SCHEDULE L-1

KEY QUESTIONS, RESOURCE OBJECTIVES, AND PERFORMANCE TARGETS FOR ADAPTIVE MANAGEMENT

[This schedule contains implementation details and will be subject to further revisions and clarifications as the provisions of the agreement are implemented through rule, statutes and programs.]

Overall Performance Goals: Forest practices,[1] either singly or cumulatively, will not significantly impair the capacity of aquatic habitat to:

a)   Support harvestable levels of salmonids;
b)   Support the long-term viability of other covered species; or
c)   Meet or exceed water quality standards (protection of designated uses, narrative and numeric criteria, and antidegradation).

Resource Objectives are defined below for the key aquatic conditions and processes affected by forest practices. These resource objectives are intended to meet the overall performance goals. Resource objectives consist of:

- **Functional Objectives**, which are broad statements of objectives for the major watershed functions potentially affected by forest practices; and
- **Performance Targets**, which are the measurable criteria defining specific, attainable target forest conditions and processes.

Resource objectives are intended for use in the Forest Practices Board's adaptive management rather than in the department's regulatory process.

Key Questions. The key questions driving adaptive management can be summarized as follows:

1.   *Are forest practices being conducted in compliance with the prescriptions contemplated in the Forest Practices Board's rules?*

      Compliance monitoring will answer this question. Compliance monitoring will be conducted by DNR and is outside the scope of this adaptive management process.

2.   *Will the rules produce forest conditions and processes that achieve resource objectives as measured by the performance targets, while taking into account the natural spatial and temporal variability inherent in forest ecosystems?*

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[1] "Forest practices" are defined in the Forest Practices Rules (76.09.010 RCW) and include road construction, timber harvesting, reforestation, brush control, etc.

Effectiveness monitoring and research will answer this question. Performance targets are not attainable in all places, even under natural conditions. The adaptive management process will take into account the extent to which a given performance target can actually be achieved given the natural spatial and temporal variability within forest ecosystems.

In addition, reasonable timeframes to achieve targets will be part of the process. There will be identification of performance targets that can be met within short (0-10 years), mid (10-50 years) and long-term (50-200 years) ranges of time measured at the landscape scale. There will also be consideration for the time required for the quantity of prescriptions to be applied on the ground to ensure adequate sample sizes for implementing adaptive management. Effectiveness monitoring and research should also test whether less costly alternative prescriptions would be effective in producing conditions and processes that meet resource objectives or where more conservative prescriptions may be necessary.

3. *Are the resource objectives the right ones to achieve the overall performance goals?*

Validation monitoring and research will answer this question. Validation monitoring and research should be designed to validate or verify the assumptions underlying the resource objectives. Resource objectives must work to achieve the overall performance goal, yet also be attainable within the context of a viable forest products industry. Current targets are those the Forest Practices Board believes will be met by the rules. Progress towards achieving resource objectives within appropriate timeframes will be tracked through time. Changes to targets should be guided by evaluating two general questions aimed at defining the appropriate level of accuracy needed to change targets: (1) what level of statistical significance, scientific confidence or trend analysis is the monitoring effort intended to achieve and was it achieved; and (2) what level of significance for biological or habitat change is expected?

Heat/Water Temperature

Functional objective: Provide cool water by maintaining shade, groundwater temperature, flow, and other watershed processes controlling stream temperature.[2]

Measures	Performance targets	Time-Frame
Stream temperature	Water quality standards—current and anticipated in next triennial review (e.g., for bull trout[3]).	*(Note--need to be completed by scientific advisory groups)*
Groundwater temperature	To be developed.	
Shade	• Type F & S streams, except Eastside bull trout habitat: that produced by shade model or, if model not used, 85-90% of all effective shade. • Westside and eastside high elevation, Type N streams: shade available within 50' for at least 50% of stream length. • Eastside: all available shade within 75' of designated bull trout habitat per predictive model.	

LWD/Organic Inputs

Functional objective: Develop riparian conditions that provide complex habitats for recruiting large woody debris and litter[4].

Measures	Performance targets	Time-Frame
Riparian condition	• Westside and high elevation Eastside habitats: riparian stands are on pathways to meet Desired Future Condition (DFC) targets (species, basal area, trees per acre, growth, mortality). • Eastside (except high elevation): DFC; current stands on pathways to achieve Eastside condition ranges for each habitat series.	
Litter fall	• Westside Type N[5]: at least 50% of recruitment available from within 50'.	

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[2] Stream temperature is affected by the interaction of a complex set of factors, including shade, air temperature, pool depth and frequency, flow, and groundwater influences. These factors are addressed in resource objectives for other conditions or processes (e.g., hydrology, sediment, LWD) in addition to the targets selected for stream temperature.

[3] Bull trout temperature standards are expected to be an outcome of DOE's triennial review of water quality standards.

[4] Litter is defined to include leaves, needles, twigs, branches, and other organic debris that is recruited to aquatic systems and riparian forest floor.

