



Lake Roosevelt Shoreline Management

Waterfront Facilities

Drawdown Impact Study



July 17, 2008



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Prepared for:

National Park Service
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1. Introduction

BACKGROUND

The Washington State Department of Ecology, in partnership with the U.S. Bureau of Reclamation, has developed a plan to withdraw additional water from Lake Roosevelt. This water will be used to provide additional water supply for municipal and agricultural use, to replace a portion of current ground water usage in the Odessa sub-area, to benefit fish by enhancing stream flows in the Columbia River, and to maintain a steady supply of water to interruptible water rights holders in drought years. This plan for additional water withdrawals is known as the Lake Roosevelt Incremental Storage Releases Program. For non-drought years, the additional water withdrawals will result in a lake level approximately 1 foot below normal levels for a short duration period at the end of August. For drought years, the withdrawals will result in a lake level drawdown of approximately 1.8 feet below normal levels at the end of August.

The Washington State Department of Ecology has developed a Programmatic Environmental Impact Statement (EIS) and a Draft Supplemental EIS to evaluate potential environmental impacts of the proposal, including impacts to recreational and scenic resources. The majority of the lake shoreline is publicly owned and managed by the National Park Service (NPS) as the Lake Roosevelt National Recreation Area (LRNRA). The remaining shoreline is owned and managed by the Confederated Tribes of the Colville Reservation and the Spokane Tribe of Indians.

PURPOSE OF STUDY

The purpose of this report is to evaluate the likely impacts of the Lake Roosevelt Incremental Storage Releases Program on existing public-use facilities that are part of the Lake Roosevelt National Recreation Area, managed by the National Park Service. The facilities in the LRNRA include 26 public campgrounds and boat-in-only campgrounds, 11 designated swimming beaches, and three concessionaire-operated marinas located at Kettle Falls, Keller Ferry, and Seven Bays.

2. Withdrawal Options

RESERVOIR ELEVATIONS

The Programmatic EIS describes the original proposal for timing and quantities of the additional withdrawals. The timing of release proposed concentrates the additional releases in the months of July and August. The maximum amount of additional lake drawdown would occur at the end of August and last from several days to several weeks. The Draft Supplemental EIS describes additional options for timing of the water releases that have the effect of spreading out the withdrawal over the summer and decreasing the expected drawdown at the end of August. This report analyzes the impacts of the Programmatic EIS release timings, because these timings present the greatest drawdown elevations in the late August evaluation period.

Reservoir elevations vary considerably over the course of the year (potentially up to 80 feet) with lowest elevations occurring during the month of May. The reservoir elevation quickly rises in early June so that the lake levels are above elevation 1,280 feet by mid-June. This corresponds with the start of the heavy summer recreation period. Reservoir elevations may reach an elevation of 1,290 feet by mid-July and slowly taper back down to the elevation of 1,280 feet by the end of August, when heavy recreational use is nearing an end. The lake levels quickly rise again in September. Many of the shoreline facilities are currently designed to function only within the range of average summer lake levels, because most recreational usage occurs during the summer months. Additional lake drawdown would produce the greatest impact on August 31st of each year. This coincides with the time of the maximum water level drawdown and is still within the heavy summer visitation period.

Reservoir elevations for current August 31st conditions, and for corresponding proposed elevations due to maximum potential drawdown amounts, are shown below:

Table 2-1: Reservoir Elevations on August 31st

Rainfall Year	Current Elevation (MSL)	Proposed Elevation (MSL)
Average / Wet Year	1,280.0 feet	1,278.9 feet
Dry Year	1,278.0 feet	1,276.9 feet
Drought Year	1,278.0 feet	1,276.2 feet



3. Facility Impacts

SITE VISIT

KPFF Consulting Engineers visited NPS-operated waterfront facilities located along Lake Roosevelt on June 3-6, 2008. Two engineers from KPFF, Katie Herold, a civil engineer and Chris LeVan, a structural engineer, attended all site visits. These site visits allowed KPFF to gain familiarity with the layout of each waterfront facility and to inventory the various waterfront systems in place. Over the duration of the site visits, the water elevation of Lake Roosevelt varied from 1,267.4 feet to 1,272.4 feet. A total of 24 waterfront facility sites were visited. Ray Dashiell of the NPS accompanied KPFF on all site visits for facilities located south of Hunters. Only Lake Roosevelt waterfront facilities that are operated by the NPS or their concessionaires were evaluated. The following facilities were designated as non-impact by the NPS and were not evaluated: Crescent Bay, Hanson Harbor, Lincoln Mill, Hawk Creek, Kamloops Island, Kettle River, Napoleon Bridge, and Summer Island.

