
SHORELINE EROSION MANAGEMENT PLAN

Second Draft

**ROCKY REACH HYDROELECTRIC PROJECT
FERC Project No. 2145**

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**Public Utility District No. 1 of Chelan County
Wenatchee, Washington**

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SECTION 1: INTRODUCTION

This Chapter outlines and defines measures to be taken by the Public Utility District No. 1 of Chelan County, Washington (Chelan PUD), and in some cases other parties, with the intent of addressing and improving the incidence of shoreline erosion along the Rocky Reach reservoir, from the Rocky Reach project boundary where it crosses the tailrace of Wells dam to the tailrace of Rocky Reach dam.

1.1 Background

Erosion is occurring along the shore of the Rocky Reach reservoir (Lake Entiat). The valley and the shoreline area have been formed by erosion processes still in progress, making the influence of the Rocky Reach Project difficult to determine; however, the Project is presumed to have some influence on the rate and location of active shoreline erosion.

Various landowners and agencies, including Chelan PUD, have put a substantial amount of effort into erosion control work where residential or recreational development has taken place along the shoreline, or where railroad or highway right of way bounds the reservoir. Less work has been done where the shoreline is used for agricultural purposes or remains undeveloped.

As part of a relicensing study in the spring and summer of 2000, Chelan PUD conducted inventory fieldwork, identifying and mapping 48 erosion sites around Lake Entiat. The results of this study were reported in the Inventory of Shoreline Erosion, Lake Entiat (Chelan PUD, 2001). Sites were inventoried if they showed signs of active erosion and were at least 50 feet long, or appeared to have potential for growing substantially or threatening important site features. The sites had a combined length of approximately 7.3 miles, or about 8.5 percent of the shoreline.

The inventory determined that shoreline erosion at most sites appears to be progressing relatively slowly, but that the average rate of recession could not be precisely estimated based on the information collected. At many sites, there appears to be little need for erosion control measures because the slowly progressing erosion does not threaten critical site features. Nevertheless, the Rocky Reach relicensing Erosion Working Group considered erosion a significant problem at some sites.

1.2 Responsibility

The extent of Project responsibility for shoreline erosion is unclear, due to a variety of factors, and is limited by flowage easements obtained on private and public lands (except federal lands) to accommodate Project operations. .

The Erosion Working Group agreed that most of the erosion features found along the reservoir predate Project construction. Moreover, due to operation of the reservoir, the shoreline now experiences lower flow velocities and a smaller range of water level fluctuations, both of which lead to less erosion. For example, in the case of erosion at the toe of alluvial fans, the current erosion faces are higher on the fan, but probably much smaller than the similar faces present before Project development. On the other hand, in some areas waves reaching the shoreline are

now somewhat larger, due to a longer fetch over which they can develop. The consensus of the relicensing Erosion Working Group, however, is that on balance shoreline erosion is less prevalent now than prior to Project development.

Easements purchased by Chelan PUD at the time of Project development release the Project from responsibility for damages caused by Project operations, including erosion. These easements apply to all shoreline lands not owned by the federal government. Of the 48 sites inventoried during the 2000 relicensing study, only two sites outside of the PUD's public park system were not covered by easements. Only one of those two sites is within the Project boundary; therefore, Chelan PUD has no responsibility to correct erosion problems at 47 of the 48 sites. However, the Erosion Working Group still supported an erosion control program that incorporated public education and demonstration of appropriate erosion control methods so that local governments and individual landowners could successfully repair sites or reduce future impairments. As outlined in section 2.2, Chelan PUD will implement an erosion control education and demonstration program.

The one inventoried site not covered by easements and within the Project boundary is identified as site 27 in the Inventory of Shoreline Erosion and is managed by the U.S. Bureau of Land Management. As outlined in section 2.4, Chelan PUD will conduct erosion control work at this site. The remaining non-easement site is identified as site 31 in the Inventory of Shoreline Erosion. It is within the Wells Project boundary and outside the Rocky Reach Project boundary. No plans for erosion control work at site 31 are included herein.

1.3 Overview of Planned Measures

As part of the Shoreline Erosion Management Plan, Chelan PUD will:

- Demonstrate appropriate erosion control techniques on erosion sites selected by Chelan PUD. The work will include signs explaining control techniques utilized.
- Make information on erosion control methods available to local governments and individuals with land along the reservoir shoreline.
- Prepare and carry out a plan for monitoring shoreline erosion in years 20 and 40 of the New License.
- Design and carry out erosion control efforts on a BLM-owned erosion site, identified as site 27 in the Inventory of Shoreline Erosion, Lake Entiat.

SECTION 2: IMPLEMENTATION

2.1 Erosion Control Demonstration Projects

During the first 20 years of the license term, Chelan PUD will select four sites at which to perform erosion control work with the intent of demonstrating a variety of appropriate, permissible techniques to the public. Chelan PUD expects that it will select and perform work at one such erosion control demonstration site within years 5, 10, 15 and 20,

respectively, of the New License, though it could elect to conduct the work sooner. The techniques will emphasize bio-engineering to the extent feasible. A potential demonstration project of particular interest to WDFW, for example, is an area of riprap which could be modified to improve its habitat value.

