

*Public Utility District No. 1 of Okanogan County
Enloe Hydroelectric Project
FERC Project No. 12569*

October 26, 2005

**Supplement to
Initial Consultation Document**

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PRELIMINARY ASSESSMENT OF PREVENTION, MITIGATION, AND ENHANCEMENT MEASURES AND DRAFT STUDY PLANS

WATER QUANTITY

Preliminary Assessment of Prevention, Mitigation, and Enhancement Measures

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
Tailrace water quality and quantity issues.	With an east bank configuration, dam/hydropower operation would not reduce flow in the river below the falls.	18 CFR 4	The tailrace will discharge near the falls and should keep water quality there within acceptable limits.	In concert with an assessment of aquatic habitat and water temperature assessments, stream flow data will be updated through 2005, and monthly low flow exceedance values re-calculated.	Determine the necessary instream flow requirements for periods other than normal “run-of-river” operation. Provide engineering and design alternatives to reduce the impacts to fish habitat below the project.
Dam and impoundment	Construction and maintenance impacts	18 CFR 4	Construction and maintenance activities will need to be performed during specified flow conditions so that environmental effects can be minimized and the activities can be efficiently and safely conducted.	Stream flow statistics will be updated as part of other studies and engineering needs, and will be used to identify any periods where construction and maintenance activities are not recommended.	Determine feasible range of stream flows to conduct construction and maintenance activities. Provide guidelines depending on seasonal flow character.
Storage potential with flashboards	An additional 280+ AF of storage	18 CFR 4	Flashboards were designed into the original project and have certain impacts to project operations and the reservoir.	Perform an incremental feasibility assessment of the Project with and without flashboards. Investigate the potential environmental impacts of flashboards. Determine acceptable operating criteria.	Minimize environmental affects such as developing operating criteria to not disturb spawning areas downstream.
Water rights	Additional water rights may be required.		With the proposed east bank configuration, an optimum	Develop water right applications to Department of Ecology for	Provision of water to the City of Oroville would

			<p>hydropower size of 1,600 cfs may require an additional 600+ cfs water right over the PUD's current 1000 cfs water right. A storage water right may be needed to allow the City of Oroville to use 280+ Acre-Feet (AF) of water made available by installing flashboards.</p>	<p>additional 600 cfs non-consumptive power water use and 280+ AF water storage for municipal use.</p>	<p>represent an important augmentation of firm water supply to a municipal water system currently under moratorium and facing growth in demand.</p>
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WATER QUALITY

Preliminary Assessment of Prevention, Mitigation, and Enhancement Measures

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Evaluation	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
General project area	Possible entrainment of sediments in water column resulting in water quality criteria exceedances	18 CFR 4 Lower Similkameen River Arsenic Total Maximum Daily Load Draft Detailed Implementation Plan (Ecology 2005)	Some mobilization of sediment is likely during construction and would be a short-term effect. Potential for increased sediment mobilization during Project operation is addressed under Geomorphic and Geotechnical.	Sediment samples are needed in the area of the penstock intake and/or other areas where possible sediment disturbance during construction. Sample data will be used to estimate water quality impacts from removal methods. Other samples may be needed to support sediment transport analyses. See the Sediment Control Study Plan. Ecology seeks local support to obtain water samples at Oroville during a high flow event as part of their Draft Detailed Implementation Plan for the arsenic TMDL. Collect samples upstream and downstream from the project during this effort.	PM&Es to be completed with construction BMPs and designs to limit sediment mobilization and transport during operation. Consider providing local support to Ecology in obtaining representative water samples during a high-flow event (Ecology 2005).
General project area	Impact of Project facilities, operations, and maintenance on temperature	18 CFR 4 Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC, Ecology 2003)	Because the Project is essentially a run-of-the-river operation with relatively small storage capabilities if flashboards are used, temperatures are not likely to be substantively affected by the Project (i.e., the project is not expected to contribute to a warming of the river by more than 0.3°C over natural conditions).	Deploy temperature loggers and record temperature data at 30-minute intervals from June through September upstream from the project, in the forebay, in the bypassed reach, and below the powerhouse. See the Water Temperature Monitoring Draft Study Plan	Planting riparian trees would likely improve fisheries habitat and provide some additional shade to the river, therefore helping to prevent warming of the water.
Similkameen River below powerhouse	Impact of Project operations on total	18 CFR 4 Water Quality Standards for Surface	Because routing most of the river flows through the powerhouse nine months of the year will reduce the	Monitor total dissolved gas below the powerhouse during spring runoff to document pre-project	No need for prevention, mitigation, or enhancement measures is anticipated.

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Evaluation	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
	dissolved gas.	Waters of the State of Washington (Chapter 173-201A WAC, Ecology 2003)	spill over the dam and consequent gas entrainment, dissolved gas concentrations are expected to decrease.	baseline conditions.	Monitoring dissolved gas below the powerhouse will determine if any unanticipated effects merit changes in the project.

WATER QUALITY

Water Temperature Monitoring - Draft Study Plan

Study Objectives:

Document water temperature conditions in the Enloe Project Area during the critical warm season and characterize the likely Project affects on the water temperature regime. Lower Similkameen River monitoring indicates that water temperatures near the Canadian border and at Oroville typically exceed the freshwater aquatic life criteria during the summer months, and water temperatures increase as the river flows downstream.

Study Methods:

Water temperature monitoring is recommended to determine the increase in temperature, if any, as the Similkameen River passes through the Project area. The monitoring approach will involve deploying and operating water temperature recorders from July through September upstream from the project area (e.g., Shanker’s Bend), in the forebay, and downstream from the powerhouse.

Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC) state that when a water body’s temperature is warmer than the criteria and that condition is due to natural conditions, then human actions considered cumulatively may not cause the 7-day average of the daily maximum temperatures of that water body to increase more than 0.3°C. The baseline for evaluating compliance with this standard is the pre-dam condition for which temperature monitoring data are not available; therefore, a direct comparison to determine temperature changes due to all human actions is not possible. This monitoring approach is proposed to determine whether the 7-day average daily maximum temperature increases through the Project area and by how much. If the increases are less than 0.3°C and the Project is not expected to further increase

temperatures, then this evidence will be used to indicate compliance with the standard and help justify the CWA §401 water quality certification. If the monitoring shows that water temperatures increase excessively through the Project area, then temperature modeling may be necessary to simulate the pre-dam conditions and evaluate whether temperature increases are attributable to the Project.

Temperature recorders will be used for continuous temperature monitoring at intervals sufficient to gather data for purposes of this study. To protect against physical damage, each unit will be fastened inside a section of pipe with holes drilled for water circulation. The units will be deployed in deep waters by divers to minimize the risk of vandalism, tampering, or loss. Each recorder will be checked monthly to ensure they are functioning properly. A temperature meter will be used to measure temperature profiles during initial deployment and again in August to verify the assumption that the waters are well mixed and the deep deployment of continuous temperature recorders is representative of river temperatures at each location. All temperature monitoring instruments will be calibrated according to manufacturer specifications and accuracy will be verified using comparisons to a National Institute of Standards and Technology (NIST)-certified thermometer.

Temperature data will be downloaded monthly from the temperature recorders into a database, reduced by deleting measurements that occurred during deployment and retrieval, and inspected for any outliers or unusual patterns.

Concurrent meteorological data are available from a nearby NOAA weather station located 3.2 miles west of Oroville, Washington, at an elevation of 1,360 feet. Wind speed, solar radiation, air temperature, and relative humidity are among the data recorded at this station. These data may be used if stream temperature modeling is needed. The historical records will also be useful in characterizing the 2006 summer season as cool, normal or hot. Daily mean, minimum and maximum stream temperatures will be derived from the data collected by each temperature recorder. The arithmetic average of seven consecutive measures of daily maximum temperature will also be calculated for each seven-day period at each monitoring location. These averages will be used to compare upstream and downstream temperatures and make comparisons to water quality standards.