There are a total of six NPS-operated boat-in only campsites that have floating facilities located on Lake Roosevelt: Plum Point, Goldsmith, Penix Canyon, Sterling Point, Detillion, and Summer Island. Due to the similarity of these facilities and the difficulty of accessing each individual site, Sterling Point was the only boat-in campsite visited. This site was considered representative of all boat-in only facilities and impacts to the other boat-in sites were judged to be similar.

The NPS also provided photos for several facilities taken after KPFF's site visits with a higher lake water elevation of 1,276.3 feet. These photos provided a closer representation of actual equipment in-service conditions at the evaluation water levels, and were used as an aid to determine the functionality of equipment at the water drawdown levels.

EVALUATION PROCESS

Each NPS facility site included various amenities such as campgrounds, boat ramps, floating docks, play areas, picnic areas, and swimming areas. Of the amenities, only the boat docks, boat ramps, and swimming areas are directly affected by water levels. Facilities were evaluated for expected water level drawdown impacts by first determining the existing level of service provided by waterfront equipment at the current August 31st reservoir elevations shown in Table 2-1. The goal of the evaluation process is to determine what additional modifications, or additions may be required to maintain the same level of service or functionality at the proposed water level drawdown elevations. For example, if a given facility has 40 feet of usable dock length at the current water level elevation of 1,278.0 feet, the goal is to provide the same amount of usable dock length (40 feet) at the lower proposed lake drawdown elevation of 1,276.2 feet.

There are several common waterfront equipment types that are found at the waterfront facilities located along Lake Roosevelt. Most of the facility sites, excluding the boat-in campgrounds, have boat launch ramps. A photo of a typical boat launch is shown in Figure 3-1. Evaluations of boat launches were performed based on the minimum elevation required to launch provided by the NPS; these elevations are included in Appendix A.

Skid docks also exist at most sites with boat launches and sit directly on the concrete surface of the boat launch. See Figure 3-2 for a photo of a typical skid dock. As the water level rises and lowers, the skid docks can be towed up and down the ramp to adjust for fluctuating water levels; thus the skid docks have no impact.



Figure 3-1 – Boat Launch (Seven Bays)



Figure 3-2 – Skid Dock (Crescent Bay)

Courtesy docks are the most common facility amenity. Courtesy docks consist of floating dock sections that are attached to a fixed mount on shore and simply rest on the ground at low water elevations. At low lake elevations, only portions of the courtesy dock may be floating and usable. See Figure 3-3 for a photo of a typical courtesy dock. The typical improvement for this situation is to add an additional dock section to the end of the existing dock system to maintain the same useable length of dock for the current August 31st water levels.

Swim beaches are typically enclosed in one or two rings of either PVC or wood log boom systems. See Figure 3-4 for a typical swimming beach surrounded by PVC and wood log boom systems. These boom systems serve to keep boaters out of the swim area to protect swimmers, to provide a resting point for tired swimmers in areas of deeper water, and to provide some wave attenuation. The mitigation solutions for swimming beaches typically involve lengthening log boom systems and extending the booms outward to enlarge the enclosed swimming area. With the increased likelihood of people swimming beyond the booms in the deeper water, it is recommended that “no boat” buoys be added beyond the outer swim boom.



Figure 3-3 – Courtesy Dock (Porcupine Bay)



Figure 3-4 – Swimming Boom System (Spring Canyon)

The construction of most waterfront equipment is fairly consistent throughout Lake Roosevelt facility sites. However, three concessionaire-operated marinas have slightly different floating dock systems than other NPS operated facilities. These marina docks are typically wood dock systems that are anchored in place and connected to shore via ramps or stairs. The marinas also typically house floating docks for houseboat loading, fuel stations and boat repair. These are accessible via ramps that fluctuate with the water level. The marinas are all located in protected bays that tend to have large flat and shallow bottom areas. This shallow lake bottom is the restricting factor for low water level usability of the marina boat docks. Shifting docks to slightly deeper water where possible is recommended. See Figures 3-5 and 3-6 for photos of marina facilities.



