

# VEGETATION MITIGATION AND MONITORING PLAN



## ENLOE HYDROELECTRIC PROJECT (FERC PROJECT NO. 12569)

FEBRUARY 2009



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## TABLE OF CONTENTS

1.0	INTRODUCTION .....	1
1.1	Purpose and Intent .....	1
1.2	Project Description .....	1
1.3	Project Boundary/Project Area .....	2
1.4	Overview of the Plan .....	2
2.0	GOALS AND OBJECTIVES .....	3
2.1	PM&E BOTA-02: Plant Riparian Vegetation Along the Reservoir .....	3
2.2	PM&E BOTA-03: Abandon Existing Shoreline Road .....	4
2.3	PM&E BOTA-04: Plant Riparian Species Along Abandoned Road Corridor .....	4
2.4	PM&E BOTA-05: Plant Riparian Species on East and West Banks Downstream of Shanker's Bend .....	5
2.5	PM&E BOTA-06: Install Temporary Grazing Control Measures .....	5
2.6	PM&E BOTA-07: Monitor Restored Areas and Replant if Necessary .....	6
2.7	PM&E BOTA-11: Implement a Noxious Weed Control Program .....	6
2.8	PM&E REC-01: Install Barricades and Fencing to Control Livestock and Prevent Unauthorized Access .....	7
2.9	PM&E AES-04: Re-vegetate Exposed Ground on the West Bank Where Former Facilities Have Been Removed .....	7
3.0	MITIGATION IMPLEMENTATION PLAN .....	9
3.1	Area Covered .....	9
3.2	Site Preparation .....	9
3.2.1	General Site Preparation .....	9
3.2.2	Site Preparation for Road Beds .....	10
3.3	Planting Plan .....	10
3.3.1	Cutting Proceedure .....	11
3.3.2	Planting Proceedure .....	12
3.4	Protection Fencing .....	12
3.4.1	Fence Description .....	13
3.4.2	Maintenance .....	13
3.5	Schedule .....	14
3.6	Cost Estimates .....	16
4.0	MAINTENANCE .....	17
4.1	Integrated Noxious Weed Management Plan .....	17
4.1.1	Area Identification .....	17
4.1.2	Weed Identification .....	18
4.1.3	Method and Type of Application .....	18
4.1.4	Post Treatment & Site Rehabilitation .....	19
4.1.5	Schedule .....	19
4.1.6	Long Term Control of Noxious Weeds .....	19

5.0	MONITORING.....	20
5.1	Monitoring Objectives .....	20
5.2	Monitoring Performance Criteria.....	20
5.3	Monitoring Species.....	20
5.4	Monitoring Protocols.....	21
5.5	Monitoring Implementation Schedule.....	21
5.6	Cost Estimates For Monitoring Studies.....	21
5.7	Reporting.....	22
6.0	REFERENCES .....	23
7.0	FIGURES .....	24
8.0	APPENDICES.....	28
	Appendix A: Fence Plan .....	A-1
	Appendix B: Sample Data Sheets.....	B-1

## **1.0 INTRODUCTION**

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### **1.1 PURPOSE AND INTENT**

This Vegetation Mitigation and Monitoring Plan (VMMP) has been prepared by the Okanogan Public Utility District No. 1 (the District) in conjunction with the Final License Application (FLA) for the Enloe Hydroelectric Project (FERC Project No. 12569) filed with FERC on August 22, 2008. The District anticipates that the VMMP will be appended to the FERC license when that license is granted. The VMMP describes the District's plan to implement the Protection, Mitigation and Enhancement (PM&E) Measures identified in Exhibit E of the FLA for vegetation.

This Mitigation and Monitoring Plan has been prepared in consultation with U.S. Fish and Wildlife Service, Bureau of Land Management, Washington Department of Fish and Wildlife, and Washington Department of Ecology, to address the measures that will be taken to facilitate the development of riparian vegetation that is otherwise expected to occur naturally. The Plan establishes cutting and planting methods for riparian trees and grasses, noxious weed maintenance, and vegetation monitoring. These measures will be taken to ensure that riparian areas are developed and become more valuable areas for wildlife.

### **1.2 PROJECT DESCRIPTION**

The District proposes to restore hydropower generation at Enloe Dam on the Similkameen River. The previous power plant ceased operation in 1958. The present application proposes relocating the site for hydropower development to the opposite (east) bank of the river. The proposed site is nearer to the dam and offers environmental and constructability advantages. In addition to constructing a new powerhouse, the District intends to retrofit crest gates to increase the hydraulic head available for power generation, install two small piers to the spillway crest, excavate a new intake canal and decommission the old intake canal by backfilling with concrete, create a new penstock intake, two above-ground penstocks and a tailrace. In addition, a section of the old Oroville-Tonasket Irrigation District (OTID) Ditch Road would be abandoned and restored to a natural riparian state. A new road would be constructed over an abandoned irrigation canal as the main access road. New recreational facilities are proposed including a new boat ramp, parking area, picnic sites and camping areas. Restoration of riparian areas along the river bank are also proposed. This VMMP focuses on the implementation of seven Protection, Mitigation and Enhancement Measures (PM&Es) outlined in Section 2 of this report.

### 1.3 PROJECT BOUNDARY/PROJECT AREA

The Enloe Hydroelectric Project is situated in a narrow portion of the Similkameen River Valley, about 3.5 miles northwest of the City of Oroville, Washington. The Project Boundary is generally defined by the 1,055 foot elevation contour and encompasses an approximately 2-mile reach of the Similkameen River, including approximately 36 acres of upland area along both river banks (Figure 1). The Project Boundary extends one-quarter (0.25) mile downstream from Enloe Dam to include Similkameen Falls and the site of the proposed powerhouse, tailrace, and associated facilities. Most of the land within the Project Boundary is publicly owned and managed by BLM (i.e. lands above the current ordinary high water mark) or DNR (i.e. river bed and banks up to current high water mark). The term Project Area used in the VMMP refers to the land and water areas encompassed by Project Boundary.