Products of Study:

The results of the *Water Temperature and Monitoring Study* will include conclusions and recommendations related to prevention, mitigation, and enhancement measures, and will be presented in Exhibit E of the FERC license application.

FISHERIES RESOURCES

Preliminary Assessment of Prevention, Mitigation, and Enhancement Measures

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
Downstream of powerhouse to Oroville.	Fluctuating flows resulting from Project operations may dewater fish redds (nests) or strand young fish and reduce reproductive success of anadromous, and resident fish species.	18 CFR 4 Section 10 (j) FPA EFH (MSA §3) Chapter 77.55 RCW Section 305 (b) MSA Section 7 ESA Tribal fish production plans State and federal watershed management plans	Studies conducted as part of 1991 license application, indicate need for preventative measures.	Review existing studies and update information as necessary. Conduct an operations study of flow within the first year to help establish appropriate criteria.	Coordinate with Water Quantity/Quality PM&E development. Operate the project as essentially a run-of river operation. Provide flow continuation in the event of an emergency shutdown. Develop plans to provide minimum flows to the downstream reach during the installation or removal of the flashboards, if used.
Spill reach	Reduced flow	18 CFR 4 Tribal fish production plans State and federal watershed management plans	The reach of the river between the dam and the falls is basically a bed rock reach that has little aquatic habitat value and is unavailable to anadromous fish.	Review existing information on channel conditions and fish use and provide analysis of value for fisheries and potential impacts to water quality.	Coordinate with Water Quantity/Quality in development of PM&Es.
Project dam	Upstream and downstream passage	18 CFR 4 Section 10 (j) FPA Tribal fish production plans State and federal watershed management plans	Upstream passage above the falls (just below the Project dam) appears unlikely. Downstream passage was addressed in the last license process.	Review existing information on upstream and downstream passage and provide analysis of impacts.	If continuing impacts are determined, integrate PM&E measures into the design of the project (e.g. fish screens) or examine other mitigation.

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
	Project may alter sediment transport regimes and potentially affect anadromous and resident fish habitat.	18 CFR 4 EFH (MSA §3) Chapter 77.55 RCW – Fish and Wildlife Codes Section 305 (b) MSA Section 7 ESA Section 10 (j) FPA	Some information exists for the relationship between sediment transport, channel morphology, and downstream fish habitat.	Review existing studies to determine if previously collected data on channel characteristics can be compared to current conditions. Review present day and historical aerial photography to evaluate channel changes in important spawning reaches. Conduct inventory of aquatic habitat types. Coordinate with geomorphology / geotechnical studies on sediment transport regimes.	If continuing impacts are found, integrate biological criteria into Develop sediment transport PM&Es. Coordinate with geomorphology / geotechnical PM&E development for sediment transport regimes.
	Project may alter distribution and abundance of anadromous and resident fish species	18 CFR 4 EFH (MSA §3) Chapter 77.55 RCW – Fish and Wildlife Codes State and federal watershed management plans Tribal fish production plans Section 305 (b) MSA Section 7 ESA Section 10 (j) FPA	Studies in the 1991 application included distribution and abundance of anadromous and resident fish species and habitat studies (e.g. instream flow studies).	Conduct reconnaissance surveys of current spawning habitat to add to existing data. Conduct surveys as necessary to assess current distribution of species relative to habitat conditions as compared to previous studies.	If continuing impacts are found, develop PM&Es to address issues.
	Project may increase stream temperatures and affect	18 CFR 4 Washington State’s Water	The Project is essentially a run-of-the-river operation	Review existing studies and update information as	Prepare and implement a plan to monitor water temperature in

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
	anadromous and resident fish species and habitat.	Quality Standards, Chapter 173-201A WAC Washington State’s Water Pollution Control Act, 90.48 RCW Tribal fish production plans Section 305 (b) Magnuson-Stevens Act Section 7 ESA Section 10 (j) FPA	with relatively small storage capabilities if flashboards are used; temperatures are not likely to be substantially affected by the Project. See Water Quantity/Quality summary.	necessary.	the project tailrace. Coordinate with Water Quantity/Quality PM&E development.
	Total dissolved gas saturation levels can cause chronic stress in anadromous, and resident fish species and habitat.	18 CFR 4 Washington State’s Water Quality Standards, Chapter 173-201A WAC Washington State’s Water Pollution Control Act, 90.48 RCW Section 305 (b) MSA Section 7 ESA Section 10 (j) FPA Section 401 CWA	Routing most of the river flows through the powerhouse will reduce the spill over the dam and consequent gas entrainment and dissolved gas concentrations are expected to be minimal. See Water Quantity/Quality Initial Assessment.	Review existing studies and update information as necessary.	Prepare and implement a plan to monitor total dissolved gas below the powerhouse. Coordinate with Water Quantity/Quality PM&E development.
	Project related changes in water quality and sediment transport may affect juvenile acclimation ponds	18 CFR 4 EFH (MSA §3) Chapter 77.55 RCW Fish and Wildlife Codes State and federal watershed	Information exists for the potential of increased sediment mobilization and water quality changes during Project operation. See Water Quantity/Quality summary.	Review existing studies and update information as necessary. Coordinate with Water Quantity/Quality.	Operate the project as a run-of river operation as much as possible. Coordinate with Water Quantity/Quality PM&E development.

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
		management plans Tribal fish production plans Section 305 (b) MSA Section 7 ESA Section 10 (j)			
	Project intercepts large woody debris recruited from reaches upstream of dam.	18 CFR 4 EFH (MSA §3) Chapter 77.55 RCW Section 305 (b) MSA Section 7 ESA Section 10 (j)	Minimal information exists for the relationship between wood transport, wood recruitment, channel morphology, and downstream fish habitat.	Review existing studies and update information as necessary. Evaluate historical aerial photography to determine if large woody debris was important component of channel configuration in lower reach of Similkameen River.	If continuing impacts are found, develop PM&Es to address issues.
	Project may affect rare aquatic macroinvertebrates through changes to physical habitat.		Minimal information exists on distribution and abundance of rare aquatic macroinvertebrates.	Review existing studies and update information as necessary.	If continuing impacts are found, develop PM&Es to address issues.
From the Project impoundment to the upstream limit of backwater area.	Project may increase downstream temperatures and affect anadromous and resident fish species and habitat.	18 CFR 4 Washington State’s Water Quality Standards, Chapter 173-201A WAC Washington State’s Water Pollution Control Act, 90.48 RCW State and federal watershed management plans Tribal fish production plans	The Project is essentially a run-of-the-river operation with relatively small storage capabilities if flashboards are used. Temperatures are not likely to be substantially affected by the Project. See Water Quantity/Quality summary.	Review existing studies and update information as necessary.	If continuing impacts are found, develop PM&Es to address issues in coordination with Water Quantity/Quality PM&E development.

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
		Section 305 (b) MSA Section 7 ESA Section 10 (j) FPA			
	Relatively small fluctuating water levels resulting from the Project if flashboards are used may adversely affect resident fish species and habitat.	18 CFR 4 EFH (MSA §3) Chapter 77.55 RCW Section 305 (b) MSA Section 7 ESA Section 10 (j) FPA	Some planned operating criteria with the use of flashboards exists from the PUDs 1991 License Application.	Review existing studies and update information as necessary.	If continuing impacts are found, develop PM&Es to address issues.
Infrastructure associated with power production	Fish entrainment/impingement	18 CFR 4 Section 305 (b) MSA Section 7 ESA Section 10 (j) FPA	Water diversion could result in entrainment of fish species.	Review existing studies and update information as necessary.	Construct a fish screen upstream of the powerhouse and install a tailrace barrier.
	Construction	18 CFR 4 Chapter 77.55 RCW WDOE 401 Water Quality regulations Hydraulic Project Approval Joint Aquatic Resource Project Approval Section 10 (j)	Construction related impacts are addressed in the last application process. Possible mobilization of sediment could occur during construction and would be short-term.	Review existing studies and update information as necessary.	Review and, if necessary, develop BMPs and coordinate with water and geological work to revise or prepare appropriate PM&Es. Prepare and implement and erosion/sedimentation control plan for project construction and operation.

