These TAs are intended to provide habitat for species of concern associated with late-successional forest conditions, those that have large home ranges, and those that have limited dispersal ability. Where terrestrial anchors also occur within aquatic anchors, additional benefits to aquatic and stream-associated species are expected by maintenance of complex forest structure to promote watershed function. Terrestrial anchors were located using a variety of considerations including known use by species of concern (when available), current forest age class and stand conditions, desired future condition and distribution/location on the district. The intent is that terrestrial anchors will remain on the landscape as long as required to achieve management goals (see FMP Chapter 4 Landscape Management Strategy 2 and FMP Chapter 4 Strategies for Species of Concern).

Green Mountain Terrestrial Anchor
This TA is 1625 acres in size and is located primarily in the Upper Yaquina, with some overlap with the Siletz and Mary's River basins. Five marbled murrelet management areas and one spotted owl activity center occur within this TA. In addition, a small amount of habitat within the home range of a second spotted owl activity center occurs in the TA. This TA is located at the headwater junction of three major watersheds. These types of watershed junctions have been identified as important areas for cross-basin movement of amphibians (Olson and Burnett 2009). Thus, part of the purpose of this TA will be to provide complex structure to promote movement of amphibians between these three watersheds. 551 acres of this TA is also located within the Rock Creek aquatic anchor and 1100 acres are located within the Upper Yaquina amphibian-emphasis aquatic anchor.

Wolf Creek Terrestrial Anchor
This TA is located in the southern portion of the district, in the Big Elk basin and is 1,001 acres in size. One marbled murrelet management area is located within this TA. Most of this TA (972) acres is located within the Wolf Creek Aquatic Anchor.

Many additional species of concern may occur within both of these anchors, particularly clouded salamander, costal tailed frog, southern torrent salamander, olive-sided flycatcher, and all of the species of forested bats. Red tree voles and American marten may occur, however their presence in this portion of the Coast Range has not been confirmed.

Human Uses

Forest Management

Table 7 shows the current annual objectives of silvicultural management activities as well as the ten - year average of acres accomplished.

Table 7. Silvicultural Management Activities

Activity	Current Level[2] (Acres Per Year)	Ten-Year Average (Acres Per Year)
Regeneration Harvest[1]	197	137[4]
Partial Cut	400	727[5]
Reforestation	171	225
Precommercial Thinning	0[3]	509
Fertilization	0	0
Pruning	0[3]	16

1. Under Oregon Department of Forestry management, this refers to a regeneration harvest (clearcut, modified clearcut or retention cut) that removes most trees, but leaves specified numbers of green trees, snags, and down wood to provide structure (habitat) in the new stand.
2. Current levels are taken from the district's most recent approved annual operations plan, which is the Fiscal Year 2012 Annual Operations Plan.
3. Customary annual objectives of 200-800 acres of Pre-commercial Thinning and 0-100 acres of Pruning were deferred due to budget constraints for FY 2012. However, 670 acres of PCT were accomplished through an ARRA funded grant.
4. The ten-year average for Regeneration Harvest is reflective of the harvest objectives that have changed over the life of the IP, including 3 minor modifications. The original regeneration harvest objective under the 2001 IP was established at 100 acres/year.
5. The ten-year average for Partial Cut harvest is reflective of the harvest objectives that have changed over the life of the IP, including 3 minor modifications. The original partial cut harvest objective under the 2001 IP was established at 900 acres/year.

Roads

The district's primary road network is an established system that has been in place for about forty years. It provides access for forest management activities, fire suppression, and public travel. (Note: these roads are designed and maintained for forest management activities, so the public should use extreme care when traveling these roads). Visions, guiding principles, and goals for managing the district's road network are discussed in the *Northwest Oregon State Forests Management Plan* (January 2010) and the *Forest Roads Manual* (July 2000). The *Forest Roads Manual* also provides standards and guidance for all road management activities and definitions, road classifications and other terms. The State Forests program is nearing completion of specific guidance for conducting transportation planning. District priorities for transportation planning are described in Management Basin Descriptions under Resource Considerations and Management Opportunities. Transportation planning will be a priority for basins or blocks determined to have limited or inadequate access.

The district's total road system consists of collectors and spurs: in total 329 miles of mostly single-lane roads with turnouts. Many of the district's main roads (collectors) were originally built in the 1940s and 1950s to standards considerably less stringent than those applied today. Many of these roads were constructed with inadequate drainage systems, poor surfacing, and little regard for slope stability and fish passage. Most of these roads

have been upgraded or vacated and now have improved drainage structures, rock surfacing, width, and alignment.

Fish passable structures have been installed on nearly all streams that have been classified as fish streams. There are a few streams in the upper reaches of drainage basins that have yet to be classified as fish or non-fish where structures may need to be replaced. There are still a few roads that are a legacy from those earlier decades and need improvement, access restriction or vacating. Also, the state has very recently acquired new property. The roads and drainage structures on these newly acquired lands have not been completely inventoried. As new information is gathered about current road conditions and environmental risks, areas of concern will be identified and prioritized for repairs and road management activities.

The following table shows the approximate number of miles by road use standard:

Table 8. West Oregon District Road System

Road Classification	Miles
Mainline	0
Collector	89
Spur	240
Administrative	0
Total Miles	**329**

Although nearly 72 percent of the district's road miles are surfaced with gravel, not all surfaced roads are suitable for "all weather" haul. Surfaced roads not suitable for "all weather" haul are improved as needed for timber sale access.

The Board of Forestry has adopted performance measures for State Forests for stream crossings and hydrologic connectivity. Approximately 24 culverts and 7 bridges are installed in known fish-bearing streams allowing fish to move upstream and downstream. Another 264 culverts are installed in non-fish bearing streams. The remaining culverts on the district are either cross drains or culverts on unknown streams in the upper reaches of drainage basins, with most of these on the valley side of the drainage divide. ODF is working with ODFW to get these streams classified. Also, there are culverts acquired in a recent land exchange that have not been inventoried.

Hydrologic connectivity measures the proportion of overall road length that drains to streams versus draining to and infiltration into the forest floor. The district has disconnected many ditches from streams during the course of road maintenance activities and new culvert installations. New roads and culverts are all designed to be disconnected

from streams. There are still some disconnect opportunities on district streams with most of these being in the upper reaches of drainages on small, non-fish streams.

The type and level of road activity that will occur during the planning period is discussed in the Proposed Management Activities and Management Basins sections of this document.

Recreation

It is recognized that recreation activities provide economic value to the local community and the region. The state forests of the West Oregon District play an important role in providing a wide variety of recreational opportunities, both to local residents and to visitors from outside the counties where they are located. In addition, these forests offer an opportunity to link the public to natural resource management.

Recreation Goals

The following are the primary goals for recreation on the West Oregon District:

1. Provide the citizens of Oregon with a place to have fun in a forested environment.
2. Provide diverse forest recreation opportunities that supplement, rather than duplicate, opportunities available in the region.
3. Manage recreational use of the forests to minimize adverse impacts to other resources and adjacent ownerships.
4. Minimize conflict among user groups.
5. Maintain compatibility with Oregon's Statewide Planning Goal 8 (Recreational Needs).

Traditionally recreation uses on the forest have included dispersed hunting, fishing, camping, and off-highway vehicle use primarily by local citizens, many of whom value the freedom of unregulated settings. The demographics of users have changed over time as additional people discover what this district has to offer. All of these changes have resulted in a much more complex recreation management program than what existed when the original plan was created.

Recreation Resources

Current recreation activities on the district consist mostly of dispersed camping, sightseeing, hiking, hunting, and fishing. However, there are four sites that do receive some level of consistent visitor use during certain periods of the year.

Big Elk Creek Campsite is located in the Big Elk Creek Management Basin and has three undeveloped camp sites along the stream that are used primarily during the summer months. Surfaced roads access two of the sites. The remaining campsite is accessed by an unsurfaced road, which is currently blocked to vehicle traffic. The two campsites that are accessed by all-weather roads can be utilized year round. These campsites are occupied most weekends from June through August.

Baber Meadows is located in the Big Elk Creek Management Basin adjacent to Bear Creek. District personnel have worked closely with Mt. Baber ATV club members to develop the meadow for an off-highway vehicle staging area. Access roads and parking areas have been recently surfaced. A restroom has been installed and overnight camp sites have been developed. Camping takes place primarily during the summer months and hunting season in the fall. The meadow functions as a staging area for ATV riders and is the beginning and eventual ending point of a loop trail system. The Department of Forestry will continue working with the Mt. Baber ATV Club to further develop the recreation potential of this site.

Yaquina Falls is located in the Upper Yaquina River Management Basin and is a series of natural waterfalls. Recreation use for the falls is primarily hiking and sightseeing, but includes fishing as well. There is no developed trail system that adequately accesses the falls. Visitor use is year round, but mostly concentrated during the summer months.

Black Rock is a parcel of land that is used for a number of recreational activities and is located in the Luckiamute River Management Basin. Camp Tapawingo is a church camp adjacent to Black Rock, and camp visitors use existing roads and trails on state forest land for hiking. There is increasing use of the area by mountain bike riders. District personnel are working with the Black Rock Mountain Bike Association, to maintain and manage the trail system.

The Role of State Forests as a Recreation Provider

State Forests use an integrated approach to forest management that seeks to achieve a broad range of resource goals and provide a balance of social, economic and environmental benefits over time. With the development of a variety of stand types through active management, the local and regional economies will benefit from opportunities for recreational hunting as well as wildlife viewing. Recreational fisheries will also be enhanced by aquatic and riparian strategies that maintain and restore properly functioning habitats for salmonids and other native fish and aquatic life.

Existing forest recreation opportunities on the West Oregon District are diverse. Many existing recreational uses such as angling, hunting horseback riding and off-road vehicle use are highly compatible with active forest management and have co-existed with these activities for decades. These activities as well as hiking and mountain biking will continue to be provided as available funding and resources allow.

For more information on specific recreation opportunities refer to the **Proposed Management Activities — Recreation section.**

Scenic

Highway 20, designated as a scenic highway by the Forest Practices Act, is considered one of the main travel corridors between the Willamette Valley and the Oregon coast. This

highway runs through the middle of the district. However, only a small portion of state forest lands are visible from this highway.

Portions of the district are also adjacent to a number of rural residences and the county roads that access them. About 2 percent of the state forest land is in close proximity to these areas.

Much of the district is visible from the US Forest Service recreation site on Marys Peak. State forest lands viewed from Marys Peak are south and east-facing slopes, seen at a distance of about 5 to 20 miles. From Highway 20, the rural residences, and Marys Peak, the visible state forest lands are adjacent to and intermixed with those of many other landowners.

The district will perform its management in areas of visual sensitivity in accordance with the Scenic Resource Strategies outlined in the FMP.

Cultural Resources

Cultural resources are scattered throughout the forest, mostly from the early logging and homesteading that took place on the West Oregon District. Cultural resources are defined as any human-created sites, structures, or objects that are of historical significance to the local area, region, state, or nation, in providing information and education of ethnic, religious, or social groups, activities, or places.

The *Archeological Resource Inventory and Assessment for the West Oregon District* (Heritage Research Associates Report No.332) provides the first inventory of cultural resources on the West Oregon District. This inventory was completed in June of 2009 and it provides a foundation of information the district can use in management planning.

Forest Stand Types—Current Condition

The current stand condition is displayed in the graphs that follow, and on a map in the Map Section. Figure 1 shows the current stand structure, acreage, and percentage, using the structure-based management definitions for structure types. The stand structure abbreviations are given below.

In order to determine the current condition of the stand structure array on the district, an algorithm in the Stand Level Inventory (SLI) was used. The algorithm uses a variety of stand characteristics such as diameter, heights, trees per acre, density, snags, down wood and understory vegetation to determine stand structures.

Currently 49 percent of the stands on the West Oregon District have been inventoried. Information for unmeasured stands is generated by imputation. Imputation uses specific information from a single measured stand to represent similar unmeasured stands.

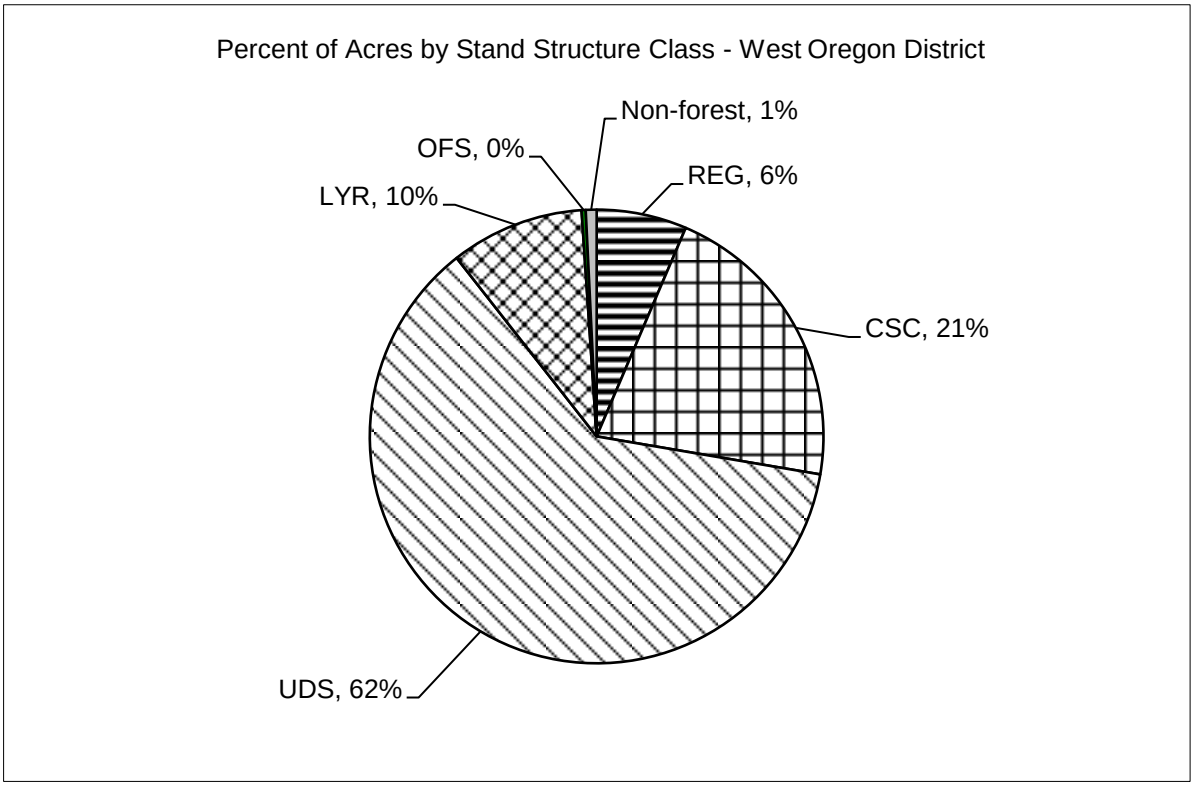
In order to correct any errors from imputed data, all silvicultural prescriptions will be based on actual field reconnaissance during pre-operational analysis and planning, rather than just SLI data.

Figure 2 shows the current age distribution of the forest, regardless of structure, by percentage of acres.

Abbreviations for Forest Stand Structure Types

REG	Regeneration
CSC	Closed Single Canopy
UDS	Understory
LYR	Layered
OFS	Older Forest Structure
NSC	Non-Silviculturally Capable

Figure 1. Current Stand Structure, by Percent[1]

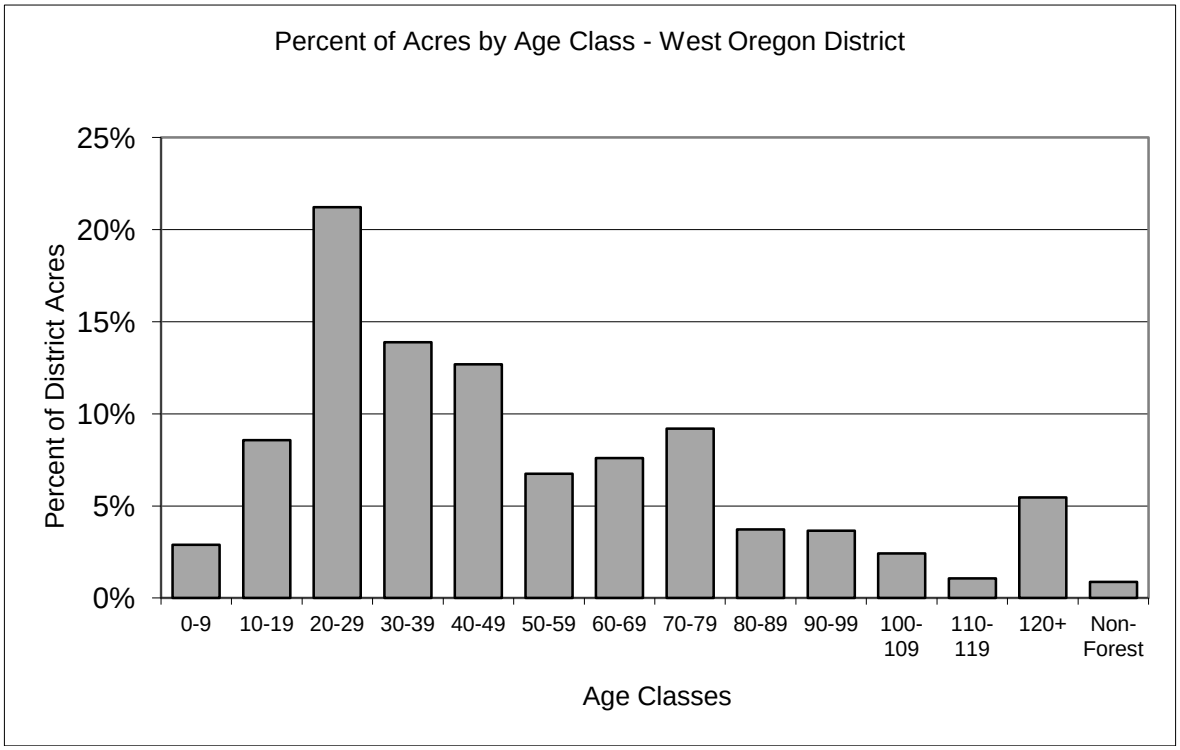


1. Based on 2009 SLI data

Note: Non-forest (NF) lands are those areas, greater than 5 acres that are maintained in a permanently non forest condition. Examples include district offices and large power line right-of-ways.

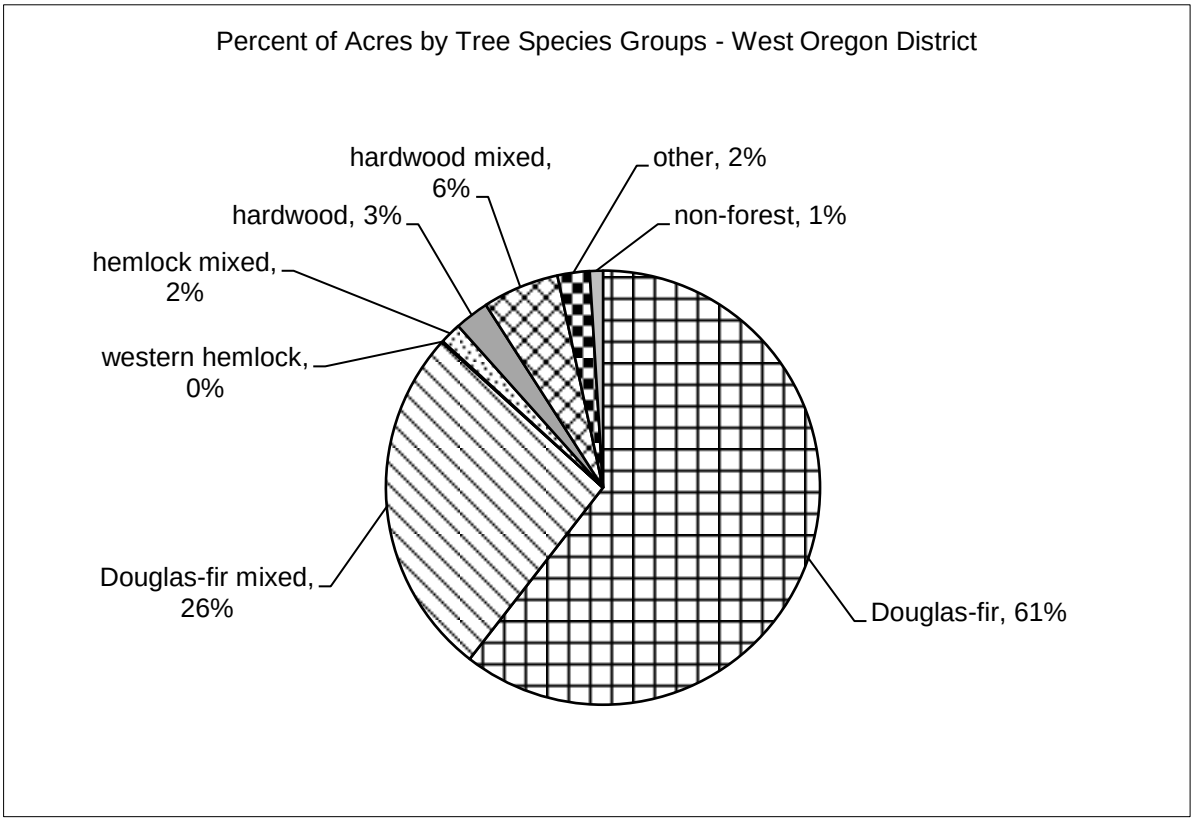
The district's largest stand structure class is UDS. The most limited stand structure class on the district is OFS. Partial cutting will be the main tool used to move stands into a more complex structure class on the district. Snags and down wood may need to be added to layered stands to help them cross over to the older forest structure classification. More details can be found in the **Management Activities in Each Stand Class** section of this plan.

