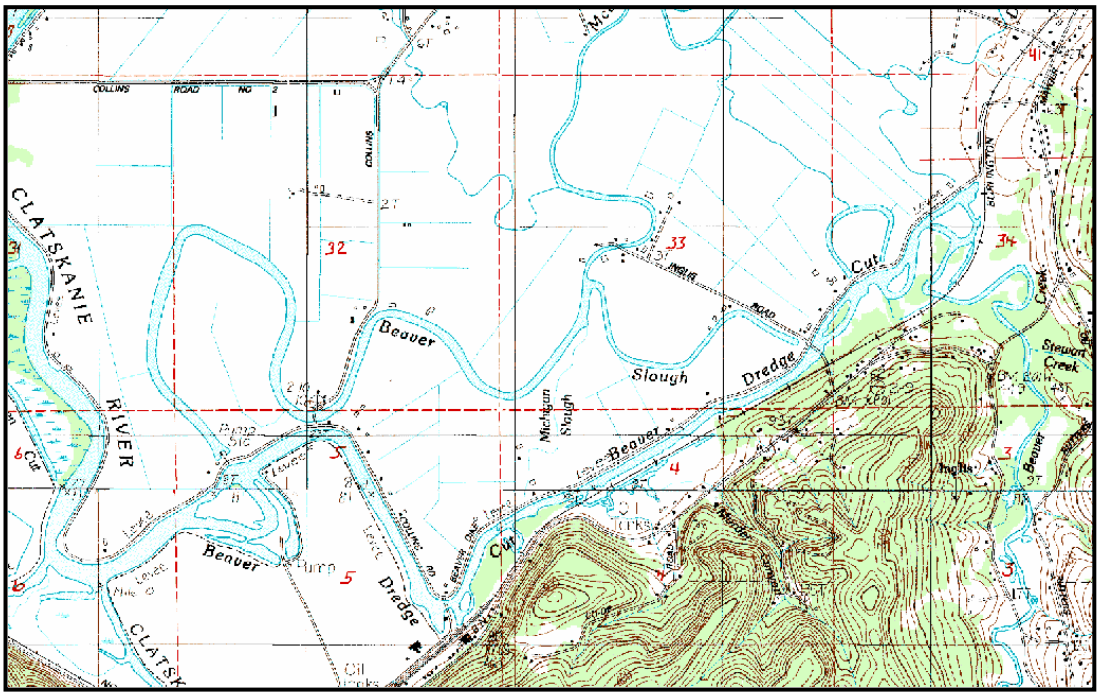


Figure 7.1: Channel modifications in the Clatskanie floodplain. Beaver Dredge Cut is an example of channel relocation and subsequent loss of floodplain connectivity (REO, 2001).

VII. Channel Modification Assessment

Introduction

Stream ecosystems are ever-changing; channels are constantly under the influences of erosion and deposition. A stream constantly seeks a quasi-dynamic equilibrium with its gradient, and maintains its floodplain by regularly overflowing its banks and by laterally shifting over the inundated region (Allan, 1995). This equilibrium has often been altered by human intervention. Waterways have played a central role in human history and we have modified stream channels to meet the various needs of our society. Stream channels within the Lower Columbia-Clatskanie Subbasin have been modified by a variety of activities including: road construction, flood control, impoundments for irrigation and drinking water, and bank stabilization and channel relocation in urban and residential zones. Figure 7.1 is an example of channel modifications within floodplain habitats of the Columbia River. Beaver Creek no longer connects to Beaver Slough, instead Beaver Dredge Cut now drains Beaver Creek directly into the Clatskanie River.

Channel modifications often result in degradation of the quality and quantity of instream habitats essential for the life cycle of salmonids. Depending on the type of channel modification, the potential effects may include: loss of spawning gravels, reduction of pool habitats, depletion of large wood, and an overall reduction in habitat complexity. Additional effects of channel modifications are flow alteration, increased scouring, reduction of off-channel habitats, and loss of connectivity to floodplain food sources. Furthermore, some channel modifications can present a barrier to fish migration, effectively eliminating the use of upstream habitats by anadromous salmonids and resident fish that migrate within the stream system (see Table 7.1).

Stream ecosystems form a continuous strand from headwaters to mouth, in which processes taking place upstream strongly influence downstream dynamics, and to some extent the reverse occurs as well (Allan, 1995). Channel modifications therefore can have impacts extending both downstream and upstream. The degree of impact to the habitat will depend on the channel habitat type and the type and magnitude of the channel modification (WPN, 1999). Within this section of the watershed assessment, channel modifications have been mapped and evaluated for potential degree of impact. The channel habitat types defined within Section III of this watershed assessment are used to evaluate the potential impacts that each channel modification can have on the instream habitats. In addition to channel habitat types, position in watershed, percent of stream channel modified, and fish presence are used to assess a potential impact of low, moderate, or high for each channel modification.

Methodology

Data Inventory and Sources

Information regarding the locations and types of developments that have affected stream channels has been collected through interviews with agency personnel and landowners, and by reviewing historic documents, agency records, topographic maps, and aerial photographs. The types and scales of current and historical channel modifications vary from points along the stream channel to entire segments or reaches of the channel. Many of the current channel modifications, such as impoundments and bridges, are mapped as points along the stream channel, while channels modified by urban developments or road construction are mapped as segments. Table 7.1 presents a list of common channel modification activities and the potential impacts from such activities.

Channel Modification Activity	Potential Impacts
Hydroelectric and irrigation dams	Migration barrier, loss of spawning and rearing habitat, non-native fish introduction
Reservoirs and artificial impoundments	Flow alteration, loss of spawning gravels
Small agricultural impoundments, cattle ponds, fire ponds	Migration barrier, loss of spawning and rearing habitat, non-native fish introduction, water quality impacts
Dikes, levees (usually for flood control)	Loss of side-channels and floodplain function, decrease in channel length, and reduction of habitat complexity
Channelization (channel straightening, hardening, or relocation)	Reduction in key habitat features such as pools and sorted gravel
Dredged channels	Decrease in habitat complexity
Stream-bank protection (riprap, pilings, bulkheads)	Decrease in lateral scour pools; likely to incite bank erosion downstream
Built-up areas in floodplains, in/near estuaries, wetlands, and channels	Loss of side-channels, flood attenuation, and food-chain support
Tide gates	Loss of off-channel rearing areas and food-chain support
Roads next to streams	Loss of side-channels, lateral pools, and riparian function
Extensive fill associated with road crossings (~250+ feet)	Loss of habitat complexity, downstream erosion
Push-up dams	Migration barrier, habitat loss, flow alteration
Sand and gravel mining in/near channels, tailings deposits	Pool filling, decreased habitat complexity

Table 7.1: Common stream channel modifications and potential impacts (WPN, 1999).

Interviews were held with watershed council members, senior and retired agency personnel, and old-time local residents. Information gathered during these interviews included the locations and purposes of the channel modifications and the approximate year and scale of impact. The location and date of historic channel modifications are approximate. Oregon State Fish Commission reports and Department of Interior Fisheries Reports were another source of historic data pertaining to instream habitat modifications and habitat enhancements. Other documents reviewed include historic society notes and historical texts. Relatively few accounts were found that described in-channel modifications; most of the historical records pertained to changes in land use and demographics.

Water rights records from the Oregon Department of Water Resources were used to locate reservoirs or impoundments. These records, introduced in the Hydrology and Water Use Assessment, contain the location, year, and size or rate of water use for each impoundment. Impoundments after 1974 would have also required a fill/removal permit from the Army Corps or Division of State Lands. In a few cases, water rights records matched up with data collected during the historical interviews.

Fill/removal permits acquired from the Oregon Division of State Lands were also used to locate channel modifications. Removal or fill of 50 cubic yards or more within "waters of the state" requires a permit from the Division of State Lands. "Waters of the state" are defined as natural waterways including all tidal and notidal bays, intermittent streams, constantly flowing stream, lakes, wetlands and other bodies of water in this state, navigable and nonnavigable (ORS 196.800-990). The earliest fill/removal permit within the Lower Columbia-Clatskanie Subbasin is from 1974. In areas designated by the Division as essential indigenous anadromous salmonid habitat, most removal-fill activities require a permit, regardless of the number of cubic yards affected (ODSL, 2001).

Another source of data for channel modifications was USGS 7.5 minute topographic maps. These maps were used to identify dikes, levees, dredged channels, excessive road fill, stream crossings, and channel straightening and relocation. For this work, stream segments were identified where channel modifications have potentially impacted the stream ecosystem. USGS maps and GIS data were also used to map stream crossings. First, the roads GIS layer was overlayed on the streams to identify all stream crossings within the subbasin. These stream crossings were then verified by overlaying them on digital aerial photographs.

Evaluation of Impact

The goals of the channel modifications assessment are to identify historic and current channel modifications, map the location of each modification, identify the type of impact, and assign a potential degree of impact. The task of assigning a potential degree of impact is based on channel habitat types and current knowledge of the potential changes in the physical, chemical, and biological nature of running waters. This task may involve some judgment calls, but the focus is to identify those modifications that are likely to have the greatest impact on the stream ecosystem. The location and type of channel modifications (both historic and current) were inventoried and mapped in GIS prior to the evaluation of impacts.