FISHERIES RESOURCES

Sediment and Fish Habitat - Draft Study Plan

Background:

Since the Dam was constructed 85 years ago, surface water impoundments such as Enloe Dam trap coarse substrates and preferentially transport fine sediments, which may result in coarsening and armoring of the riverbed in downstream reaches. Coarsening and armoring may reduce the abundance and quality of spawning habitat for salmonids. Increased loading of fine substrates may fill the interstitial spaces of spawning gravel thereby reducing intragravel flows, which flush metabolic wastes and decrease oxygen exchange for incubating eggs. Alteration of the sediment transport regime may also alter channel morphology and thus affect the formation and maintenance of important habitat types through the loss of channel complexity.

Study Objective:

Determine if Project operations alter sediment transport regimes and evaluate potential impacts to stream habitat in the reaches downstream of the powerhouse.

Study Methods:

Characterization of the sediment transport regime is being developed by the Geomorphology / Geotechnical group and will be used to develop conclusions regarding habitat conditions. The fisheries team will review available information to identify areas that are heavily utilized by anadromous and resident fish species. Information sources will include at a minimum, recovery plans, subbasin plans, spawner surveys, work conducted as part of the 1991 license application and the 1988 USFWS instream flow study. This review will focus on locating previous studies that quantitatively characterized sediment characteristics in areas downstream of Project facilities. Sites that were previously studied may be revisited and comparisons of current and previous conditions performed. If available, present day and historical aerial photography will be reviewed to determine if channel changes have occurred in areas that are heavily utilized for spawning by anadromous and resident fish species. This review will focus on loss of channel complexity over time. If it appears that fine sediments limit reproductive success of salmonids, it may be desirable to collect site specific information to assess substrate characteristics (e.g., intragravel DO, gravel permeability).

Products of Study:

An assessment of changes in aquatic habitat type and composition over time (if any).

Study Schedule:

Document review will begin in early 2006.

FISHERIES RESOURCES

Fish Distribution and Habitat Utilization - Draft Study Plan

Background:

Resident fish in the Similkameen River include rainbow trout, mountain whitefish, bridgelip sucker, longnose dace, sculpin, northern pike minnow, black crappie, brook trout, cutthroat trout, largescale sucker, redbreast shiner, largemouth bass, smallmouth bass, and burbot. Resident rainbow trout are known to spawn and rear below the project facilities. Summer steelhead and chinook salmon are known to spawn and rear in the Similkameen River below Enloe Falls. Most of the critical spawning habitat is located downstream of river mile 5.0 and the majority of summer chinook spawning occurring near river mile 3.6. Little spawning is thought to occur in or near the proposed East Bank powerhouse due to a lack of suitable spawning gravel in this reach near the Falls and the depth of the pool below it.

Study Objective:

The objective of this study is to update the 1991 license application with the current distribution and abundance of fish species within the Project Area with emphasis on anadromous and resident fish species.

Study Methods:

Spawning distribution

Conduct surveys to update information on important spawning areas for the various species. Study site selection will be guided by existing information on habitat use by the species of interest but may also include areas for which utilization has not been documented. Surveys will focus on identifying potentially suitable spawning habitat and documenting physical evidence of spawning activity (e.g., localized substrate disturbances, altered bed morphology, etc.). If spawning fish are observed during the course of the surveys, field crews will record basic information including number of fish present, species, general behavior, substrate characteristics, depth, velocity, etc.

Rearing distribution

The proposed sampling strategy is to sample representative units of major habitat types in locations on the Similkameen River from the dam to Oroville. Snorkel surveys will be used to assess abundance and species composition and will be compared with previous studies. If approved by Services and state agencies, electrofishing may be used in shallow habitats and will be compared with previous studies. Stations will be selected near where previous studies occurred on the basis of providing an adequate sample of major habitats in each general area and accessibility for the types of equipment to be used in sampling. Since much of the land surrounding the project is on private property, permission of the landowner will need to be obtained for the sampling activities.

General observations will be made of habitat and physical conditions in the sampling stations. These observations will include physical measurements of water temperature, specific conductance, and dissolved oxygen. The sampling station will be measured for length and width, and photographs of the station will be taken. Data collected from each station will also include characterization of substrate and maximum average depth, riparian conditions, and the presence of woody debris or other cover objects.

Products of Study:

Maps illustrating the distribution of species relative to Project facilities and characterization of the relative abundance of species observed at each study location. This information will be compared with previous studies.

Study Schedule:

Field surveys for spawning distribution studies will be timed to occur concurrently with spawning periods for as many of the target species as possible. Surveys are anticipated in the Spring of 2006 and late Fall/early Winter 2006.

Field surveys for the rearing studies will be designed to incorporate the life history characteristics and migratory behaviors of the species of interest. Some surveys will be conducted in late summer of 2006 but surveys in other seasons may be necessary.

BOTANICAL AND WILDLIFE RESOURCES**Preliminary Assessment of Prevention, Mitigation, and Enhancement Measures**

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
General Project area	Effect of sediment management on riparian and wetland vegetation	18 CFR 4, COE, BLM Land Management Plans	No sediment removal is proposed, but disturbance of sediment during construction may have some affects near the Project	Vegetation Mapping Study	Develop BMPs to protect riparian and wetland vegetation. Provide environmental training for Operations employees
General Project area	Impacts on threatened, endangered or sensitive plant species	18 CFR 4, State and Federal ESA, BLM Land Management Plans, WDFW	No impacts are expected according to previous studies.	Special Status Plant Surveys, if necessary Vegetation Mapping Study Riparian Surveys	Develop BMPs to protect sensitive vegetation.
General Project area	Effect of fluctuating stream flow and sediment management on riparian vegetation	18 CFR 4, BLM, WDFW	Riparian vegetation is in good condition and should not be affected by the proposed operations	Vegetation Mapping Study Riparian Surveys Study	Develop BMPs to protect riparian and wetland vegetation. Provide environmental training for Operations employees
General Project area	Disturbance of vegetation resulting from road grading and grounds maintenance	18 CFR 4	Existing impacts to vegetation will continue.	Vegetation Mapping Study	Limit vegetation maintenance in sensitive habitats as much as possible. Provide environmental training for Operations employees Repair erosion-damaged slopes Control noxious weeds along roads.
General Project area	Loss of riparian shrub steppe cover type	18 CFR 4	Project changes such as the installation of flashboards, if used will impact the current area of inundation and impact	Riparian Surveys Study	Riparian Plantings Weed Control Program