### 1.4 OVERVIEW OF THE PLAN

The remainder of the VMMP is organized into the following five sections:

**Section 2** describes the goals and objectives of the VMMP, outlining the seven Protection, Mitigation and Enhancement (PM&E) measures that are addressed in this plan.

**Section 3** describes implementation of the VMMP, including site preparation before planting, the planting plan, fencing considerations and maintenance, and water access and storage options for livestock. Section 3 also provides the schedule for implementation of each aspect of the plan, as well as outlining the estimated costs.

**Section 4** outlines maintenance of the riparian restoration areas; primarily weed control. Maintenance details include weed identification, method and type of control, and long term monitoring of weeds.

**Section 5** describes monitoring objectives and performance criteria, monitoring species and protocols, an implementation schedule, monitoring cost estimates, and finally, the reporting methods that will be used.

**Section 6** provides references used in developing this plan.

## 2.0 GOALS AND OBJECTIVES

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The goal of the VMMP is to facilitate the rapid development of riparian vegetation within the Project Area for the benefit of wildlife and visitors.

The objectives of the Mitigation and Monitoring Plan are to ensure that the following Protection, Mitigation and Enhancement Measures (PM&Es) are successfully planned and executed:

- PM&E BOTA-02: Plant Riparian Vegetation Along the Reservoir
- PM&E BOTA-03: Abandon Existing Shoreline Road
- PM&E BOTA-04: Plant Riparian Species Along Abandoned Road Corridor
- PM&E BOTA-05: Plant Riparian Species on East and West Banks Downstream of Shanker's Bend
- PM&E BOTA-06: Install Temporary Grazing Control Measures
- PM&E BOTA-07: Monitor Restored Areas and Replant if Necessary
- PM&E BOTA-11: Implement a Noxious Weed Control Program
- PM&E REC-01: Install Barricades and Fencing to Control Livestock and Prevent Unauthorized Access
- PM&E AES-04: Re-vegetate exposed ground on the west bank where former facilities have been removed. (This was outlined in the FLA, but was not given a PM&E number at that time Page E.8-26).

Each PM&E is explained in detail below, outlining the purpose and objective of each measure, an analysis of the impact of each measure on other resources, the expected results and actions to be taken if the expected results are not achieved. Figures 2 and 3 show the locations where PM&E measures described in this Plan will be implemented.

### 2.1 PM&E BOTA-02: PLANT RIPARIAN VEGETATION ALONG THE RESERVOIR

#### **Objective**

The objective of this mitigation measure is to facilitate the rapid development of riparian vegetation to replace any lost when the low-flow elevation for the reservoir is increased. This measure will also benefit fish and aquatic resources along the impoundment shoreline.

### **Impacts to Other Resources**

Beneficial impacts to wildlife species that use riparian vegetation should result. No negative impacts are expected to occur from planting riparian vegetation along the reservoir shoreline.

### **Expected Outcome and Further Actions**

The expected outcome is the establishment of additional stands of woody riparian vegetation. The monitoring element of this plan includes provision for replacement planting of restored areas should the plantings fail to establish themselves adequately during the first five years after planting.

## **2.2 PM&E BOTA-03: ABANDON EXISTING SHORELINE ROAD**

### **Objective**

The existing unimproved shoreline road along Enloe Reservoir will be returned to natural condition, eliminating the current interruption between the shoreline and upland habitat.

### **Impacts to Other Resources**

No impacts to other resources are expected from the abandonment of this road. An existing primitive road will be improved for access to the dam and recreation site, so that visitor access is not affected.

### **Expected Outcome and Further Actions**

Abandoning the road will eliminate traffic disturbance to wildlife utilizing the riparian habitat. No further actions will be needed.

## **2.3 PM&E BOTA-04: PLANT RIPARIAN SPECIES ALONG ABANDONED ROAD CORRIDOR**

### **Objective**

In order facilitate the re-establishment of riparian vegetation in the abandoned roadbed, woody riparian species will be planted in the riparian section of the abandoned road. This will improve habitat along the reservoir for wildlife.

### **Impacts to Other Resources**

No negative impacts are expected to occur from planting riparian vegetation along the abandoned road corridor.

### **Expected Outcome and Further Actions**

The expected outcome is the establishment of additional stands of woody riparian vegetation. The monitoring element of this plan includes provision for replacement

planting of restored areas should the plantings fail to establish themselves adequately during the first five years after implementation

## **2.4 PM&E BOTA-05: PLANT RIPARIAN SPECIES ON EAST AND WEST BANKS DOWNSTREAM OF SHANKER'S BEND**

### **Objective**

The purpose of this mitigation measures is to facilitate the rapid development of riparian vegetation to replace any lost when the low-flow elevation for the reservoir is increased. This measure will also benefit fish and aquatic resources along the impoundment shoreline.

### **Impacts to Other Resources**

Beneficial impacts to wildlife species that use riparian vegetation should result. No negative impacts are expected to occur from planting riparian vegetation on the east and west banks downstream of Shanker's Bend.

### **Expected Outcome and Further Actions**

The expected outcome is the establishment of additional stands of woody riparian vegetation. The monitoring element of this plan includes provision for replacement planting of restored areas should the plantings fail to establish themselves adequately during the first five years after implementation.

## **2.5 PM&E BOTA-06: INSTALL TEMPORARY GRAZING CONTROL MEASURES**

### **Objective**

Protective enclosures for individual plants will be used to protect the young plants from consumption by wildlife such as beaver or deer. In addition, a temporary fence may be required to protect riparian areas on the west side of the river.

### **Impacts to Other Resources**

Beaver and deer will be prevented from consuming new plantings, but they will be unaffected from accessing existing vegetation. No negative impacts are expected to occur from installing protective enclosures for individual plants or through the temporary fencing proposed for the west side of the river.

