

Upper Nehalem Watershed Project WIT Action Plan

Background:

Watershed analysis projects collect needed information at both watershed and site-specific levels and analyze that information. In general, watershed analysis projects are intended to provide a greater understanding of current conditions and interrelated processes in watersheds. This information can sometimes be applied in current management (day-to day operations and Annual Operations Plans (AOPs)), but can also be used through an adaptive management process to improve existing and future plans and accomplish Forest Management Plans (FMP) objectives (Implementation Plans (IPs) and/or FMPs).

The WIT Process:

At the conclusion of each watershed analysis project, ODF forms a Watershed Implementation Team (WIT) tasked with reviewing the results of the project. This WIT is organized and carried out at the district level. This process is followed:

1. Review the results of the watershed analysis and make sure there is a common understanding of the results.
2. From a common understanding the WIT reviews the result and the following information is given:
 - What action will be taken in response to this result? (If not implemented, document why)
 - What is the timeline for conducting these actions?
 - Who has the responsibility for conducting these actions?
 - Responses to data gaps will also be given.
3. After the WIT has gone through the results and made decisions on how to address them, those decisions will be documented with a brief report in the form of an action plan. This report will be posted along side the complete watershed analysis report on the web, and will be considered part of the formal watershed analysis project.

Desired Outcome:

The goal of this process is an action plan to ensure the integration of results into ODF actions.

The Upper Nehalem Project:

This action plan is created to facilitate the implementation of watershed analysis findings. It was created by a WIT consisting of personnel from the Astoria and Forest Grove Districts with Salem staff. This team closely examined these findings in the context of ODF policy, objectives, and operational considerations. As a result, the WIT made decisions regarding agreement with project findings, appropriate planning levels and methods to implement findings, and relative priority for implementation.

This document records the decisions made by the WIT with rationale for these decisions. It is intended that this action plan be consulted during ODF planning. Additionally, it provides a record for the interested public of the decisions made in response to the watershed analysis.

While this WIT document addresses the recommendations listed in chapters 11-15 of the Upper Nehalem Watershed Analysis report, it should be noted that these recommendations were based on the information documented in chapters 1-10 of that report. This information, which is also summarized in the latter portion of chapter 15, provides the rationale for these recommendations. Further, it is anticipated that the Analysis report will provide a ready reference when designing projects to address the actions of this plan. In particular, the maps contained in the Analysis report will help with the location, preliminary screening and prioritization of potential project sites.

Organization of this WIT report

When the Contractors were conducting the project they identified and organized single resource concerns. They then synthesized these separate concerns into an overall priority list of concerns. The ODF responses follow this concept but in a reverse fashion. The first section is the overall priority list for management actions. These are the actions that address multiple issues or have the greatest perceived potential to influence aquatic and riparian resources. ODF will treat this list as the high priority items and concentrate on responding to this list. The remaining lists are single resource concerns. Because the highest priority items from the single resource lists have already been integrated onto the overall list, the remaining single resource concerns will be addressed opportunistically over time and as secondary to the overall list. All of the lists are attached so as to act as checklists for actions.

Overall Priority Issues

Table 15-1 from the Analysis report is a list of the overall priority items for management actions. These are the actions that address multiple issues or have the greatest perceived potential to

influence aquatic and riparian resources. This list has been adapted to the action plan as Table 1. ODF will concentrate on responding to this list. Table 1 has planned ODF responses for each issue.

Single Resource Issues

The highest priority single resource issues have been integrated with other areas of resource sensitivity in Table 1. The single resource issues below will be dealt with opportunistically through time during AOP planning.

Road Management Considerations

ODF road improvements to minimize potential road-related risks to aquatic and riparian resources in the upper Nehalem watershed are discussed in Chapter 14 of the Analysis report. These are broken out into several categories below.

Road Repair

Table 4 identifies and prioritized 82 road segments for on-site review as possible repair projects. The District Engineer will consult this list to opportunistically apply solutions through both maintenance and yearly activity planning.

Stream Crossing Replacement/Repair

Five stream crossings were identified for consideration of replacement within the project area. Four are already incorporated into Table 1 for high priority action. One crossing remains as a low priority to be dealt with opportunistically (Table 5). Stream crossings to be considered for replacement were prioritized based on Attention Priority (AP) code, washout hazard rating, location in Salmon Anchor Habitats (SAH), and proximity to streams with sediment concern. No adult fish passage barriers on known fish bearing streams were identified in the project area.

Table 6 shows 21 stream crossings prioritized for repair in the project area. These will likely require retrofitting in order to function properly. These will also be reviewed during process AOP for opportunities.

Fish Presence Verification

Table 7 identifies 25 stream crossings that may restrict adult and juvenile fish passage on streams with likely fish presence. Likely fish presence indicates that a stream exhibits habitat conditions determined likely to support fish populations, but fish presence surveys have not yet been conducted on the stream. Likely barrier crossings were not prioritized other than by passage restriction type. When planning yearly fish surveys the District will consult this list for opportunities to conduct surveys.

Fine Sediment

There are 58 reaches with high levels of fines that could be affecting the habitat value to native fishes. Reaches consisting of heavy fine sediment loads within the upper Nehalem are listed in Table 3 of this action plan. These are also shown in Figure 11-2a,b of the Analysis report. While there was no specific management source identified, ODF will opportunistically review listed reaches for any that would benefit from enhancement actions.

Specific channel reaches are shown in the Analysis report in Figure 15-1a,b where instream fine sediment levels (> 2mm size fractions) exceeded estimates of historic sediment loading. Table 14-1 shows hydrologically-connected roads locations with a potential sediment concern. Specific areas where both Areas of Resource Sensitivity (ARS) features overlap and potential restoration recommendations have been identified and prioritized in Chapter 14 and are summarized. These will be reviewed during the AOP process for opportunities.

Non-Road Management Considerations

Alternative Vegetation Management

The recommendations for alternative vegetation management were specific to stand situations predicted to inhibit development of PFC under the proposed management scenarios (Figure 12-2a,b in Analysis report).