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
			the riparian habitat.		
General Project area	Impacts of maintenance activities on wildlife habitat	18 CFR 4 and BLM Management Plans	Maintenance activities may cause minor losses of habitat and short-term disturbances to wildlife. These impacts are generally restricted to the dam and powerhouse areas as well as along the project roads.	Wildlife and Vegetation Mapping Studies	Develop BMPs to protect riparian vegetation.
Riparian and shoreline	Impacts from livestock to sensitive wildlife and riparian habitats.	18 CFR 4	Riparian habitats support the highest diversity of wildlife species. Livestock in the Project area can impact sensitive wildlife habitats, particularly riparian and wetland types, and uplands supporting native bunchgrasses and forbs.	Riparian Survey Study	Fencing may be considered to protect sensitive areas. Riparian plantings – plant native riparian shrubs and trees where these habitats have been degraded by livestock grazing, human disturbance, and bank erosion. Control noxious weeds
Riparian and shoreline	Loss of perch trees and nesting trees.		Bank erosion or inundation could impact perch trees for raptors and other birds.	Wildlife Species Study	Besides planting trees for shade by the river, perching poles could be erected for raptors and other birds in areas along the river where perch trees are sparse or vulnerable to falling from bank erosion. Nesting boxes could be established in areas lacking natural cavities or snags.
Project power lines	Loss of raptor population due to electrocution		Project power lines inherent to a power project may result in decrease of raptor populations due to electrocution.	Wildlife Species Study	Modify power lines within the Project Area according to current guidelines to avoid raptor electrocution
Construction impacts	Impacts to bird population and habitat from construction		Disturbances from construction noise impact the availability of that habitat to	Wildlife Species Study	Perform construction activities as much as possible during times when bald eagle are not present in the immediate

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
	noise		bald eagles.		project area.
Construction impacts	Impacts to wildlife habitat due to land disturbance		Land disturbances from construction activities impact the habitat available for wildlife.	Wildlife Species Study	Avoid sensitive or unusual habitats when establishing construction lay down areas and other activities likely to disturb areas used by wildlife.

TERRESTRIAL RESOURCES

Wildlife Species Study- Draft Plan

Objective of Study:

The objective is to characterize wildlife use within the project boundaries.

Study Methods:

Methods will focus on a literature review, agency interviews, habitat mapping, and reconnaissance level field studies. Existing literature relevant to the project area will be identified, compiled, reviewed, and summarized to describe wildlife use. Key sources of literature will include Enloe Dam FERC documents, Okanogan Forest Service reports, regional watershed reports, published and unpublished technical reports, and other material specific to the project vicinity. FERC documents to be reviewed would include:

Application for License for a Major Water Power Project 5 Megawatts or Less, Enloe Hydroelectric Project FERC Project No. 10536, 1991 (referred to as the “PUD’s 1991 License Application”);

Supplement to the Initial Consultation Document, Enloe Hydroelectric Project, FERC Preliminary Permit No. 10536, April 1989

Agency and tribal biologists will also be interviewed to capture local knowledge of wildlife use, agency processed reports, and other data not readily available to the public. Telephone interviews will be conducted with biologists from the Washington Department of Fish and Wildlife, U.S. Fish and

Wildlife Service, Bureau of Land Management, U.S. Forest Service, Colville Confederated Tribe, and Okanogan County. Information not available in documents will be summarized by agency for inclusion in the license application.

Wildlife habitats will be mapped in conjunction with vegetation community mapping and ground-truthing. Habitats will be mapped according to several classification systems. Classification of wetlands and riparian habitats will follow Cowardin et al. Upland habitats will be classified by using a system identical to past mapping efforts in the project area or region to maintain consistency. This will be accomplished by reviewing past documents (e.g., watershed analysis, etc.) containing classification of habitats. Selection of a classification system will be closely coordinated with the agencies and tribal biologists participating in the licensing. Maps and tables will be produced for the project area identifying the type, area, and associated wildlife species. Species will be linked to habitat types by using *Wildlife Habitat Relationships in Oregon and Washington (Johnson and O'Neal, 2001)*, Enloe Dam FERC documents (, and other information obtained from the agency and tribal interviews.

Reconnaissance-level wildlife surveys will be conducted by foot or vehicle to gain a general understanding of wildlife use of the project area. A one-day survey will be conducted during late spring and again during summer. Three additional one-day surveys will be conducted between October and April, when bald eagles inhabit the project area. The surveys will involve traversing habitats in representative portions of habitats types to documents occurrence of wildlife species including birds, mammals, reptiles, amphibians, and invertebrates and important habitat features (e.g., snags, perch trees, etc.). General observations of the suitability of habitat types for special-status species (e.g., bald eagles, etc.) will also be recorded during the surveys. All observations will be recorded in field notebooks and transcribed onto data sheets for analysis of wildlife use of the project area.

Products of Study:

Results of the *Wildlife Species Study* will include conclusions and recommendations related to prevention, mitigation, and enhancement measures, and will be presented in Exhibit E of the FERC license application.

Study Schedule:

Surveys will be conducted in 2006.

References:

Johnson, D. H. and T. A. O'Neal. 2001. *Wildlife-habitat relationships in Oregon and Washington*. Oregon State University Press. 736 pp.

TERRESTRIAL RESOURCES

Vegetation Mapping Study Plan – Draft Plan

Objective of Study:

By using previous studies as much as possible, provide a detailed map showing the location of all major plant communities occurring within the Project Area.

Study Methods:

Five major plant communities were identified in the Project Area, based on the ICD (ICD 2005).

- Shrub-steppe
- Upland meadow
- Riparian shrub
- Riparian forest
- Herbaceous (wet meadow or freshwater marsh)

All major plant communities within the Immediate Project Vicinity will be mapped by using existing aerial photographs and previous vegetation maps for the Project Area. Non-vegetated areas will be also be mapped. Visual coverage by foot and vehicle will be used to field-check the vegetation/cover-type map. Corrections will be mapped on printed copies of the aerial photographs during the field surveys. A description of each cover type will be provided.

Any unique habitats or features, such as springs, caves, cliffs, and rock outcrops not previously identified during the aerial photographic interpretation will be added to the vegetation/cover type map during the field surveys. Any wetland communities identified will be mapped. Descriptions of the type of wetland (e.g., freshwater marsh, seep, etc.), dominate plant species present, and species composition will be provided. The area of coverage will include the area within the immediate vicinity of: 1) the Enloe Dam and spillway, 2) the proposed project facilities , and 3) the impounded channel of the Similkameen River.

Field verification (ground-truthing) will be conducted within the Project Area as established for the FERC Licensing process in areas owned by the PUD or for which the PUD has obtained permission for investigators to access BLM or private property and that can be safely accessed or viewed. Areas unsafe for access or viewing include steep cliffs and unstable slopes not visible from accessible points.

Products of Study:

As part of the Exhibit E for the FERC license application, each cover type observed within the Immediate Project Vicinity will be included and the vegetation community mapped. The report on botanical resources will include a general description of botanical resources within the Immediate Project Vicinity and a description of plant communities in the Project Area.

Study Schedule:

Ground-truthing of vegetation cover maps prepared from aerial photographs is scheduled for spring-summer 2006.

TERRESTRIAL RESOURCES**Special-Status Plant Surveys –Draft Study Plan****Objective of Study:**

To identify the locations of endangered, threatened, rare, or other special status plant species within the existing Project Area.

Study Methods:

For the purposes of this study, special-status plant species are defined as those species listed, proposed, or under review as threatened or endangered by the federal government or the State of Washington and those identified as federal species of concern or as sensitive species by the State of Washington. According to the PUD's 1991 License Application, no known populations of federal or state-listed plants occur in the Project Area. Federal and state agencies will be consulted to determine whether any such species, as well as any federal species of concern or state sensitive species have been reported from the project vicinity in recent years.

If potential habitat is available in the Project Area for such species, surveys will be conducted within suitable habitat in the entire Project Area. Prior to field surveys, herbarium investigations will be conducted to gather information on each species. For some species, field visits may be made to known locations of special-status plant species in the immediate project vicinity to obtain additional morphological and habitat information. All field surveys will be floristic (meaning the biogeography of plants) and the entire Project Area will be surveyed at least once. Multiple surveys may be required to search for all potentially present special status plant species during appropriate seasons. Survey protocols will follow "Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants" (USFWS 2000).

The locations of all special status plant species observed within the Project Area will be mapped. Photographs showing diagnostic floral characteristics will be taken of any special status plant species observed within the Project Area. Voucher specimens will be collected in accordance with government collecting regulations.

