

Forest Practices Implementation and Effectiveness Monitoring Update

This report summarizes work completed by ODF Private Forests Monitoring Unit personnel since the last Board of Forestry (Board) update in September 2013.

2015 Legislative Outcomes

Funding for the program was maintained at the current level. The Department submitted a Water Quality Policy Option Package (POP) for a manager of the Monitoring Unit, in addition to a Geotechnical Specialist, Road Engineer, and an additional fraction of an FTE of a Forest Management Technician. While this POP was advanced as part of the Governor's Recommended Budget, the legislature did not carry it forward.

Implementation Monitoring

Forest Practices Act (FPA) Compliance Audit

Background

The Board was introduced to the Compliance Audit program in the September 2012 Monitoring Unit update¹. As per a 2011 Legislative Budget note, the department utilizes private contractors to collect audit data and uses that data to determine apparent compliance. The compliance audit provides statistically valid rates of compliance of the FPA for forestlands from which timber was harvested during the previous two years. The protocol and sampling process allows for reporting results at the statewide and FPA regional levels, by industrial, private non-industrial and other (e.g., county, state) ownerships, and by rule division. The department reports on FPA compliance as an annual Key Performance Measure for the Agency. The department presented the 2013 compliance audit report to the Board at the September 3, 2014 meeting². The department has compiled results from the 2014 audit and is finalizing the annual report. This update provides high-level results for 2014 as compared to 2013.

FPA Compliance Audit Process

The compliance audit evaluates a subset of rules based on information provided from field measurements made by contractors. The audited rules include road construction and maintenance, timber harvesting, some riparian management area measures, measures for other wetlands, and rules

¹ Oregon Department of Forestry. September 2012 Board of Forestry Meeting. Forest Practices Effectiveness Monitoring and Compliance Audit Update. Agenda Item 3.
http://www.oregon.gov/odf/Pages/board/BOF_090512_Meeting.aspx

² Oregon Department of Forestry, September 2014 Board of Forestry Meeting. Forest Practices Act Compliance Audit Results. Agenda Item 7.
http://www.oregon.gov/odf/BOARD/docs/2014_Sept/BOFSR_20140903_07.pdf

for operations near waters of the state. The 2014 Compliance Audit used the same protocols as the 2013 audit only differing in the sample-size of 100 notifications vs. 200 in 2013.

The sampling design randomly selects notifications from the three FPA regions (Northwest, Eastern, and Southern Oregon Areas) and three landowner types (private industrial, private non-industrial, and other, which includes municipally owned, county and State Forests lands). Sampling is proportional to the number of notifications indicating some type of timber harvest. Table 1 indicates the distribution of sample sites in 2014.

Table 1. Number of notification units sampled in 2014 by area and landowner class, private industrial (PI), private non-industrial (PNI), other (includes municipally owned, county and State Forests lands).

Area	Total Units	Units by Landowner Class		
		PI	PNI	Other
Eastern Oregon	18	9	8	1
Northwest Oregon	45	30	14	1
Southern Oregon	37	19	13	5
Total	100	58	35	7

FPA Compliance Audit Results

Results of the 2014 FPA Compliance Audit are similar to those of the 2013 audit. The 2014 compliance audit resulted in an overall rule-level compliance rate of 96 percent (95% confidence interval = 95% - 97%). Table 2 also shows that the rates per region are comparable to 2013 results.

Table 2. Rule-level Compliance Statewide and by Forest Practices Act (FPA) Regions for 2013 and 2014.

	Percent compliant	
	2013	2014
Statewide	96% (96% – 97%)	96% (95% – 97%)
FPA Area		
Eastern Oregon Area	96%	94%
Northwest Oregon Area	98%	96%
Southern Oregon Area	95%	97%

Overall rule-level compliance rate by ownership was high, between 96 and 98 percent (Table 3). The 2014 rates are similar to 2013 results.

Table 3. Rule-level Compliance Rates by Ownership Class for 2013 and 2014.