Figure 3-5 – Marina Facilities (Keller Ferry)



Figure 3-6 – Marina Facilities (Kettle Falls)

The resulting drawdown impact was evaluated by comparing site investigation field notes and photos taken last year by the NPS with photos taken this year when the lake elevation was at approximately 1,276.3 feet. For NPS-attended site visits, the average expected facility functionality was discussed. This functionality was then compared with the resulting expected loss of functionality at the August 31st drought year elevation.

Ground slopes were estimated to determine the extent of beach or boat launch exposure at the drawdown depths. Facilities were evaluated without the benefit of a field survey.

4. Findings

AVERAGE OR WET YEAR

The drawdown amount expected for an average or wet year results in a lake elevation of 1,278.9 feet. This elevation is approximately 1-foot less than the current elevation seen at that time of year. However, 1,278.9 feet is still above the elevations typically seen at that time of the year during a dry or drought year. This drawdown elevation remains within the current normal range of summer elevations when considering dry or drought years. Because this elevation is within the normal facility operating range, the facilities are not newly impacted by the drawdown. There are however, several boat launch facilities that function adequately at 1,280 feet but are not recommended for use at lower elevations. Thus, although the facilities would typically remain functional around August 31st during an average or wet year, they would not now be recommended for use at that time of the year, regardless of the yearly rainfall conditions.

Table 4-1 lists NPS facilities that are not currently designed to function at elevations below 1,280 feet. The values shown for minimum boat launch elevations are published by the NPS.



Table 4-1: Non-Functional Facilities for Water Levels Below 1,280 Feet

Facility	Minimum Boat Launch Elevation	Impacts
Marcus Island	1,281 feet	No new impact.
Hawk Creek	1,281 feet	No new impact.
Evans	1,280 feet	Slight impact in average or wet year only.
North Gorge	1,280 feet	Slight impact in average or wet year only.
China Bend	1,280 feet	Slight impact in average or wet year only.
Napoleon Bridge	1,280 feet	Slight impact in average or wet year only.
Kettle Falls	-	No new impact to swim area.
Kamloops	-	No new impact. Courtesy dock on dry land above 1,280 feet.
Kettle River	-	No new impact. Courtesy dock on dry land above 1,280 feet.

For the Marcus Island and Hawk Creek boat launches, the lake level drops below the recommended launch elevation each year during the summer season. Thus, the drawdown does not directly affect those facilities, because they are already not recommended for use at that time of year.

Evans, North Gorge, China Bend, and Napoleon Bridge see lake elevations below minimum launch elevations at the end of August, during dry and drought years. The boat launches are not typically closed at the listed elevations. Site inspections reveal that all but very large boats and trailers could continue to use the ramps with the new drawdown elevation of 1,278.9 feet.

It is recommended that no improvements be made for this drawdown condition. Water elevations will typically be either already below the published boat launch elevation, or close enough to the elevation that few users would be inconvenienced. The small number of users that would need to go elsewhere to launch their boat and the length of time that this inconvenience would occur is not sufficient to justify improvements. Marcus Island, Hawk Creek, and Evans boat ramps are located in shallow surrounding areas; this is the limiting factor for extending ramps. North Gorge, China Bend, and Napoleon Bridge are in steep bank areas and would require extending the ramp on an embankment or building ramps steeper than the standard slope, neither of which is desirable.

DRY YEAR

The drawdown amount expected for a dry year would yield a lake elevation of 1,276.9 feet on August 31st. This is approximately 1 foot less than the current typical elevation occurring at that time of year. The difference between a drought year and a dry year elevation is approximately 8 inches. The specific difference in functionality that occurs between elevations 1,276.9 feet and 1,276.2 feet is too small to evaluate without the use of field survey data or site observations occurring at those two specific elevations. Therefore, site evaluations concentrated on identifying the impacts for the worst-case drawdown, which occurs during the drought year. Suggested improvements to handle drought year impacts are sufficient to mitigate the dry year drawdown.

DROUGHT YEAR

The drawdown amount expected for a drought year would yield a lake elevation of 1,276.2 feet on August 31st. This is 1.8 feet less than the current typical elevation occurring at that time of year. The drawdown amount impacts several facilities because they currently are not designed for operation at these new lower lake level elevations. The primary facilities impacted are courtesy docks and enclosed swim areas. A summary of facility impacts and recommended mitigation strategies are listed in Table 4-2.