Surveys will be conducted in areas owned by the PUD or for which the PUD has obtained access permission from local property owners and that can be accessed safely. Areas unsafe for access include steep cliffs, unstable slopes, and areas bounded by impassable stream conditions.

Products of Study:

The results of the special status plant study, identifying the locations of all endangered, threatened, or other special status plant species observed within the existing Project Area. Species descriptions will include current status, phenology, habitat requirements, and distributional range. The locations of all endangered, threatened, or other special-status plant species observed within the Project Area will be included in Exhibit E of the FERC license application.

Study Schedule:

Survey timing is dependent on the flowering period of target species. Surveys would likely be scheduled for May or June 2006, and possibly for July or August 2006 if late-flowering species are determined to be potentially present.

References:

U.S. Fish and Wildlife Service (USFWS). 2000. Guidelines for conducting and reporting botanical inventories for federally listed, proposed and candidate plants.

TERRESTRIAL RESOURCES

Riparian Surveys – Draft Study Plan

Objective of Study:

To identify the distribution, community types, and condition of riparian vegetation in the Project Area.

Study Methods:

Riparian vegetation in the Project Area will be surveyed in conjunction with other botanical surveys. Prior studies from the PUD's 1991 License Application will be utilized as much as possible for baseline information. The riparian vegetation will be described, and its distribution and width will be mapped. Data collected will include the species composition, an estimate of the percent cover, the height of the vegetation, and mortality, if any. The surveyors will record the presence/absence of seedlings and young saplings in areas with tree species. Surveys will be conducted in areas that the PUD owns or for which the PUD has obtained access permission from local property owners and that can be accessed safely. Areas unsafe for access include steep cliffs, unstable slopes, and areas bounded by impassable stream conditions

Products of Study:

The results of the riparian surveys will identify the distribution, community types, and condition of riparian vegetation observed within the Project Area. Riparian vegetation mapping will include digitized maps. The riparian study will identify the distribution, community types, and condition of riparian vegetation observed within the Project Area. Riparian vegetation descriptions will include the species composition, an estimate of the percent cover, the height of the vegetation, mortality (if any), and presence or absence of tree seedlings and young saplings in areas where trees are present. The results will be included in the Exhibit E of the FERC license application.

Study Schedule:

Surveys are scheduled for spring and summer 2006.

SOCIO-ECONOMIC RESOURCES

Preliminary Assessment of Prevention, Mitigation, and Enhancement Measures

Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
Labor	Temporary increase in local jobs		The project will provide a temporary increase in local jobs during the construction period, which will help reduce unemployment in the area and generate more local spending by construction workers.	Update employment data in local and regional areas; develop engineering estimate of construction workforce	Likely to be a temporary, minor, positive effect on local economy.
Tax base	Increase in permanent local tax base		The project will provide taxable revenues with no accompanying increase in demand for services. No project-related population growth is expected.	Forecast additional tax revenues to County	Positive impact.
Transportation	Increased Use of the Loomis Oroville Road and Highway 97		Slight temporary increase in roadway use and maintenance. The increase will be from labor commuting from Oroville, Omak, and Okanogan. Construction traffic will increase on Loomis Oroville Road.	Developing engineering schedule of construction worker-trips. Obtain traffic engineers review of effect on local roads and intersections	Base any PM&Es on traffic engineer's review and recommendations
Personal income	Increase and/or decrease in personal income		Increase in personal income due to increased local jobs. The Project should keep the PUD's power costs lower than it otherwise would have been, which benefits the PUD's ratepayers.	Forecast possible economic effects of Project on area and on the PUD.	None

GEOMORPHIC AND GEOTECHNICAL RESOURCES

Preliminary Assessment of Prevention, Mitigation, and Enhancement Measures

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
Access roads	Increased erosion and sedimentation potential and a decrease in slope stability from access road improvement and use.	18 CFR 4 18 CFR 4 WAC 173-204 Sediment Management Standards Lower Similkameen River Arsenic TMDL Draft Detailed Draft Implementation Plan	Access to the powerhouse and other facilities will be along existing roads. Road may require re-grading, resurfacing, maintenance, and bridging across slide areas. Modifications may impact slope stability and sedimentation.	Follow standard construction BMPs. Survey roadways prior to construction activities to determine unstable areas along road routes. No specific studies recommended.	Use standard erosion and sediment control measures and develop site-specific BMPs as part of a Sediment Control Plan, including for example: Existing slide material removed Roadway maintained with crushed rock Check dams Filter fabric fences Grading toward ditches and sediment traps Mulching and hydroseeding in disturbed areas
Head works	Increased erosion and sedimentation if sediment removal activities are to occur.	18 CFR 4 18 CFR 4 WAC 173-204 Sediment Management Standards Lower Similkameen River Arsenic TMDL Draft Detailed Draft Implementation Plan	If existing intakes are used then sediment removal will be required for intake modifications. If new intakes are constructed site preparation activities may affect sediment loading. Regular sediment removal may be required for refurbished or new intakes, but will be avoided as much as possible in designing the Project.	See Sediment Control Study Plan.	Use standard erosion and sediment control measures and develop site-specific BMPs as part of a Sediment Control Plan.
Penstocks	Increased erosion and sedimentation during construction and maintenance activities.	18 CFR 4 18 CFR 4 WAC 173-204 Sediment Management Standards	Penstock construction and maintenance may impact slope stability, erosion and sedimentation potential.	Follow standard construction BMPs. Survey penstocks areas prior to any disturbance to determine unstable areas and erosion susceptibility.	Use standard erosion and sediment control measures and develop site-specific BMPs as part of a Sediment Control Plan.

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
		Lower Similkameen River Arsenic TMDL Draft Detailed Draft Implementation Plan		No specific studies recommended.	
Dam and impoundment	<p>Increased erosion potential and sedimentation from flashboard installation, if used.</p> <p>Change to sediment transport characteristics from flashboard installation, if used, or otherwise altering the existing dam.</p> <p>Existing dam is preferentially causing deposition of coarse material behind dam and passage of fine material over dam.</p> <p>Change to bank/slope stability characteristics from flashboard installation, if used, or otherwise altering the existing dam.</p>	<p>18 CFR 4</p> <p>18 CFR 4</p> <p>WAC 173-204 Sediment Management Standards</p> <p>Lower Similkameen River Arsenic TMDL Draft Detailed Draft Implementation Plan</p>	<p>Flashboards may be used again on the existing dam. Sedimentation and sediment transport processes may be impacted by the type of use.</p> <p>Preferential passage of fine-grained material will degrade downstream spawning substrate.</p> <p>Prolonged increases to impoundment water levels may reduce bank stability.</p>	<p>Sediment Control Study would review previous studies and update as appropriate including: Review sequence of historical air photos showing channel, bank and stream characteristics of river system including areas of existing impoundment, upstream and downstream reaches.</p> <p>Conduct and assessment of velocities and flow rates through impoundment, over and downstream of dam to evaluate erosion, scour and possible affects on sediment.</p> <p>Survey reservoir banks prior to construction activities to determine unstable areas.</p>	<p>Use standard erosion and sediment control measures and develop site-specific BMPs as part of a Sediment Control Plan, including for example:</p> <ul style="list-style-type: none"> Water that enters the isolated area will be directed to sumps Silty water and contaminated water will be pumped to settling basin equipped with oil/water separator Filter fabric fences, sediment ponds and check dams for shoreline work <p>Also Reservoir Banks may need additional protection in areas of lighter loamy soils and known slide areas. Additional slope protection may be needed along the toe of the roadways.</p>
Powerhouse	Changes to bank/slope stability conditions along bank and valley	<p>18 CFR 4</p> <p>18 CFR 4</p> <p>WAC 173-204 Sediment</p>	<p>Cut and fill activities may alter bank/slope stability in areas of new powerhouse footprint.</p> <p>Powerhouse or construction</p>	<p>Conduct geotechnical assessment of slopes/footprint of new powerhouse location.</p> <p>Survey reservoir banks prior</p>	Use standard erosion and sediment control measures and develop site-specific BMPs as part of a Sediment Control Plan.