Measures	Performance targets	Time-Frame
	• Eastside Type N: at least 70% of recruitment available from within 50'.	
Pool frequency	< 2 channel widths per pool.	
In-stream LWD	Westside: • Streams <20 m (or 65.6 ft.) bankfull width: > 2 pieces (total wood) per channel width • Streams <10 m (or 32.8 ft.) bankfull width: >0.30 key pieces per channel width • Streams >10 m (or 32.8 ft.) bankfull width: >0.50 key pieces per channel width Eastside: (To be developed.)	
Residual pool depth		

Mean Segment Bankfull Width in meters and (feet)	Minimum Unit Size in meters and (feet)	Minimum Residual Pool Depth in meters and (feet)
0 to <2.5 (>0 to 8.2 ft.)	0.5 (5.4 ft.)	0.10 (0.33 ft.)
∃2.5 to <5.0 (≥ 8.2 to 16.4 ft.)	1.0 (10.8 ft.)	0.20 (0.66 ft.)
∃5.0 to <10.0 (≥ 16.4 to 32.8 ft.)	2.0 (21.5 ft.)	0.25 (0.82 ft.)
∃10.0 to <15.0 (≥ 32.8 to 49.2 ft.)	3.0 (32.3 ft.)	0.30 (0.98 ft.)
∃15.0 to <20 (≥ 49.2 to 65.6 ft.)	4.0 (43.1 ft.)	0.35 (1.15 ft.)
∃20 (≥ 65.6 ft.)	5.0 (53.8 ft.)	0.40 (1.31 ft.)

Sediment

Functional objective: Provide clean water and substrate and maintain channel forming processes by minimizing to the maximum extent practicable, the delivery of management-induced coarse and fine sediment to streams (including timing and quantity) by protecting stream bank integrity, providing vegetative filtering[6], protecting unstable slopes, and preventing the routing of sediment to streams.

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[5] Targets for Westside and Eastside Type S and F streams are a low priority because adequate leaf litter is expected to be a by-product of riparian stand conditions.

[6] Vegetative filtering can be measured by riparian vegetation, which is covered under the target for riparian condition under LWD.

Measures	Performance targets	Time-Frame
Mass wasting sediment delivered to streams	• Road-related: virtually none is triggered by new roads; favorable trend on old roads. • Timber harvesting-related: no increase over natural background rates from harvest on a landscape scale on high risk sites.	
Road sediment delivered to streams	• New roads: virtually none.	
Ratio of road length delivering to streams / Total stream length (miles/mile)	Old roads: Not to Exceed: Coast (Spruce) West of Crest East of Crest 0.15-0.25 0.15-0.25 0.08-0.12	
Ratio of road sediment production delivered to steams/Total stream length (tons per year/mile)	Old roads: Not to Exceed: Coast (Spruce) West of Crest East of Crest 6-10 T/yr 2-6 T/yr 1-3 T/yr	
Streambank/ equipment limitation zone disturbance (caused by forest practices)	• Type S&F: no streambank disturbance outside road crossings. • Type N: ≤10% of the equipment limitation zone.	
Fines in Gravel	Less than 12% embedded fines (<0.85 mm).	

Hydrology

Functional objective: Maintain surface and groundwater hydrologic regimes (magnitude, frequency, timing, and routing of stream flows) by disconnecting road drainage from the stream network, preventing increases in peak flows causing scour, and maintaining the hydrologic continuity of wetlands.

Measures	Performance Targets	Time-Frame
Road run-off	Same targets as road-related sediment.	
Peak flows	West side: Do not cause a significant increase in peak flow recurrence intervals resulting in scour that disturbs stream channel substrates providing actual or potential habitat for salmonids, attributable to forest management activities.	
Wetlands	No net loss in the hydrologic functions of wetlands	

Chemical Inputs

Functional objective: Provide for clean water and native vegetation (in the core and inner zones) by using forest chemicals in a manner that meets or exceeds water quality standards and label requirements by buffering surface water and otherwise using best management practices.

Measures*	Performance targets	Time-Frame
Entry to water	No entry to water[7] for medium and large droplets; minimized for small droplets (drift).	
Entry in RMZs	Core and inner zone: levels cause no significant harm to native vegetation.	

Stream Typing and Fish Passage

Functional objective (stream typing): Type "fish habitat" streams to include habitat which is used by fish at any life stage at any time of the year, including potential habitat likely to be used by fish which could be recovered by restoration or management, and including off-channel habitat, by using a multi-parameter, field-verified, peer reviewed, GIS logistic regression model using geomorphic parameters such as basin size, gradient, elevation and other indicators.

Functional objective (fish passage): Maintain or restore passage for fish in all life stages and provide for the passage of some woody debris by building and maintaining roads with adequate stream crossings.

Measures	Performance targets	Time-Frame
Accuracy of predictive models	Fish habitat model: statistical accuracy of +/- 5%, with line between fish and non-fish habitat waters equally likely to be over and under inclusive.	
Access barriers	Eliminate road-related access barriers over the time-frame for road management plans.	

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[7] Targets are for forest chemicals other than Bt and fertilizer. BMPs for both are not priorities for adaptive management.
* These measures and performance targets are not intended to override label requirements.