In order to identify a potential degree of impact, the channel modifications were overlayed with channel habitat types and fish distribution. Channel habitats types were assessed in Section II of this watershed assessment. Briefly, each channel habitat type has a sensitivity rating that corresponds to the degree and type of impact to be expected from channel modifications as well as modifications of the hydrologic cycle. Fish distribution has been derived from ODF stream class maps, which contain the distribution of resident and anadromous fish species. The Fish and Fish Habitat Assessment, Section VII of this watershed assessment, contains more detail on fish distribution. After identifying the presence or absence of fish and the channel habitat type, each modification was evaluated for potential degree of impact on the stream channel and supported aquatic ecosystems. Table 7.2 contains the general guidelines used to evaluate impacts. These guidelines are used along with a consideration of the geographic extent, age, and longevity of the modification.

Stream crossings were not evaluated for potential degree of impact because of the uncertainty associated with this data type. Knowledge of the type, condition, and amount of fill associated with each stream crossing was not available for this watershed assessment. The majority of stream crossings are located on private lands. Problems with accessibility and the shear number and extent of stream crossings make it impractical to survey these features at the subbasin scale. Channel modifications from stream crossings include extensive fill leading to a loss of habitat complexity and downstream erosion.

Potential Degree of Impact
Low - Channel habitat type sensitivity is low; and/or - - impacts likely affect only a small area (~<1% of channel); - channel characteristics such as pattern, width, substrate type, bank erosion, pool features, and large wood distribution are largely unchanged; - fish are absent or assumed absent from the affected portion of the stream channel.
Moderate - Channel habitat type sensitivity is moderate; and/or - - impacts are localized but apparent; - changes to channel characteristics such as pattern, width, substrate type, bank erosion, pool features, and large wood distribution are detectable but not obvious; - fish are present or fish distribution is unknown within the affected portion of the stream channel.
High - Channel habitat type sensitivity is high; and/or - - impacts are obvious: gross changes occur in-channel characteristics such as pattern, width, substrate, and bank erosion; - a significant length of the channel is affected; - fish are present or fish distribution is unknown within the affected portion of the stream channel.

Table 7.2: Conditions for the potential degree of impact assessed to channel modifications.

Results

Two data formats were collected during the assessment of channel modifications: points of impact and segments of impacted stream channels. ODSL fill/removal permits and OWRD water rights records, as well as some of the data from other agencies and local residents, are represented as a point of impact. Additional data sources such as USGS topographic maps and interviews of agency personnel and local residents identified segments of the stream channel that have been modified. Both data types have been mapped in Figures 7.2-7.4. Points of impact are displayed as symbols and segments of impacted channels are displayed as lines, with colors indicating the degree of impact. Each point is referenced by Township, Range and Section within Appendix Tables 7.1a-7.3a.

A summary of the points of impact is presented in Table 7.3. This table presents the different types of impact occurring within each subwatershed and the relative degree of impact. Points of impact were found within 19 of the 32 subwatersheds of the Lower Columbia-Clatskanie Subbasin. Figure 7.5 presents a chart of the points of impact within each subwatershed. The three largest subwatersheds, Clatskanie River, Clatskanie Floodplain, and Beaver Creek, contain the majority of the points of impact found within the subbasin. More than half of the points of impact within the Clatskanie River subwatershed have a high potential for impact. The majority of the high potential impacts are near the city of Clatskanie, where erosion and flood control is common. The Clatskanie Floodplain subwatershed, which is a mainly composed of sloughs, has the second highest number of points of impact. Most of the points of impact within the Clatskanie Floodplain subwatershed have a moderate potential impact and are from dredging and erosion/flood control. Beaver Creek has numerous high and moderate potential points of impact from impoundments, road construction and bridges. Twelve of the remaining subwatersheds have between one and six points of impact with a moderate or high potential.

Segments of impacted streams are summarized in Table 7.4 and Figure 7.6. Within most of the impacted stream channels, there are several channel modification activities. The Clatskanie River has impacts from stream cleaning, dredging, roads next to stream, stream-bank protection, channelization, dikes and levees, and built up areas in urban and residential zones. To simplify matters, the most prominent or recent impacts within each stream segment were used to categorize the types and total stream miles of impacts. The greatest concentration of impacted channel segments can be found in the Clatskanie River subwatershed. Roads next to streams are the most common impact within that subwatershed, although stream cleaning has occurred throughout most of the length of the Clatskanie River and in the lower portion of Carcus Creek. Stream cleaning is a historic impact that occurred in many segments that are currently impacted by numerous other channel modification activities such as roads, built-up areas within the floodplain, and channelization.

The Clatskanie Floodplain has the second most miles of impacted stream segments, mainly affected by dikes and levees. There are 26.5 miles of channels that have been highly impacted by agricultural improvements. Many of these channels

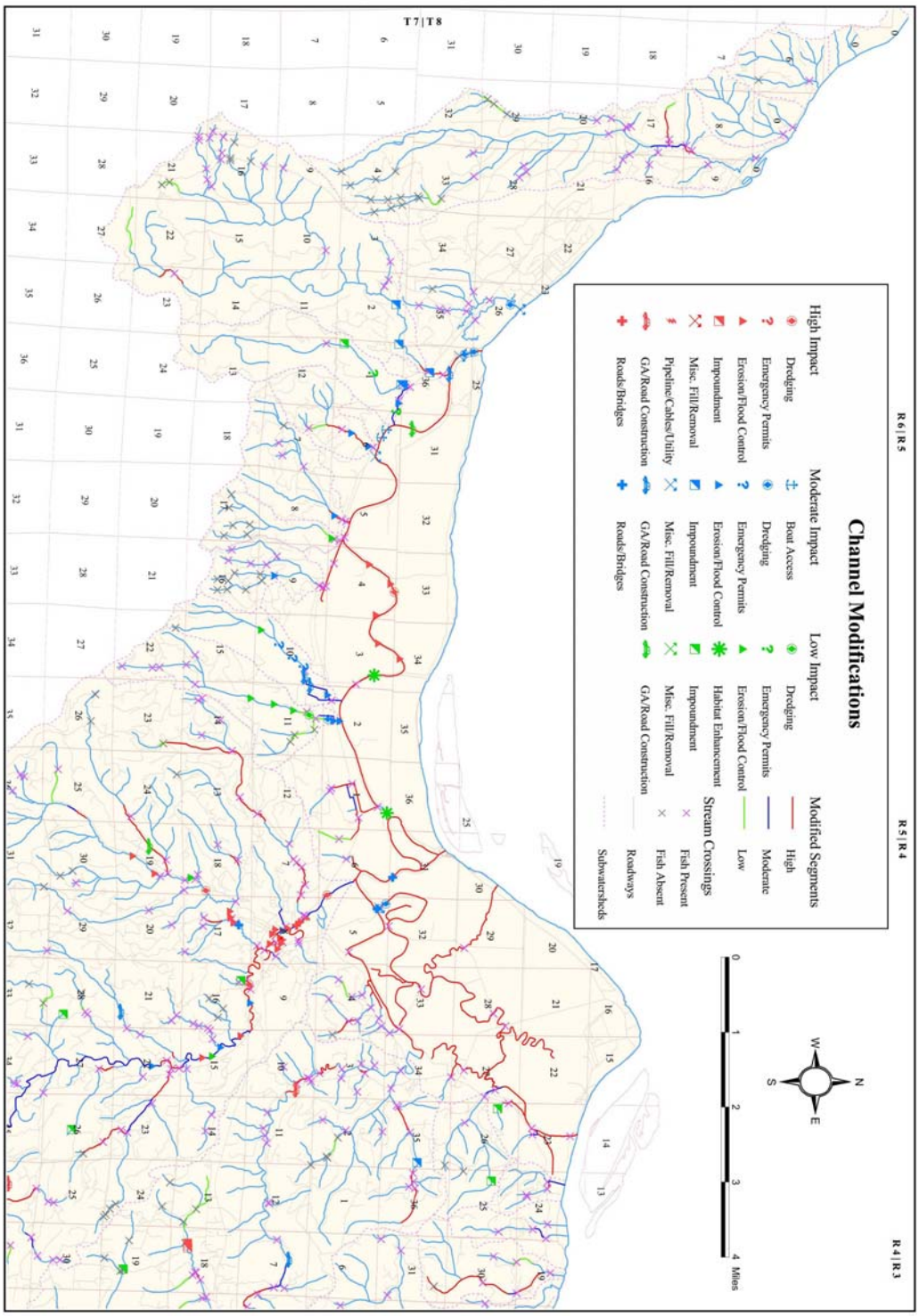


Figure 7.2: Channel modification map 1 of 3.

Data source: USGS digital line graph files; USGS topographic maps; State and Federal agency reports.

