DECISION NOTICE

North Shore Development Submerged Logs Project Final Environmental Assessment
September 10, 2010

INTRODUCTION

We, the Department of Natural Resources and Conservation Director Mary Sexton and the Department of Environmental Quality Director Richard H. Opper, have reviewed all the information and comments received during the preparation of the North Shore Development Submerged Logs Project Environmental Assessment. We have also reviewed the Final Environmental Assessment, including comments received on the Draft Environmental Assessment and the responses to those comments.

We have compared the two alternatives to the project objectives and evaluated the advantages and disadvantages of each.

We have reviewed the identified issues and the analysis of environmental effects relevant to each issue for both proposed alternatives.

We have carefully reviewed the proposed project as outlined in the Final Environmental Assessment to ensure pertinent State and County laws, agency Administrative Rules as well as agency plans, Memorandum of Understanding (MOU) and Conservation agreements have been honored, upheld and implemented.

DECISION

We have chosen to implement the Action Alternative as outlined in chapter 2 of the Final Environmental Assessment. The proposed decision to be made under the action alternative for each agency is described below.

I, Department of Natural Resources and Conservation Director Mary Sexton, will recommend that a Land Use License issued to North Shore Development for operations outlined in the Final Environmental Assessment be submitted to the Board of Land Commissioners for approval for the following reasons:

1. Localized, temporary and geographically isolated lake bed disturbances are expected to have no significant environmental impacts to water quality from turbidity, heavy metals, polycyclic aromatic hydrocarbons (PAH), dissolved oxygen and nutrients (nitrogen and phosphorus) during salvage activities. Expected consequences are further described on pages 21-23 of the Final Environmental Assessment.
2. No significant impacts are expected to occur to fisheries resources from minor habitat modification, short-term fisheries displacement and short-term sediment suspension resulting from log salvage operations. Expected consequences are further described on pages 30-33 of the Final Environmental Assessment.
3. Recreational opportunities within the project area will not be diminished or altered due to mitigations constraining operations during peak seasonal use and scheduled recreational events in the area. These mitigations are further described in detail on page 37 of the Final Environmental Assessment.
4. The selected alternative meets the purpose and benefits of the proposed action as described on page 1 of the EA and will result in revenue generation for the State of Montana.

5. Water quality monitoring during the implementation of salvage activities provides necessary adaptive management strategies to insure high levels of confidence in the effectiveness of water quality mitigation as well as environmental effects verification.

I, Department of Environmental Quality Director Richard H. Opper, will recommend that North Shore Development's application for a short-term water quality standard for turbidity (318 Authorization) be granted for the following reasons:

1. Proposed activities under the action alternative will be unable to met numeric standards for total suspended sediment and turbidity as adopted by the Board of Environmental Review under MCA 75-5-301 and narrative standards during periods of operations will be adopted.
2. Mitigations incorporated into the project design will allow the proposed actions to be implemented to ensure that the activity is not harmful, detrimental, or injurious to public health and the uses of state waters and will ensure that existing and designated beneficial uses of state water are protected and maintained during project implementation and upon project completion.
3. Water quality monitoring during the implementation of salvage activities provides necessary adaptive management strategies to insure high levels of confidence in water quality mitigation effectiveness as well as environmental effects verification.

We believe the potential environmental effects of both the no-action and action alternatives were adequately identified and analyzed in the Final Environmental Assessment.

The Final Environmental Assessment and other pertinent information about this project are posted and available for reference at the DNRC website: North Shore Development Submerged Logs Project Final EA.

Upon execution of the decision, we will recommend that the Land Use License issued to North Shore Development, LLC be submitted to the Board of Land Commissioners for approval. We also recommend that a 318 Authorization for the project be issued by the Department of Environmental Quality.

Sincerely,

Mary Sexton
Director
Montana Department of Natural Resources and Conservation

Richard H. Opper
Director
Montana Department of Environmental Quality

North Shore Development Submerged Logs Project

Environmental Assessment

FINAL

September 8, 2010

Prepared by:

NORTHWEST MANAGEMENT, INC.
1417 Orange Street, Helena, MT 59624
(406) 442-7555
www.consulting-foresters.com

TABLE OF CONTENTS

3CHAPTER 1 – PURPOSE AND BENEFITS OF THE PROPOSED ACTION 3

INTRODUCTION 3
PURPOSE AND BENEFITS OF THE PROPOSED ACTION 3
DECISIONS TO BE MADE 4
Joint Decision 4
RELEVANT AGREEMENTS, LAWS, PLANS, PERMITS, LICENSES, AND OTHER REQUIREMENTS 4
Relevant agreements, laws, and plans 4
Federal, State and Local Permits or Requirements 7
RELEVANT PAST, PRESENT, AND RELATED FUTURE ACTIONS 8
AGENCY AND PUBLIC INVOLVEMENT 8
Public Involvement 8
AGency Involvement 9
Issues Identified through Scoping 9
Table 1 Issues Analyzed in Further Detail 10
Table 2 Issues Eliminated from Further Analysis 11

CHAPTER 2 – ALTERNATIVES 12

DEVELOPMENT OF ALTERNATIVES 12
DESCRIPTION OF THE ALTERNATIVES 12
Alternative A—No action 12
Alternative B—Action 12
Proposed Project Area 12
Proposed Activities 13
Project Design Measures to Reduce impacts 16

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES 18

LAKE BED SEDIMENTS AND WATER QUALITY 18
AIR 23
VEGETATION/WETLANDS 24
FISHERIES/AQUATIC RESOURCES 24
WILDLIFE/ THREATENED, ENDANGERED AND SPECIAL STATUS SPECIES 33
NOISE 33
RISK/HEALTH HAZARDS/SAFETY 34
COMMUNITY DRINKING WATER 35
PUBLIC SERVICES/TAXES/UTILITIES/ECONOMICS 35
AESTHETICS/RECREATION 36
CULTURAL/ HISTORICAL RESOURCES 37

CHAPTER 4 – RESPONSE TO PUBLIC COMMENTS 39

CHAPTER 5 - CONSULTATION, COORDINATION, AND PREPARATION 67

LIST OF PREPARERS 67
LIST OF AGENCIES AND PERSONS CONSULTED 67

REFERENCES 68

APPENDICES **72**

PROPOSED MONITORING PLAN—Monitoring surface water quality and lake bed sediment sampling *73*
Estimating the Amount of Sediment on the Surface of Salvage Logs *86*
Reported Effects of Turbidity and Suspended Sediment Concentrations on Salmonids[1] *90*
Location Maps and Aerial Photographs *96*

CHAPTER 1 – PURPOSE AND BENEFITS OF THE PROPOSED ACTION

INTRODUCTION

This Environmental Assessment (EA) has been prepared to determine the potential natural resource, social, and economic effects of permitting the salvage of submerged logs from past logging operations lying on the State-owned bed of Flathead Lake pursuant to a Settlement Agreement (October 2008) that was entered into by the State of Montana, Board of Land Commissioners(Land Board) and the Montana Department of Natural Resources and Conservation (DNRC) with North Shore Development Co., LLC (North Shore). This agreement determined North Shore to be the owner of all submerged logs marked with a circled "N" brand and the State of Montana to be the owner of all other submerged logs within the State-owned portion of Flathead Lake. Under this agreement, the Land Board agreed to issue North Shore an exclusive land use license for 10 years subject to requirements imposed by the Montana Environmental Policy Act (MEPA) and other applicable permits, laws and regulations. The proposed project area covers the State-owned bed of Flathead Lake north of Point Caroline and Long Beach (see map 1 of the proposed project area in the appendix).

PURPOSE AND BENEFITS OF THE PROPOSED ACTION

DNRC is proposing to grant a land use license to North Shore, in accordance with the October 2008 Settlement Agreement, to allow the salvage of submerged logs lying on the State-owned bed of Flathead Lake. In addition, the Montana Department of Environmental Quality (DEQ) is proposing to grant a 318 Authorization to North Shore for a short-term narrative water quality standard for turbidity within Flathead Lake. The project objectives are to: 1) capture the value from merchantable submerged logs lying on and in the bed of the State-owned bed of Flathead Lake; and 2) generate revenue for State of Montana school trust beneficiaries from the land use license fees and from the procurement of State owned logs. Additional benefits may include 1) the removal of navigation hazards posed by some submerged logs occurring in shallow areas of Somers Bay, and 2) the increased supply of high quality historically significant wood to local manufacturers.

Under the proposed action, merchantable logs that are owned by North Shore and the State of Montana which are currently lying on the bed of Flathead Lake in Somers Bay and elsewhere in the project area, would be slowly lifted from the bottom of the lake by divers with the assistance of lift bags or cable winches so as to minimize any temporary disturbance of sediment on the lake bottom. The logs would then be floated to a staging area and taken out of the lake and transported for processing. Active log recovery operations would be limited to a designated 5-acre section of the project area. The active log recovery area would be marked with highly visible buoys so as to minimize any conflicts with recreational users. In order to maintain the integrity of the shoreline of Flathead Lake in its natural state, North Shore would not remove any logs from the shoreline or from the upslope below the low water mark in Flathead Lake. There would be no log removal activities within 1000 feet of the EPA superfund site in Somers Bay.

DECISIONS TO BE MADE

JOINT DECISION

Once the environmental analysis has been completed, including the 30-day public review period, DNRC Director Sexton and DEQ Director Opper will jointly issue a decision on the proposed action. The Decision Notice will determine 1) which alternative was selected 2) if the selected alternative meets the project objectives, 3) if the proposed project adequately addresses issues and concerns, and 4) if there is a need for further environmental analysis or to prepare an environmental impact statement. Director Sexton will soon after bring the joint decision before the Land Board for final approval.

RELEVANT AGREEMENTS, LAWS, PLANS, PERMITS, LICENSES, AND OTHER REQUIREMENTS

RELEVANT AGREEMENTS, LAWS, AND PLANS

- Settlement Agreement

North Shore is a Montana limited liability company. The company was formed in 2005 for the purpose of salvaging logs that had sunk in Flathead Lake during logging operations by the Somers Lumber Company, and which the company owned under a chain of title from the Somers Lumber Company. In September 2005 North Shore applied for and received a permit from the DEQ in connection with the proposed salvage operations (Authorization No. MTB006006 Short-Term Water Quality Standard for Turbidity Related to Construction Activity Pursuant to 75-5-318, MCA, Valid October 1, 2005 through September 30, 2006). However, in the Spring of 2006 the DNRC ordered North Shore to cease and desist any salvage operations and then commenced a legal action to determine ownership of the sunken logs. After extensive discovery in the litigation, the parties reached a settlement under which (1) the State acknowledged that North Shore as the owner of any submerged logs with a circled "N" end stamp found in or upon the State-owned bed of Flathead Lake; (2) North Shore acknowledged that the State is the owner of all other submerged logs found in or upon the State-owned bed of Flathead Lake; and (3) subject to MEPA and any required regulatory permits, the Land Board agreed to issue to North Shore a land use license under which North Shore would conduct log salvage operations on Flathead Lake. In October 2008, the Montana Eleventh Judicial District Court, Flathead County, entered a Consent Decree approving the settlement (Consent Decree).

The following have been determined to be other agreements, laws and regulations applicable to this project:

- Montana Environmental Policy Act (MEPA)

Since 1971 MEPA has been Montana's bedrock environmental law. In its simplest terms, MEPA institutes a "look before you leap" policy by requiring state agencies to consider the environmental, social, cultural

and economic impacts of proposals before a project is approved. The purpose of MEPA is to foster state government decisions that are informed, accountable, open to public participation, and balanced.

- DNRC Administrative Rules for MEPA

The DNRC administrative rules under which it implements MEPA are ARM 36.2.501 through 543.

- DEQ Administrative Rules for MEPA

The DEQ administrative rules under which it implements MEPA are ARM 17.4.601 through 636.

- Lake and Lakeshore Protection Regulations, Flathead County, Montana

A Flathead County Lake and Lakeshore Construction Permit is required when working with heavy equipment from the high water mark to 20 horizontal feet above it. Since the logs are being floated directly to a trailer on a boat ramp, a Flathead County Lake and Lakeshore Construction Permit is not necessary. If in the future North Shore elects to utilize different extraction areas and utilize heavy equipment within 20 feet above the high water mark, a Flathead County Lake and Lakeshore Construction Permit would be obtained.

- Montana Water Quality Act- Water Quality Standards and Classifications

Flathead Lake is classified as an A-1 surface water (ARM 17.30.608). Under this classification, no increases are allowed above naturally occurring concentrations of sediment or suspended sediment (except as permitted in 75-5-318, MCA settleable solids, oils, or floating solids which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife (ARM 17.30.622).

- DNRC Real Estate Management Plan Rules (ARM 36.25.901 through 918)

The DNRC Real Estate Management Plan covers those activities related to the leasing, exchanging, or selling of School Trust lands for residential, commercial, industrial, and conservation purposes. Proceeds generated from leases, licenses, sales, and easements are used to support the beneficiaries of state school trust.

- Montana Boating Laws

The 2009-2010 Montana Boating Law is produced by Montana Fish Wildlife and Parks (FWP). It contains specific information on the harassment of wildlife, diver down flag warning, required boating equipment and safety tips.

- FWP Aquatic Nuisance Plan

Aquatic Nuisance Species (ANS) have become a serious problem in Montana. ANS are non-indigenous plant or animal species that threaten the diversity and abundance of native species, the ecological

stability of native infested waters, or the commercial, agriculture, aquacultural or recreation activities dependent on such waters. The Montana ANS Plan was an initial step in establishing a program to specifically address ANS issues. The goal of the Montana ANS Management Plan is to minimize the harmful ecological, economic and social impact of ANS through prevention and management of introduction, population growth, and dispersal into, within, and from Montana.

- Montana Wildlife Laws- Nongame and Endangered Species Conservation Act (87-5-101 et seq., MCA) and provisions for wild birds

The Montana legislature, mindful of its constitutional obligations under Article II, Section 3, and Article IX of the Montana constitution, enacted The Nongame and Endangered Species Conservation Act, in which the legislature found and declared:

1. that it is the policy of the State of Montana to manage certain nongame wildlife for human enjoyment, for scientific purposes, and to ensure their perpetuation as members of ecosystems:
2. that species or subspecies of wildlife indigenous to this State that may be found to be endangered within the State should be protected in order to maintain and, to the extent possible, enhance their numbers.
3. it is unlawful for a person to hunt, capture, possess, purchase or expose for sale, ship, or transport any wild bird, other than a game bird, or any part of the plumage, skin, or body of the bird, irrespective of whether the bird was captured or killed within the state, or to take or destroy the nest or eggs of a wild bird.

- Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana.

This Memorandum of Understanding and Conservation Agreement was developed to expedite implementation of conservation measures for westslope cutthroat trout and Yellowstone cutthroat trout throughout their respective historical ranges in Montana. This agreement is a collaborative effort among resource agencies, conservation and industry organizations, tribes, resource users, and private landowners. This Agreement serves to document Montana's efforts as part of a coordinated multi-state, range-wide effort to conserve westslope cutthroat.

- Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin, Montana

This restoration plan for bull trout in Montana was developed collaboratively by, and is supported by the Montana Bull Trout Restoration Team. The purpose of this restoration plan is to provide the framework for a strategy to reverse or halt the decline of bull trout populations in western Montana, and restore populations in areas where they have declined. The plan is intended to guide state restoration efforts, and complement federal conservation and recovery processes.

FEDERAL, STATE AND LOCAL PERMITS OR REQUIREMENTS

- DNRC Land Use License

Under the Settlement Agreement, the Land Board agreed to authorize DNRC to issue North Shore an exclusive land use license for 10 years subject to requirements imposed by MEPA and other applicable permits, laws, and regulations.

- DEQ 318 Authorization

North Shore previously applied and received a 318 authorization from the DEQ. A 318 authorization is needed for conducting work in Montana's streams, wetlands, floodplains and other water bodies. The 318 Authorization allows the generation of turbidity/sediment for construction activity in State waters. Because the 318 authorization previously issued to North Shore is now out of date, another 318 authorization is needed.

- Lake and Lakeshore Protection Regulations, Flathead County, Montana

A Flathead County Lake and Lakeshore Construction Permit is required when working with heavy equipment from the high water mark to 20 horizontal feet above it. Since the logs are being floated directly to a trailer on a boat ramp, a Flathead County Lake and Lakeshore Construction Permit is not necessary. If in the future North Shore elects to utilize different extraction areas and utilize heavy equipment within 20 feet above the high water mark, a Flathead County Lake and Lakeshore Construction Permit would be obtained.

- Fish Wildlife and Parks Commercial Use Permit

North Shore has applied for a Montana Fish Wildlife and Parks Commercial Use Permit to use the Somers Bay boat launch to extract salvaged logs from Flathead Lake.

- U.S. Army Corps of Engineers 404 Permit

Section 404 of the Clean Water Act regulates the discharge of dredged or fill material in wetlands, streams, rivers, and other U.S. waters. Because the project does not remove lake bed material and there would be no construction materials on the bed of Flathead Lake, a 404 permit is not needed.

- 310 permit

Montana's Natural Streambed and Land Preservation Act, also known as the 310 Law, is a State law which requires that any person planning to work in or near a perennial stream or river on private or public land must first obtain a 310 permit from the local conservation district. The Flathead Conservation District has confirmed that the proposed scope of work for the project does not require a 310 permit.

- Permit for Storm Water Discharge

The 1972 amendments to the Federal Water Pollution Control Act, later referred to as the Clean Water Act, prohibit the discharge of any pollutant to waters of the United States. In Montana a Storm Water Discharge Permit is required when construction activity results in the disturbance of equal to or greater than one acre of total land area. Because there is no land disturbance in connection with the proposed project, a Storm Water Discharge Permit would not be necessary.

- SMZ Alternative Practice

The Streamside Management Law provides minimum standards for forest practices in streamside management zones (SMZ). The SMZ encompasses a strip at least 50 feet wide on each side of a stream, lake, or other body of water, measured from the ordinary high water mark, and extends beyond the high-water mark to include wetlands and areas that provide additional protection in zones with steep slopes or erosive soils. North Shore would need to secure a SMZ alternative practice prior to conducting any activities.

- USFWS Compatibility Determination and Special Use Permit

This permit is required when doing any work in close proximity to a USFWS refuge or property. North Shore would not salvage any logs within 500 feet of the north shore of Flathead Lake including the Waterfowl Production Area. A special use permit would not be needed.

RELEVANT PAST, PRESENT, AND RELATED FUTURE ACTIONS

State agencies are required to consider past, present, and related future actions on state lands in the cumulative effects analysis. At present, there are currently no permitted DNRC activities in the proposed project area. The Army Corps of Engineers and DEQ have an outstanding permit for a "breakwater" on Flathead Lake to protect a boat dock, but the proposed activity is not anticipated to have an impact within the project area.

Lake trout is actively managed within the project area. In attempt to reduce lake trout populations in the lake, the Confederated Salish and Kootenai Tribes (CSKT) actively manages through a combination of sport fishing and gill netting. "Mack Days," sponsored by CSKT, is a popular lake trout fishing event that occurs twice a year. FWP has conducted gill netting within the project area near Somers Bay. These activities have been considered in the cumulative impacts analyses for individual resources listed in Chapter 3.

AGENCY AND PUBLIC INVOLVEMENT

PUBLIC INVOLVEMENT

With regard to the proposed project, the DNRC solicited initial public comments in early December 2008. The public comment period closed on January 8, 2009. Advertisements seeking public comment

on the project were placed in the Missoulian, The Daily Interlake and the Bigfork Eagle. A postcard was mailed to over 300 interested parties. Nine responses were received from the public- seven individuals and two organizations (Flathead Lakers and the Flathead Lake Biological Station). Comments focused on issues and concerns related to eleven general resource areas and are displayed in Table 1 Issues Analyzed in Further Detail and Table 2 Issues Eliminated from Further Analysis. In addition to initial public scoping, representatives from North Shore have held meetings with the Flathead Lake Biological Station to discuss the salvage operations and potential impacts it may have on the Flathead Lake ecosystem. The discussions with the Biological Station included the log retrieval process, potential mitigation measures and monitoring protocols. A newsletter updating the status of the project was mailed out to interested parties during the week of March 15, 2010.

The Draft Environmental Assessment was made available to the public during the 30-day public comment period. A public meeting was held at the Lakeside Community Chapel from 5pm to 8pm on August 17, 2010.

AGENCY INVOLVEMENT

An Environmental Analysis Process Agreement (Process Agreement) was developed among the DNRC, DEQ, and North Shore in October 2009 to outline the tasks associated with the development of this project and to clearly identify duties and responsibilities of the agencies (DNRC and DEQ) and North Shore's contractor, Northwest Management, Inc. (NMI). One of the requirements of the Process Agreement was to form an Interdisciplinary Team (ID Team) to perform the environmental assessment for the project. The ID Team consists of:

1. NMI - Project Leader and resource specialists.
2. DNRC and DEQ MEPA coordinators.
3. Subcontractor resource specialists.
4. DNRC and DEQ resource specialist.

The first ID Team meeting was held November 3, 2009. In the first meeting the rules, laws and regulations that are applicable to the project, as outlined above, were discussed. A list of permits and agreements applicable to the project was also discussed. Finally individual responsibilities and timelines were established to help facilitate the MEPA process.

ISSUES IDENTIFIED THROUGH SCOPING

In the scoping process, DNRC and DEQ resource specialists, other agencies, and the public raised issues about the project's potential impacts on the environment. The ID Team reviewed the issues raised, and together determined which of the issues raised would be analyzed in greater detail, and which would be eliminated from further analysis. The following issues were considered in the development of project alternatives.

TABLE 1 ISSUES ANALYZED IN FURTHER DETAIL

Resource Area	Issue	Where Addressed in EA
Cumulative Effects	Salvage operations would have cumulative effects on Flathead Lake's water quality.	Chapter 1, Page 8; Chapter 3, Pages 22-24.
Economic	There is a weak market for wood products. Additional mitigation costs associated with removing the logs would make the logs expensive. The economic value of Flathead Lake exceeds the value of logs.	Chapter 3, Page 37. (Economics)
Fisheries	Removal of logs could impair fish habitat, opportunities for forage. Removal activities pose increased risk of contamination.	Chapter 3, Page 30-32.
Lake Ecology	Logs provide habitat for aquatic invertebrates. Removal of logs could disrupt lake biota and food web. Impacts to near shore insect habitat.	Chapter 3, Page 31. Chapter 3, Page 30-32. Chapter 2, Page 17.
Recreation	Logs pose navigation hazard.	Chapter 2, Page 18.
Water Quality	Further nutrient inputs could exceed TMDLs. Operations could contribute to further decline of dissolved oxygen. Mitigation would not protect water quality. Effect of sediment on water quality, dissolved oxygen, creosote, petrochemicals and	Chapter 3, Pages 22-24. Chapter 3, Pages 23-24. Chapter 3, Page 24. Chapter 3, Page 22-24.

Resource Area	Issue	Where Addressed in EA
	other toxic materials.	
Environmental Review	Independent scientific review should be conducted. Incorporate best available science, peer reviewed, including Flathead Lake Biological Station (FLBS) data.	Appendix A-D Chapter 3, Pages 21-22.
Socio-Cultural	Project could impact right to clean and healthful environment.	Chapter 3, Page 34-35.