- **Vegetation Composition:** Riparian zone dominated by bare ground, grasses, shrubs. (Condition 1 in Analysis report)
- **Riparian Structures/Development:** Encroachment of road and rail line structures within the 100-ft riparian zone. (Condition 2 in Analysis report)
- **Sparse Levels of Stocking in Stands:** Sparse hardwood, mixed species and conifer stands that preclude development of a second cohort. (Conditions 3a and 3b in Analysis report)
- **Hardwood Senescence:** Dense hardwood stands (Riparian codes HMD and HSD) that become sparse due to future mortality, yet preclude development of a second cohort. (Condition 4 in Analysis report)

Large Wood

Included in Table 2 of this action plan and as noted in Section 9.3.4 of the Analysis report, the following 11 stream reaches were lacking key pieces of large wood: Cow Creek, Gilmore Creek, Nettle Creek (2 reaches), Osweg Creek, Quartz Creek, South Fork Quartz Creek, Walker Creek (3 reaches), and Dell Creek (Kavanagh et al. 2005). Other general areas shown on Figure 15-

1a,b of the Analysis report, where in-channel wood was low in combination with riparian characteristics that offered low wood recruitment potential will be reviewed for opportunities during the AOP process.

Shade/Water Temperature:

Locations on ODF lands in the watershed where opportunities exist for the alternative vegetation measures to address a moderate to high probability of not achieving PFC for water temperature in 100 years are shown on Figures 12-3a,b of the Analysis report. Long-term restoration recommendations for key areas based on stream length and specific riparian stand situations are listed below in Table 1. The recommendations of appropriate management actions per riparian stand scenario have been outlined in Section 12.1.3 of the Analysis report.

Other scattered sections of stream reaches with moderate or high probability of not achieving PFC for water temperature in the 100-year time frame exist throughout the ODF land as shown in Figure 12-3a,b of the Analysis report. However, the reaches are of small magnitude and overall they represent a low probability for a measurable influence on aquatic resources in the watershed. Alternative vegetation management measures for these areas are rated with a low priority (4).

DATA GAPS

The following data gaps were identified during the upper Nehalem River Watershed Analysis.

1. Riparian Conditions along stream channels within Clatskanie River contiguous parcels.

Current aerial photos provide enough information for screening level information. More detailed information will be collected by District staff during site visits when laying out activities in these parcels.

2. Field surveys are needed to detect deep seated landslides.

State Forest staff is contracting a slope and channel stability project that will include information on deep seated features. This project will be completed by the fall of 2006. This project is a screening level tool, site specific surveys will take place when planning and conducting operations.

3. Detailed site-specific field surveys of steep slopes would be required to determine basin potential and sediment delivery potential of particular areas.

The above mentioned slope and channel stability project includes components to measure basin potential and sediment delivery. Site specific surveys will take place when planning and conducting operations.

4. More detailed information is needed to assess the effects of nitrate-nitrogen levels in Quartz Creek.

After review, it was decided by ODF that additional information is not needed at this point in time. When further information is needed that information will be gathered.

5. Hydrology data gaps identified include forest-specific streamflow data including low flows in managed and non-managed streams.

This is a research question that is beyond the scope of this project. After review, ODF has determined it has higher research needs and will not investigate this topic at this time.

6. Additional field information is needed to assess wetlands and in the Project Area.

After review, it was decided by ODF that information available at this time is sufficient to answer current needs. When more detailed information is needed a project will be initiated to gather the needed data.

7. Additional field information is needed to assess exotic/invasive plants.

Salem staff is developing a program approach to assessing and addressing noxious weeds. It should be completed within a year.

8. Additional site-specific information is required to evaluate the risk posed by debris flows to fish-bearing channels.

The above mentioned slope and channel stability project includes information on debris flows and fish streams. Site-specific information will be gathered when planning specific operations.

9. To evaluate how forest management will affect debris flow risk and ultimately the ecological condition of channels requires additional information on rates and spatial patterns of timber harvest.

The above mentioned slope and channel stability project and other ODF modeling on Harvest and Habitats will provide the information by ODF.

10. To estimate how mass wasting would alter channel and valley floor morphology detailed field surveys in landslide and debris flow deposition zones are needed.

The above mentioned slope and channel stability project includes information on debris flow deposition. Field-based evaluation will precede specific operations.

11. To obtain a more quantitative and accurate estimate of the various rates of erosion in the Nehalem watershed would require additional aerial photograph interpretation and field surveys.

The above mentioned slope and channel stability project has various aspects of erosion/mass wasting that will receive a high/mod/low rating. A more quantitative estimate of erosion rate is not needed at this time.

12. To verify the need for culvert replacements at five road crossings further field assessment of these crossings are needed.

District staff will make site visits to these crossings as outlined in the WIT document.

Table 1

Astoria: Potential sites for management activities ranked according to priority level. From Table 15-1 of Analysis report.					
Mgt. Basin	Stream	Reach Location	Priority	Issue to Address	ODF response (include what, who and when)
Beneke	Beneke Cr.	Beneke Vacated 1 @ 0.30	1	High washout hazard	This segment was vacated with the Bull Music Combination timber sale during the Summer of 2005.
"	Gilmore Cr.		2	Low in-stream wood; low recruitment potential scenario #3b, 4.	This stream reach is in an area with threatened and endangered species concerns. No operations are currently planned in this area. When the status of this area changes a plan will be developed to address the low in-stream wood issue.
"	Gilmore Cr. Tributary A		2	Low in-stream wood; low recruitment potential scenario #3b, 4.	This stream reach is in an area with threatened and endangered species concerns. No operations are currently planned in this area. When the status of this area changes a plan will be developed to address the low in-stream wood issue.
Buster	Unnamed Trib to Walker Cr.	RM 0.2; Grasslands 20 @ mile 0.49	1	Juvenile barrier blocking 0.5 miles; replacement;	This culvert will be vacated by 10/31/08 with the Rapid Stanley timber sale (FY08).
"	Buster Creek		1	Low in-stream wood; low recruitment potential scenario #3a, 3b, 4; SAH	ODF is conducting a stream enhancement project during the 2006 in-water work period with the Military Green timber sale (341-05-82). There will be ongoing stream enhancement projects conducted with area timber sales FY08 and FY09 AOP's. Specific plans for sites and timing will be formulated by the Jewell Unit Forester and ODFW Fish Habitat Biologist.
"	Osweg Cr.	Osweg 10 @ mile 0.28	3	AP code 2 with high washout hazard; low sediment concern	Site was field reviewed by unit foresters on 3/16. No repairs were needed at this time. This site will be monitored yearly and repaired if condition worsens.
"	Klines Cr.	0.6 mi.	3	Low in-stream wood; low recruitment potential scenario #4 - hardwood	Due to access limitations it is only feasible to conduct wood placement with cable systems. Currently there are no operations planned at this time. Specific plans for sites and timing will be formulated by the Jewell Unit Forester and ODFW Fish Habitat Biologist when area timber sales are planned.
Fishhawk	Fishhawk Cr.	Fishhawk Lake to Confluence	4	Shallow reservoir heating; not forest management related.	ODF has no management authority over the upstream reservoir heating (Fishhawk Lake). ODF will continue to work with the Watershed Council for solutions.