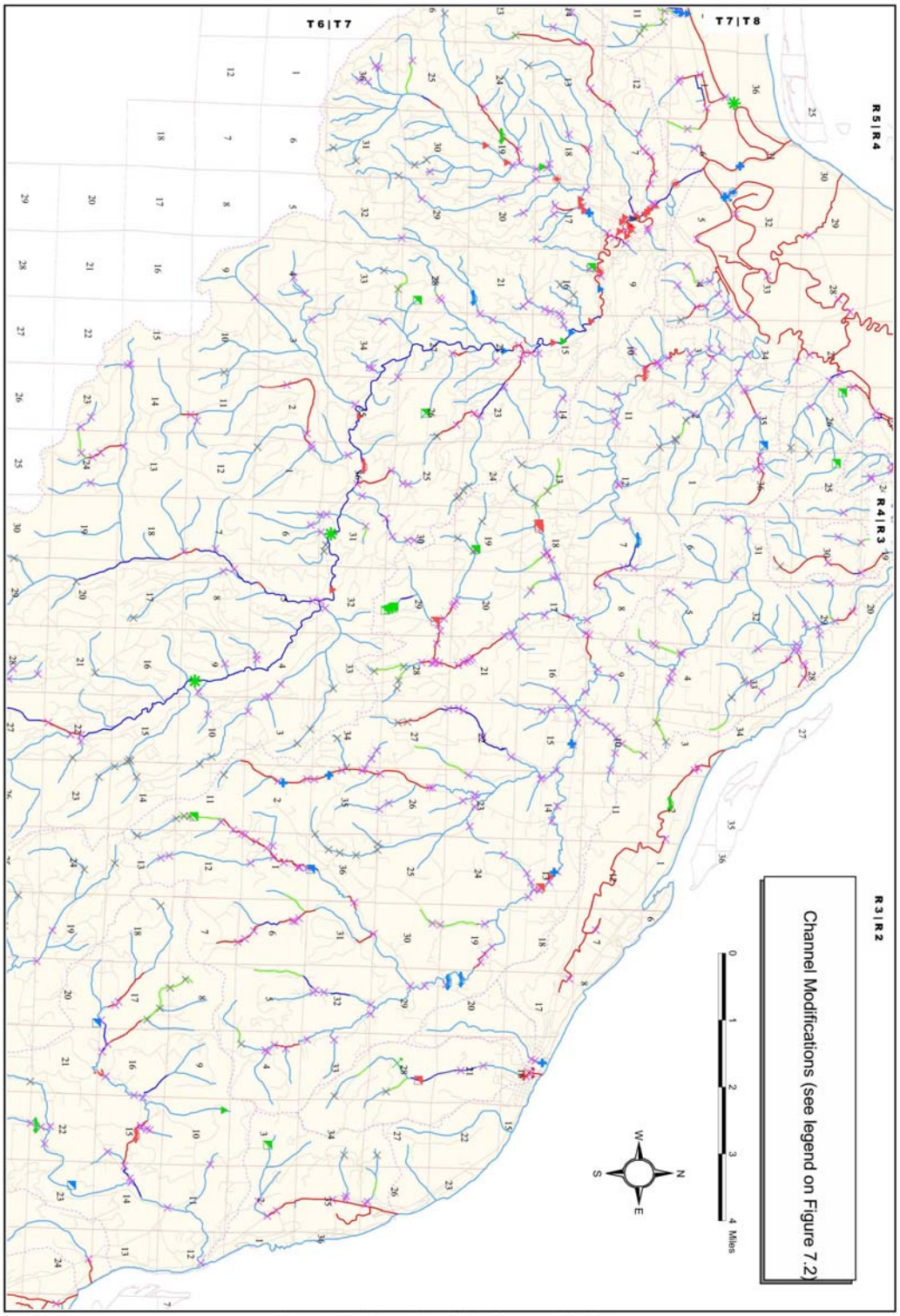


Figure 7.3: Channel modification map 2 of 3.

Data source: USGS digital line graph files; USGS topographic maps; State and Federal agency reports.

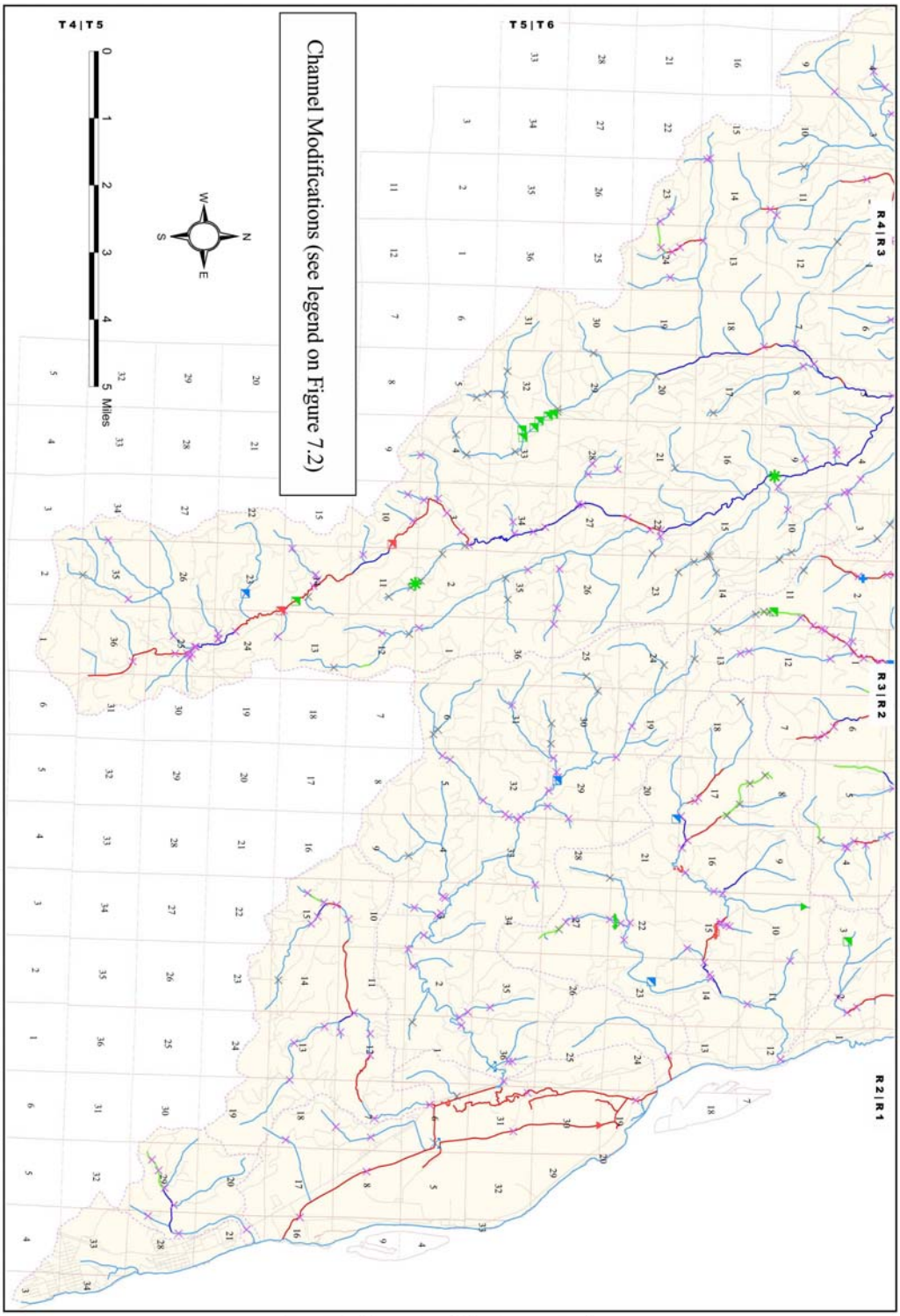


Figure 7.4: Channel modification map 3 of 3.

Table 7.3: Summary of the points of impact identified within the subbasin.

Subwatershed	Modification Type	Impacts (count)			Grand Total
		High	Moderate	Low	
Beaver Creek	Erosion/Flood Control	1			1
	Impoundment	5	2	6	13
	Road Construction	1	3		4
	Roads/Bridges		4		4
	Total	7	9	6	22
Clatskanie Floodplain	Boat Access		3		3
	Dredging	1	5		6
	Erosion/Flood Control	5	1		6
	Habitat Enhancement			2	2
	Impoundment			1	1
	Misc. Fill/Removal		4		4
	Road Construction		1	1	2
	Roads/Bridges		2		2
	Total	6	16	4	26
Clatskanie River	Dredging	3			3
	Erosion/Flood Control	18	5	2	25
	Habitat Enhancement			3	3
	Impoundment	2	1	10	13
	Misc. Fill/Removal	1			1
	Pipeline/Cables/Utility	1			1
	Road Construction	1	1	1	3
	Roads/Bridges	1	1		2
	Total	27	8	16	51
Deer Island	Emergency Permits	1			1
	Erosion/Flood Control	1			1
	Misc. Fill/Removal		1		1
	Total	2	1		3
Eilertsen Creek	Erosion/Flood Control			1	1
	Total			1	1
Fox Creek	Impoundment	1			1
	Misc. Fill/Removal	1		1	2
	Roads/Bridges	1			1
	Total	3		1	4
Goble Creek	Emergency Permits	1			1
	Erosion/Flood Control			1	1
	Impoundment		2		2
	Road Construction	1		1	2
	Total	2	2	2	6
Graham Creek	Dredging		1	1	2
	Erosion/Flood Control		1	3	4
	Total		2	4	6
Neer Creek	Impoundment			1	1
	Total			1	1
Nice Creek	Roads/Bridges		1		1
	Total		1		1
OK Creek	Erosion/Flood Control		1		1
	Total		1		1
Olsen Creek	Erosion/Flood Control		1		1
	Total		1		1
Plympton Creek	Impoundment		3		3
	Total		3		3

Table 7.3: Summary of the points of impact identified within the subbasin.

