

7.0 Channel Modifications

Activities which alter the natural physical characteristics of stream channels often hinder fish migration and the quality of stream habitat. The degree of impact depends on the channel characteristics and the type of channel modification. Stream channels are dynamic and their physical characteristics change inevitably due to natural processes. However, human-induced changes should be identified in order to evaluate impacts on stream habitat for fish and other aquatic life. With this information, potential restoration opportunities can be considered. For this assessment, historic and current channel modifications were identified and mapped.

Methodology

Interviews were conducted by the Portland State University assessment team from November, 1998 through January, 1999 with long-time residents and retired state agency personnel in order to identify historic channel modifications within the Nehalem Watershed. The locations were identified on paper USGS topographic maps and then were digitized into a GIS layer. Information regarding types and locations of current channel modification permits was obtained from the Division of State Lands. This information was not in GIS, so was digitized using stream names and River Mile information provided by DSL.

Historic Channel Modifications

The modifications identified through interviews occurred mainly on the mainstem Nehalem River, Cook Creek, North Fork of the Nehalem River, Salmonberry River and Fishhawk Creek (See Figure 7-1). In addition to the channel modifications identified by the people interviewed, there is thought to have been many small-scale diversions, dredging and instream structures that occurred in the Nehalem Watershed during the late 1800's and early 1900s during heavy logging and railroad and road building. Because of the lack of written records, historic channel modifications are difficult to locate in many cases. According to Walt Weber (1998), the railroad along the Salmonberry and mainstem Nehalem River has taken away part of the natural floodplain.

Log drives were initiated in 1901 by the Wheeler Timber Company. Most occurred from 1910 to 1926. In November, 1910, two million feet of logs came went down the Nehalem River, some originating from the Salmonberry River area (Farnell, 1981). Logs were dragged to the edge of streams, pushed in and floated to the sawmill downstream. During this period, the trees were mainly old-growth Douglas fir which were probably big enough to scour the river bed, alter stream banks and move large woody debris existing in the stream. The riparian zone along the streams were also damaged. Often, the riparian trees were the first to be cut due to their proximity to the stream and the subsequent ease of getting them into the river.

Figure 7-1

Figure 7-1

Logs were usually floated out on high water levels during winter storms, however a splash dam was built by Olson and Hanson in 1923 on the North Fork of the Nehalem River to release the logs of three timber companies (Wheeler Lumber Co., Dawson Bros. and C.L. Doughney). The splash dam could be used during much of the year. The river was dammed so that water and logs were backed up behind it. Then the dam was breached allowing the water and logs to wash downstream to the sawmill. The elevated water flowing downstream overflowed the banks of the river in many places. It is estimated that one hundred million board feet of timber were floated out of the North Fork of the Nehalem River, mostly with the assistance of splash dams (Farnell, 1981). The last use of the splash dam was in 1926.

An additional effect of logging was the construction of the dike wall at Wheeler in the early 1920s. The purpose of the dike was to direct logs floated down the Nehalem and its tributaries to the Wheeler Sawmill. The dike wall crumbles a bit every year, as high flows from the river erode it. There were additional dikes on the lower part of the North Fork Nehalem River and on the Mainstem Nehalem River (Weber, 1998).

There have been many dams in the watershed for different purposes. An old 20 foot hydro power dam exists across the East Fork Nehalem River which was built to power a sawmill. Reload ponds for sorting lumber existed on Rock Creek, Salmonberry River, and near the head of the mainstem Nehalem River (Fick and Martin, 1998).

Due to the extensive use of the rivers as highways for commerce during the 1901 to 1926 period, the state was given claim to the bed of the Nehalem River to River Mile 84 and to the bed of the North Fork of the Nehalem River to River Mile 17.8 (Farnell, 1981).

Large woody debris was removed from river reaches at various times. Stumps, root wads, sunken logs, and other debris from logging practices accumulated on the river bottoms which hung up and tore fishermen's nets. The fisherman formed a Snagging Association and removed debris which was washed downstream every winter (Nehalem Valley Historical Society). Additionally, in the 1960s, large woody debris was cleared from the North Fork Cronin Creek and the North Fork Salmonberry River (Webb, 1999).