TABLE 2 ISSUES ELIMINATED FROM FURTHER ANALYSIS

Issue	Rationale
Erosion/wetlands impact along North Shore	There would be no logs removed from the lakeshore. There would be no log removal activities within 1,000 feet of the Somers Bay superfund site, upwards of 500 feet from the low water mark along the north shore of Flathead Lake and a variable buffer distance (depending on the location of any legal water intake wells) along the east and west shores. North Shore would only salvage logs that are lying directly on the bottom of Flathead Lake. Any logs lying or submerged on the upslope to the low water mark would not be salvaged. Within Somers Bay 200 logs that were initially staged there have dispersed throughout the bay and would be salvaged. There would be no impact on erosion and subsequent loss of wetlands along the north shoreline and the U.S. Fish and Wildlife Service Waterfowl Production Area. The only logs removed would be those from past logging operations. Recruitment trees transported into the lake from the Flathead River would not be disturbed.
State should conduct an EIS	After the Draft EA has been distributed for public review and comments from the public have been addressed, the Decisionmakers (Directors Sexton and Opper) will issue a Decision Notice. Part of the joint decision will be to determine if the proposed action will impose significant impacts to the human environment according to the criteria listed in each agency's administrative rules for MEPA (ARM 36.2.524 and ARM 17.4.608).

	According to these ARMs, if the proposed action poses significant adverse impacts to the human environment, then an EIS would be required.
Identification and removal of only the Somers Lumber logs	Logs with the circled "N" end stamp would be removed under the land use license. Other logs that are on the lake bottom as a result of past logging activities may also be removed under the land use license with additional rent to be paid to the State in connection with such removal.
Salvage operation will set a precedent for other similar actions	The scope of this EA is limited to activities proposed by North Shore in the project area described. Any actions outside of the scope of this EA will be subject to appropriate environmental review.

CHAPTER 2 – ALTERNATIVES

DEVELOPMENT OF ALTERNATIVES

The following alternatives were developed by the proponent, North Shore, DNRC and DEQ personnel, public comments, and ID team input.

DESCRIPTION OF THE ALTERNATIVES

ALTERNATIVE A—NO ACTION

Under the no-action alternative no salvage operations would take place. Environmental conditions, as described in the affected environment, would be expected to persist in the existing dynamic state. This alternative will be used as a basis for comparing the effects that the Action Alternative would have on the environment.

ALTERNATIVE B—ACTION

Under the action alternative, merchantable submerged logs would be removed from the State-owned bed of Flathead Lake. The sunken logs would be slowly lifted from the bottom of the lake by divers with the assistance of lift bags or cable winches so as to minimize any temporary disturbance of sediment on the lake bottom. The logs would then be secured to a pontoon boat and moved to landings where they would be floated onto a trailer and transported to a staging area.

PROPOSED PROJECT AREA

The proposed project area includes State-owned lake bed below the low watermark north of Pt. Caroline on the west shore and Long Beach on the east shore of Flathead Lake. North Shore would not conduct salvage operations within 1000 feet of the Somers Bay superfund site, upwards of 500 feet

from the low water mark along the north shore of Flathead Lake, and a variable buffer distance (depending on the location of any legal water intake wells) along the east and west shores. Please see Aerial Photo 1 Proposed Project Area and Aerial Photo 2 Proposed Buffer Zones in the appendix.

PROPOSED ACTIVITIES

If the action alternative is selected and the land use license is approved by the Land Board, salvage operations would start in the fall of 2010. As per the proposed monitoring plan (see appendix) a series of sediment samples from pre-determined locations of lake bottom sediments and sediment lying on submerged logs will be analyzed for heavy metals. The initial log salvage operation would also start in a pre-determined location, and a series of water quality samples will be taken before, during and after the salvage operations.

Log recovery operations would be limited to a designated 5-acre section in the license area until recovery is completed in the section, and then continue in the next 5-acre section approved by the DNRC. North Shore would plan to operate generally in a grid pattern, moving from one 5-acre section to an adjacent 5-acre section, unless prior log mapping activities have shown that the number of logs in the adjacent 5-acre section is not sufficient to make recovery efforts worthwhile in the particular section. In an attempt to minimize recreational conflicts North Shore would be willing to conduct salvage operations in a 5-acre section not contiguous with the grid pattern.

The surface area covered by a 5-acre section is an area approximately 466 ft. x 466 ft. North Shore would identify each 5-acre working section with GPS coordinates and report it to the designated contact person at the DNRC when approval is sought to move log recovery activities to another section. Before completing log recovery activities in any section, North Shore would report to the DNRC the next 5-acre section where North Shore plans to continue its log removal activities.

Operating Season

North Shore would plan on conducting log salvage operations from approximately March through December. During the summer months North Shore would adopt a flexible schedule of when they are operating and where in an attempt to minimize recreational conflicts.

Log Salvage Rates

North Shore estimates that it would initially salvage 20-30 logs a day. Once log salvage operations are refined and perfected the log salvage rate could peak at 50 logs a day. On average North Shore would salvage 400-800 logs a month or approximately 3000-5600 logs during the operating season.

Log Recovery Process

North Shore would plan to use two divers, a dive boat, and a specially designed log hauling pontoon boat. On each boat North Shore plans to use two people assisting the divers and helping secure the logs to the pontoon boats.

The 5-acre section in which log removal activities are being undertaken would be identified using GPS coordinates and marked with buoys and dive flags to show that diving is taking place within the section. Search lanes would be set up in the 5-acre retrieval area. The search lanes would initially be set up by using a floating line with a small weight approximately every 15 feet, allowing the divers to see the line as they perform the search. The search lines would be in a reel, and the boat would lay the line out from the reel for the length of the area to be searched. Several lanes approximately 25 feet apart would be laid out for the divers to search. Divers would start at one end of the search lane and zig-zag back and forth through the lane along the entire length attaching markers with lift lines or lift bags to the logs that are to be removed.

New technologies are expected to be released in the summer of 2010 that would allow the divers to use surface GPS that "ping" each diver's location within 3 meters of the diver. It is hoped that this would allow the search lanes to be established without using lines underwater. Because this technology is new and not tested, North Shore anticipates working with the manufacturer in the testing and is hopeful that the technology would be useful and reliable for finding submerged logs that are to be removed.

North Shore would not expect to have the divers attempt to distinguish between species of logs to determine which logs to raise after they are found, but instead would expect the divers to raise whatever logs are found regardless of their species. Likewise, North Shore would not expect its divers to try to distinguish, while diving and raising logs, cut logs which bear the circled "N" end stamp from other cut logs. North Shore would not raise any logs that are obviously rotted or which, for some other reason, do not appear to be salvageable. Likewise, North Shore would not raise any logs that appear to be naturally occurring or do not have cut ends.

Log Extraction Process

When logs are found, North Shore would expect to raise the logs using several methods. First, a line would be attached to the log by a diver. This would be accomplished by fishing a line under the log by hand and tying it to the log, but if it is not possible to run a line under the log by hand, the line would be attached to a curved firm tube that would slide under the log so that the line can be pulled around the log and then tied. The line may also be attached to a log by using fasteners such as eyebolts, lag screws, or hooks that would first be hammered into or screwed into the log as an attachment point to which the line can be tied. Once a line is secured to a log, the log would be raised to the surface using either lift bags or winches.

Lift bag method. If the lift bag method is used, the diver would carry lift bags that would be attached to the line on the log, and the lift bag (or multiple lift bags, depending on the size of the log) would be filled with air by the diver and would then become buoyant, which would pull the log to the surface. An air supply source would be carried by the diver to fill the lift bags. Once the lift bag reaches the surface, workers on the boat would retrieve the lift bag with the line attached to the log, and secure the log to the pontoon boat to take to the extraction point.

Boat winch method. If winches are used to raise the logs, the diver would secure either a small lift bag or a small surface float/marker to the line attached to the log, which would float up to the surface and

carry the line to the surface. Once the line is brought to the surface, workers on the boat would retrieve the lift bag or surface float/marker with the line attached to it and then attach the line to a winch, which would be used to winch the log to the surface where it would be secured to the pontoon boat to take to the extraction point.

Another possible method of raising logs follows the same general principles, but would use log tongs. The log tongs can either be lowered to a diver using a winch system, or brought down by a diver, with a line attached. The diver would manually attach the log tongs to a log, and once the grip is secure, the log can be raised to the surface using a winch or lift bags as described above.

Surface Operation

When logs are brought to the surface they would either have an eye bolt on the end or a rope secured to the end of the log. When the log is at the surface the end of the log would be secured to the boat using the eyebolt or the rope. A weighted rope would be lowered down the side log or logs and used to winch the lower end of the log to the surface. Several logs could be secured between the pontoons of the boat allowing the boat to securely take the logs to the extraction point. This method would allow the boat to be pulled over the top of the trailer at the extraction point and the logs attached to the trailer and un-attached from the boat. When longer distances are required to take the logs to an extraction point additional logs would be securely attached to the outside of the boat using the same method by attaching them to braces on the boat which would reduce the amount of trips needed to transport logs to the extraction site.

Extraction Points

FWP has given permission to remove the original 200 logs (extracted and staged for removal under the 2005 permit that was granted to North Shore by the DEQ) using the Somers Bay boat launch site. North Shore has applied for a restricted commercial use permit to use the boat launch site at different times throughout 2010. Flathead County has given verbal approval to use the Flathead County boat launch in Lakeside and is in the process of preparing a commercial use permit. North Shore has had discussions with the North Flathead Lake Yacht Club, the Oshansey family and other private landowners regarding the possible use of their private properties as additional extraction points.

Extraction Process

When the logs are brought to either the Somers Bay boat launch site or the Flathead County boat launch site in Lakeside, North Shore anticipates that the logs would be removed using trailers similar to boat trailers. It is anticipated that other methods of extraction besides “trailering” could be used. It could be possible in the future to utilize a small barge to load the logs directly from the lake to the barge’s deck and then transport the logs to a boat launch or dock where they could be loaded with a self loading log truck.

Trailering

The log hauling boat would be driven onto a trailer, where the logs would be secured to the trailer and released from the boat. For example, a line would be attached from the trailer to an eyebolt on the log and the line attaching the log to the boat would be released and clipped back to the boat. The boat would back up from the trailer and the trailer (with the logs secured on it) would pull the logs out of the water and haul the logs to the staging area. The time at the loading ramp is anticipated to be similar to the time it takes to load a boat onto a trailer, secure it, and pull it out. North Shore divers base their estimates of unloading time on their practicing the loading process in other waters and witnessing a similar submerged log salvage operation that has been active for several years in Lake Pend Oreille, in Northern Idaho. . For a depiction of the process, you can view a video online at **http://www.youtube.com/watch?v=NV3hdjjQixw**.

Staging Area

The staging area would be located on property owned by Montana Log Homes at 3250 U.S. Highway 93 South, approximately 6 miles north of Somers Bay. After the trailers arrive at the staging area the logs would be taken off of the trailers by a track hoe or self-loading logging truck. The logs would then be sorted based on whether the log is branded with a circled "N" stamp or not. Further sorting by species is anticipated. Logs without a circled "N" stamp would be scaled at the staging area. NMI has developed proprietary software that is a modified Excel spreadsheet that accounts for all income generated from the sale of forest products. Money generated from the sale of non-branded logs would be retained in a trust account set up with Sterling Bank. NMI would mail out a bi-monthly project accounting statement to the DNRC that itemizes the trust accounts balance and any activity.

PROJECT DESIGN MEASURES TO REDUCE IMPACTS

Turbidity Minimization

- Salvage operations would be restricted or halted if adverse weather conditions such as storms, freezing weather, or other conditions might cause accelerated water turbidity, erosion, or any other condition which may have an adverse effect on State land or resources.
- Dredging, or use a scraper, bulldozer, front-end loader, backhoe, or hydraulic shovel to remove sediments would be prohibited.
- Divers would brush off sediment when they locate salvageable logs and as the logs are prepared for lifting. Based on observations by divers, there is normally only a thin film of sediment, at most, on the submerged logs on the lake bottom. Brushing off that film of sediment near the lake bottom (within approximately two feet) would allow the sediment to settle quickly and in the same area as the salvaged log.
- Divers would attempt not to stand or walk on the lake bottom to minimize sediment disturbance and restricted sight distance.
- The logs would be lifted straight to the surface to reduce any dispersal of silt during the lifting process.

- North Shore would collect water quality samples and real-time turbidity monitoring will be conducted using a portable hand-held turbidimeter with an immersible probe that can be lowered to the desired depths correlating to sampling.

Environmental Protection

- No log removal activities would take place within 1,000 feet of Somers Bay EPA Superfund site—twice the buffer recommended by DEQ and EPA.
- Log removal and loading would take place only at developed boat launches so as to minimize disturbance to the lake shoreline.
- No removal activities would take place within approximately 1000 feet of the north end of Flathead Lake, in the Flathead Waterfowl Production Area, or on the shoreline of Flathead Lake. The actual buffer distance would be established based on the location of the low water mark of Flathead Lake. No logs would be removed from the upslope towards the low water mark.
- Any boat or equipment that would be used in the lake would be cleaned in accordance with state law, including the Aquatic Nuisance Plan. FWP has facilitated the development of the Montana Zebra Mussel Working Group to prevent the spread of unwanted organisms.
- Boats would utilize four-stroke motors to prevent ejection of oil into the water.
- Each boat would be equipped with oil absorbent in the unlikely event oil or fuel is accidentally spilled into the water.
- North Shore would not be working above the high water mark of the lake, except at the designated boat launches. If a log were to fall off the trailer and disturb mineral soil, North Shore would reseed with a native grass/forb mix. North Shore would also monitor for noxious weeds and develop a noxious weed mitigation plan.
- North Shore with oversight from the DNRC and DEQ will implement a proposed monitoring plan (see Appendix) to determine how long and what changes in water quality occur in the local vicinity of the log salvage operation.

Reducing Recreation Conflicts

- Active areas would be well marked with buoys and flags and limited in size to one 5-acre parcel (approximately 466 ft. x 466 ft.) at a time. The actual area marked with buoys and flags would between 1 and 2 acres.
- North Shore would create a public information board in coordination with FWP's Jerry Sawyer. The sign would identify the submerged logs retrieval sites with images of the dive boat, log extraction methods, and the highly visible buoys and dive flags that would be used to delineate

the active log salvage area. The display board would include the current location of the log removal activities.

- North Shore would not conduct any salvage operations on evenings when the North Flathead Lake Yacht Club holds their sailboat races. North Shore would also not conduct salvage operations during the Montana Cup sail boat races July 30-August 1 2010.

- North Shore would plan to use public boat ramps during off peak hours whenever possible.
- North Shore recognizes that recreation users have the priority and right away in using the public boat ramp and the waters within Somers Bay.
- Submerged logs lying near the surface that pose a hazard to boaters and recreationists would be removed.

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing environment and potential impacts to resources resulting from the salvage of submerged logs presently lying on the State-owned lake bed in the northern portion of Flathead Lake.

LAKE BED SEDIMENTS AND WATER QUALITY

Submerged log salvage would result in temporary disturbance of the lake bed that is comprised primarily of fine-grained sediments within the proposed project area, potentially resulting in temporary direct impacts to water quality. The analysis of lake bed sediments and water quality has been combined because of the interactive relationship between the two resources.

Affected Environment

Lake Bed Sediments

The Flathead River is the major sediment source for the lake. It annually contributes bedload sediment to an active delta proximal to the river's mouth, and the bulk of suspended sediment further into deeper portions of the lake. The active and inactive delta complex covers approximately 20 square kilometers of the lake's north end. Active sediment deposition and suspension occurs primarily during spring runoff in late April to early June.

Prior to 1938 and the construction of Kerr Dam, lake levels responded to yearly runoff, staying low during most of the year and then rising briefly during the spring runoff. The delta plain formed a large vegetated lobe extending into the lake. In 1939 the processes affecting the delta changed drastically. Since that time, artificially high lake levels have allowed storm waves to erode the delta plain, resulting in loss of historic habitat, and increased contributions to suspended sediment.

The particle size of lake bed sediments in the Somers Bay area of Flathead Lake has been characterized by Moore et al. (1982). The mean percent by weight consists of 60.2 percent clay-sized particles and 36.8 percent silt-sized particles. Using the mid point of the particle diameter range for each fraction (2.1 µm for clay and 33 µm for silt), the average particle diameter in surface sediments is estimated to be 14 µm. Recent investigation by North Shore divers has shown that the depth of the sediment layer deposited on the surface of the logs targeted for salvage is approximately 1/8 inch.

Somers Bay BNSF Site

The Burlington Northern Santa Fe Railway Company ("BNSF") operated a railroad tie treating facility in Somers immediately adjacent to Flathead Lake between 1901 and 1986. See Map1 Somers Bay EPA Superfund Site in the appendix. Various preservatives were used at the approximate 80 acre site throughout the history of its operation, including zinc chloride (1901 to 1943), chromated zinc chloride (1940 to 1943), and creosote/petroleum preservative mixtures (1927 to 1986). The Montana Department of Health and Environmental Science ("DHES"; currently DEQ and U.S. Environmental Protection Agency (EPA)) conducted several phases of investigation and remediation at the site beginning in the early 1980's and continuing through the present under the authorities of the Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response Compensation and Liability Act (CERCLA). Both heavy metals and polycyclic aromatic hydrocarbons (PAHs) were identified as the primary contaminants of concern.

Montana DEQ and EPA primarily targeted on-site soil and groundwater impacts for remediation beginning in 1993 through soil removal and a combination of in-situ and groundwater extraction/treatment techniques. Groundwater treatment systems were turned off in 2009 for an agreed-to interim period of two years. The site is currently in its second year of dormancy with on-going monitoring to determine the next phase of remediation, if necessary.

Of relevance to North Shore's proposed submerged log salvage project are the findings of several surface water quality and lake sediment sampling events conducted in areas of Flathead Lake proximal to the former tie-treating facility during the period 1985 through 1988. Review of those studies identified the Remedial Investigation (ERT, 1986) as most pertinent to the proposed project. A summary of data and information reviewed from those documents follows:

- *Surface water quality.* October 1985 sampling indicated that with the exception of zinc, concentrations of heavy metals (arsenic, chromium, copper, lead, and selenium) were all below laboratory method detection limits. Zinc concentrations ranged from 0.014 milligrams per liter (mg/L) to 0.021 mg/L, which is far below the DEQ human health standard of 2.0 mg/L. With the exception of acenaphthylene, fluorene, and benz(a)pyrene, all other polycyclic aromatic hydrocarbon ("PAH") concentrations were below laboratory method detection limits. Concentrations of these three constituents were reported in parts per trillion and fall well below respective DEQ human health standards.

- *Lake bottom sediment quality.* October 1985 sampling indicated that with the exception of zinc, other heavy metal concentrations were near or below background concentrations. Zinc concentrations ranged from 47µg/g to 79µg/g; background is considered to be 50µg/g. PAH concentrations were not found to be above detection limits in any of the sediments sampled.

- *Lake beach sediment quality.* During a beach sediment investigation conducted during April 1986, visual creosote impacts were noted in samples collected from borings along the rip-rap beach wall, and at the western edge of the Waterfowl Production Area – no laboratory analysis data was available. In addition, approximately 40 cubic yards of visually contaminated beach sediment was removed from this area during April 1988.

Finally, the mobility of the subject contaminants resulting from the tie-treatment with creosote at the former BNSF site was evaluated to determine the potential for migration over the time period since last documented in the mid-1980's. Available research using treated ties indicate that creosote does leach out its constituents (primarily PAHs as discussed above), the leaching process is acute at the start and tapers off with time, and migration is limited to very short distances-maximum up to 10 meters horizontally, and not more than 60 cm vertically. Data on the migration into soils and water are contradictory, but the majority of the data indicate the migration process is limited with biodegradation process under aerobic conditions rapid (Brooks, 2004).

Water Quality

Flathead Lake is classified as an A-1 surface water (ARM 17.30.608). Under this classification, no increases are allowed above naturally occurring concentrations of sediment or suspended sediment (except as permitted in MCA 75-5-318), settleable solids, oils, or floating solids which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife (ARM 17.30.622). In addition, under Section 303(d) of the Federal Clean Water Act and Montana Water Quality Act (Chapter 75, Part 5) regarding Total Maximum Daily Loads (TMDL) Flathead Lake is listed as impaired for the beneficial use of aquatic life support. Contaminants addressed under the 303(d) listing include the following: mercury, nitrogen (total), phosphorus (total), polychlorinated biphenyls, and sedimentation/siltation.

Within the context of the proposed Project and of relevance to the A-1 classification and 303(d) listing, are potential impacts to water quality from re-suspension of lakebed sediment, and potential release of dissolved concentrations of phosphorus. In addition, public and agency scoping for the proposed Project identified these two contaminants as those of concern with regard to water quality.

The project team evaluated existing yet limited total suspended solids (TSS) information and data that has been collected as part of previous investigations and is directly related to sedimentation/siltation (i.e., turbidity) in Flathead Lake. Ellis et al. (2000) conducted water quality monitoring in Flathead Lake during spring runoff (April through July), collecting TSS data at multiple depths at one mid-lake station. The minimum and maximum TSS concentrations (milligrams per liter – mg/L) at each depth reported by Ellis et al. (2000) are provided below:

- 0 to 30 meters - <0.5 and 0.7;
- 5 meters - <0.5 and 1.5; and
- 90 meters - <0.5 and 0.5.

TSS data (mg/L) collected at this same station by the Flathead Lake Biological Station over a 20-year period extending from 1988 to 2007 are summarized below (FLBS, 2010):

- 0 to 30 meters – 0.5 to 1.5; and
- 5 meters – 0.5 to 14 (The maximum concentration occurred once during the 1988 field season. The majority of TSS concentrations were below 2 mg/L.);

These data indicate that TSS concentrations in Flathead Lake generally range from 0.5 to 1.5 mg/L, and occasional excursions to higher concentrations likely occur during spring runoff when TSS concentrations would be expected to be at their maximum. The Nutrient Management Plan developed for Flathead Lake infers that sedimentation/siltation effects to the lake primarily result from inflowing streams, and effectively serve as a contributor of adsorbed nutrients, primarily phosphorus (DEQ, 2001)

Related to re-suspension of lakebed sediments during log salvage operations is potential effects to dissolved oxygen ("DO") concentrations and a resulting increase in nutrient concentrations (i.e. phosphorus). Reduced DO levels (e.g., anaerobic conditions) can negatively influence the adsorption of phosphorus on sediments and result in release to the water column. DO levels in the near-shore shallow project area are expected to be at or near saturation levels due to shallow water and atmospheric availability.

Studies of similar aquatic environments indicate that an increased release of phosphorus to the water column may occur with sediment disturbance/resuspension (Smokorowski et al., 1999). Increased nutrient availability may further stimulate or increase phytoplankton growth that typically occurs in a temperate lake as the water column stratifies due to increasing surface water temperatures in the spring. Growth typically occurs in the near-surface zone that also receives sufficient light for plant photosynthesis resulting in an initial increase of chlorophyll α. Increased phytoplankton growth with resulting increased concentration of chlorophyll α can potentially result in decreased available light and dissolved oxygen to aquatic organisms.

Environmental Consequences

No-Action Alternative

Under the no-action alternative no salvage operations would take place. Environmental conditions, as described in the affected environment, would be expected to persist in the existing dynamic state.

Action Alternative

Total Suspended Solids (Turbidity)

Log salvage operations would likely cause a temporary increase in TSS (turbidity) levels in the immediate area of the log removal site resulting from disturbance of lake bed sediments. However, the level of increased sedimentation and dispersal would depend on a variety of factors such as the amount of sediment deposited on the logs, whether the logs are lying directly on the lake bottom or partially submerged, the depth in the water column where the logs are removed, and particle size.

To minimize potential for turbidity, North Shore proposes that the salvage divers would remove (sweep) the bulk of sediment from the logs prior to initiating the lifting operation. Divers would also be careful not to disturb the sediments on the lake bed as it could reduce visibility and slow down the salvage operation In addition, video review, and diver observations also indicate that the logs predominately rest on top of the sediments, and any burial in surrounding sediments is negligible. As a result, the bulk of the sediment disturbance would occur within approximately 2 feet of the lake bottom before the logs are raised to the surface. Calculations indicate that the time required for clay and silt particles characteristic of lake bed sediments in the project area to be re-deposited is at most approximately 1.9 hours if removed as proposed.

