

***CHAPTER 1: ROCKY REACH SHORELINE EROSION
MANAGEMENT PLAN***

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EXECUTIVE SUMMARY

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 the Rocky Reach Project reservoir (Lake Entiat). 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 is progressing relatively slowly. However, the Rocky Reach relicensing Erosion Working Group (EWG) considered erosion a significant problem at some sites.

Chelan PUD purchased flowage easements around the reservoir except on sites federally owned at the time of Project development. These easements cover damage in perpetuity to land within the Project boundary and to adjoining lands, by “seepage, erosion or similar causes....” Of the 48 sites inventoried, only two outside of the PUD’s public park system were not covered by easements, and only one of those two sites is within the Project boundary. Chelan PUD will be addressing that site under the Rocky Reach Comprehensive Historic Properties and Cultural Resources Management Plan.

Three other Protection, Mitigation and Enhancement measures (PMEs) were also developed by the EWG to address the incidence of shoreline erosion along the Rocky Reach reservoir. Specifically, the Shoreline Erosion Management Plan (SEMP) calls for Chelan PUD to implement the following PMEs:

- 1) Demonstrate appropriate erosion control techniques by performing erosion control work at four sites.
- 2) Distribute information that includes suggested repair methods to assist the public in efforts to control shoreline erosion around the reservoir.
- 3) Monitor future shoreline erosion.

SECTION 1: INTRODUCTION

During the relicensing effort for the Rocky Reach Hydroelectric Project (Project), representatives from Chelan PUD, the USDA Forest Service, the Washington State Department of Fish and Wildlife (WDFW), and the community council of the city of Monitor formed an Erosion Working Group (EWG). The group developed a Rocky Reach Comprehensive Shoreline Erosion Management Plan (SEMP) for the Project. The EWG does not intend to continue as a resource forum once the New License is issued, though implementation of the SEMP will be conducted in coordination with the relevant management agencies, as described in Section 4 of this Chapter.

This SEMP contains sections highlighting the background of erosion occurring along the shore of the Rocky Reach reservoir (Section 2); a relicensing inventory conducted to identify erosion sites (Section 3); and specific Protection, Mitigation, and Enhancement measures (PMEs) to address shoreline erosion that Chelan PUD will implement through the term of the New License for the Rocky Reach Project (Section 4).

SECTION 2: BACKGROUND

Erosion is occurring along the shore of the Rocky Reach reservoir (Lake Entiat). 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.

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 influences the location of active shoreline erosion. 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. 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.

The EWG 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 EWG, however, was that, on balance, shoreline erosion is less prevalent now than prior to Project development.

SECTION 3: STUDIES AND EVALUATION OF PROJECT EFFECTS

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 the Project reservoir (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 EWG considered erosion a significant problem at some sites.

There were 48 sites inventoried. Of these sites, all but two were either in Chelan PUD parks or covered by flowage easements. Only one of those two sites is within the Project boundary; therefore, Chelan PUD has no legal requirement to correct erosion problems at 47 of the 48 sites. However, the EWG 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 4.1, Chelan PUD, as the landowner, will implement an erosion control education and demonstration program.

The one inventoried site not covered by easements and within the Project boundary is also a site of significance to the Cultural Resources Working Group. Chelan PUD will conduct erosion control work at this site; however, treatment of the site will be included in the Historic Properties and Cultural Resources Management Plan rather than in this plan, to protect the site. The remaining non-easement site is identified as site 31 in the *Inventory of Shoreline Erosion*. It is within Douglas County PUD's Wells Project boundary and outside the Rocky Reach Project boundary, so no plans for erosion control work at site 31 are included herein.

SECTION 4: PROTECTION, MITIGATION AND ENHANCEMENT MEASURES

The overall goal of the Shoreline Erosion Management Plan (SEMP) is to address and improve 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. The Erosion Working Group (EWG) developed the following objectives and activities to meet this goal.

4.1 Objective 1: Demonstrate Appropriate Erosion Control Techniques

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 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 within areas covered by flowage 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 4.2. 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 an amount not to exceed \$200,000 for demonstration site repairs and sign maintenance during the 50-year term of the New License and any subsequent annual

licenses. 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.

4.2 Inform the Public About Erosion Control Methods

Chelan PUD will seek opportunities to distribute information to assist the public in efforts to control shoreline erosion. 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 4.3. Chelan PUD will update the information no less than every five years of the first 20 years of the new license, or commensurate with the completion of a demonstration project under Section 4.1 of this Chapter.

Chelan PUD will spend an amount not to exceed \$25,000 on this effort during the 50-year term of the New License and any subsequent annual licenses.

4.3 Monitor Future Shoreline Erosion

4.3.1 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 affected landowners and park operators, current information on the status of erosion along the reservoir, on both public and private lands. The study area will include all shoreline areas within the Project boundary. Chelan PUD will consult with the affected landowners 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 SEMP, Chelan PUD will inventory erosion sites in the reservoir by boat. The inventory will include erosion sites along the reservoir shoreline greater than 50 feet in length which are experiencing relatively active erosion, or less than 50 feet 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.

4.3.2 Baseline Monitoring for Selected Sites

Chelan PUD will select four to six representative erosion sites not selected as demonstration projects in Section 4.1 and for which no repair work is planned for more frequent monitoring. Chelan PUD will install survey monuments 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.

4.3.3 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.

4.3.4 Monitoring Costs

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

SECTION 5: LITERATURE CITED

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.