### **Expected Outcome and Further Actions**

Increased survival of the new plantings is expected to result from the installation of protective enclosures and fences. The protective enclosures and temporary fencing will be routinely inspected and repaired as necessary.

## **2.6 PM&E BOTA-07: MONITOR RESTORED AREAS AND REPLANT IF NECESSARY**

### **Objective**

In order to ensure that new plantings are becoming established, the District will monitor restored areas annually for five years and then once at eight years. Additional riparian trees will be planted if the original plantings fail to meet the performance criteria outlined in this VMMP.

### **Impacts to Other Resources**

No impacts are expected to occur from monitoring riparian vegetation in the Project Area, or from installing additional plants.

### **Expected Outcome and Further Actions**

Monitoring and additional planting, if necessary, are expected to confirm and supplement the establishment of additional stands of woody riparian vegetation. Monitoring is also expected to confirm the development of herbaceous wetland vegetation in areas along the reservoir that will be more mesic under future operating conditions. The District will provide an annual report for five years and then once at eight years of the monitoring results to BLM and the Washington State Department of Ecology. If the original plantings do not meet the performance criteria in the VMMP, additional riparian plants will be installed.

## **2.7 PM&E BOTA-11: IMPLEMENT A NOXIOUS WEED CONTROL PROGRAM**

### **Objective**

In order to control noxious weeds along access roads and construction sites for the Project, the District will implement a Noxious Weed Control Program. Once the desired control and reduction in noxious weed infestations has been assured, any bare areas of the sites will be re-vegetated with native grasses to facilitate the re-establishment of native vegetation and help prevent further incursion from noxious weeds.

### **Impacts to Other Resources**

Impacts to sensitive species could occur from chemical or manual weed control methods if any are present at a treatment site. However, no sensitive species have been reported from the current treatment sites.

The sensitive plant surveys were reported in the *Technical Memorandum for Special Status Plants Study* which is Appendix E.3.4 of the draft License Application and Appendix E.3.6 of the final License Application. These surveys covered the entire project area from the upstream end above Shanker's Bend to the downstream end below the existing powerhouse. In most areas, the project boundary does not extend much above the ordinary high water line. Conducting surveys of the project area often

required traversing land outside the actual FERC project area. As stated in the *Technical Memorandum for Special Status Plants Study*, areas that were inaccessible for foot surveys included steep cliffs, unstable slopes, and areas bounded by impassable stream conditions. Such areas were either closely inspected by boat or were inspected with binoculars. These areas generally also have little land surface within the project boundary that can support vegetation.

### **Expected Outcome and Further Actions**

Temporary eradication of noxious weeds at treatment sites is expected to result from implementation of this measure. Long-term control provisions have been included because these noxious weeds are present elsewhere in the Project vicinity and are likely to recur

## **2.8 PM&E REC-01: INSTALL BARRICADES AND FENCING TO CONTROL LIVESTOCK AND PREVENT UNAUTHORIZED ACCESS**

### **Objective**

The actions proposed by the District under this PM&E measure are intended to improve water quality and prevent damage to wetlands and proposed riparian/wetland mitigation sites. Additional objectives are addressed under this PM&E within the Recreation Management Plan.

### **Impacts to Other Resources**

There are no expected negative impacts to other wildlife. Smooth bottom wires will prevent injury to fawns and yearling deer who often try to move between lower fence wires and adult deer easily jump a fence with a top wire 40 inches above the ground.

### **Expected Outcome and Further Actions**

The permanent fence will aid in riparian vegetation establishment, and will protect water quality. The permanent fence will be inspected on a regular basis and repairs will be made as necessary.

## **2.9 PM&E AES-04: RE-VEGETATE EXPOSED GROUND ON THE WEST BANK WHERE FORMER FACILITIES HAVE BEEN REMOVED**

### **Objective**

The objective of this element is to establish native vegetation where bare soil may be exposed by the removal of the former powerhouse, surge tank, or penstock facilities on the west bank. While rocky ledges underlie much of this area, there is vegetation along the penstock and along the old powerhouse access road that could be disturbed, depending on the methods used to remove the facilities.

**Impacts to Other Resources**

No impacts to other resources are expected to occur from re-vegetation activities in at the sites of the former facilities.

**Expected Outcome and Further Actions**

Native grasses and other native vegetation are expected to establish at these locations. If noxious weed species encroach, then the areas will be added to those scheduled for treatment under the noxious weed control section of this plan (Section 4.1).

The following sections describe site preparation, planting, fencing, water access for livestock, weed control, and monitoring necessary to effectively implement these measures.

## **3.0 MITIGATION IMPLEMENTATION PLAN**

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### **3.1 AREA COVERED**

Three general areas have been identified as suitable locations for planting riparian species (Figure 2). All three areas are between the dam and Shanker's Bend. Two of these areas are on the east side of the reservoir, and the third is on the west side. It is not possible to accurately determine the exact planting sites at this time. Development of the planting plan will be carried out through consultation with stakeholders to determine the exact location and extent of mitigation.

### **3.2 SITE PREPARATION**

Site preparation prior to planting enhances growing conditions for the plant material installed. Site factors that may inhibit successful establishment include unsuitable substrate and invasive weeds.

#### **3.2.1 General Site Preparation**

Site preparation includes the scarification of surface soils to reduce soil compaction and provide a suitable planting bed. In culturally sensitive areas, other methods that do not disturb the ground can be used such as adding a mulch mixture to the surface of the site.

For relatively small sites, site preparation may be accomplished by hand raking. For larger sites, mechanical methods to scarify the site may be used, followed by raking or harrowing. The planting area must be free of living sod and perennial weeds before planting.

Site preparation may include the entire area, strips or patches or individual 'scalp' areas for each plant. Scalp planting is a method that places plants in an area cleared of competing vegetation and the area for each tree/shrub should provide a minimum 3-foot diameter circle (1.5 feet on each side of the planted stock) (USDA, 2007). This procedure is typically carried out by hand, backhoe or front-end loader immediately prior to planting. By preparing only small strips (4-10 feet wide), or scalp areas which maintain the existing vegetation between rows, wind and water erosion will be reduced and wildlife benefits will be provided. It is important to ensure that noxious weeds in the immediate area are removed to prevent rapid re-colonization of weeds. If needed, soil amendments may be applied, such as compost, sawdust, or woodchips.