Salvage operations would transport multiple logs during each boat trip to the boat launch off-loading areas. Although turbidity would likely be cumulative in the immediate area of individual removed logs, the settling time indicated above would allow for re-deposition during the period necessary for transport and off-loading, resulting in very minimal cumulative effects from successive loads.

In addition, North Shore would conduct “real-time” turbidity monitoring during initial active salvage operations, implementing a proposed monitoring plan (see appendix) that would collect water samples to determine how long and what changes in water quality occur in the local vicinity of the log salvation operation. The samples would be analyzed at either the lab at the Flathead Lake Biological Station or a private EPA certified lab. As TSS data is collected and analyzed during initial salvage efforts, North Shore would consult with the Flathead Biological Station, Montana DNRC, Montana DEQ, and other appropriate agencies to evaluate and implement modifications to its salvage procedures as warranted. These modifications could include frequency of logs salvaged and numbers, actual lifting techniques, transport techniques and numbers, and consideration of any seasonal variations in baseline conditions.

Heavy Metals and PAH Contaminants (Somers Bay BNSF Site)

In consideration of contaminants found in the lake beach sediments resulting from the former Somers Bay BNSF Site, DEQ and EPA personnel have indicated through recent correspondence to NMI that a 500 foot buffer zone extending from the high-water mark along the rip-rapped area of shoreline where beach sediment impacts were identified should become a condition of North Shore’s Land Use Permit. In response, North Shore has proposed a buffer zone of 1,000 feet in that area that combined with its evaluation of contaminant occurrence and mobility (see Chapter 3, Somers Bay BNSF) eliminates any associated risk to water quality. Map 1, Somers Bay BNSF Site found in the appendix depicts the proposed 1000-foot buffer.

Dissolved Oxygen and Nutrients

As previously discussed, North Shore's log salvage operation, with its anticipated yet very localized disturbance of lake bed sediments, has potential to increase nutrient loads, primarily phosphorus, to the water column. Impacts (*i.e.*, increased phytoplankton growth and biomass) from any increase in nutrient loads would depend on several factors, including available phosphorus in sediment porewater, the time of year, and corresponding water column stratification, DO saturation, and light levels as affected by turbidity.

North Shore will implement the proposed monitoring plan that would include real-time turbidity monitoring as well as collecting water samples before, during and after log salvage operations. Water samples would be analyzed for phosphorous, dissolved nitrogen and heavy metals amongst other parameters. If a marked increase in selected monitoring and sampling parameters occurs above baseline conditions, North Shore would consult with the Flathead Biological Station, DNRC, DEQ, and other agencies to make appropriate modifications to its salvage procedures, and/or implement further mitigation measures.

It is anticipated that the impact on water quality due to the project would be temporary, geographically limited to the location of log removal, and mitigated by removing the sediment near the lake bottom. Given the naturally occurring fluctuations in suspended sediments resulting from spring runoff, the log removal process used for the proposed project would have a minimal impact on water quality.

AIR

Affected Environment

The airshed in the Flathead Lake/Somers Bay area is of excellent quality. It is not included in the Kalispell air quality non-attainment area for PM-10 (particulates 10 micrometers or less).

Environmental Consequences

No-Action Alternative

Under the no-action alternative no salvage operations would take place. Environmental conditions, as described in the affected environment, would be expected to persist in the existing dynamic state.

Action Alternative

The boat engines and other vehicles used in the raising and transporting of the logs may create minor and temporary emissions within lawful levels. Road dust and other air-borne particulates would not be produced as the removal would occur over water and the hauling would occur on paved surfaces. Four-stroke engines would be used by the dive boat and pontoon boat to prevent additional smoke when starting or idling the boats engine. The proposed action would not create any additional objectionable odors, or alter air movement, moisture or temperature patterns, either locally or regionally. Thus, direct, indirect, and cumulative impacts to air quality as a result of the proposed action are expected to be minimal.

VEGETATION/WETLANDS

Affected Environment

The shallows, wetlands and sloughs found along the north shore of Flathead Lake, between Somers and the Flathead River, are maintained as a Waterfowl Production Area administered by the U.S. Fish and Wildlife Service. The existing native vegetation along the North Shore includes cottonwood, ponderosa pine, birch, willow, and red-osier dogwood mixed with cattail/reed canary grass marshes, temporary wetlands, and small emergent pools. Along the east and west shores ponderosa pine and Douglas-fir grow in close proximity to the water along with willows and dogwoods.

Environmental Consequences

No-Action Alternative

Under the no-action alternative no log salvage operations would take place. Environmental conditions, as described in the affected environment, would be expected to persist in the existing dynamic state.

Action Alternative

Log salvage operations would not take place adjacent to any existing vegetation. Anticipated extraction points are either paved boat ramps or graveled ramps. North Shore would follow all guidelines for preventing the spread of aquatic nuisance plants. All boating and diving equipment would be washed and dried prior to entering the project area. Thus, direct, indirect, and cumulative impacts to vegetation and wetlands as a result of the proposed action are expected to be minimal.

FISHERIES/AQUATIC RESOURCES

Affected Environment

Flathead Lake is the largest natural freshwater lake in the United States west of the Mississippi River. Flathead Lake has a surface area of 122,885 acres and measures 27 miles long and 8 to 15 miles wide, with 160 miles of shoreline. The lake averages 153 feet deep, and is 371 feet deep at its deepest point. The lake's major tributaries are the Flathead and Swan Rivers, which provide 85 and 10 percent of the annual water to Flathead Lake, respectively. Approximately 65 percent of the annual inflows to Flathead Lake occur between May 15 and June 10 as a result of snowmelt from the surrounding mountains. Flathead Lake is considered oligotrophic (*i.e.,* oligotrophic means being deficient in plant life or algae) and monomictic (*i.e.,* one mixing period). Flathead Lake is listed on the 1996 and 2000 Montana 303(d) lists as impaired for the beneficial use of aquatic life support, with probable causes being related to nutrients (i.e., nutrients, noxious aquatic plants, organic enrichment/low DO, and algal growth/chlorophyll) (Montana DEQ 2001).

Eighteen fish species are known to occur in Flathead Lake including the following: bull trout (*Salvelinus confluentus*), lake trout (*Salvelinus namaycush*), westslope cutthroat trout (*Oncorhynchus clarki lewisi*), rainbow trout (*Oncorhynchus mykiss*), lake whitefish (*Coregonus clupeaformis*), mountain whitefish

(*Prosopium williamsoni*), pygmy whitefish (*Prosopium coulterii*), largemouth bass (*Micropterus salmoides*), longnose sucker (*Catostomus catostomus*), largescale sucker (*Catostomus macrocheilus*), northern pike (*Esox lucius*), northern pikeminnow (*Ptychocheilus oregonensis*), black bullhead (*Ameiurus melas*), brook stickleback (*Culaea inconstans*), yellow perch (*Perca flavescens*), redside shiner (*Richardsonius balteatus*), pumpkinseed (*Lepomis gibbosus*), and peamouth (*Mylocheilus caurinus*) (Montana Fisheries Information System [MFISH] 2010). Nine of the eighteen fish species have been introduced to Flathead Lake including lake trout, rainbow trout, lake whitefish, largemouth bass, northern pike, yellow perch, pumpkinseed, brook stickleback and black bullhead.

Gill netting efforts conducted on Flathead Lake by MFWP between 1996 and 2005 show that the fish population is dominated by lake whitefish, northern pikeminnow, and peamouth. Yellow perch, lake trout and westslope cutthroat trout made up the majority of the remaining fish netted (Weaver et al. 2006).

The bull trout and westslope cutthroat trout populations in Flathead Lake have an adfluvial life history, meaning that they reside in the lake most of the year but migrate up the Flathead River, Swan River and their tributaries to spawn. The remaining 15 fish species are considered resident fish that spend their entire life in Flathead Lake.

Bull trout and westslope cutthroat trout are considered species of concern by the State of Montana, and the bull trout is listed as a threatened species by the U.S. Fish & Wildlife Service (USFWS) under the federal Endangered Species Act (ESA). Section 9 of the ESA prohibits take (*i.e.,* harm, harass, kill) of threatened or endangered species such as the bull trout, and prohibits adverse modification of designated critical habitat. On January 14, 2010, the USFWS proposed to revise the designation of critical habitat for bull trout under the Endangered Species Act of 1973, to include Flathead Lake as well as numerous other bull trout waters in Montana (Federal Register 2010). This is a proposed revision to the September 2005 bull trout critical habitat designation that did not include Flathead Lake. Further discussion relative to bull and cutthroat trout follows.

Bull Trout

The bull trout is ranked globally as G3 (globally the species is considered potentially at risk because of limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas), and is ranked by the state of Montana as S2 (at risk because of very limited and/or declining numbers, range, and/or habitat, making it vulnerable to global extinction or extirpation in the state) (MNHP 2010).

In June 2000, the State of Montana released the *Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin*, Montana (Montana Bull Trout Restoration Team (MBTRT) 2000). The purpose of the restoration plan is to provide the framework for a strategy to reverse or halt the decline of bull trout populations in western Montana, and restore populations in areas where they have declined. The plan provides general guidance for conservation and protection of those populations that are stable or increasing, as well as recommendations to restore populations that have declined. Within the plan are designated “restoration/conservation areas” (RCAs), one of which includes much of the

Flathead system (Flathead Lake, Middle and North Forks Flathead River, South Fork Flathead River above Hungry Horse Dam).

Additionally, within each RCA, core areas have been identified for bull trout. Core areas are watersheds, including tributary drainages and adjoining uplands, used by migratory bull trout for spawning and early rearing, and by resident bull trout for all life history requirements. Core areas typically support the strongest remaining populations of spawning and early rearing bull trout in a restoration/conservation area, and are usually in relatively undisturbed habitat. Nodal habitats are those used by sub-adult and adult bull trout as migratory corridors, rearing areas, overwintering areas, and for other critical life history requirements. Flathead Lake is classified as such a nodal area (MBTST 2000).

Within the Flathead Lake, North, and Middle Fork RCA, risk factors to bull trout have been identified and include: illegal introductions, fisheries management, upland forestry practices, population trend, and abundance. Restoration goals identified for the Flathead RCA include:

- Maintain or restore self-sustaining populations in the core areas;
- Protect the integrity of the population genetic structure; and,
- Enhance the migratory component of the population.

Lakes and reservoirs are important to adfluvial bull trout populations. In six of the 12 bull trout restoration/conservation areas (Flathead, Swan, South Fork Flathead, Upper Kootenai, Lower Kootenai, and Lower Clark Fork), large bodies of standing water form the primary habitat for rearing of subadult migratory bull trout and provide food and cover for fish to achieve rapid growth and maturation. Despite the importance of lakes and reservoirs, very limited information is available range-wide on habitat use by bull trout in these waters. In general, bull trout appear to be bottom oriented in lakes, but use relatively shallow zones (less than 40 m; 130 ft), provided water temperatures there are less than 15 degrees C (59 degrees F). During summer, bull trout appear to primarily occupy the upper hypolimnion of deep lakes, but forage opportunistically in shallower waters. River/lake transition zones appear to be particularly important habitats. Introduced species, especially lake trout and mysis shrimp (*Mysis relicta*) in combination, have been implicated in drastically altering the food web where they occur, which has led to declines or extinction of bull trout in many lakes. Although poorly understood at this time, habitat conditions in lakes and reservoirs are potentially critical to persistence of migratory bull trout populations and require additional investigation (Montana AFS 2008).

Declines in bull trout abundance and distribution have been caused by habitat loss and degradation from land and water management practices; population isolation and fragmentation from dams and other barriers; competition, predation and hybridization with introduced non-native fish species (lake trout, northern pike, brook trout, and others); historical overharvest; and poaching. Although their numbers and distribution have declined from historical levels, bull trout populations exhibiting resident and migratory life histories can be found throughout their historic range in Montana (MFWP 2010b).

Bull Trout Status in Project Area

Gill netting data collected at various locations throughout Flathead Lake show an overall decreasing trend in bull trout numbers over time. In 1981 and 1983, bull trout comprised 10 and 13 percent of fish caught; however, since 1999, bull trout comprised only 0.4 to 2.5 percent of fish caught. The number of bull trout caught per net has dropped from 2.6 and 1.6 fish per net in 1981 and 1983 to a range of 0.1 to 0.5 fish per net since 2000 (Weaver et al. 2006).

Three long-term spring gill netting locations are within the proposed project area. The survey locations are Point Caroline, immediately east and outside of Somers Bay, and in the bay just south of Wayfarers State Park in Bigfork. Between 1995 and 2009, the spring gill net surveys conducted for bull trout in the project area show a range of 0.17 to 1.33 fish per sinking net and from 0 to 1.17 fish per floating net at the three locations combined (pers.comm Deleray 2010).

The MFWP fisheries biologist considers Somers Bay to be one of the most important areas for bull trout in Flathead Lake with extensive use by both sub-adult and adult fish. Bull trout reside in the proposed project area year round and are known to stage in large numbers in the proposed project area prior to their spawning runs to upstream habitats in the Flathead drainage. Pre-spawning adult bull trout congregate in between April and July and begin to run upstream to the mouths of spawning streams as early as April. Based on spring gill netting data from 2000-2009, of the 154 total bull trout caught in gill nets on Flathead Lake 82 (53%) were caught in Somers Bay. Somers Bay provides suitable shallow shoreline habitat for many of the forage fish (minnows, suckers, mountain whitefish, etc.) that sub-adult and adult bull trout are dependent on for food. The MFWP fisheries biologist did not speculate on the significance or value of the logs as habitat for bull trout or their prey base as no studies have been conducted, but the likelihood that some of the logs provide value as habitat in the area certainly exists. The eastern shoreline of the lake is not as valuable habitat as the northern and northwestern shorelines due to the steep topography and deeper water depths which limits foraging by fish (pers. Comm. Deleray).

Westslope Cutthroat Trout

Westslope cutthroat trout are ranked globally as G4T3 (globally the species is considered uncommon but not rare [although it may be rare in parts of its range], and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern) (T3 means the subspecies or population is considered potentially at risk because of limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas), and is ranked by the state of Montana as S2 (MNHP 2010). The westslope cutthroat trout is one of two subspecies of native cutthroat found in the state. Together, they have been designated Montana's state fish. The westslope cutthroat's historic range included all of Montana west of the Continental Divide as well as portions of the upper Missouri River drainage (MFWP 2010b).

Westslope cutthroat trout have three possible life forms, adfluvial (migrates to lakes), fluvial (migrates to rivers) or resident (stays in streams). All three life forms spawn in tributary streams in the springtime when water temperature is about 10 degrees Celsius and flows are high. While resident fish spend their

entire life in tributary streams, migratory life forms can travel several hundred kilometers as they move between adult and spawning habitat (MFWP 2010b).

Westslope cutthroat are common in both headwaters lake and stream environments. Cutthroat trout spawn between March and July depending on elevation, with the first year of spawning occurring at 4 to 5 years of age (Natureserve 2010). The eggs hatch in a few weeks to a couple of months. The newborn fry frequently migrate back to lakes to rear after 1 to 4 years in their native stream (MFWP 2010b). The average size of these fish is 6 to 16 inches, depending on habitat, but they rarely exceed 18 inches in length. The diet of cutthroat trout consists mainly of aquatic and terrestrial insects and zooplankton, they consume very few fish (Natureserve 2010).

This fish has been seriously reduced in its range by two primary factors: hybridization with rainbow and/or Yellowstone cutthroat, and habitat loss and degradation (MFWP 2010b). In addition, lake trout are known to be effective predators on cutthroat trout, and lake whitefish have also caused cutthroat trout declines through competitive interactions (Natureserve 2010).

In 2007, MFWP facilitated preparation of the *Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana* (MFWP 2007). Many state, local, and federal agencies; non-governmental organizations, and Montana tribes are signatories to the Memorandum/Agreement, including Montana DNRC. The Memorandum/Agreement's overarching goals for cutthroat trout in Montana are to: 1) ensure the long-term, self-sustaining persistence of each subspecies distributed across their historical ranges as identified in recent status reviews, 2) maintain the genetic integrity and diversity of non-introgressed populations, as well as the diversity of life histories, represented by remaining cutthroat trout populations, and 3) protect the ecological, recreational, and economic values associated with each subspecies (MFWP 2007). As the Agreement puts in place a primarily conservation-based program, its applicability to actions such as that being analyzed in this document are focused on any opportunities to conserve and/or maintain cutthroat trout in the vicinity of the project area.

Westslope Cutthroat Status in Project Area

Gill netting data collected at various locations throughout Flathead Lake show an overall decreasing trend over time. In the early 1980s, westslope cutthroat trout made up 20 to 40 percent of the catch while in recent years less than 20 percent. Compared to the early 1980's with a catch per unit effort of two to three fish per net, in recent years the catch has ranged from 0.5 to 1.6 fish per net. From the 1990's to the 2000's there has been a slight increasing trend for westslope cutthroat trout with four of the six years between 2000 to 2005 showing a catch rate of 1.0 fish per net or greater (Weaver et al. 2006).

Three long-term spring gill netting locations are within the proposed project area. The survey locations are Point Caroline, immediately east and outside of Somers Bay, and in the bay just south of Wayfarers State Park in Bigfork. Between 1995 and 2009, the spring gill net surveys conducted for westslope cutthroat trout in the proposed project area show a range of 0 to 2.2 fish per floating net at the three locations combined (Deleray 2010).

Westslope cutthroat trout reside in the proposed project area year round and are known to stage in large numbers at the mouth of Flathead River prior to their spring spawning runs to upstream habitats. Westslope cutthroat also use the east side of the lake near Bigfork (Deleray 2010).

Fisheries and Aquatic Habitat

Water depths in the Somers and Kalispell bay areas are fairly shallow with the majority ranging from 20 to 60 feet with one deep pocket just west of the mouth of the Flathead River that is approximately 100 feet deep. On the east side of the proposed project area near Bigfork water depths range from 20 to 160 feet with tight contours indicating steep drops in elevation over short distances. From the available information (e.g., diver observation, underwater video) on the substrate in the proposed project area it appears that the majority is composed of fine sediment (silt/sand) with little vegetation. Underwater images of the proposed project area showed primarily individual logs covered in fine silt and scattered over the flat lake bottom. Estimated density of these logs is approximately 30-50 logs per acre. Structure provided by the logs likely adds some local diversity to fisheries and aquatic habitat, though the actual value of this structure habitat is difficult to ascertain. Several studies have been completed that document the importance of woody debris in aquatic systems including its value as cover/shelter for aquatic species and bank/shoreline stabilizing material, etc. The bulk of these studies however, were focused on riverine and stream habitat provided by woody debris (Fausch and Northcote 1991, Beechie and Sibley 1997, Christensen et. Al. 1996) In these studies, it was found that pool formation, bank stability, and hiding cover were the most important attributes in providing habitat for certain fish species. The primary value of woody debris in lake environments were related to near shore (littoral zone) habitat that can provide shoreline erosion protection and clusters of wood as well as complex branching that provides horizontal and vertical structure for hiding, sheltering, and additionally, substrate for zooplankton growth. In comparison to natural recruitment trees (which would not be disturbed) that have branches and/or root wads which increase their structural diversity and provide cover habitat, these pre-cut logs are linear and most lie directly on the lake bed.

Other Aquatic Species

The zooplankton community in Flathead Lake is comprised of two cladocerans, *Daphnia longiremis* and *Leptodora kindtii*. A study from the late 1990's, showed the zooplankton community had stabilized with a shift from dominance by large cladocerans to small cladocerans, copepods, and rotifers (Stanford et al. 1997). Aquatic invertebrates known to occur in the lake and potentially in the project area include mayflies, midges, crayfish, snails, and mussels.

Environmental Consequences

No Action

Under the No Action Alternative, Project activities would not occur. Fisheries and aquatic habitat in the Project Area would remain unchanged from what is currently present. No project-associated impacts to aquatic resources would occur.

Action Alternative

Potential environmental impacts associated with the action alternative would include minor habitat modification in those portions of the project area where salvage occurs, short-term displacement of fish in the immediate vicinity of ongoing salvage operations, and short-term sediment suspension in the immediate vicinity (and dispersal envelope) of ongoing and recent salvage operations. The majority of the submerged logs are lying directly on the lakebed. A more in-depth discussion of these potential impacts to fisheries and water quality is provided below.

Habitat Modification

Habitat impacts associated with the project would include a reduction in log density in areas selected for salvage, with a corresponding reduction in available "structure" habitat. As stated earlier, it is understood that most of the merchantable logs that would be salvaged are lying individually scattered on the bed of the lake, and therefore providing only horizontal "structure" as potential habitat. While these logs may likely provide some habitat for aquatic species, the diversity provided by the logs is considered relatively low, and the impact associated with the removal of the logs is considered minor. Likewise, North Shore would not remove any logs within 1,000 feet of the north shore and on the upslope of the low water mark on Flathead Lake. These logs would continue to contribute to near shore habitat for fisheries and aquatic organisms within the project area.

Throughout the license period, we expect a maximum of approximately 5,000 logs per year would be removed over the entire project area, resulting in a corresponding reduction of potential habitat in the project area. As stated earlier, no "natural" recruitment logs would be removed during salvage operations, and these logs would remain and serve to provide habitat in the future.

Fish Displacement

Salvage operations would include surface and sub-surface activity in the immediate vicinity of salvaged logs. Surface activity would include operation of the dive boat and the pontoon boat. Subsurface activity would consist of two divers swimming along the bottom and conducting associated salvage activities as described in Chapter 2. Because of the nature of the operation, the potential disturbance to and/or displacement of individual fish, would be limited to the general area in the vicinity of the pontoon boat. As logs are salvaged in one location, activities would progress along search lines to the next log or group of logs. Thus, the associated disturbance would progress with the search and salvage operation. It must be noted, as described in the *Proposed Action* section, that salvage operations would take place in specific 5-acre plots or sections of the project area, so the maximum extent of potential disturbance at any one time would be each 5-acre section, though in reality the extent of potential disturbance would be limited to the immediate vicinity of the active salvage operations. No salvage operations would occur at the mouth of the Flathead River.

Additional surface activity associated with the project would be the travel of the pontoon boat from a search section to the unloading area. This activity would be generally comparable to existing recreational boat traffic relative to its potential to displace or otherwise impact fish inhabiting the

immediate area (see *Recreation*). North Shore anticipates salvaging 20-40 logs a day and averaging 400-800 logs per month.

Suspended Sediments

This section describes potential effects of resuspended sediments on fish. Resuspension of bed sediments can result in physical impairment (*e.g.*, gill abrasion, reduced ability to locate prey and avoid predators); elevated nutrient concentrations; and toxicity due to sediment-associated contaminants. See also Lake Bed Sediments and Water Quality above for a discussion of water quality in Flathead Lake.

No sediment quality information was located for the proposed project area. Therefore this analysis will not address potential toxicity associated with sediment resuspension.

A range of studies have illustrated the effects of turbidity levels beyond natural background on the physiology and behavior of salmonids. High concentrations of suspended solids may be fatal to salmonids, while lower concentrations of suspended solids and turbidity may cause chronic sublethal effects such as loss or reduction of foraging capability, reduced growth, reduced resistance to disease, increased stress, and interference with cues necessary for orientation in homing and migration (Bash et al., 2001). Salmonid populations not normally exposed to high concentrations of natural turbidity or exposed to anthropogenic sediment sources may be adversely affected by levels of turbidity considered to be relatively low. Low levels of turbidity appear to correspond to suspended sediment concentrations that may adversely affect coldwater salmonids (Bash et al., 2001).

Suspended sediment effects on salmonids can be grouped into three categories: lethal, sublethal and behavioral (Bash et al., 2001). Lethal effects kill individual fish, cause overall population reductions, and damage the capacity of the system to produce future populations. This category includes reductions caused by sublethal or behavioral effects. Sublethal effects relate to tissue injury or alteration of the physiology of an organism. Effects are chronic in nature and while not leading to immediate death, may produce mortalities and population decline over time. Behavioral effects are described as any effect that results in a change of activity usually associated with an organism in an undisturbed environment. These changes may lead to immediate death or population decline or mortality over time.