Figure 2. Stand Age Distribution, by Percentage of acres



The age class distribution of the West Oregon District is the result of past harvest activities. Thinning as a stand management tool within the district started in the 1980's with a very minor amount of acreage accomplished each year. By 1992, the amount of acreage targeted for thinning increased. The younger age classes are the result of regeneration harvests.

Figure 3. Tree Species, by Percentage of Acres



In Figure 3, single species stands are defined as having more than 80 percent of the basal area in the listed species. Mixed species stands are defined as having more than one species present, but the listed species is the predominate species by basal area and comprises at least 20 percent of the basal area. The mixed species stands are found mainly in the northern one third of the district and along the coastal areas, while the southern two thirds of the district consist mostly of Douglas-fir stands.

Management Activities

Current Condition Analysis

Stand Structures Interaction

The Current Condition Analysis and the Landscape Design sections of this Implementation Plan describe the amount of each of the identified forest stand types. As described in the *Northwest Oregon State Forests Management Plan* (April 2010), the stand types represent only five points along a continuum of forest development. Five "stand" types were developed as a means to plan for and assess the development of the forest toward a range of "forest" types over time. Because the five types are only points along a continuum they do not express five specific habitat types nor are they perceived as discrete habitats by wildlife species. This is discussed in detail in Appendix C of the *Northwest Oregon State Forests Management Plan* (April 2010).

As you think about the current condition and desired future condition descriptions as they relate to wildlife habitat keep in mind the following concepts and refer to Appendix C in the *Northwest Oregon State Forests Management Plan* (April 2010) for more detail.

Thus, as you examine the current and desired future conditions described by the stand types, it is important to think about combinations and aggregations of different stand types that function together to provide the benefits for wildlife use.

For example, when thinking about the amount of mature forest habitat that will be provided by the anticipated future array of layered and older forest structure stands – also consider the role of understory and closed single canopy stands. The desired future condition was developed to provide a blueprint of a desirable array for the development of the percentage of layered and older forest structure stand types and non-complex stand types in the future if natural disturbances allow and management assumptions come to fruition. These stand types will be complemented by adjacent understory and large diameter closed single canopy stands to provide habitat patches that represent mature forests to wildlife species. The result being significantly more acres of mature forest habitat available for wildlife than any single stand type represents.

The entire array of all stand types has not been depicted because it is virtually impossible to predict how each stand on the landscape will develop over the next several decades. By focusing on where we anticipate the development of layered and older forest structure stands, it provides the local manager with the blueprint for the management prescriptions necessary to move the landscape in the desired direction. Future adjustments will undoubtedly have to be made as natural disturbances, insects and disease, or other factors result in some stands not developing in accordance with management plans.

Regeneration

The regeneration (REG) structure comprises 6 percent of the district. This structure is primarily characterized by young (less than or equal to 18 years) even-aged stands of conifer or hardwood seedlings and saplings. This structure type has evolved as management strategies and techniques have evolved. Presently, it is not uncommon to find mature live trees, snags, and down wood intermixed throughout this structure. This structure type is widely used by big game animals for foraging habitat.

Closed Single Canopy

The closed single canopy (CSC) structure makes up 21 percent of the district. This structure is characterized by the closed crowns of the overstory trees, which prevent light from reaching most of the forest floor. This low light level precludes the introduction of both brush and trees in the understory, thus leaving the forest floor sparsely vegetated. Of all the structure types, this type is the least used by wildlife species, especially species requiring more complex habitats.

The abundance of CSC on the district can be attributed mainly to the highly successful reforestation efforts following harvesting conducted in the 1970's through 1990's. Closed single canopy stands are found in every basin and vary in age from 18 to 70 years.

Understory

The understory (UDS) stand structure, which accounts for 62 percent of the district, is the most common stand structure. This structure occurs where normal tree mortality, previous density management (precommercial thinning, partial cutting), poor stocking, Swiss Needle Cast disease, root disease, or a combination of these factors have prevented the overstory canopy from fully closing. As a result, an understory of herbs, shrubs, and small trees has developed. Large, healthy conifer or hardwood trees (or a combination of both) with large crowns typically characterize the overstory.

On this district, previous partial cutting contributes greatly to the presence of this structure. In stands managed through partial cutting, tree densities have been reduced enough to allow for understory vegetation development. The residual trees have increased growth in girth and crown size. In most cases, this structure provides better wildlife habitat, provides more recreation opportunities, is more scenic, provides better tree growth, and maintains forest health better than the CSC stand structure.

Many stands in the north and east portions of the district contain Phellinus weirii, a root rot that contributes to the UDS structure type development. These infected stands are characterized by the presence of pockets of dead trees, resulting in a brush understory, surrounded by the surviving forest canopy.

Layered

The layered structure (LYR) comprises 10 percent of the district. It is characterized by vertical layering of tree crowns, shrubs and herbs. On this district, most LYR stands

consist of an overstory of large Douglas-fir with an understory of hardwood and shrubs and a few shade tolerant conifer. Previous partial cut harvests have been geared toward putting CSC and UDS stands on a pathway to becoming LYR structure. The district will continue to work at developing this stand structure.

Older Forest Structure

Currently, older forest structure (OFS) is significantly below the desired target percentage. This structure comprises less than 1 percent of the district. OFS stands contain all of the components of the LYR structure, but additionally contain large overstory trees and an abundance of snags and downed wood. Presently multiple LYR structure stands on the district are only missing the snag and down wood components of OFS.

Hardwoods

Although hardwood stands are not a stand structure type, as defined in the *Northwest Oregon State Forests Management Plan*, they do play an important role in the mix of stand structures across the landscape. Hardwoods on the West Oregon District are found as nearly pure stands (up to 40 or 50 acres); as a major component in conifer stands; as small patches within conifer stands; as the dominant species in riparian areas; or as a second canopy layer in some conifer stands. Although hardwood trees occur in a wide variety of stand types, densities, and compositions, a hardwood stand is defined as a stand where hardwood are the predominate species by basal area and comprise at least 20% of the basal area. The most common hardwood species on the district are red alder, bigleaf maple and bitter cherry.

Hardwoods contribute to diversity in the forest structure in two ways. The small stands or patches of pure hardwoods provide for vegetative diversity in the conifer-dominated landscape. Hardwoods also play an important role in the development of layered stands by providing vertical diversity in conifer-dominated stands.

Approximately 3,031 acres of state forest lands meet the preceding definition of a hardwood stand, of which 99 percent have been classified as UDS and less than 1 percent as REG, CSC or LYR.

The importance of hardwood stands on the landscape has only recently been recognized, and therefore the management of hardwoods is still evolving. The district will maintain a component of hardwoods, in both pure and mixed stands, through a variety of silvicultural techniques (discussed in the **Management Activities in Each Type** section).

Non-Silviculturally Capable and Non-Forest Types

Less than 1 percent of the district is classified as Non-Silviculturally Capable (NSC) and Non-Forest (NF) types. The NSC areas are located on 3 sites: an estuary, a meadow with very shallow soils, and a forested area on a very poor site. The NF areas include such areas as progeny sites, power line corridors, and cell towers/communication sites.

NSC forest lands are defined in administrative rule OAR 629-35-0040 as not capable of annual wood production of 20 cubic feet per acre at culmination of mean annual increment. However, these lands do provide unique and significant habitat contributions to the district landscape. NSC lands are characterized by geologic and hydrologic conditions unsuitable for the commercial growth and harvest of forest tree species. Geologic conditions include rock cliffs, talus slopes, rock slopes and outcroppings, and other substrate conditions incapable of supporting forest tree species. Hydrologic conditions include floodplains, marshes, beaver ponds, and other aquatic conditions that prevent the growth of forest tree species. These lands provide for plant and animal communities not associated with the other forest structures.

NF lands are silviculturally capable areas, greater than 5 acres that are either maintained in a permanently non-forest condition or are off-limits to harvest due to genetic tracking.

NSC and NF areas are not considered part of the commercial forest land base and will not be managed for the growth and harvest of forest tree species.

Management Activities in Each Stand Type

This section describes the various management activities and the effects of management for each structure type.

Regeneration Stands

Management practices will be applied to these young stands in order to quickly re-establish tree cover and maintain tree growth, while providing big game forage and wildlife habitat. These stands have the potential to move through all of the stand structures toward OFS, depending on current and future landscape designs. All current and future regeneration harvests are designed to retain some live green trees, snags, and down wood. These structural components in the young plantation will contribute to the proper habitat function of REG stands throughout their growth and development.

Reforestation

Reforestation promptly follows all regeneration harvests and patch-cut harvests where at least one-quarter acre has been removed. Site-specific conditions determine species composition, stock type, and stocking levels. A variety of conifer species are planted during reforestation, including Douglas-fir, western hemlock, western red cedar, and Sitka spruce. Red alder is sometimes planted in areas that contain root rot disease that is harmful to conifer species. Tree planting, site preparation, vegetation management, and tree protection activities are important for successful stand establishment and maintenance. Site-specific prescriptions may include slash piling, prescribed burning, herbicide treatments, manual release, and tubing (of seedlings to protect them from animal damage).

Pre-commercial Thinning

Pre-commercial thinning (PCT) is an important density management practice in young, dense stands. PCT generally occurs in stands between 13 and 17 years old and removes small or defective trees, in order to provide more water, light, and nutrients to increase the growth of the healthy residual trees. In addition, PCT delays the canopy from closing, thus preserving the growth of herbaceous vegetation required by big game; and provides an opportunity to maintain species diversity in the plantation through tree selection.

Pruning

Pruning removes the limbs on the lower 9 to 24 feet of the tree bole. It is conducted to improve wood quality or to prevent certain diseases. Currently, only white pines are pruned to prevent infection from white pine blister rust. In the past, Douglas-fir has been pruned to increase wood quality, with the added benefit of reducing bear damage; however, it has not been found to be a cost effective investment for State Forests. An additional benefit of pruning is that it helps post-pone the CSC condition, thus retaining big game forage for a longer period of time.

Closed Single Canopy Stands

Fertilization

No stand fertilization is planned during this Implementation Plan period, because it would not be a cost effective investment considering the silvicultural prescriptions that are anticipated under this IP.

Partial Cut

Past management experience has found that most CSC stands respond well to partial cutting. Not only do the residual trees grow faster, but also complex structures and diverse habitats develop more rapidly, with the creation of snags and down wood, and the introduction of a shade-tolerant shrub and conifer understory (such as western hemlock, western red cedar, vine maple). Partial cutting improves forest health by increasing stand vigor and lowering susceptibility to damage from insects, disease, and windthrow, etc. Partial cutting also produces timber, revenue, and enhancements to other resources, including scenic and wildlife resources. Therefore, the majority of current CSC stands will be partial cut, to help these stands develop into the UDS structure.

In planted stands, the first partial cut occurs sometime between age 25 and 35 years. A second thinning usually is conducted around 15 years later. Partial cuts in CSC natural stands will contain a variety of ages, sizes, and stand densities.

Partial cuts in areas with a DFC of general will have a silvicultural thinning prescription that reduces stocking enough to increase or maintain individual tree growth. Trees are left evenly spaced over the stand. The goal is to produce high quality, high volume stands at final harvest.

Underplanting/Patch Cutting

In areas with a DFC of complex, stands may receive a similar prescription to the one mentioned above, or the stand may be thinned heavier to allow understory re-initiation (i.e. establishment of a second layer of trees), either natural or planted. In addition, small patch cuts (from 1-5 acres in size) may be introduced and replanted. Both underplanting and patch cut planting is done with shade tolerant conifer or hardwood. The goal here is to increase diversity and put the stands on a pathway towards a complex structure. Underplanting and patch cutting will occur only on sites well suited for these activities and only if funding is available.

Clearcut Harvests

Clearcut harvest in CSC structure will generally be limited to severely infected Swiss Needle Cast (SNC) stands, severely overstocked stands, or other stands with disease issues or environmental damage.

SNC disease has severely stunted the growth of Douglas-fir in some plantations on the west portion of the district. Stands with moderate to severe infection generally do not benefit from partial cutting. Therefore, the best management strategy appears to be removal of the Douglas-fir and replacement with disease resistant species. Moderately infected stands will be monitored and considered for clearcut if SNC increases in severity. A few clearcuts may also result from the treatment of laminated root rot. These operations will be followed with planting resistant species. Clearcut harvest in severely overstocked CSC stands will be conducted if the stands are determined to be poor candidates for developing layered or older forest structure or where thinning will leave residual trees with poor height-to-diameter ratios.

Snags and down wood will be created when clear cutting CSC stands; however, the amounts created will depend on site-specific conditions, including tree size, number of existing snags, and the amount and condition of the down wood.

In hardwood stands, particularly those with very few or small conifer trees, it will be necessary to meet the residual live tree, snag, and down wood goals using hardwood trees and logs. Although hardwood snags and down wood do provide short-term wildlife habitat and some other ecosystem needs, they do not persist long enough to provide the legacy necessary to achieve older forest structure. On these sites with very low conifer stocking, the district will develop site-specific prescriptions, which may include lower targets of residual trees, snags, and down wood, in order to meet the overall long term goals of the *Northwest Oregon State Forests Management Plan*.

Understory Stands

Partial Cut Harvests

Partial cut harvests in UDS stands are intended to reduce the canopy density, while maintaining and encouraging the development of an understory component or complexity in stands designated as DFC complex. Some of these stands occurred naturally, while

others are the result of previous partial cut operations. Snags and down woody material may be created during these stand entries dependant on site specific conditions.

Partial cuts in areas with a DFC of general will have a silvicultural thinning prescription that reduces stocking enough to increase or maintain individual tree growth. Trees are left evenly spaced over the stand. The goal is to produce high quality, high volume stands at final harvest.

Underplanting/Patch cutting

In areas with a DFC of complex, stands may receive a similar prescription to the one mentioned above, or the stand may be thinned heavier to allow the existing understory to continue to grow. If the understory contains mainly brush, an understory of conifer may be planted. In addition, small patch cuts (from 1-5 acres in size) may be introduced and replanted. Both underplanting and patch cut planting is done with shade tolerant conifer or hardwood. The goal here is to increase diversity and put the stands on a pathway towards a complex structure. Underplanting and patch cutting will occur only on sites well suited for these activities.

The ability to reforest underplant areas and patch cuts often depends on funding.

Clearcut Harvest

Most clearcut harvests conducted under this IP will be in understory stands predominately in areas of DFC general. In DFC complex areas, some clearcutting may occur in understory stands that will not easily develop the complexity needed for LYR stands or in cases of disease or severe environmental damage.

UDS stands that are poor candidates to develop into LYR or OFS typically consist of overstory Douglas-fir, with an understory of dense shrub cover such as vine maple, hazel, or salal. Due to the height of the existing tree canopy and the difficulty in establishing seedlings in the thick understory vegetation, it is extremely difficult to develop these stands into LYR and OFS.

Occasionally UDS stands are clearcut because *Phellinus weirii* infection is so severe.

Snags and down wood may be created during these stand entries.

Layered Stands

Partial Cut Harvests

Partial cut harvests in LYR stands are intended to reduce the canopy density, while maintaining and encouraging further development of LYR and OFS components such as large overstory trees and understory vegetation layering. Some of these stands occurred naturally, while others are the result of previous partial cut operations. Snags and down wood will be created during these stand entries if needed. Where a LYR stand has the potential of achieving OFS structure, by the addition of a few snags and some down wood, and a commercial harvest operation is not necessary or viable the district will consider

creating these structure components through another means, depending on funding availability.

Clearcut Harvests

Some stands classified as LYR may be considered for clearcut harvest if they are not in an area designated to become complex structure. Clearcutting will result in a REG stand of vigorously growing trees, with some live green trees, snags, and down wood remaining from the previous stand.

Older Forest Structure Stands

It is expected that OFS stands will remain in the old forest condition until a disturbance moves all or part of them to a more simple condition.

Partial Cut Harvests

OFS stands will likely be left unmanaged during this planning period. However, it is possible that a dense stand of OFS could be partial cut to promote increased overstory tree diameter growth and understory tree response. This would also be an opportunity to create additional hard snags and large down wood within the stand.

Clearcut Harvests

Because there are so few stands that are currently in OFS, no clearcuts are planned in OFS stands during this implementation plan period.

Proposed Management Activities

This section describes the management activities that will be accomplished starting in Fiscal Year 2013.

All management activities will be designed consistent with FMP strategies (Chapter 4 in the FMP) for the conservation of resources including those related to slope stability, cultural, scenic resources, and plants .

Harvesting

The Annual Harvest Objects (AHO) in Table 9 identifies the sustainable and predictable production of timber (forest products) from the district, and the harvest activities "for the ten-year period that will be necessary to move toward the desired future condition" (NW FMP page 5-4). The AHO is determined through the District Opportunity Analysis described in Appendix A. The Opportunity Analysis establishes 12 MMBF as the sustainable volume that can be produced to meet the goals of the Northwest Oregon State Forest Management Plan as applied through this Implementation Plan. The acre ranges for regeneration harvest and partial cut harvest describe the types of harvest activities that will

occur over time to achieve the volume objective and desired future condition of stand structures.

The AHOs will be implemented through the district's Annual Operations Plan. The objective is to achieve the average of the AHO over the expected 10 year planning horizon for the Implementation Plan. Under normal circumstances, the volume proposed in an Annual Operations Plan will be near the AHO target; however, unforeseen, events may result in an Annual Operations Plan volume that is farther from the AHO target. Unforeseen events may consist of, but are not limited to, catastrophic windstorm, fire, or poor market conditions. For example, catastrophic events may lead to emergency salvage operations that result in harvesting above of the AHO, or poor market conditions preclude meeting AHO volume. When unforeseen factors for one district preclude achieving AHO objectives, the State Forester may re-direct annual harvest levels to another district. The Annual Operations Plan will describe how the volume relates to the AHO volume identified in the Implementation Plan.

The acres of regeneration harvesting and partial cutting proposed in each Annual Operations Plan will normally be within the ranges identified in Table 9, but the mixture of acres will vary from year to year based on the stands selected for harvest, their current condition, desired future condition, and the silvicultural prescription used to move the stand from its current to its future condition. Numerous factors apply to the stand selection process and their relative importance may change from year to year and from basin to basin. Factors that affect the stand selection process include the overall objectives indentified in this Implementation Plan, recent harvest activity in the basin, results of threatened and endangered species surveys, condition of the transportation system, and current market conditions.

If changed conditions, new information, or different strategies indicate a significant shift in the AHO is necessary; this Implementation Plan will be revised.

Table 9. Annual Partial Cut and Regeneration Harvest Objectives, by Volume and Acres

Volume (MMBF)	Regeneration Harvest Acres	Partial Cut Harvest Acres
12	100 - 280[2,3]	200 - 1000[1,3]

1. Patch cuts less than five acres will count toward the annual partial cut objective.
2. For this 10-year planning period, stands currently identified as OFS will not be considered for regeneration harvest.
3. The large range of partial cut and regeneration harvest acres is due to several factors. The number of acres harvested to meet the volume target for the district depends on the volume per acre of the stands. If high volume stands are being harvested, less acres will need to be cut to meet the volume target. If lower volume stands are being harvested, then more acres will need to be cut to meet the volume target. The large acreage range also gives the district flexibility to respond to natural disturbances, stand conditions and market conditions. For instance, if a significant wind event occurred, the district would have the flexibility to have higher regeneration harvest acres to respond to those situations if needed. In

good market conditions, partial cutting acres may be higher. In low market conditions, regeneration harvest acres may be higher.

See **Appendix A** for additional information on the rationale and method applied to determine the proposed silvicultural activities in Table 9 above.

Structure Outputs

The harvest levels proposed in this implementation plan will contribute toward the desired future structure targets as outlined in Table 15, **Information Summary for all Management Basins**. Table 10 shows an estimate of desired future structure targets at the end of this implementation planning period.

Partial cutting will be the primary silvicultural stand management activity to advance stands toward the next level of structural complexity. More complex structures will not be achieved immediately following a partial cut. Partial cutting in both younger and older stands will progress CSC and UDS stand structures toward the more complex LYR stand structure. Some younger stands will receive multiple partial cut entries to develop the components of a LYR stand. Some LYR stands may require an additional partial cut entry to hasten the development of OFS characteristics (larger diameter trees, higher snag densities, and greater down wood levels, etc.). For the 10-year planning period, stands currently in OFS will be retained to function as complex structure on the landscape.

Partial Cut Harvest and Structural Components

During the planning process, partial cuts will be evaluated at the stand and basin level for the need/opportunity to add structural components. Some snags may need to be created in older partial cuts that are lacking in hard snags. Structural components in younger partial cuts will be addressed at the next silvicultural decision point. This delay in snag creation in younger partial cuts will provide for the creation of larger diameter snags in the future. While there is no specific down wood target for partial cuts, it is expected that the recruitment of down wood will be continuous through natural processes and management activities for those stands progressing towards complex stand structures. An estimated 200 cubic feet per acre of down wood will be added during older partial cut operations as a result of residual slash from harvesting operations. In addition, these stands will be monitored over time to ensure that recruitment of down wood is taking place through natural processes.

Regeneration Harvest and Structural Components

For regeneration harvest units, snag creation will be considered based on existing snag presence. Down wood will be added at the time of harvesting by leaving cull logs and slash, and if necessary, by creating down wood. The down wood target for regeneration harvests is 600 to 900 cubic feet per acre in decay class 1and 2. In conifer stands where down wood is severely lacking, 1 to 2 trees per acre may be left in addition to the 5 green trees per acre target. These additional trees may be felled immediately after harvest or left standing for the purpose of recruitment by natural means over time (e.g., windthrow).