Table 1

"	Warner Cr.	Warner Creek Confluence	2	Temp. based on stream length influenced; Riparian Restoration Strategy #4	Preliminary assessment indicates that this area is in the floodplain. Further assessment will be done by the Reforestation Unit Forester by 10/31/09 to determine if the floodplain is suitable for planting.
Hamilton	Hamilton Cr.		3	Low in-stream wood; low recruitment potential scenario #3b, 4.	Further assessment will be completed by ODFW Fish Habitat Biologist by 10/31/07. Placement of large wood will be done per ODFW recommendation by 10/31/10 with Rising Tide timber sale (FY08)
"		Tidewater Loop @ mile 3.49	2	AP code 2 with high washout hazard; low sediment concern	Further assessment will be completed by ODF Engineering Unit Forester by 10/31/06. Issue will be resolved per Engineering Unit Forester recommendation by 10/31/09 with Rising Tide timber sale (FY08)
Lousignot		Vesper Spur 16850 @ mile 0.09	1	High washout hazard; sediment concern	Further assessment will be completed by ODF Engineering Unit Forester by 10/31/06. Issue will be resolved per Engineering Unit Forester recommendation by 10/31/09 with Silver Spoon timber sale (FY08) or District Road Crew.
Northrup	Northrup Cr.	RM 4.0	3	Low in-stream wood; low recruitment potential scenario #4 - hardwood; headwater	Further assessment will be completed by ODFW Fish Habitat Biologist by 10/31/07. Placement of large wood will be done per ODFW recommendation by 10/31/10 with the Ridge 77 timber sale (FY08)
"	Cow Cr.	ODFW Reach 28	4	1.6 mi., (high fines, but no obvious management sources)	Since no management source was identified possible ODF responses are limited. Unit Forester will explore enhancement options with ODFW biologist during this planning cycle.
Quartz	Rock Cr.	RM 26.5 - 27.0	1	Temp. 0.5 mi. Riparian Restoration Scenarios #1, 2, 4; SAH	Further assessment will be done by the Reforestation Unit Forester by 10/31/07. Riparian area planting of conifer will occur if site assessment indicates lack of conifer at site is source for non-properly functioning condition.

Table 1

"	Quartz Cr.		3	Low in-stream wood; low recruitment potential scenario #4 - hardwood	Further assessment will be completed by ODFW Fish Habitat Biologist and Reforestation Unit Forester by 10/31/07. Stream enhancement projects will be conducted with area timber sales. Specific plans for sites and timing will be formulated by the Jewell Unit Forester and ODFW Fish Habitat Biologist. Riparian area planting of conifer will occur if site assessment indicates lack of conifer at site is source for non-properly functioning condition.
"	Quartz Cr.		2	Temp. 0.8 mi. Riparian restoration strategy #4.	Further assessment will be completed by ODFW Fish Habitat Biologist and Reforestation Unit Forester by 10/31/07. Stream enhancement projects will be conducted with area timber sales. Specific plans for sites and timing will be formulated by the Jewell Unit Forester and ODFW Fish Habitat Biologist. Riparian area planting of conifer will occur if site assessment indicates lack of conifer at site is source for non-properly functioning condition.
"	Mainstem Nehalem River	Near Spruce Run Cr. Confluence	4	Temp. 2.0 mi. Riparian restoration strategy #3b, 4	This issue cannot be addressed with forest management practices. Water temperature of the mainstem of the Nehalem River is beyond the control of ODF management practices.
Sager	Sager Creek	Sager Cr. Road @ mile 0.38	2	0.28 mi. parallel road, hydrological connection; sediment sources	Roadside ditches will be assessed for possible disconnection opportunities from the hydrological system by the Jewell Unit Forester by 12/31/07. Any improvements will be completed with the Paradise East timber sale (FY08).
"	Sager Creek		2	Temp. 0.5 mi. Riparian Restoration Scenarios #3a – Sparse Hardwood;	Further assessment will be done by the Reforestation Unit Forester by 10/31/07. Riparian area planting of conifer will occur if site assessment indicates lack of conifer at site is source for non-properly functioning condition.
"	Deep Creek	Deep Creek @ mile 0.21	1	High washout hazard	Further assessment was completed by ODF Engineering Unit Forester and Jewell Unit forester on 3/16/06. The channel scour that led to this issue was legacy scour prior to fill replacement in 2003. No further action is required.