While many laboratory studies have demonstrated the effects of suspended sediments on salmonids, the cumulative impact is difficult to capture. Many of the impacts may be synergistic in nature; such that one impact can lead to a host of other impacts that may affect the growth, reproduction, and survival of fish. The following factors mediate effects of suspended sediment on salmonids (Bash et al., 2001):

- Duration of exposure;
- Frequency of exposure;
- Toxicity;
- Temperature;

- Life stage of fish;
- Angularity of particle;
- Size of particle;
- Type of particle;
- Severity/magnitude of pulse;
- Natural background turbidity of area (*e.g.* watershed position, legacy);
- Time of occurrence;
- Other stressors and general condition of biota; and
- Availability of and access to refugia.

Table RES-1 in the appendix summarizes the results of various studies assessing the impacts of suspended sediments on those salmonid species that occur in Flathead Lake. Reduced survival in juvenile rainbow trout has been reported at suspended sediment concentrations as low as 90 mg/L while reduced growth has been reported in the same species at 50 mg/L (Bash et al., 2001). The 96-hour LC_{50} (concentration resulting in mortality in 50 percent of the test population) in juvenile whitefish was reported to be 16,613 mg/L, while that in juvenile rainbow trout was reported to be 19,364 mg/L (Bash et al., 2001).

It is difficult to determine the effect of sediments of various sizes and shapes based on laboratory experimentation owing to the complexity of natural systems. In addition to the character of the material, a number of other factors must be considered in evaluating salmonid response to suspended sediments. These factors include the life history stage, presence of cumulative stressors, availability of refugia that are well distributed, connected, and accessible, condition of biotic community, frequency and magnitude of exposure to suspended sediments, and the physical processes associated with hydrology, sediment input, transport, and storage present in a particular watershed. Past land use practices within a watershed are also of import (Bash et al., 2001).

The log removal activities in connection with the proposed project are likely to result in short-term local turbidity increases in the immediate vicinity of active salvage operations. The elevated turbidity has potential to impact fisheries and aquatic resources through direct exposure, though we anticipate that the level of the actual impact would be minimal for several reasons including:

- the proximity of divers would likely displace any fish in the active salvage area, and thus minimize risk of exposure to the temporarily disturbed sediment;

- the resuspension of sediment is expected to be limited in time and scope (and thus exposure risk), since sediment that is disturbed during salvage operations is expected to return to the lake bed within at most 1.9 hours; and

As discussed in the Lakebed Sediments and Water Quality section above, North Shore would work with scientific experts to develop a monitoring program and, if needed, additional sediment mitigation strategies, which could include modifying: frequency of logs salvaged and numbers, actual lifting

techniques, transport techniques and numbers, and consideration of any seasonal variations in baseline conditions.

WILDLIFE/ THREATENED, ENDANGERED AND SPECIAL STATUS SPECIES

Affected Environment

The shallows, wetlands and seasonal mudflats found along the north shore of Flathead Lake and adjoining uplands support a wide diversity of birds during all seasons, particularly during migration, when the area is heavily used by flocks of waterfowl, waterbirds and shorebirds. Overall a minimum of 229 bird species are known to occur here, and 172 of these are regular, common or abundant seasonally. There are four bald eagle nesting territories within the Flathead Waterfowl Production Area.

Shoreline and offshore habitats are important to overwintering waterfowl and gulls, along with small concentrations of bald eagles. The north shore regularly supports flocks of tens of thousands of mixed waterfowl species during spring migration. Offshore habitats are important during winter when up to 2000 mixed diving ducks and 100-200 tundra swans overwinter there.

There are a variety of shorebirds known to use the area primarily during spring migration. The north shore is also a major staging and roosting area for gulls during spring and fall migration, with upwards of 5,000 gulls a day.

Environmental Consequences

No-Action Alternative

Under the no-action alternative no log salvage operations would take place. Environmental conditions, as described in the affected environment, would be expected to persist in the existing dynamic state.

Action Alternative

Potential environmental impacts with the project in regards to wildlife could be temporary displacement of waterfowl as the dive boat moves across the water within the project area. Foraging and feeding osprey and bald eagles could also be temporarily displaced. Overall the log removal activities are expected to have minimal impact on the above mentioned species. The surface activities of the log removal boats have a comparable impact as a recreational motorized boat. Because the salvage operation is occurring on average 500-1000 feet from the shoreline it is anticipated that there would be little or no disturbance to shorebirds and gulls. North Shore also does not anticipate salvaging logs from late November to early April so there should be no impact to overwintering birds.

NOISE

Affected Environment

Recreational and commercial boat use, Montana Highway 95 and other commercial projects around the north end of Flathead Lake all contribute noise to the project area.

Environmental Consequences

No-Action Alternative

Under the no-action alternative no log salvage operations would take place. Environmental conditions, as described in the affected environment, would be expected to persist in the existing dynamic state.

Action Alternative

Boats and trucks used in the log retrieval operation would create minor temporary engine noise. This noise is not expected to cause an impact as it would not measurably increase existing noise from recreational and commercial uses on the lake. Furthermore, the noise would be temporary, periodic and would occur mostly during daylight hours.

RISK/HEALTH HAZARDS/SAFETY

Affected Environment

Flathead Lake is used by several recreationists and commercial fishing operators all of whom are required to abide by Montana State Boating Laws. These laws contain specific information on the harassment of wildlife, diver down flag warning, required boating equipment and safety tips.

Environmental Consequences

No-Action Alternative

Under the no-action alternative no log salvage operations would take place. Environmental conditions, as described in the affected environment, would be expected to persist in the existing dynamic state.

Action Alternative

Recreational boaters, sailors and anglers would continue to be travel through the project area throughout the operating season. North Shore would conduct salvage operations in 5-acre sections. To minimize safety risks potentially posed by the operations within the active sections, the divers would place fluorescent buoys and dive flags delineating the working perimeter of approximately 1-2 acres in size. Likewise, North Shore would yield to recreational boaters when transporting logs to landing sites. North Shore would adopt a flexible work schedule to minimize conflicts with other users on the lake.

Divers performing the log extraction would be certified at a minimum as a Rescue Diver with specialty training in Search and Recovery, Underwater Navigation, Project Aware, First aid/CPR. It is also expected that all other employees would be first aid/ CPR trained and trained as DAN Oxygen providers. Each transport boat would have a first aid kit on board, marine radios with emergency channel, and a cellular phone. The dive boat would have an oxygen kit with ample O2 to transport the diver to the closest medical facility in the case of a dive emergency, and an emergency plan form would be on board

that would have all contact information for local medical facilities as well as emergency contact information for the closest re-compression chambers. Divers would have communication devices that would allow communication with the boat while underwater. Each diver would carry an alternate air source as well as a dive knife capable of cutting any line that they may become tangled in. Each person on board boats would have a personal flotation device.

Due to safety and operational precautions, direct, indirect, and cumulative impacts to health and safety are expected to be minimal.

COMMUNITY DRINKING WATER

Affected Environment

There are approximately 202 surface water rights within the project area boundaries; however, to the extent that those rights are used for domestic or irrigation purposes, the point of diversion is most likely located within 100-150 feet of the shoreline, with most pumps located even closer (pers. comm. DNRC Water Resources, Kalispell). Aerial photo # 3 Water Rights is located in the appendix.

Environmental Consequences

No-Action Alternative

Under the no-action alternative no log salvage operations would take place. Environmental conditions, as described in the affected environment, would be expected to persist in the existing dynamic state.

Action Alternative

This project may have a temporary, geographically limited impact on water quality directly within the project area when and in proximity to where the log removal activities are occurring. The removal activities would take place in a defined area away from surface water intakes. According to the Lake Bed Sediments and Water Quality Analysis, the bulk of the sediment disturbance would occur within approximately 2 feet of the lake bottom before the logs are raised to the surface. Calculations indicate that the time required for clay and silt particles characteristic of lake bed sediments in the project area to be re-deposited is at most approximately 1.9 hours if removed as proposed.

Salvage operations would transport multiple logs during each boat trip to the boat launch off-loading areas. Although turbidity would likely be cumulative in the immediate area of individual removed logs, the settling time indicated above would allow for re-deposition during the period necessary for transport and off-loading, resulting in no cumulative effects from successive loads. Thus direct, indirect, and cumulative impacts to community drinking water as a result of the proposed action are expected to be minimal.

PUBLIC SERVICES/TAXES/UTILITIES/ECONOMICS

Affected Environment

Employment in the wood products industry constitutes around 22% of labor income in the Flathead Valley (Bureau of Business and Economic Research, University of Montana 2009). Basic industries like forest products also generate wealth both directly and indirectly by "multiplying" economic benefit. In the US, every one forestry job generates 1.5 other jobs in the economy, and lumber and wood products manufacturing creates 2.3 jobs for each additional job created (US Bureau of Economic Analysis).

Environmental Consequences

No-Action Alternative

Under the no-action alternative no log salvage operations would take place. Environmental conditions, as described in the affected environment, would be expected to persist in the existing dynamic state.

Action Alternative

The proposed action would not have an effect upon or result in a need for new or altered governmental services. The proposed action would have a positive effect upon the local and state tax base and revenue by creating jobs in the removal and transport of the submerged logs, and by providing an increased supply of high quality wood to local mills. If the action alternative is chosen, North Shore would be paying the Licensor (State of Montana) rent at the annual rate of $21,000. In addition, if the action alternative is adopted, North Shore would pay the State additional rent under the land use license based on 5% of the total amount received in connection with the sale of any unstamped logs that are recovered and sold at a price of $1,000/mbf or less, and 10% of the total amount received in connection with the sale of any unstamped logs that are recovered and sold at a price of $1,001/mbf or more.

The proposed action would not result in a need for new facilities or substantial alterations of any of the following utilities: electrical power, natural gas, other fuel supply or distribution systems, or communications.

AESTHETICS/RECREATION

Affected Environment

Somers Bay boat launch receives extensive public use, averaging over 50,000 boat launches per year. Recreational motor boating, sailing and fishing excursions all launch from Somers Bay. "Mack Days" sponsored by The Confederated Salish and Kootenai Tribes in an attempt to reduce the number of non-native lake trout is held from March 12- May 23, 2010, Friday thru Sunday. Pick up times are from 2:00pm to 5:00pm Friday thru Sunday at the Somers Bay boat launch. The North Flathead Yacht Club is located in Somers Bay. Races and sailing clinics are scheduled throughout the summer months. Evening sail boat races originate from the Yacht Club during summer evenings. The 2010 Montana Cup is held July 30-August 1. Commercial fishing charters utilize the project area for commercial fishing trips as there is no commercial fishing on the Confederated Salish and Kootenai owned portion of the lake.

Environmental Consequences

No-Action Alternative

Under the no-action alternative no log salvage operations would take place. Environmental conditions, as described in the affected environment, would be expected to persist in the existing dynamic state.

Action Alternative

The proposed action would not result in any alteration of any scenic vista, or creation of an aesthetically offensive site or effect that is open to public view. There would be no alteration of the aesthetic character of a community or neighborhood. As the salvaged logs are sold and used locally, the unique character of the logs would enhance the aesthetics of local towns and neighborhoods.

Past and present use of the project area has been for recreation. Motor boating, sailing, sea-kayaking, fishing and wildlife viewing all would continue to occur in the proposed project area. However, except for the active 1-2 acre portion of the 5-acre section (an area approximately 466 ft. x 466 ft) where the divers would be working, the remaining project area would have no restrictions on recreational use. The 1-2 acre work zone would be marked with highly visible buoys and dive flags. The vast majority of commercial fishing activity takes place within the deeper waters of Flathead Lake where log salvation operations would not be occurring. North Shore would alter the schedule of operations so as not to conflict with existing recreational sporting activities including Mack Days and yacht races held by the North Flathead Yacht Club. User conflicts at loading and unloading areas would be avoided or minimized by yielding to recreational traffic on the lake and at the loading and unloading sites, and by conducting activities to the extent possible during off peak hours.

CULTURAL/ HISTORICAL RESOURCES

Affected Environment

The proposed project area includes State-owned lake bed below the low watermark north of Pt. Caroline on the west shore and Long Beach on the east shore of Flathead Lake. According to DNRC archaeologist Patrick Rennie, no cultural resources have been identified in the project area.

Environmental Consequences

No-Action Alternative

Under the no-action alternative no log salvage operations would take place. Environmental conditions, as described in the affected environment, would be expected to persist in the existing dynamic state.

Action Alternative

The proposed action would not destroy or alter any site, structure, or object of pre-historic, historic or paleontological importance. The proposed action would not cause any physical changes that would

affect any unique cultural values or have any effect on existing religious or sacred uses of any sites or areas.

The proposed land use license states that representatives of the State Historical Society of the State of Montana shall at all reasonable times, upon written notification of the DNRC prior to entry, have the right to enter into the premises for the purpose of carrying out the duties assigned the Historical Society by the State Antiquities Act, Section 22-3-421, et seq., MCA.

If North Shore divers locate any submerged watercraft or any other cultural resources they would cease any operations that might endanger the resource and they would contact the DNRC archaeologist.

CHAPTER 4 – RESPONSE TO PUBLIC COMMENTS

Comments Received on North Shore Development Submerged Log Project and Agency Response

Comment 1. (Jakes)

From: Randolph Jakes [mailto:hfsrjakes@yahoo.com]
Sent: Sunday, July 18, 2010 4:11 PM
To: Poncin, Greg; Pete Sauer
Cc: maren and dave; Bill; Dennis; Ellen; Eric and Jan Hurst; Kirk Kalbfleisch; Orrin; Sherry; Lewis-Don and Sue; tdevoe@ventoracing.com; Mark Lorang; dtesta@flatheadbeacon.com
Subject: Re: log salvage from Flathead Lake

7-18-2010

Mr. Poncin,

I will introduce myself as a person who lives in Lakeside and enjoys boating on Flathead Lake, especially and almost exclusively in the Somers Bay area.

After reading local media coverage and the assessment posted on line of Montana's DNRC decision to grant North Shore Development a land use license to conduct a log salvage operation for 10 years (possibly 20 years with an extension) to remove 800 logs per month and 5,600 logs per operating season from our bay by utilizing the public fishing / boating access site in Somers, I can't help but wonder who was "asleep at the wheel" when this license was granted!

Yesterday (Saturday, July 17, 2010) the public was using that boating access site for the intended purpose of that site, and it was literally overflowing. Cars and boat trailers filled the parking lots to capacity and then BOTH sides of the highway for at least a quarter of a mile. This type of use at this site shows that it is extremely popular. The very limited grassy areas were covered by bodies as individuals and families enjoying the day. I find it extremely short sighted to think that this access site would not be compromised by the presence of a full scale logging operation loading and filling 10 logging trucks a day.

I understand the company's desire for these "beautiful" logs - they come from virgin forests over 100 years ago and, I'm sure, contain magnificent specimens the like of which we may never see again because of our ever increasing use (and misuse) of our forested lands. One of the reasons we no longer have large tracts of large growth forests is the ability of corporations to consume our resources at a rate much higher than nature can replace them. Companies exist for one reason - to make profits. Although many companies start out with the expectations that they will "do no harm", most, in fact, do.

I do not trust North Shore Development to always keep the access site in as good a shape as it is now, nor do I trust your office to "police" this new and untested company and regulate it's activities. It is very easy for me to imagine "something going wrong" with this kind of time period (20 years) and the history our state has of letting natural resource extraction companies basically come into existence, destroy vast areas of our state, and then cease to exist before any type of clean up is even thought of. All one has to do is look at our state's miserable management of leach mining gold companies as a fairly recent example.

I urge you rescind this license and instead require this company to find and purchase their own access site. Public access sites were not created to benefit private corporations. They were created through public funding so that the average citizen could have a tiny bit of access to the magnificent resources of our lake, instead of allowing only those privileged enough to purchase their own lake shore that type of access. I am placing myself on record as being extremely disappointed in your personal responsibility as am employe of the Montana DNRC for not advocating for the citizens of this area, state and nation, and instead helping in any way a private company with dreams and expectations of making huge profits while paying only limited lip service to the needs of the people who will, again, be displaced by the cranes and skidders and logging trucks and pontoon platforms and diving rigs, etc. You are naive, Mr. Poncin, if you think granting this license will do anything positive for the rights and privileges of the people you were hired to protect.

Randolph Jakes - PO Box 1091, Lakeside, MT 59922 516-474-4806

Response to Comment 1. (Jakes):

Public Ramp: With regard to your concerns about the impact to the Somers Bay public boat ramp, Chapter 2 (Description of Alternatives) the Environmental Assessment explains that an application for a restricted use permit to utilize the FWP Fishing Access site at Somers Bay will not be evaluated until a Decision Notice has been issued on the salvage log project. Under the FWP process, which is not part of this EA, North Shore will ensure priority for recreation users, and provide commercial liability protection for the State of Montana. Further, under the Action Alternative, sites other than Somers Bay are being considered for the removal of salvage logs.

Log Removal: The proposed log removal process is similar to the removal of a boat from the lake--it involves a pickup truck and a modified boat trailer. Three to four logs will be removed from a near shore pontoon boat, winched directly onto a boat trailer and removed from the lake. The logs will be processed at an offshore location. For a depiction of the process, you can view a video online at **http://www.youtube.com/watch?v=NV3hdjjQixw**. There are no plans to use logging trucks, cranes, skidders or any mechanical equipment at the extraction site. DNRC, DEQ and Fish Wildlife and Parks will ensure that the terms of the license are complied with and that the public interest is protected.

Comment 2. (Sherlock)

From: Patrick Sherlock [mailto:psherlock@bresnan.net]
Sent: Monday, July 19, 2010 8:55 AM
To: Poncin, Greg
Subject: Log Salvage via Somers Public Boat Ramp

Dear Greg Poncin and the DNRC:

I have heard about the proposal for log salvage on north Flathead from the Somers ramp. I am a citizen of the Flathead and utilize either Flathead Lake or the Somers boat ramp several times a week. I am very concerned about the proposed project. There are two issues in my mind:

1. Disturbing the bottom by removing the logs. This will disturb the bottom no doubt and stir up sediment which will disturb fishing and water quality. If the logs are taken out in peace-meal fashion this may not be a problem. I would look to the Biological Station and their opinion in this regard. As a citizen this should be no problem overall if done correctly and controlled in some fashion by DNRC.

2. Using the Somers ramp is another issue. This is totally unacceptable for a commercial operation of this type and magnitude. This is a public facility and should only be used as such. It is very busy Spring, Summer and Fall. There is no room for this operation. Allowing two hundred logs to be removed BEFORE overall approval also appears to be wrong and unwise. That should be cancelled. What do we the people get out of this operation? Safety? Money? Inconvenience? Etc? It appears we the public don't get anything but problems. This is a dangerous operation make no mistake about it. These logs are huge and dangerous. We want no part of them for any reason. There is no good reason to allow this. What if a child is injured? Who pays? DNRC? Do they have insurance? Why can't they pay a owner of shore property for removal on private property? Reason: nobody wants this operation on their property. I wouldn't unless well compensated. The Yacht club has been approached and has turned them down. This is not a public operation and there is no benefit to the public from what we can see. The ramp and parking log will be jammed up with equipment, workers, etc. Basically the ramp and parking lot at Somers will be tied up during this operation. So what if it's at nite or early morning. It's still tied up. It doesn't matter. If a member of the public wants to get his boat in or out of the lake whenever this operation is underway, will there be delay? Yes, there will be, but that is not the main reason this project should be denied. What matters is that this is a wonderful **public facility** that gets very heavy use every time we use it ourselves. Last week during the week at 2 PM on a weekday no less than 5 to 6 boats either went in or out of the lake on the ramps with more waiting in 5 minutes time. I have heard on some busy days and nites boats cannot get in or out for hours. I even heard some boaters could not get out till after midnite on some days. There is not enough parking except off season when there is ice on the lake or snow in the parking lot. Please know we are strongly against this and you should be too. Since when does the public have the duty to help a for profit enterprise? There are no other boat ramps for miles of Somers. If a fisherman shows up at 5 AM, what is he to do? Go elsewhere so these fellows can make a profit? This is not something that needs to be approved by the DNRC for any reason. Their application should be denied.

Here's our considered solution: The logs are moved in the high water season to a shallow water area near an area where a crane or ramp can be used. The logs are anchored to the bottom in their new location. When the lake level drops in winter the logs would then be high and dry and could be literally trucked out or craned out to trucks. These logs are very valuable as they are used and prized by many for their color and uniqueness. They are used for picture frames, plaques, and for violins among other things. This is a solution that solves the log salvage company problems but it would take longer and would not be on public property or at we the public's expense and or inconvenience. There could be considerable profit involved and a land owner could be compensated for the log removal. Let's not forget that aspect as well.

Sincerely,

Patrick D. Sherlock
440 Lakehills Lane
Kalispell, MT 59901
Ph: 406-752-6151
Cel: 406-253-1500
Office: 406-752-6500

Response to Comment 2. (Sherlock):

Sediment: With regard to concerns about sediment, the mitigation strategies discussed in the EA are designed to minimize the disturbance of lake bottom sediments. These strategies include removing the majority of the sediment near the lake bottom, and removing the logs upward through the water column with minimal disturbance to the lake bottom. Based on visual inspections by North Shore divers of the amount of sediment deposited on logs, it is anticipated that the disturbed sediments are expected to be re-deposited within 2 hours. As described in Chapter 3 of the EA, the strategies in the Action Alternative were developed based on consultations and recommendations of agency representatives and numerous scientists.

Monitoring: The Montana DEQ will administer the proposed water quality monitoring plan which will establish baseline conditions in a project activity area, monitoring and sampling during salvage operations, and post salvage monitoring to assess turbidity levels and areas of dispersion. Water samples will be analyzed for turbidity, phosphorous and heavy metals. Testing will be conducted in accordance with standard field methods prescribed by the U.S. Geological Survey (USGS 2010), National Park Service (NPS, 2008) and University of Montana Flathead Lake Biological Station at Yellow Bay.

The plan was developed by AMEC Earth and Environmental Consulting and Northwest Management, with input from Mark Lorang at the Flathead Lake Biological Station, Dr. Johnnie Moore, professor of geology at the University of Montana, DNRC and DEQ scientists.

Based on the resulting data, North Shore will modify its operations as needed to comply with Montana's water quality rules and regulations.

Public Ramp: Please see response to Comment 1.

Comment 3. (Curtiss)

From: ccurtiss@deep6-enterprises.com [mailto:ccurtiss@deep6-enterprises.com] **On Behalf Of** Clint Curtiss
Sent: Tuesday, July 20, 2010 1:57 AM
To: Poncin, Greg
Subject: Log salvaging procedures.

Mr. Poncin-

My name is Clint Curtiss. I work for Deep Six Enterprises, out of Eureka, MT. I wanted to make you aware that our company is one of three commercial diving companies within our wonderful state. Neal Structural Repair, Noxon, MT. and, Liquid Engineering Corp. Billings, MT. All of these companies perform exceptional work underwater according to OSHA 29 CFR Part 1910, Subpart T - Commercial Diving Operations. Also, the ADCI, "Association of Diving Contractors International". I was curious as to how the diving operations were going to be performed, equipment, procedures, etc. With compliance and safety always being a concern, these diving operations should be performed utilizing specially trained divers using surface supplied air, surface communications, and a three man dive crew to name just a few. Also, I might add, Deep Six Enterprises owns a very portable diver decompression chamber that could be helpful in the event of a diving related illness. I am not familiar with the company handling the diving and salvage operations. In the event that this company could not comply with regulations I'm sure one of these MT based diving companies can.

