

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests Preliminary Evaluation of Indicator of Sustainable Forest Management



E.a.: Composition, diversity and structure of forest vegetation

Current desired trend/target: Following establishment of a statewide plant and animal conservation policy, the composition, diversity, and structure of Oregon forest vegetation are within, or growing towards, desired future condition ranges.

The following is a response by Oregon Department of Forestry (ODF) technical and policy staff to the October 11, 2010 Oregon Roundtable on Sustainable Forest preliminary evaluation of Indicator of Sustainable Forest Management E.a.: *Composition, diversity and structure of forest vegetation*. This evaluation can be accessed at:

http://www.oregon.gov/ODF/indicators/docs/Draft_Ea_Roundtable_Evaluation.pdf

The current data report for this indicator can be accessed at:

<http://www.oregon.gov/ODF/indicators/indicatorEa.shtml>

This online report reflects the revisions indicated in this response.

Key Roundtable findings

1. The indicator is not ready to assign ratings on condition and trend.
2. The purpose and importance of this indicator is not clear.
3. The protocol is state-of-the-art for the purpose for which it was designed - but it doesn't seem to answer all the questions posed by the indicator. Broaden the approaches to truly measure and describe biological diversity. It appears that the data are much richer than displayed in the indicator report. With time and staff work it can be further utilized.
4. Analysis/maps of species diversity and/or richness in the overstory and understory would be useful.
5. The lack of a policy goal is a problem. There doesn't seem to be either a historic benchmark or a desired future condition, so it would be impossible to state whether there is a trend.
6. Consider discussing trends as a description of our ability to meet management goals over time.
7. Consider combining data to analyze habitat conditions/effectiveness
8. A risk analysis for vegetation structure components is needed.

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests
Preliminary Evaluation of Indicator of Sustainable Forest Management E.a.:
Composition, diversity and structure of forest vegetation
March 31, 2011 Draft

Staff response to specific Roundtable comments

1. Is the purpose and intent for the indicator clear?

Roundtable Comment: Better describe the indicator's use and validity and how the information can lead to better decisions, serve as a measure of change over time and space, and be useful to evaluate other sustainable forestry factors such as invasive species and climate change effects.

Staff Response: The following language will be included in the report section titled "Why is this indicator important?"

"Comparing differences in the composition and structure of plants assessed at different intervals of time can serve as indicators of changes to ecosystems, and as indicators of the status of other organisms and ecosystem processes that are difficult to measure directly. The information presented with this indicator is a first-in-time analysis and serves as a baseline from which future analyses can be compared. Comparisons of the contemporary information represented here with historic inventories are problematic because of inconsistencies of sampling designs between inventory periods and the fact that similar analyses for previous inventories have not yet been generated. Changes in composition, structure, and forest canopy can be used to verify and relate information from this indicator to that presented in other indicators such as timber harvest rates, mortality from insects and diseases, amount of wildfire, conversion of forest land to other uses, carbon sequestration and storage, as well as the effects of climate change. Detecting, quantifying, and accounting for changes also serves as an early warning and an informed basis for modifying forest policies as well as other policies that directly or indirectly affect forest ecosystems. We are investigating the feasibility for including herbaceous and shrub species in future iterations of this indicator to track the status and trends of invasive species and those most sensitive to changes in climate."

Roundtable Comment: Are the data the first photograph in a time sequence, or do they indicate something right now? Clearly identify the "window of time" that data gathering occurred versus a "point in time."

Staff Response: Within the section titled "Focus of Indicator E.a and the questions to be answered" there is a link for "Data Availability and Analysis" that fully describes the time frame and sources the data were collected (see http://www.oregon.gov/ODF/indicators/IndicatorEa_data.shtml)

2. Is the protocol for indicator data collection clear and technically sound?

Roundtable Comment: Some believe the current indicator protocol may rely too heavily on one data source, making it incomplete. Can it answer the questions posed by the indicator? We need access to understory and non-tree species information in the database, recognizing the spatial resolution may not match that available for overstory vegetation.