The most common drawdown impact is the loss of floating courtesy dock space for boat moorage. Existing courtesy docks have been fabricated and installed by the National Park Service maintenance staff; the NPS has standard construction details for dock sections with 20-foot or 10-foot lengths and widths of 4 feet, 6 feet, or 8 feet. For a 1.8 foot drop in water elevation, the waterline recedes approximately 16.5 feet down the boat ramp. Many of the courtesy docks lie parallel to and at the same slope as the boat ramp. These docks lose approximately 16.5 feet of moorage space. The recommended mitigation strategy is to add an additional 20-foot length of floating dock section. For courtesy docks not adjacent to boat ramps, the existing ground slope was estimated. It was then determined whether a 10-foot section or a 20-foot dock section should be added. Specific recommendations for each facility can be found in Appendix A.

Swim areas consist of either log booms or polyvinylchloride (PVC) booms anchored to the shore and anchored out in the water. For the swim areas, rough estimates were made to determine the loss of water enclosed in the swim area. The recommendations are to add additional wood or PVC log boom sections to the existing booms and re-anchor the booms in deeper water. At areas where the inner boom already rests on dry land, the recommendation is to extend the outer log boom only. Specific recommendations for each swimming area can be found in Appendix A.



In addition to the boat ramps already impacted during an average or wet year there is one additional ramp impacted. The boat launch ramp at Snag Cove is listed as having a recommended minimum lake elevation of 1,277 feet prior to use. The proposed drought drawdown elevation is 9.5 inches lower than this recommended elevation. The recommended minimum lake boat launch elevations are typically conservative and are expected to impact only very large boats. It is estimated that few if any people will be unable to launch at this ramp during the proposed drought year drawdown. No mitigation is recommended for boat launch ramps.

Estimated costs associated with the recommended improvements are based on the assumption that the National Park Service maintenance staff will purchase materials and construct courtesy docks and swim boom units, rather than an outside contractor. It is also assumed that NPS staff will be responsible for material delivery to the installation site and for all installation work. It is expected to take three years to construct and install the recommended improvements. Cost escalation to the mid point was applied to the total estimated cost assuming 4.5 percent yearly escalation. A summary of the total improvement cost for each site in today's dollars is listed in Table 4-2, with escalation added to the total cost of all improvements at the bottom. A more detailed cost breakdown can be found in Appendix A.

Table 4-2: Facility Impacts for Dry and Drought Years

Facility	Amenities Impacted	Recommended Mitigation	Estimated Total Cost
Spring Canyon	Three Courtesy Docks, PVC and Wood Swim Booms	Add a 20-foot long dock section to each dock, add four logs, move four buoy anchors to log boom, add four "No Boat" buoys, and retrofit PVC boom for easy removal.	\$58,200
Plum Point	One Courtesy Dock	Add a 20-foot long dock section.	\$12,000
Keller Ferry	Two Courtesy Docks, Wood Swim Boom	Add a 20-foot long dock section to each impacted dock, add four logs, move three buoy anchors, and add four "No Boat" buoys.	\$34,200
Goldsmith	One Courtesy Dock	Add a 20-foot long dock section.	\$15,000
Penix Canyon	One Courtesy Dock	Add a 20-foot long dock section.	\$12,000
Jones Bay	Two Courtesy Docks	Add two 20-foot dock sections and one pile to one dock.	\$34,000
Sterling Point	One Courtesy Dock	Add a 20-foot long dock section.	\$12,000