Thank you,

--
Clint J. Curtiss
Deep Six Enterprises, LLC.
P.O. Box 1647
Eureka, MT 59917
Phone: 406-992-DIVE
Cell: 406-270-9723
ccurtiss@deepsixdiving.com
www.deepsixdiving.com

Response to Comment 3 (Curtiss): Dive operations are being conducted by Northwest Dive and Recovery Services based out of Bigfork, Montana. The dive operations are OSHA compliant and the primary dive mode that is being used is SCUBA (OSHA 29 CFR Part 1910, Subpart T Commercial Diving Operations 1910.424). These requirements are will be met or exceeded. An onsite hyperbaric chamber (decompression chamber) is not required as the dives proposed in the Action Alternative will be less than 100 feet. No planned decompression dives are anticipated. If the unlikely event there is a need for a hyperbaric chamber, there is one located close by in the Kalispell Regional Medical Center.

Comment 4. (Kuehn)

Scott Kuehn
4375 Old Marshall Grade Road
Missoula, MT 59802
montanaforester@yahoo.com

July 19, 2010

Montana DNRC
Greg Poncin
655 Timberwolf Parkway, Suite 2
Kalispell, MT 59901-1215

Dear Greg Poncin:

I would like to comment on the retrieval of the sunken logs (aka Deadheads) in Somers Bay in Flathead Lake by North Shore. I am in full support on this project. I believe the sediment disturbed during removal would be minimal and very short term. The fish in Flathead Lake survived thousands of years before these logs were lost, I'm sure they will survive if they are removed. I was waiting too read in the EA on how many "snags/deadheads" per acre of lake bottom would be required, but I must have missed that part.

I was around both times when the DNRC salvaged the deadheads behind the Bonner mill in the Blackfoot. The skidder was on the gravel beds and some of the logs were line skidded through Blackfoot River, yet the fish and river survived.

The deadheads in the Blackfoot were mostly "Bull Pine" that were dense enough to sink and had low value 75 years ago, as well as today. The Somers logs may be a little different, but do not have the value of some of the Curly/Birdseye Maple from the mid west and east. The value in these logs is in the marketing, not by the board foot. Old growth Fir and Larch is still available in western Montana, but not ones that have been submerged over 50 years.

Again, I support this project and might even volunteer to help set chokers.

Sincerely,

Scott Kuehn

Response to Comment 4. (Kuehn): Chapter 1 of the EA identifies removal of impediments to recreational users and making historic woods available as benefits of this project.

Comment 5. (Webber)

From: Orrin Webber [mailto:orrincompass@centurytel.net]
Sent: Tuesday, July 20, 2010 10:56 AM
To: Poncin, Greg
Subject: Fw: log salvage from Flathead Lake

Mr Poncin, Please consider these comments as mine I am AGAINST allowing any public site to use as a logging staging area.NSD needs to find there own private place the State cannot afford the liability with this type of project.
----- Original Message -----
From: Randolph Jakes
To: gponcin@mt.gov ; Pete Sauer
Cc: maren and dave ; Bill ; Dennis ; Ellen ; Eric and Jan Hurst ; Kirk Kalbfleisch ; Orrin ; Sherry ; Lewis-Don and Sue ; tdevoe@ventoracing.com ; Mark Lorang ; dtesta@flatheadbeacon.com
Sent: Sunday, July 18, 2010 4:10 PM
Subject: Re: log salvage from Flathead Lake

7-18-2010

Mr. Poncin,

I will introduce myself as a person who lives in Lakeside and enjoys boating on Flathead Lake, especially and almost exclusively in the Somers Bay area.

After reading local media coverage and the assessment posted on line of Montana's DNRC decision to grant North Shore Development a land use license to conduct a log salvage operation for 10 years (possibly 20 years with an extension) to remove 800 logs per month and 5,600 logs per operating season from our bay by utilizing the public fishing / boating access site in Somers, I can't help but wonder who was "asleep at the wheel" when this license was granted!

Yesterday (Saturday, July 17, 2010) the public was using that boating access site for the intended purpose of that site, and it was literally overflowing. Cars and boat trailers filled the parking lots to capacity and then BOTH sides of the highway for at least a quarter of a mile. This type of use at this site shows that it is extremely popular. The very limited grassy areas were covered by bodies as individuals and families enjoying the day. I find it extremely short sighted to think that this access site would not be compromised by the presence of a full scale logging operation loading and filling 10 logging trucks a day.

I understand the company's desire for these "beautiful" logs - they come from virgin forests over 100 years ago and, I'm sure, contain magnificent specimens the like of which we may never see again because of our ever increasing use (and misuse) of our forested lands. One of the reasons we no longer have large tracts of large growth forests is the ability of corporations to consume our resources at a rate much higher than nature can replace them. Companies exist for one reason - to make profits. Although many companies start out with the expectations that they will "do no harm", most, in fact, do.

I do not trust North Shore Development to always keep the access site in as good a shape as it is now, nor do I trust your office to "police" this new and untested company and regulate it's activities. It is very easy for me to imagine "something going wrong" with this kind of time period (20 years) and the history our state has of letting natural resource extraction companies basically come into existence, destroy vast areas of our state, and then cease to exist before any type of clean up is even thought of. All one has to do is look at our state's miserable management of leach mining gold companies as a fairly recent example.

I urge you rescind this license and instead require this company to find and purchase their own access site. Public access sites were not created to benefit private corporations. They were created through public funding so that the average citizen could have a tiny bit of access to the magnificent resources of our lake, instead of allowing only those privileged enough to purchase their own lake shore that type of access. I am placing myself on record as being extremely disappointed in your personal responsibility as am employe of the Montana DNRC for not advocating for the citizens of this area, state and nation, and instead helping in any way a private company with dreams and expectations of making huge profits while paying only limited lip service to the needs of the people who will, again, be displaced by the cranes and skidders and logging trucks and pontoon platforms and diving rigs, etc. You are naive, Mr. Poncin, if you think granting this license will do anything positive for the rights and privileges of the people you were hired to protect.

Randolph Jakes - PO Box 1091, Lakeside, MT 59922 516-474-4806

Response to Comment 5. (Webber): See response to Comment 1 (Jakes) above.

Comment 6. (Wright)

1104 – 1st Avenue East
Kalispell, MT 59901
July 19, 2010

Mr. Greg Poncin, Kalispell Unit Manager
Kalispell Unit, NWLO, DNRC
655 Timberwolf Pkwy, Ste 1
Kalispell, MT 59901-1215

Ref: North Shore Development Log Removal from Flathead Lake

Dear Greg:

I would like to comment on the proposed log removal from the bed of Flathead Lake. It is a project that has been the pipe dream of countless people. I know as many individuals contacted me through the years when I was in your position with the DNRC about doing the same. It seems that North Shore Development actually has a legal right to at least some of the logs that presently lie on the bottom of the lake.

The recovery of old, sunken logs have been proven to be a viable undertaking in the Great Lakes and in Washington State and maybe other locations too. The logs that are recovered in these operations have been of very high value and the lumber cut has been extremely valuable to craftsman for furniture, cabinetry, and other high-end wood working projects. And the removal of the logs is done with little or no environmental problems.

I would think that most of the logs to be recovered in this proposed project would be western larch, Douglas-fir, and ponderosa pine; since that would be the main species cut for railroad ties and lumber back in the old days. There also will be lesser amounts of Engelmann spruce and western red cedar and other minor species. I also think that many of the sunken logs will be the butt logs, which are larger and heavier, and thus would be many of the ones that sunk while being floated to the Somers mill. Speaking from experience and also from talking with the "old timers", a lot of the old growth trees in those days had ring shake in the butt logs, thus the spring board stumps. Still a lot of butt logs with ring shake made it out of the woods to the mills. These logs will most likely fall apart when sawn. But, overall, I think there will be a large volume of high quality lumber produced from this adventure.

I read the environmental document and do not see anything that I would or could object to with North Shore's proposed log removal project. The EA covered everything from the mundane, to the ridiculous and everything in between. Most of the process to develop the EA was a waste of someone's time and money, but that is the way it seems to work to get something done anymore.

I am in favor of North Shore's project for the following reasons:

1) It will provide employment for people during a time of high unemployment and depressed lumber market.

2) High value logs will be recovered and high value and quality lumber will be produced from the logs for which there should be a good demand.

3) The School Trust fund will receive revenue with minimum or no adverse affect to the environment.

4) With the removal of the logs from the bottom of Flathead Lake, it will somewhat return to its natural state like it was before the Somers mill with only logs on the lake bed put there by natural events.

Sincerely,

William F. Wright

Response to Comment 6. (Wright): This project is intended to provide revenue to the School Trust beneficiaries and an increased supply of high quality timber to support the local industry.

Comment 7. (Nielsen)

From: Darrick Nielsen [mailto:darricknielsen@hotmail.com]
Sent: Wednesday, July 21, 2010 8:59 AM
To: Poncin, Greg; Darrick Nielsen
Subject: Log Salvage

Dear Greg
I wish to comment on the log salvage operation.
It sound to me like this is a done deal with permits already issued.
I have a hard time beliving that the salvage operation will have minimal impact on the lake environment.
The water will get stirred up and disturb the fisheries that rely on the logs for rookeries.
I hope they don't plan on using public access sites on the lake to take the logs out of the water.
Those are for public not private use. This operation will obviously destroy any access that is used by the public, let alone put even more pressure on access sites that are already over used around the lake.
What the loggers say and what actually happens will be two completly different things if this is allowed to happen,
mark my words.
Do not allow this operation to happen.
Thank you
Darrick Nielsen

Response to Comment 7 (Nielsen): Thank you for your comments on the Flathead Lake Submerged Log Salvage Project. No permits or approvals for any aspect of this project have been issued at this time.

Fisheries impact: With regard to the impact on fisheries, including bull trout, under the Action Alternative, temporary displacement and short term sediment suspension in the immediate vicinity of log removal activities may occur; however, these impacts are not expected to result in high, concentrated and sustained sediment levels which pose a risk to fish populations. In addition, it is likely that the presence of divers would displace fish in the salvage area, and the suspension of sediment in the project area is likely to be geographically isolated and temporary in nature. North Shore is not proposing to remove natural recruitment logs which provide a diversity of aquatic habitat. North Shore will be monitoring the amount and dispersion pattern of sediments under a proposed monitoring plan approved and administered by the Montana DEQ.

With regard to your concerns about use of the public boat ramp, please see the response to Comment 1 (Jakes).

Comment 8. (Amnotte)

From: maren and dave [mailto:grimnot@bresnan.net]
Sent: Wednesday, July 21, 2010 9:14 AM
To: Poncin, Greg
Subject: North Shore Development Submerged Logs Project

Mr. Poncin

I have many concerns, namely disturbing lake bottom sentiment containing creosote from the past logging mill operation, rafting 5 acre log patches as a navigation hazard,
and disrupting fish habitat.

My biggest concern is the use of a public (State) owned boat ramp for private gain. The mission statement of the DNRC is that public facilities are for the benefit of the public .

If this company is going to make as much money as has been stated then they can afford to buy a piece of Lakeshore property put in a ramp on their private land remove the logs and when finished with the operation sell the land to recoup their purchase cost.

The idea of using private land for this purpose removes any conflicts with the public ramp use, helps the local real estate market, and reinforces "property rights" concerning business ventures .

Thank you for your consideration

David Amnotte
P.O.. # 1748
Bigfork Mt. 59911

Response to Comment 8 (Amnotte):

Somers Bay: With regard to your concerns about toxic sediments, Chapter 2 of the EA provides that under the Action Alternative, no log salvage operations would occur within 1,000 feet of the Somers Bay superfund site. This buffer is twice the buffer distance recommended by DEQ and EPA experts and is anticipated to adequately ensure that toxic sediments will remain settled.

Log Removal: With regard to your concerns about "rafting 5 acre log patches", North Shore is planning to transport the retrieved logs with a pontoon boat and remove the logs according to the process described in the response to Comment 1.

Fisheries Impacts: With regard to your concern about disruption of fish habitat, please see the response to Comment 7 above.

Comment 9. (Ellis, FLBS)

From: Poncin, Greg
To: 'Ellis, Bonnie'
Cc: Germann, Sonya ; 'Jim Cancroft' ; Hallsten, Greg
Sent: Wednesday, July 21, 2010 10:15 AM
Subject: RE: log salvage EA

Bonnie,
Both Mark Lorang and Jack Stanford from the FLBS have had opportunities to comment, and we welcome your comments on this project as well whenever you can get them to us. As I explained in my voice message to you, we look forward to receiving input that leads to a better design and implementation of proposed projects. However, I do not intend to officially extend the comment period on the draft EA.

Please call me at your earliest convenience at the numbers listed below so we can discuss this further. I would also encourage you to talk with Mark Lorang and Jack Stanford to see what interaction they've had with this project as representatives of the FLBS.

Thank you for your interest and I look forward to talking with you soon.

Greg Poncin
Kalispell Unit Manager
MT DNRC
(406) 751-2263
(406) 250-4439

From: Ellis, Bonnie [mailto:bonnie.ellis@flbs.umt.edu]
Sent: Tuesday, July 20, 2010 5:13 PM
To: Poncin, Greg
Subject: log salvage EA

Dear Greg,

I would like to request an extension for commenting on the proposed log salvage EA. I left you a phone message. I understand the Biological Station is quoted in the proposal often and since I spoke with the consultant several times, I'd like the opportunity to review their final assessment. I should be back in the office late in the week.

Regards,

Bonnie

Bonnie K. Ellis
Research Assistant Professor
Flathead Lake Biological Station
The University of Montana
32125 Bio Station Lane
Polson, MT. 59860-6815
406-982-3301 x239
http://www.umt.edu/flbs/

Response to Comment 9 (Ellis/FLBS): The request to officially extend the comment period was denied by the DNRC Kalispell Unit Manager Greg Poncin on July 21, 2010.

Comment 10. (Sherlock)

From: Landstrom, Dave
To: 'Patrick Sherlock' <psherlock@bresnan.net>
Cc: Poncin, Greg; Sawyer, Jerry
Sent: Wed Jul 21 16:01:34 2010
Subject: RE: Somers Log Salvage Operation and Somers Boat Ramp and Parking lot

Dear Mr. Sherlock,
I have forward these comments to Greg Poncin of The Department of Natural Resources and Conservation (DNRC) . DNRC is the state agency conducting an Environmental Assessment (EA) for this proposal. An application for a restricted use permit to utilize the Montana Fish, Wildlife and Parks (FWP) Fishing Access Site at Somers Bay for log removal will not be evaluated until a final EA has been completed and a record of decision has been issued. Please feel welcome to phone me if you would like further information.

Sincerely,

David Landstrom
Regional Parks Manager
Montana Fish, Wildlife & Parks
(406) 751-4574

Response to Comment 10: Please see response to Mr. Sherlock in Comment 2, above.

Comment 11. (Flathead Lakers)

P.O. Box 70 · Polson, MT 59860
(406) 883-1346
Fax (406) 883-1357
lakers@flatheadlakers.org
www.flatheadlakers.org

FLATHEAD LAKERS

Flathead Lakers:
Working for clean water, a healthy ecosystem, and lasting quality of life in the Flathead Watershed

July 21, 2010

Greg Poncin, Kalispell Unit Manager
Montana DNRC
2250 Hwy 93 N
Kalispell, MT 59901
via e-mail: gponcin@mt.gov

Re: Comments on North Shore Development Submerged Logs Salvage Project Draft Environmental Assessment

Dear Mr. Poncin:

Although the Flathead Lake north shore submerged logs salvage project described and evaluated in the June 23, 2010 Environmental Assessment (EA) is much improved from the original proposal on which the Flathead Lakers previously submitted comments on January 26, 2009, we still have questions and concerns regarding the proposal's impacts on Flathead Lake and its use.

The Flathead Lakers is a nonprofit organization working to protect clean water, healthy ecosystems and lasting quality of life in the Flathead Watershed. Our organization was founded in 1958 and currently has 1,500 members.

The EA provides a significant amount of information and statements about the "affected environment and environmental consequences" of the proposal, but provides inadequate documented evidence for the source of the information, statements and conclusions. Although the EA includes a list of references, they are not always referred to in pertinent sections within the document itself.

Areas where we believe more information or additional substantiation for the information provided is needed include the following:

- Evidence that a 1,000 foot buffer from the Somers Bay BNSF Site is adequate to prevent resuspension of contaminated sediments, including the rationale for the 500-foot buffer recommended by EPA and DEQ.

- Evidence that a 1,000 foot buffer from the north shore of the lake is sufficient to avoid disturbance of waterfowl that use this area heavily. An evaluation by Montana FWP and the U.S. F&WS (managers of the Flathead Lake Waterfowl Production Area at the lake's north shore) of the potential impacts of this proposed project on waterfowl is needed. We recommend that no salvage operations take place within an area determined by FWP and F&WS during spring and fall migrations.

- Evidence that there will be no impact on native fish, particularly the threatened bull trout. Review by FWP is needed and perhaps a restriction on salvage operations at specific locations during spawning seasons.

- Additional information about sediment disturbance. Although extensive information about the predicted disturbance of sediments from the top of the logs to be salvaged is provided, very little information is provided about the amount of sediment that will be disturbed as lines are placed under the logs for

lifting to the surface. In addition, we question whether all the logs are laying perfectly level on the bottom of the lake with a small triangle of sediment sitting on top of them. We suspect that the logs may be laying like a pile of pick-up sticks, tangled together at various angles and that when one is moved several more will be disturbed. As each one is picked up, the sediment is disturbed and then settles on the remaining logs to be disturbed again over and over as the logs are removed. If this is the case, a great deal more sediment would be disturbed than discussed in the EA, potentially releasing more nutrients and leading to oxygen reduction. Without additional information about sediment disturbance and how effective the proposed procedures will be for mitigating disturbance, we oppose issuing a 318 permit for temporary turbidity increases. Although the turbidity may be temporary at each salvage site, disturbing lake bottom sediments for eight months of the year over 10 years warrants additional review.

- Additional information about how timing the removal of the logs at the Somers Bay boat launch site (that the EA states averages 50,000 boat launches per year) will reduce impacts on recreational boaters. North Carolina prohibits the use of public boat ramps for removal of salvaged logs.

We commend the applicant for proposing that the University of Montana Flathead Lake Biological Station undertake monitoring and evaluation, with modifications of procedures if needed, during initial salvage operations. We believe monitoring and evaluation by the Flathead Lake experts at the Biological Station is critical to ensure adequate protection of the lake. However, it is our understanding that there is no agreement or contract with the Biological Station for this work. This should be a requirement of the permit, should one be issued to the applicant.

In addition, we recommend that if Biological Station staff are not available to submit comments on the EA within the designated comment period, that the comment deadline be extended to allow the Biological Station the opportunity for thorough review and comment.

In order to further ensure protection of Flathead Lake's water quality and aquatic life, we recommend that the first year of the project, if approved, be considered a pilot project. Review and evaluation of project impacts at the end of the first year should be required, along with modifications to the project design and procedures, or permit revocation, if needed.

Flathead Lake is a local and national treasure that contributes greatly to the local economy and quality of life. It deserves all of our best efforts to sustain its quality.

Thank you for your consideration.

Sincerely,

Larry Ashcraft
President

Robin Steinkraus
Executive Director

Response to Comment 11. (Flathead Lakers):

Somers Bay buffer: With regard to the buffer around the Somers Bay "superfund" site, this buffer was proposed based on a literature review and recommendations of EPA and DEQ scientists. The U.S. EPA Region VIII, Montana Operations Office Record of Decision in September 1989 found the presence of heavy creosote contamination in water and soil located within 20 feet of the shoreline. In addition approximately 40 cubic yards of visually contaminated beach sediment was removed near the shoreline during 1988.

Waterfowl: With regard to the potential disturbance of waterfowl, the buffer proposed in the Action Alternative was developed with input from the manager of the Flathead Lake Waterfowl Production Area and Montana FWP. North Shore would not conduct any salvage activities from late December to early March. The impact on the waterfowl area is expected to be comparable to that of a recreational motorboat.

Fisheries impact: With regard to the impact on fisheries, including bull trout, under the Action Alternative, temporary displacement and short term sediment suspension in the immediate vicinity of log removal activities may occur; however, these impacts are not expected to result in concentrated and sustained sediment levels which pose a risk to fish populations. In addition, it is likely that the presence of divers would displace fish in the salvage area, and the suspension of sediment in the project area is likely to be geographically isolated and temporary in nature. North Shore is not proposing to remove natural recruitment logs which provide a diversity of aquatic habitat. North Shore would be monitoring the amount and dispersion pattern of sediments under the proposed monitoring plan approved by the Montana DEQ . Bull trout do use Somers Bay to congregate prior to their spawning runs to upstream habitats in the Flathead drainage.

Monitoring: Montana DEQ will provide oversight and data analysis of the proposed monitoring plan which will help establish baseline conditions in the project activity area, monitoring and sampling during salvage operations, and post salvage monitoring to assess turbidity levels and areas of dispersion. Water samples will be analyzed for turbidity, phosphorous, dissolved nitrogen and heavy metals. Testing will be conducted in accordance with standard field methods prescribed by the U.S. Geological Survey (USGS 2010), National Park Service (NPS, 2008) and University of Montana Flathead Lake Biological Station at Yellow Bay.

The proposed monitoring plan was developed by AMEC Earth and Environmental Consulting and Northwest Management, with input from Mark Lorang at the Flathead Lake Biological Station, and Dr. Johnnie Moore, professor of geology at the University of Montana, DNRC and DEQ.

Based on the resulting data, North Shore will modify its operations as needed to comply with Montana's water quality rules and regulations.

Boat Launch: With regard to concerns about concerns about use of the public boat launch, please see the response to Comment 1.

Comment 12. (Hursts)

From: Eric and Jan Hurst [mailto:eandjh@bresnan.net]
Sent: Wednesday, July 21, 2010 5:21 PM
To: Poncin, Greg
Subject: log salvage from Flathead Lake

Dear Mr. Poncin:

We are joining the numerous citizens who are voicing our concern over the proposed log salvage by North Shore Development. We live on Juniper Bay located in the vicinity of the proposed operation, where we use the lake ourselves as well as observe the enjoyment of the lake by fellow boaters, fisherman, and water enthusiasts.

We are concerned about the environmental impact of removing logs from the lake bottom and the resulting release of sediment and pollutants.

We are also concerned about the impact of the operation to access to Flathead lake for the general public. The proposed schedule of the operation from April through November conflicts with the peak boating and fishing season on the lake. In addition, the plan to use the Somers boat launch facility as a removal point for the logs makes absolutely no sense to us. Why would a key public facility such as this be used for a commercial operation that stands to gain a large profit at the expense of the public? This facility is packed all summer, on both weekdays and weekends. Parking is at a premium and the entire area gets very congested. Flathead County is currently paving the area East of the ramp to facilitate better access to parking which usually extends into dirt areas on both sides of Highway 93. Why should this already stressed facility be used for the log operation which would disrupt boating operations even more? In addition, the area of the lake which would be logged can get quite congested with boats and the plan to restrict access in 5 acre sections would significantly restrict navigable area. It is essential for the citizens and visitors to the Flathead be given adequate access to the lake. Our economy depends on tourism, and the reputation of the lake as a beautiful place to visit would be tarnished by a multi-year project such as this.

We urge you not grant permits to North Shore Development for this project.

Sincerely,
Eric and Jan Hurst
567 N Juniper Bay Road
Somers, MT 59932

Response to Comment 12. (Hursts):

Public Boat Ramp: Please see response to Comment 1.

Sediment: Please see response to Comment 2.

Comment 13. (Cook/Lindon Boat)

LINDON BOAT HARBOR

2130 West 600 South
Lindon, Utah 84042

Mailing address:
P.O. Box 523
Pleasant Grove, Utah 84062

T 801-318-6724

July 22, 2010

To whom it may concern,

I have had the opportunity to work with Northwest Dive and Recovery as they have been practicing techniques in my harbor to remove logs from Flathead Lake. I have a busy harbor with 2 boat launch ramps, 2 docks, 26 rental slips, 12 courtesy slips, fishing dock, and a retail store.