Table 1

"		Grand Rapids 601030 @ mile 0.19	3	AP code 2 with high washout hazard; low sediment concern	Further assessment was completed by ODF Engineering Unit Forester and Jewell Unit forester on 3/16/06. This issue will be resolved per Engineering Unit Forester recommendation by 10/31/08 with the Rapid Stanley timber sale (FY08).
Forest Grove: Potential sites for management activities ranked according to priority level. From Table 15-1					
Mgt. Basin	Stream	Reach Location	Priority	Issue to Address	
McGregor	NF Wolf Cr.		2	Low in-stream wood; low recruitment potential scenario #4 - hardwood	A stream enhancement project designed to add in-stream wood is currently being discussed for inclusion with the FY06 Zues' Boots timber sale by the District and ODFW Fish Habitat Biologist.
"	Bear Creek Trib to SF Rock Cr.	Section 10 Road @ mile 3.33	2	0.52 mi. Stream parallel road; hydrological connection sediment sources; SAH	District Engineer will assess roadside ditches for possible disconnection opportunities from the hydrological system. Any improvements will be completed by the District Road Crew by October 31, 2007.
"	SF Rock Creek		1	Low in-stream wood; low recruitment potential scenario #4 - hardwood; SAH	There will be ongoing stream enhancement projects conducted with area timber sales. Specific plans for sites and timing will be formulated by the District and ODFW Fish Habitat Biologist. Opportunities will be explored in the FY08 AOP with the Steel Shield timber sale.
Wheeler	Unnamed Trib. to Lousignont Cr.	RM 0.5; North Lousignont @ 4.4	1	Juvenile barrier blocking 3.7 miles; sediment concern; SAH	Fish passage culvert - bottom of has not filled with natural sediments due to a lack of sediments in the stream. District Road crew will machine place additional sediments by August 31, 2007.
"	Lousignont Cr.		1	Temp. 0.4 mi. riparian restoration scenario #1; SAH	Further assessment will be done by the District by 10/31/07. Riparian area planting of conifer will occur if site assessment indicates lack of conifer at site is source for non-properly functioning condition.
"	Lousignont Cr.		1	Low in-stream wood; low recruitment potential scenario #1, 2, 4; SAH	This stream reach is in an area with threatened and endangered species concerns. No operations are currently planned in this area. When the status of this area changes a plan will be developed to address the low in-stream wood issue.
"	Lousignont Cr.	Marshall Road mile 0.03	2	0.51 mi. Stream parallel road; hydrological connection sediment sources; SAH	District Engineer will assess roadside ditches for possible disconnection opportunities from the hydrological system. Any improvements will be completed by the District Road Crew by October 31, 2007.

Table 1

"	Carlson Cr. trib to Lousignont Cr.	Clarkson Creek road mile 1.02; Clarkson Cr. Spur 0.44 mi at road mile 0.21	2	1.14 mi. Stream parallel roads; hydrological connection; sediment sources; SAH	District Engineer will assess roadside ditches for possible disconnection opportunities from the hydrological system. Any improvements will be completed by the District Road Crew by October 31, 2007.
"	Doty Cr.		2	Temp. 0.1 mi. riparian restoration scenario #4; SAH but small stream length influenced	This is Doty Pond. District will not pursue riparian restoration at this time. It is not prudent to conduct riparian restoration on 0.1 miles of stream. It is doubtful that this has any impact on stream temperature.
"	Upper Nehalem River		1	Low in-stream wood; low recruitment potential scenario #1, 3b, 4; SAH	There are no in-stream wood projects planned. Opportunities will be explored with the FY08 Joe Cockeran timber sale.
"	SF Nehalem River	ODFW Reach 154	4	0.5 mi. (Fines); SAH: but no obvious management sources	Since no management source was identified, possible ODF responses are limited. Unit Forester will explore enhancement options with ODFW biologist during this planning cycle.
Wilark	Oak Ranch Cr.	RM 7.0; Oak Ranch @ 0.12 mi.	1	Juvenile barrier blocking 14.4 miles	Culvert was replaced with a bridge in 2005.
"	Little Clatskanie River	Little Clatskanie @ 0.38 mi.	2	AP code 1 with high washout hazard; low sediment concern	District Engineer will assess stream crossing to determine appropriate remedy prior to July 1, 2006. Mitigating action will be completed by September 15, 2007.

Table 2

Stream reaches with low levels of key pieces of large wood (<0.5 pieces/ 100m). From table 11-5 of Analysis report.

1710020101		1710020102		1710020103	
Stream	Key Pieces Large Wood	Stream	Key Pieces Large Wood	Stream	Key Pieces Large Wood
Derby Creek	0.02	Northrup Creek	0.1	Hamilton Creek	0.3
Dell Creek	0	Northrup Creek Tributary A	0.2	Hamilton Creek	0.3
North Fork Wolf Creek	0.2	Northrup Creek	0.4		
North Fork Wolf Creek	0.3	Deep Creek	0.3	Hamilton Creek Tributary A	0.1
Rock Creek	0.4			Buster Creek	0.4
Rock Creek	0.4			Buster Creek	0.4
Wolf Creek	0.1			Buster Creek	0.2
Upper Nehalem River	0.4			Nettle Creek	0
Lousignont Creek	0.2			Nettle Creek	0
				Stanley Creek	0.4
				Cow Creek	0.1
				Cow Creek	0
				Kline's Creek	0.2
				Quartz Creek	0
				South Fork Quartz Creek	0.3
				South Fork Quartz Creek	0
				Gilmore Creek	0
				Gilmore Creek	0.3
				Gilmore Creek	0.2
				Gilmore Creek	0.1
				Gilmore Creek Tributary A	0.2

Table 2

				Gilmore Creek Tributary A	0.2
				Beneke Creek	0.3
				Trailover Creek	0.1
				Walker Creek	0

Table 3

Reaches supporting high sediment loads in the upper Nehalem by 5th field HUC.
From table 11-7 of Analysis report.

1710020101		1710020102		1710020103	
Stream	Percent Fines	Stream	Percent Fines	Stream	Percent Fines
Derby Creek	33	Lousignont Creek	38	Bull Heifer Creek	32
Lousignont Creek	44	Lousignont Creek	62	Bull Heifer Creek	58
North Fork Lousignont Creek	63	Sager Creek	71	Bull Heifer Creek Tributary A	34
Olson Creek	62	Sager Creek	64	Osweg Creek	86
Clear Creek	55	Sager Creek	86	Buster Creek	37
Bear Creek	31	Fishhawk Creek (above lake)	30	Buster Creek	39
Bear Creek	56	Fishhawk Creek (above lake)	62	Buster Creek Tributary	87
Bear Creek	67	Fishhawk Creek (above lake)	36	Buster Creek Tributary	94
North Fork Wolf Creek	44	Fishhawk Creek (above lake)	33	Buster Creek Tributary	55
South Fork Nehalem River	60	Northrup Creek Tributary A	41	Buster Creek Tributary	64
Upper Nehalem River	61	Trestle Creek	97	Buster Creek Tributary	65
Lousignont Creek	32	Trestle Creek	65	Beneke Creek	40
Lousignont Creek	37	Warner Creek	43	Beneke Creek	40
Lousignont Creek	40	Warner Creek Tributary B	35	Beneke Creek	95
		Warner Creek Tributary C	34	Crawford Creek	68

Table 3

		Deep Creek	45	Gilmore Creek	53
		Deep Creek	34	Gilmore Creek	48
		Deep Creek	33	Gilmore Creek Tributary A	40
		Deep Creek Tributary	36	Slaughters Creek	40
		Deep Creek Tributary	60	Slaughters Creek	36
		Cow Creek	49	Stanley Creek	37
				Walker Creek	55
				Quartz Creek	38

Table 4

Road sections in the Upper Nehalem project area prioritized for repair based on road drainage and prism Attention Priority (AP) codes, hydrologic connection of road drainage, road critical location, location within Salmon Anchor Habitat (SAH), and proximity to streams with sediment concern. From table 14-1 of Analysis report.