Table 4-2 (continued): Facility Impacts for Dry and Drought Years

Facility	Amenities Impacted	Recommended Mitigation	Estimated Total Cost
Seven Bays	Three Marina Dock Systems	Move location of two docks and shore connections. Retrofit dock to allow temporary relocation to attach to main dock.	\$42,000
Fort Spokane	Seven Courtesy Docks, Wood Swim Boom	Add two 20-foot sections to one dock, and one 20-foot section to another. Mitigation of other docks not recommended, due to steep bank. Swim area mitigation not recommended, due to narrow deep channel, add three "No Boat" buoys.	\$59,500
Detillion	Two Courtesy Docks	Add a 20-foot long dock section to each dock.	\$24,000
Porcupine Bay	Two Courtesy Docks, PVC and Wood Swim Booms	Add two 10-foot long sections to one dock and one 20-foot long section to the other. Add one log and two PVC pipes to swim booms and anchors to enlarge swim area. Add plant prohibitory fabric to new swim beach, and add four "No Boat" buoys.	\$43,100
Hunters	Three Courtesy Docks, Wood Swim Boom	Add a 20-foot long section to each dock. Add four logs to swim boom and one anchor. Add three "No Boat" buoys.	\$55,100
Gifford	Two Courtesy Docks	Add one 20-foot long dock section to one dock and two 10-foot long dock sections to the other.	\$35,000
Cloverleaf	Wood Swim Boom	Add five logs and one anchor and relocate shore anchor. Add one "No Boat" buoy.	\$8,200
French Rocks	One Courtesy Dock	Add a 20-foot long section to dock.	\$12,000
Kettle Falls	One Government Dock	Add a 10-foot long section to dock.	\$6,000
Evans	One Courtesy Dock, Wood Swim Boom	Add a 20-foot long section to dock, add four logs, move two anchors, and add two anchors to swim boom.	\$21,000
Snag Cove	One Courtesy Dock	Add a 20-foot long section to dock.	\$12,000
		Subtotal	\$495,300
		Escalation to midpoint	\$33,500
		Total	\$528,800



5. Conclusion

SUMMARY

The effect of the proposed additional water withdrawals from Lake Roosevelt is a decrease in water elevations during the summer months. The lower water level does not affect summer recreation until the end of August, when the lake level is already at its lowest point of the summer season. During average or wet years, the water elevation is estimated at 1 foot less than the current operating elevation at the same time of year. This lower elevation still remains higher than typical lake levels at that time of year during dry or drought years. Because this water elevation is within current operational elevations, no improvements are recommended.

The drawdown amount for a dry year is 1 foot less than the current operating elevation at the same time of year. There are several facilities that are not currently designed to function at this lower elevation. Courtesy boat docks and swim areas are impacted by the drawdown. A portion of docks will remain above water level and swim areas will contain less water. Improvements are recommended, but it is recommended that improvements be made to handle the additional drawdown expected for the drought year rather than for the dry year alone.

A drought year will see a decrease in elevation 1.8 feet lower than the current drought year operation elevation for that time of year. This water level drop impacts many facilities. The main effect is less usable dock area for the courtesy docks and less surface area and depth of water in the swim areas. It is recommended that facilities be retrofitted where possible to maintain the current level of service. The estimated total cost to retrofit the existing facilities is \$528,800. See Table 4-2 and Appendix A for specific recommendations and cost breakdown.

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Appendix A

Facility Equipment Information and Cost Data

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
Total for All Facilities =									\$495,300	
Crescent Bay	CR	6/3/08	1,265'	-	-	-	-		Total =	\$0
								Boat Launch	No adverse impact.	-
								Skid Dock	No adverse impact.	-
Spring Canyon	SC	6/3/08	1,222'	X	-	-	X		Total =	\$58,200
								Boat Launch	No adverse impact.	-
								Skid Dock - Low-Water	No adverse impact.	-
								Skid Dock - Main	No adverse impact.	-
								Courtesy Dock - Main	Add (1) - 6' x 20' dock section.	\$15,000
								Courtesy Dock - Boat Launch - East	Add (1) - 6' x 20' dock section.	\$15,000
								Courtesy Dock - Boat Launch - West	Add (1) - 6' x 20' dock section.	\$15,000
								Government Dock	Impact does not decrease functionality.	-
								Swim Beach	No adverse impact.	-
								Swim Boom System - PVC - Inner	Retrofit PVC boom system to detach from anchors so it can be removed from the water. Provide (2) floats to attach to anchor cables.	\$2,000
								Swim Boom System - Wood - Outer	Add (4) - 30' logs to outer wood swim boom system to enlarge swimming area. Move (4) buoy anchors further outward. Add (4) "No Boat" buoys w/ anchors.	\$11,200
Plum Point	PP	-	-	-	-	X	-		Total =	\$12,000
								Courtesy Dock	Add (1) - 4' x 20' dock section.	\$12,000
Keller Ferry	KY	6/3/08	1,229'	X	X	-	X		Total =	\$34,200
								Boat Launch	No adverse impact.	-
								Skid Dock - Low-Water	No adverse impact.	-
								Skid Dock - Main	No adverse impact.	-
								Courtesy Dock - Boat Launch	Add (1) - 6' x 20' dock section.	\$15,000
								Courtesy Dock - East	Add (1) - 6' x 20' wood dock section.	\$8,000
								Courtesy Dock - West	No adverse impact.	-
								Service Dock - D	No adverse impact.	-
								Moorage Dock	No adverse impact.	-
								Swim Beach	No adverse impact.	-
								Swim Boom System - Wood - Inner	Inner boom on dry land and outer boom becomes new swim area boundary. No need to extend inner boom.	-
								Swim Boom System - Wood - Outer	Add (4) - 30' logs to outer wood swim boom system to enlarge swimming area. Move (3) buoy anchors further outward. Add (4) "No Boat" buoys w/ anchors.	\$11,200
Goldsmith	GS	-	-	-	-	X	-		Total =	\$15,000
								Courtesy Dock	Add (1) - 6' x 20' dock section.	\$15,000