Subwatershed	Modification Type	Impacts (count)			Grand Total
		High	Moderate	Low	
Rinearson Slough	Road Construction			1	1
	Total			1	1
Ross Creek	Erosion/Flood Control		2		2
	Total		2		2
Tandy Creek	Emergency Permits		3		3
	Erosion/Flood Control		1	1	2
	Road Construction		2		2
	Total		6	1	7
Tank Creek	Impoundment			1	1
	Total			1	1
Tide Creek	Impoundment		1		1
	Misc. Fill/Removal		1		1
	Total		2		2
West Creek	Emergency Permits			2	2
	Erosion/Flood Control		1		1
	Impoundment		2	1	3
	Total		3	3	6
	Grand Total	41	63	41	145

affected by dikes and levees have also been channelized through bank stabilization and channel relocation (see Figure 7.1). Deer Island and Rinearson Slough subwatersheds also have extensive channel modifications of floodplain channels as a result of agricultural improvements. Beaver Creek and its tributaries have 14.4 miles of highly impacted stream channels scattered throughout the subwatershed. Roads next to streams are the main channel impacts observed within the Beaver Creek subwatershed.

Stream crossings are included on the maps of Figures 7.2-7.4, however the impacts from these features have not been evaluated. Channel modifications from stream crossings include extensive fill leading to a loss of habitat complexity and downstream erosion. Table 7.5 summarizes the number of crossings per subwatershed based on fish presence or absence.

Habitat enhancement activities are limited to five locations within the subbasin, three of which are within the Clatskanie River subwatershed (Figures 7.2-7.4). The habitat enhancement activities consist of three fish habitat enhancements and two wetland enhancement projects. All habitat enhancements are rated as having a low impact on the stream system.

Conclusions

Stream cleaning of large wood, debris jams, and beaver dams was conducted in the 40's and 50's by the Oregon Fish Commission for habitat enhancement purposes. Within the Lower Columbia-Clatskanie Subbasin, the Clatskanie River and its tributary Carcus Creek were cleaned of obstructions to fish passage. Despite the intentions of the stream cleaning efforts, the removal of instream structure resulted in poor fish returns due to channelization, increased rate of flow and scouring, and a reduction in key habitat features such as pools and sorted gravel. It is possible that the stream channels have

Figure 7.5: Summary of channel modifications identified from historic data, interviews, and agency records.

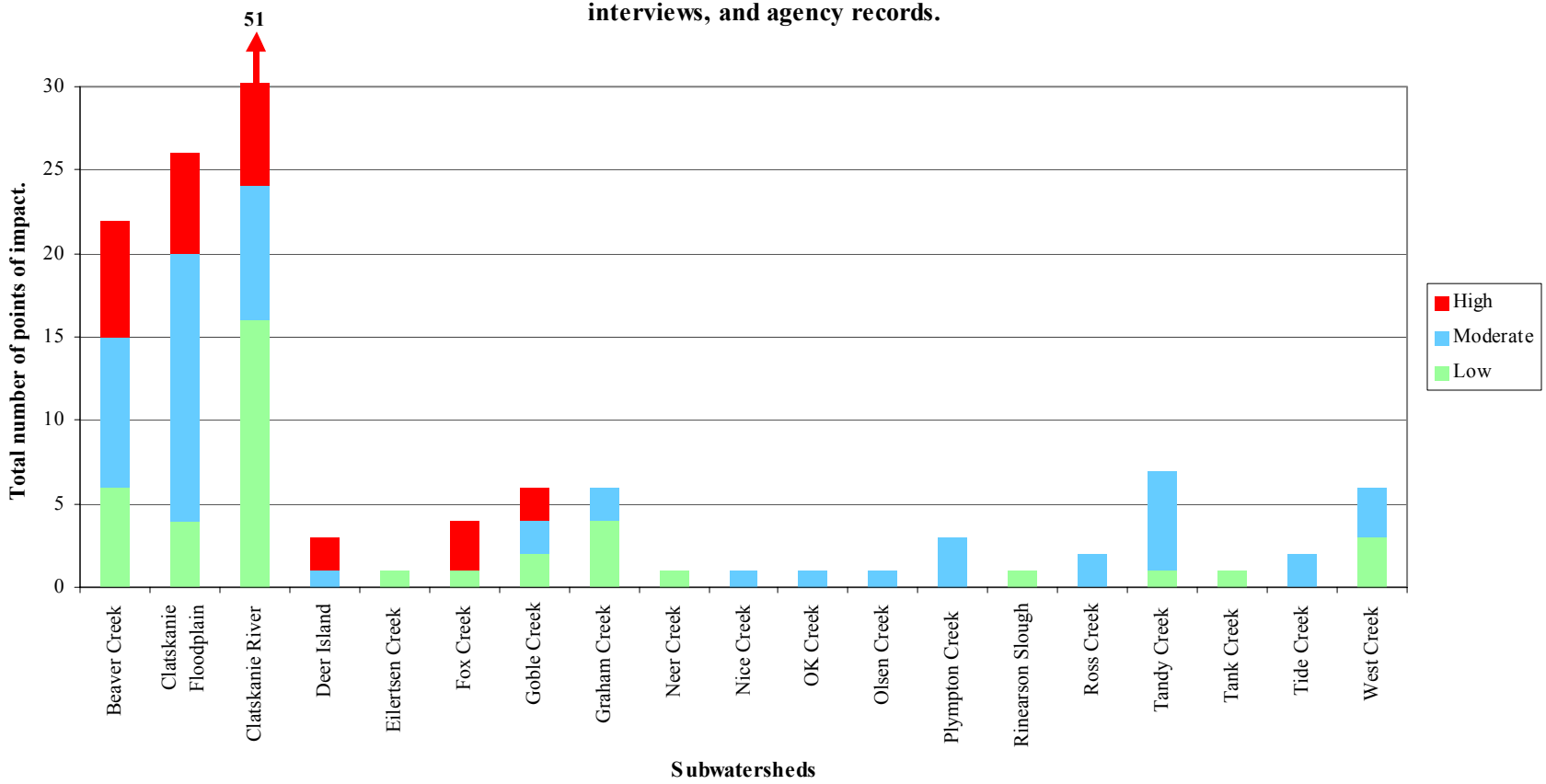


Table 7.4: Summary of modified stream segments presented as stream miles.

Subwatershed	Modification Type	Impacts (mi)			Grand Total
		High	Moderate	Low	
Beaver Creek	Roads	14.429	3.052	6.537	24.018
	Total	14.429	3.052	6.537	24.018
Clatskanie Floodplain	Built-up areas	0.238		0.002	0.240
	Channelization	6.652	0.735	0.216	7.603
	Dikes and levees	26.544	0.163		26.707
	Dredged channels	5.118			5.118
	Roads	0.491		1.100	1.591
	Total	39.043	0.897	1.318	41.258
Clatskanie River	Built-up areas	3.231	0.444		3.674
	Dredged channels	0.054	1.587		1.641
	Roads	18.160	3.912	2.019	24.091
	Stream Cleaning		18.916		18.916
	Total	21.444	24.858	2.019	48.322
Deer Island	Channelization	4.374			4.374
	Dikes and levees	9.038			9.038
	Total	13.412			13.412
Eilertsen Creek	Built-up areas			0.355	0.355
	Total			0.355	0.355
Flume Creek	Roads	1.964	0.113	0.319	2.397
	Total	1.964	0.113	0.319	2.397
Fox Creek	Channelization	0.198			0.198
	Roads		1.017	0.577	1.594
	Total	0.198	1.017	0.577	1.792
Goble Creek	Roads	2.271	1.680	1.667	5.618
	Total	2.271	1.680	1.667	5.618
Graham Creek	Channelization		0.276	0.586	0.862
	Roads			0.133	0.133
	Total		0.276	0.719	0.996
Green Creek	Roads	1.194		1.530	2.724
	Total	1.194		1.530	2.724
Hunt Creek	Roads	0.729	0.522	0.978	2.229
	Total	0.729	0.522	0.978	2.229
Hunter	Channelization	0.410			0.410
	Total	0.410			0.410
McBride Creek	Roads		0.702	0.643	1.344
	Total		0.702	0.643	1.344
Merrill Creek	Channelization	0.104			0.104
	Roads	2.255	0.508	0.205	2.969
	Total	2.359	0.508	0.205	3.073
Neer Creek	Channelization	2.087			2.087
	Dikes and levees	0.759			0.759
	Roads			0.217	0.217
	Total	2.846		0.217	3.064
Niemela Creek	Dikes and levees	0.101	0.305		0.406
	Total	0.101	0.305		0.406
OK Creek	Built-up areas	0.097			0.097
	Total	0.097			0.097

Table 7.4: Summary of modified stream segments presented as stream miles.