Management Basin	Road Name	Segment Location (Road Mile)	Segment Length (Mi)	Drainage AP Code ¹	Prism AP Code ²	Critical Location ³	Hydrologic Connection	SAH ⁴	Sediment Concern
McGregor	Lower Rock Creek	0.54	0.11	-	3	CT	Y	N	N
McGregor	Olson	1.49	0.03	-	-	SD	Y	N	N
Wheeler	South Lousignont	2.32	0.25	1	-	-	Y	Y	Y
Wheeler	Shields Spur 1.57 Mile	0.93	0.31	2	3	-	Y	Y	N
Quartz	Sterling Ranch 1005	0	0.17	2	-	-	Y	Y	N
Buster	Osweg 2010	0	0.08	2	-	-	Y	N	N
Wheeler	Shields Spur 1.57 Mile	1.4	0.31	-	3	-	Y	Y	N
Wheeler	BC 1.95	1.22	0.22	-	3	-	Y	Y	N
Wheeler	Shields Spur 1.72 Mile	0.48	0.2	-	3	-	Y	Y	N
Wheeler	Shields Spur 1.72 Mile	0.25	0.1	-	3	-	Y	Y	N
Quartz	Sterling Ranch 9010	0	0.07	-	3	-	Y	Y	N
Hamilton	Tidewater Loop 120	0	0.86	-	3	SP	Y	N	N

Table 4

Beneke	Tidewater Loop 20	0.71	0.19	-	3	SP	Y	N	N
Buster	Osweg 20	0.03	0.12	-	3	-	Y	N	Y
Hamilton	Ebsen 10	0.86	0.09	-	3	SP	Y	N	N
Hamilton	Fishhawk Creek 05	0	0.09	-	3	-	Y	N	N
Hamilton	Tidewater Loop 135	0.63	0.09	-	3	-	Y	N	N
Hamilton	Tidewater Loop 135	0.96	0.06	-	3	SP	Y	N	N
Northrup	Northrup Creek 20	0.35	0.05	-	3	-	Y	N	N
Hamilton	Tidewater Loop	0.36	0.54	-	3	-	Y	N	N
Beneke	Wild Goose Ridge 60	0.96	0.22	-	3	-	Y	N	N
Hamilton	Fishhawk Creek 1020	0	0.13	-	3	-	Y	N	N
Northrup	Foster 300	0.13	0.13	-	3	-	Y	N	N
McGregro	No Fo	2.89	0.12	-	3	SF	Y	N	N
Sager	Jones 10	0.59	0.1	-	3	-	Y	N	N
Quartz	Lost Lake	3.33	0.1	-	3	-	Y	N	N
Hamilton	Tidewater Loop 110 ⁵	0.85	0.09	-	3	-	Y	N	N
Beneke	Wild Goose Ridge 60	0.81	0.08	-	3	-	Y	N	N
Quartz	Lost Lake	4.47	0.06	-	3	-	Y	N	N
Buster	Green Mountain	5.11	0.06	-	3	-	Y	N	N
Quartz	August Fire	3.02	0.06	-	3	-	Y	N	N

Table 4

Beneke	Wild Goose Ridge 60	0.64	0.05	-	3	-	Y	N	N
Hamilton	Tidewater Loop	0.98	0.05	-	3	-	Y	N	N
Beneke	Foster 16010	0.4	0.04	-	3	-	Y	N	N
Quartz	Sterling Ridge 60	0.53	0.04	-	3	-	Y	N	N
McGregor	Music	1.69	0.03	-	3	SF	Y	N	N
Buster	Osweg 3010	0.04	0.03	-	3	SF	Y	N	N
Wheeler	Clarkson Cr Spur 0.44 mi.	0.21	0.73	-	-	SP	Y	Y	Y
Fishhawk	Fishhawk Loop	3.33	0.69	-	-	-	Y	Y	Y
Wheeler	Section 10	0	0.52	-	-	SP	Y	Y	Y
Wheeler	Marshall	0.03	0.51	-	-	SP	Y	Y	Y
Wheeler	Clarkson Creek	0	0.45	-	-	SP	Y	Y	N
Wheeler	Clarkson Creek	1.02	0.41	-	-	-	Y	Y	Y
Beneke	Wild Goose Ridge 20 ⁵	1.81	0.31	-	-	-	Y	Y	N
Wheeler	Voltaire	0	0.3	-	-	-	Y	Y	N
Wheeler	Derby Ridge	0.96	0.28	-	-	SP	Y	Y	N
Buster	Nettle Creek 30	0	0.26	-	-	-	Y	Y	N
Buster	Buster Creek	6.13	0.5	-	-	-	Y	N	N

Table 4

Hamilton	Ebsen 1010	0	0.46	-	-	-	Y	N	N
Northrup	Northrup Creek	1.78	0.45	-	-	-	Y	N	N
Buster	Buster Creek	5.5	0.41	-	-	SP	Y	N	N
Sager	Deep Creek Relocated	0.98	0.4	-	-	SP	Y	N	N
Beneke	Beneke Vacated 1 ⁵	0.14	0.39	-	-	SF	Y	N	N
Buster	Grasslands 20	0.21	0.34	-	-	-	Y	N	N
Northrup	Northrup Creek	0.77	0.34	-	-	-	Y	N	N
Hamilton	Ebsen 10	0.37	0.33	-	-	SP	Y	N	N
Sager	Sager Creek	0.38	0.28	-	-	SP	Y	N	Y
Buster	Soak Alley	0.38	0.25	-	-	-	Y	N	N
Northrup	Northrup Creek	0.44	0.24	-	-	SP	Y	N	N
Buster	Buster Creek	6.7	0.24	-	-	-	Y	N	Y
	Beneke Beneke Vacated 1	0.56	0.23	-	-	SP	Y	N	N
Buster	Wage ⁵	2.64	0.17	-	-	SP	Y	N	N
Buster	Stanley Creek	0	0.12	-	-	-	Y	N	Y
Buster	Buster Creek	1.71	0.88	-	-	SP	Y	Y	N
Hamilton	Tidewater Loop 80 ⁵	0	0.55	-	-	SP	Y	N	N