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests

Preliminary Evaluation of Indicator of Sustainable Forest Management E.a.:

Composition, diversity and structure of forest vegetation

March 31, 2011 Draft

Staff Response: The indicator clearly describes the different data sources that were used for the GNN analysis conducted by the Landscape Ecology Modeling, Mapping, and Analysis (LEMMA) team at OSU. Within the section titled “Focus of Indicator E.a and the questions to be answered” there is a link for Data Availability and Analysis that fully describes the time frame and sources the data were collected.

We are working closely with ecologists within the Oregon Climate Change Research Institute (OCCRI) to model and map understory and tree species for two inventory occasions that can be used to detect and quantify any changes or trends in spatial distributions.

Including forest features like meadows and wetlands would mean an extra set of maps for each ecoregion and there is not adequate data available for mapping individual meadows and wetlands. Identification and mapping of meadows within forestland were not included in the GNN analysis and therefore would require separate analyses of imagery data and field inventories.

Roundtable Comment: Information on the dead wood components (snags and down wood) is needed but missing.

Staff Response: Mapping dead wood components would be very informative because a variety of wildlife and other species are dependent on decadent standing and fallen trees. Mapping mortality from natural decadence, fires and insect/diseases might be better suited for Indicator F.a.-Tree mortality from insects and diseases and damaging agents...or F.a. might be better suited as a Strategy E indicator. The FIA 5-year report included a section on dead wood (<http://www.fs.fed.us/pnw/publications/gtr765/>, pages 42-48). FIA “analyzed data on snags and down wood collected by FIA crews on more than 2,600 field plots in the state. Dead wood is described in broad terms at the statewide level, with comparisons between western Oregon and eastern Oregon when relevant.” A reference to dead wood will accompany the link to the FIA 5-year report in the indicator.

Roundtable Comment: Use several data sources instead of just one -- The Nature Conservancy? Oregon Wildlife Conservation Strategy?

Staff Response: The data used for the GNN analysis for this indicator (see the various sources used in the Information section in the indicator write-up) is not of the same purpose, extent, and standards as the Nature Conservancy or the Oregon Conservation Strategy information.

Roundtable Comment: True biological diversity sampling may not be possible with the current level of sampling. Examples of possible diversity sub-samples: aspect, elevation, any other identified topics of social concern.

Staff Response: What is “true biological diversity sampling?” Aspect and elevation are geophysical attributes that can influence the type and number of species that exploit certain areas across the landscape and they were used as predictor variables within the GNN analysis.

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests

Preliminary Evaluation of Indicator of Sustainable Forest Management E.a.:

Composition, diversity and structure of forest vegetation

March 31, 2011 Draft

Roundtable Comment: If technically possible, we need more details than just reporting species dominance. It makes a difference if the dominant species is 100% or 51% of the stand.

Staff Response: It is not technically possible to report species ratios with the GNN data which has higher accuracy at watershed scales than at stand scales. The LEMMA team has produced GNN analysis for individual species of trees so we could integrate each tree layer to produce a results column in the database that listed the number and names of the tree species predicted to fall within a particular cell. While an analysis that shows species ratios at a stand level across Oregon is desired by many it is very challenging to accomplish with the data we have available.

3. Are indicator data being reported at the appropriate spatial and temporal scales?

Roundtable Comment: It appears that the data are much richer than displayed in the indicator report. With time and staff work it can be further utilized to enlarge our knowledge base and suggest more sophisticated policy options for the Board.

Staff Response: This statement is true...there is much more data available from the GNN analysis that can be used for this indicator that would enlarge our knowledge base. Staff could create additional mapped information, graphics, and text; however, the amount of information could be overwhelming for the purposes of the indicator

Roundtable Comment: Be clear on appropriate uses for the indicator data. It is important to note in the indicator report that the data cannot be used at very small, site-specific scales. Characteristics of composition, structure and diversity are very appropriately addressed at the scale of ecoregions. But there was also interest in having the data answer questions in at many scales (from macro to micro), such as stratifying the data by ownership and gathering additional data at smaller scales.