### **3.2.2 Site Preparation for Road Beds**

Due to the proximity of identified cultural and historic resources, the construction team will work closely with the HPMPC (Historic Properties Management Plan Coordinator) to insure the sites are not disturbed and consistent with the Historic Properties Management Plan.

Site preparation of road beds involves removing some of the existing roadbed (gravel), scarifying the ground, importing soil and mixing native and imported soils together. The road surface is scarified or decompacted, using an excavator, to improve infiltration and promote the establishment of vegetation. Surface treatment may include providing undulations that correspond to the local topography. Weeds in the immediate area will be removed to prevent re-colonization of the new soil by weeds. If needed, additional soil amendments may be applied, such as compost, sawdust, or woodchips.

### **3.3 PLANTING PLAN**

Riparian vegetation will be planted at selected locations along the reservoir (Figure 2). While riparian shrubs are expected to establish naturally along the new low water elevation, planting riparian vegetation is expected to facilitate the replacement of existing plants that may be lost after the low water elevation is increased.

Construction site areas that are not in use for on-going operations once construction is completed will be part of the recreational use area. Development of this area is described elsewhere and not addressed in this plan.

Pole cuttings of cottonwoods (*Populus spp.*) and willows (*Salix spp.*) will be obtained from native stock in the surrounding area to ensure lower cost, local ecotype and availability. Plants adjacent to the reservoir that are likely to be inundated are a likely source of this material (subject to BLM approval). The riparian zone at Enloe is currently dominated by willow, but other native species that are also present, such as red-osier dogwood and mountain alder, may also be used.

Salvage planting is not proposed due to the low success rate and additional watering requirements, although the willows and any young cottonwoods at the current low-flow shoreline of Enloe reservoir may be harvested to provide planting stock.

Rooted stock is not proposed due the high cost and time involved in locating material. Also, rooted stock must either be planted close to water or irrigated which would require additional permitting. It is anticipated that the use of pole cuttings from native stock will be sufficient to adequately restore riparian areas to a natural state, without the need for irrigation.

It is anticipated that pole plantings will not be significantly affected by competition with weeds, because mesic conditions do not benefit weed colonization. However, an

integrated noxious weed management plan is provided in this mitigation monitoring plan to address the potential for noxious weeds invasion (Section 4.2).

Pole cuttings are sensitive to trampling and consumption by livestock and wildlife. Protection from livestock requires adequate fencing (section 3.4) and small scale planting protection from beavers (Section 3.2.2) as described in this plan.

### **3.3.1 Cutting Procedure**

1. Pole cuttings will be harvested during the dormant season after leaves have fallen and before buds start to swell (early winter to early spring). After planting, rooting occurs from root primordia along the complete length of the stem, creating an extensive root system (Hoag, 1995).
2. Healthy, vigorous young poles with larger diameters and no obvious insect or disease problems will be chosen as these establish quicker and more successfully than older or thin poles (NRCS 2008). This is because a larger supply of energy is stored in the stem to improve establishment success (Hoag, 1995).
3. Cuttings will be thinned from live wood at least 2 years old. Up to  $\frac{2}{3}$  of the plant will be removed to ensure remaining habitat exists for wildlife whilst the cuttings become established (NRCS, 1998).
4. Willow poles will be  $\frac{3}{4}$  inch diameter or greater and young cottonwood poles will be 1.5-3.5 inches in diameter. The length of the cuttings will be determined by the depth of groundwater and height of surrounding vegetation. The poles long enough so that the above-ground portion will be tall enough to avoid shading by the surrounding herbaceous vegetation. Generally, willow poles will be 18 inches long minimum and cottonwood poles will be 6 to 9 feet long.
5. The cuttings will be prepared by removing all side branches and the top 2 feet in order to remove the apical bud and most of the flowering parts. This ensures that the majority of energy in the stem will go to the auxiliary buds for rooting and sprouting, rather than be spent on flowering (Hoag, 1995).
6. Cuttings will be tied into bundles of 8 to 12 inches diameter using two pieces of twine to ease transportation and soaking.
7. Between harvest and planting of poles, the cut ends of the poles will be placed in water to prevent dehydration. The pole cuttings will be stored in a cool (34-36°F), dark place until ready for planting for up to 6 months (NRCS, 1998).
8. The cutting bundles will be soaked for 5 to 7 days before planting to allow swelling of the root buds before planting and to aid in leaching out natural anti-rooting hormones found in the cuttings. The bundles will be removed from the water before roots emerge.

### 3.3.2 Planting Procedure

1. Planting will be done in late spring, after high flows have passed and before hot, dry summer weather has begun.
2. The site will be prepared by removing major weed colonies by hand.
3. Holes between 1 to 4 inches wide and 18 inches to 3 feet deep (dependant upon the size of the pole cuttings) will be made with a power auger or punch bar tool. This hole will of a sufficient depth for the cut end of the pole to remain in ground water throughout the growing season. Willow species in general can tolerate shallower ground water depths (1.5 feet or deeper) than cottonwoods (4 feet or deeper) (NRCS 2008). To minimize labor, excavation time, and moisture loss, hole size will not be any larger than necessary to insert the poles without damage to the buds.
4. Pole plantings may be planted in rows, or at random in the most suitable places, at a rate of 2 to 5 poles per square yard where appropriate.
5. The cuttings will be placed carefully in the hole to prevent major damage to the buds.
6. At least  $\frac{1}{2}$  to  $\frac{2}{3}$  of the cutting will be planted below ground to provide support during high flows. At least 2 to 3 feet should be below ground.
7. After placing the cutting, the hole will be backfilled with a soil and water slurry to remove air pockets. It is critical that all air pockets are removed.
8. Fertilizers and rooting hormones will not be used as these rarely increase success enough to offset the material and labor costs involved (NRCS, 1998).
9. Protective enclosures for individual plants will be used to protect the young plants from consumption by wildlife such as beaver or deer. These enclosures may consist of wire cages or rigid protection tubes.
10. The locations of the plantings will be mapped, either as individual plants or as groups of a certain number of individuals.