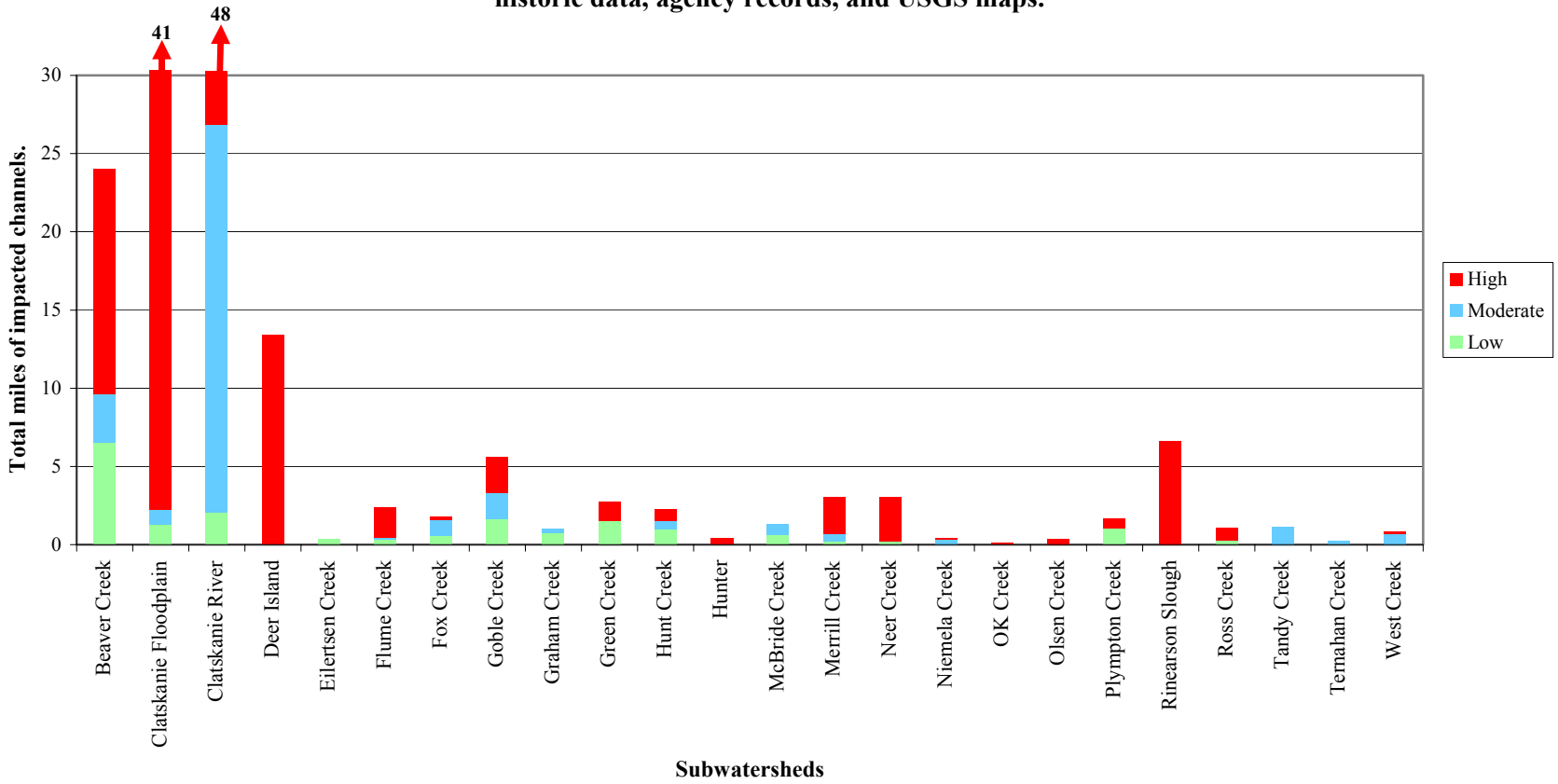
Subwatershed	Modification Type	Impacts (mi)			Grand Total
		High	Moderate	Low	
Olsen Creek	Built-up areas	0.362			0.362
	Total	0.362			0.362
Plympton Creek	Built-up areas	0.148			0.148
	Roads	0.494		1.048	1.542
	Total	0.642		1.048	1.690
Rinearson Slough	Dikes and levees	6.630			6.630
	Total	6.630			6.630
Ross Creek	Roads	0.816		0.281	1.097
	Total	0.816		0.281	1.097
Tandy Creek	Built-up areas		0.231		0.231
	Channelization		0.911		0.911
	Total		1.142		1.142
Ternahan Creek	Roads		0.206		0.206
	Total		0.206		0.206
West creek	Built-up areas	0.145			0.145
	Dikes and levees		0.671		0.671
	Total	0.145	0.671		0.816
	Grand Total	109.093	35.950	18.413	163.457

rebounded from this activity; streams are dynamic systems, and this issue will be further investigated in the Fish and Fish Habitat Assessment. However, the recruitment potential for large woody debris within the Clatskanie River is poor (see Riparian and Wetlands Assessment). Therefore, the ability of the system to recover instream structure after stream cleaning is questionable and will be further investigated in the Fish and Fish Habitat Assessment.

The Clatskanie River, within the area of the city of Clatskanie, has been subject to multiple impacts from erosion and flood control, as well as urban and residential development of the floodplain. The lower river has also been dredged recently. Potential impacts from these developments include channel straightening and a decrease in lateral scour pools, as well as losses of side channels, flood attenuation, and food-chain support. Riparian functions of shading, organic material inputs, and off channel habitats have also been lost. Through the various impacts of urban and residential development, roads next to the stream, forestry, and agriculture, the Clatskanie River has been moderately impacted throughout most of its length.

While habitat enhancement within the subbasin is minimal to date, the Lower Columbia River Watershed Council has implemented a substantial project reconnecting Westport Slough with the Clatskanie River. This project has restored flow through the Westport Slough allowing for flushing of nutrients and sediments, as well as passage of biota between the stream systems. Sediments have been accumulating at the mouths of many of the tributaries of the Westport Slough due to the stagnant nature of the slough before the reconnection. Habitat improvements from the reconnection of the Westport Slough include improved hydrological conditions within the channel and with time it is

Figure 7.6: Summary of modified channel segments identified from interviews, historic data, agency records, and USGS maps.



expected that improved fish access and use of tributary streams will also result. In addition to this project, there has been wetland enhancement conducted by Fort James Corp. two miles to the west of the Clatskanie Slough.

Other forms of habitat enhancement include a fish ladder on the falls at river mile 17 of the Clatskanie River, fish habitat enhancement in a tributary to the upper Clatskanie River above the falls, and wetland enhancement around river mile 12. The falls were blasted in the 1940's and the fish ladder constructed in the 1950's to open up additional spawning grounds to salmon and steelhead. The Oregon Fish Commission, now known as the Department of Fish and Wildlife (ODFW), conducted the fish ladder project.

Floodplains of the Columbia River can be found in the Clatskanie Floodplain, Rinearson Slough, Neer Creek, and Deer Island subwatersheds. Channel modifications within these floodplains have resulted in a loss of some 43 miles of slough habitats. Historically these floodplains contained highly productive wetlands and extensive slough habitats, connected to the Columbia River and its tributaries during high flows. Periodic flooding opens up off-channel habitats to fish, providing additional sources of food and refuge from high flows. Flooding also serves the wetlands by flushing out wastes and bringing in minerals, organic material, and oxygen rich water. The miles of channels impacted by dikes and levees are a conservative estimate of the historic extent of channels that used to dissect these floodplains. Agricultural improvements have masked the natural sinuosity and complexity of the floodplains that once drained Beaver Creek, the Clatskanie River, Plympton Creek, Neer Creek, Tide Creek, and many other small tributaries. Anadromous salmonids utilize these habitats in both the adult and juvenile stages. Adult salmonids use floodplain habitats as resting and possibly feeding areas during migration. Floodplain habitats are also utilized by juvenile salmonids for refuge and as feeding grounds.

Stream crossings are presented in this section as an indication of the extent of channel modifications. Most of the stream crossings are within agricultural and forestry lands. Fill/removal permits are not required for normal forest or agriculture operations, so the extent of channel modification is not known for most of the stream crossings. The Sediment Sources Assessment section of the watershed assessment evaluates the potential impacts to water quality associated with stream crossings and roads next to streams.

Data Gaps

This assessment of channel impacts is based on current knowledge of stream channel responses to various modification activities. Due to the number and extent of channel modifications as well as limited access to private lands, the channel modifications have not been field verified. This assessment is a cursory level examination of the potential impacts from historic and current channel modifications. Data gaps can be filled on a project level basis. Field surveys of proposed project sites will be more time and cost efficient then surveying the entire subbasin for all channel modifications.