I have never had any complaints from any customers. They have refined their technique to where is is a very fast process using only a pickup truck pulling a boat trailer and their boat. The process is similar to loading a boat on a trailer and pulling the trailer out only it is quicker. You would not even realize that they are taking logs out until the trailer pulls out of the water with logs on it.

I can not see how there could be any more damage done to the ramps or marina than what a recreational boater would cause pulling a boat out of the water on a trailer would cause. It is very simple and quick. They have always been very curious and wait until all other boaters are clear before before they use the ramp.

I have been very pleased working with them and their willingness to help us if we need it. I would highly recommend them and would love to have them use our facilities in the future.

Sincerely,

Mark Cook
Harbor Master

Response to Comment 13: Thank you for your comments.

Comment 14. (Walker)

North Shore Development Submerged Logs Project
Draft Environmental Assessment
Comment Form

Environmental Quality

Submit comments on the Draft EA using the form below. Responses to comments will be provided in the Final EA. Thank you!

Please submit comments by July 21, 2010.
Use additional sheets as necessary.

Name: Michael Walker Date: 7/8/2010

Organization:

Address: P.O. Box 870
Lakeside, MT 59922

E-mail: mdanew@hotmail.com Phone: 406-250-8810

I support salvage logging in Flathead Lake. The disturbance to the eco system will be temporary and nominal. The recourse of old groth preserved lumber is a treasure that shouldn't be wasted.

As a Montana native with a background in recourse management, the salvage operation will present possibly the lowest impact of any logging operation modern ops at the time these logs were cut.

As a diver, (PADI MSDT 239941) I am familiar with bottom conditions and the effects of disturbance. It's my opinion based on experience, that recovery of this recourse will NOT cause detrimental tempory or long term consequences.

Thank you, for the opportunity to voice my thoughts.

MWalker

Response to Comment 14: Thank you for your comments.

Comment 15. (Abel)

From: Tom Abel [tom@abelengineeringinc.com]
Sent: Thursday, July 15, 2010 1:27 PM
To: Poncin, Greg; 'Randolph Jakes'; 'Pete Sauer'
Cc: 'maren and dave'; 'Bill'; 'Dennis'; 'Ellen'; 'Eric and Jan Hurst'; 'Kirk Kalbfleisch'; 'Orrin'; 'Lewis-Don and Sue'; tdevoe@ventoracing.com; 'Mark Lorang'; dtesta@flatheadbeacon.com; Sawyer, Jerry; Landstrom, Dave; nwimanage@montana.com; Germann, Sonya; 'Jody Bakker'
Subject: RE: log salvage from Flathead Lake

Board,

I am not a member of the board, but I was commodore when we were considering allowing the use of our launch ramp to retrieve logs. The people doing the project are good people, they do not seem to be irresponsible. They were very helpful when we were putting up our new docks allowing us to use their boats and at one time did some SCUBA diving for us. I think it made sense to let them use our ramp back then and I still think it should be considered.

One can may imagine a logging operation involving big trucks, tracked vehicles, cranes, slash and mess all over. The proposed log retrieval operation would not involve any of the above equipment. What we talked about at the time was taking one or maybe two logs out of the lake at a time. The logs would be placed on a modified boat trailer and pulled up the ramp with a pickup truck. The log would be transported somewhere off-site for loading onto a logging truck. Our ramp would experience no more rugged use than launching boats. The work would be monitored weekly and could be stopped at any time if we thought our property was being compromised.

I was part of the work party that recently poured a new section of concrete for the ramp, so I do not want it damaged either. My feeling is the way they intend to use the ramp would cause no damage. The ramp usage would not be during times when members are present.

There has been discussion about projects around the club like dust abatement, paving the parking lot, putting in a boat painting slab, having an RV dump, installing new bathroom, buying a trailer storage lot. These are all projects that could be financed by the proceeds from leasing our ramp.

Pete presented some valid concerns about the lake. None of us want Flathead Lake to be compromised in any way. It is our playground and a source of beauty and pride for our club. I am sure the State of Montana would not allow the retrieval of logs if there were a chance for damage to the lake bed. This company has secured all then necessary permits and done the necessary studies.

My opinion is we should not have a closed mind towards leasing our ramp and should look at this as an opportunity to further improve our facility at very little cost or inconvenience to our members.

Tom

1

Response to Comment 15:

Public Boat Ramp: Please see response to Comment 1 for more information about the impact of the removal process. North Shore will consider alternative removal sites during the course of the project.

Comment 16. (Sauer)

From: Randolph Jakes [mailto:hfsrjakes@yahoo.com]
Sent: Thursday, July 15, 2010 9:13 AM
To: Poncin, Greg; Pete Sauer
Cc: maren and dave; Bill; Dennis; Ellen; Eric and Jan Hurst; Kirk Kalbfleisch; Orrin; Sherry; Lewis-Don and Sue; tdevoe@ventoracing.com; Mark Lorang; dtesta@flatheadbeacon.com
Subject: Re: log salvage from Flathead Lake

wow! great research! I'm thinking maybe everyone in the club needs to read this and weigh in so that we have lots of negative responses sent in... Great job, Pete!

--- On **Thu, 7/15/10, Pete Sauer <*pete@sailmontana.com*>** wrote:

From: Pete Sauer <**pete@sailmontana.com**>
Subject: log salvage from Flathead Lake
To: **gponcin@mt.gov**
Cc: "maren and dave" <**grimnot@bresnan.net**>, "Bill" <**bcorwin@centurytel.net**>, "Dennis" <**dennis_somersbay@hotmail.com**>, "Ellen" <**racej27@yahoo.com**>, "Eric and Jan Hurst" <**eandjh@bresnan.net**>, "Kirk Kalbfleisch" <**thistle2850@yahoo.com**>, "Orrin" <**orrincompass@centurytel.net**>, "Randy" <**hfsrjakes@yahoo.com**>, "Sherry" <**tom@abelengineeringinc.com**>, "Lewis-Don and Sue" <**susan356@centurytel.net**>, **tdevoe@ventoracing.com**, "Mark Lorang" <**mark.lorang@umontana.edu**>, **dtesta@flatheadbeacon.com**
Date: Thursday, July 15, 2010, 8:45 AM

Mr. Poncin,

I am writing to express my concerns regarding the proposed submerged log salvage from Flathead Lake. My concerns are based on discussions the North Flathead Yacht Club had a few years ago with the commercial entities involved. I was Commodore of the yacht club at that time. I am currently vice-commodore of the North Flathead Yacht Club, however, I am not writing in that capacity but rather as concerned citizen of the State of Montana.

When the North Flathead Yacht Club was proposed as a possible extraction site, it was determined that the use of heavy equipment (barges, logging trucks, loaders, etc) would have significant and long-term negative impact to our facility and to the lake, especially the lake shore at the extraction site. It was apparent that the boat ramp and parking lot would see significant degradation.

While disturbing the lake bed, lake shore and boat ramp is a major concern in an already polluted lake, my concerns are more about the use of a public facility (the Somers boat ramp - a state owned fishing access site) for commercial gain. The same concerns that the yacht club had are valid at the proposed FWP extraction site.

Obviously there is monetary gain involved in this project. Therefore this proposal undoubtedly falls under the FWP Commercial Use Rules, Adopted December 14, 2006.

Under ARM 12.14.115 General Policy (1):

ARM 12.14.115 GENERAL POLICY (1) Department land belongs to the people of

Montana and the department manages these sites and associated resources in trust for the

benefit of current and future generations of the people. The department's primary

responsibilities are to maintain or enhance the resources of these sites and to provide

benefits to the public from these sites.

(2) Some types of commercial use can help the department to achieve its resource

management goals and/or provide desired services to the public when properly managed.

Commercial use must be managed to prevent or minimize conflicts with the public and the

intended purposes of a site.

I have a hard time seeing where log salvage is acceptable under this policy. The salvage proposal is entirely driven by profit and will do nothing but damage the site, limit public access to the lake from the site during the operation, and provide no benefit to the general public. These salvage activities will not "maintain or enhance the resources of the site", nor will it "provide benefit to the public...". In addition, log salvage will not "help the department achieve its resource management goals" or "provide desired services to the public..." Most importantly, as stated in (2) **Commercial use <u>must</u> be managed to prevent or minimize conflicts with the public and the intended purposes of a site."**

How can log salvage possibly fall under the intended purpose of a fishing access site? I would guess that this proposal is ripe for legal litigation the moment it is approved. The state can ill-afford the drain on its resources to oversee these activities or to defend itself from a lawsuit over a proposal that offers no

benefit to the state in the first place.

In summary, log salvage from Flathead Lake is questionable to begin with from an environmental standpoint. What makes this proposal completely unacceptable is the use of a state-owned facility by a commercial for-profit enterprise to salvage these logs.

Peter Sauer,8 Wyndover Hill Dr,Kalispell MT 59901
(406)250-1452

Response to Comment 16:

Public Boat Ramp and Log removal process: Please see the response to Comment 1. The use of the Somers public boat ramp and the conditions of such use will be determined in a separate license issued by Fish Wildlife and Parks. Under the Action Alternative, this project could result in revenue to the beneficiaries of the School Trust in the amount of $21,000 a year for the School Trust.

Comment 17. (Dover)

From: Mary Caye Dover [mailto:marycayedover@gmail.com]
Sent: Wednesday, July 21, 2010 10:00 AM
To: Poncin, Greg
Subject: Logging operation on Flathead Lake

Mr. Poncin, 7/21/10

Flathead Lake is one of the precious jewels of Montana and needs to be protected with zeal and insight.

I am spending a gorgeous Sunday afternoon on Flathead Lake reading through the draft of the North Shore Development Submerged Logs Project Environmental Assessment Draft, June 23, 2010. Many unknown variables need to be addressed before a rush decision is made to salvage logs from Flathead Lake.

As a sixth grade science teacher I teach my students to find testable questions before beginning a science experiment. While the report mentions negative consequences of the potential release of dissolved concentrations of phosphorus and decreased levels of dissolved oxygen, the draft is vague and inconclusive. For example:

Problem:
Will log salvaging increase phosphorous levels and reduce DO levels in Flathead Lake?
Hypothesis:
If 800 logs per month are removed from Flathead Lake, then phosphorous levels will increase and DO levels will decrease affecting aquatic organisms.

We don't know! I understand that the North Shore Development Company put time and money into conducting an environmental assessment. The introduction of the environment assessment states that the draft has been prepared to determine the potential natural resource, social, and economic effects of permitting the salvage of submerged logs from past logging operations. This is a complex extraction that needs more quantitative testing to determine the EFFECTS to Flathead Lake.

The company is fast to propose the mechanics of the projected without carefully thinking through the long term health of Flathead Lake. Obviously, the desire for large profits is creating a ominous cloud.

A concerned citizen and teacher,
Marycaye Dover

Response to Comment 17:

Sediment and Water Quality: North Shore intends to monitor phosphorus, dissolved nitrogen, turbidity and heavy metals before during and after the salvage activities. For further discussion of the monitoring plan, please see the response to Comment 2.

Comment 18. (Anderson)

Dear Greg,

Thanks for taking the time to read this. I am writing to express my concern about the potential salvage of logs from Flathead Lake. I am concerned about the environmental impact of the removal as well as the impact upon the Public access site in Somers Bay. There is no "real" way to measure the impact until it actually occurs. No one really knows how much sediment will be raised by this removal or how long it will take to settle. Common sense tells us that if the operation is an all day, all week long, all month, etc., affair, the stirring up of sediment from the lake floor will indeed be a constant problem. It can't help but effect the quality of the water, impacting wildlife as well as contributing to the pollution of an already threatened lake ecosystem. This is not to mention the impact of the haul boats on the waterway, and the use of the public access point. It has been said that most of the extraction will occur during the off season. This is not to be believed. Why is it that money and greed are priorities that are placed above the protection of our greatest natural resource, clean water? Let sleeping dogs lie. Leave the logs where they are until it can be proven beyond a shadow of doubt that there will be no impact on the lake. My vote as a member of the public is not to allow the logs to be removed from the Somers Bay

access site.

Many thanks,

Wendy Anderson
Bigfork, Montana

Response to Comment 18. (Anderson):

Sediment and Water Quality: North Shore intends to monitor phosphorus, turbidity, dissolved nitrogen and heavy metals before during and after the salvage activities. For further discussion of the monitoring plan, please see the response to Comment 2.

Comment 19. (Schlaper)

DNRC,

I have followed this project since it's inception. As a an owner of land in Somers that overlooks the proposed submerged logs project, and having reviewed the entire process for removal and al the inherent environmental concerns, I am in complete support of this project moving forward.

Todd Schlapfer

509-951-5121

Response to Comment 19: Thank you for commenting on the Flathead Lake Submerged Log Project.

Comment 20. (Stanford/FLBS)

From: Stanford, Jack [jack.stanford@flbs.umt.edu]
Sent: Thursday, July 29, 2010 3:37 PM
To: Poncin, Greg
Cc: Ellis, Bonnie; lakers@flatheadlakers.org
Subject: RE: Comments on Submerged Log Salvage Draft Environmental Assessment

Greg,
I am sorry that I just was so swamped to do anything to improve the application. If I can help as you move forward, I will do it. I will be on line at my field camp in BC.
A log or two here and there is no big deal as I said to you. But hundreds will be a huge mess and the push back will be hard. Turbidity plumes of size bigger than say 100 m2 is going to create problems for all of us. Also remember that the sediments are anoxic due to very small particle size and compaction so disturbing them releases massive amounts of phosphorus. That could cause localized blooms of bad things we don't want. Bottom line: large scale and long term activity likely will violate all the TMDL criteria for the lake as well as cause the non-deg clause of the Mt statutes to kick in.
Be careful with this one; it can bite badly if done at a larger scale than a few logs per year.
Jack.

Jack. A. Stanford
Jessie M. Bierman Professor of Ecology and Director
Flathead Lake Biological Station
The University of Montana
32125 Bio Station Lane
Polson, MT. 59860-6815
406-982-3301 x236
jack.stanford@umontana.edu
http://www.umt.edu/flbs/

From: Poncin, Greg [mailto:gponcin@mt.gov]
Sent: Thursday, July 29, 2010 4:28 PM
To: Undisclosed recipients
Subject: Comments on Submerged Log Salvage Draft Environmental Assessment

Thank you for taking the time to send us your comments. We understand that this project is of interest to many people - both to people who live near Flathead Lake and to people who visit to enjoy the many amenities the lake provides. We also understand that Flathead Lake is very important not only to the local community but to the entire state. We want to assure you that we are carefully considering each comment letter that comes in to make sure that all applicable issues are adequately analyzed and that the proponent's, (North Shore Development, LLC) proposed action is fully explained. We will be providing responses to all comments in the final environmental document, answering questions posed and clarifying aspects that might seem vague. As soon as the project team feels they have addressed your comments in full, they will be handing the joint environmental assessment document off to DNRC Director Sexton and DEQ Director Opper for the decision. We will be in touch with you as we continue finalizing the environmental assessment so that you can stay involved in the process. Please feel free to email or call with any additional questions you may have at this time. And thank you again for your time and interest in helping guide the design of this project.

Greg Poncin
Kalispell Unit Manager

Jack,

Thanks for your offer to help. We actually could use your assistance to offer some specific constructive feedback on the science we've applied as part of our environmental assessment of potential impacts. As you likely know, Amec Earth and Environmental was contracted to analyze the extent and effect of the turbidity relative to the log recovery methods described in the action alternative (proposed activities). In their analysis they have presented us with some very good information on the affected environment and the environmental consequences associated

with the proposed activities. They have also attached some very interesting calculations pertaining to amount and duration of sediment disturbance.

The proponent's consultant, Jim Cancroft is working with Mark Lorang from the Biological Station, to establish monitoring protocols and thresholds that DEQ can use as they administer the 318 permit.

DEQ, DNRC, and the proponent all realize that Flathead Lake and all its amenities are a valuable resource that must be protected, and that submerged log salvage from this water body, in this day and age, will require extra diligence on everyone's part to avoid as you say, creating problems for all of us. Going in to this we've discussed with the proponent the need to take it slow and see what works and what does not. We'll have the monitoring in place to allow us to make necessary adjustments and involvement from the FLBS will be an important part of making this a long term success for all of us.

Your comments on what we feel is the best available science regarding potential impacts to the water quality will be helpful in making sure we get the best possible project design. You can find the EA on-line at: **http://dnrc.mt.gov/env_docs/june/NorthShore.pdf**.

Response to Comment 20: Dr. Stanford, Flathead Lake Biological Station:

The Montana DEQ will oversee, assist and analyze the data of a the proposed monitoring plan which will help establish baseline conditions in the project activity area, provide for monitoring and sampling during salvage operations, and post salvage monitoring to assess turbidity levels and areas of dispersion. Water samples will be analyzed for turbidity, phosphorous, dissolved nitrogen and heavy metals. Testing will be conducted in accordance with standard field methods prescribed by the U.S. Geological Survey (USGS 2010), National Park Service (NPS, 2008) and University of Montana Flathead Lake Biological Station at Yellow Bay.

The plan was developed by AMEC Earth and Environmental Consulting and Northwest Management, with input from Mark Lorang of the Flathead Lake Biological Station, Dr.Johnnie Moore, professor of geology at the University of Montana, DNRC and DEQ.

Data will be analyzed, and operations will be adapted as necessary to ensure compliance with Montana's water quality rules and regulations.

Comment 21. (O'Toole)

From: Tim O'Toole [totoole@vestal-wiler.com]
Sent: Wednesday, July 14, 2010 12:05 PM
To: Poncin, Greg
Subject: Re: Log lift

Greg-
Thanks so much for the info. I live in Florida most of the year and have a second home in Bigfork. I just like watching and learning what goes on here.
You were very helpful.

Tim O'Toole

Sent from my 3Gs iPhone.

On Jul 14, 2010, at 12:38 PM, "Poncin, Greg" <gponcin@mt.gov> wrote:

> Tim,
> In answer to your questions, a sawmill was located on the north shore of Somers Bay from the early 1900's until it burned down in the mid 50's. During this time period it was common to use rivers and lakes to transport logs to a mill and such was the case with this mill - logs were floated down the Flathead and Swan Rivers, then rafted to Somers Bay, where they were secured with booms in a sort of floating log yard. The mill managers new from experience that a certain percentage of these logs would sink before they could be plucked from the lake and processed into lumber. Based on the amount of logs that were processed over the years at this mill, some have speculated there may be as much as 80 million board feet laying on the bottom of Flathead Lake.
>
> The sediment is a concern for 2 reasons: 1) The Dept of Environmental Quality (DEQ) requires that anyone who intends to implement projects that may temporarily exceed water quality standards for turbidity in water bodies must apply for a 318 permit. Part of that permitting process is the analysis that verifies it is temporary and can be minimized to the extent possible thru the design of the project, and 2) DEQ and DNRC was not certain what if any toxic substances may be present in the sediment and so contracted a study as part of the environmental analysis to determine that. We understand that water quality in Flathead Lake is a big deal and want to ensure any impacts are minimized before authorizing the project.
>
> Because the majority of logs are the property of Northshore Development (the proponent of this project) they would be the ones to comment on what specifically will be done with the salvaged logs. I've been told by them that they will market these logs for specialty products, such as flooring and beams, but some may be sold for other uses as well.
>
> Additional information can be found in the draft environmental analysis (EA) at
>
> http://dnrc.mt.gov/env_docs/june/NorthShore.pdf or in the attached document.
>
> We'll be taking comments on the draft EA until July 21 and would welcome those or any additional questions you might have.
>
>
> Greg Poncin
> Kalispell Unit Manager
> MT DNRC
> (406) 751-2263

>
> -----Original Message-----
> From: Tim O'Toole [mailto:totoole@vestal-wiler.com]
> Sent: Tuesday, July 13, 2010 4:20 PM
> To: Poncin, Greg
> Subject: Log lift
>
> I read the beacon article with interest. Would you please tell how that many logs got to that part of the lake, why the sediment is such an issue and what is ultimately done with the salvaged logs?
>
> Thank you,
>
> Tim O'Toole
>
> Sent from my iPad
> <NorthShore_DraftEA_DirectorInfoPoints.doc>

Response to Comment 21. (O'Toole):

Turbidity and release of toxic substances have been identified as potential impacts to water quality. North Shore will not conduct salvage activities where toxic sediments are known to be present and will monitor turbidity levels under a monitoring plan approved by the Montana DEQ. For more detail, please see the response to Comment 2.

CHAPTER 5 - CONSULTATION, COORDINATION, AND PREPARATION

LIST OF PREPARERS

Montana Department of Natural Resources and Conservation (DNRC), Montana Department of Environmental Quality (DEQ)

Sonya Germann- DNRC MEPA Coordinator
Greg Hallsten- DEQ MEPA Coordinator

Northwest Management, Inc

Jim Cancroft- Project Leader
Vaiden Bloch – GIS and Map Production
Diane Corrao- Document Production

AMEC Earth & Environmental

Dave Jacobson – Project Manager/Physical Sciences Coordinator
Pat Mullen – Biological Sciences Coordinator/Sr. Review
Kirk Eakin – Vegetation/Wildlife/Threatened, Endangered, and Sensitive Species

The Law Office of Diane Conradi

Diane Conradi-MEPA Document Production

Cohen and Wolf, P.C., North Shore Legal Representative

David Zabel- North Shore Attorney

Northwest Dive and Recovery Services

Jody Bakker- Diver
Jay Barth- Diver

LIST OF AGENCIES AND PERSONS CONSULTED

Montana Department of Natural Resources and Conservation
Montana Department of Environmental Quality
Montana Fish Wildlife and Parks
United States Environmental Protection Agency
Flathead Lake Biological Station

REFERENCES

Bachmann, R. W, 1958, The Ecology of Four North Idaho Trout Streams with Reference to the Influence of Forest Road Construction. Master's thesis. University of Idaho, Moscow.

Bash, J., C. Berman, and S. Bolton, 2001, Effects of Turbidity and Suspended Solids on Salmonids (Final Research Report, Research Project T1803, Task 42, Effects of Turbidity on Salmon). Prepared for the Washington State Department of Transportation, Washington State Transportation Commission, Olympia, WA. **http://www.wsdot.wa.gov/Research/Reports/500/526.1.htm** (accessed on 02/24/10).

Beechie, T.J. and T.H. Sibley. 1997. Relationships between Channel Characteristics, Wood Debris, Fish Habitat in Northwestern Washington Streams. Transactions of the American Fisheries Society 1997; 217-229

Brooke, Kenneth M. 2004. Polycyclic aromatic hydrocarbon migration from creosote-treated railway ties into ballast and adjacent wetlands. Res. Pap FPL-RP-617. Madison, WI: U.S. Department of Agriculture, Forest Service., Forest Products Laboratory. 53 p.

Campbell, H.J. 1954. The Effect of Siltation from Gold Dredging on the Survival of Rainbow Trout and Eyed Eggs in Powder River, Oregon. Oregon Game Commission, Portland, Oregon

Christensen, D.L, B.R. Herwig, D.E. Schindler, S.R. Carpenter 1996. Impacts of Lakeshore Residential Development on Coarse Woody Debris in North Temperate Lakes. *Ecological Applications* 6(4), 1996. pp 1143-1149. Ecological Society of America.

Deleray, M. 2010. Fisheries Biologist, Montana Fish, Wildlife & Parks, Kalispell, Montana. Personal Communication. February 16, 2010.

DEQ, 2001. Montana Department of Environmental Quality, Nutrient Management Plan and Total Maximum Daily Load for Flathead Lake, Montana. December 28.