### 3.4 PROTECTION FENCING

The lands within the boundary of the Enloe Hydroelectric Project (FERC Project No. 12569) on the Similkameen River (Project Area) and adjacent lands are currently not fenced. Currently, three ranchers have rights to graze cattle on BLM land within the Project Area. Because there are no fences to limit or control livestock access, cattle freely roam the entire site. Cattle access the river for drinking water wherever the topography allows.

In order to improve water quality, prevent cattle from entering the proposed recreation site, and prevent damage to wetlands and proposed riparian/wetland mitigation sites, the District will install an 8,000 foot long cattle fence along the eastern boundary of the Project Area from Shanker's Bend to Enloe Dam (Figure 2). At its northern end, the cattle fence will tie in to a rock outcrop just south of the apex of Shanker's Bend. Cattle will have access to the river just upstream from the rock outcrop. At its southern end, the fence will tie in to another rock outcrop just east of the proposed powerhouse.

### **3.4.1 Fence Description**

The configuration of the cattle fence will be consistent with BLM guidelines for livestock fencing installed in areas inhabited by common ungulate species (BLM Manual Handbook H-1741-1 Fencing). The fence will consist of three well-stretched horizontal wires with the top wire no more than 38 inches above the ground. The other wires will be spaced at intervals 16 and 26 inches above the ground. The bottom wire will be smooth and the other two wires will be barbed. This configuration will reduce injury to fawns and yearling deer who often try to move between lower fence wires. Adult deer easily jump a fence with a top wire 38 inches above the ground. One access point through the fence for pedestrians will be provided near the north end of the recreation site.

The District will install a stock watering tank approximately 300 upslope from the river, just inside the Project Boundary and north of the proposed recreation site, as an alternative source of drinking water for grazing cattle. The tank will be supplied with water from an existing pump and water line located on the east bank of the river. The pump and water line is owned by one of the grazing lessees. The grazing lessee has an existing water right to withdraw water from the river for stock watering purposes. The District will monitor the need to install a security fence around the pump and electrical power system to discourage vandalism and theft if it becomes a problem. .

A cattle guard will be installed where the cattle fence crosses the main access road to the dam. The cattle guard grid will be designed to bear the maximum expected vehicle load (which may include construction equipment). A gate (accessible only by authorized personnel) will be installed where the cattle fence crosses Enloe Dam Road.

### **3.4.2 Maintenance**

Inspection of the livestock and security fences will be conducted routinely by District staff or contractors. Maintenance will be conducted when necessary to preserve the integrity of the fences.

### 3.5 SCHEDULE

The implementation schedule (Table 1) assumes that the FERC license application will be accepted in early 2009 and that compliance with NEPA will be completed by spring 2010. Planting and fencing design would begin in spring 2010 and take about five months to complete. Preparation of bid documents, solicitation of bids from equipment vendors and construction contractors, and negotiation of contracts would take an additional five months. Installation of fencing and grazing control measures (BOTA-06), site preparation and planting activities (BOTA-2, BOTA-04 and BOTA-05) in the mesic section of the abandoned shoreline road are expected to begin in late spring 2011 and continue for approximately 2 months. Abandonment of the existing shoreline road and improvements to the access road (BOTA-03) would occur during the first construction season in 2011 to help facilitate movement of equipment, workers and supplies to the power station site. Site preparation and planting activities in the drier parts of the mitigation areas are expected to begin in late spring 2014 (when crest gate operations will result in more mesic conditions) and continue for approximately 2 months. The noxious weed control program (BOTA-11) will be implemented in 2010, prior to the initiation of construction activities. Monitoring and possible replanting of restored areas (BOTA-07) would begin one year after planting at each planting area.

**Table 1 VMMP Schedule**

Activity	2009	2010				2011				2012				2013				2014				
	1 <sup>st</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	
FERC License Application Accepted																						
NEPA compliance completed																						
Planting and Fencing Design																						
Bid Documents, Negotiation of Contracts, Etc.																						
Site Preparation and Planting Activities																						
Abandonment of the Existing Shoreline Road																						
Installation of Fencing and Grazing Control Measures																						
Monitoring and Possible Replanting of Restored Areas																						

### 3.6 COST ESTIMATES

Initial cost estimates for each of the proposed recreation PM&E measures described in this VMMP are presented in Table 2. These costs will be refined during subsequent design work.