Table 7.5: Stream crossings in each subwatershed, summarized by CHT sensitivity. Impacts were not evaluated for these features.

Subwatershed	Fish	CHT Sensitivity			Grand Total
		High	Moderate	Low	
Beaver Creek	Absent	12	21		33
	Present	108	44	18	170
Total		120	65	18	203
Clatskanie Floodplain	Absent	1	2	2	5
	Present	25	7	15	47
Total		26	9	17	52
Clatskanie River	Absent	14	40	7	61
	Present	51	85	46	182
Total		65	125	53	243
Clifton	Present	1		1	2
Total		1		1	2
Deer Island	Absent	1			1
	Present	7		1	8
Total		8		1	9
Eilertsen Creek	Absent			6	6
	Present			2	2
Total				8	8
Flume Creek	Absent		1		1
	Present	1	3	1	5
Total		1	4	1	6
Fox Creek	Absent		1	1	2
	Present	2	2		4
Total		2	3	1	6
Goble Creek	Absent	1	6		7
	Present	17	8		25
Total		18	14		32
Graham Creek	Present		3	6	9
Total			3	6	9
Green Creek	Absent		4		4
	Present	11	17	1	29
Total		11	21	1	33
Hunt Creek	Absent	2	3	11	16
	Present	4	14	4	22
Total		6	17	15	38
Hunter	Present	1			1
Total		1			1
McBride Creek	Present		7		7
Total			7		7
Merrill Creek	Absent		1		1
	Present	10	5		15
Total		10	6		16
Neer Creek	Absent			2	2
	Present	4	1	3	8
Total		4	1	5	10
Nice Creek	Present	2			2
Total		2			2
Niemela Creek	Present		2	2	4
Total			2	2	4
OK Creek	Absent			8	8
	Present		4	4	8
Total			4	12	16
Olsen Creek	Absent			1	1
	Present		3	2	5
Total			3	3	6
Plympton Creek	Absent	2		4	6
	Present	2	1	15	18
Total		4	1	19	24
Rinearson Slough	Present	5			5
Total		5			5
Ross Creek	Present		2	1	3
Total			2	1	3
Speer Creek	Absent			1	1
	Present	1			1
Total		1		1	2
Tandy Creek	Absent			1	1
	Present		2		2
Total			2	1	3
Tank Creek	Absent			2	2
	Present		2		2
Total			2	2	4
Ternahan Creek	Present		3	1	4
Total			3	1	4
Tide Creek	Absent	1	6	3	10
	Present	19	10	3	32
Total		20	16	6	42
West Creek	Present		3	1	4
Total			3	1	4
Grand Total		305	313	176	794

Confidence Evaluation

High. Although the data presented here have not been field verified, the technique used to evaluate impacts is broad enough to give a general evaluation of the degree to which channels have modified. The results presented here will be useful in planning for monitoring and restoration activities throughout the subbasin.

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Appendix Tables

Channel Modifications Assessment

Appendix Table 7.1a: ODSL Fill/Removal Permits

Watershed	Stream	Location (TxRxSec)	Description	Permit Number	Issue Date	Applicant	Removal (yards3)	Fill (yards3)	Fish Distrib.	CHT	CHT Sensitivity	Impact
Clatskanie Floodplain	Westport Slough	07N 05W 3	Erosion/Flood Control	212401	19830802	Marshland Draina	0	17000	Present	FP2	High	Moderate
Clatskanie Floodplain	Westport Slough	07N 05W	Erosion/Flood Control	212400	19830802	Webb Dist Improv	0	51000	Present	FP2	High	Moderate
Clatskanie Floodplain	Westport Slough	08N 05W 31	Road Construction	18853	19991011	Columbia Co. PWD	0	1	Present	FP2	High	Low
Clatskanie River	Perkins Creek	07N 04W 21	Road Construction	17190	19990719	Col. County Road	40	160	Present	MM	Moderate	Moderate
Goble Creek	S.F. Goble Creek	06N 02W 22	Road Construction	17188	19990719	Columbia County	15	20	Present	FP3	High	Low
Clatskanie River	West Creek	07N 04W 19	Road Construction	17182	0	Columbia County	0	75	Present	MM	High	Low
Goble Creek	Goble Creek	06N 02W 16	Emergency Permits	16887	19990310	Columbia County	0	40	Present	FP2	High	High
Clatskanie River	Clatskanie River	07N 04W 15	Erosion Control	16883	19990506	Girt James	0	75	Present	FP2	High	Moderate
Deer Island	Merrill Creek	05N 01W 7	Emergency Permits	16863	19990302	Columbia County	0	250	Present	FP3	High	High
West Creek	West Creek	08N 06W 36	Emergency Permits	16828	19990225	Reeves Roy and C	0	0	Present	LC	Moderate	Low
Beaver Creek	Beaver Creek	07N 03W 7	Road Construction	16682	19990715	ODOT	360	170	Present	LC	Moderate	Moderate
Tandy Creek	Tandy Creek	07N 05W 10	Emergency Permits	16209	19981208	Columbia County	450	0	Present	MM	Moderate	Moderate
Tandy Creek	Tandy Creek	07N 05W 10	Emergency Permits	16208	19981215	Aske Doug	150	0	Present	MM	Moderate	Moderate
Clatskanie River	Clatskanie River	07N 04W 8	Erosion Control	15991	19990319	Feasel Nathan	12	517	Present	FP2	High	High
Ross Creek	Ross Creek	07N 05W 6	Erosion/Flood Control	15329	19980724	Conklin Jack	0	84	Present	MM	Moderate	Moderate
Clatskanie River	Clatskanie River	07N 04W 8	Erosion Control	15066	19980520	Lund Mattie M	60	200	Present	FP3	High	Moderate
Clatskanie River	Clatskanie River	07N 04W 8	Erosion Control	15065	19980520	Clatskanie Parks	160	450	Present	FP2	High	High
Clatskanie River	Clatskanie River	07N 04W 8	Maintenance Dredging	14612	19980731	Clatskanie City	75000	75000	Present	FP3	High	High
Clatskanie River	Clatskanie River	07N 04W 22	Erosion Control	14302	19970821	Thompson Philip	88	150	Present	FP2	High	Moderate
Clatskanie River	Clatskanie River	05N 03W 11	Fish Habitat Enhancement	14276	19970814	ODFW	0	202	Absent	MH	Moderate	Low
Clatskanie River	Clatskanie River	07N 04W 8	Erosion/Flood Control	14235	19970821	Stimson Lumber	0	0	Present	FP2	High	Moderate
Tandy Creek	Tandy Creek	07N 05W 10	Road Construction	14234	19970717	Columbia County	133	472	Present	LC	Moderate	Moderate
Eilertsen Creek	Eilertsen Creek	07N 05W 5	Erosion Control	14119	19970630	Berntsen Gary &	96	0	Present	SM	Low	Low
Olsen Creek	Olsen Creek	07N 05W 5	Erosion Control	14118	19970630	Remick Frank & T	215	0	Present	MM	Moderate	Moderate
Ross Creek	Ross Creek	07N 05W 6	Erosion Control	14112	19970630	Dawley Earl & Lo	124	288	Present	MM	Moderate	Moderate
West Creek	West Creek	08N 06W 36	Erosion Control	14021	19970617	West Creek Group	360	272	Present	LC	Moderate	Moderate
Clatskanie Floodplain	Westport Slough	08N 06W 36	Maintenance Dredging	13949	19970624	Teevin Bros Land	3250	0	Present	FP2	High	Moderate
Tandy Creek	Tandy Creek	07N 05W 10	Road Construction	13819	19970522	Columbia County	400	0	Present	MM	Moderate	Moderate
Goble Creek	Goble Creek	06N 02W 3	Erosion Control	13774	19970429	Columbia County	0	300	Absent	SV	Low	Low
Beaver Creek	Beaver Creek	07N 04W 10	Road Construction	13665	19970320	Columbia County	945	1002	Present	MM	High	High
Rinearson Slough	Unknown	07N 03W 2	Road Construction	13549	19970108	Columbia County	72	44	Present	FP3	High	Low
Goble Creek	Goble Creek	06N 02W 15	Road Construction	13548	19970108	Columbia County	211	172	Present	LM	High	High
Clatskanie Floodplain	Beaver Slough	07N 04W 5	Misc. Removal	12224	19970129	Clat. Drainage D	2000	0	Present	FP3	High	Moderate
Clatskanie River	Conyers Creek	07N 04W 17	Erosion Control	12005	19960829	Abeyta Harry	0	100	Present	FP3	High	High