Gravel was dredged from the bottom of the Nehalem River for the construction of Highway 26 (Peyton, 1999).

Around 1955, two municipal water facilities were built on the North Fork Nehalem River near Sally Creek and Fall Creek (Weber, 1998). These facilities still exist and have fish ladders.

Current Channel Modifications

Present day occurrence of large-scale channel modifications is not common.

There is very little diking, dredging, or damming going on. The land use practices that impacted the rivers early in the 1900s have been altered by the availability of resources (trees), modernization of techniques (logging trucks) and changes in government policy (Oregon Forest Practices Act). The most common channel modifications found are culverts placed at road crossings and debris flows due to road construction in close proximity and upslope from streams. According to ODFW (1993), some illegal, unpermitted removal of small amounts of instream gravel occurs in the mainstem Nehalem River.

Several dams have been removed in the watershed, however there is a dam on Fishhawk Creek which forms Fishhawk Lake. The dam was constructed for recreational purposes. Also, Vernonia puts a large log across Rock Creek in the summer to create a swimming hole. The log is removed at the end of the summer before school starts.

Some limited information was available from the Division of State Lands regarding permitted channel modifications. The approximate locations of the activities are shown in Figure 7-1. There were 150 permitted channel modifications listed with DSL dating from the early 1970's to present. Potential improvements to quality of stream habitat have been made (See Table 7-1). The most common type of permit issued (39%) is for erosion control. These locations are scattered throughout the watershed, but are more concentrated on the lower Nehalem River (below Anderson Creek) and on the Lower North Fork Nehalem River (from Grassy Lake Creek to confluence with mainstem Nehalem River). Eighteen permits (12%) are listed as fish habitat enhancement activities.

Table 7-1. Channel Modification Permit Types.

Permit Type	Number	Percent of Total
Erosion/Flood Control	59	39%
Roads/Bridges	27	18%
Fish Habitat Enhancement	18	12%
Maintenance Dredging	13	9%
Pipeline/Cables/Utility	5	3%
Misc. Removal	3	2%
Commercial Gravel Removal	2	1%
Emergency Permits	2	1%
Moorage Development	1	1%
Misc./ Unknown	20	13%
Total	150	100%

Data Source: DSL, 1998

Permitted activities such as road building and dredging may have had a large negative impact on habitat quantity and quality. Two commercial gravel removal permit locations existed on the Nehalem River near River Mile 17 and expired in 1998. Maintenance dredging has been done at eight different locations along the mainstem Nehalem River. Additional maintenance dredging was permitted on the North Fork

Nehalem River and on Fishhawk Creek above the dam in the 1970s. It is impossible to know the degree of impact of these activities without extensive field surveys and an evaluation of affected stream habitat.

Data Gaps

- A comprehensive inventory is needed of current channel modifications, including but not limited to culverts. Locations, types and degree of actual impact to streams needs to be determined.
- A more extensive search for records could be done. Additional information might be found in county records, city records and ODFW reach and habitat surveys.
- Cooperation of private landowners in providing records and access to their properties for field surveys would greatly help the effort toward ensuring salmonid access to important habitat.

References

The following people were interviewed during the period November, 1998 through January, 1999 for historic channel modification information:

Fick, Larry – retired, Oregon Department of Forestry

Martin, George – retired, Oregon Department of Forestry

Walt Weber – retired, Oregon Department of Fish and Wildlife

Don Webb – retired, Oregon Department of Fish and Wildlife

Wesley Batterman – long-time resident of the Nehalem River Watershed

Ralph Swan – retired, Game Commission

Maggie Peyton – long-time resident of the Nehalem River Watershed and Coordinator for the Upper and Lower Watershed Councils.

Division of State Lands (DSL). 1998. Permit Status Tables. Support Services, Salem, Oregon.

Farnell, J. 1981. *Nehalem, Necanicum, Nestucca: Navigability Studies*, Division of State Lands, Salem, Oregon.

Nehalem Valley Historical Society. Date Unknown. *A Patchwork History of Nehalem Bay*.

Oregon Department of Fish and Wildlife. 1993. *Draft: Nehalem Basin Plan*.