Ellis, B.K., J.A. Craft, and J.A. Stanford, 2000, Monitoring Water Quality in Flathead Lake, Montana: 2000 Progress Report. Open File Report 158-00. Flathead Lake Biological Station, University of Montana, Polson, MT. **http://www.deq.mt.gov/wqinfo/TMDL/FlatheadLake/FlatheadAppC.pdf** (accessed on 02/25/10).

ERT, 1986. Environmental Research and Technology Inc. D930 Remedial Investigation Draft Task Completion Reports for Surface Water, Sediments, and Aquatic Life Investigations of Flathead Lake (Kalispell Bay) near Somers, Montana.

Fausch, K.D and T.G Northcote. 1992. Large woody debris and salmonid habiat is a small coastal British Columbia stream. Can. J. Fish. Aquat. Sci. 49:682-693.

Federal Register. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for Bull Trout in the Coterminous United States; Proposed Rule. Vol. 75, No. 9. January 14, 2010.

FLBS (Flathead Lake Biological Station), 2010, Flathead Lake Biological Station – Water Quality at FLBS: Flathead Monitoring Program (FMP) Database. FLBS, University of Montana, Missoula, MT. **http://www.umt.edu/FLBS/WaterQuality/default.aspx** (accessed on 02/26/10).

Glenn, E., 2009, Mass of a grain of sand: The Physics Factbook, **http://hypertextbook.com/facts/2003/MarinaTheodoris.shtml** (Accessed March 2, 2010).

Herbert, D.W.., and G .C. Merkens, 1961, The Effect of Suspended Mineral Solids on the Survival of Trout. Int. J. Air Water Pollut. 5: 46-55.

Herbert, D.W.M., and J.M. Richards, 1963l The Growth and Survival of Fish in Some Suspensions of Solids of Industrial Origin. Int. J. Air Wat. Poll. 7:297-302.

Kleinhans, M.G. and Th. W.J. van Asch, 2005, Grain-size sorting and slope failure in experimental Subaqueous grain flows: In: Powders and grains, Eds. R. Garcia-Rojo, H.J. Herrmann, and S. McNamara, Taylor & Francis Group, London, ISBN 0 415 38348, pp, 977-980.

Miller, R.L. and R.J. Byrne, 1996, The angle of repose for a single grain on a fixed rough bed: Sedimentology 6:303-314.

Montana Chapter of the American Fisheries Society. 2008. Bull Trout Status Page. Written by Gary Carnefix.

Montana Department of Environmental Quality. 2001. Nutrient Management Plan and Total Maximum Daily Load for Flathead Lake, Montana.

Montana Department of Natural Resources and Conservation. 2010 DNRC Water Resources Kalispell, Montana. Personal Communication. May24, 2010.

Montana Fish, Wildlife & Parks. 2010a. Montana Fisheries Information System database search. http://fwp.mt.gov/fishing/mFish/

Montana Fish, Wildlife & Parks. 2010b. Species database search. http://fieldguide.mt.gov/

Montana Natural Heritage Program. 2010. Animal Species of Concern Report. http://mtnhp.org/SpeciesOfConcern/?AorP=a

Moore, J.N., J.S. Jiwan, and C.J. Murray, 1982, Sediment Geochemistry of Flathead Lake, Montana: Department of Geology, University of Montana, Missoula, Montana.

Moore, J.N. 2010, Professor of Geosciences, University of Montana. Personal Communication.

National Park Service 2008. Water Quality Monitoring Protocol for Inland Lakes, Natural Resource Report NPS/MWR/GLKN/NRTR – 2008/109.

Naturserve 2010. Species database search. **http://www.natureserve.org/**

Newcombe C.P., and D.D. MacDonald. 1991, Effects of Suspended Sediment on Aquatic Ecosystems. *North American Journal of Fisheries and Management* 11:78-82.

Redding, J.M., C.B. Schreck, and F.H. Everest, 1987, Physiological Effects on Coho Salmon and Steelhead Trout of Exposure to Suspended Solids. Trans. Amer. Fish. Soc. 116: 737-744.

Scullion, J., and R. W. Edwards, 1980, The Effect of Pollutants from the Coal Industry on the Fish Fauna of a Small River in the South Wales Coalfield. Environmental Pollution Series A Ecological and Biological 21:141-153.

Servizi, J.A. and D.W. Martens, 1987, Some Effects of Suspended Fraser River Sediments on Sockeye Salmon (*Oncorhynchus nerka*), p. 254-264. In: H.S. Smith, L. Margolis, and C.C. Wood (ed.) – Sockeye Salmon *Oncorhynchus nerka*) Population Biology and Future Management. Can. Spec. Publ. Fish. Aquat. Sci. 96.

Sleath, J.F.A., 1984, Sea Bed Mechanics: John Wiley & Sons, New York.

Smokorowski, K.E., K.J. Withers, and J.R.M. Kelso, 1999, The Effects of Log Salvage Operations on Aquatic Ecosystems; Predicting the Change in Oxygen Regimes. Can. Tech. Rep. Fish. Aquat. Sci. No. 2297. Great Lakes Laboratory for Fisheries and Aquatic Sciences, Department of Fisheries and Oceans, Sault Ste. Marie, Ontario, Canada.

Stanford, J. A. , B. K. Ellis, J. A. Craft, and G. C. Poole. 1997. Water quality data and analyses to aid in the development of revised water quality targets for Flathead Lake, Montana. University of Montana, Flathead Lake Biological Station, Polson, Montana. 165 pp.

United States Environmental Protection Agency, 1989. Record of Decision. Burlington Northern (Somers Plant) Superfund Site, Flathead County, Montana. September 1989.

U.S. Geological Survey 2010. Lake Water-Quality Assessment for Michigan Inland Lakes, Sampling – Strategy and Methods, Michigan Water Science Center. Website accessed on September 2, 2010.

Weaver, T., M. Deleray, and S. Rumsey. 2006. Flathead Lake and River System Fisheries Status DJ Report No. F-113-R1-R-4, SBAS Project No. 3130, Montana Fish, Wildlife and Parks, Kalispell, Montana.

APPENDICES

A—Proposed Monitoring Plan
Monitoring Surface Water Quality and Lake Bed Sediment Sampling

B—Estimating the Amount of Sediment on the Surface of Salvage Logs

C—Reported Effects of Turbidity and Suspended Sediment Concentrations on Salmonids

D—Location Maps and Aerial Photographs

PROPOSED MONITORING PLAN—MONITORING SURFACE WATER QUALITY AND LAKE BED SEDIMENT SAMPLING

INTRODUCTION

The intent of the water quality sampling is to verify that log salvage operations are consistent with the findings of the Environmental Assessment that any disturbance of sediments is temporary and would cause no significant impacts to the lake environment. The following Sample and Analysis Plan (SAP) is subject to modifications based on potential additional monitoring protocols from the Montana DEQ or the Flathead Lake Biological Station. Different data collection techniques might also be used that are more economical and or more efficient.

Monitoring Objectives:

To determine how long and what changes in water quality occur in the local vicinity of the log salvage operation, which will determine if additional mitigation measures are necessary. Include Montana DEQ representatives in the initial sampling procedures.

Project Background:

AMEC Earth and Environmental Scientists researched and wrote the chapters on Lake Bed Sediments and Water Quality, and Fisheries/Aquatic Resources in the North Shore Development Submerged Logs Project Draft Environmental Assessment (North Shore Development Submerged Logs Project Environmental Assessment). In responding to public comment on issues on water quality and the potential of heavy metals in the lake bottom sediments the Montana DEQ is now requiring a monitoring plan be established prior to grant a 318 permit.

Study Area Description

The proposed project area includes State-owned lake bed below the low watermark north of Pt. Caroline on the west shore and Long Beach on the east shore of Flathead Lake. Log recovery operations would be limited to a designated 5-acre section in the license area. It is understood that the individual 5-acre sections vary greatly in the number of logs to be salvaged. In consultation with the Montana DEQ individual 5-acre sections would be selected and sampled.

MONITORING/SAMPLING SCHEDULE

Schedule

A series of sediment samples would be taken in Somers Bay and in close proximity to the 1,000 foot buffer of the BNSF Somers Bay Superfund Site. Individual sample locations will be determined in consultation with the Montana DEQ.

Water quality samples would be taken at three pre-determined sites chosen in consultation with the DNRC and DEQ. At each sampling location baseline sampling, sampling during salvage operations and post-salvage operations sampling would occur over a two day period in the fall of 2010. The plan would be to repeat the sampling in the spring and summer at other pre-determined locations.

Baseline Monitoring/Sampling

Before any log salvage operations commence baseline water quality data would be collected as described below directly over logs to be salvaged. Water Samples would be taken within 0-5' of the lake bottom,5'-15' above the lake bottom and within 5' of the surface using the handheld mulitimeter for the variables listed in the Methods section below.

Monitoring/Sampling During Salvage Operation

Water quality samples would be collected starting within 0-5' above the lake bottom, then 5' to 15' above the lake bottom and finally within 5' of the surface of the lake as soon as all logs extracted and secured to the pontoon boat. The water quality samples would be repeated in 15 minutes directly at the site and 50' in the direction towards the shoreline.

Post-Salvage Operation Monitoring/Sampling

Water quality samples would be repeated the following day at the previous sampling site before any additional log salvaging occurs. Then, this sampling would be the same as "Baseline" for the prior day but prior activities would be noted on samples.

All samples would be packaged at the conclusion of the day and transported to the appropriate lab. Phosphorous sampling needs to take place within 48 hours of collection

METHODS

North Shore's Sampling and Analysis Plan (SAP) to address water quality concerns associated with submerged log salvage operations (primarily turbidity, phosphorous, and metals) resulting from sediment disturbance includes three primary monitoring/sampling events to establish the following:

- Baseline conditions, i.e., those water quality conditions prior to any log salvage operations and resulting sediment disturbance.
- Monitoring/sampling during salvage operations to evaluate any real-time water quality impacts.
- Post salvage monitoring/sampling to assess the length of time of water quality impacts, if detected, remain within the project area and the spatial extent of those impacts.

In its development of this SAP, North Shore has adopted standard field methods for water quality monitoring prescribed by the U.S. Geological Survey (USGS 2010), National Park Service (NPS 2008), and

University of Montana Biological Station at Yellow Bay on Flathead Lake. Variability in water quality parameters targeted in this study likely occurs in response to seasonal warming, prevailing winds, and inflow. However, North Shore proposes to only implement monitoring/sampling just prior to a salvage event regardless of variability to evaluate to the greatest extent possible the isolated impacts of log salvage operations in reference to baseline conditions at that point in time.

Measurement of Field Parameters

Water quality measurements should represent, as closely as possible, the natural condition of the surface water at the time of sampling. Procedures followed to ensure consistent, high-quality data, include:

- Make field measurements only with calibrated instruments that have been error-checked.
- Maintain a permanent log book for each field instrument for recording calibrations and repairs.
- Test each instrument (meters and sensors) before leaving for the field.

A multi-meter will be used to measure the following core field parameters including temperature, specific conductance (SC), pH, turbidity and dissolved oxygen (DO). A Secchi disk would be used to measure water clarity. Each of these parameters along with methods of measurement is briefly discussed below.

Temperature: Measured in units of degrees Celsius (^{o}C) and recorded to the nearest degree or tenth of a degree as warranted by the instrument and would be measured at approximate sample depth of 0-5 from the lake surface. Field technicians would measure temperature in general accordance with SOP-9 (**Appendix A-1**).

Specific Conductance (SC): Specific conductivity (SC) is the ability of water to conduct an electrical current for a unit length and unit cross-section at a certain temperature, measured in units of microsiemens per centimeter (µS/cm), and recorded to the nearest µS/cm. Commonly used in water quality monitoring, SC is a general measure of the number of ions dissolved in the water. Field technicians would measure SC in general accordance with SOP-7 (**Appendix A-1**).

pH: Commonly used in water quality monitoring, pH is a measure of the acidity of water, measured in standard pH units (SU), and recorded to the nearest 0.1 pH unit. The pH scale is from 1 to 14: neutral water is pH 7, acidic waters have pH <7, and alkaline waters have pH >7. Field technicians would measure pH in general accordance with SOP-8 (**Appendix A-1**).

Dissolved Oxygen: Dissolved Oxygen (DO): units of mg/L record value to nearest 0.1 mg/L unless otherwise justified; percent saturation (% DO) record value to nearest %; also temperature compensated to 25°C. Field technicians would measure DO in general accordance with SOP-10 (**Appendix A-1**).

Clarity: Measurement of Secchi disk transparency has historically been the most common means of measuring water clarity due to its simplicity. It is a qualitative evaluation of the transparency of water to light based on the reflection of light from the surface of the Secchi disk and is a function of the absorption characteristics both of the water and its dissolved and particulate matter. To get an accurate measure of Secchi depth, the disk must hang vertically from the side of the boat. A transparency turbidity tube is used to estimate stream quality as it relates to suspended materials in water, measuring water clarity and is recommended when the Secchi disk can be seen on the lake bottom or when the disk does not hang vertically due to a current or an unstable boat.

Turbidity: Turbidity is defined as an "expression of the optical property that causes light to be scattered and absorbed rather than transmitted in straight lines through the sample." The scattering of light through water is due principally to the presence of suspended particles. In surface waters, these solids include materials such as clay, silt, organic and inorganic materials, soluble colored compounds, plankton, and microscopic organisms. Real-time turbidity monitoring would be conducted using a portable hand-held turbidimeter with an immersible probe that can be lowered to the desired depths correlating to sampling. Measurements would be recorded on field forms in nephelometric Turbidity Units (NTUs).

Water Sample Collection

Water samples would be collected for laboratory analysis of total phosphorous, nitrogen and dissolved metals using an integrated sampling tube or a Van Dorn sample bottle. Information recorded in the field log book or field data sheet would include:

- Site identification code.
- Sample date, time, and depth.
- Whether duplicate samples for quality control were collected at this site.
- Any additional notes or observations pertinent to this sample or location for this sampling period.

A tube sampler collects and integrates a column of water into a single sample. If the top end is capped, all or most of the water wouldl remain in the tube as it is raised. The main advantage over using a surface dip (often called a grab sample), is that a larger stratum of water in the epilimnion is represented by the sample, reducing the effect of high chlorophyll concentrations from concentrated scums on the seasonal mean. Bottom water, and on occasion other depths, wouldl be sampled using a Van Dorn remote-closing water bottle.

Decontamination procedures specific to both the tube and Van Dorn samplers would include thorough rinsing three times with hot tap water, rinsing three times with 0.1 N HCl, and finally, rinsing three times with deionized water.

Integrated Sampling Tube:

- Following prescribed decontamination procedure, rinse compositing jug and sampler three times before sampling.

- Collect sample by lowering sampler into water column to 2 m depth, secure the top stopper, raise the sampler vertically, and immediately drain it into the compositing jug. Fill the jug at least 75% full to ensure adequate water for all analyses.
- Once water is collected, immediately begin dispensing it into the appropriate analyte bottles.

Van Dorn Sampler:

- Following prescribed decontamination procedure, rinse compositing jug and sampler three times before sampling.
- Collect sample by lowering sampler to depth approximately 1 m above lake bottom, open sampler, collect, and raise to surface.
- Stand the Van Dorn on the side of the boat or boat seat, crack top slightly and rinse and fill sample bottles.

Water Sample Analysis

All samples collected for laboratory analysis would be containerized, and preserved according to meet laboratory requirements and in general accordance with SOP-15 (**Appendix A-1**). Samples would be documented and shipped under chain-of-custody to the laboratory in general accordance with SOP-18 (**Appendix A-1**). Table 1 below, provides a summary of sample analyses including method, containerization, and preservation. Total metals include arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, and zinc.

TABLE 1

SUMMARY OF LABORATORY ANALYTICAL METHODS

Analyte	Laboratory Method	Sample Container	Preservative
Total Phosphorous	SM 4500-P-E	250 ml plastic	H_2SO_4
Total Nitrogen	SM 4500 or EPA equivalent	500 ml plastic	H_2SO_4
Total Suspended Solids	SM 2540-D	1 L plastic	raw
Total Metals	mercury – EPA 245.1 others – EPA 200.8	250 ml plastic	HNO_3

Sediment Sampling

A series of sediment samples would be taken in Somers Bay and in close proximity to the 1,000 foot buffer of the BNSF Somers Bay Superfund Site. Individual sample locations would be determined in consultation with the Montana DEQ.

The intent is to sample the following:

- Measure and sample sediment on logs. Measure the thickness and test for heavy metals.
- Take core sample of lake bottom to look at its stratigraphy and determine the thickness of the flock layer. Test for heavy metals.

Recording Field Information

Waterproof field forms used to record physical and chemical water quality field data wouldl be prepared ahead of time, labeled with the project and station IDs. In addition to recording the field variables, any samples collected for laboratory analyses will be indicated. Documentation would include:

- Date, time of day, GPS coordinates to verify location.
- Water appearance - general observations on water may include color, unusual amount of suspended matter, debris, or foam.
- Weather - recent meteorological events that may have impacted water quality include heavy rains, cold front, wind and wave action.
- Biological activity - excessive macrophyte, phytoplankton, or periphyton growth.
- Watershed or in-lake activities - shoreline, inlet stream, or drainage-basin activities or events such as bridge construction, shoreline mowing, new construction, high densities of fast moving boats or personal water craft close to shore.
- Description of any photographs taken.
- Field instrument calibrations.
- List of field parameter measurements and samples collected.

Sampling Equipment Decontamination

Field technicians would decontaminate field sampling equipment according to SOP-2 (**Appendix A-1**) as appropriate to avoid contamination of samples to be measured.

QUALITY ASSURANCE/QUALITY CONTROL

Quality control is the planned and systematic pattern of all actions, or controls, necessary to provide adequate confidence that a project outcome optimally fulfills expectations. Quality assurance is a program for the systematic monitoring and evaluation of the various aspects of a project to ensure that standards of quality are being met. Together, quality assurance/quality control (QA/QC) is a significant part of any monitoring program. It is a broad management concept of maintaining the ability to provide reliable information, requiring the complete integration of field and laboratory systems of sample collection and analysis. QA/QC incorporates peripheral but essential operations such as survey design, equipment preparation, maintenance tasks, data handling, and personnel training. The objective of

QA/QC is to ensure that the data generated by a project are meaningful, representative, complete, precise, accurate, comparable, and scientifically defensible (National Park Service, 2008).

Field technicians will collect one QC sample per sampling event consisting of a split or duplicate sample to calculate laboratory precision. This sample would be prepared, labeled, and submitted for laboratory analysis in accordance with SOP-19 (**Appendix A-1**).

REPORTING/FEEDBACK LOOP

All lab data would be available to DEQ as soon as it is returned to North Shore. The intent of the water quality sampling is to verify that log salvage operations would cause no significant impacts to the lake environment. If the data indicates a cause for concern more extensive monitoring could occur or additional mitigation measures applied. North Shore understands the need to follow an "adaptive management approach" to the log salvage operations. For example, in 5-acre sections that contain above average amounts of submerged logs, North Shore might only salvage logs every other day or week if water quality samples indicate a reason of concern.

Appendix A-1

STANDARD OPERATING PROCEDURE

EQUIPMENT DECONTAMINATION

SOP-2

The purpose of this section is to describe general decontamination procedures for field equipment. Decontamination will be performed on all non-dedicated and non-disposable sampling equipment that may contact potentially contaminated media. Field personnel must wear disposable latex or Nitrile gloves while decontaminating equipment at the project site, and shall change gloves between samples. Every precaution must be taken by personnel to prevent contaminating themselves with the wash water and rinse water used in the decontamination process.

Table A-1 lists equipment and liquids necessary to decontaminate field equipment.

The following should be done in order to complete thorough decontamination:

1. Set up the decontamination zone upwind from the sampling area to reduce the chances of windborne contamination.
2. Visually inspect sampling equipment for contamination; use stiff brush to remove visible material.
3. The general decontamination sequence for field equipment includes: wash with Liquinox or an equivalent degreasing detergent; deionized water rinse; 10% dilute nitric acid rinse; rinse with deionized water three times.
4. Rinse equipment with methanol in place of the nitric rinse if sampling for organic contamination. Follow with a deionized water rinse.
5. Decontaminated equipment that is used for sampling organics should be wrapped in aluminum foil if not used immediately.
6. Clean the outside of sample container after filling sample container.

Alternatively, field equipment can be decontaminated by steam cleaning, rinsing with 10% dilute nitric acid, and rinsing with deionized water.

All disposable items (e.g., paper towels, latex gloves) should be deposited into a garbage bag and disposed of in a proper manner. Handling and disposal procedures for the rinse and wash water will be specified in the project work plan.

TABLE A-1. EQUIPMENT LIST FOR DECONTAMINATION

5-gallon plastic tubs	Liquinox (soap)
5-gallon plastic water container	Hard bristle brushes
5-gallon carboy DI water	Garbage bags
1-gallon cube of 10% HNO_3	Latex gloves
1-gallon container or spray bottle of 10% Methanol or pesticide grade acetone for organics	Spray bottles
	Paper towels, aluminum foil

STANDARD OPERATING PROCEDURE

EQUIPMENT DECONTAMINATION

SOP-2

The purpose of this section is to describe general decontamination procedures for field equipment. Decontamination will be performed on all non-dedicated and non-disposable sampling equipment that may contact potentially contaminated media. Field personnel must wear disposable latex or Nitrile gloves while decontaminating equipment at the project site, and shall change gloves between samples. Every precaution must be taken by personnel to prevent contaminating themselves with the wash water and rinse water used in the decontamination process.

Table A-1 lists equipment and liquids necessary to decontaminate field equipment.

The following should be done in order to complete thorough decontamination:

1. Set up the decontamination zone upwind from the sampling area to reduce the chances of windborne contamination.
2. Visually inspect sampling equipment for contamination; use stiff brush to remove visible material.

3. The general decontamination sequence for field equipment includes: wash with Liquinox or an equivalent degreasing detergent; deionized water rinse; 10% dilute nitric acid rinse; rinse with deionized water three times.
4. Rinse equipment with methanol in place of the nitric rinse if sampling for organic contamination. Follow with a deionized water rinse.
5. Decontaminated equipment that is used for sampling organics should be wrapped in aluminum foil if not used immediately.
6. Clean the outside of sample container after filling sample container.

Alternatively, field equipment can be decontaminated by steam cleaning, rinsing with 10% dilute nitric acid, and rinsing with deionized water.

STANDARD OPERATING PROCEDURE

FIELD MEASUREMENT OF pH

SOP-8

INSTRUMENT CALIBRATION

1. Meter should be calibrated with appropriate standards and checked per manufacturer's recommendations. The two point standard method should be used for calibration. If instrument is a multi-parameter meter follow instructions for measurement of pH from manual.

FIELD PROCEDURES

1. Rinse decontaminated glass beaker with approximately 50 milliliters of sample water three times.

2. Rinse pH electrode with deionized water.
3. Check meter using 7.0 pH buffer. Re-calibrate meter, if not within 0.1 pH standard units (s.u.).
4. Fill beaker with sample water.
5. Immerse probe in sample, agitate probes to provide thorough mixing. Continue to agitate until reading has stabilized. Read pH to nearest 0.1 s.u. If reading is being taken in-situ or with flow-through evacuation from a well, wait until reading stabilizes and record.
6. Record the sample pH on field measurement form. Note any problems such as erratic readings. If previous readings are available compare current measurement to previous reading to check that current reading is within reasonable limits.
7. Rinse probe with deionized water and store according to manufacturer's directions.