Table 4

Hamilton	Tidewater Loop	2.1	0.83	-	-	SP	Y	N	N
Wheeler	SB 0.13	0	1.05	-	-	-	N	N	N
Wheeler	Ingersol Spur 1.64 mile	0	0.08	-	2	-	N	Y	N
Sager	East Sager Vacated 3	0.23	0.1	-	-	FS	N	N	Y
Crawford	Crawford Ridge 14010 ⁵	1.21	0.02	-	-	CT	N	N	N
McGregor	Music ⁵	1.91	0.05	-	2	SP, SF	N	N	N
McGregor	McGregor	6.15	0.02	-	-	-	N	N	N
Quartz	Lost Lake 12020	0	0.03	-	-	-	N	N	N
Sager	Walker Ridge 40	0	0.15	2	-	-	N	Y	N
Wheeler	Morgan Cr. Spur 0.67 mi.	0.38	0.09	2	-	-	N	Y	N
Quartz	Lost Lake 180	0.05	0.21	2	3	SF	N	N	N
Buster	Walker Ridge 10	0	0.13	2	-	-	N	N	N
Northrup	Foster 50	0.04	0.22	2	-	-	N	N	N
Northrup	Bovine 160	0.1	0.26	2	-	-	N	N	N
Quartz	Lost Lake 140	0.27	0.03	2	-	-	N	N	N
Quartz	Lost Lake 110	0.05	0.06	2	-	-	N	N	N

Table 4

Quartz	Lost Lake 10	0	0.27	2	-	-	N	N	N
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1 Only Drainage AP codes 1 and 2 are considered in this prioritization; AP codes 3-5 are not identified.

AP Code 1 indicates surface water is causing severe erosion of road prism and needs immediate attention.

AP Code 2 indicates surface water is causing moderate erosion of road or onto steep fill

2 Only Prism AP codes 1-3 are considered in this prioritization; AP codes 4 and 5 are not identified.

AP Code 1 does not exist in the project area.

AP Code 2 indicates arcuate cracks or other landslide is present reducing road width and drop on outside edge of road.

AP Code 3 indicates serious surface erosion or minor cutback slump.

3 Critical road locations identified include sidecast/fill slides (CT), fill slides (FS), stream in ditch (SD), stream parallel (SP), and steep fill (SF).

4 Salmon Anchor Habitats in the project area include HUC's #171002020304 (Buster Cr.), #171002020205 (Fishhawk Cr.), #171002020101 (Lousignont Cr.), and #171002020105 (Upper Rock Cr.)

5 Road segment also contains culvert in need of replacement or repair.

Table 5

Streams crossings in the Upper Nehalem project area prioritized for replacement based on crossing Attention Priority (AP) code, washout hazard rating, location in Salmon Anchor Habitats (SAH), and proximity to streams with sediment concern. From table 14-2 of Analysis report.

Mgt Basin	Road Name	Crossing Location	AP Code ¹	Washout Hazard Rating	SAH ²	Sediment Concern
		(Road Mile)				
Buster	Grasslands	4.5	1	H	Y	N

1 Only AP codes 1 or 2 are considered in this prioritization; AP codes 3-5 are not identified. AP code 1 indicates the crossing is in failure

2 Salmon Anchor Habitats in the project area include HUC's #171002020304 (Buster Cr.), #171002020205 (Fishhawk Cr.), #171002020101 (Lousignont Cr.), and #171002020105 (Upper Rock Cr.).

Table 6

Streams crossings in the Upper Nehalem project area prioritized for repair based on fish passage condition, crossing Attention Priority (AP) code, washout hazard rating, location in Salmon Anchor Habitats (SAH), and proximity to streams with sediment concern. From table 14-3 of Analysis report.

Mgt Basin	Road Name	Crossing Location (Road Mile)	Fish Passage		AP Code ²	Washout Hazard Rating	SAH ³	Sediment Concern	ODF response
			Known Juvenile Barrier	Stream Length					
				Upstream of Barrier (Mi) ¹					
Hamilton	Tidewater Loop Spur A	0.56	-	-	1	M	N	N	
Hamilton	Tidewater Loop 80	0.25	-	-	1	M	N	N	
Wheeler	Section 10	1.53	-	-	2	M	Y	N	
Buster	Grand Rapids	1.53	-	-	2	M	Y	N	
Hamilton	Ebsen	0.19	-	-	2	M	Y	N	
Hamilton	Wooden	0.07	-	-	2	M	Y	N	
Northrup	Foster 2010	0.47	-	-	2	M	Y	N	
Lousignot	Vesper Spur 16850	0.44	-	-	2	M	N	N	
Buster	Osweg 1010	0.04	-	-	2	M	N	N	
Beneke	Sarajarvie Creek	0.33	-	-	2	M	N	N	
Buster	Osweg 10	0.37	-	-	2	M	N	N	
Crawford	Crawford Ridge 14010	0.75	-	-	2	M	N	N	
Hamilton	Fishhawk Creek 1010	0.03	-	-	2	M	N	N	
Hamilton	Tidewater Loop 110	0.79	-	-	2	M	N	N	
Hamilton	Tidewater Loop 80	0.18	-	-	2	M	N	N	
Hamilton	West Tidewater	0.72	-	-	2	M	N	N	
McGregor	Music	2.03	-	-	2	M	N	N	
Buster	Wage 90 Vacated	0.14	-	-	2	L	Y	N	

Table 6

McGregor	Pit	0.97	-	-	2	L	Y	N	
Sager	Walker Ridge	1.96	-	-	2	L	Y	N	
Sager	West Sager Creek 120	0.17	-	-	2	L	N	N	

1 The stream length upstream of barriers represents stream mileage up to the current upstream extent of passage on each stream.