Table 10. Anticipated Stand Structure Development by 2022

	REG	CSC[2,3]	UDS[3,4]	LYR[4]	OFS
Current Condition[5]	6	21	62	10	0
After Implementation Plan Period[1]	12	10	64	12	1
Desired Future Condition	←	68	→	16	15

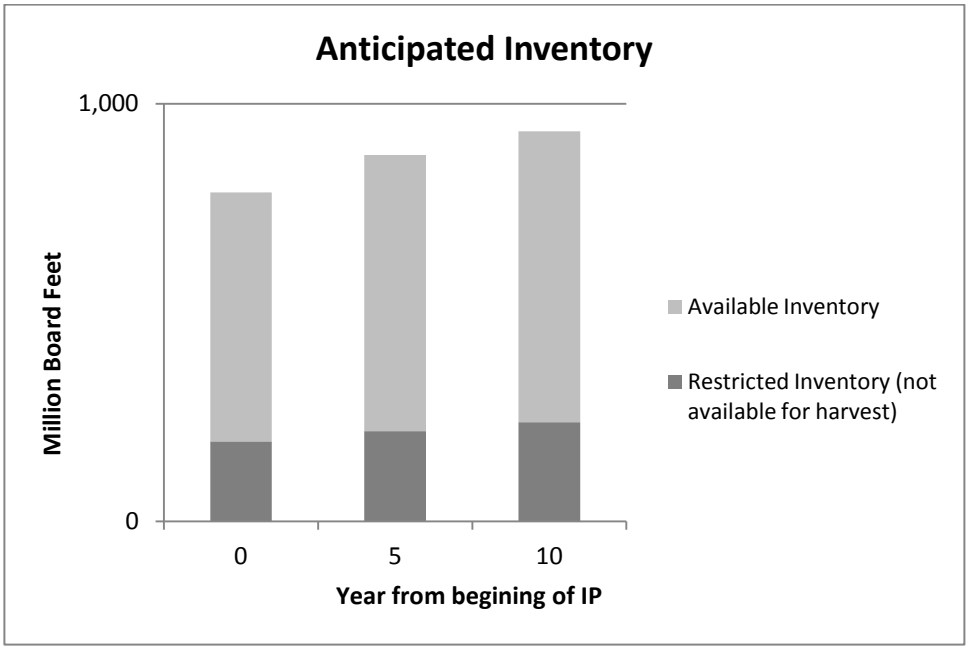
1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop UDS or LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment and development of trees greater than 32 inches in diameter.
5. The percentage for all stand structures does not equal 100% because 1% of the district is designated as Non-Silviculturally Capable or Non-Forest.

Figure 4 shows the anticipated inventory on the district at three points during this IP (current inventory [year 0], inventory half-way through the IP [year 5], and inventory at the end of the IP [year 10]). The total inventory is increasing over 10 years of this IP, even with the increase in annual harvest from 10 MMBF per year to 12 MMBF. The increase in volume can be attributed to two things:
A large segment of the district is composed of plantations that are rapidly accumulating volume;

- Additional complex structure is being developed on the district and since complex stands typically carry more volume per acre than the simple stands, that total volume on the district is increase.

This figure shows that the harvest levels are sustainable over the short term. These harvest levels are also sustainable over the long term; a full discussion of the long term sustainability of these harvest levels can be found in Appendix A.

Figure 4. Anticipated Inventory



1. The volume in this chart is based on the outputs of the harvest model used to inform this implementation plan. These figures are estimates intended to demonstrate the volume trend under this implementation plan rather than absolute values.
2. Restricted Inventory are those areas that not available for harvest and includes Inner Riparian Zone, designated NSO areas (40 percent of the provincial circle), Marbled Murrelet Management Areas, Administrative Sites, high landslide hazard locations that are a risk to public safety, and some other non-harvestable sites.

Reforestation and Young Stand Management

Table 11 below lists silvicultural activities for the West Oregon District for fiscal 2013 to 2022.

Table 11. Annual Silvicultural Activities Starting in Fiscal Year 2013

Activity	Estimated Annual Acreages
Site Preparation	200 - 800 acres[1]
Reforestation	200 - 400 acres[2]
Animal Damage Control	200 - 500 acres[3,5]
Release	0 – 600 acres[4,5]
Precommercial Thinning	0 – 800 acres[5]
Pruning	0 – 50 acres[5]

1. Site preparation may include one or more of the following occurring on the same acreage: machine slash piling, pile burning, broadcast burning, or vegetation control with herbicides.

2. Reforestation acres may be different than regeneration harvest acres because they do not relate directly to the regeneration harvest acres for that fiscal year. There may be additional acres due to units being held over for site preparation or units being harvested in the first year of their contract period. Partial cut areas with underplanting or patchcut planting will contribute to reforestation acres.
3. Animal damage control work may include one or more of the following conducted on the same acreage: mountain beaver or other rodent trapping, tree tubing, or repellent application.
4. Release work may include vegetation control using herbicides or hand or power tools.
5. The acres shown represent a range dependent on annual workloads and budget levels. In years of low fiscal budget levels, these estimates could fall to zero.

Roads

Guidance for achieving the desired condition will come from the *Forest Roads Manual* (ODF, July 2000).

Potential Road Activities

To accomplish the district's silvicultural objectives, it is estimated that between 30 and 50 miles of new road construction and between 20 and 50 miles of road improvement will be necessary over the entire district during the planning period. Road construction and improvement identified in this plan will be primarily achieved through project work connected with timber sales. Additional details can be found in the **Management Basins** section of this document. Roads will be maintained as necessary to protect water quality and the road system asset value. Stream crossing structures associated with roads are addressed in the Aquatic Resources: Habitat Restoration section.

Roads will be maintained as necessary to protect water quality and the road system asset value. Road maintenance activities will follow the maintenance guidance in Chapter 7 of the Forest Roads Manual and the Forest Practices rules. Road maintenance is accomplished under timber sale contracts for roads used for hauling forest products, and using the district road crew for all other roads. Maintenance is focused on ensuring proper drainage to prevent sediment entering streams. After this, roads are graded to allow efficient forest management and where needed, recreation. Collector roads and roads in active sale areas need and get the most maintenance. District personnel respond to heavy storms and thaw periods by road inspections, additional maintenance, and where necessary stopping heavy truck use during periods when roads cannot handle traffic without damage to water quality or the road asset.

No new mainline roads will be required. Approximately 90 percent of the roads to be constructed will be single spur roads within timber sale areas. These spurs will be narrow and have lengths between 0.1 and 1.0 miles. Collectors that connect these sale areas to the mainline system make up the remaining 10 percent, and in most cases, will access other future timber sales. Many of these same roads will be used for numerous management activities over the next several decades.

Table 12 summarizes proposed road activities on the West Oregon District.

Table 12. Average Yearly Road Activities for the West Oregon District for fiscal 2013 to 2022.

Activity	Estimated Annual Mileage
New Construction	1.0 miles rocked road; 3.0 miles dirt road
Road Improvement	3.5 miles
Road Vacating	0.1 miles

Recreation

Primary funding for forest recreation is dependent upon timber sale revenues. While current funding levels are low for the recreation program, this IP looks at opportunities beyond the immediate fiscal situation. This includes grants and partnerships with user groups. Based on a regional recreation assessment, ODF recognizes that the demand for forest recreation is generally increasing. In alignment with policies and available funds we will strive to contribute to meeting these increased demands.

The opportunities listed below are known projects the district would like to pursue. They are considered to be realistic opportunities that could be completed or addressed in the next ten years. They are described in two categories, motorized, and non-motorized. Activities are not listed in any priority and as always new opportunities can be suggested through public comment, the State Forests Advisory Committee, and user groups or a Recreation Advisory Committee if one is formed (The West Oregon District does not currently have a recreation advisory committee).

Recreation Management Objectives

Objective #1- Integrate recreation opportunities with active forest management. Key considerations include timber harvesting, transportation system management, fire protection, wildlife, and adjacent landowners.

Objective #2- Informing and educating district recreational users of the forest about recreation opportunities, safety, rules, and a general orientation to the forest.

Objective #3- Enforce statutes and rules governing recreation use of state land.

Objective #4- Develop and maintain recreational facilities in compliance with the Facilities Standards Manual.

Designation of Activity Zones

The designation of activity zones is a method commonly used to allocate recreational use, facilities, and settings throughout a working forest. The goal for activity zone designations

is to minimize resource impacts, reduce conflicts between different users, and to strive to accommodate recreation demands.

To this point the West Oregon District has not designated any activity zones. If it becomes evident that designating zones will improve the protection of resources and/or delivery of recreation services, the District will consider designating activity zones during this Implementation Plan period and update this section of the IP through a minor modification.

Motorized Recreation Opportunities

The following is an array of likely opportunities that will be considered or pursued during this implementation plan:

- Development of "Spring Branch" campground near the Mt Baber Staging Area.
- Construct or re-route OHV trail between Salmon Creek Staging Area and the existing Mt Baber ATV club's trail system.
- Development of an OHV trails inventory and comprehensive trails plan.

Non-Motorized Recreation Opportunities

The following is an array of likely opportunities that will be considered or pursued during this implementation plan:

- Seasonal road closures to improve quality of hunting experience and escapement for animals.
- Identify/develop alternate parking area accessing Black Rock mountain bike trail system.
- Explore and potentially establish a trail system into Upper Yaquina Falls.
- Designation of high use dispersed camp sites.

Managers will apply the following general approaches when developing facilities for recreation:

Designated Dispersed Campsites

Designated dispersed campsites are typically areas of historic or high use located across the West Oregon District. Campers are required to adhere to the Oregon Department of Forestry regulations regarding placement of campsites, campfires, sanitation, and stay limits. During the regulated use portion of fires season, campfires are only permitted in the "Designated Dispersed" campsites. There are currently no "Designated Dispersed" campsites on the West Oregon District.

Staging Areas

A staging area is a facility for accommodating a specific trail-oriented recreation activity. The area meets the minimum requirements of a campground but generally does not have drinking water. Fees may be charged for overnight use.

Trailheads

A developed area, which includes a parking area, trail information, trash receptacles, and vault toilet facilities at heavily used sites.

Recreation Advisory Committee

The purpose of a Recreation Advisory Committee (RAC) is to provide a forum for recreation users to have direct input into the development, review, and implementation of specific recreation policies, plans and projects for the West Oregon District. The West Oregon District does not currently have a recreation advisory committee, and would look to existing user groups and other local citizens in the formation of a RAC.

The committee's input will help ensure that the recreation program benefits from a variety of creative ideas. It also allows different user groups to interact with each other in a setting that fosters better integration among competing recreational uses. It will also assist in establishing priorities that reflect both the needs of users, and the broad range of forest resource goals and strategies.

Public Safety and Law Enforcement

Concern for public safety requires maintaining a high level of communication with recreational users. District staff attend meetings of the Mt. Baber ATV club and apprise them of activities on state lands in the vicinity of the staging area and trails that may be of concern to them. In addition, it will be a high priority to increase contact with the Black Rock Mountain Bike Association and advise them of forest management activities in the area.

Benton, Polk, and Lincoln counties employ forest deputies that patrol private and state forest land. These individuals are responsible for law enforcement and also provide monitoring and investigation services.

Event management

The West Oregon District permits organized club-sponsored trail use events. Both motorized and non-motorized trail events are held on the district. The OHV events occur within the Big Elk Creek Management Basin and the non-motorized mountain bike event occur in the Luckiamute River Management Basin.

Aquatic Resources: Habitat Restoration

The NW Forest Management Plan (NW FMP) establishes an Aquatic and Riparian Strategy for habitat restoration projects on State Forests (FMP 2010). State Forest's commitment to habitat restoration is further supported in the Species of Concern Policy (Species of Concern 2010) which lists habitat restoration projects as an aquatic strategy. The FMP and Species of Concern Policy establish several principles that provide the context and approach that State Forests will use for habitat restoration activities. The

purpose of this document is to describe habitat restoration goals and how restoration activities will be prioritized and reported for West Oregon District.

Habitat Restoration Approach

The overarching approach to habitat restoration is described in the NW FMP (page 4-67 through 4-68) and summarized below:

- Eliminate human-induced conditions on the forest that may contribute to aquatic habitat deficiencies, or that may limit the timely recovery of desired aquatic habitat conditions.
- Promote aquatic habitat conditions that will support the short-term survival needs of depressed salmonids, in order to reduce the potential for further declines in these populations.
- Attain properly functioning aquatic habitat conditions in a timely manner.
- Encourage forest conditions that will support the ecological processes necessary to naturally create and maintain complex aquatic habitats on a self-sustaining basis.

Landscape and site-specific strategies will improve levels of aquatic function in the short term to meet the immediate habitat needs of depressed species and place aquatic habitats on a trajectory toward desired conditions. At the same time actions are carried out to restore the ecological processes and functions that create and maintain self-sustaining habitats over the long term. Restoration strategies include completing assessments to identify limiting factors (3a) and identify, design, and implement projects to remedy identified problems (3b). Projects should mimic natural process, use multidisciplinary approach, and consider site-specific as well as watershed scale processes and disturbance regimes. Projects will be designed to re-establish natural physical and biological processes.

Limiting factors (3a above) have largely been identified in the ODFW conservation strategy, the 2005 State of Oregon Coastal Coho Assessment (OCCA) (State of Oregon 2005), and ODF Watershed Analyses. Therefore the task is to identify, design, and implement projects to address the limiting factors (3b above). This document is intended to address these elements of the restoration strategy by describing goals and priorities over the next 10 years.

District Goals

<u>Contribute to Ecological Benefits through Stream Habitat and Water Quality Improvement</u>

West Oregon District will implement restoration projects to improve aquatic habitat, riparian function, and water quality where appropriate and feasible. The ecological value of potential projects will be evaluated using a “Restoration Screening Tool” described later in this document (under “Ecological Benefits”).

There are several principles for evaluating ecological benefits established in the Coho Conservation Plan (2007) (OCCP). Examples that fit well with State Forest policies and information base include (but are not limited to):

- Conservation investments that achieve desired status goal for coho ESU.
- Work that supports remediation of population-scale limiting factors identified for coho populations in the 2005 OCCA.
- Work that is based on watershed assessments and limiting factor analysis conducted by local watershed conservation entities (or others) at scales finer than the population-scale limiting factors in the 2005 OCCA.
- Work that supports restoration of ecological processes rather than providing a short-term substitution for ecological processes.
- Work that supports conservation of multiple native fish and wildlife species.
- Work that supports maintenance or enhancement of life-history diversity in coho and other native fish and wildlife species.
- Work that supports conservation of unique or rare functioning habitats and habitat diversity.
- Work that capitalizes on time-sensitive opportunities (e.g., willing landowners, time-association with land-use action, etc.).
- Work that is likely to produce a large increase in productive capacity of coho salmon.

In the Coastal coho and Steelhead ESUs: Projects will be implemented that contribute to measureable restoration goals established for coho in the OCCP (Table 13) with a priority to work in streams/watersheds with high to moderate intrinsic potential for coho or steelhead.

Number of Habitat Restoration Projects

Projects can be implemented *opportunistically* (when operating near streams that would benefit from restoration efforts) or with a *collaborative* approach both of which will be evaluated for ecological benefits. West Oregon goals are to:

- Implement 0-2 opportunistic projects per year if resources and partners are available.
- Implement 1-3 collaborative projects over a 10-year period if resources and partners are available.
- Improve fish passage and disconnect roads from streams. Both of these activities support state forests Performance Measure 5: Forest road risks to waters quality and fish habitat (ODF 2010). The Performance Measures are to:
    - Reduce the miles of hydrologically connected roads and reduce the number road crossings that are barriers to fish passage.

Table 13. Goals for the amount of high quality habitat in each independent coho population in the Oregon Coast Coho Evolutionary Significant Unit for watersheds in State Forest Districts. ***(Adapted from: Oregon Coast Coho Conservation Plan Appendix 2 page 21)***

		High Quality Habitat Miles			
ODF District	**Population Unit**	**Total Needed**	**Current**	**Additional**	**Current % of Total**

					Needed
West Oregon	Siletz	111	32	79	29%
West Oregon	Yaquina	191	55	136	29%
West Oregon (minor)	Beaver Creek	31	19	11	63%

West Oregon District Priorities

The principles for prioritizing habitat restoration projects on West Oregon District are as follows:

- Prioritize projects for the best benefit to endangered species
- Prioritize projects that are most cost effective and efficient

The following project types are in order of priority assuming all else is equal. An exception to priorities may occur when projects can be implemented with high efficiency or if the "Restoration Screening Tool" suggests that for a given watershed there is a different order of priorities. For West Oregon District the overarching priorities are:

1. Fish Passage: This is considered the highest priority when passage project improves or provides access to (a) greater than ¼ mile of habitat and/or (b) high or moderate intrinsic potential for coho (CLAMS), or high priority restoration reaches for steelhead or Chinook.

2. Road Decommission or Hydrologic Disconnection: Hydrologic disconnection is important for all roads (i.e. including roads with connectivity to Type N or Type F streams) to reduce impacts on water quality. Decommission roads with the following characteristics:
    a. Stream side roads: roads parallel and within 100 feet of Type F streams
    b. Roads with significant stream crossing blow-out potential.
    c. Roads with many Type F stream crossings.

    Road decommissioning around Type N streams may be a lower priority than instream habitat projects (below). For State Forests, most roads around small Type N streams are compliant with the Roads Manual and Performance Measures for roads.

3. Instream Habitat Projects (wood placement, boulders, etc.): The FMP states that a priority will be placed on projects that supplement natural "legacy" elements (large woody debris) that are lacking due to previous disturbance events, and/or management activities. An emphasis will be placed on projects that re-introduce large "key" pieces of wood to channels in natural configurations. Projects will maximize the functional attributes of large woody material, and minimize potential conflicts with public safety in downstream reaches. A priority will be placed on streams with salmon or steelhead habitat. Where data are available

(Coast ESU), the highest priority will be to work in areas of "high intrinsic potential" for coho or steelhead (CLAMS 2005 and 2008). These types of projects will be evaluated by both the ODF Hydrologist and the local ODFW biologist.

4. Alternative Plans to Manage Riparian Areas: These projects will promote the desired future condition for riparian areas (MFC or Complex Structure). Such projects will not be carried out in areas with beaver presence unless plantings can be adequately protected against beaver damage.

5. Beaver: Beaver will be allowed to persist (i.e. not be trapped or moved out of streams) and beaver dams will not be destroyed (FPA OAR 629-660-0050). Exceptions include:
    a. Beaver pose a risk to stream crossings that cannot be managed with alterations to the crossing.
    b. Beaver pose a risk to plantation.

    Under these exception conditions:
    a. Relocation following ODFW relocation guidelines (ODFW 2010) will be considered.

Rationale for Priorities:

1. Fish Passage: No matter how good the habitat quality, if fish can't access it, there is little benefit. So a priority is placed on fish passage. Exception: if the projects do not access sufficient or important habitat, other habitat restoration projects may be a higher priority. Placing road work as a priority is consistent with the FMP principle to "eliminate human-induced conditions on the forest that may contribute to aquatic habitat deficiencies".
2. Road Decommissioning or Hydrologically Disconnecting Roads: Roads have the potential to chronically and episodically impact water quality and stream habitat more than any other forest activity. Therefore a priority is placed on decommissioning roads within the context of a transportation plan. Hydrologic connectivity is a Performance Measure and disconnecting roads reduces potential for road-sediment to get in streams. Placing road work as a priority is consistent with the FMP principle to "eliminate human-induced conditions on the forest that may contribute to aquatic habitat deficiencies".
3. Instream Restoration: Nearly all streams throughout the Coast range have low levels of large wood. Large wood provides complex habitat for fish – a limiting factor identified in the coho habitat restoration plan (OCCP 2007).
4. Alternate Vegetation Plans are an important tool for shifting riparian conditions to a desirable trajectory that will provide large wood recruitment to streams and ultimately replace the need for stream enhancement projects. This is placed as a lower priority because of challenges with successfully achieving reforestation near streams. Typically problems include: creating enough light (large enough opening in the overstory canopy) for the seedlings while minimizing potential negative effects on stream temperature and wood recruitment, controlling weed

and brush competition near streams where the usual control tools are more restricted, and overcoming elk and beaver damage. State Forests has some current examples of where the Alternative Vegetation Plans are being implemented. Outcomes from these projects will help guide future use of Alternative Vegetation Plans.

5. Beaver: Currently State Forests is taking a passive approach to beaver colonization. We are not actively reintroducing beaver but we will make every attempt not to interfere with existing beaver and beaver activities. Beaver influence on streams provides key habitat conditions to support recovery of listed fish.

Ecological Benefits

Restoration Screening Tool

The ecological value of restoration projects can be weighed against several existing information sources. The information sources will be compiled in a "Restoration Screening Tool GIS Database" (under development by the ODF Hydrologist in Collaboration with ODFW). The ODF Hydrologist will review the screening tool when opportunistic (i.e. during the AOP process) or collaborative projects are being considered. This database will compile information from several sources including: Fish habitat distribution (ODFW 2010b); stream size and fish distribution (ODF GIS Data); stream gradient and width; Intrinsic Potential for Coastal coho (CLAMS 2005) and Steelhead in the Oregon Coast (CLAMS 2008); road crossings, road segments, and stream reaches identified as good opportunities for restoration in Watershed Analyses (if available and applicable) and ODFW Aquatic Inventory Assessments (if available and applicable); and OCCP measurable criteria for coho recovery. The Restoration Screening Tool may eventually be adapted to track beaver-related information and restoration accomplishments.