Ownership Class	Percent compliant	
	2013	2014
Other	98%	98%
Private Industrial	96%	96%
Private Non-Industrial	94%	96%

Compliance Rates by Rule Division

At a rule division basis, compliance was generally high (Table 4) in 2014. The highest compliance was found with rules dealing with vegetation retention along streams. High compliance was also found with rules dealing with road construction and those dealing with operations near the waters of the state. The lowest compliance rates were found with rules involving written plan requirements and rules dealing with the protection of other wetlands. These may indicate a need for further emphasis on small wetlands, although this rule division had a small sample size. The pattern of compliance by rule division is consistent with 2013. We cannot determine if the difference reflect a trend with two years of data.

Table 4. Compliance Rates by Rule Division for 2013 and 2014.

Rule Division	Description	Percent Compliant	
		2013	2014
Several	Written plans	75%	83%
625	Road Construction and Maintenance	97%	98%
630	Harvesting	95%	93%
640	Vegetation Retention Along Streams	98%	99%
655	Protection for Other Wetlands	72%	83%
660	Operations Near Waters of the State	99%	98%

Scale of resource impacts

The scale of resource impacts resulting in sediment delivery was mostly within the lowest damage classification (≤ 1 cubic yard sediment). Of the 149 locations contributing sediment to Waters of the State, 68% contributed less than 1 cubic yard of sediment. These events frequently involved trace amounts of sediment found in or adjacent to streams. Three events that contributed more than 10 cubic yards of sediment to streams were associated with roads. One event exceeding 100 cubic yards was associated with a road failure on a steep slope.

The bulk of this delivery was to small water bodies. In 97% of these cases, sediment was delivered to Small type-N streams. Delivery to wetlands $>1/4$ acre and those $<1/4$ acre accounted for the other 3%. There were no instances of sediment delivery recorded directly to fish bearing streams in the 2014 effort.

FPA Compliance Audit Results: Values Created

The department uses data derived from the compliance audit process in several ways. The information serves as a good starting point for focused training, both internally and externally. Multiple trainings done in conjunction with the Oregon Professional Loggers program and other stakeholders, such as Regional Forests Practices Committees, have been provided opportunities to review the findings and review FPA standards for individual topics as indicated by the results. For timberlands and mills engaged in forest certification processes, the audit results provide useful information during periodic review of management measures on timber source lands.

Future Outlook

The FPA Compliance Audit provides a monitoring system that supports efforts for continuous improvement by the agency, industry and landowners alike. The department plans to keep the same protocol in place for the next two audits, 2015 and 2016, to evaluate variance in compliance and trends in response.

Changes in results are expected because of changes in written plan rules, notification system, and focused training efforts that result from findings in previous years. For example, lower compliance with written plans may improve in coming years because of the 2013 FPA rule change involving written plan requirements, as well as the implementation of the electronic notification system.

The department plans to modify the audit based on results, e.g., replacing rule divisions that have consistently high results, with divisions that have not been audited. These changes will be done with input from the internal and external review committees.

Leave Tree & Downed Wood Compliance Report

In 2014, the Department finalized the Technical Report for the monitoring study on compliance with the leave tree and downed wood statutes (ORS 527.676). Results of the study were presented to the Board of Forestry in April 2014³.

Overall compliance with ORS 527.676 was high, about 97%. However, possible issues relating to the Department's ability to determine compliance were identified. Compliance could not be determined for 8% of the study sample harvest units because leave tree areas were located outside of mapped unit boundaries and adjacent to similar stands of trees. Leave trees should be retained within the unit boundaries, thus when they are located outside of the mapped unit boundary and adjacent to similar stands, the Department did not feel that they could determine which trees were intended to be associated with the harvest unit. The Board of Forestry directed the Department to explore opportunities to improve efficiency and effectiveness of ORS 527.676 with the Regional Forest Practices Committees (RFPC). This work will be scheduled as RFPC and staff workload allows. The riparian and bald eagle rule analyses are the current priority work topics with staff and the Committees.

³ Report can be found at:

http://www.oregon.gov/odf/PRIVATE_FORESTS/docs/Leave%20Tree%20Downed%20Wood%20Report%20Final%20April%202014.pdf

Voluntary Measures in the Coast Range

The Oregon Plan for Salmon and Watersheds was developed to help recover salmon and improve watersheds throughout the state. The Oregon Plan emphasizes the importance of voluntary restoration efforts to benefit salmon. Since the establishment of the Oregon Plan, private forest landowners have voluntarily conducted thousands of restoration projects and contributed millions of dollars to salmon and watershed restoration. The Private Forests Monitoring Program, the Oregon Watershed Enhancement Board (OWEB), the Oregon Forest Research Institute (OFRI) and representatives of forest landowners and operators to conduct a collaborative study on reported voluntary measures on forestlands in the Oregon Coast Range.