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
Total for All Facilities =									\$495,300	
Hanson Harbor	<i>HH</i>	6/3/08	1,253'	-	-	-	-		Total =	\$0
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Skid Dock</i>	No adverse impact.	-
Penix Canyon	<i>PC</i>	-	-	-	-	X	-		Total =	\$12,000
								<i>Courtesy Dock</i>	Add (1) - 4' x 20' dock section.	\$12,000
Jones Bay	<i>JB</i>	6/3/08	1,268'	-	-	-	X		Total =	\$34,000
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Courtesy Dock - Boat Launch</i>	No impact. (dock section added to Courtesy Dock - Campground instead)	-
								<i>Courtesy Dock - Campground</i>	Add (2) - 4' x 20' dock sections. Add (1) new pile.	\$34,000
Sterling Point	<i>SP</i>	6/4/08	-	-	-	X	-		Total =	\$12,000
								<i>Courtesy Dock</i>	Add (1) - 4' x 20' dock section.	\$12,000
Lincoln Mill	<i>LM</i>	6/4/08	1,268'	-	-	-	-		Total =	\$0
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Skid Dock</i>	No adverse impact.	-
Hawk Creek	<i>HC</i>	6/4/08	1,281'	-	-	-	X		Total =	\$0
								<i>Boat Launch</i>	No new impact. Shallow bay is limiting factor.	-
								<i>Courtesy Dock - Boat Launch</i>	No new impact. Shallow bay is limiting factor.	-
								<i>Courtesy Dock - Campground</i>	No new impact. Shallow bay is limiting factor.	-

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
Total for All Facilities =									\$495,300	
Seven Bays	<i>SB</i>	6/4/08	1,227'	-	X	-	-		Total =	\$42,000
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Skid Dock - Low-Water</i>	No adverse impact.	-
								<i>Skid Dock - Main</i>	No adverse impact.	-
								<i>Dock A</i>	Dock A can be shifted towards the lake along with Dock B, since Dock C is no longer used. This requires construction of (1) new set of stairs w/ handrails and relocation of dock anchors.	\$20,000
								<i>Dock B</i>	Relocate along with Dock A. This requires construction of (1) new set of stairs w/ handrails and relocation of dock anchors.	\$20,000
								<i>Dock D</i>	No adverse impact.	-
								<i>Dock E</i>	No adverse impact.	-
								<i>Dock F</i>	No adverse impact.	-
								<i>Dock G</i>	Relocate and attach to end of main dock. Relocate dock anchors.	\$2,000
								<i>Dock K</i>	No adverse impact.	-
								<i>Main Dock</i>	No adverse impact.	-
Fort Spokane	<i>FS</i>	6/4/08	1,247'	X	-	-	X		Total =	\$59,500
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Skid Dock</i>	No adverse impact.	-
								<i>Courtesy Dock - Boat Launch</i>	Add (2) - 6' x 20' dock sections. Add (1) additional pile.	\$40,000
								<i>Courtesy Dock - Picnic - #1</i>	Add (1) - 6' x 20' dock section. (picnic dock near boat launch)	\$15,000
								<i>Courtesy Dock - Picnic - #2</i>	Impacted. No space available to extend.	-
								<i>Courtesy Dock - Picnic - #3</i>	Impacted. No space available to extend.	-
								<i>Courtesy Dock - Campground - #1</i>	Impacted. Not advisable to extend, too steep.	-
								<i>Courtesy Dock - Campground - #2</i>	Impacted. Not advisable to extend, too steep.	-
								<i>Courtesy Dock - Campground - #3</i>	Impacted. Not advisable to extend, too steep.	-
								<i>Government Dock</i>	Impacted. Not advisable to extend, too steep.	-
								<i>Swim Beach</i>	No significant impact. Steep bank in swim area. Lower water elevations don't significantly decrease available swim area.	
								<i>Swim Boom System - Wood</i>	No significant impact. Steep bank in swim area. Lower water elevations don't significantly decrease available swim area. Add (3) "No Boat" buoys w/ anchors.	\$4,500