Opportunistic Projects: Projects Associated with Timber Sales

By their nature these are not identified in advance of annual operations plans. These projects may not necessarily follow priorities established above. This allowance is made because these projects are typically a highly efficient means to improve the quality of aquatic habitat because the operation includes harvest mechanisms or proximity to streams that facilitate efficient (high benefit to habitat: low cost) implementation. Guiding principles for implementation of habitat restoration projects associated with timber sales include but are not limited to one or more of the following:

- Good access to stream (e.g. either cable over stream or road/tractor ground near stream).
- Trees of sufficient size (meet ODFW diameter and length criteria) or with root wad attached are available in the harvest area.
- Operation is adjacent to a salmon or steelhead stream.
- Operation is adjacent to stream with an active channel width between 10 and 20 feet. Wider channels may work, but are more challenging because of the length of wood required (2 X channel width). Projects in narrower channels can work as

well, but are considered a lower priority-especially if the stream is steep and only contains cutthroat trout.
- Personnel are available to administer implementation of the project.
- Address 1 or more of the habitat restoration priorities.

Collaborative Projects: Planned outside of Timber Sales

In addition to meeting ecological priorities, these projects will have substantial community support and collaboration. These projects will be filtered through the Restoration Screening Tool by the ODF Hydrologist and weighed against the established priorities for the district. The Watershed Council Coordinator and/or local ODFW Habitat Biologist typically will provide leadership in the design, grant requests, and implementation of these projects.

Measure of Accomplishment

The ODF Hydrologist will report progress towards habitat restoration goals using the following metrics:
Number of projects

- By type (e.g. barrier removal, hydrologic disconnection, decommission, wood placement, etc.)

Miles of stream or roads treated or habitat made accessible

- By type
- By 5th Field HUC

Number of miles treated within salmon or steelhead habitat

- On Coast this can be reported as miles of High IP.
- On the coast and for coho this can be reported in terms of miles per watershed with measurable criteria established in the coho conservation plan.

Reporting System and Timeline

We will utilize Oregon Watershed Enhancement Board's (OWEB) existing habitat restoration reporting system.

- Annually (March): Projects will be reported to OWEB by ODF/ODFW District Person.

The OWEB database will be queried by the ODF Hydrologist to provide the following reports:

- Annually (August): Summary of annual accomplishments by district by project type for Division purposes.

- Biennially (August-or PM reporting time frame): Maps and narrative of accomplishments to date by watershed
- Annually (August): Establish an annual summary of accomplishments by district by watershed for the county report

Energy and Mineral Resources

No energy or mineral resources, including aggregate rock, have been identified on the district. In the event that an aggregate rock source is identified, the district will assess the amount and quality of rock present. If the assessment data indicates sufficient rock, the district will analyze resource protection issues and estimate long-term rock requirements.

Lands and Access

The District Land Acquisition and Exchange Plan describes parcels that district has identified being desirable to acquire or exchange in order to better achieve the goals of the FMP. The district has recently completed a significant exchange, so the district is currently updating that plan. In addition, the Department of State Lands has an "Asset Management" plan for Common School Lands that may result in the sale or exchange of some Common School Lands during this IP.

The district will carry out the following activities.

- Continue to pursue land exchange opportunities when resources and adequate funding are available, and when:

  (1) The transaction furthers the purposes of ORS 530.010, the acquisition of lands chiefly valuable for the production of forest crops, watershed protection and development, erosion control, grazing, recreation or forest administration purposes; and
  (2) The exchange furthers the objectives of achieving greatest permanent value as defined in OAR 629-035-0020 as expressed in the approved forest management plan; and
  (3) The transaction results in the consolidation of state forest lands, or makes management of state-owned forest lands more economically feasible.
- The establishment and maintenance of property corners and lines will be prioritized and scheduled through the Annual Operations Plans.
- Obtain access agreements along roads not managed by ODF and scheduled through the Annual Operations Plan.

Cultural Resources

The District will consider cultural resources when planning management activities. The following points are used during the classification of a cultural site:

- Inventoried cultural resource sites will be evaluated to determine the appropriate protection class (Class I, II, or III).
- Potential operation areas will be checked against the cultural resource site inventory for the district to see if any sites are in or adjacent to the operation area.
- Sites that are within or adjacent to a proposed operation that has the potential to impact the site, and which have not been assessed for class designation, will be evaluated to determine the appropriate cultural resource class.
- Class I sites will be protected according to the legal standards in the applicable laws (At this time the district is not aware of any Class I sites).
- Protection of Class II or III sites will be based on field inspection of the site and consultation with the State Forests Operations Coordinator or other specialist.

The district will perform its management in areas with identified cultural resource sites in accordance with the Cultural Resource Strategies outlined in the FMP.

Special Forest Products

The district will continue its firewood cutting program and miscellaneous forest products program in a manner that is consistent with the FMPs resource management strategies.

District Firewood Cutting Program

The District issues personal use firewood permits for areas where timber sale contracts have been completed. These permits serve two purposes:

- Provide a low cost source of firewood for the public
- Remove excess logging debris from the landings in the harvest unit.

The process for obtaining a personal use firewood permit is described in the District AOP.

Miscellaneous Forest Products

The District typically issues between 50 and 75 miscellaneous forest product permits for salal and Oregon grape each fiscal year. In addition, interest is being shown by the public in obtaining commercial vinemaple and mushroom permits. It is expected that the demand for these products will increase.

There are three designated permit areas: Green Mountain, Burnt Woods and Bonner Ridge. Only one group of permittees per designated product are allowed into an area at one time. Permits are issued first come, first served. Permits are issued for a one month period. Quantities allowed to be harvested under the permit and fees for permits are varied, depending upon the product.

Invasive Species

The NWFMP Forest Health Strategies call for monitoring pest populations, damage levels and trends, to use Integrated Pest Management (IPM) to suppress or prevent damaging pest populations, and to cooperate with other agencies and associations to prevent the introduction of non-native pests. (FMP pg. 4-77 to 4-79).

Recent draft Policy and Procedures prepared for the State Forest Division articulates how active Invasive Weed Management should be pursued. This section of the IP serves as the District Invasive Weed Management plan that will be used to guide the management of invasive weeds on Oregon Department of Forestry managed lands. This is a dynamic plan and it may be incomplete or lacking information, however, it will be updated through the Annual Operations Planning process as available or as management strategies change.

The known invasive species currently found on the district are listed in Table 14 below.

Generally, species found in small amounts will be eradicated. Japanese knotweed is a plant that fits this category. This will be accomplished using hand and chemical controls as well as continued monitoring of the site.

The other invasive species are found scattered throughout the district and will be "actively controlled" because to eradicate them would be impractical. In some cases, "actively controlled" may only mean monitoring their spread and impact through doing stand exams, stocking surveys and road inventory. In other cases, actual control activities, such as roadside spray application, will be identified and included as part of the annual operations plan. Equipment washing to prevent the introduction or spread of invasive species will be required in most timber sale contracts on the district where there is a significant threat from invasive species.

Table 14. West Oregon District Common Invasive Species and Management Objectives

Species	Current status	Objective	Comments
Garlic Mustard	None known	Prevent	Early detection and rapid response (EDRR)
False Brome	All Basins, except Siletz River Basin	Control	EDRR, treat with herbicides, wash equipment coming out of known infestation areas.
English Ivy	Upper Yaquina River & Marys River Basins – very isolated patches	Eradicate	EDRR, treated with herbicides.
Gorse	Upper Yaquina & Siletz River – currently thought to be eradicated.	Monitor	EDRR
Himalayan Blackberry	All basins	Control	Treat through plantation & roadside herbicide applications.
Knotweed - various species	Marys River Basin – thought to be eradicated.	Monitor	EDRR

Species	Current status	Objective	Comments
Scotch Broom	All basins	Contain	Treat through plantation & roadside herbicide applications. Equipment washing for containment.
Tansy ragwort	All basins	Monitor	Encourage bio-control agents
Herb Robert	All basins	Contain	Treat with herbicides.
Reed canary grass	All basins	Monitor	
Meadow Knapweed	Luckiamute River Basin	Eradicate	Treat with herbicides; apply bio-control agent when available.
English holly	All basins	Monitor	Site specific treatment.

1. **Eradicate:** The noxious weed species is eliminated from the district, including all viable seeds and/or vegetative propagules.
2. **Control:** Seed production is prevented throughout the target patch, and the area coverage of the weed is decreased over time. Prevent the weed species from dominating the vegetation of the area but accept low levels of the weed.
3. **Contain:** Weeds are geographically contained and are not increasing beyond the perimeter of the infestation. Treatment within established infestations may be limited, but control or eradicate outside those areas.

Landscape Design Overview

The forest management plan establishes that a total of 30-50 percent of the landscape will become complex over the long term. A desired future condition map can be found in the attached **Map Section**. The landscape design process was a collaborative effort between the district, resource specialists and ODFW biologists. The district intends to achieve the desired future condition of 31 percent complex stands on the district by designating areas for older forest structure (OFS) and layered (LYR) stand structures across the landscape, ensuring a variety of forest patch sizes and shapes that provide connectivity between watersheds, and dispersal habitat for wildlife. The overall design will include habitats for species on the District's Species of Concern (SOC) list, and also include habitats necessary for those species needing more open conditions. The development of the Desired Future Condition Complex (DFCC) and the desired future condition stand structures is a long-term process.

The following criteria were considered when developing the placement of DFCCs on the landscape:

- Marbled Murrelet Management Areas (MMMAs).
- Northern Spotted Owl home range areas.
- Concentrated areas of existing complex stand structures.
- Stands currently on a pathway to complex structure.
- Landscape Design from 2001-2011 IP.
- Location of adjacent federal lands.

In addition to the DFCCs, corridors of the more complex stand structure types will be provided along streams. These corridors will provide some connectivity between the DFCCs within basins. However, the scattered nature of the parcels on the district and the interwoven multitude of other landowners make it impractical to plan for a continuous corridor from the management basins south of Highway 20 to the basins in the northern part of the district.

For the next 30 to 40 years, areas not designated to be OFS or LYR will provide the pool from which regeneration (REG) and understory (UDS) stand structures will be created. These stand structures will be arranged across the rest of the landscape, based on habitat, resources, and logistical and operational needs and constraints. The closed single canopy (CSC) stand structure will not be purposely designed in the landscape design. It will be identified and mapped as stands move into that stand structure.

Complex Structure in the Short Term (15% in 20 years)
In addition to FMP landscape design principles stands which are most likely to reach complex in a shorter time frame and which contribute to:

- Large patch sizes
- Large blocks of interior habitat
- Connectivity between patches

- Good distribution of complex habitat across the forest
- Good headwater habitat and overlap with Terrestrial and Aquatic Anchors

Known locations of SOC-
Locate around known SOC when information is available (owl locations, responses, MMMA, designated Terrestrial Anchor [TA] or Aquatic Anchor [AA]; priority given to terrestrial species)

Stand Characteristics include but are not limited to:

- Large trees, range of species, good understory development
- Areas that do not have to be clearcut harvested to reach complex
- Utilize stands currently in complex or managed to achieve complex (previous investments in thinned units)
- Recently clearcut stands are not good candidates as by their nature they will take an extended period of time to reach complex structure.
- Currently occupied habitat and/or high habitat potential stands for terrestrial, aquatic and amphibian SOC.

Long-Term Complex Structure (31%) Design
In addition to the stands established above for short term development: Use same biological principles and add

- Also consider the use of in-operable acres if appropriate (meaning they have to be able to reach complex structure).
- Additions of inoperable areas will be identified as such in meeting notes/GIS.
- Added only if they contribute to the biological goals for species of concern.

Anchor Design Principles
Designating Terrestrial Anchors

- If it is decided to have one or more terrestrial anchors on a district, locate them using SOC Policy guidelines including 1.3.4, 1.3.8 and 1.3.9. The guidelines include the following:
    - Locate anchors to address needs associated with identified SOC, particularly those with low mobility or large home ranges
    - Prioritize placing TAs in areas that contain high-quality habitat considering the landscape design principals described above (e.g., areas that already have complex structure and/or known use by SOC species or areas that are most likely be functioning habitat and/or providing complex forest structure soon).
- Include areas with known SOC occurrence.
- Maximize benefits to multiple species by overlapping TA and AA as much as possible (when applicable when a district will have both TA and AA).

Designating Aquatic Anchors

- Consider establishing Aquatic Anchors in watersheds with any of the following characteristics:
    - Watershed with high quality habitat or high potential for high quality habitat for SOC
    - High occurrence of fish or amphibian species of concern.
    - High percentage of ODF ownership (20%)
    - High percentage of ODF ownership in small headwater catchments (>15%) considered to be good habitat for amphibians.
- Consider designating complex habitat in Aquatic Anchors to provide additional benefit for fish SOC (large wood recruitment, older forests to reduce effects on hydrology). However, terrestrial needs take priority over aquatic needs.
- Consider applying site-specific strategies to maintain, improve, or restore habitat such as wider no-cut buffers around fish and non-fish streams, habitat restoration, or road improvement projects.

Implementation of Landscape Design Maps

The landscape design map represents the district's current vision of where complex structures will be developed over time. The district will use this map in the planning of harvest operations and the designing of silvicultural prescriptions. Through the course of implementation, however, refinements to the landscape design map are likely to occur due to stand conditions, harvest efficiency and operability concerns, or new information

The district may identify a site designated for the development of complex structure on the landscape design map that is not currently suitable for the development of complex structure. In these cases the landscape design may be changed, replacing the less desirable site with a site of comparable acreage that is better suited for the development of complex structure.

Changes to the landscape design will be fully described in an Annual Operations Plan and will not exceed 240 acres in a year. The complex structure goal will remain consistent with the BOF direction that calls for the District to develop complex structure across 31% of its landscape. The landscape design map will be fully reviewed with any major revision of the district implementation plan.

Management Basins

Management Basins Overview

The district has been divided into 5 management basins (Table 15). These basins follow the boundaries of sub-basins delineated by major watersheds with minor exceptions. The Upper Yaquina and Big Elk Creek basins drain to the coast via the Yaquina River, the Siletz River basin drains to the coast via the Siletz River and the Luckiamute River and Marys River basins drain to the Willamette River. The minor exceptions include some parcels, or portions of parcels, that were included in adjacent watershed basins for management reasons.

Information Summary for All Management Basins

Table 15. Summary: Current Condition[1] (CC) and Desired Future Condition (DFC), by Stand Structure and Percentage

						NON COMPLEX CONDITION				
Management Basin	**Acres**	**NSC/ Non-Forest[3]**	**REG**	**CSC**	**UDS**	**COMPLEX CONDITION**	**LYR**		**OFS**	
		CC[1]	CC	CC	CC	DFC[2]	CC	DFC	CC	DFC
Big Elk Creek	9,717	1	7	23	23	72	10	13	0	15
Luckiamute River	2,515	2	10	24	57	48	7	33	0	19
Marys River	7,356	0	4	20	69	72	7	21	0	7
Siletz River	7,336	1	8	23	55	64	13	14	22	7
Upper Yaquina River	9,790	0	6	18	66	73	9	12	0	15
District Total	**36,714**	**1**	**6**	**21**	**62**	**69**	**10**	**16**	**0**	**15**

1. The Current Condition was determined using the latest Stand Level Inventory updated September 2011.
2. The Desired Future Condition will be achieved in an estimated 20 to 80 years.
3. NSC/Non-Forest (Non-Silviculturally Capable and Non-Forest lands). Non-Silviculturally Capable lands are not capable of growing forest tree species (defined in OAR 629-035-0040). Non-Forest lands are those areas, greater than 5 acres, that are maintained in a permanently no forest condition (example include district offices, work camps and large power line right-of-ways).

Information Summary (continued)

In the *Northwest Oregon State Forests Management Plan* (pg 4-48*)*, the ranges for the desired future condition of stand structure types were outlined. These ranges are given below.

Regeneration (REG)	15–25%
Closed Single Canopy (CSC)	5–15%
Understory (UDS)	30–40%
Layered (LYR)	15–25%
Older Forest Structure (OFS)	15–25%

Table 15 on the previous page shows that for the West Oregon District's desired future condition, the planned percentages of stand structure types fall within the management plan ranges. The desired future condition map in the **Map Section** shows planned future stand structure across the district. The time required to achieve this desired future condition depends on site quality and density management.

Basin Descriptions

Big Elk Creek

This basin is the second largest on the district with 9,717 acres, and is south of the Burnt Woods Ridge and Baber Ridge, located mostly in Lincoln County. One hundred fifty six (156) acres are in Benton County. Approximately 6,400 acres are in one contiguous block, the other 3,300 acres occur in many parcels of various sizes. The majority of these parcels are located south of Eddyville and east of Elk City. There are three scattered parcels of land included in the basin. The Table Mountain parcel, which is located in the Alsea River basin, was included in this management basin for management purposes. Similarly, the Pooles Slough and Tracy Creek parcels, which are scattered coastal parcels, were included in this basin.

The southern portion of this basin is in close proximity to the Siuslaw National Forest. The western portion of the basin is intermixed with lands belonging to Plum Creek and Nestucca Forests. The eastern portion is mostly adjacent to lands owned by Starker Forests, Inc and Thompson Gates.

The majority of the Siuslaw National Forest land is comprised of complex forest structures, and is currently being managed as late successional reserves. The adjacent private lands are comprised of young, less complex stand structures (REG, CSC and UDS). State Forest land is comprised of a mixture of young, less complex stand structures (REG, CSC, and UDS) as well as some more complex structure (LYR).

Key Resource Considerations for the Big Elk Basin:

- Big Elk Creek, a main tributary of the Yaquina River, originates in this basin. The main tributaries to Big Elk Creek in this basin are Wolf Creek, Johnson Creek, Bear Creek, Deer Creek and Spout Creek. Salmonids and resident cutthroat trout reside in Big Elk Creek and most of its tributaries.
- There are approximately 27 miles of fish bearing (Type F) streams in this basin.
- Recreational considerations include the Baber Mountain ATV Club Camping and trailhead facilities with approximately 3 miles of motorized trails.
- There are three MMMA's in the basin. In addition, an isolated parcel is within an owl home range area in the southeast part of the basin.
- Wolf Creek terrestrial anchor is located almost entirely in this basin (997 acres).
- Wolf Creek aquatic anchor is located in this basin.
- The transportation system provides good access.

Desired Future Condition and Landscape Design

Currently there are multiple complex stands within this basin and opportunities to develop more.

Management Opportunities

Harvest – There are a number of harvest opportunities from partial cuts to clearcuts. Partial cuts may take place in both DFC general and complex areas, including the terrestrial anchor. Clearcuts are only planned in DFC general areas.

Recreation – limited recreational development may occur in association with the Mt Baber ATV Club (see recreation section).

Transportation – This basin is a high priority for planning and/or investments in the infrastructure. Road construction and improvement will be at the same rate as the last ten years.

Luckiamute River

This basin is composed of 2,515 acres. There are four blocks of land, the largest one lies in the northern-most portion of the basin. This block is in Polk County. The other three are in Benton County west of Kings Valley. The adjacent landowners in this basin include: Weyerhaeuser, Forest Capital, Hull-Oakes Lumber, Starker Forests and small landowners.

The adjacent private lands are comprised of young, less complex stand structures (REG, CSC and UDS) and farm land. State Forests land is comprised of a mixture of young, less complex stand structures (REG, CSC, and UDS) as well as LYR.

Key Resource Considerations for the Luckiamute River Basin:

- The main tributaries to the Luckiamute River in this basin are the Little Luckiamute River, Dutch Creek and Bonner Creek. Coho salmon and Steelhead reside in Little Luckiamute River and Bonner Creek has Coho salmon.
- There are approximately 4 miles of fish bearing (Type F) streams in this basin.
- Recreational considerations include the Black Rock Mountain Bike area in the Black Rock parcel, and hunting and fishing.
- A spotted owl pair site is located in the Black Rock parcel. This entire parcel is located within the home range for this pair. In addition, a portion of the Bonner Ridge block is located within the home range of another owl home range.
- There is a domestic water source for Camp Tapawingo.
- The transportation system provides good access.

Desired Future Condition and Landscape Design

Currently there are very few complex stands within this basin; however some have been put on a pathway to complex structure.

Management Opportunities

Harvest –Harvest opportunities are very limited due to past harvests and the presence of northern spotted owls.

Recreation - limited recreational development may occur in association with the Black Rock Mountain Bike area (see recreation section).

Transportation - This basin is a low priority for planning and/or investments in the infrastructure. Road construction and improvement will be below the rate as the last ten years.

Marys River

This basin is composed of 7,356 acres. There are four blocks of land, the largest one lies in the northern-most portion of the basin. Part of this block is in Polk County. The rest is in Benton County. Two blocks lie north and south of Highway 20 and west of Blodgett, in Benton County. The last block is south of Highway 20 and west of Burnt Woods and is in Lincoln County. The headwaters of the West Fork of the Marys River are on State lands.

The basins adjacent owners include: Hull-Oakes Lumber, Starker Forests and small landowners.

The adjacent private lands are comprised of young, less complex stand structures (REG, CSC and UDS) and farm land. State Forest land is comprised of a mixture of young, less complex stand structures (REG, CSC, and UDS) as well as LYR.

Key Resource Considerations for the Marys River Basin:

- The main tributaries to the Marys River in this basin are the West Fork and East Fork of the Marys River, Oleman Creek, and the Tum Tum River. Coho salmon reside in the Tum Tum River and the lower portion of the Marys River. Resident cutthroat are present throughout the basin.
- There are approximately 10 miles of fish bearing (Type F) streams in this basin.
- Recreational considerations are limited. Hunting and fishing are the main recreation in this area.
- Portions of two spotted owl home ranges overlap in the northern part of the basin.
- A small portion (8 acres) of the Green Mountain terrestrial anchor is located in this basin.
- A small portion (4 acres) of the Wolf Creek terrestrial anchor is located in this basin.
- The transportation system provides good access.

Desired Future Condition and Landscape Design

Currently there are several complex stands within this basin and opportunities to develop more.