The main objectives of the study are to:

- 1) Tell the story of voluntary measures on forestlands in Oregon.
- 2) Identify barriers to the implementation and reporting of voluntary measures.
- 3) Describe voluntary measures that are most frequently implemented by forest landowners.

To accomplish objectives 1 and 3, the study will summarize information reported to the Oregon Watershed Restoration Inventory (OWRI) database. OWRI is the primary repository for information on voluntary projects that were done in association with the Oregon Plan. The study will also survey forestland owners on what they perceive as barriers to implementing and reporting voluntary projects (objective 2).

The anticipated benefits of the study are:

- 1) Increased awareness and support of voluntary measures by forestland owners and stakeholder groups.
- 2) Improved access to technical assistance, reporting opportunities, financial and other assistance to help with implementing future restoration work by forestland owners.
- 3) Increased implementation and reporting of voluntary measures by forestland owners.

Effectiveness Monitoring

RipStream Project

The main objective of the Riparian Function and Stream Temperature (RipStream) project is to evaluate the effectiveness of FPA forest practices rules and State Forests management strategies at protecting stream temperatures within and immediately below harvest units and promoting desired riparian structure. Most of the focus to date, including the ongoing riparian rule analysis process, has been on the effectiveness of FPA and the State Forest Northwest Forest Management Plan (NWFMP) riparian protections for stream temperature. Stream temperature analyses are essentially complete, and are in different stages of preparation for publication. Analyses to address riparian structure and large wood recruitment questions remain to be completed. Completed work since the September 2013 Board meeting has largely focused on developing the stream temperature

predictive analysis and developing estimates of predicted temperature and shade changes for alternative harvest strategies for the riparian rule analysis process; however, substantial progress has been made on downstream temperature analyses.

Accomplishments since the September 2013 presentation to the Board include:

- 1) Fulfilment of a cooperative agreement with Oregon State University for the development of a descriptive model of the downstream temperature dynamics and related stream characteristics observed in the RipStream data. Principle Investigator: Dr. Ivan Arismendi (June 2015).
- 2) Completion of a contract with Oregon State University for the provision of statistical assistance in the development of the stream temperature predictive model. Principle Investigator: Dr. Lisa Madsen, Department of Statistics (June 2013).
- 3) Submission and acceptance (pending minor revisions) of a downstream temperature manuscript for publication in *Hydrological Processes*. The manuscript describes a physical basis for stream temperature change downstream of harvest, using RipStream data. Lead author - Dr. Lawrence (Mick) Davis of D3 Scientific (July 2015).
- 4) Development of the stream temperature predictive model. Model development was assisted by statisticians from OSU and forest industry, RipStream external review team members, scientists from the U.S. Environmental Protection Agency, and others. The model was used to develop estimates of predicted temperature change that would result from different simulated harvest approaches (April 2015). Work has begun on writing the stream temperature predictive model analysis as a manuscript for publication. Principle Investigator – Dr. Jeremy Groom, OSU Dept. of Statistics (formerly Oregon Department of Forestry).
- 5) Progress on preparing the Numeric Criteria temperature analysis and the five-year post-harvest analysis for publication. The Board has been appraised of these findings at earlier meetings. Principle Investigator – Dr. Jeremy Groom (formerly Oregon Department of Forestry).
- 6) Peer-reviewed publication in the Federal PNW-GTR-880 of the case-study of large wood recruitment for a State Forests RipStream site using the OSU Streamwood model. Authors include Dr. Mark Meleason of ODF State Forests, Dr. Jeremy Groom (formerly Oregon Department of Forestry), and Liz Dent (Oregon Department of Forestry).
- 7) Oral presentation of the RipStream rule analysis process as an example of the ODF/DEQ/Board of Forestry adaptive management cycle. Presenter: Dr. Jeremy Groom (formerly Oregon Department of Forestry) (Society of American Foresters, Salt Lake City, UT, October 2014).