Appendix Table 7.1a: ODSL Fill/Removal Permits

Watershed	Stream	Location (TxRxSec)	Description	Permit Number	Issue Date	Applicant	Removal (yards3)	Fill (yards3)	Fish Distrib.	CHT	CHT Sensitivity	Impact
Graham Creek	Graham Creek	07N 05W 2	Erosion Control	12002	19960829	Anicker Ray	0	490	Present	LC	Moderate	Moderate
Tandy Creek	Tandy Creek	07N 05W 2	Erosion/Flood Control	11976	19960829	Peterson Jeff	5400	90	Present	LC	Moderate	Moderate
Clatskanie Floodplain	Graham Creek	07N 05W 2	Erosion Control	11975	19960829	Good Eric	0	490	Present	LC	Moderate	Moderate
Clatskanie River	Clatskanie River	07N 04W 36	Road Construction	11936	19960821	Columbia County	360	300	Present	FP2	High	High
Graham Creek	Graham Creek	07N 05W 11	Erosion Control	11933	19960821	Sears Mike	0	0	Present	SM	Low	Low
Graham Creek	Graham Creek	07N 05W 11	Erosion Control	11921	19960829	McCallister Greg	0	490	Present	SM	Low	Low
OK Creek	Favorite Creek	07N 05W 9	Erosion/Flood Control	11919	19970717	Lammi George	1930	78	Present	MM	Moderate	Moderate
Tandy Creek	Tandy Creek	07N 05W 10	Erosion Control	11918	19960829	Schultz Jerry	210	0	Present	SM	Low	Low
Graham Creek	Graham Creek	07N 05W 11	Erosion Control	11893	19960829	Koski Gary	0	490	Present	SM	Low	Low
Clatskanie River	Clatskanie River	07N 04W 15	Erosion Control	11814	19960822	Girt James	0	0	Present	FP2	High	Low
Clatskanie River	Conyers Creek	07N 04W 18	Erosion Control	11313	19960723	Crocker Raymond	0	0	Present	MM	High	Low
Clatskanie River	Conyers Creek	07N 04W 17	Erosion Control	11272	19960701	Lilich Morris	0	100	Present	FP3	High	High
Clatskanie River	Clatskanie River	07N 03W 32	Erosion Control	11145	19960710	Walker Robert	0	300	Present	FP2	High	High
West Creek	West Creek	07N 06W 1	Emergency Permits	11010	0	Boatwright Engin	0	0	Present	MM	Moderate	Low
Tandy Creek	Tandy Creek	07N 05W 10	Emergency Permits	10549	19961009	Peterson Jeff	0	49	Present	MM	Moderate	Moderate
Clatskanie Floodplain	Westport Slough	07N 05W 3	Wetland Enhancement	10320	19960112	Fort James Corp.	0	0	Present	FP2	High	Low
Deer Island	Deer Island Slough	05N 01W 6	Misc. Removal	10108	19960206	Morse Bros Inc	0	0	Present	FP2	High	Moderate
Fox Creek	Fox Creek	07N 02W 28	Misc. Removal	9800	19950721	City of Rainier	200	0	Present	SV	Low	Low
Clatskanie River	Clatskanie River	07N 03W 31	Wetland Enhancement	9166	19940927	Hiatt Malcom E.	0	0	Present	FP2	High	Low
Fox Creek	Fox Creek	07N 02W 16	Misc. Removal	8605	19940701	Rainier School D	10300	4000	Present	LM	High	High
Clatskanie Floodplain	Discoll Slough	08N 06W 26	Misc. Removal	7865	19940509	Fort James Corp	1000	1000	Present	FP3	High	Moderate
Clatskanie River	Clatskanie River	07N 04W 8	Misc. Fill	7788	19940509	Poysky George II	0	5000	Present	FP2	High	High
Beaver Creek	Beaver Creek	07N 02W 20	Road Construction	7729	19940228	Columbia County	140	133	Present	FP2	High	Moderate
Beaver Creek	Beaver Creek	07N 02W 20	Road Construction	7727	19940228	Columbia County	142	120	Present	FP2	High	Moderate
Clatskanie Floodplain	Plympton Creek	08N 06W 36	Road Construction	6791	19920724	Clatsop County R	156	126	Present	LM	High	Moderate
Clatskanie River	Clatskanie River	07N 04W 8	Pipeline/Cables/Utility	6577	19920420	Clatskanie City	50	1250	Present	FP2	High	High
Graham Creek	Graham Creek	07N 05W 2	Maintenance Dredging	5842	19900919	Koski Gary	2600	0	Present	LC	Moderate	Moderate
Beaver Creek	S.F. Beaver Creek	06N 03W 2	Roads/Bridges	5615	19900518	Columbia COunty	760	490	Present	LM	High	Moderate
Clatskanie River	Clatskanie River	05N 03W 23	Dams	5352	19890829	Bauder Rudolph &	3000	3000	Present	FP3	High	High
Beaver Creek	S.F. Beaver Creek	07N 03W 35	Roads/Bridges	4938	19880811	Columbia County	95	80	Present	FP3	High	Moderate
Clatskanie River	Clatskanie River	07N 04W	Maintenance Dredging	4879	19881003	Clatskanie City	45000	0	Present	FP2	High	High
Clatskanie Floodplain	Beaver Slough	07N 04W 5	Maintenance Dredging	4676	19870730	Beaver Lumber Co	8000	0	Present	FP3	High	Moderate
Tide Creek	Tide Creek	06N 02W 36	Misc. Fill	4661	0	Tide Creek Rock,	0	0	Present	FP3	High	Moderate
Clatskanie Floodplain	Westport Slough	07N 05W 6	Moorage Development	4518	19870217	Shirlor Inc	0	1000	Present	FP2	High	Moderate
Clatskanie River	Clatskanie River	07N 04W 8	Roads/Bridges	4273	19851029	Oregon St. Highw	40	450	Present	FP2	High	High

Appendix Table 7.1a: ODSL Fill/Removal Permits

Watershed	Stream	Location (TxRxSec)	Description	Permit Number	Issue Date	Applicant	Removal (yards3)	Fill (yards3)	Fish Distrib.	CHT	CHT Sensitivity	Impact
Clatskanie River	Clatskanie River	07N 04W 8	Erosion/Flood Control	4258	19850909	City of Clatskan	0	140	Present	FP2	High	High
Graham Creek	Graham Creek	07N 05W 11	Maintenance Dredging	4218	19850718	Columbia County	0	86	Present	SM	Low	Low
Clatskanie Floodplain	Westport Slough	07N 05W 6	Misc. Fill	3857	19831031	Brusco Corp.	0	32000	Present	FP2	High	Moderate
Clatskanie Floodplain	Westport Slough	08N 06W 36	Moorage Development	3478	19811218	Hannon Bros Cons	1300	0	Present	FP2	High	Moderate
Clatskanie Floodplain	Westport Slough	08N 06W 36	Maintenance Dredging	3426	19811012	Westport Lumber	2000	0	Present	FP2	High	Moderate
Clatskanie Floodplain	Beaver Slough	07N 04W 8	Maintenance Dredging	3257	19850612	W. Pacific Dredg	8000	0	Present	FP3	High	Moderate
Beaver Creek	Beaver Creek	07N 03W 13	Erosion/Flood Control	3078	19900730	Columbia County	180	450	Present	FP2	High	High
Clatskanie Floodplain	Discoll Slough	08N 06W 26	Maintenance Dredging	3073	19790504	Crown Zellerbach	1000	0	Present	FP3	High	Moderate
Clatskanie River	Conyers Creek	07N 04W 19	Erosion/Flood Control	3065	19900628	Poole Alice	35	64	Present	MM	High	High
Clatskanie Floodplain	Beaver Slough	07N 04W 5	Roads/Bridges	3011	19790220	Columbia County	0	250	Present	FP3	High	Moderate
Clatskanie Floodplain	Clatskanie Slough	08N 04W 33	Roads/Bridges	2988	19781220	Columbia County	0	1500	Present	FP2	High	Moderate
Clatskanie River	Conyers Creek	07N 04W 19	Erosion/Flood Control	2822	19880426	Poole Alice	213	1252	Present	MM	High	High
Clatskanie River	Conyers Creek	07N 04W 17	Roads/Bridges	2758	19771128	Hamilton Constru	100	150	Present	FP3	High	Moderate
Beaver Creek	Beaver Creek	07N 03W 15	Roads/Bridges	2757	19771128	Hamilton Constru	100	200	Present	FP2	High	Moderate
Beaver Creek	Beaver Creek	07N 03W 13	Roads/Bridges	2756	19771128	Hamilton Constru	250	120	Present	FP2	High	Moderate
Clatskanie River	Conyers Creek	07N 04W 17	Erosion/Flood Control	2737	19870827	Conyers James	50	300	Present	FP3	High	High
Clatskanie Floodplain	Westport Slough	08N 06W	Misc. Fill	2724	0	Brusco Booming &	0	0	Present	FP2	High	Moderate
Clatskanie River	Clatskanie River	07N 04W 8	Erosion/Flood Control	2579	19860821	City of Clatskan	0	485	Present	FP2	High	High
Clatskanie Floodplain	Westport Slough	07N 05W 4	Erosion/Flood Control	2306	19840713	Marshland Draina	0	32900	Present	FP2	High	Moderate
Clatskanie Floodplain	Westport Slough	07N 05W	Erosion/Flood Control	2277	19840621	Woodson Drainage	0	10120	Present	FP2	High	Moderate
Clatskanie River	Conyers Creek	07N 04W 18	Maintenance Dredging	2258	19840607	Hicks David	5	112	Present	FP3	High	High
Clatskanie Floodplain	Westport Slough	07N 05W 6	Boat Ramps	2136	19751001	Shirlor Inc	1000	100	Present	FP2	High	Moderate
Clatskanie River	Clatskanie River	07N 04W 8	Erosion/Flood Control	1887	19820601	Humphrey FE	0	100	Present	FP2	High	High
Clatskanie River	Clatskanie River	07N 04W 35	Erosion/Flood Control	1884	19820720	Thompson Louis	54	234	Present	FP2	High	High
Clatskanie Floodplain	Westport Slough	08N 05W 34	Erosion/Flood Control	1877	19820421	Marshland Draina	4670	12290	Present	FP2	High	Moderate
Clatskanie Floodplain	Westport Slough	07N 05W	Maintenance Dredging	1869	19750204	Westport Lumber	2000	0	Present	FP2	High	Moderate
Clatskanie River	Clatskanie River	07N 04W 8	Erosion/Flood Control	1732	19800204	Lilich John	0	100	Present	FP2	High	High
Clatskanie River	Clatskanie River	07N 04W 10	Erosion/Flood Control	1518	19780929	Grayson Charles	50	400	Present	FP3	High	High
Clatskanie River	Clatskanie River	07N 04W 15	Erosion/Flood Control	1222	19760817	Grayson Charles	0	150	Present	FP2	High	High
Clatskanie River	Clatskanie River	07N 04W 8	Erosion/Flood Control	1156	0	City of Clatskan	10	38	Present	FP2	High	High
Clatskanie River	Clatskanie River	07N 04W	Erosion/Flood Control	895	19741007	Girt Everett	0	150	Present	FP2	High	High
Clatskanie River	Clatskanie River	07N 04W	Erosion/Flood Control	868	19740909	Wika Ozzie & Ron	0	800	Present	FP2	High	High
Clatskanie Floodplain	Westport Slough	07N 05W	Fish Habitat Enhancement	0	0	LCR Watershed Co	0	0	Present	FP2	High	Low