Management Opportunities

Harvest – There are a number of harvest opportunities from partial cuts to clearcuts. Partial cuts will take place in both DFC general and complex. Clearcuts are only planned in DFC general areas.

Transportation – This basin is a medium priority for planning and/or investments in the infrastructure. Road construction and improvement will be about the same as the rate of the last ten years.

Siletz River

This basin is composed of 7,336 acres. There are two relatively large blocks of land and three smaller. All but one block is centered in the middle of the basin. The other one is on the western edge. The majority of State land in this basin is in Polk County the rest is in Lincoln County. The basins adjacent owners include: The Confederated Tribes of the Siletz, BLM, Plum Creek Timber, Forest Capital, Nestucca Forests LLC and small landowners.

The adjacent private lands are comprised of young, less complex stand structures (REG, CSC and UDS) and farm land. State Forest land is comprised of a mixture of young, less complex stand structures (REG, CSC, and UDS) as well as LYR.

Key Resource Considerations for the Siletz River Basin:

- The main tributaries to the Siletz River in this basin are Big Rock Creek, Lucas Creek, Fall Creek, Steere Creek and Little Rock Creek. Coho salmon, Steelhead and Chinook Salmon reside in Big Rock Creek and Steere Creek.
- There are approximately 18 miles of fish bearing (Type F) streams in this basin.
- Recreational considerations are limited. Hunting and fishing are the main recreation in this area.
- Seven MMMA's occur in this basin. In addition, a portion of the home range of one spotted owl is on the eastern portion of the basin.
- A large portion, 515 acres, of the Green Mountain terrestrial anchor is located in this basin.
- The transportation system provides good access.

Desired Future Condition and Landscape Design

Currently there are many complex stands within this basin and more have been put on the pathway to Complex Structure. This basin also includes an aquatic anchor and a portion of a terrestrial anchor.

Management Opportunities

Harvest – First entry commercial thins will make up the majority of the partial cuts. This type of harvest will occur in DFC general and complex areas, and may occur in the terrestrial anchor. Clearcut harvest opportunities are planned only for the DFC general areas.

Transportation - This basin is a low priority for planning and/or investments in the infrastructure. Road construction and improvement will be below the rate as the last ten years.

Upper Yaquina River

This is the district's largest basin with 9,791 acres. There are three blocks of land, one lies north of the Burnt Woods Ridge and Baber Ridge roads and south of Highway 20, in Lincoln County.

One of the larger blocks of State land is in the northeast corner of the basin and reaches into portions of Polk, Lincoln and Benton Counties. This block contains the headwaters of the Yaquina River. A smaller piece (790 acres) is located north of the Eddyville – Blodgett highway and is referred to as the Norton Hill block.

The northern most portion of this basin is adjacent to a small block of BLM land and in the near vicinity of a large Forest Capital ownership. The rest of the basins adjacent owners include: Nestucca Forests LLC, Hull-Oakes Lumber, Starker Forests and the Confederated Tribes of the Siletz.

The BLM land is comprised of complex forest structures, and is currently being managed as late successional reserves. The adjacent private lands are comprised of young, less complex stand structures (REG, CSC and UDS). State Forest land is comprised of a mixture of young, less complex stand structures (REG, CSC, and UDS) as well as LYR and OFS also.

Key Resource Considerations for the Upper Yaquina Basin:

- The Yaquina Rivers' headwaters are in this basin. The main tributaries to the Yaquina River in this basin are the Little Yaquina River, Little Elk Creek, Cline Creek and Salmon Creek. Salmonids and resident cutthroat trout reside in the Yaquina River and most of its tributaries.
- There are approximately 23 miles of fish bearing (Type F) streams in this basin.
- Recreational considerations are limited. Hunting and fishing are the main recreational activities in this area. With the recent acquisition of land containing numerous Yaquina River waterfalls, limited hiking by local residents occurs in the eastern portion of the basin. A portion of the Baber Mountain ATV Club trail system is also in this basin.
- Visual resource considerations are relatively limited to those lands visible from Highway 20.
- There are five MMMA's within this basin. In addition, two spotted owl home ranges overlap in the northeast part of the basin.
- A majority, 1102 acres, of the Green Mountain terrestrial anchor is located in this basin.
- Upper Yaquina amphibian emphasis aquatic anchor.
- The transportation system provides good access.

Desired Future Condition and Landscape Design

Currently there are several complex stands within this basin and opportunities to develop more. This basin also includes a portion of a terrestrial anchor.

Management Opportunities

Harvest – There are a number of harvest opportunities from partial cuts to clearcuts. Partial cuts may take place in both DFC general and complex, including the terrestrial anchor. Clearcuts are only planned in DFC general areas.

Recreation – limited recreational development may occur in association with the Mt Baber ATV Club (see recreation section). Exploration of a Yaquina Falls trail system may occur.

Transportation – This basin is a high priority for planning and/or investments in the infrastructure. Road construction and improvement will be at the same rate as the last ten years.

Appendix A

District Opportunity Analysis

This section of the Implementation Plan describes the computer modeling conducted to inform the key decisions regarding the timber harvest and tree-stand structure goals to be achieved by this plan. It then explains how the model outputs are analyzed, adjusted, and converted to specific annual harvest volume targets and ranges for regeneration (clearcut) and partial-cut harvests for implementation on the ground; this process is referred to as a Model Solution Review (MSR).

Harvest Modeling

The harvest scheduling model that generated the data for the Opportunity Analysis is based on the models developed for the Harvest and Habitat Model Project. These models are designed to simultaneously achieve goals for timber harvest and stand structure development consistent with the principles of structure-based management described in the Northwest Oregon State Forests Management Plan (FMP). These models incorporate rules that emulate the strategies and practices contained in plans, policies and strategies that apply to the West Oregon District. More information on these models can be found in the Harvest and Habitat Model Project Final Report (ODF; March 8, 2006) or by contacting the State Forests Operations Coordinator in Salem, Rob Nall, (503) 945-7514, rnall@odf.state.or.us.

The harvest scheduling model for this opportunity analysis has been updated from the Harvest and Habitat Model to:

- Ensure the model rules reflect the plans, policies and strategies that are applicable to this Implementation Plan, as described in the Introduction section of the Implementation Plan (page 4);
- Incorporate the current spatial data, including stand boundaries, locations of species of concern and the current landscape design; and
- Use revised yield tables developed from Stand Level Inventory data.

These models generate specific outputs (e.g. harvest volume per period, stand structure at point in time, etc.), but in reality there is uncertainty surrounding the accuracy of each of these numbers because the models' inputs are based on samples such as the forest inventory, projections like the growth and yield tables, and assumptions such as the number and location of northern spotted owl sites. If any of these inputs is incorrect, the outputs may be higher or lower. If the growth and yield projections are wrong, then the long-term harvest and structure estimates would change. Or if, for example, the assumptions about northern spotted owls are wrong and new owl sites are established, this would likely have an immediate impact on the harvest volume.

Modeling uncertainty - Unfortunately, it is very difficult if not impossible to demonstrate the uncertainty inherent in these types of models. The State Forests Division and other groups (e.g., C.L.A.M.S.[2]) with similar projects have been unable to calculate and display this uncertainty. In recognition of the uncertainty associated with these models, the district will monitor conditions on the district relative to the model assumptions and outputs (e.g., the number and location of owl sites, the actual harvest volume per acre, observed stand structure, etc.). If significant differences are found, the district will initiate a new modeling effort to address them. In addition, ODF will regularly update the models with new information and reevaluate the results to ensure that goals can continue to be met in a sustainable manner.

Harvest and Structure Goals

To inform the decisions on stand structure and harvest objectives, the division developed two sets of model runs to examine the range of outputs (stand structure and harvest volume) under different management scenarios:

1. The first set is referred to as the District Potential Scenarios. The purpose of these scenarios is to identify the broad potential of these lands and provide context for the implementation plan decisions. The District Potential computer modeling runs examine four different management scenarios ranging from the current implementation plan, which has a 50 percent landscape design (Base Case), to a scenario based on the State Forest Practices Act.

2. The second set of modeling runs is referred to as the Landscape Options Scenarios. These scenarios examine the potential stand structure and harvest volume outputs based on three different landscape designs developed for the district by district staff, resource specialists, and Oregon Dept. of Fish & Wildlife (ODFW) biologists.

The Division's decisions on harvest and structure goals are based on the broad strategies contained in the FMP. They also take into consideration the nine Performance Measures adopted by the Board of Forestry for State Forests (www.oregon.gov/ODF/PUBS/docs/2011PerformanceMeasuresReport.pdf). In these measures, the Board set specific targets for the Clatsop and Tillamook State Forests, but not for the West Oregon District. The harvest and structure decisions for the West Oregon District considered the principles contained within the Performance Measures, particularly:

- Performance Measure 3 – Increase annual revenues/volume above current levels
- Performance Measure 6 – Increase complex stand structures above current levels over the next two decades and develop complex structure in those areas where it is anticipated to result in the greatest benefits to both aquatic and terrestrial species of concern

[2] Coastal Landscape Analysis and Modeling Study – a project sponsored by Oregon State University College of Forestry, the US Forest Service Pacific Northwest Research Station, and the Oregon Department of Forestry.

District Potential Scenarios

The four management scenarios modeled to examine the district potential include the following:

1. FPA – This scenario simulates management practices under the State's Forest Practices Act (www.oregon.gov/ODF/privateforests/fpaKeys.shtml).
2. Take-Avoidance – All of the Division policies for complying the state and federal Endangered Species Acts (through Take Avoidance Strategies) are simulated under this scenario, as well as the riparian (streamside), green tree retention, snag, and down-wood strategies from the Northwest Oregon State Forest Management Plan. The only strategy missing from the FMP is the specific stand structure goals.
3. FMP with 30percent Landscape Design – Simulates fully implementing the Northwest Oregon State Forest Management Plan, including Species of Concern Strategies and the Division's Take-Avoidance Strategies. This model scenario includes a landscape design[3] that targets 30 percent of the district for complex stand structure (the lower end of the range identified in the FMP).
4. Base Case (FMP with 50percent Landscape Design) – This scenarios is the same as the one above, except that the landscape design targets 50 percent of the district for complex structure (the upper end of the range identified in the FMP). It uses the landscape design from the 2003Implementation Plan.

The FPA and Take-Avoidance scenarios in the 2003 IP are not consistent with the FMP and thus were not considered as options for this implementation plan. However, these two scenarios help define a range of potential outcomes inherent to the district. Figure A-1 below displays the results of these four model scenarios as well as the 2003 IP harvest object of 10 million board feet (MMBF) per year (broad green line) and a broad yellow line depicting 70 percent of the FPA modeling run (this has been found to be a convenient reference). The X axis across the bottom of the graph is in periods with each period representing five years, so P20 on the graph represents a point 100 years in the future.

One prominent feature on the graph is the significant increase in harvest volume that occurs in periods two and three with the Take-Avoidance, 30percent Landscape Design, and Base Case scenarios. This feature depicts stands maturing into a harvestable age that were a result of very high harvest levels (approximately 40 MMBF per year) that occurred in the 1980s based on a forest management plan that calculated sustained yield across three districts rather than an individual district.

Table A-1 below displays the average annual harvest volume for the first decade (the average of P1 and P2 from the figure) and the first decade volume as a percent of the FPA scenario. The results of the district Model Solution Review (MSR) on the 30 Percent Landscape Design scenario is also shown in parentheses on this table. The details of the

[3] The initial modeling for District Potential used a draft 30 percent landscape design for this scenario. The figures below use the results of the final model run for this IP based on the landscape design described in it and the Species of Concern strategies developed for the IP.

MSR are discussed later in this appendix, but indicate that model volume outputs should be reduced by about 2.5 MMBF per year.

The complex structure (Layered and Older Forest) development associated with these management scenarios is shown in Figure A-2. The solid lines represent the total complex structure and the dashed lines represent the Older Forest Structure[4], while the Layered Structure is the difference between the two lines for each scenario.

Figure A-1. West Oregon District Potential – Harvest Volumes

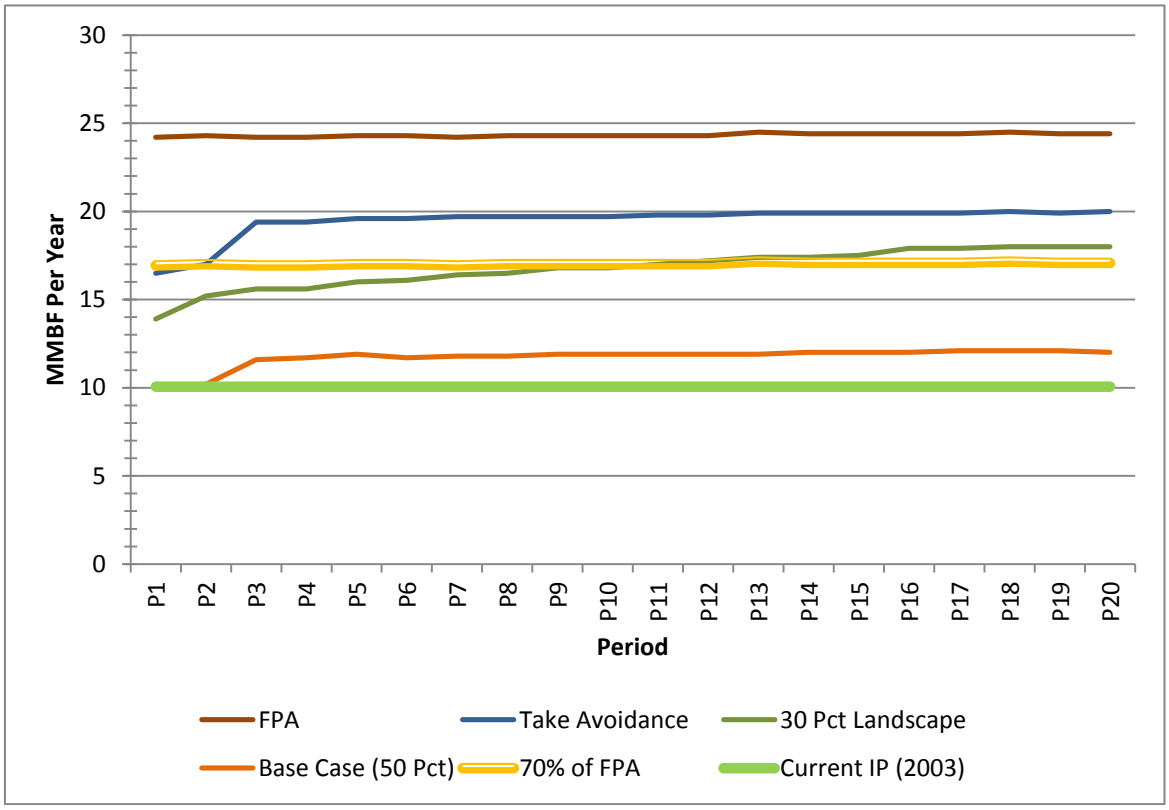
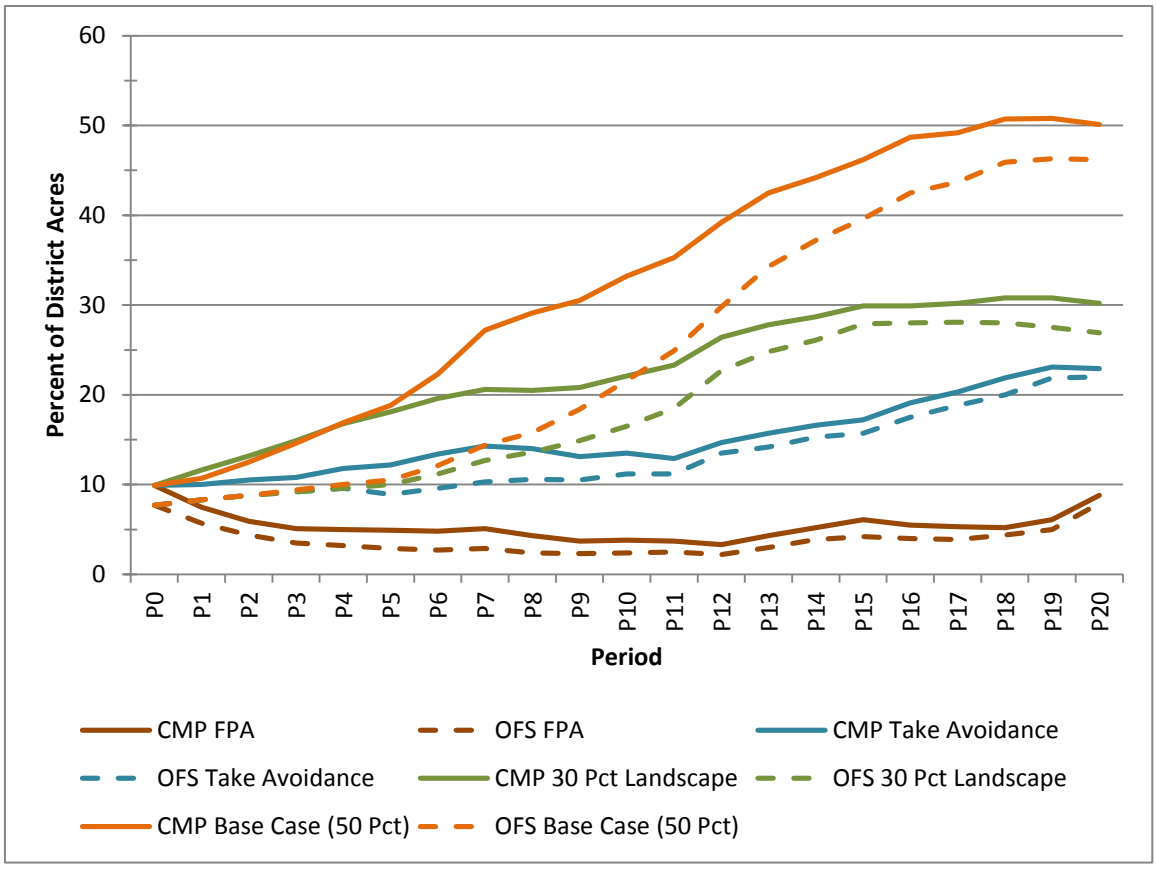


Table A-1. Modeled Harvest Volumes

[4] The estimate of Older Forest Structure in these models is based on tree size and does [not?] include estimates of snags and down wood, so the Older Forest Structure estimates may be high. The department is currently working on methods to incorporate estimates of snags and down wood for future modeling.

Model Scenario	Ave. Volume 1st 10 Years	Percent of FPA
FPA	24	100
70% FPA	17	70
Take-Avoidance	17	69
30 %Landscape	15 (12*)	60
Base Case	10	42
Current IP (2003)	10	41
* Harvest volume based on the MSR.		

Figure A-2. District Potential - Complex Stand Structure



The FPA and Take-Avoidance Scenarios do not attain the minimum structure required in the FMP. The structure they do develop is located in areas where clearcutting is prohibited, such as northern spotted owl sites, Marbled Murrelet Management Areas (under the Take-Avoidance scenario), and riparian management areas. As a result, nearly all of the complex structure in these areas is composed of Older Forest Structure. Under the Take-Avoidance scenario, approximately 22 percent of the district is covered by harvest restrictions to protect various resources.

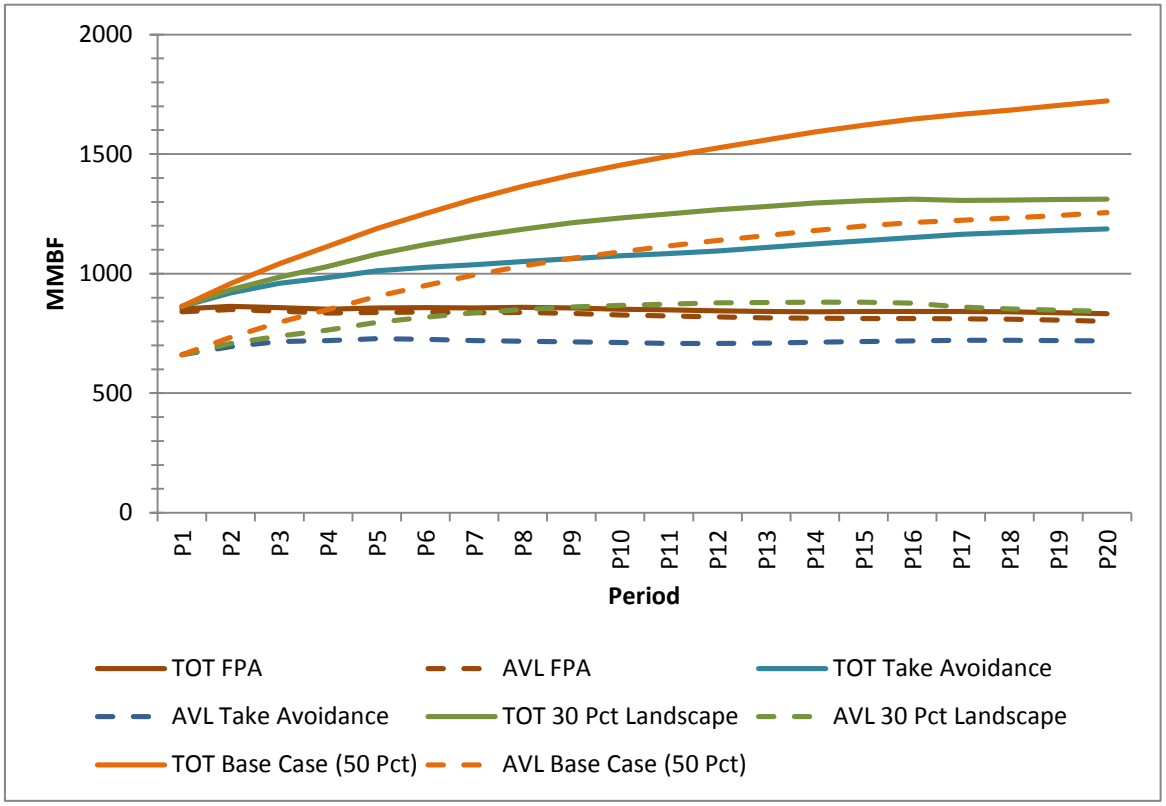
The 30 Percent Landscape Design achieves the short term goal of 15 percent complex structure in 20 years and the FMP requirement of 30 percent total complex structure (15 percent Older Forest Structure and 15 percent Layered) in 85 years. The 30 percent total complex structure is maintained through the end of the modeling horizon (150 years).