STANDARD OPERATING PROCEDURE

FIELD MEASUREMENT OF WATER TEMPERATURE

SOP-9

1. Most field meters are equipped with temperature probes as a function of other field parameters. Water temperature is typically recorded using either a multi-parameter, specific conductance or pH meter. When possible, measure temperature of surface water at midstream submersing the probe for approximately one minute or until temperature stabilizes. Temperatures should be collected from moving water, avoiding still pools which may be warmer than actual conditions.
2. When in situ temperature measurements are not possible, draw sample of at least 200 mL into a decontaminated beaker or sample bottle as soon after sampling as possible.
3. Place probe in sample. Allow to equilibrate (about 1 minute). During winter conditions record temperature immediately if not checking in-situ, particularly with groundwater samples.
4. Record temperature to nearest 0.5° in field log book or on field data sheet.
5. Rinse probe with deionized water.

STANDARD OPERATING PROCEDURE

FIELD MEASUREMENT OF DISSOLVED OXYGEN

SOP-10

1. Rinse probe and cable with deionized water.
2. Prepare probe and dissolved oxygen (DO) meter or multi-parameter meter in accordance with instrument manufacturer's operating procedures (in meter box). Make certain probe contains sufficient electrolyte and the oxygen sensor membrane is in good repair.
3. Calibrate probe and meter using the fresh water-air calibration method. Correct calibration value for temperature and altitude; adjust meter accordingly.
4. When possible, place probe directly into the stream or water to be measured. If not possible, place probe into beaker filled with sample. Manually raise and lower probe through sample about 1 foot/second. Allow sufficient time for probe to stabilize to sample temperature and dissolved oxygen concentration.
5. Read dissolved oxygen value. Record appropriate data on field forms.

STANDARD OPERATING PROCEDURE

QUALITY CONTROL SAMPLES

SOP-18

Quality Control (QC) samples are submitted along with natural samples to provide supporting laboratory data to validate laboratory results. QC samples are submitted blind, and do not have any unique identifying codes that would enable the lab or others to bias these samples in any way. Usually, the time or sampling location is modified in a way which will separate blank and standard samples from the rest of the sample train. QC samples are identified only on field forms and in field notebooks. The following codes are typically used:

N	Natural Sample	Soil, water, air, or other of interest material from a field site
SP	Split Sample	A portion of a natural sample collected for independent analysis; used in calculating laboratory precision
D	Duplicate Sample	Two samples taken from the same media under similar conditions; also used to calculate precision
BB	Bottle Blank	Deionized water collected in sample bottle; used to detect contamination sampling containers
CCB	Cross Contamination	Deionized water run through decontaminated equipment and analyzed for Blank residual contamination and deionized water contamination
BFS	Blind Field Standard	Certified materials of known concentration; used to determine laboratory accuracy
TB	Travel or Trip Blank	Inert material (deionized water or diatomaceous earth) included in sample cooler; sent by the lab, the sample is used to determine if contamination by volatiles is present during collection or shipping

In general, selected QC samples will be inserted into the sample train within a group of twenty samples. Unless otherwise specified, QC samples will be prepared in the field. Deionized water blanks will be collected from carboys and cubitainers used in the field. An exception to field preparation of QC samples is the preparation of some blind field standards. Since the concentration of analytes in the sample is to be mixed according to specific

manufacturer's instructions, field conditions may not provide the needed laboratory atmosphere. This is especially true for volatile organic compounds, which need to be prepared just before analyzing. Under these circumstances, standards will be shipped to the laboratory for preparation, keeping the concentration or manufacturer's QC Lot Number as blind as possible.

The number and types of samples submitted for each group of natural samples will be determined by the project manager and others, including state or Federal agencies, and will be defined in the project work plan. Each field crew leader will be responsible for all QC samples prepared by that crew.

STANDARD OPERATING PROCEDURE

SAMPLE PACKAGE AND SHIPPING

SOP-19

All environmental samples collected should be packaged and shipped using the following procedures:

PACKAGING

1. Label all sample containers with indelible ink (on the side, not on the cap or lid). Place labeled sample bottles in a high quality cooler containing an adequate amount of ice and/or frozen blue ice (appropriate for the season), making sure the cooler drain plug is taped shut.
2. Place the samples in an upright position and wrap the samples with absorbent, cushioning material for stability during transport. Samples should not be loose; the cooler should be able to withstand tough handling during shipment without sample breakage.
3. Fill out the appropriate shipping forms, and place the paperwork in a Ziploc bag and tape it to the inside lid of the shipping container. Shipping forms usually include: 1) a chain-of-custody form, documenting the samples including in the shipment; 2) an analysis request form, specifying the laboratory analyses for each sample. If more than one cooler is used per chain of custody, put a photocopy in the other coolers and mark them as a copy.
4. Close and seal the cooler using fiberglass strapping tape.
5. Secure the shipping label with address, phone number, and return address clearly visible.

SHIPPING HAZARDOUS MATERIALS/WASTE

Hazardous materials need to be shipped using procedures specified under Federal Law. Samples need to be shipped in Ziploc bags or paint cans filled with packing material, depending on the level of hazard. Special package labeling may be needed. Consult the project manager for specific shipping procedures.

ESTIMATING THE AMOUNT OF SEDIMENT ON THE SURFACE OF SALVAGE LOGS

This Section describes the calculations used to determine the amount of sediment that could be present on logs to be salvaged in Flathead Lake, and the equations used to estimate the time that sediment particles would remain suspended in the water column after being washed off the logs.

The proposed salvage logs on the bottom of Flathead Lake will have accumulated a surface coating of sediment from the deposition of suspended particles over the period of time when the log reached the lake sediment to the present. Quantitative information on the amount of accumulated sediment on salvage logs in Flathead Lake is not available. An estimate of the maximum amount of sediment that could have accumulated on a log was obtained using the typical diameter of the logs (18 in) and an estimated angle of repose for accumulated sediments.

The angle of repose is the maximum slope angle that unconsolidated particles can maintain; at higher angles friction is not sufficient to counter the force of gravity and a particle will be transported down the slope (i.e., off the surface of a salvage log). A considerable body of scientific literature exists on the calculation of the angle of repose of submerged particles (e.g., Sleath, 1984; Miller and Byrne, 1966; Kleinhans and van Asch, 2005, and cited references). The angle of repose increases with decreasing particle size, increasing cohesiveness of the particles, increasing particle angularity, and decreasing uniformity of the particles; values can range from nearly 90 degrees to less than 20 degrees, depending on the values of these parameters (Miller and Byrne, 1966). An angle of repose equal to 33 degrees was selected to estimate the maximum accumulation of sediment on salvage logs; this value is within the range of average values reported for well rounded sand (32.2 – 33.5) by Miller and Byrne (1966).

Figure 1 shows a cross section of a salvage log with a 9 inch radius. The shaded area represents the theoretical maximum sediment that would accumulate at a given position along the log, assuming an angle of repose equal to θ_3. The amount of sediment on the log is calculated by first determining the area of the circle segment between Line c and Arc s (Equation 0.1). The segment area is then subtracted from the area of triangle ABC (Equation 0.2) to obtain the cross-section area of accumulated bulk sediment (Equation 0.3). The total mass of sediment on a single log (Equation 0.4) is calculated by multiplying the cross-section area of bulk sediment (sediment and pore water) by the length of the log (assumed to be 204 in.), (1 – sediment porosity), and the density of accumulated sediment particles (assumed to be 2.65 kg/L). Porosity data is not available for Flathead Lake sediments; the value of 0.45 is a typical value for sediments consisting primarily of silt and clay sized particles (http://www.geology.sdsu.edu/clases/geol1351/porosity.htm). The accumulated sediment is assumed to consist primarily of inorganic particles, therefore, a density of 2.65 kg/L (the density of quartz sand particles) was assumed for TSS calculations (Elert, 2009). The angles and line segment lengths used to determine the circle segment and triangle areas are shown below (all angles are measured in radians):

$$\text{Segment Area} = 0.5 * \lfloor (r * s) - (c * d) \rfloor = 9.654\, in^2 \qquad (0.1)$$

$$\text{Triangle ABC Area} = \left(0.5 * h * c\right) = 15.603\ in^2 \qquad (0.2)$$

$$\text{Cross Section Accumulated Sediment Area} = 15.603 - 9.654 = 5.949\ in^2 \qquad (0.3)$$

$$\text{Sediment Mass} = \left[5.949\ in^2 * 204\ in * 0.0164\left(\frac{L}{in^3}\right) * \left(1 - 0.45\right) * 2.65\left(\frac{kg}{L}\right)\right] = 29\ kg \qquad (0.4)$$

Where:

r = log radius	=	9.0 in.;
s = [r * (angle of θ)]	=	10.367 in.;
c = [2 * r * Sin(θ/2)]	=	9.803 in.;
d = [2 * r * Cos(θ/2)]	=	7.548 in.;
a = [(c/2) * Sin(θ_3/2)]	=	5.845 in.;
h = [a* Sin(θ_3]	=	3.183 in.;
θ = [180 – 2*θ_2], (66º)	=	1.152 radians;
θ_2 = [90 – θ_3], (57º)	=	0.995 radians; and
θ_3 = angle of repose, (33º)	=	0.401 radians.

The theoretical maximum depth of sediment on top of a 9-in. diameter log, assuming an angle of repose of 33°, is 1.4 in. Underwater observations of the amount of sediment on the proposed salvage logs indicates that sediment accumulations are substantially less than this depth, and are estimated to be approximately 1/8 in. or less (Jody Bakker, personal communication). Estimates of TSS were calculated by assuming a 1/8 in. accumulation of sediment along the Arc s shown in Figure 1.

Estimating Total Suspended Solids (TSS) from Salvage Operations

To estimate increases in TSS from log salvage operations, it is assumed that divers will brush accumulated sediment off the surface of a log before raising the log up through the water column. It is assumed that the initial increase in turbidity from this action would occur within a depth of 3 ft from the lake bottom and extend within a right cylinder equal to the length of the salvage log (17 ft). This assumption results in an initial TSS impact volume of 21,617 liters. Assuming that the sediment suspended in this volume is distributed equally within this volume, the increase in TSS from the salvage of one log is estimated to be 2,921 mg/L.

Estimating the Deposition Time for Suspended Particles

An estimate of the time required for particles suspended during log salvage operations to resettle to the lake bed was obtained by calculating the equilibrium fall velocity (W) for the estimated median grain size of particles that have accumulated on salvage logs. The equation used is shown below (Sleath, 1984):

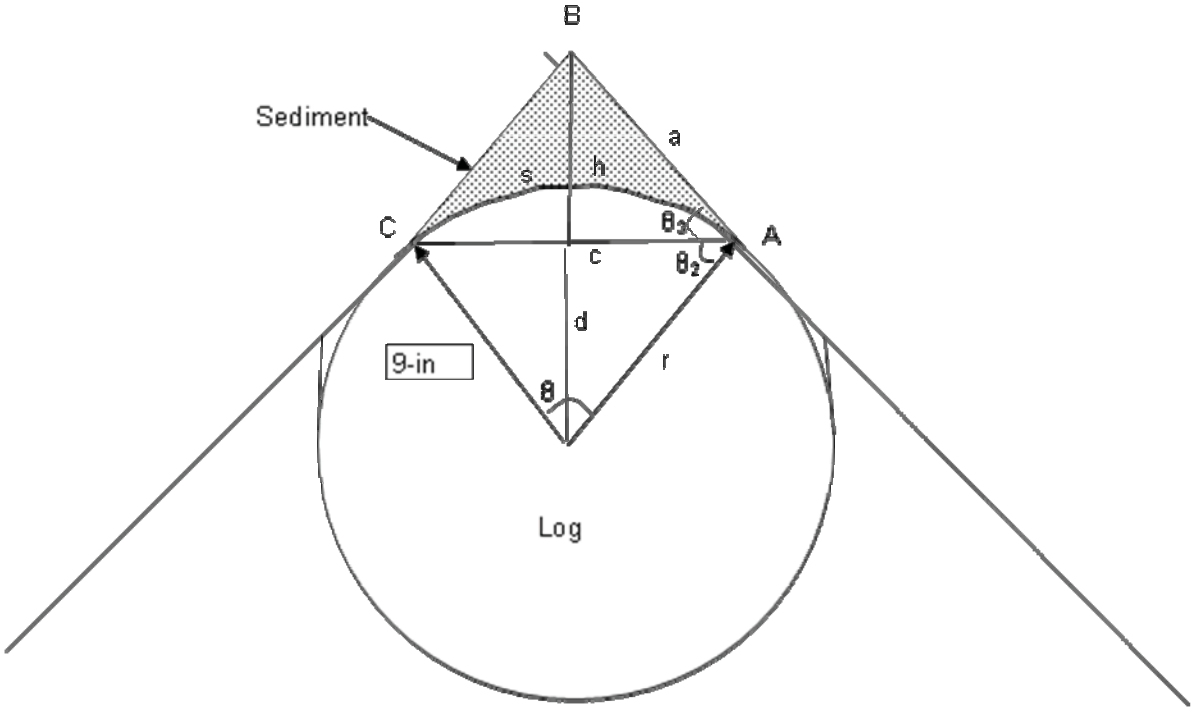
$$W = \left[\frac{g * D^2}{18 * \nu} \left(\frac{\rho_s - \rho_w}{\rho_w} \right) * CF \right] \qquad (0.5)$$

Where:

W = particle equilibrium fall velocity	=	0.000431 ft/s
g = acceleration of gravity	=	9.81 m/s^2;
D = median grain size	=	1.38E-05 m;
ν = kinematic viscosity of water at 50° F =		1.31E-06 m^2/s;
ρ_s = particle density	=	2.65 kg/L; and
ρ_w = water density	=	1.0 kg/L.
CF = conversion factor from m/s to ft/sec	=	3.280833

The mean grain size (percent weight basis) of surficial sediments in Flathead Lake consists of 36.8 percent silt-sized particles and 60.2 percent clay-sized particles (Moore et al., 1982). A weighted average using these fractions and a mean particle diameter for silt (33 µm) and clay (2.1 µm) sized particles was used to estimate the particle diameter used in Equation (0.5).

Using equation (0.5), if sediment particles are suspended 3 ft above the lake bottom during salvage operations, it is estimated that it would take 1.9 hrs for the particles to resettle to the lake sediments.



GEOMETRY FOR CALCULATING LOG SEDIMENT AREA

Flathead Lake Log Salvage
Flathead Lake, Montana

By: KAM Date: 03/01/10 Project No. A00249.000

AMEC Geomatrix

P:\Flathead Lake Log Salvage\Figure\Fig 1_Sed on log.xls

TABLE RES-1

REPORTED EFFECTS OF TURBIDITY AND SUSPENDED SEDIMENT CONCENTRATIONS ON SALMONIDS[1]

Flathead Lake Log Retrieval Environmental Assessment

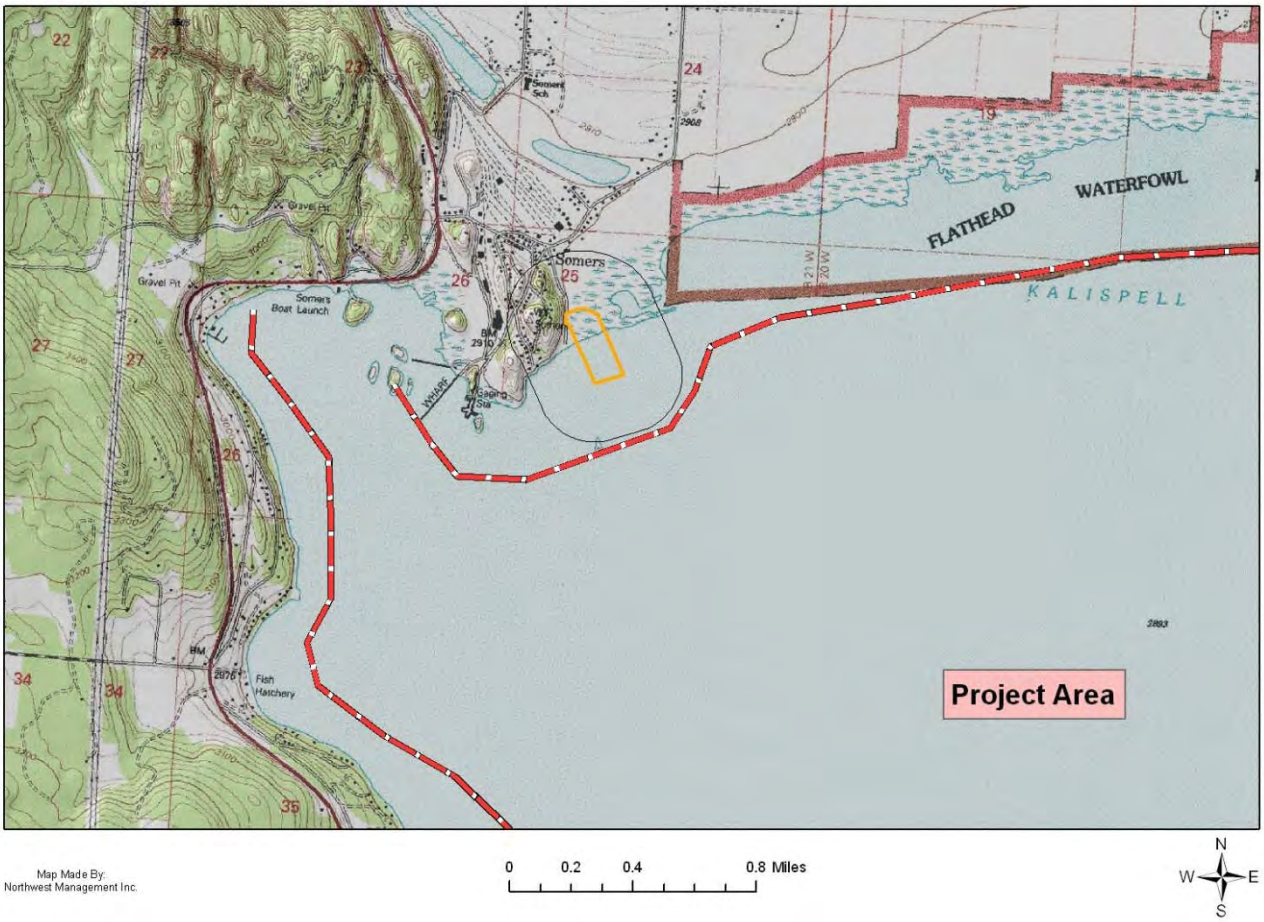
Flathead Lake, Montana

Effect	Species Life Stage	Concentration (mg/L)	Reference[2]
Reduced survival	Rainbow trout juvenile (*Oncorhynchus mykiss)*	270	Herbert & Merkens, 1961
	Rainbow trout juvenile	200	Herbert & Richards, 1963
	Rainbow trout juvenile	1,000 – 2,500	Campbell, 1954
	Rainbow trout juvenile	90	Herbert & Merkens, 1961
Mortality (96-hr LC_{50})	Whitefish juvenile (*Prosopium williamsoni*)	16,613	Newcombe & Mcdonald, 1991
	Rainbow trout juvenile	19,364	Newcombe & Mcdonald, 1991
Reduced growth (1,848-hr exposure)	Rainbow trout juvenile	50	Herbert & Richards 1963

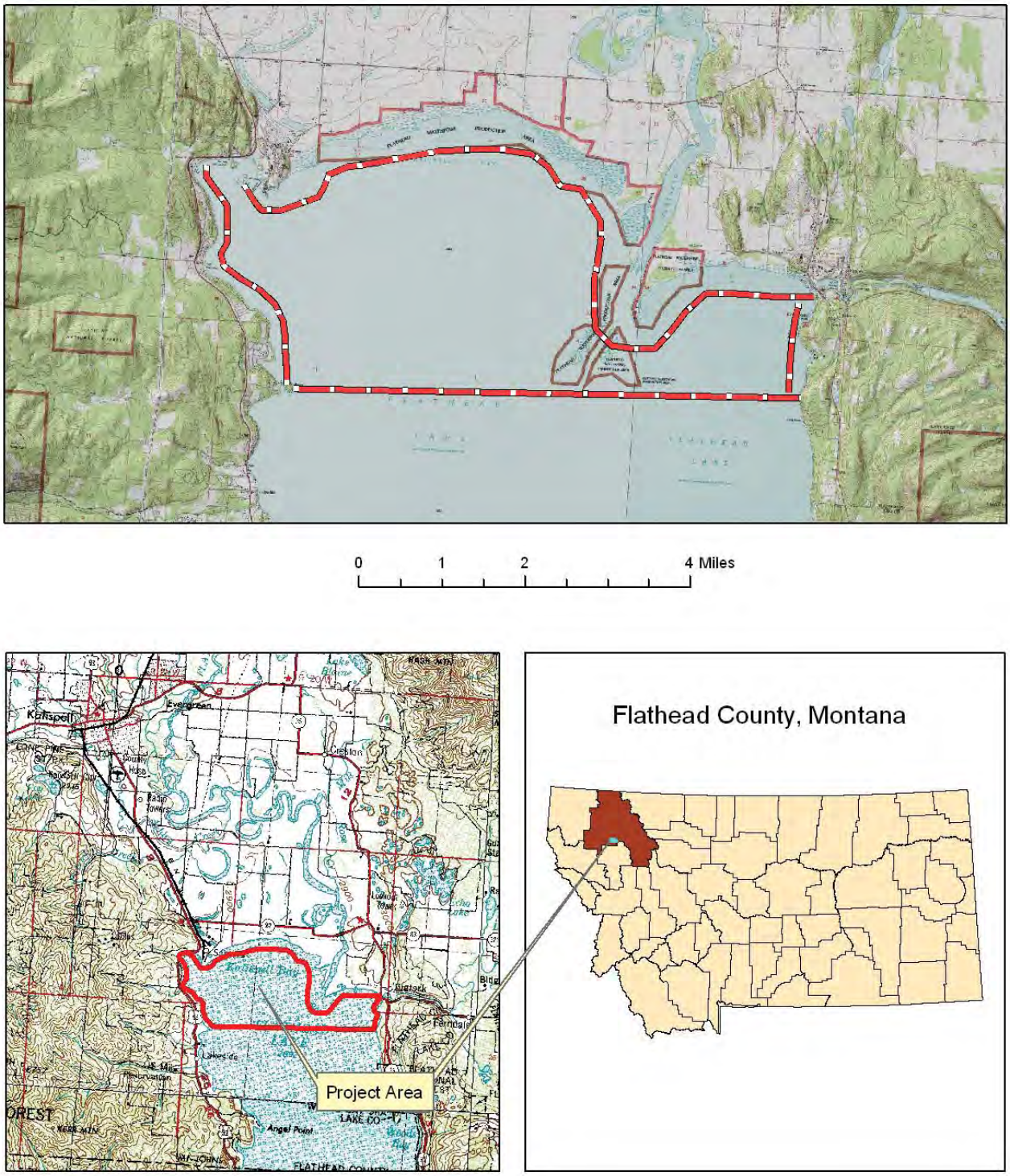
Reduced feeding	Cutthroat trout (*O. clarkii*)	35	Bachman, 1958
Reduced condition factor	Rainbow trout juvenile	110	Scullion & Edwards, 1980
Altered diet	Rainbow trout juvenile	110	Scullion & Edwards, 1980
Disease (fin rot)	Rainbow trout juvenile	100 – 270	Herbert & Merkens, 1961
Displacement	Rainbow trout juvenile	110	Scullion & Edwards, 1980
Histological damage (96-hr exposure)	Rainbow trout juvenile	171	Newcombe & McDonald, 1991
Gill trauma (96-hr exposure)	Sockeye underyearling (*O. nerka*)	3,148	Servizi & Martens, 1987
Stress (increased plasma cortisol when exposed for 7 – 8 days)	Rainbow trout yearling	2,000 to 3,000 mg/L (topsoil)	Redding et al., 1987

LOCATION MAPS AND AERIAL PHOTOGRAPHS

Map # 1 Somers Bay BNSF Superfund Site Buffer



Map #2 - Location Map



Map Made By:
Northwest Management Inc.

Aerial Photo #1 - Proposed Project Area

Aerial Photo #2 - Proposed Buffer

Aerial Photo #3 - Water Rights