Staff Response: The spatial scale of the mapped GNN data is included in the information section along with a description of the spatial scales at which the information is useful.

Roundtable Comment: It is probabilistic survey data that can give region-level information, spatially speaking. Temporally, it is only a status, no trend, but that can be captured in the symbols (trend currently unknown).”

Staff Response: This statement is basically correct.

Roundtable Comment: As stated earlier, some believed the indicator is overly reliant on one data source, limiting its usefulness over time and space.

Staff Response: The data for the GNN analysis was reliant on at least 4 data sources but since FIA consolidated these sources future analyses will be reliant on FIA. If there were other reliable data sources we will certainly evaluate the integration in future GNN or similar analyses.

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests

Preliminary Evaluation of Indicator of Sustainable Forest Management E.a.:

Composition, diversity and structure of forest vegetation

March 31, 2011 Draft

4. From the indicator report can you draw a conclusion regarding the quality of the Indicator E.a information?

Roundtable Comment: The data are collected and analyzed systematically based on a statistical sampling design. The quality of the data are high to the extent conclusions can be drawn about tree species, but we are not able to make appropriate statements about other types of forest vegetation. The only conclusion to be drawn is the abundance of quality and pertinent information. If there was scientific consensus that there is a strong correlation between tree stand type and forest vegetation, then perhaps the data would be adequate.

Staff Response: There is a strong correlation between tree overstory species, geography, climate and the composition of understory species. ODF is working closely with OCCRI to explore the feasibility to sufficiently model and map understory species.

Roundtable Comment: Current condition information is good, trend information is missing. Consider identifying a trend based on historical data.

Staff Response: Historical data do not exist for the GNN analysis so identifying trends would be very difficult. However, it might be possible to perform but would require large amounts of funding and would have high error rates given different sampling protocols and designs among past FIA inventories. Nonetheless, we are working with OCCRI to explore the feasibility of comparing similar vegetation modeling and mapping techniques using previous inventories (known as “periodic”) with current (known as “annual”).

Roundtable Comment: The OSU study includes extensive additional information regarding ground-truthing and model accuracy that should at least be summarized in the report.

Staff Response: We could certainly include the GNN model accuracy information, however, it might be better to have a link to the LEMMA website where the details of the accuracy assessments can be obtained. The link will be at the bottom of the accuracy assessment information on the Data availability and analysis webpage (http://www.oregon.gov/ODF/indicators/IndicatorEa_data.shtml).

5. From the indicator report can you draw a conclusion regarding the current conditions measured by Indicator E.a.?

Roundtable Comment: The data are adequate to determine the current species composition, species diversity, and structure of the macro vegetation in Oregon's forests. But the data only tells the story of the dominant tree species. Analysis/maps of species diversity and/or richness in the overstory and understory would be useful.

It would help to a diversity index based on species and structure. There are generic diversity indices suitable for this purpose.

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests

Preliminary Evaluation of Indicator of Sustainable Forest Management E.a.:

Composition, diversity and structure of forest vegetation

March 31, 2011 Draft

The only interesting reference point is that Oregon's forest remains dominated by the same native tree species present before settlement, but there is no means to compare in what diversity, abundance or size.

Staff Response: It is possible for this indicator to report on tree species richness but this analysis has not been conducted at the reporting scale of this indicator and it could be misleading. According to research conducted by FIA analysts... "Accurately determining species richness in natural stands is not possible with a clustered, nested-subplot-size design. This suggests that relying on these plots to describe factors affecting stand-level species diversity is prone to [unacceptable] error."

Reporting changes in *generic* diversity indices such as alpha (number of species in a small area within a landscape), beta (ratio of the turnover of species between communities), or gamma diversity (total number of species in a landscape) would report inaccurate results given the main feature of the Forest Inventory and Analysis system, the phase 2 plot system, was not designed to report these indices and there are differences in sampling design among historical inventories.