The Base Case (50 percent landscape design) achieves the short term structure goal in 20 years and the FMP minimum requirements of 30 percent complex and 15 percent Older Forest Structure in 45 years. The 50 percent complex structure goal is achieved in 90 years. Complex structure develops much more quickly under the 50 Percent Landscape Scenario than it does under the 30 Percent Landscape Scenario; however, the faster development of complex structure occurs at the cost of about 4.5 million board feet of harvest per year.

The standing inventory of timber volume is an important metric (measurement that helps determine whether a project is meeting its goals) to examine to ensure the management

scenario is sustainable in terms of harvest volume and stand structure. Figure A-3 shows the total standing volume and the available volume for the four management scenarios. The total inventory (solid lines and shown as TOT in the legend) is standing timber volume of all ODF-managed lands on the district. The available inventory (dashed lines and shown as AVL in the legend) represents the standing inventory on all ODF managed lands where harvesting is allowed (i.e., it excludes the volume on lands where clearcutting is not allowed, such as northern spotted owl sites, Marbled Murrelet Management Areas, and operationally limited areas).

FigureA-3. District Potential - Inventory



All management scenarios start with the same total inventory, since they all have the same land base. The FPA management scenario has a higher available inventory than the other scenarios, because it has fewer restrictions on harvest (smaller riparian management areas, lower protection standards for northern spotted owls and no protections for marbled murrelets). The other three scenarios have the same protection standards, but different structure goals (Take-Avoidance has no structure goal).

The total inventory on all scenarios, except FPA, increases over time, largely because trees in the no-harvest areas continue to grow and accumulate volume. The total volume under the FPA scenario declines very slightly over time, because the growth on the no-harvest area does not exceed the reduction that occurs in the available inventory.

The available inventory in the other scenarios increases initially then levels off. The slight increase in the available inventory for the Take-Avoidance scenario is due to the maturing of the plantations that comprise a large proportion of the district. The Take-Avoidance

available inventory levels off when these plantations reach a condition at which they can be clearcut.

The available inventory for the 30 Percent Landscape and Base Case scenarios increases significantly over the next 50 to 100 years (P10 to P20), then levels off. These scenarios are accumulating considerably more available inventory because they are developing additional complex structure, which typically has a higher volume per acre than the other stand structures. Thus, as the amount of complex structure increases, so does the available inventory. The available inventory for these scenarios levels off when the district accumulates enough inventory to sustain the complex structure goal. This can occur before the complex structure goal is attained.

The sustainability of the volume and structure under these management scenarios is indicated by the non-declining trend of the available inventory lines for each of the scenarios after an initial period of adjustment. The available inventory lines for each of these scenarios remain flat (non-declining) from year 100 to year 150 (end of the modeling horizon). During the evaluation of these model scenarios, sustainability over the very long term beyond 150 years is confirmed by:

1. evaluation of long-term sustained yield calculations – this ensures that the growth from the standing inventory will support the harvest volume
2. review of the age class distribution - this ensures that enough acres will be available for clearcutting of stands that are an appropriate age.

District Potential Conclusion

After evaluating the results of the District Potential Scenarios and comparing the results to the principles contained in Performance Measures 3 and 6, Division leadership determined that the Base Case (50 percent landscape) scenario did not meet the objective of increasing harvest revenue/volume. The 30 Percent Scenario did achieve an increase in volume/revenue and provided an increase in complex structure in 20 years. Division Leadership also determined that additional modeling was necessary to explore other landscape design options with goals of 35 and 40 percent complex structure and to gauge the effects of implementing additional Species of Concern Strategies.

Landscape Options

The management scenarios below are based on the three landscape designs developed by the district in a collaborative process with resource specialists and ODFW biologists[5]. The three landscape designs are in turn based on complex structure goals of 30, 35, and 40 percent. However, when the Terrestrial Anchors and Aquatic Anchors are incorporated, the

[5] Landscape design planning meetings were held on December 12 and 15, 2011. Participants included: Rod Krahmer, Derek Wilson, and Doug Cottam from ODFW; Clint Smith, Liz Dent, Rob Nall and Jennifer Weikel – ODF resource specialists; and Evelyn Hukari, Dan McMinds, John Hawksworth, Ted Erdmann, Chris Humcke, and Mike Totey from the West Oregon District.

30 Percent scenario actually has a 32 percent landscape design (see section ”Biological Elements – Fish and Wildlife”).

The 30 Percent Landscape management scenario was run with and without the additional Species of Concern Strategies. A comparison of these model runs determined that the addition of the Terrestrial and Aquatic Anchors reduced harvest volume by an average of one percent during the first 50 years of the model horizon. The reason the additional Species of Concern Strategies (see section ”Biological Elements – Fish and Wildlife”) had so little effect on the harvest volumes is that the Terrestrial Anchors are largely within the 30percent Landscape Design, which already has a restriction on clearcutting and certain types of thinning. The Aquatic Anchors increase the harvest restrictions within the existing riparian management area of fish-bearing streams and increase the width of the riparian management areas on perennial, non-fish-bearing streams from 25 feet to 50 feet. So the Aquatic Anchors do not restrict harvest on a large number of acres. Given the low impact of the additional Species of Concern Strategies, they were incorporated into all subsequent model runs.

Figure A-4 displays the results of the three Landscape Options, with the solid lines representing the total harvest volume and the dashed line representing the harvest volume from clearcuts. Table A-2 shows the average annual harvest volume for the first decade and the average volume as a percentage of the FPA scenario.

Figure A-4. Landscape Options - Harvest Volume

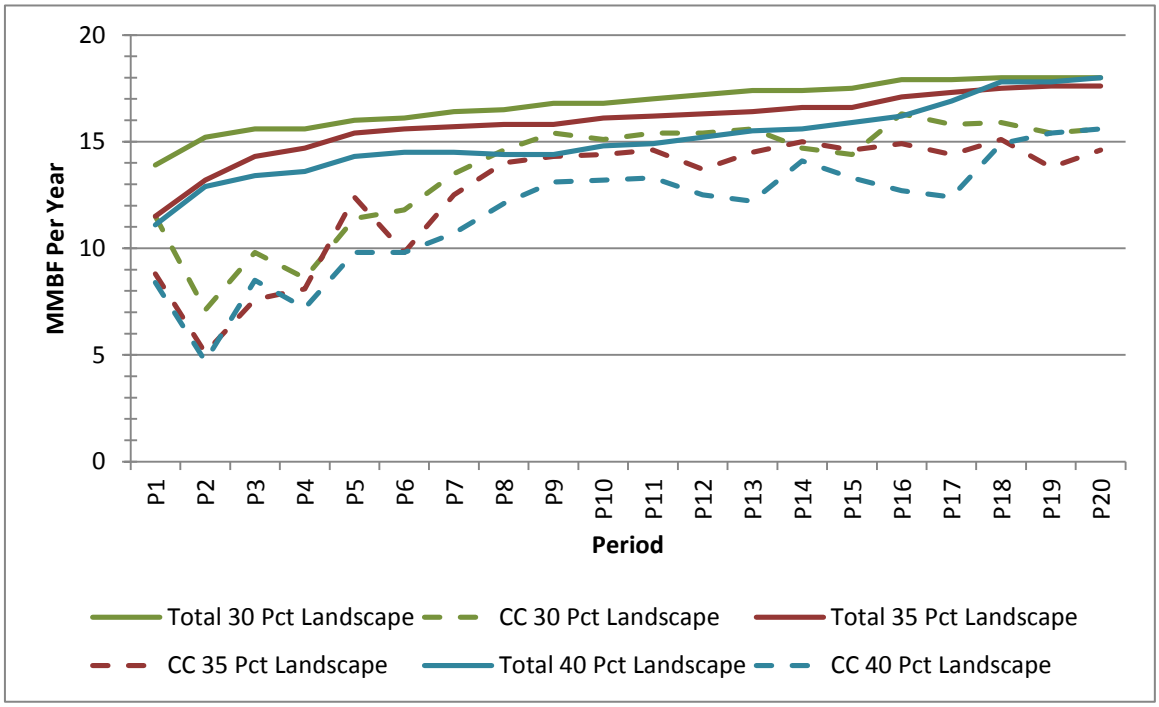


Table A-2. Landscape Options - First Decade Harvest Volume

Model Scenario	Ave. Volume 1st 10 Years	Percent of FPA
30% Landscape	14 (12*)	60
35% Landscape	12	51
40% Landscape	12	49
* Harvest volume based on the MSR.		

During the first decade, the 30 Percent Landscape Design scenario has an average annual harvest about 20 percent higher than the 35 and 40 Percent Landscape Design scenarios. The average annual harvest volumes for the 35 and 40 percent scenarios are very similar, because almost mature stands have been included in the 35 percent landscape design. So the difference in harvest potential is not expressed until the second decade, when many plantations become available for clearcutting in the 35 Percent Landscape scenario.

The drop in clearcut volume after the first five years reflects the silvicultural need for a first-entry thinning on many plantations to maintain growth. The volume increase from the first-entry thinning will not provide a corresponding increase in revenue, because first-entry thinnings are normally comprised of low-value trees.

The first decade harvest volumes from these management scenarios all show an increase in volume/revenue. However, the district Model Solution Review (MSR) (described later in this appendix) indicates that these harvest volumes should be reduced by about 2.5 MMBF per year. Applying this reduction to all three management scenarios results in the 30 Percent Landscape Design scenario harvesting about 12 MMBF per year and the other two scenarios harvesting 10 MMBF per year, which is the same as or less than the 2003 IP harvest volume. Therefore, only the 30 Percent Landscape Design scenario results in an increased annual harvest volume/revenue.

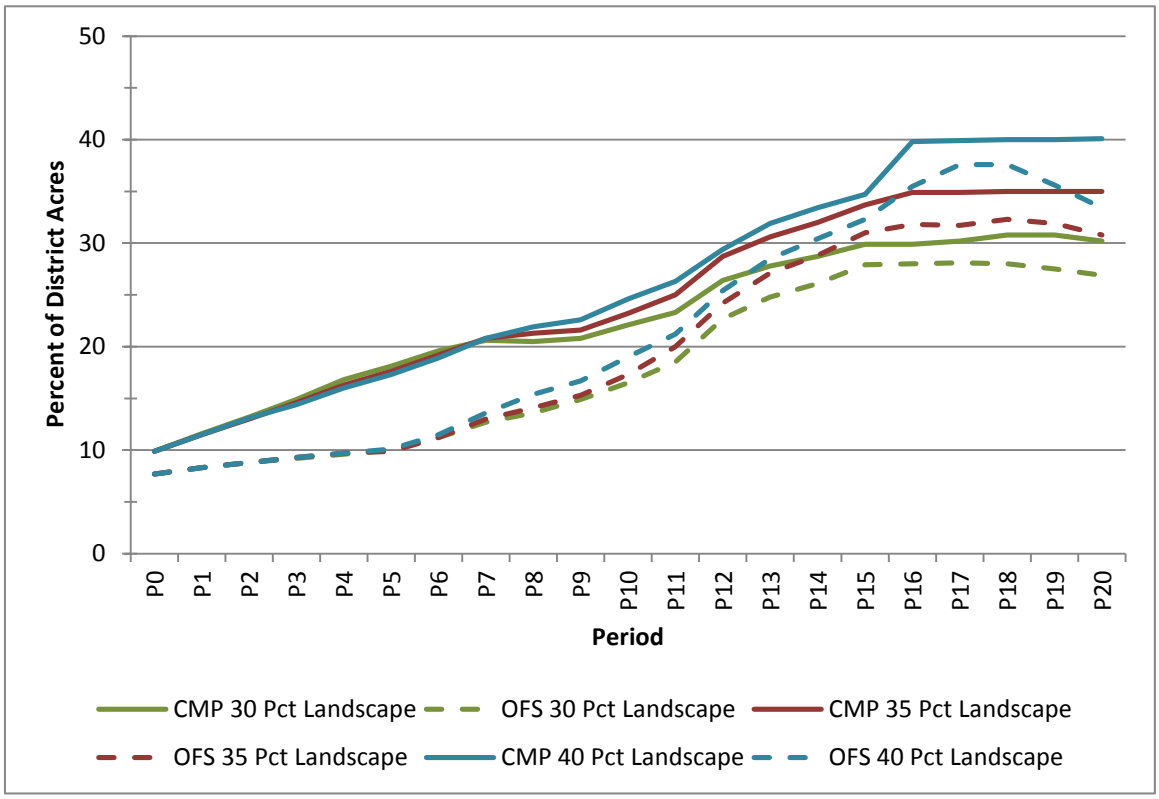
Figure A-5 shows the complex structure development associated with each of these three management scenarios. As in Figure A-2 in the District Potential section, the solid lines represent the total complex structure and the dashed lines represent the Older Forest Structure.

Each of the scenarios achieves its respective complex structure goal at approximately the same time, in about 85 to 90 years (P17 to P18). The similarity in time to achieve complex structure and the trajectory taken to achieve it are understandable, since the difference between each complex structure goal is less than 2,000 acres on the West Oregon District: a complex structure goal of 35 percent targets about 1,850 acres more complex structure than does a goal of 30 percent.

Figure A-6 shows the total and available inventory for these three management scenarios. As in Figure A-3 in the District Potential section, the solid lines show the total standing

volume and the dashed lines show the available volume. The available inventory lines for the 30 and 35 Percent Landscape Design scenarios flatten out, indicating that these scenarios are sustainable over the long term. The slight decline in available inventory line for the 40 Percent Landscape Design scenario indicates that the increase harvest volume starting in 90 years (P18) on Figure A-4 may not be quite as high as shown.

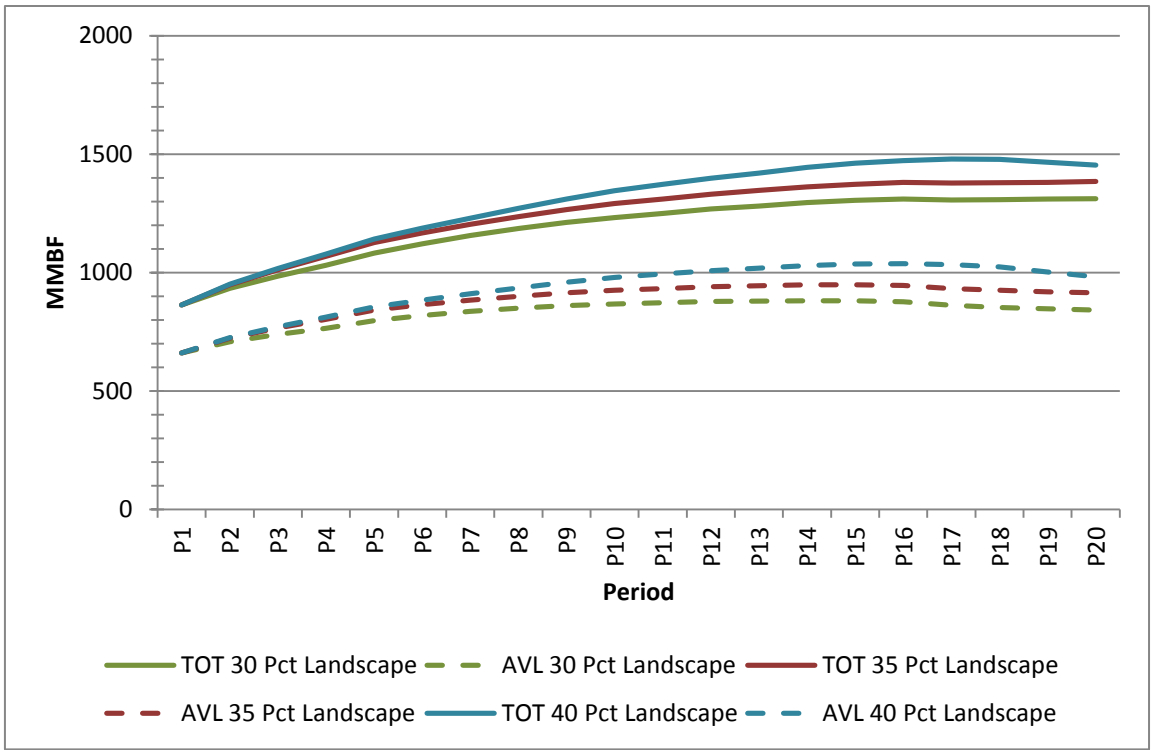
Figure A-4. Landscape Options - Stand Structure



Landscape Options Conclusions

After evaluating the results of the District Potential Scenarios and comparing the results to the principles contained in Performance Measures 3 and 6, then considering the harvest reduction identified through the district MSR, Division Leadership determined that the most appropriate balance of outputs is achieved somewhere between a 30 – 35 Percent Landscape Design scenario. This approach could achieve both the increased volume/revenue and increased stand structure principles contained in Performance Measures 3 and 6.

Figure A-6. Landscape Options - Inventory



Model Solution Review

District staff along with the State Forest Operations Coordinator performed a Model Solution Review (MSR) to evaluate the harvest outputs from the model results based on a 30 percent landscape design. The MSR consists of a detailed review of the model outputs for the first four periods (20 years) to ensure that these harvest levels can be implemented while achieving the goals of this IP. Specifically, the MSR is designed to identify data errors, violations of rules or policy, and assess the effect of operational issues that could not be incorporated into the model. This MSR was conducted using ArcView (a Geographic Information System [GIS] program) to review the location of the harvest units selected by the model and their position relative to and effect on resources such as water and wildlife.

Multiple MSRs were conducted during development of the harvest model and the IP. The earlier MSR identified issues with the data and/or model rules that needed to be corrected in order to improve the accuracy and reliability of the model outputs. The final MSR was conducted to:

- ensure all previous corrections had been incorporated into the harvest model
- identify and quantify the effect of data or model issues that cannot be corrected at this time
- make any necessary adjustments to the model's estimated harvest volume in order to set the Annual Harvest Objective for this IP.

This MSR identified three issues that required a reduction in the Annual Harvest Objective because a correction to the data or the model could not be devised. These issues include:

- Over-estimating the harvest volume from first-entry commercial thinning
- the likely establishment of additional MMMAs during this IP period
- the under-representation of perennial Type N streams in the data

First Entry Commercial Thinning (Partial-Cut Harvest)

The average harvest volumes per acre shown in Table A-3 depict model results and actual results from the last IP period. Actual Regeneration Harvest volumes per acre can easily fluctuate plus or minus 10 percent based on the stands selected for any given Annual Operations Plan (AOP). The Actual Partial-Cut Harvest volumes have a very large range due to the types of stands being harvested. These volumes may be as low as 6 MBF per acre for first-entry commercial thinnings or as high as 18 MBF per acre for thinning in a 70- to 80-year-old stand.

Overall, the harvest volume per acre predicted by the model compares well to the average volume per acre actually harvested on the district over the last 10 years. However, a more detailed analysis carried out during the MSR found that the yield tables used by the model overestimated the harvest volume from the first-entry commercial thinning and under-estimated the volume per acre from the older thinnings, with the resulting average appearing correct.

Table A-3. Average Harvest per Acre

	Model[1]	Actual[2]	Difference
Regeneration Harvest	31.9 MBF	35.0 MBF	3.1 MBF
Partial Cut Harvest	12.5 MBF	11.7 MBF	-0.8 MBF

1. Average volume harvest per acre for periods 1 and 2 before MSR adjustments in partial-cut harvest volumes.
2. Based on the 10-year average volume harvested per acre using "cut-out" or timber cruise information.

During this IP, the district will be shifting its focus to more first-entry thinnings of plantations. In a separate analysis, the district found that there will be a silvicultural need for first-entry commercial thinnings of plantations on approximately 9,000 acres over the next 10 years in order to maintain stand growth. The district estimates that the over-estimate of harvest volume from plantations, combined with the necessary shift to thinning of young stands, results in the model over-estimating the Annual Harvest Objective by up to 1 MMBF.

Additional Marbled Murrelet Management Areas

During the last IP period the district saw an increase in the detections of marbled murrelets and the establishment of additional MMMAs at a rate of about one per year. The district staff expects this trend to continue, and additional MMMAs that will be established will result in a corresponding decrease in harvest opportunities. Analysis of the impact of additional MMMAs found that harvest may have to be reduced by up to 1 MMBF per year.

Perennial Type N Streams

A review of the district's stream layer does not represent all perennial Type N (non-fish bearing) streams. As a result, the model currently under-estimates the district's riparian management area, where harvesting is restricted. The district MSR anticipates that this may impact the annual harvest objective by as much as 0.5 MMBF per year.

Annual Harvest Objective

Based this MSR, the district has determined that the new model volume output (14.5 MMBF) per year cannot be sustainably implemented. Considering the findings of the MSR described above, district staff and the Operations Coordinator adjusted the IP volume output down to the new sustainable level (12 MMBF). The resulting volume can be implemented given the acreage ranges displayed in Table A-4.

Table A-4. Harvest Outputs

	Model Outputs[1]	AOP Average 2002 through 2011	Implementation Plan[2]
Volume (MMBF)	14.5	10	12
Regeneration Harvest Acres	288	142	100 – 280
Partial-Cut Harvest Acres	414	705	200 – 1000
Total Acres	**702**	**847**	**300 – 1,280**

1. Average annual harvest level based on the average outputs from the first two periods (P1&P2) of the IP Revision Harvest Model (30LD_12).
2. Annual harvest levels for the implementation plan starting in July 2013.