Work over the next year will include continued progress on temperature analysis publications and preparation for continued analysis of the riparian desired future condition and large wood recruitment analysis.

The RipStream study and the Department benefit from the long-term commitment of its external review committee. This committee is comprised of individuals from the forestland owner community, forest industry representatives, Oregon State University, U.S. Forest Service, Oregon

Department of Fish and Wildlife, and the Department of Environmental Quality. This committee has advised the Department on RipStream since the inception of the project and will continue to be used for scientific and technical matters relating to the riparian rule process and other analyses.

Riparian Rule Analysis

The monitoring group was charged with the remaining critical steps in the riparian rule analysis (see rule analysis process, June 2013 Board materials, Consent Agenda Item I):

- Determine if proposed alternatives reflect available scientific information.
- Review science on applicability of alternatives.
- Evaluate alternatives in terms of restrictions on practices; provide input on alternatives.
- Select alternative(s) to carry into rule language development and/or voluntary measure(s).
- Analyze the geographic scope of proposed rules.

This work and the compliance audit are the highest priority topics for the effectiveness and implementation monitoring personnel.

The Board's riparian rule analysis is based on findings of degradation concerning DEQ's Protecting Cold Water (PCW) criterion. The Department regularly met with the Regional Forest Practices Committees, Committee for Family Forestlands, and stakeholders to develop prescriptions that met the PCW to the maximum extent practicable. Since September 2013, the Department has interacted with the Board as follows:

- Presented results of the Systematic Review (November 2013).
- Discussed preliminary results and emerging policy issues (April 2014).
- Held Board Workshop on: latest science; policy and legal roles and decision spaces; stakeholder perspectives; Board discussion (June 2014, with workshop summary presented in September 2014).
- Provided an update on the Riparian Rule Analysis and associated adjusted timeline (November 2014).
- Presented methods for evaluating riparian prescriptions and their geographic extent (April 2015).
- Provided partial results for evaluating riparian prescriptions (June 2015).
- Presented additional results for evaluating riparian prescriptions, considerations for Board decisions and policy analysis framework, and prescription packages (July 2015).

Trask Watershed Study Road Sediment Analysis

The Department serves as a cooperator along with the Bureau of Land Management, the U.S. Forest Service, the U.S. Geological Service, Weyerhaeuser, and Oregon State University in

carrying out the Trask Watershed Study. The study is a multidisciplinary endeavor to examine the effects of timber harvest on the aquatic environment at multiple scales. A component of the study, the Road Sediment Analysis, examines changes in turbidity and delivery of sediment to streams before harvest, after road construction/reconstruction, and following harvest. The Road Sediment Analysis (sediment study) began in the winter of 2010; data collection was completed during the spring of 2013 and included a winter's worth of data collection for each of the phases described. ODF Private Forests personnel provided technical oversight, administered grant requirements, provided field staff and coordinated other field data collection efforts.

The sediment study is an intensive data collection effort involving five stream crossings distributed across state forestland (3) and private industrial land (2). Water samples from storm and non-storm periods were collected with automated samplers above and below crossings and were analyzed for total suspended solids (sediment) and turbidity. Funding for the project was provided by the Oregon Forest Industries Council, Weyerhaeuser, and the National Council for Air and Stream Improvement. Oregon Department of Forestry technicians installed and maintained the samplers and processed all samples for turbidity and sediment.

Dr. Ivan Arismendi, of Oregon State University's Department of Fisheries and Wildlife, has submitted a manuscript describing this analysis and the subsequent findings to *Water Resources Research* (April 2015). The study found increases in turbidity and sediment at some road crossings. However, the level of these increases were well below thresholds that have been found to be detrimental to any local, known organisms. The largest increases in turbidity and sediment were found at the control crossing, and are coincident with the falling of an alder between the two sample stations above and below the road. The alder's demise resulted in stream channel disturbance. One crossing, surrounded by the footprint of a clearcut harvest without a buffer, resulted in diminished sediment and turbidity levels between the above crossing and below crossing stations, post-harvest and post-road improvement. We anticipate publishing these results prior to the next Monitoring Update to the Board.