2 Only AP codes 1 or 2 are considered in this prioritization; AP codes 3-5 are not identified.

AP code 1 indicates the crossing is in failure

AP code 2 indicates the crossing is nearing failure.

3 Salmon Anchor Habitats in the project area include HUC's #171002020304 (Buster Cr.), #171002020205 (Fishhawk Cr.), #171002020101 (Lousignont Cr.), and #171002020105 (Upper Rock Cr.).

Table 7

Streams crossings in the Upper Nehalem project area identified as adult and juvenile barriers on streams with likely fish presence and their presence in Salmon Anchor Habitats (SAH). From table 14-4 of Analysis report.

Mgt Basin	Road Name	Crossing Location (Road Mile)	Likely Fish Barrier Type	SAH¹
Wheeler	Clarkson Creek	0.96	Adult/Juvenile	Y
Wheeler	Fire Road 1	1.19	Adult/Juvenile	Y
Wheeler	Salmonberry	0.07	Adult/Juvenile	N
Quartz	August Fire	3.48	Adult/Juvenile	N
Buster	Soak Alley 20	0.42	Adult/Juvenile	N
Crawford	Squaw Creek	1.29	Adult/Juvenile	N
Hamilton	Tidewater Loop	2.57	Adult/Juvenile	N
Hamilton	Tidewater Loop	3.49	Adult/Juvenile	N
Hamilton	Wooden 10	0.02	Adult/Juvenile	N
Hamilton	West Tidewater	0.01	Adult/Juvenile	N
Wheeler	Clarkson Creek	1.02	Juvenile	Y
Wheeler	Marshall	0.03	Juvenile	Y
Wheeler	South Lousignont	2.98	Juvenile	Y
Wheeler	Round Top	0.57	Juvenile	Y
Quartz	Sterling Ranch	0.79	Juvenile	Y
Quartz	Sterling Ranch 10	0.18	Juvenile	Y
Buster	Nettle Creek	1.06	Juvenile	Y
McGregor	North Fork Wolf Creek	3.16	Juvenile	N
Hamilton	Fishhawk 10	0.06	Juvenile	N
Beneke	Sarajarvie Creek 40	0.7	Juvenile	N
Beneke	Sarajarvie Creek 40	0.028	Juvenile	N
Beneke	Wild Goose Ridge 20	2.27	Juvenile	N

Table 7

Northrup	Northrup Creek	1.92	Juvenile	N
Wilark	Beaver Home	0.05	Juvenile	N
Wilark	Beaver Home	0.52	Juvenile	N

1 The stream length upstream of barriers represents stream mileage up to the current upstream extent of passage on each stream.

2 Only AP codes 1 or 2 are considered in this prioritization; AP codes 3-5 are not identified.

AP code 1 indicates the crossing is in failure

AP code 2 indicates the crossing is nearing failure.

3 Salmon Anchor Habitats in the project area include HUC's #171002020304 (Buster Cr.), #171002020205 (Fishhawk Cr.), #171002020101 (Lousignont Cr.), and #171002020105 (Upper Rock Cr.).

Table 15-2. Potential enhancement sites for the Upper Nehalem Watershed ranked according to ODFW habitat priority level.

Stream Name	Length		Channel Size	Priority	Access	Habitat Survey	Field Verified	ODF District	Potential Project Extent		Resource Concern	Miles Affected
	(m)	(ft)							From	To		
South Fork Rock Creek	2200	7216	Medium	1	H	yes	X	FG	HWY 26	Shields Rd	Large wood	0.8
South Fork Rock Creek	1780	5840	Medium	1	H	yes	X	FG	Mouth	HWY 26		
Olson Creek	1274	4178	Medium	2	M		X	FG	Rock Creek	End of Coho		
Rock Creek	1832	6010	Large	2	M	yes	X	FG	North Fork Rock Creek	TJ/		
Rock Creek Trib C	401	1317	Medium	2	M		X	AST	Rock Creek	End of Coho	Replaced culverts	1.5
Wolf Creek	5200	17057	Large	2	H		X	FG	Nehalem River	North Fork Wolf Creek		
Wolf Creek	1429	4867	Medium	2	M		X	FG	North Fork Wolf Creek	Wolf Creek Falls		
North Fork Wolf Creek	4213	13820	Medium	2	M	yes	X	FG	Wolf Creek	End of Coho	Large wood	1
North Fork Wolf South Trib	1602	5253	Medium	2	U			FG	North Fork Wolf Creek	End of Coho		
North Fork Wolf Creek Trib B	1375	4512	Medium	2	M			FG	North Fork Wolf Creek	End of Coho		
North Fork Wolf Creek Trib B	86	281	Medium	2	M			FG	North Fork Wolf Creek	End of Coho		
Lousignont Creek (Timber)	1998	6555	Medium	2	M	yes	X	FG	Carlson Creek	End of Coho	Large wood	2
Lousignont Creek (Timber)	1704	5588	Medium	2	H	yes	X	FG	Carlson Creek	End of Coho	Large wood	

North Fork Lousignont Creek	3402	11159	Medium	2	M		X	FG	Lousignont Creek	Endo of Coho		
South Fork Lousignont Trib A	1104	3622	Medium	2	U			FG	South Fork Lousignont Creek	End of Coho		
Nehalem River	2158	7077	Medium	2	M	yes	X	FG	Hans Creek	End of Coho		
South Fork Nehalem River	1343	4405	Medium	2	M	yes	X	FG	Hans Creek	End of Coho		
Step Creek	536	1758	Medium	2	M		X	FG	Nehalem River	End of Coho		
Nehalem River	422	1385	Medium	3	L	yes	X	FG	Hans Creek	Endo of Coho (Doty Pond?)		
Upper Nehalem River Trib B	598	1963	Medium	3	L			FG	Nehalem River	End of Coho		
Selder Creek	1859	6099	Medium	4	N			AST	Rock Creek	End of Coho		
Olson Creek	832	2730	Medium	4	N		X	FG	Rock Creek	End of Coho		
North Fork Rock Creek	1950	6395	Medium	4	N	yes	X	AST	Large TJ/	End of Coho		
North Fork Rock Creek Trib B	1096	3596	Medium	4	N			AST	Mouth	Endo of Coho		
South Fork Rock Creek	1001	3284	Medium	4	N	yes	X	FG	Above Shields Rd	End of Coho		
Bear Creek (Rock Creek)	1622	5319	Medium	4	H	yes	X	FG	South Fork Rock Creek	End of Coho		
North Fork Wolf Creek	1429	4688	Medium	4	N	yes	X	FG	Wolf Creek	End of Coho		
Lousignont Creek (Timber)	1528	5013	Medium	4	N	yes	X	FG	North Fork Lousignont Creek	Carlson Creek		
Carlson Creek	1567	5138	Medium	4	M	yes	X	FG	South Fork Lousignont Creek	End of Coho		