When selecting a site to be one of the four erosion control demonstration projects, Chelan PUD will consider the following criteria:

- Does the site help ensure that the program as a whole will include a variety of site configurations? Sites chosen for the demonstration program should facilitate demonstration of methods suited to different shoreline conditions found near the reservoir (e.g. high, steep slope vs. low, gentle slope).
- Is the site accessible to the public, such as a public park?
- Would the proposed work occur in an area for which Chelan PUD has obtained a flowage easement? Chelan PUD will not perform erosion control work in violation of easements.

Chelan PUD will design the demonstration projects, and work with WDFW to obtain the necessary permits in an expedited manner, to the extent feasible. As part of the work at each of the four erosion control demonstration sites, Chelan PUD will post an interpretive sign at each site explaining the method or methods being used to control erosion and referring the public to sources of additional information, such as the material described in section 2.2. Chelan PUD will provide an opportunity for WDFW to provide input on to designs and sign content. Chelan PUD will maintain the signs for the duration of the license and any subsequent annual licenses, unless the methods used become outdated and the associated information is no longer beneficial.

Chelan PUD will spend up to \$200,000 for this effort during the 50-year license term. Chelan PUD will select and perform erosion control work at the rate of one or more sites per five-year period, after the effective date of the New License.

2.2 Information Distribution

Chelan PUD will seek opportunities to distribute information to assist the public in efforts to control shoreline erosion around the reservoir. The information may include technical information on suggested repair methods and/or reference and contact information that will allow landowners to readily find suitable technical information. Distribution may take place through county offices responsible for building or shoreline development permits, and/or through the Chelan PUD staff responsible for arranging electrical service to sites along the reservoir. Information may also be distributed directly to owners of erosion sites continuing to have erosion problems or noted to have changed substantially since the 2000 Inventory of Shoreline Erosion or subsequent monitoring described in section 2.3. . Chelan PUD will spend up to \$25,000 on this effort during the 50-year term of the license.

2.3 Monitoring

2.3.1 Shoreline Erosion Monitoring in Year 20 and Year 40 of the New License

Chelan PUD will complete and carry out a plan for monitoring the progress of shoreline erosion for changes in condition or trend, and for monitoring the effectiveness of repairs in years 20 and 40 of the New License. The goal of the monitoring plan is to obtain, and make available to managing agencies or affected landowners, current information on the status of erosion along the reservoir, on both public and private lands. The study area will include areas within the project boundary around Lake Entiat and immediately downstream of the dam, and areas immediately adjacent to the lake that have been impacted by shoreline erosion. Chelan PUD will consult with the managing agency regarding new or existing non-easement sites on which Chelan PUD determines that erosion has become significantly worse and will perform appropriate repairs.

Under this shoreline erosion monitoring plan, Chelan PUD will inventory erosion sites in the reservoir by boat. The inventory will include erosion sites along the Lake Entiat shoreline greater than 50 ft in length which are experiencing relatively active erosion, or less than 50 ft in length, but which appear to pose an immediate threat to structures or other important site features. The inventory will include an initial screening of sites to select those more active sites for which descriptions are desired. The selected sites will be photographed, located for mapping purposes, and described in writing for inclusion in the inventory. Written descriptions will include information about slope angle, material types, stability, activity level and erosion rate, any previous site work and performance of those repairs, any affected site features, and any factors contributing to the erosion.

2.3.2 Baseline Monitoring for Selected Sites

Chelan PUD will select four to six representative erosion sites not selected as demonstration projects in section 2.1 and for which no repair work is planned for more frequent monitoring. Chelan PUD will monument or otherwise equip these sites in order to monitor the rate of erosion at five-year intervals. Written descriptions of these sites will be made available to the appropriate managing agency, if any, and include the information described in the previous paragraph.

2.3.3 High Flow or Event Monitoring

In addition to the planned shoreline erosion monitoring described above, Chelan PUD will also inspect the reservoir shoreline for new erosion sites or substantial changes to existing sites after exceptionally high flows (e.g. 100-year level flood flows) through the reservoir or other events which could lead to unusual shoreline erosion, as determined by Chelan PUD. Shoreline monitoring under such special circumstances will be conducted similar to the year 20 and year 40 shoreline erosion inventories.

2.3.4 Monitoring Costs

The estimated cost of monitoring for the 50-year term of the license is \$180,000.

2.4 Erosion Control Plan for BLM Site 27

Site 27 in the 2000 Inventory of Shoreline Erosion is on land managed by the U.S. Bureau of Land Management (BLM). Chelan PUD will prepare a design and carry out appropriate erosion control work at this site, with the review and approval of BLM staff.

Other sites in the inventory are on land covered by easements, as discussed in Section 1.2, paragraph 2, and will not be repaired by Chelan PUD.

The estimated cost of performing design, construction, and maintenance of erosion control measures for this site for the 50-year term of the license is \$200,000.

SECTION 3: REFERENCES

Chelan PUD, 2000. Shoreline Erosion Study Plan - final, Rocky Reach Hydroelectric Project, FERC Project No. 2145. Chelan PUD. January 15, 2000. 13 pp.

Chelan PUD, 2001. Inventory of Shoreline Erosion, Lake Entiat - final, Rocky Reach Hydroelectric Project, FERC Project No. 2145. Chelan PUD, Wenatchee, Washington. June 1, 2001. 66 pp.