Nonetheless, the most recent FIA 5-year report (Donnegan et al. 2008) includes a section on Lichen and Plant Biodiversity based on the suite of forest health indicators (Gray and Azuma 2005; Jovan 2008). The FIA crews surveyed for epiphytic (tree-dwelling) lichens on all phase 3 plots between 1998 and 2003, within a 16-week period during the growing season, and recorded the abundance of each species occurring within a 0.93-acre area. The 5-year report informs that "there are 333 phase 3 plots across the forested regions of Oregon" and states that "the relatively small number of phase 3 samples is intended to serve as a broad-scale detection monitoring system for forest health problems." The report includes 2 maps of Oregon with color coded points for phase 3 plots. The points in one map shows lichen species richness index for all 333 plots and the other map shows vascular plant species plot-level richness index on 110 of the phase 3 plots. The vascular plant data collection has never been fully implemented and is frequently the first target for any budget reductions. Perhaps the best alternative is to provide a link in the indicator report so that readers can reference the FIA 5-year report to learn what information is available for Oregon in terms of plant biodiversity indices.

We will also remove the metric for vegetation species diversity: richness and evenness from the indicator report.

Donnegan, Joseph; Campbell, Sally; Azuma, Dave, tech. eds. 2008. Oregon's forest resources, 2001–2005: five-year Forest Inventory and Analysis report. Gen. Tech. Rep. PNW-GTR-765. Portland, OR: U.S. Forest Service, Pacific Northwest Research Station. 186 p.

Gray, A.N.; Azuma, D.L. 2005. Repeatability and implementation of a forest vegetation indicator. *Ecological Indicators*. 5: 57–71

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests

Preliminary Evaluation of Indicator of Sustainable Forest Management E.a.:

Composition, diversity and structure of forest vegetation

March 31, 2011 Draft

Jovan, S. 2008. Lichen bioindication of biodiversity, air quality, and climate: baseline results from monitoring in Washington, Oregon, and California. Gen. Tech. Rep. PNW-GTR-737. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 115 p.

Roundtable Comment: Provide clearer conclusions on what stands out from the data. Are (desired) outcomes being met?

Staff Response: The indicator provides clear information on how the tree species in Oregon's forests are distributed across the various ecoregions. There isn't a set of desired outcomes developed for the indicator other than no net loss of forest land. The geographical distribution of tree species have been predicted to change with changes in climate predicted for this century. With future analyses for this indicator it may be possible to detect, quantify, and map trends or changes in species distributions. Ongoing work with OCCRI will help determine the best set of methodologies to achieve these possibilities.

6. From the indicator report can you draw a conclusion regarding the current trend measured by the indicator, when compared to the Desired Trend Statement?

Roundtable Comment: The lack of a policy goal is a problem. There doesn't seem to be either a historic benchmark or a desired future condition, so it would be impossible to state whether there is a trend.

The data present a snapshot of current conditions, but they don't say anything about change through time (trend).

Staff Response: This statement is accurate. Through the 2011 *Forestry Program for Oregon* revision process, staff is recommending the Board revise the desired trend statement for this indicator to, "The composition, diversity, and structure of forest vegetation are within, or growing towards, desired future condition ranges established through the *Oregon Conservation Strategy*."

Roundtable Comment: A range of desired future conditions could be based on the management objectives and protection strategies of various landowners and evaluating whether the combination of those objectives and strategies are moving forest vegetation conditions in the right direction.

Staff Response: An enormous and challenging task but not a bad suggestion.

Roundtable Comment: The report tells where the dominant trees are different and what the size distribution is for that species, but it doesn't tell whether areas are Douglas fir plantations or mixed species forests. This is important to evaluate the indicator.

Staff Response: The indicator does not identify species composition in individual stands of trees characteristic of plantations. Given the data available it is probably impossible to perform this analysis for all forested areas within the state.