Carlson Creek	914	2999	Medium	4	N	yes	X	FG	South Fork Lousignont Creek	End of Coho		
Nehalem River	6869	22530	Large	4	U			FG	Castor Creek	Step Creek		
Nehalem River	756	2480	Large	4	M	yes	X	FG	Step Creek	Hans Creek		
Nehalem River	972	3189	Large	4	M	yes	X	FG	Step Creek	Hans Creek		
Nehalem River	1500	4918	Medium	4	N	yes	X	FG	Step Creek	Hans Creek		
Nehalem River	875	2869	Medium	4	N	yes	X	FG	Hans Creek	End of Coho (Doty Pond?)		
Step Creek	972	3189	Medium	4	N			FG	Nehalem river	End of Coho		
Derby Creek	280	917	Medium	4	N			FG	Nehalem River	End of Coho		
East Humbug Creek	3428	11245	Medium	1	H		X	AST	1st Rd X-ing	End of Road Access		
Buster Creek	1789	5866	Medium	1	H		X	AST	Walker Creek	Stanley Creek		
Buster Creek	3280	10758	Medium	1	H		X	AST	Stanley Creek	End of Road Access		
Walker Creek	5892	19326	Medium	1	H	yes	X	AST	2nd Walker CR RD X-ing	End of Road Access	Culvert replaced	0.1
East Humbug Creek	1738	5699	Medium	2	U			AST	End of Road Access	End of Coho		
Quartz Creek	1985	6511	Medium	2	U	yes		AST	Nehalem River	High Gradient Reach Below S FK		
SF Quartz Creek			Medium									
Moore's Creek	655	2150	Medium	2	H	yes			Nehalem River	End of Coho	Culv. Removed, road vacated	0.2
Buster Creek	888	2914	Medium	2	M		X	AST	End of Lower Rd Access	End of Coho	Culvert replaced	1

Walker Creek (Buster Creek)	1253	4111	Medium	2	M		X	AST	Buster Creek	TJ Upstream of Wage Rd		
Stanley Creek	1259	4131	Medium	2	U			AST	Buster Creek	End of Coho		
Hamilton Creek	3399	11149	Medium	2	M	yes	X	AST	Fishhawk Creek	End of Road Access	Culvert replaced	1.9
Grub Creek	950	3115	Medium	2	U			AST	Nehalem River	End of Coho		
Squaw Creek	4495	14745	Medium	2	U			AST	Nehalem River	End of Coho	Culvert removed	1.1
West Branch Squaw Creek	1248	4095	Medium	2	U			AST	Squaw Creek	End of Coho		
Northrup Creek	709	2324	Medium	2	H		X	AST	ODF Boundary	Cow Creek	Culvert replaced	0.2
Northrup Creek	5912	19391	Medium	2	M		X	AST	Cow Creek	End of Coho	Large wood	1.5
Sager Creek	2513	8241	Medium	2	M	yes	X	AST	Nehalem River	East Sager Creek		
East Sager Creek	1696	5564	Medium	2	M		X	AST	Sager Creek	End of Coho	Culv. Removed, road vacated	1
Deep Creek	403	1322	Medium	2	U		X	AST	TJ AT T6N- R6W-12	End of Coho		
Deep Creek	3099	10165	Medium	2	U	yes		AST	TJ/ AT T5N- R5W 19NW	TJ at End of Deep Creek Rd		
Deep Creek Trib C	402	1319	Medium	2	U			AST	TJ AT T6N- R6W-12	End of Coho		
Warner Creek	1515	4970	Medium	2	U	yes		AST	Fishhawk Creek	End of Coho	Culvert replaced	2.5
Buster Creek Trib A	167	547	Medium	3	H			AST	Buster Creek	End of Coho	Culver replaced	0.3
Beneke Creek	1609	5279	Medium	3	L		X	AST	Bull Heifer Creek	TJ AT T6N- R7W-11C		

Cow Creek	2908	9537	Medium	3	H		X	AST	Northrup Creek	200M above Cow Cr Road	Culverts replaced	3.9
Cow Creek (Vinemaple)	1383	4537	Medium	4	N	yes	X	AST	End of Road Access	End of Coho (falls)		
Klines Creek (South)	1107	3630	Medium	4	N	yes	X	AST	Nehalem River	End of Coho		
Buster Creek	3844	12607	Large	4	U		X	AST	Nehalem River	/TJ AT T5N-R6W-30NW		
Buster Creek	2783	9128	Medium	4	N		X	AST	End of Lower Rd Access	End of Coho		
Buster Creek Trib B	1908	6257	Medium	4	N			AST	Buster Creek	End of Coho		
Buster Creek Trib C	1077	3532	Medium	4	N			AST	Buster Creek	End of Coho (below Rd x-ing)		
Walker Creek (Buster Creek)	2014	6606	Medium	4	N		X	AST	Walker Creek	End of Coho		
Walker Creek (Buster Creek) Trib	1473	4832	Medium	4	N		X	AST	Walker Creek	End of Coho		
Hamilton Creek	2302	7551	Medium	4	N	yes	X	AST	End of Road Access	End of Coho		
Beneke Creek	5163	16934	Large	4	H	yes	X	AST	Gilmore Creek	Walker Creek		
Beneke Creek	1600	5249	Medium	4	N			AST	End of Road Access	Bull Heifer Creek		
Bull Heifer Creek	500	1640	Medium	4	N			AST	Beneke Creek	End of Coho		
Beneke Creek	222	729	Medium	4	N			AST	Bull Heifer Creek	TJ AT T6N-R7W-11C		
Gilmore Creek			Medium									
Gilmore Creek Trib A	1929	6326	Medium	4	N			AST	Gilmore Creek	End of Coho		