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
Total for All Facilities =									\$495,300	
Detillion	<i>DE</i>	-	-	-	-	X	-		Total =	\$24,000
								<i>Courtesy Dock - West</i>	Add (1) - 4' x 20' dock section.	\$12,000
								<i>Courtesy Dock - East</i>	Add (1) - 4' x 20' dock section.	\$12,000
Porcupine Bay	<i>PB</i>	6/4/08	1,243'	X	X	-	X		Total =	\$43,100
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Skid Dock</i>	No adverse impact.	-
								<i>Courtesy Dock - Day Use</i>	Add (2) - 6' x 10' dock sections.	\$18,000
								<i>Courtesy Dock - Boat Launch</i>	Add (1) - 6' x 20' dock section.	\$15,000
								<i>Swim Beach</i>	Add approximately 2,000 square feet plant prohibitory fabric to beach.	\$1,500
								<i>Swim Boom System - PVC - Inner</i>	Add (2) PVC boom sections and move shore anchor to extend swim area towards campground.	\$1,600
								<i>Swim Boom System - Wood - Outer</i>	Remove (1) wood log from boat beach boom and add to swim boom and move shore anchor 30 ft to extend swim area towards campground. Add (4) "No Boat" buoys w/ anchors.	\$7,000
Hunters	<i>HU</i>	6/5/08	1,232'	X	-	-	X		Total =	\$55,100
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Skid Dock</i>	No adverse impact.	-
								<i>Courtesy Dock - Boat Launch - East</i>	Add (1) - 6' x 20' dock section.	\$15,000
								<i>Courtesy Dock - Boat Launch - West</i>	Add (1) - 6' x 20' dock section.	\$15,000
								<i>Courtesy Dock - Day Use Area</i>	Add (1) - 6' x 20' dock section.	\$15,000
								<i>Courtesy Dock - Campground</i>	No new impact. (already out of service by 1,278')	-
								<i>Swim Beach</i>	No adverse impact.	-
								<i>Swim Boom System - Wood</i>	Add (4) log boom sections and (1) anchor w/ buoy. Add (3) "No Boat" buoys w/ anchors.	\$10,100
Gifford	<i>GC</i>	6/5/08	1,249'	-	-	-	X		Total =	\$35,000
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Skid Dock</i>	No adverse impact.	-
								<i>Courtesy Dock - Boat Launch - South</i>	No new impact. (already out of service higher than 1,278')	-
								<i>Courtesy Dock - Boat Launch - North</i>	Add (1) - 6' x 20' dock section.	\$15,000
								<i>Courtesy Dock - Campground</i>	Add (2) - 8' x 10' dock sections. (Enlarge berths between finger docks.)	\$20,000

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
Total for All Facilities =									\$495,300	
Cloverleaf	<i>CL</i>	6/5/08	-	X	-	-	X		Total =	\$8,200
								<i>Courtesy Dock</i>	No new impact. (already out of service higher than 1,278')	-
								<i>Swim Beach</i>	No adverse impact.	-
								<i>Swim Boom System - Wood</i>	Add (5) - 30' logs and (1) anchor w/ buoy to log boom system at center of channel. Relocate shore anchor on south side 50' towards the lake. Add one "No Boat " buoy w/ anchor.	\$8,200
Daisy	<i>DR</i>	6/5/08	1,265'	-	-	-	-		Total =	\$0
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Skid Dock</i>	No adverse impact.	-
								<i>Courtesy Dock</i>	No new impact. (already out of service higher than 1,278')	-
Bradbury Beach	<i>BB</i>	6/5/08	1,251'	X	-	-	-		Total =	\$0
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Skid Dock</i>	No adverse impact.	-
								<i>Courtesy Dock</i>	No new impact. (already out of service higher than 1,278')	-
								<i>Swim Beach</i>	No adverse impact.	-
								<i>Swim Boom System - PVC - Inner</i>	No significant impact. Lower water elevations don't significantly decrease available swim area or affect usability.	-
								<i>Swim Boom System - Wood - Outer</i>	No significant impact. Lower water elevations don't significantly decrease available swim area or affect usability.	-
French Rocks	<i>FR</i>	6/6/08	1,265'	-	-	-	-		Total =	\$12,000
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Skid Dock</i>	No adverse impact.	-
								<i>Courtesy Dock</i>	Add (1) - 4' x 20' dock section.	\$12,000