Other Factors Affecting Implementation

Other factors that could potentially affect full implementation of the IP objectives are given below. As the district continues to conduct surveys for threatened and endangered species and refines its resource and landscape mapping, other impacts could be discovered in addition to those already anticipated with the MSR. The following factors are recognized as potentially affecting harvest levels, but adjustments have been made to the Annual Harvest Objective:

- High Landslide Hazard Locations – These impact a very small acreage on the district, so there is no need for a volume adjustment.

- Northern Spotted Owl Take-Avoidance Circles – The model reflects the current NSO sites and assumes the same number of sites over time. Adjustments could not be estimated based on the change in the number of northern spotted owl sites, because there is no clear trend for owl populations on the district. Depending on the location, any changes to the number of northern spotted owl sites (either up or down) may require reexamining the timber harvest levels through additional modeling.
- Model Data – The model uses a combination of "harvest units" and stand polygons in applying the rules and determining the harvest levels. While this process normally produces reasonable harvest, a few of the combinations are not operationally feasible. This may have a small effect on harvest levels, but no adjustments have been made. It is the District plan to make improvements to this data layer over time, so it does not have an impact on future modeling.

Implementation

Given the past harvest activities on the district and the resulting current stand ages as described above, the district will likely use a higher proportion of its clearcut objective in the first half of the IP period, and use a subsequently higher portion of its partial-cut objective in the later portion of the IP period. This strategy will allow young stands to continue to mature into a commercial age and size during the early portion of the IP period.

Appendix B

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Map Section

West Oregon District Overview

West Oregon District: Current Condition Stand Structure

West Oregon District: Desired Future Condition Stand Structure

West Oregon District: Forest Land Management Classification – Stewardship Classes

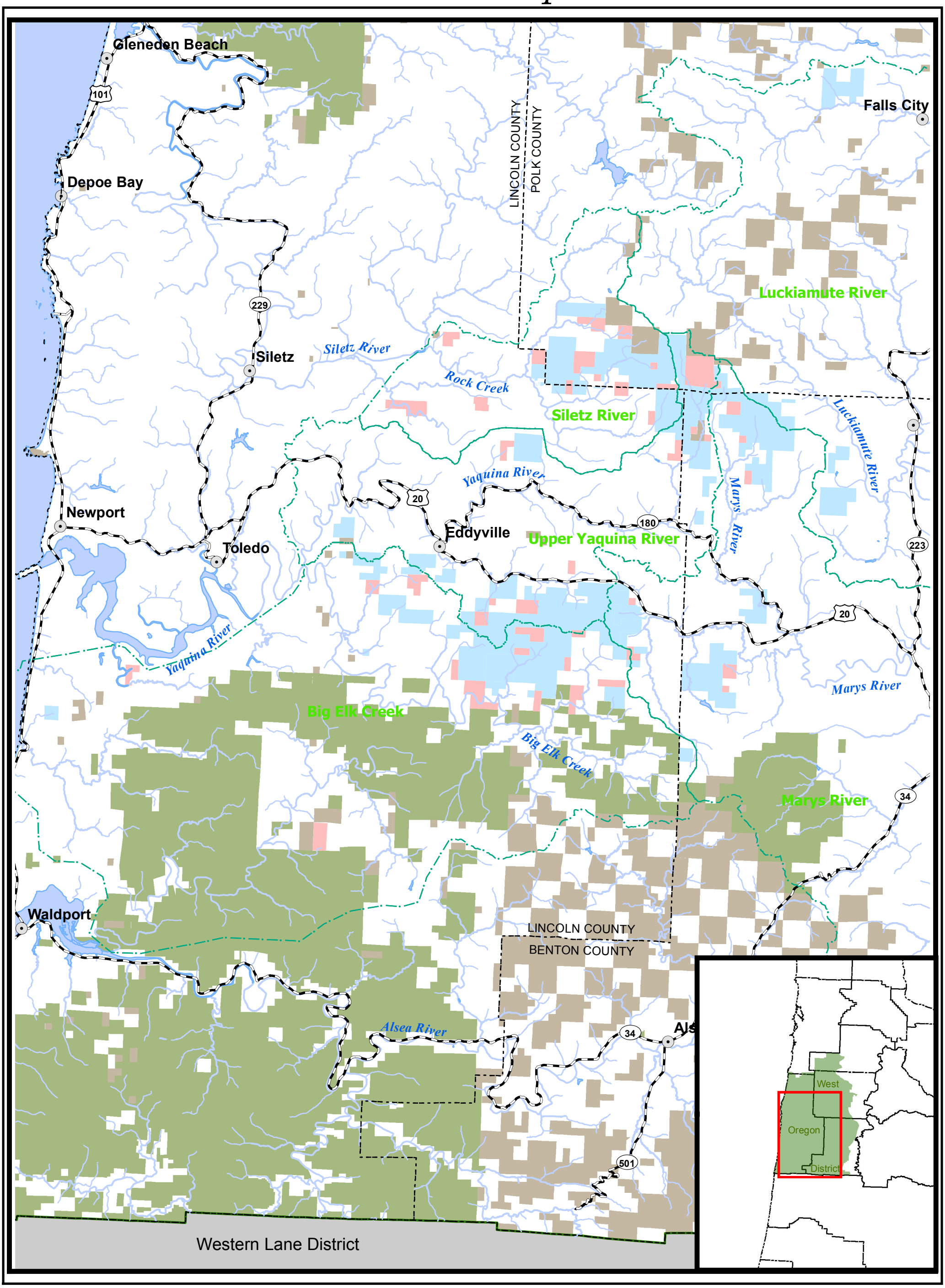
West Oregon District: Forest Land Management Classification – Biological Subclasses

West Oregon District: Forest Land Management Classification – Management Subclasses

West Oregon District: Forest Land Management Classification – Social Subclasses

West Oregon District: Terrestrial and Aquatic Anchors

West Oregon District
Ownership



Ownership
- Common School Lands
- Board of Forestry Lands
- US Bureau of Land Management
- US Forest Service

- **Towns**
- **Roads**
- **Streams, Large**
- **Streams, Medium**
- **Management Basins**

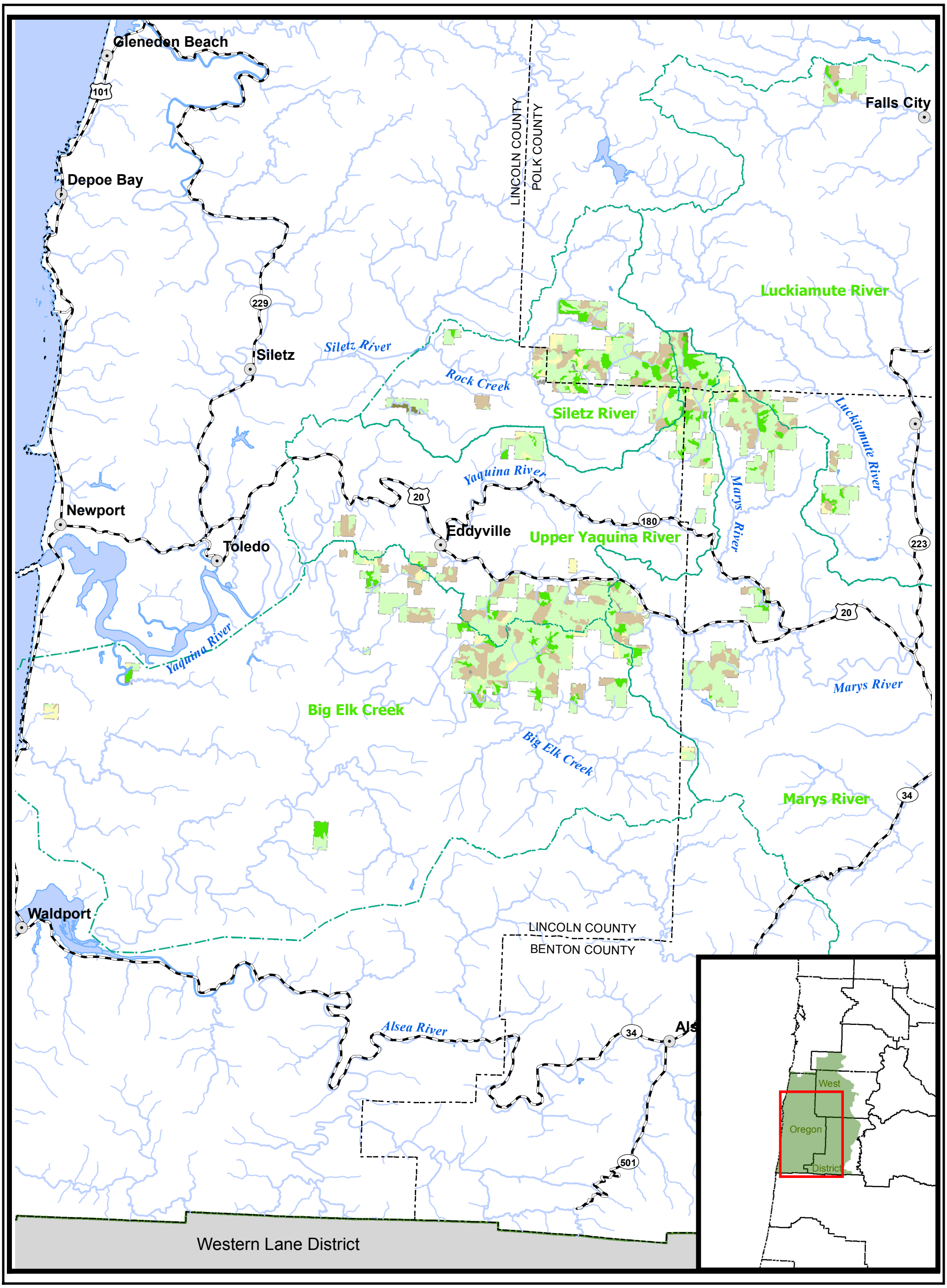
N

0 1 2 4 6 8 10
Miles

This product is for informational purposes, and may not be suitable for legal, engineering or surveying purposes.This information or data is provided with the understanding that conclusions drawn from such information are the responsibility of the user.

JTH 3/15/2012

West Oregon District
Current Condition



Stand Structure Type
- Nonforested
- Regeneration
- Closed Single Canopy
- Understory
- Layered
- Older Forest Structure

- **Towns**
- **Roads**
- **Streams, Large**
- **Streams, Medium**
- **Management Basins**

N

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Miles

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JTH 3/15/2012

West Oregon District
Desired Future Condition

Gleneden Beach
Depoe Bay
Newport
Toledo
Siletz
Eddyville
Falls City
Waldport
Alsea
Western Lane District
LINCOLN COUNTY
POLK COUNTY
LINCOLN COUNTY
BENTON COUNTY
Luckiamute River
Siletz River
Rock Creek
Yaquina River
Upper Yaquina River
Marys River
Big Elk Creek
Alsea River
101
229
20
180
223
34
501

Stand Structure Type
- LYR
- OFS
- Other

- **Towns**
- **Roads**
- **Streams, Large**
- **Streams, Medium**
- **Management Basins**

N

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Miles

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JTH 3/15/2012

West Oregon District
Stewardship Classifications

Gleneden Beach
Depoe Bay
Newport
Toledo
Siletz
Eddyville
Falls City
Waldport
Alsea
Western Lane District
LINCOLN COUNTY
POLK COUNTY
LINCOLN COUNTY
BENTON COUNTY
Luckiamute River
Siletz River
Rock Creek
Siletz River
Luckiamute River
Yaquina River
Marys River
Upper Yaquina River
Yaquina River
Marys River
Big Elk Creek
Big Elk Creek
Marys River
Alsea River
101
229
20
180
223
20
34
34
501
West
Oregon
District

Stewardship Classifications
- Special
- Focused
- Other

- **Towns**
- **Roads**
- **Streams, Large**
- **Streams, Medium**
- **Management Basins**

N

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Miles

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JTH 3/15/2012

West Oregon District

Stewardship Classifications - Biological Subclasses

Gleneden Beach
Depoe Bay
Newport
Toledo
Siletz
Eddyville
Falls City
Waldport
Alsea
Western Lane District
LINCOLN COUNTY
POLK COUNTY
LINCOLN COUNTY
BENTON COUNTY
Siletz River
Rock Creek
Yaquina River
Yaquina River
Big Elk Creek
Big Elk Creek
Alsea River
Marys River
Marys River
Luckiamute River
Luckiamute River
Siletz River
Upper Yaquina River
Big Elk Creek
Marys River
101
229
20
180
223
20
34
34
501

West
Oregon
District

Special Stewardship
Aquatic and Riparian Habitat
Wildlife Habitat
Plants

Focused Stewardship
Aquatic and Riparian Habitat
Wildlife Habitat
Plants

Roads
Streams, Large
Streams, Medium
Management Basins

N

0 1 2 4 6 8 10
Miles

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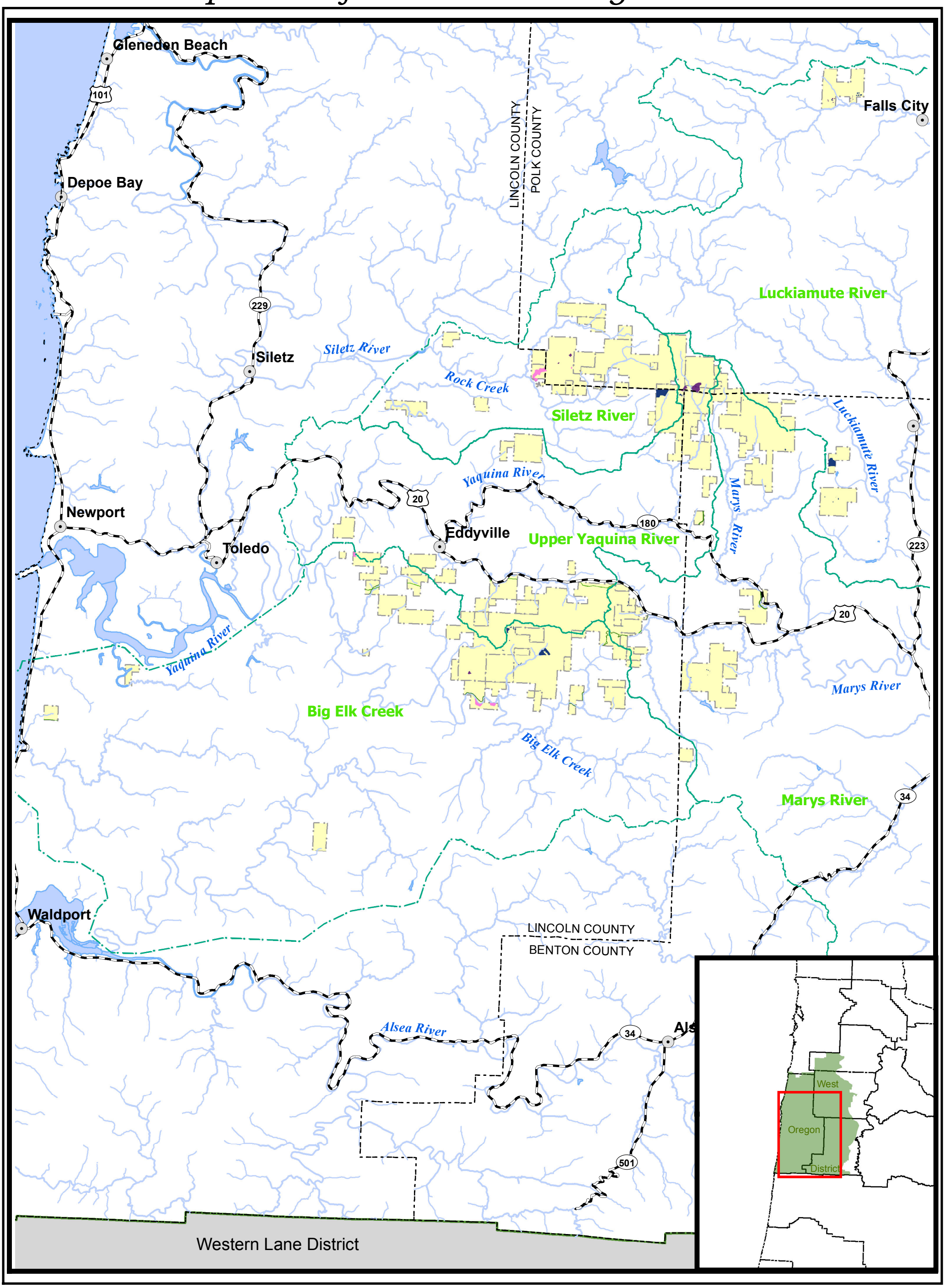
JTH 3/15/2012

West Oregon District

Stewardship Classifications - Management Subclasses



Special Stewardship

- Administrative Sites
- Easements
- Energy and Minerals
- Research/Monitoring
- Transmission
- Operationally Limited

Focused Stewardship

- Research/Monitoring

- Towns
- Roads
- Streams, Large
- Streams, Medium
- Management Basins

N

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Miles

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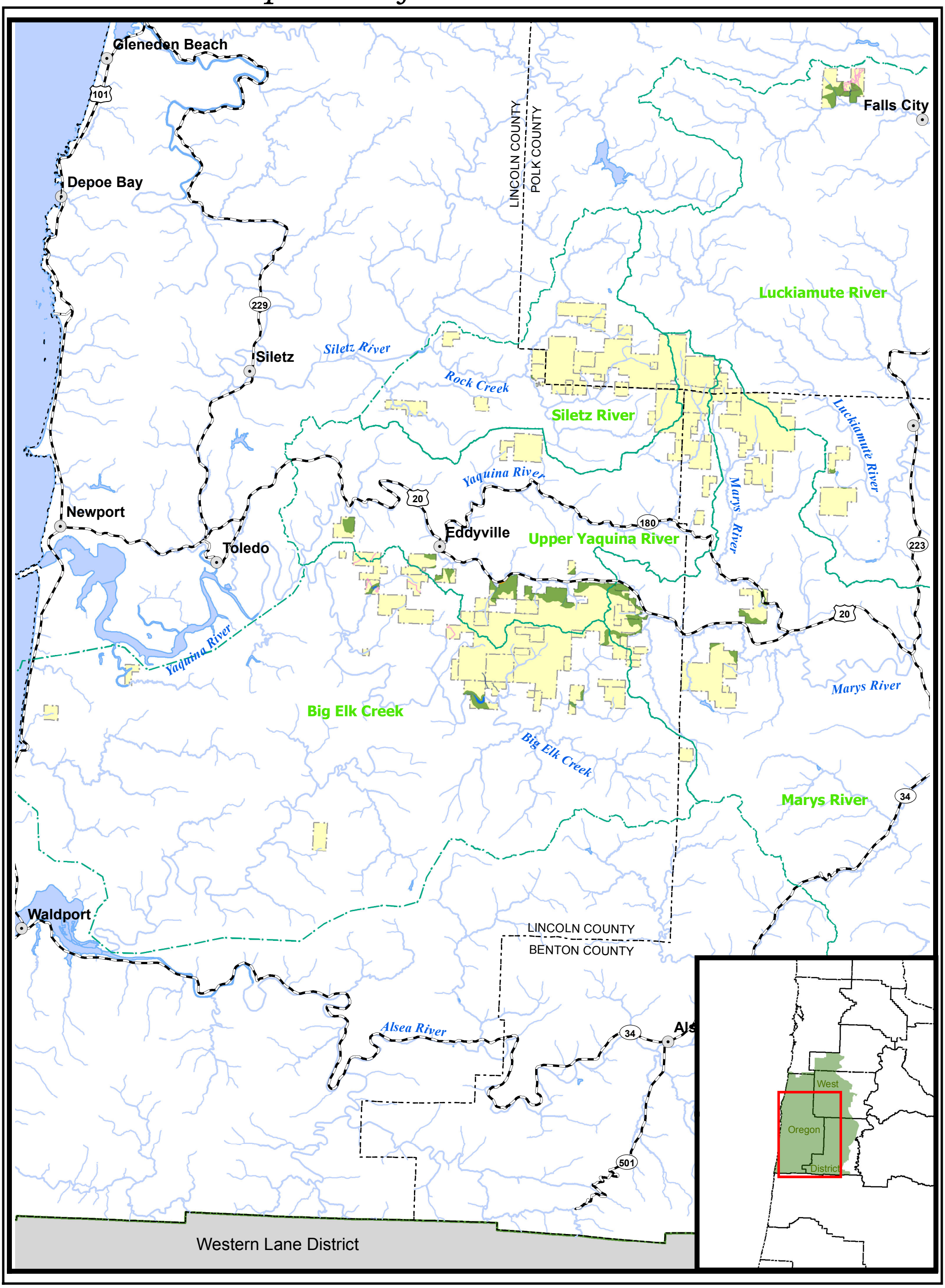
JTH 3/15/2012

West Oregon District

Stewardship Classifications - Social Subclasses



Special Stewardship
- Recreation
- Visual

Focused Stewardship
- Domestic Water Use
- Visual
- Recreation

- Towns
- Roads
- Streams, Large
- Streams, Medium
- Management Basins

N

0 1 2 4 6 8 10
Miles

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JTH 3/15/2012

West Oregon District
Anchor Habitats

Gleneden Beach
Depoe Bay
Newport
Toledo
Waldport
Siletz
Eddyville
Falls City
Alsea
101
229
20
180
223
34
501
LINCOLN COUNTY
POLK COUNTY
LINCOLN COUNTY
BENTON COUNTY
Siletz River
Rock Creek
Yaquina River
Luckiamute River
Marys River
Alsea River
Big Elk Creek
Green Mtn. TA
Rock Creek Aquatic Anchor
Upper Yaquina Aquatic Anchor (Amphibian Emphasis)
Upper Yaquina River
Wolf Cr. TA
Wolf Creek Aquatic Anchor
Big Elk Creek
Marys River
Western Lane District
West
Oregon
District

Terrestrial Anchor
Aquatic Anchor - Applicable to State Forests Only
Roads
Streams, Large
Streams, Medium
Management Basins
State Forest Land

N

0 1 2 4 6 8 10
Miles

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JTH 3/15/2012

Oregon
John A. Kitzhaber, MD, Governor

Department of Forestry
State Forester's Office
2600 State Street
Salem, OR 97310-1336
503-945-7200
FAX 503-945-7212
www.oregon.gov/ODF

"STEWARDSHIP IN FORESTRY"

To: Liz Dent, State Forest Division Chief

From: Doug Decker, State Forester

Date: June 25, 2014

Subject: Implementation of the Revised Forest Land Management Classification Rule on State Forests

This memo addresses approval of the implementation of the revised Forest Land Management Classification System (FLMCS) rule, including the new High Value Conservation Areas and Special Use classifications, on State Forest lands managed by the following districts: Astoria, Coos, Forest Grove, North Cascade, Southwest Oregon, Tillamook, West Oregon, and Western Lane.