Water Quality Pesticide Management Team (WQPMT)

The Water Quality Pesticide Management Team (WQPMT) is comprised of state agencies responsible for water quality and natural resource management in Oregon: Oregon Department of Agriculture (ODA), Oregon Department of Environmental Quality (DEQ), Oregon Health Authority, Oregon Watershed Enhancement Board, Oregon State University, and Oregon Department of Forestry. With ODA in the lead role, the team developed a Pesticide Management Plan, which was approved by the Environmental Protection Agency, with the main goal of reducing ground and surface water contamination from pesticides currently registered and used in Oregon. This approach aligns closely with FPA rules that direct the department to work with partners to conduct monitoring and evaluation of the chemical and other petroleum product rules.

One of the main tools for completing this work is DEQ's Pesticide Stewardship Partnership, or PSP. Currently there are eight PSP areas across Oregon. A ninth watershed was recently selected on the Middle Rogue, near Medford. A PSP is a non-regulatory and collaborative

approach that works with local partners to reduce contamination from current use pesticides. Three of the nine PSPs represent some amount of private forestland and one PSP area has a significant amount of private forests. Part of ODF's role in the forested areas is to provide technical information on reforestation approaches and connect local stewardship foresters and landowners with the WQPMT. In 2014, the team met with local private industrial forestland representatives from the South Yamhill PSP. The purpose of the meeting was to share results from past seasons of sampling efforts and engage in a dialogue that led to further refinement of the annual sampling schedule and testing for two additional analytes based on input from the landowners.

Results of water quality data are evaluated based on the Pesticide Management Plan, which describes prioritizing education and outreach based on pesticide detection frequency and, using non-regulatory EPA benchmarks, pesticide concentration relative to benchmark. Detections from forested areas are usually prioritized on the lower end of the scale with respect to detection frequency and concentration, where education and/or continued monitoring are the expected responses.

For the 2013-2015 biennium, more than 1100 water samples were collected; the team presented information about the PSP program at dozens of forums; conducted eight waste pesticide collection events across that state that removed over 145,000 pounds of unused pesticides (including older legacy pesticides such as DDT); and provided three technical assistance grants aimed at working with local partners and pesticide users to improve water quality.

Implementation and Effectiveness Monitoring: Updating the Monitoring Strategy

The Private Forests' Monitoring Strategy⁴ has guided the Division's monitoring priorities since it was updated in 2002. The Strategy established a prioritized list of monitoring questions categorized by general issues and monitoring type (effectiveness, implementation, etc.). The questions were drawn from the previous monitoring strategy, Oregon Plan for Salmon and Watersheds Workplan, the Forest Practices Advisory Committee final report, and citizen and stakeholder group input in 1994 and 2000.

The Department developed a draft work plan for how to update the strategy, and the Board approved this work plan at their January 2015 meeting. Staff have gathered input from stakeholders and partner agencies on the suite of questions to consider in the strategy, and how to prioritize these questions. The next phase of the process consists of working with these groups to prioritize the questions in a documented and consistent manner, and then solicit their input on the draft strategy once we have completed it. We anticipate bringing the strategy to the Board in spring 2016.

⁴ Oregon Department of Forestry - Forest Practices Monitoring Program Strategic Plan. April 2002.
<http://cms.oregon.gov/odf/privateforests/docs/monitoringstrategicplan.pdf>

Other Monitoring Information

Numerous personnel changes for the Monitoring Unit have occurred over the last two years. The Unit added a third Monitoring Specialist, Dr. Daniel Olson, and a Monitoring Technician, Michael Thompson. The Monitoring Coordinator, Dr. Jeremy Groom, has left ODF to enroll in graduate school. The department plans to recruit for that position, following an evaluation of position needs and priorities. The department plans to continue to work with Dr. Groom to complete several RipStream stream temperature publications.

Unit personnel also:

- Developed and participated in a workshop on Department principles and guidelines for working at the interface between science and values in policy-making processes.
- Represented the Department on the interagency water-monitoring group, Stream Team.
- Administered a contract for, and assisted implementation of, State Forests' consultant to conduct a Systematic Review of hypotheses on Marbled Murrelets.
- Gave presentations (both talks and posters) at professional society meetings (Society of American Foresters, American Water Resources Association).