**Table 2. Cost Estimates for Proposed PM&E Measures**

<b>PM&amp;E Measure</b>	<b>Cost</b>
PM&E BOTA-02: Plant Riparian Vegetation	<ul style="list-style-type: none"> <li>Plant Riparian Vegetation: \$30,000</li> </ul>
BOTA-03: Abandon Existing Shoreline Road and Restore Existing Road	<ul style="list-style-type: none"> <li>Abandoning existing shoreline access road: \$5,000</li> <li>Restoring existing access road: \$350,000</li> </ul>
PM&E BOTA-04: Plant Riparian Species Along Abandoned Road Corridor	<ul style="list-style-type: none"> <li>Plant Riparian Species Along Abandoned Road Corridor: \$15,000</li> </ul>
PM&E BOTA-05: Plant Riparian Species on East and West Banks Downstream of Shanker's Bend	<ul style="list-style-type: none"> <li>Plant Riparian Species on East and West Banks Downstream of Shanker's Bend: \$20,000</li> </ul>
PM&E BOTA-06: Install Temporary Grazing Control Measures	<ul style="list-style-type: none"> <li>Protective enclosures for individual plants: \$20,000</li> <li>Temporary fence on the west side: \$5,000</li> </ul>
PM&E BOTA-07: Monitor Restored Areas and Replant if Necessary	<ul style="list-style-type: none"> <li>Monitor Restored Areas for 5 years: \$50,000</li> <li>Replanting if Necessary: \$5,000 - \$15,000</li> </ul>
PM&E REC-01: Install Barricades and Fencing to Control Livestock and Prevent Unauthorized Access	<ul style="list-style-type: none"> <li>Rock barricades, gates and safety/security fence, stock watering tank, pump enclosure, water line extension: \$75,000</li> <li>Cattle fence: \$10,000</li> </ul>
PM&E BOTA-11: Implement a Noxious Weed Control Program	<ul style="list-style-type: none"> <li>Seed costs for initial phase: \$1,000</li> <li>Total costs for initial phase: \$10,000</li> <li>Future costs: unknown at this time</li> </ul>
Re-vegetate exposed ground on the west bank where former facilities have been removed	<ul style="list-style-type: none"> <li>Seed costs: unknown at this time</li> <li>Total costs: unknown at this time</li> <li>Monitoring costs: unknown at this time</li> </ul>

## 4.0 MAINTENANCE

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The District will be responsible for maintaining restored riparian areas, fencing and livestock water storage facilities in acceptable conditions through routine maintenance, repair, replacement and replanting.

### 4.1 INTEGRATED NOXIOUS WEED MANAGEMENT PLAN

There are multiple small areas of noxious weed infestations within the Project boundary that will be controlled, reduced, or eradicated. Following treatment at these areas, native species will be seeded to facilitate the re-establishment of native wildlife habitat. Additional sites may be identified for treatment in the future by BLM or the PUD, but those are beyond the scope of this plan.

Biocontrol is not proposed because successful establishment for biocontrol agents may take from one to several years. When effective, their result is to reduce populations over time. However, the weed control as addressed in this plan is for the eradication or control of specific weed stands that occur within the FERC Project boundary and at the restoration sites.

#### 4.1.1 Area Identification

Weed control treatments described in this plan will be conducted at four sites<sup>1</sup> (Figure 3):

**Area 1:** Parking and Overlook, approximately 0.4 acre

**Area 2:** Intersection and side road (unauthorized road), approximately 0.6 acre

**Area 3:** Open Flat, approximately 0.9 acre

**Area 4:** Riverbank, approximately 0.06 acre

Final mapping may result in changes to the extent of the treatment areas. Additional treatment areas may be identified during the life of the license.

An estimated total of approximately 87,250 square feet (2.0 acres) will be treated using herbicide and manual methods for controlling noxious weeds. Herbicide application will be limited to areas upslope of the existing lower access road, unless otherwise determined by BLM's lease administrator.

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<sup>1</sup> While Area 1 will be treated to control weeds prior to construction of the new intake and powerhouse, the new intake will occupy most of this area. Therefore, little or no subsequent treatment or monitoring is expected at this site.

Proposed weed control is limited to the Project boundary and the restoration areas. Weeds are present elsewhere in the vicinity of the Project, but these are outside the District's area of responsibility.

#### **4.1.2 Weed Identification**

Targeted species for eradication/reduction that have infested the Enloe Dam area are as follows:

##### **Class B:**

- Houndstongue (*Cynoglossum officinale*)
- Diffuse knapweed (*Centaurea diffusa*)
- Sulfur cinquefoil (*Potentilla recta*)

##### **Class C:**

- Babysbreath (*Gypsophila paniculata*)

#### **4.1.3 Method and Type of Application**

##### **Methods**

The methods used in the integrated noxious weed management plan will be a mixture of hand pulling and hand spraying of herbicides. This is to ensure the careful removal of noxious weeds without harming beneficial plant species.

For chemical treatment using broadleaf herbicides, two hand-spray methods will be used: 1) hose reel from a slurry tank on a 4WD pickup and 2) backpack sprayer. All chemicals will be mixed off-site and no chemicals will be stored, flushed or mixed on the Enloe site. Near the Similkameen River bank, where there is a small infestation of diffuse knapweed near the high-water line, hand pulling and bagging of knapweed will be the preferred method.

##### **Types and Application of Herbicides**

Proposed herbicides for broadleaf control will be combination of 2, 4-D Amine 4, Roundup. Use of other broadleaf herbicides such as Tordon and Redeem will also be considered to aggressively treat heavily infested roadway edge for diffuse knapweed. Application rates will follow Specimen Labels for each respective herbicide. No use of soil sterilization chemicals will occur at this site. MSDS and Specimen Labels will be provided upon request.

#### **4.1.4 Post Treatment & Site Rehabilitation**

Once desired control and reduction in noxious weed infestations have been established, a native grass mix such as the western native grass mix described in Table 3 generally will be used to reestablish the areas. Where weed control is conducted in developed recreational use areas, a grass mix that includes non-native species may be used if approved by BLM for this purpose. The rate of seed/acre will depend on the type of mix used.

**Table 3. Grass mix species composition.**

<b>Western Native Grass Mix</b>
25% sheep fescue
25% sandberg bluegrass
20% Indian ricegrass
10-15% bluebunch wheatgrass
10-15% prairie junegrass

#### **4.1.5 Schedule**

Weed control methods for targeted species are expected to be implemented in early May, with a possible follow-up treatment in October of the same year. If necessary, the treatment may be repeated in May of the following year to further reduce knapweed regeneration. Any native grass seeding will be done in early spring and fall of the second year to ensure coverage.

#### **4.1.6 Long Term Control of Noxious Weeds**

Monitoring of noxious weed infestations within the Project boundary will be carried out in the summer/fall annually for five years, and then once at 8 years. The method and type of application for control of new weed infestations will be the same as described in Section 4.1.3, unless more effective methods are developed. If dramatic changes in weed populations occur during these time periods, it may be necessary to re-evaluate the weed control measures. Consultations with BLM, FWS & WDFW will be considered prior to implementation of new weed control plans.