Appendix Table 7.2a: ODWR Water Rights for Impoundments

Watershed	Stream	Location (TxRxSec)	Permit #	Year	Rate	Fish Distribution	CHT	CHT Sensitivity	Impact
Beaver Creek	Lost Creek	T7N R3W 19	R 100512	1993	5.0 af	Absent	FP3	High	Low
Beaver Creek	Unnamed	T7N R3W 29	R 5574	1970	2.0 af	Present	FP3	High	Low
Beaver Creek	Unnamed	T7N R3W 29	S 34854	1970	5.0 af	Present	MV	Moderate	Low
Beaver Creek	Unnamed	T7N R3W 29	S 34855	1970	5.0 af	Present	MV	Moderate	Low
Beaver Creek	Unnamed	T7N R3W 29	S 34856	1970	0.04 cfs	Present	MV	Moderate	Low
Clatskanie Floodplain	Unnamed	T8N R4W 26	R 101739	1993	0.03 af	Present	MM	Moderate	Low
Clatskanie River	Unnamed	T7N R4W 16	R 102955	1993	0.03 af	Present	SM	Low	Low
Clatskanie River	Unnamed	T7N R4W 26	R 101470	1993	0.17 af	Present	MH	Moderate	Low
Clatskanie River	Unnamed	T7N R4W 28	R 103016	1993	0.36 af	Present	FP3	High	Low
Neer Creek	Unnamed	T6N R2W 3	S 33534	1968	0.06 cfs	Present	MH	Moderate	Low
Tank Creek	Unnamed	T8N R4W 25	R 101819	1993	0.1 af	Absent	SV	Low	Low
West Creek	West Creek	T7N R6W 1	R 102854	1993	1.0 af	Present	SM	Low	Low
Beaver Creek	Beaver Creek	T7N R3W 36	S 37286	1973	0.02 cfs	Present	FP3	High	Moderate
Beaver Creek	NF Stewart Creek	T8N R4W 35	S 24582	1956	0.09 af	Present	MM	Moderate	Moderate
Clatskanie River	Dribble Creek	T5N R3W 23	R 11164	1987	8.2 af	Present	SM	Low	Moderate
Goble Creek	Goble Creek	T6N R2W 20	R 12313	1997	0.26 af	Present	MM	High	Moderate
Goble Creek	SF Goble Creek	T6N R2W 23	R 12864	1999	3.0 af	Present	MM	High	Moderate
Tide Creek	Endicott Creek	T6N R2W 29	R 1519	1953	0.03 af	Present	LM	High	Moderate
Beaver Creek	Palmer Creek	T7N R3W 18	R 100512	1993	5.0 af	Present	FP3	High	High
Beaver Creek	Palmer Creek	T7N R3W S18	?	1993	?	Present	FP3	High	High
Beaver Creek	Palmer Creek	T7N R3W S18	?	1993	?	Present	FP3	High	High
Beaver Creek	Unnamed	T7N R3W 29	R 5588	1970	5.0 af	Present	FP3	High	High
Fox Creek	Fox Creek	T7N R2W 28	R 1319	1952	14.5 af	Present	MV	Moderate	High

Appendix Table 7.3a: Historical and Current Data Collected From Interviews, Agency Records, and Publications.

Watershed	Stream	Type	Location (TxRxSec)	Description	Source	Approx. Date	Fish Distrib.	CHT	CHT Sensitivity	Impact
Clatskanie River	Clatskanie River	Water Diversion	T5N R3W 14	Small home use hydro power plant	Oregon Fish Commission	1951	Present	FP3	High	Low
West Creek	West Creek	Impoundment	T8N R6W 36	Dam on West Creek 3ft high	Oregon Fish Commission	1951	Present	MM	Moderate	Moderate
West Creek	West Creek	Impoundment	T7N R6W 1	Dam on West Creek 3ft high	Oregon Fish Commission	1951	Present	MM	Moderate	Moderate
Plympton Creek	Plympton Creek	Impoundment	T7N R6W 2	Dam on Plympton Creek 30ft. high	US Dept. of Interior Fisheries Report	1950	Present	MM	Moderate	Moderate
Plympton Creek	Plympton Creek	Impoundment	T7N R6W 1	Westport water supply diversion dam 4ft high on Plympton Creek	US Dept. of Interior Fisheries Report	1950	Present	MM	Moderate	Moderate
Plympton Creek	Plympton Creek	Impoundment	T8N R6W 36	Diversion dam 5ft high with fishway on Plympton Creek	US Dept. of Interior Fisheries Report	1950	Present	LM	High	Moderate
Beaver Creek	Beaver Creek	Impoundment	T7N R3W 13	Dam on Beaver Creek	Interview	1934-1948	Present	FP2	High	High
Clatskanie River	Clatskanie River	Habitat Enhancement	T6N R3W 9	Clatskanie River Fish Ladder 1 1/4 miles west of Apiary	US Dept. of Interior Fisheries Report	?	Present	LM	High	Low
Deer Island	Tide Creek	Erosion/Flood Control	T6N R1W 30	Tide Creek Tide Gates	US Dept. of Interior Fisheries Report	1950-present	Present	FP3	High	High
Beaver Creek	Lost Creek	Impoundment	T6N R3W 11	Old Mill Pond on Lost Creek	Interview	1930/1940-present	Absent	MM	High	Low
Clatskanie River	Conyers Creek	Erosion/Flood Control	T7N R4W 17	Rip Rap on Conyers Creek	Interview	1996-1997	Present	FP3	High	Moderate
Fox Creek	Fox Creek	Roads/Bridges	T7N R2W 16	Bridge on Fox Creek replaced by a culvert. (fill opened in 1996 and restored at C street)	Interview	1950	Present	LM	High	High
Nice Creek	Nice Creek	Roads/Bridges	T7N R2W 16	Culvert in Nice Creek from Hwy 30 to Columbia receives effluent from Pww?	Interview	?	Present	LM	High	Moderate
Clatskanie River	Carcus Creek	Impoundment	T6N R3W 32	Earthern dam forming pond on Carcus Creek	Interview	later 1940s	Absent	LM	High	Low
Clatskanie River	Carcus Creek	Impoundment	T6N R3W 32	Earthern dam forming pond on Carcus Creek	Interview	later 1940s	Absent	FP3	High	Low
Clatskanie River	Carcus Creek	Impoundment	T6N R3W 33	Earthern dam forming pond on Carcus Creek	Interview	later 1940s	Absent	FP3	High	Low
Clatskanie River	Carcus Creek	Impoundment	T6N R3W 33	Earthern dam forming pond on Carcus Creek	Interview	later 1940s	Absent	FP3	High	Low
Clatskanie River	Unnamed	Impoundment	T6N R3W 33	Earthern dam forming ponds on Carcus Creek Trib.	Interview	later 1940s	Absent	FP3	High	Low
Clatskanie River	Carcus Creek	Impoundment	T6N R3W 33	Earthern dam forming pond on Carcus Creek	Interview	later 1940s	Absent	FP3	High	Low
Clatskanie River	Clatskanie River	Impoundment	T5N R3W 10	Low dam for Hydro power on the Clatskanie River	Interview	later 1940s	Present	FP3	High	High