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
Total for All Facilities =									\$495,300	
Kettle Falls	<i>KF</i>	6/5/08	1,234'	X	-	-	X		Total =	\$6,000
								<i>Boat Launch</i>	No adverse impact.	-
								<i>Skid Dock - Boat Launch - South</i>	No adverse impact.	-
								<i>Skid Dock - Boat Launch - North</i>	No adverse impact.	-
								<i>Government Dock</i>	Add (1) - 4' x 10' dock section.	\$6,000
								<i>Swim Beach</i>	No new impact. (already out of service higher than 1,278')	-
								<i>Swim Boom System - Wood</i>	No new impact. (already out of service higher than 1,278')	-
								<i>Fuel Station Dock System</i>	No adverse impact.	-
								<i>Boat Repair Dock</i>	No adverse impact.	-
								<i>Main Access Dock</i>	No adverse impact.	-
Kamloops Island	<i>KI</i>	-	-	-	-	-	X		Total =	\$0
								<i>Courtesy Dock</i>	No new impact (per NPS, no site visit).	-
Kettle River	<i>KR</i>	-	-	-	-	-	X		Total =	\$0
								<i>Courtesy Dock</i>	No new impact (per NPS, no site visit).	-
Napoleon Bridge	<i>NB</i>	6/5/08	1,280'	-	-	-	-		Total =	\$0
								<i>Boat Launch</i>	No new impact.	-
Marcus Island	<i>MI</i>	6/5/08	1,281'	X	-	-	X		Total =	\$0
								<i>Boat Launch</i>	No new impact.	-
								<i>Courtesy Dock</i>	No new impact. (already out of service higher than 1,278')	-
								<i>Swim Beach</i>	No new impact.	-
								<i>Swim Boom System - Wood</i>	No new impact. Shallow bay. Safe to swim beyond boom because boats won't be using ramp in the area at low lake levels.	-
Summer Island	<i>SI</i>	-	-	-	-	X	-		Total =	\$0
								<i>Courtesy Dock</i>	No new impact (per NPS, no site visit).	-
Evans	<i>EV</i>	6/5/08	1,280'	X	-	-	X		Total =	\$21,000
								<i>Boat Launch</i>	No new impact.	-
								<i>Courtesy Dock - Boat Launch</i>	No new impact.	-
								<i>Courtesy Dock - Campground</i>	Add (1) - 6' x 20' dock section.	\$15,000
								<i>Swim Beach</i>	No adverse impact.	-
								<i>Swim Boom System - PVC - Inner</i>	No adverse impact. PVC will lay on beach, outer boom becomes new swim area limits.	-
								<i>Swim Boom System - Wood - Outer</i>	Add (4) logs to boom, move (2) existing anchors and add (2) anchors.	\$6,000

Facility	Facility Code	Site Visit	Boat Launch	Swimming	Marina	Boat Campsite	Campground	Waterfront System	Expected Impact For Dry or Drought Year	Current Estimated Cost
Total for All Facilities =									\$495,300	
Snag Cove	<i>SN</i>	6/5/08	1,277'	-	-	-	X		Total =	\$12,000
								<i>Boat Launch</i>	No significant impact. Lengthening not justified.	-
								<i>Skid Dock</i>	No adverse impact.	-
								<i>Courtesy Dock</i>	Add (1) - 4' x 20' dock section.	\$12,000
North Gorge	<i>NG</i>	6/5/08	1,280'	-	-	-	X		Total =	\$0
								<i>Boat Launch</i>	No new impact.	-
								<i>Courtesy Dock - West</i>	No new impact. (already out of service higher than 1,278')	-
								<i>Courtesy Dock - Boat Launch</i>	No new impact. (already out of service higher than 1,278')	-
China Bend	<i>CB</i>	6/5/08	1,280'	-	-	-	-		Total =	\$0
								<i>Boat Launch</i>	No new impact.	-
								<i>Courtesy Dock</i>	No new impact.	-