## 5.0 MONITORING

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### 5.1 MONITORING OBJECTIVES

Revegetation monitoring will be conducted to evaluate the establishment of the woody riparian plantings and to identify any problems that may need to be corrected.

The Project area will also be monitored to assess sites that may convert from one wetland vegetation community to another or from upland vegetation to herbaceous wetland.

### 5.2 MONITORING PERFORMANCE CRITERIA

It is anticipated that the new riparian plantings will have at least a 75% survival rate, as determined by counting surviving individuals. If the riparian vegetation in any area becomes too dense to identify individuals, that area will be considered to have met the performance criteria, with the equivalent of a 100% survival rate. Should the survival rate of the riparian plantings decrease to less than 75% of the original planting during any of the monitoring periods, new riparian plants will be planted to replace those deceased. The type of plants used and technique of planting will remain the same. However, if losses occur because the depth to water table depth at a planting site is different from the anticipated depth, then the actual planting locations may be shifted to more suitable sites.

Areas that have been planted with grass seed following weed control efforts will be monitored by visual inspection and by photo points. It is anticipated that vegetation will attain a 75% cover value, not including any new individuals of the targeted species. If this cover value is not achieved, then additional grass seed will be planted. If the targeted weed species re-establish, then weed control treatment will continue.

Monitoring of noxious weed infestations within the Project boundary will be carried out in the summer/fall annually for five years, and then once at 8 years. The method and type of application for control of new weed infestations will be the same as described in Section 4.1.3, unless more effective methods are developed. If dramatic changes in weed populations occur during these time periods, it may be necessary to re-evaluate the weed control measures. Consultations with BLM, FWS & WDFW will be considered prior to implementation of new weed control plans.

### 5.3 MONITORING SPECIES

Woody riparian species that will be planted and monitored are willow species and cottonwood. Red-osier dogwood and mountain alder may also be planted if suitable material is available.

Grass establishment will be monitored only at sites where facilities are removed and grass seed is planted. The species list is provided above.

#### **5.4 MONITORING PROTOCOLS**

Woody riparian plantings will be monitored either by counting the surviving individuals or, if access for counting individuals is not feasible, by counting surviving individuals in quadrats distributed across the planting area. If the riparian vegetation in any area becomes too dense to identify individuals, the extent of that area will be mapped.

Monitoring techniques will include photo points and plant cover sampling, either on line intercept transects or in quadrat plots randomly distributed along a line. Alternatively, point-intercept sampling along a line may be used to determine species distribution. The choice of methods will depend on the site conditions when initial monitoring begins, but the same method will be used throughout the monitoring period. Due to the narrow zone in which such changes may occur, randomized sampling may not be feasible, and the final selection of a monitoring method will depend on the condition of the shoreline and banks when monitoring is initiated.

Fixed start and end points for the sampling will be established and recorded by GPS. These points may be marked with rebar stakes in the first year. However, since flooding is likely to remove or obscure the stakes in some years, the points may have to be located by coordinates each year. If changes to the shoreline remove a monitoring area during the monitoring period, then a new sampling site will be established inland of the original location.

Examples of data sheets for monitoring are provided in Appendix B, although the data sheets used may be modified versions.

#### **5.5 MONITORING IMPLEMENTATION SCHEDULE**

Monitoring of riparian plants will be carried out in the late summer or early fall annually for five years beginning in the year following planting, and then once at 8 years. Data recorded will include an evaluation of the condition of the plants, as well as the counts or cover data.

#### **5.6 COST ESTIMATES FOR MONITORING STUDIES**

Monitoring costs for woody riparian plantings (included in Table 2) are estimated to be \$50,000. Monitoring costs for natural establishment of herbaceous wetland species are estimated to be up to \$50,000.

## 5.7 REPORTING

Each year that monitoring is conducted a report will be prepared, using the monitoring data to assess the state of riparian mitigation areas and any management actions that may be necessary to achieve the performance criteria. The report will also provide information on the current state of the exclusion fencing.