On June 5, 2013, the Oregon Board of Forestry adopted a revision to the FLMCS rule (OAR 629-035-0055) that added the classifications of High Value Conservation Area and Special Use while removing the Special Stewardship Classification. The purpose of this rule revision was to increase the visibility of the important conservation strategies that were already occurring on State Forests.

It was clear that implementation of this rule revision would result in a major change to the FLMCS maps/data and would be required to be available for public comment for 30-days (OAR 629-035-0060). Upon approval of the rule revision, the districts were directed to begin the task of updating the FLMCS data with the goal of having draft maps available for a public comment process that would occur concurrently with the normal 45-day public comment period for the Annual Operations Plans.

The public comment period occurred between March 17 and May 2, 2014 and included three open houses that focused on the implementation of the revised FLMCS rules, especially the location and purpose of High Value Conservation Areas. The open house were held early in the public comment period at the Forest Grove, Astoria, and Tillamook district offices. In response to the public comment period, the Division received:

- Eight letters/emails
- Approximately 1,700 form letter type emails
- Fifteen comments generated through an on-line survey

Almost all of the comments were generally supportive of the implementation of the FLMCS. Many of the comments included a request that the Department improve the durability of the High Value Conservation Areas; this issue is currently being addressed through the Alternative Forest Management Plan Project.

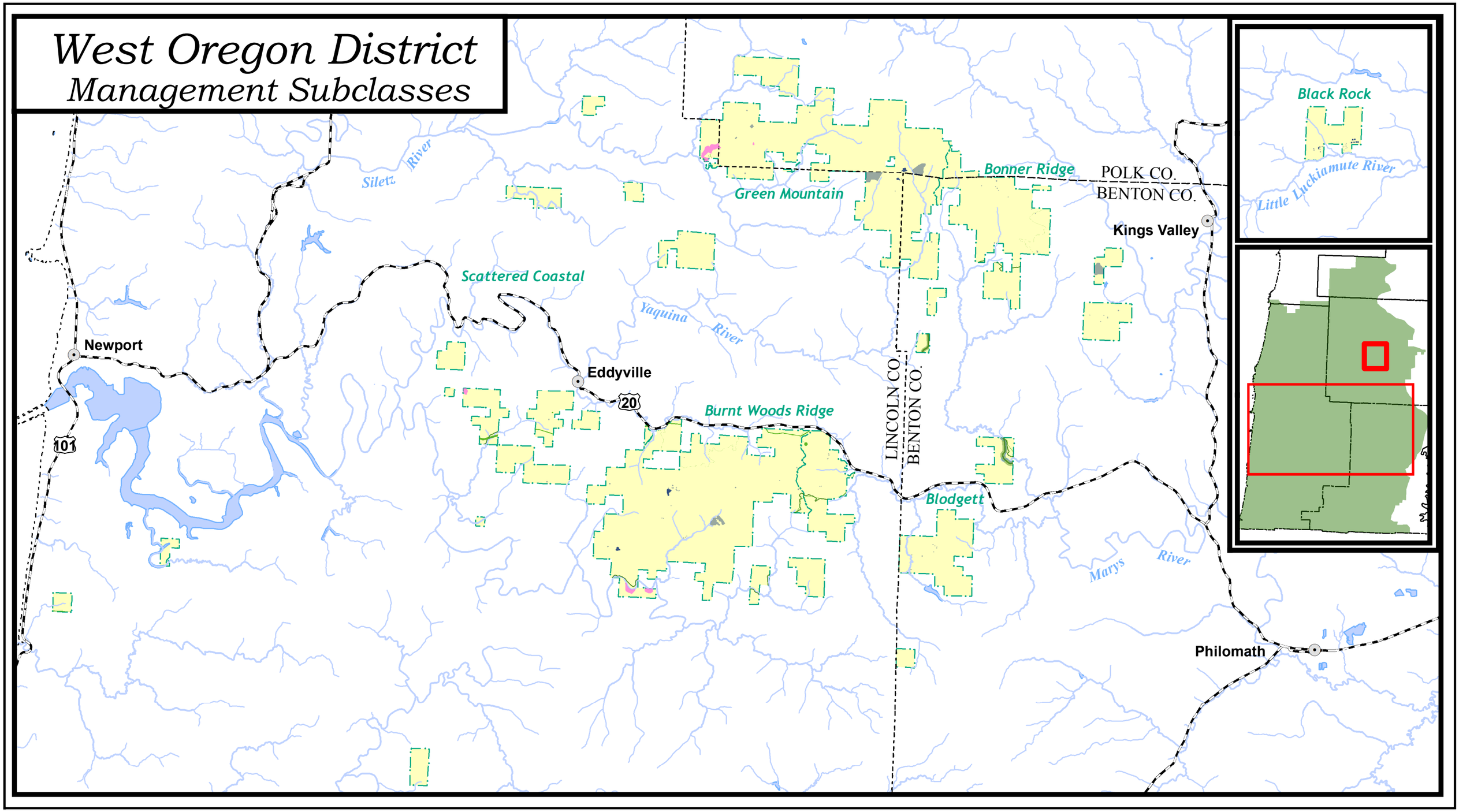
Several individuals indicated that old growth should be classified as High Value Conservation Areas. After reviewing the management strategies for old growth in the Northwest Oregon, Southwest Oregon, and Elliott State Forest Management Plans, I have found that old growth stands (as defined in those plans) qualifies for classification as High Value Conservation Areas under the Unique, Threatened, or Endangered Plants subclass. I have directed the districts to include existing old growth stands as High Value Conservation Areas in their final FLMCS designations.

After reviewing the draft FLMC maps/data, the public input, the recommendations from the District Foresters and Area Directors, and consistent with OAR 629-035-0060 (2), I am approving the revised FLMCS for Astoria, Coos, Forest Grove, North Cascade, Southwest Oregon, Tillamook, West Oregon, and Western Lane Districts.

Doug Decker
State Forester

6·25·14
Date

West Oregon District
Management Subclasses



Special Use
- Administrative Sites
- Easements
- Research/Monitoring
- Transmission
- Operationally Limited

Focused
- Easements
- Research/Monitoring
- Transmission

Towns

Roads
- Streams, Large
- Streams, Medium

Management Basins

N

0 1 2 4 6 8 10
Miles

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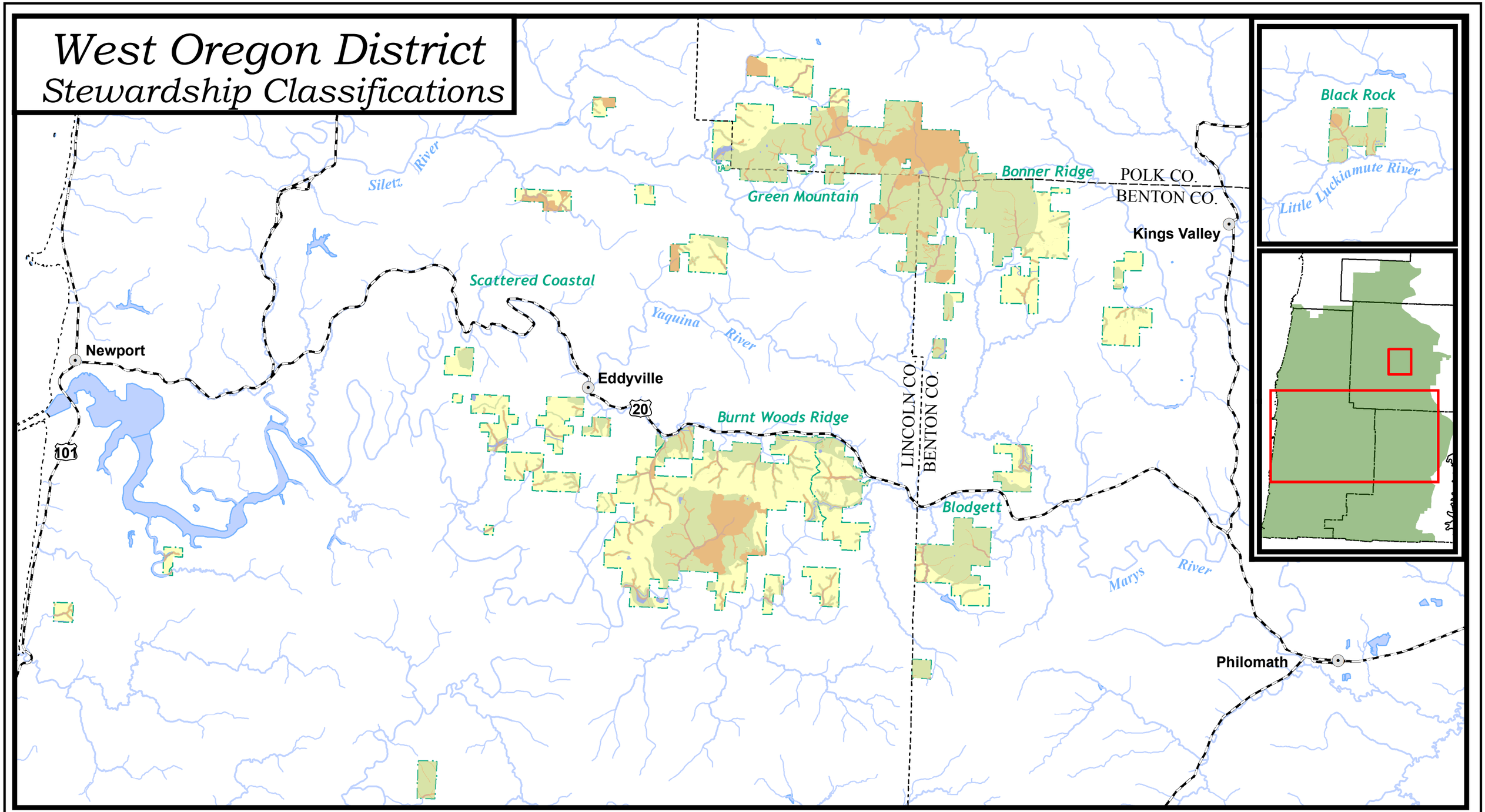
MW 3/12/2014

West Oregon District
Stewardship Classifications



Stewardship Classfications

- High Value Conservation Area
- Special Use
- Focused
- Other

Towns

Roads

Streams, Large

Streams, Medium

Management Basins

N

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Miles

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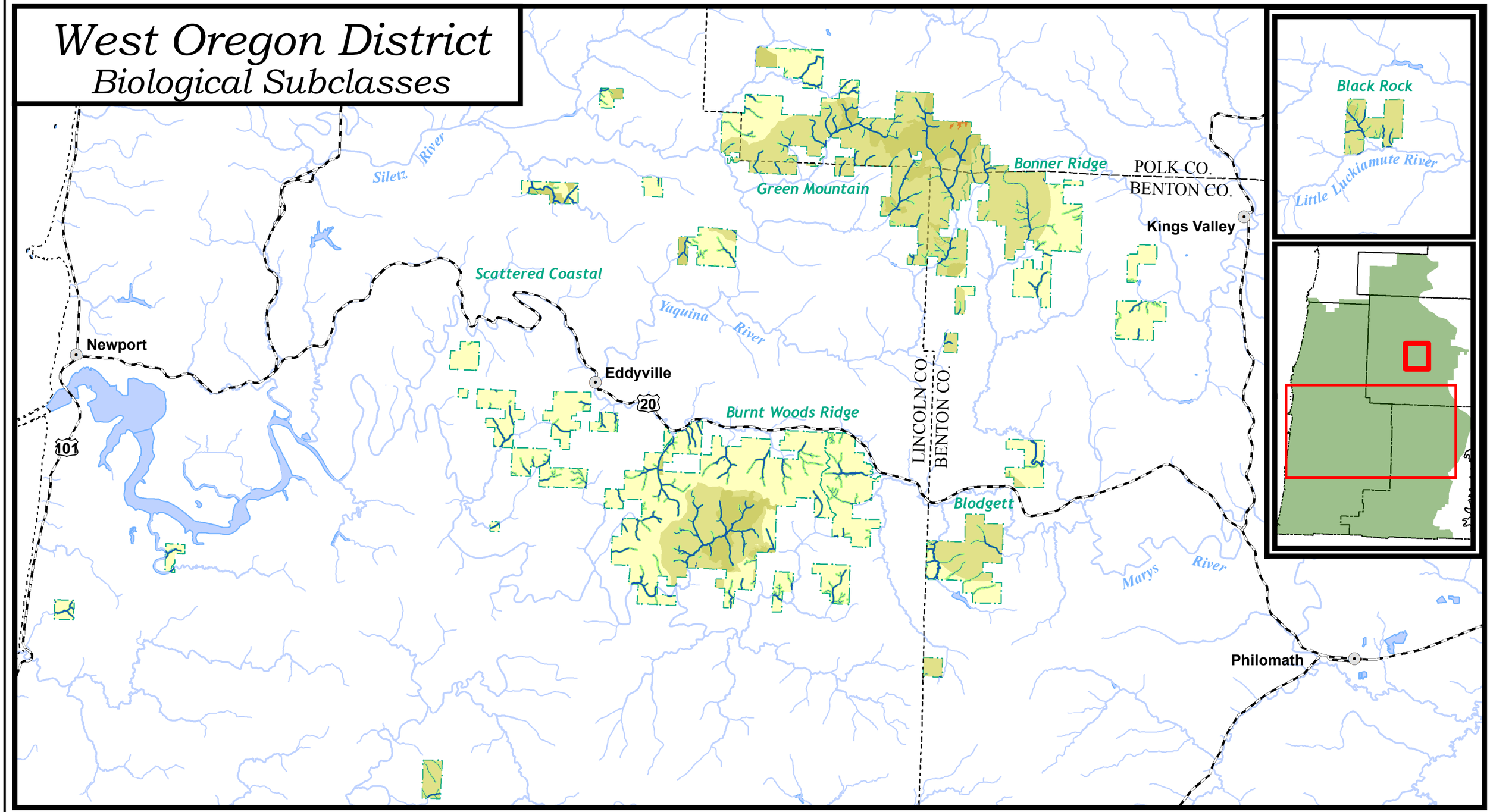
MW 3/12/2014

West Oregon District
Biological Subclasses



High Value Conservation Areas
- Aquatic and Riparian Habitat
- Wildlife Habitat

Focused
- Plants
- Aquatic and Riparian Habitat
- Wildlife Habitat

Towns

Roads
- Streams, Large
- Streams, Medium

Management Basins

N

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Miles

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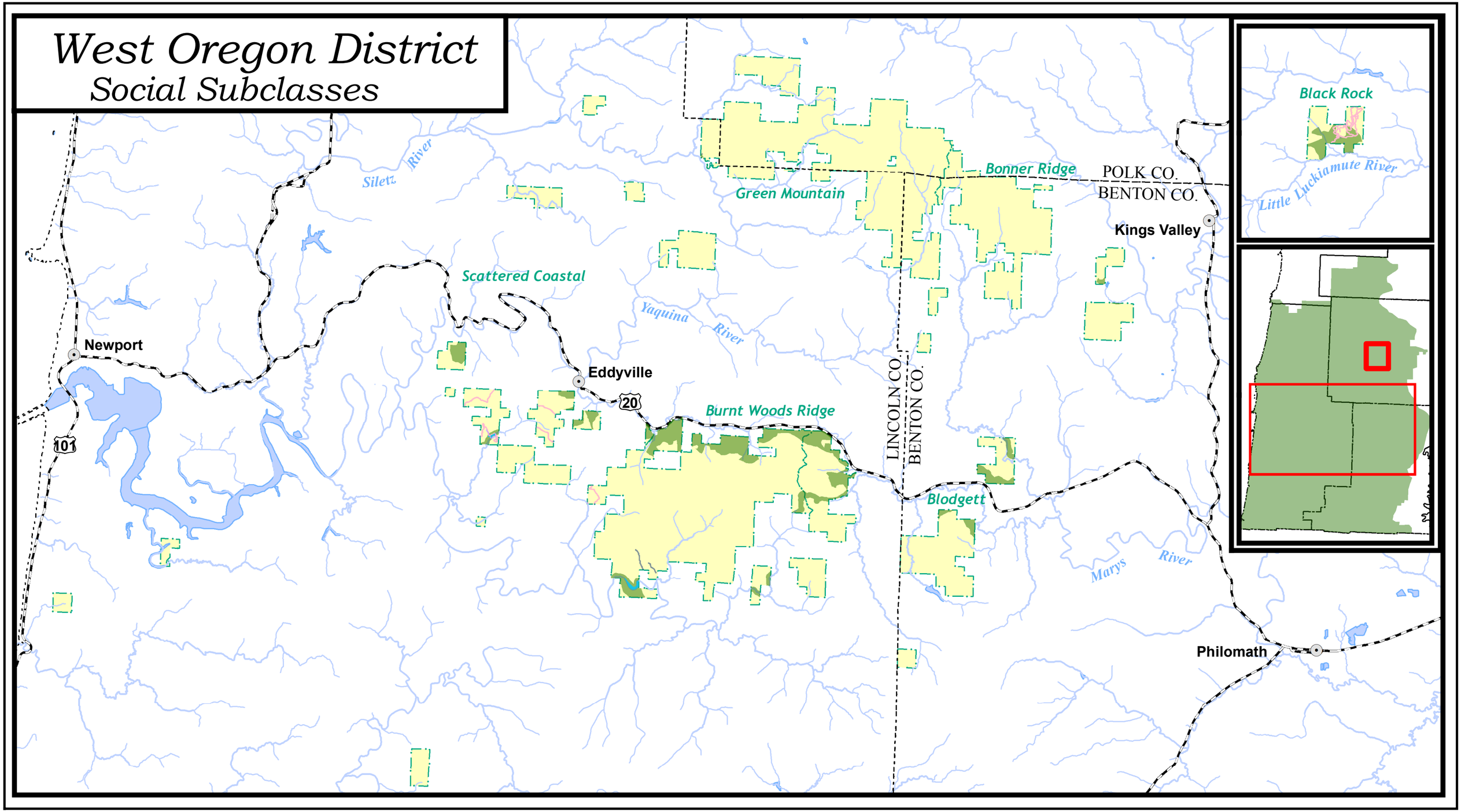
MW 3/12/2014

West Oregon District
Social Subclasses



Special Use
- Recreation
- Visual

Focused
- Cultural Resources
- Domestic Water Use
- Visual
- Recreation

Towns

Roads
- Streams, Large
- Streams, Medium

Management Basins

N

0 1 2 4 6 8 10
Miles

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MW 3/12/2014

MEMORANDUM

To: Mike Bordelon, State Forests Division Chief,
Liz Dent, State Forests Division Deputy Chief,
AndyWhite, Area Director,
Doug Decker, State Forester

From: Mike Totey, District Forester
CC: Rob Nall, Operations Coordinator
Date: March 6, 2014
Re: Minor Modification to the West Oregon District Implementation Plan

---

The West Oregon District Implementation Plan (IP) under the Northwest Oregon State Forests Management Plan (FMP) was approved June 2012. The FMP provides for minor modifications as approved by the District Forester. Minor modifications are any modifications to the approved document that do not meet the definition of a major modification included in the approved IP document. The modification herein is less than 25% of the total harvest level and therefore qualifies as a minor modification.

Harvest Levels

The District recognized the need to have a higher proportion of clearcut harvest objectives in the first half of the IP period (as stated in the IP in Appendix A on pg.78), for the planned harvest ranges. This, along with the current status of T&E surveys, has caused the district to make an adjustment to the mixture of regeneration and partial cut harvest ranges to most efficiently and effectively meet FMP goals and objectives.

This modification will also help achieve the average of the annual harvest objective (12 MMBF) over the 10 year IP period. In FY13 WO accomplished 7.9 MMBF, in FY14 WO is projected to accomplish 11.3 MMBF, and in FY15 WO is planning to accomplish 13.2 MMBF. The total over those three years is 32.4 MMBF, or 10.8 MMBF/fiscal year, which is still less than the 12 MMBF annual harvest objective.

The modified IP harvest levels shown in the table below better reflects the current need of the district, the current stand conditions on the district, and will better meet the objectives over the life of the IP.

Activity	Original IP Harvest Level	Modified IP Harvest Level
Partial Cut	200 – 1,000 acres	0 – 1,200 acres
Clearcut	100 – 280 acres	255 – 400 acres

This minor modification to the West Oregon District Implementation Plan is approved, effective March 6, 2014. Modify Table 9 in the IP to reflect the new harvest levels.

Mike Totey, District Forester

3-6-14
Date