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
	slope. Induced erosion and sedimentation from construction and maintenance activities.	Management Standards Lower Similkameen River Arsenic TMDL Draft Detailed Draft Implementation Plan	activities of new powerhouse may increase erosion and sedimentation potential.	to construction activities to determine unstable areas.	
Tailrace modifications	Change to erosion and sedimentation potential from construction activities and tailrace operations.	18 CFR 4 18 CFR 4 WAC 173-204 Sediment Management Standards Lower Similkameen River Arsenic TMDL Draft Detailed Draft Implementation Plan	If the flow regime or dimensions of tailrace are altered, erosion and sedimentation processes will be affected during construction activities and subsequent operations.	Follow standard construction BMPs. Survey footprints of new/existing tailrace prior to construction activities to determine any erosion/sedimentation potential. Address affect of potential tailrace modifications in the Sediment Control Study. Otherwise, no specific studies recommended.	Use standard erosion and sediment control measures and develop site-specific BMPs as part of a Sediment Control Plan, including for example: Silty water and construction contaminated water will be pumped to settling basin with oil/water separator.
Project power line	Increased erosion and sedimentation from construction and maintenance activities.	18 CFR 4 18 CFR 4 WAC 173-204 Sediment Management Standards Lower Similkameen River Arsenic TMDL Draft Detailed Draft Implementation Plan	Utilizing the existing power line locations within the Project Area is not expected to increase down gradient sedimentation.	Follow standard construction BMPs. Survey footprints of existing transmission lines prior to construction activities to determine any unstable areas. No specific studies recommended.	Use standard erosion and sediment control measures and develop site-specific BMPs as part of a Sediment Control Plan.
Staging areas	Increased erosion and sedimentation from construction activities.	18 CFR 4 18 CFR 4 WAC 173-204 Sediment	Staging areas may require grading, increasing erosion and sedimentation potential.	Follow standard construction BMPs. Survey footprints of staging areas prior to construction activities to determine any unstable areas.	Use standard erosion and sediment control measures and develop site-specific BMPs as part of a Sediment Control Plan.

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
		Management Standards Lower Similkameen River Arsenic TMDL Draft Detailed Draft Implementation Plan		No specific studies recommended.	

GEOMORPHIC AND GEOTECHNICAL RESOURCES

DRAFT Sediment Control Study

Objectives of Study:

Assess the effect of project operations on sediment, river channel and impoundment characteristics, and channel and bank stability along potentially impacted reaches of the Similkameen River.

Study Methods:

The study will consist of data and document review, data collection, field reconnaissance, and various quantitative and qualitative analyses of the possible effects of Project construction and operation on sediment issues:

Data and document review, data collection, and related fieldwork will include:

- A review of existing information on sediment load data (including pertinent data from British Columbia) and previous studies of project operations affects on sediment, if any;
- Reviewing historical air photos showing channel, bank and stream characteristics of river system including areas of existing impoundment, upstream and downstream reaches;

- Conducting field reconnaissance of the areas associated with the proposed project features and construction activities;
- Conducting field reconnaissance of specific river reaches upstream, downstream and within the impoundment to assess channel and bank stability; and

Products of Study:

The results of the *Sediment Control Study* will include conclusions and recommendations related to prevention, mitigation, and enhancement measures, and will be presented in Exhibit E of the FERC license application.

Study Schedule:

The sediment study will be conducted during spring and summer of 2006.

CULTURAL RESOURCES

Preliminary Assessment of Prevention, Mitigation and Enhancement Measures

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
Enloe dam and powerhouse and associated objects and/or structures	Adverse effects due to removal of/changes to historic materials from rehabilitation activities. The Dam and Powerhouse are listed on the NRHP.	36 CFR 60 RCW 27.34.200 Chapter 197-11 WAC Chapter 43.21C RCW	Modifications to the Dam and Powerhouse or the surrounding environment would result in adverse effects to this NRHP-listed resource.	Conduct a historic properties inventory and consult with SHPO and NPS regarding additional HAER studies or other types of mitigation.	Develop a PA or MOA and HPMP. Comply with the Secretary of the Interior's Standards for Rehabilitation.
General Project area	Potential effects from shoreline erosion and recreation activities on two archaeological sites (45OK532 and 45OK566). These sites are eligible for the NRHP.	18 CFR 4; 36 CFR 60; 36 CFR 800 RCW 27.34.200 Chapter 197-11 WAC Chapter 43.21C RCW Exec. Order 11593	Impacts could occur from ground disturbance due to vehicular traffic, stockpiling of material, and other construction-related activities.	Archaeological survey of APE, including reviewing previously identified sites, recording current conditions, and testing of newly identified sites.	Develop a PA or MOA and HPMP, which includes a monitoring and treatment plan in collaboration with the CCT Cultural Resources Dept.
General Project area	Potential effects of shoreline erosion on two archaeological sites (45OK533H and 45OK565).	18 CFR 4; 36 CFR 60; 36 CFR 800 RCW 27.34.200 Chapter 197-11 WAC Chapter 43.21C RCW Exec. Order 11593	Impacts could occur from ground disturbance due to vehicular traffic, stockpiling of material, and other construction-related activities.	Archaeological survey of APE, including reviewing previously identified sites, recording current conditions, and testing of newly identified sites.	Develop a PA or MOA and HPMP, which includes a monitoring and treatment plan in collaboration with the CCT Cultural Resources Dept.
General Project area	Potential effects to unidentified archaeological sites and TCP of the Confederated Tribes of the Colville Reservation	18 CFR 4; 36 CFR 60; 36 CFR 800 RCW 27.34.200 WAC 352-16-020 Chapter 197-11 WAC Chapter 43.21C RCW Exec. Order 11593	Impacts could occur from ground disturbance	Archaeological survey and TCP study prepared in coordination with the Confederated Tribes of the Colville Reservation.	Develop a PA or MOA and HPMP, which includes a monitoring and treatment plan in collaboration with the CCT Cultural Resources Dept.

CULTURAL RESOURCES

Archaeological Resources – Draft Study Plan

Objectives:

The field survey would include the location and recordation of archaeological resources within the Project Area of Potential Effect (APE). The archaeological survey and report would satisfy Section 106 of the National Historic Preservation Act, as amended

Study Methods:

The Section 106 process would include consultation with Consulting and Interested Parties (including collaboration with the Colville Tribe's Cultural Resources Dept.), determination of the Area of Potential Effect (APE), and an inventory of all cultural resources 50 years of age or greater within the APE, assessment of the potential eligibility of those resources for inclusion in the NRHP, consideration of the project effects on NRHP-eligible resources within the APE, and the development of mitigation measures. All of the information described above would be included in a Cultural Resources Section 106 Technical Report. This work and the resultant Technical Report will utilize as much as possible prior historical and cultural studies performed in the Project Area.

ENTRIX would identify consulting parties (e.g., DAHP, CCT Tribe, Okanogan PUD) and interested parties. Prior studies from the PUD's 1991 License Application will be utilized as much as possible for baseline information. A letter would be prepared to the DAHP initiating the Section 106 process. Information obtained from a record search at the Washington Department of Archaeology and Historic Preservation (DAHP) would be used to help develop a detailed study plan for field surveys of the APE. Following a detailed review of the results of the background research, a field assessment would be conducted to identify archaeological resources within the APE. Resources identified as adjacent to the APE would be field checked to verify size and distance from the APE. Survey methodology would follow standard methods in accordance with the Secretary of the Interior's Standards for Identification [48 FR 44720-44721] and the Federal regulations found at 36 CFR 800.4(b)1. Field surveys would be dependent on accessibility and terrain. If cultural resources are discovered within the APE, further investigation would be conducted to determine if the resource is eligible for listing in the NRHP. Assessment is required to document site(s) integrity and significance with regard to criteria set forth at 36 CFR 60.4. Archaeologists would meet with consulting parties after fieldwork to present results of fieldwork and collect any information on properties identified. Project archaeologists will prepare a brief prehistoric context for the study area and then use available information to determine which sites are eligible for listing in the NRHP. Appropriate Washington State Archaeological site forms would be submitted to DAHP for review.