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests

Preliminary Evaluation of Indicator of Sustainable Forest Management E.a.:

Composition, diversity and structure of forest vegetation

March 31, 2011 Draft

Roundtable Comment: The characterization of composition and structure is only available for a single point in time. Realistically, provision for re-assessment at about 10-year intervals would be reasonable.

Staff Response: The FIA data collection is on a 10-yr cycle with 1/10 of the landscape sampled each year of the cycle

7. Can a case be made that other technical information should be considered as a supplement or an alternative to the information already provided for the indicator?

Roundtable Comment: Some participants believe a strong case can be made that the department should consider other technical information.

Staff Response: We would welcome a description and access to that information.

Roundtable Comment: It would have been helpful to examine all three Strategy E indicators at once and synthesize evaluations. Show they influence each other. Indicator E.b. assumes “protected lands” are treated differently. It is important to link to species of concern or species at risk (Indicator E.c).

Staff Response: We agree all three indicators are important to consider in a synthesis evaluation. Linking species of concern could be done but would require a great deal of analysis and gathering of T&E species data across a variety of sources as well as creating a method for linking Ec that is accurate and informative.

Roundtable Comment: How this information will be used as an indicator is unclear.

Staff Response: See response in question 1 above.

Roundtable Comment: Possible lack of information on snags, invasive species, meadows was identified. Unclear whether references to USFS subtype data for each dominant tree species would supply that information. Some source should be searched out.

Staff Response: The indicator does not report on snags, invasive species, or meadows. The FIA phase 2 plot data is incomplete with respect to invasive species and only those occurring with greater than 3% cover at the sampling site are recorded. However, the FIA 5-year report published findings from the vegetation sampling on 110 phase 3 plots distributed across Oregon (page 63-65) and snags (page 42-48). We will include a link to the 5-year report in the indicator.

This indicator is focused on the distribution of forest tree species in Oregon and does not yet concentrate on meadows, wetlands, understory plants or lichens yet. Including these other ecosystem features is problematic from the standpoint of not having adequate data for each ecoregion.

Roundtable Comment: Ideally, it would be good to have more complete descriptions in terms of understory vegetation, but this would almost certainly have to be done by imputation, so there may not be much value in such a refinement.

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests

Preliminary Evaluation of Indicator of Sustainable Forest Management E.a.:

Composition, diversity and structure of forest vegetation

March 31, 2011 Draft

Staff Response: This suggestion has been addressed above.

Roundtable Comment: Be clear about what the data show (big picture, coarse grain), and what they can't show (stand level or smaller resolution).

In the Condition Section of report we have the following language that is clear about the big picture of what this data show: “The information provided by the first report for this indicator serves as a mid-scale assessment and relative index of forest conditions in terms of the composition and geographic distribution of plant species that comprise Oregon’s forest ecosystems, the age and size structure of trees, and the percentage of land designated as forest covered by tree canopy.”

8. Do you believe there is an adequate level of institutional commitment and resources allocated for continued full implementation and reporting of this indicator into the future?

Roundtable Comment: The report itself does not address the issue. The indicator is ambiguous with regard to the scale of assessment (ecoregion, basin, subbasin, stand, hectare) and the definition of goal (what is ideal composition, diversity, and structure). However, this ambiguity may provoke collaboration to define scale and goal.

We need social agreement as to what it is we're trying to manage to.

Staff Response: In the Data Availability section of the report the indicator explains that “Digital GNN imputation maps are provided as 30-m-resolution ArcGIS grids, where the grid value is a unique plot number that links to the plot database.” And a map of the ecoregions scale at which the modeling was organized is provided in Figure 1.

Roundtable Comment: Institutional commitment in this time of budgetary travail is unclear, but it is very important that policy makers be made aware of the priority we would give to it.

Staff Response: No comment.

9. What improvements would you like to see in future reporting for the indicator?

Roundtable Comment: Add a link to the PNW Research Station website.

Staff Response: Agreed.

Roundtable Comment: Correct or supplement the report’s size class chart for normal size class distribution by species. For example, red alder will never have “giant” trees. May vary by ecoregion.

