SKAGIT RIVER HYDROELECTRIC PROJECT
(FERC PROJECT NO. 553)

EROSION CONTROL PROGRAM

2008-2009 COMPLETION REPORT

North Cascades National Park and Seattle City Light

May, 2010

INTRODUCTION

As stipulated in the 1991 Erosion Control Settlement Agreement (SA) between the National Park Service (NPS) and Seattle City Light (SCL), erosion control activities in Ross Lake National Recreation Area (NRA) continued in 2008 and 2009 (license years 13 and 14). All work was preformed by NPS crews, with funding from SCL. Detailed accounting of expenditures is provided in other reports and is not duplicated here. The purpose of this report is to update the Federal Energy Regulatory Commission (FERC) on progress under the terms of the operating license for the Skagit Project.

Activity in 2008 focused on Site E-64 (East Bank trail location north of Rainbow Point) and Site E-116 (access trail to Lightning Creek Boat-in Campground). In addition, erosion problems at two new sites, E-103 and E-105 on Ten Mile Island, were addressed. In 2009, erosion repairs were undertaken at four sites: E-47 (May Creek Campground) and E-103-105 (Ten Mile Island). See Figure 1 for a map of erosion control and monitoring sites addressed in 2008 and 2009.

Routine maintenance of existing erosion control structures was also undertaken in both 2008 and 2009. Maintenance involves visiting all completed sites and monitoring the status of the structure toe and the rock armor originally placed to protect the adjoining structure. The rock armor has a tendency to be displaced by lake level fluctuations, boat wakes, and wave activity, as well as by free floating woody debris washing in and grinding against the structure and armor. Where this occurs, NPS imports rock to re-armor the exposed toe and reduce scouring risk to the structure itself. NPS crews gather rock from as close to the site as possible without creating any further erosion issues. The available rock varies from location to location on the lake, so at times, rock is hauled from a further distance. There is no central quarry location for this armor rock.

PROGRESS BY PROJECT-2008

Site E-64, East Bank trail north of Rainbow Point:

At this site, approximately 100 feet of trail were relocated further up the hill from the existing trail to enhance its capacity to accommodate horses and pack trains. Prior to installation of a new shoreline logjam this section of trail had been significantly impacted by erosion, making it hazardous for stock travel. Moving the trail increased the distance from the shoreline and the log jam installed to correct the shoreline erosion.

Site E116 Trail North of Lightning Creek boat-in campground on Ross Lake:

This site has had breakwater log booms installed and anchored to shoreline bedrock. Crews have been in the process of collecting, when available, large woody debris floating on Ross Lake and placing the debris behind the log booms to further dissipate wave energy. This process will continue as debris becomes readily collectible. Initial surveys indicate that debris placement has worked well in reducing wave impact (such as raveling) on the shore soil structures.

E103-105 Ten Mile Island:

At these sites, several hundred linear feet of island perimeter shoreline was deteriorating from a combination of wave action and unauthorized foot trails made by campers. NPS crews installed large woody debris/logs along the impacted shoreline and pinned the debris in place with one ton boulders. The large woody debris was backfilled with smaller woody debris and soils and replanted with native vegetation.

PROGRESS BY PROJECT-2009

E-47, May Creek Campground:

In 2002, NPS crews installed approximately 60 feet of dry-lay rock wall at Site E-47 per erosion control design. Over the past few years, wave activity penetrated the north end of the rock wall, threatening the structure and beginning to scour the shoreline directly below the campground's restroom facility (Photo 1). In 2009 NPS crews corrected this problem by installing an additional 30 feet of dry-lay rock wall beginning at the north end of the original structure (Photo 2).

E103-105 Ten Mile Island:

As continuation of work begun in 2008, NPS crews installed and anchored large woody debris/logs in place along another approximately 100 feet of shoreline (Photo 3).

NPS Greenhouse and Plant Propagation:

In 2009 the NPS grew approximately 1,200 plants in the native plant nursery in Marblemount for use at erosion control sites along Ross Lake. Work included collection and propagation of native plants from seeds and cuttings (Photo 4), care for plants in the nursery, maintenance of the nursery facility, and planting in the fall. Planting work occurred at three erosion control sites in 2009. The NPS crew planted 820 native plants at erosion control sites on Tenmile Island and Dry Creek (Photo 5).

MONITORING

Five sites along Ross Lake are currently visited every other year to monitor the rate of bank recession (see Figure 1). These five sites all have severe erosion, but were not proposed for mitigation in the Erosion Control Plan. Data on bank retreat rates and processes will be used to inform the design of future erosion control structures and the priority of sites for future work. Erosion rate monitoring sites were revisited in 2008, and will be visited again in 2010.