Based on past studies, it is expected that adverse effects could occur to the NRHP-listed archaeological resources. A Traditional Cultural Properties (TCP) Study, in coordination with the Tribes, a Programmatic Agreement (PA) or Memorandum of Agreement (MOA), and Historic Properties Management Plan (HPMP) would need to be prepared with appropriate consulting parties.

Products from Study:

A Cultural Resources Section 106 Technical Report detailing applicable regulations, a summary of the background research, project methodology, field results of the archaeological survey, project effects, and proposed mitigation. A TCP Study, a PA (with consulting parties) or MOA, and HPMP, which would include a monitoring and treatment plan.

Study Schedule:

Research and fieldwork would occur during spring 2006. The report would be completed by summer 2006.

CULTURAL RESOURCES STUDY UPDATE PLANS**Historic Resources – Draft Study Plan****Objective of the Study:**

Evaluation and inventory of buildings and structures within the Project Area of Potential Effect (APE) that are at least 50 years of age. The historic buildings and structures survey and report would satisfy Section 106 of the National Historic Preservation Act, as amended.

Study Methods:

See Archaeological Field Survey and Assessment Study Plan for a description of initiation of the Section 106 process. The Historic Buildings and Structures Study would include conducting background research at the Washington Department of Archaeology and Historic Preservation; the Special Collections at the University of Washington; the Okanogan County Office of Planning and Urban Development historical files; the Okanogan County Historical Society, and contacting Mary Riley, local historian. Prior studies from the PUD's 1991 License Application will be utilized as much as possible for baseline information. Field studies would be conducted to evaluate, and record, as necessary, all buildings and structures within the Project APE that are at least 50 years of age. Washington State Historic Property Inventory Forms would be completed for any resources not previously recorded. Forms would not be filled out for resources included in the National Register of Historic Places (NRHP) Nomination Form. This work and the resultant Technical Report will utilize as much as possible prior historical and cultural studies performed in the Project Area.

Based on past studies, it is expected that adverse effects could occur to the NRHP-listed resources. A PA or MOA and HPMP would need to be prepared with appropriate consulting parties to outline mitigation measures, responsible parties, and schedule.

Products of Study:

A Cultural Resources Section 106 Technical Report detailing applicable regulations, a summary of the background research, project methodology, field results of the historic resources survey, project effects, and proposed mitigation. A PA or MOA and a HPMP that complies with the Secretary of the Interior's Standards for Rehabilitation.

Study Schedule:

Research and fieldwork would occur during spring 2006. The report would be completed by summer 2006.

LAND USE RESOURCES

Preliminary Assessment of Prevention, Mitigation, and Enhancement Measures

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
General Project area	Effect of project-related vehicular travel on air quality	18 CFR 4	Construction activity and related trips to transport materials, equipment and workers may slightly affect air quality, but not enough to have a substantial impact	No further study anticipated	None anticipated
General Project area	Effect of Project operations and Project-related activities on air quality	18 CFR 4	Anticipated Project-related impacts to air quality are minor and temporary, largely from mobile sources.	No further study anticipated	None anticipated
General Project area	Effect of noises associated with Project operations, maintenance, repair, and increased traffic	18 CFR 4	Construction noise levels are anticipated to be well below state-mandated limits, and generally will not have an extensive negative effect within the area due to the large expanses of uninhabited lands surrounding the Project.	No further study anticipated	Project noise would be substantially attenuated by steep and complex surrounding terrain.
Wetlands	Effects of the Project on wetlands in the Project area	18 CFR 4, COE; Clean Water Act Section 404	No naturally-occurring wetland areas are adversely affected by the Project. (This assumes that the project design will not involve substantial fill in the river, which is regulated as “other waters of the U.S.”)	No further study anticipated	None anticipated

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
Floodplains	Effects of Project operations and maintenance on the 100-year floodplains	18 CFR 4, COE	Minor effects to floodplains upstream of the dam could occur from the use of flashboards, if used. The project has relatively small storage capacity with flashboards, if used, and no ability to attenuate floods downstream of the project.	Effects on floodplains will be included in Water Quantity/Quality study plan to be conducted in conjunction with the project engineering and configuration.	None anticipated
Shorelines	Effects of the Project on shoreline areas	State Shoreline Management Act requires review and approval of all development on shorelines of the State.	Project construction will require review and approval under Okanogan County's Shoreline Master Program.	<p>Okanogan County is beginning the process to prepare a new Regional Shoreline Master Program that will likely result in new regulations on development within shoreline areas. As the project is developed, it is important that the County's shoreline process is followed and its ramifications on project permitting understood.</p> <p>Review State Shoreline guidelines and monitor County effort to identify regulatory requirements as options for the project are developed.</p>	Design and develop project to minimize impact on shoreline functions and values. Provide for improved public access to shoreline area.
Critical areas	Effects of the Project on critical areas (fish & wildlife habitat, wetlands, frequently flooded areas, geologically hazardous areas and aquifer recharge areas)	State Growth Management Act requires review and approval of all development with identified critical areas.	Project construction will require review and approval under Okanogan County's Shoreline Master Program.	<p>Critical Areas Assessment: As the project is developed, it is important that critical areas are identified and their ramifications on project permitting understood. To be conducted in conjunction with Wildlife and Botanical Studies.</p> <p>Also review local and state critical areas regulations and monitor County effort to identify regulatory requirements as options for the project are developed</p>	Design and develop project to minimize impact on critical areas. Provide for enhancement of habitat where possible. (See Wildlife and Botanical PM&Es.)

RECREATIONAL RESOURCES

Preliminary Assessment of Prevention, Mitigation, and Enhancement Measures

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
General Project area	Effects of additional improvements to make it more easily accessible.	18 CFR 4, federal, state, and regional recreation plans	The character of the Enloe Dam project area would change drastically if it is made more accessible via trail on the old rail grade or improved road access.	Recreation section of needs to consider current recreation plans.	Collaborate with Okanogan County on planned Similkameen Trail; ensure new and/or improved access includes provisions for public viewing, interpretation, and recreation.
Oroville-Nighthawk Trail	Project historic preservation, education and interpretative displays may tie into planned Oroville-Nighthawk Trail.		Potential benefit to trail users.	<p>Characterize anticipated trail use in vicinity of project features. Determine potential for PM&Es to attract new visitors. Characterize public use hazards.</p> <p>Study planned recreational uses to determine potential negative effects on botanical, fish, wildlife, and water quantity/quality. To be conducted in conjunction with Wildlife and Botanical Studies.</p>	<p>In collaboration with Okanogan County, provide an overlook from the trail to the historic powerhouse and dam site, with educational and interpretive displays (contingent on historical preservation funding).</p> <p>Use BMPs to mitigate for identified negative impacts on botanical, fish, wildlife, and water resources resulting from increased recreational activities.</p>
Access to river	Project design may improve access to the Similkameen River on the east bank below the dam.		Potential benefit to river users.	Characterize current and anticipated river use in project vicinity. Determine potential for PM&Es to attract new visitors. Characterize public use hazards.	In collaboration with Okanogan County, provide small park facilities at the site of the existing unimproved river access on the left (east) bank of the river

LAND USE

Land Use - Draft Study Plan

Objectives of the Study:

The Study Plan for Land Use is intended to ensure that as the project is designed, due consideration is given to the requirements of local land use programs and regulations, specifically Okanogan County's Sub Area Comprehensive Plan for the Oroville area, Shoreline Master Program (SMP) and Critical Areas regulations as well as the watershed planning effort under in WRIA 49.