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests

Preliminary Evaluation of Indicator of Sustainable Forest Management E.a.:

Composition, diversity and structure of forest vegetation

March 31, 2011 Draft

Staff Response: The chart mentioned is sufficient for displaying the size class of trees by dominant species. The fact that there is a zero value in the giant tree category for red alder indicates that there are no giant red alders.

Roundtable Comment: Try to establish trends from historical data, recognizing it is developed from different methods.

Since the data was generated over several years, better explain why the current information represents a single point in time.

Staff Response: This has been explained above.

Roundtable Comment: Other sources of technical information is needed beyond just tree data. Consider “overstory species richness” mapping as a measure of diversity. Need to also measure non-tree vegetation diversity.

Staff Response: This has been addressed above

Roundtable Comment: Some participants would like the data correlated with elevation and aspect.

Staff Response: Aspect, elevation and other topographical features were part of the GNN modeling process. We will include a link to the LEMMA website where the modeling methodology is explained in better detail.

Roundtable Comment: Consider plant association groups as a tool to define desired conditions and trends. If plant associations are too fine a scale for the indicator, look at some higher level of plant community classification.

Staff Response: This is an excellent suggestion. A GIS integration of the GNN individual species maps could certainly provide the data set. The plant association group approach might be a more informative alternative to the display of dominant species. Staff will explore possibilities and usefulness for creating plant association group maps.

Roundtable Comment: We need a risk analysis for vegetation structure components. Under current management, are there vegetation types or structural components that are likely to decrease?

Staff Response: The risk analysis suggested is definitely important and would be challenging. Oregon’s forests have a variety of ownerships and districts within natural resource agencies each with a slightly different management plan that would have to be evaluated if we were to report at ecoregional levels. Inferences from timber harvest data like that in Indicator C.b. might provide general trends.

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests

Preliminary Evaluation of Indicator of Sustainable Forest Management E.a.:

Composition, diversity and structure of forest vegetation

March 31, 2011 Draft

Roundtable Comment: For all indicators be clear about the purpose, interdependencies, what we know and don't know, and why is each indicator important.

Staff Response: Including what we don't know would overwhelm the capacity of the internet. We have tried to be as clear as possible for each indicator and are considering, and making, specific changes.

Roundtable Comment: A well stated goal is needed for this indicator to clarify what direction is wanted. It could be as simple as "a heterogeneous forest landscape with a variety of species and age class compositions."

Staff Response: Or "no significant changes in the distribution and extent of the major plant association groups by ecoregion." This is a good suggestion and will be considered by staff in consultation with the Oregon Biodiversity Information Center.

Roundtable Comment: In a format suitable for Board and public absorption, it's hard to summarize all the data available. Consider the possibility of going full bore on one mapping region, and explaining that that is an example of what is available for each.

Staff Response: This suggestion is at diametric to other suggestions that encourage more analyses and more data. The data and maps for each ecoregion are completed and displayed for anyone to examine or not. Examining one ecoregion already gives an example of what is available for each and if people want to explore the others they can because the others are right there.

Roundtable Comment: Some of the report's figures have some comparative information from other sources, or some implications of habitat effect. That is probably more meaningful to readers than so many statistics, some of which perhaps might be verbalized into "largely" for "few" or other descriptors.

Staff Response: There are generalizations such as suggested throughout the report. For example there are 20 instances of "more" in the text for the ecoregions and few instances of "few."

Roundtable Comment: Include a generic (e.g., not species) diversity index.

Staff Response: Addressed above.

Roundtable Comment: Tracking these data through time will create a valuable trend picture. Advocate standing pat with this data set, not gathering additional observations.

Staff Response: Excellent suggestion!

STAFF RESPONSE

Oregon Roundtable on Sustainable Forests

Preliminary Evaluation of Indicator of Sustainable Forest Management E.a.:

Composition, diversity and structure of forest vegetation

March 31, 2011 Draft