Since monitoring began in 1994, the mean distance of bank erosion among the five sites is 8.7 ft, compared to the maximum distance of 37 ft in steep sand deposits in Ruby Arm. The rate of bank erosion at the five sites varied based slope and material type. The fastest erosion rate recorded is at Monitoring Site E-9, where steep slopes combined with very thick sandy bank material resulted in a rate of erosion equal to 0.8 ft/yr since 1994. At the other end of the scale, thick, dense glacial till on nearly level slopes at Monitoring site W-78 is eroding at a rate of only 0.25 ft/year. Based on the monitoring data it is clear that bank erosion is episodic. For example,

at Monitoring Site E-55, annual bank erosion rate can exceed 5 ft year when trees are undercut and take a large amount of bank with them when they fall into the reservoir.

COMPLIANCE

Permits from the U.S. Army Corps of Engineers (404 permit) and the State Department of Wildlife (hydraulic permit) were obtained before work began at the erosion control work sites. Copies of these permits are kept at the NPS Geology office in Marblemount and are available on request.

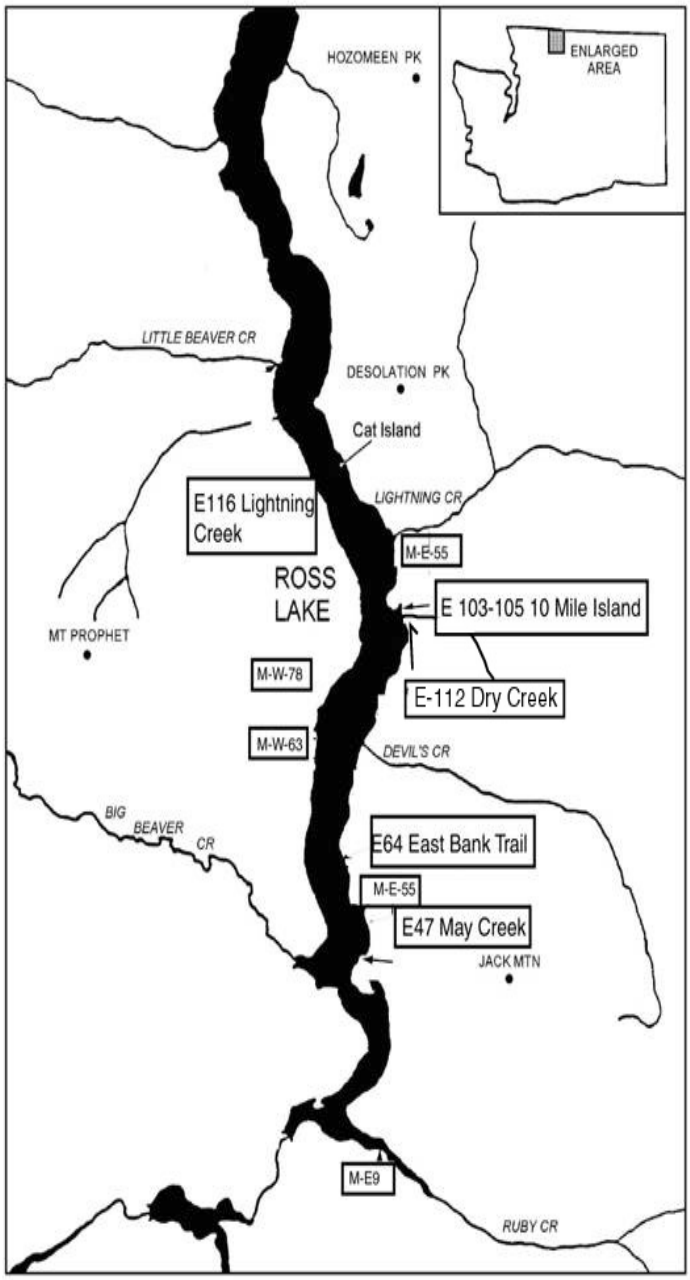

Figure 1. Skagit Project Erosion Control and Re-vegetation sites worked on in 2008-09 (Note: M-E sites are bank erosion rate monitoring sites.)

Photo 1. May Creek-before erosion control measures (2008).

Photo 2: May Creek-after erosion control work (2009).

Photo 3: Crane places rock at Ten Mile Island site. (2009).

Photo 4. Volunteers collect native plant seed at Dry Creek (2009).

Photo 5. Planting natives at site E-103 Tenmile Island (2009).