Background:

As this study plan is drafted, Okanogan County is currently updating the 1964 vintage Comprehensive Land Use Plan, with the first area being tackled the northern part of the County, including the project site. This planning effort can provide valuable insight into future land use patterns in the project area and should include population projections and other data that can inform preparation of the FERC license.

Of more significance to the project is the County's project to update the SMP and Critical Areas regulations to comply with provisions of the Shoreline Management Act and Growth Management Act.

While the County is not statutorily required to adopt an updated SMP until the year 2014, the County and several cities have joined together and successfully competed for "Early Adopter" grants from the Department of Ecology. This means that over the next 24 to 30 months, Okanogan County will be actively engaged in rewriting the existing SMP to comply with new state mandated guidelines. The process requires, among other things, an inventory and analysis of shoreline resources (physical and biological), preparation of a cumulative impact analysis and restoration plan, all based on "Best Available Science." It is highly likely that this process will result in changes to the existing environmental designation and regulatory frameworks, both of which have the potential to affect the Enloe Project. Because the process to prepare an updated SMP is just getting underway, it seems imperative that the effort be closely monitored.

The County intends to use the SMP update process to meet its obligation to "review and revise" critical areas regulations to incorporate the use of "Best Available Science." The County has until 2007 to complete the process and adopt new regulations.

While WRIA planning is generally considered more of a water resources issue, the WRIA 49 Planning Unit has decided to include a habitat component in the watershed plan for the Okanogan River Basin. This along with the water quantity work the Planning Unit will be undertaking, is directly related to land use. Much like the Comprehensive Planning, the WRIA 49 Planning Unit will be doing work over the next few years that directly relates to the Enloe Project.

Study Methods:

The Study Plan for Land Use maintaining contact and coordinating with the various Land Use planning programs and then revise and update the land use section as appropriate in the new application.

Study Products:

Land Use Section of license application that is consistent as possible with County, et. al. land use planning.

RECREATIONAL RESOURCES**Recreation Resources – Draft Study Plan****Study Objectives:**

Impacts related to recreational use at and near the project are expected to occur. Okanogan County's project to convert the old railroad grade to a multi-purpose recreational trail and the inclusion of a park as part of the Enloe Project will undoubtedly attract additional and more diverse users. The study plan for recreation is intended to characterize existing and anticipated uses of the project site and adjacent lands.

Study Methods:

The Okanogan County Outdoor Recreation Plan (2004) and other recreation related plans prepared by the City of Oroville, Bureau of Land Management, U. S. Forest Service, Department of Fish & Wildlife and Department of Natural Resources need to be reviewed and a variety of groups consulted (e.g. Upper Columbia Fisheries Enhancement Group, Pacific Northwest Trail Association) in order to provide a foundation for the study of recreation impacts.

Beyond review of existing plans, the study plan includes the design and implementation of a visitor survey to define current use and provide a basis for projections of future use. The visitor survey will include a physical presence at the project site over a twelve-month period. Number and types of campsites, number and origin of visitors, favored activities will be among the questions posed on the survey. Depending on the amount of data collected, it is also possible some other form of survey instrument (e.g. mailed to PUD customers, published in local papers, on line) could also be employed to broaden input. Data collected from the survey(s) will be used to project future use and inform revision of the recreation section of the New application.

Study Products:

Report of Visitor Use Survey Findings and an updated section of the new application.

VISUAL RESOURCES

Preliminary Assessment of Prevention, Mitigation, and Enhancement Measures

Environmental Setting	Potential Project Effect	FERC Requirements and State/Federal Management Objectives	Initial Assessment	Proposed Studies	Prevention, Mitigation, and Enhancement Measures
Enloe dam and powerhouse	Visual impacts to the landscape during project construction and building facilities.	18 CFR 4 BLM VRM System	Construction activities would be visible from various viewpoints, including recreation sites and roads and would be a short-term visual impact. New facilities would potentially be a long-term impact.	Update the inventory and analysis of the project area using BLM VRM guidelines.	Use materials that are visually compatible with the site, that are natural appearing and non-reflective. Grading, planting grasses, and repairing slopes damaged by erosion.
Loomis-Oroville Road	Short term visual impacts during project construction. New construction could have visual impacts.	18 CFR 4 BLM VRM System	Construction activities would be visible to travelers from certain locations on the road. Construction materials could create a visual impact.	Update the inventory and analysis of the project area using BLM VRM guidelines.	Use materials that are visually compatible with the site, that are natural appearing and non-reflective. Grading, planting grasses, and repairing slopes damaged by erosion.
Similkameen River below dam	Potential visual effects from small changes to the water levels.	18 CFR 4 BLM VRM System	Impacts could occur to recreation users (i.e. fishing) due to changes in the water level if flashboards are used.	Update the inventory and analysis of the project area using BLM VRM guidelines.	None anticipated to necessary.
General Project area	Potential visual effects to recreational users of the Similkameen Connector Trail.	18 CFR 4 BLM VRM System	Impacts could occur to recreation users from construction activities and new construction.	Update the inventory and analysis of the project area using BLM VRM guidelines.	Use materials that are visually compatible with the site, that are natural appearing and non-reflective. Grading, planting grasses, and repairing slopes damaged by erosion.

VISUAL RESOURCES

Visual Resources – Draft Study Plan

Objective of the Study:

This study would include an inventory of aesthetic resources within the Project Area and an analysis of the potential visual impacts from proposed surface-disturbing activities and development, per the Bureau of Land Management (BLM) Visual Resource Management (VRM) System.

Study Methods:

The Visual Resources Assessment would follow the BLM VRM System methodology and contain two phases: Inventory and Analysis. Prior to an inventory, ENTRIX staff would review any existing visual resources analyses completed as part of previously submitted FERC applications for Enloe Dam. Staff would also review BLM VRM data of the project.

The Inventory Phase would include reviewing and field verifying the VRM data of the project area, which has been rated as having medium sensitivity in the background and fore/middle ground, with a management class rating of IV. The management classes (Classes I – IV) have corresponding established objectives (e.g., preserving the existing character of the landscape).

The Analysis Phase would involve determining whether the potential visual impacts from construction and development would meet the management objectives or whether design adjustments would be required. The analysis would include a visual contrast rating process, which compares project features with the major features of the existing landscape using the basic design elements of form, line, color, and texture. As part of the analysis key observation points would be selected and visual simulations would be prepared. The analysis can be used to reduce visual impacts.

Products from Study:

A Visual Resources Inventory and Analysis of the Project area including a description and photographs of the visual resources and an analysis of the potential visual impacts from project construction, operations and maintenance.

Study Schedule:

Research and fieldwork would occur during spring 2006. The report would be completed by the end 2006.

GLOSSARY OF ABBREVIATIONS

AF	Acre-feet
BLM	Bureau of Land Management
BMP	Best Management Practices
^o C	degrees Centigrade
cfs	cubic feet per second
COE	U.S. Corps of Engineers
CCT	Colville Confederated Tribes
CWA	Clean Water Act
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FPA	Federal Power Act
HPMA	Historic Properties Management Plan
ICD	Initial Consultation Agreement
MOA	Memorandum of Agreement
MSA	Magnuson-Stevens Act
NPS	National Parks Service
NRHP	National Register of Historic Places
PA	Programmatic Agreement
PM&E	Prevention, Mitigation and Enhancement
PUD	Public Utility District
SHPO	State Historic Preservation Office
TES	Threatened and Endangered Species
TMDL	Total Maximum Daily