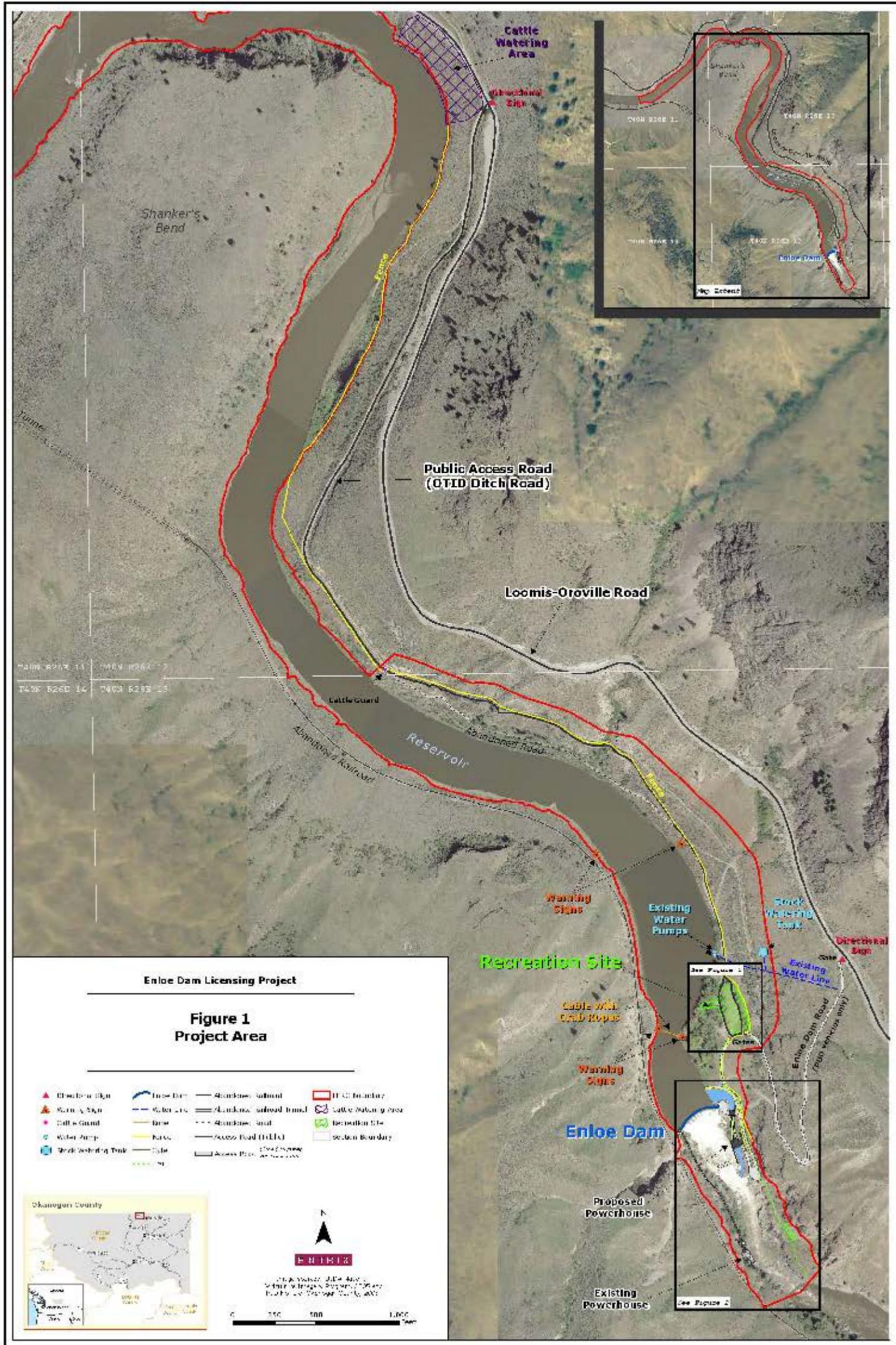
## 6.0 REFERENCES

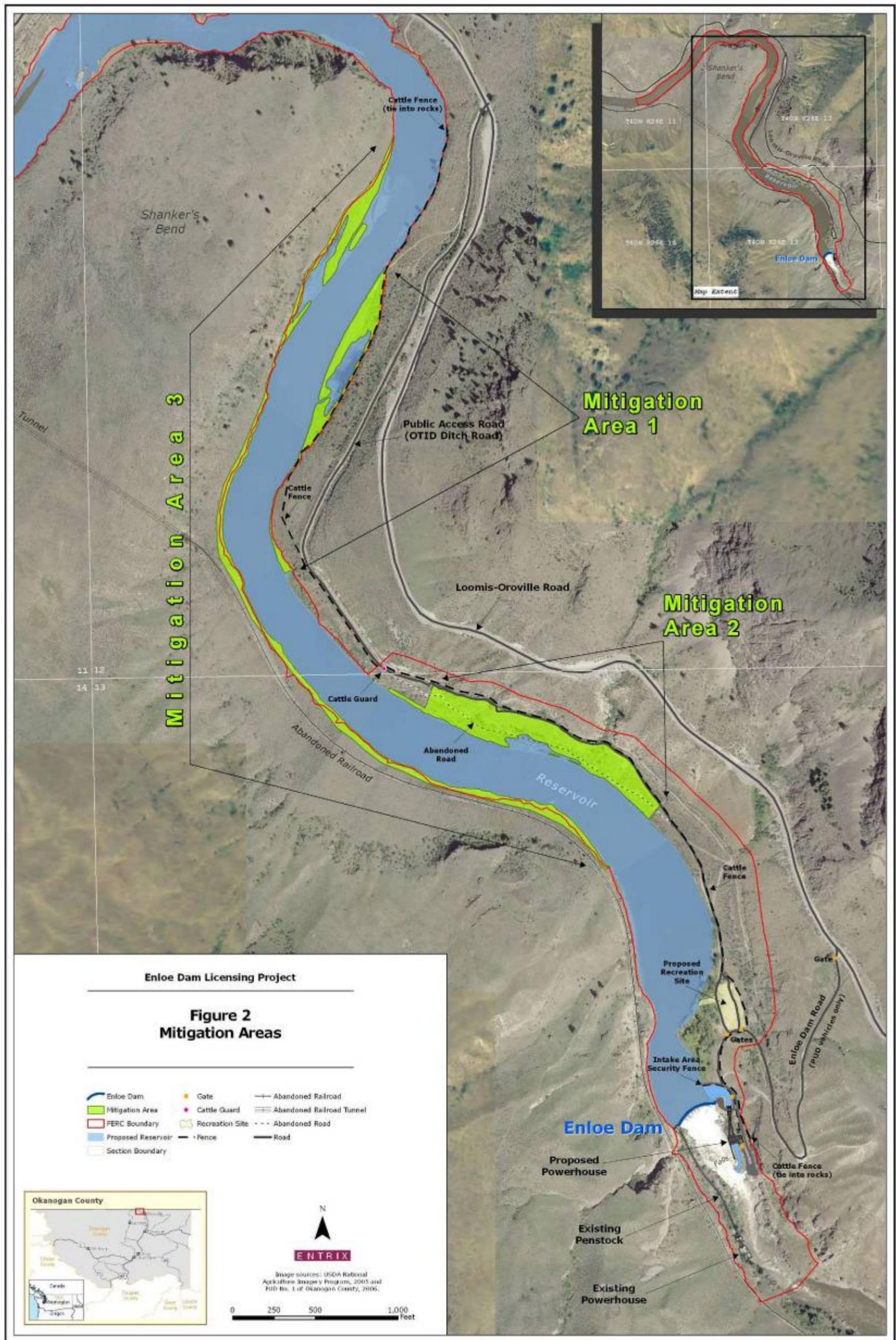
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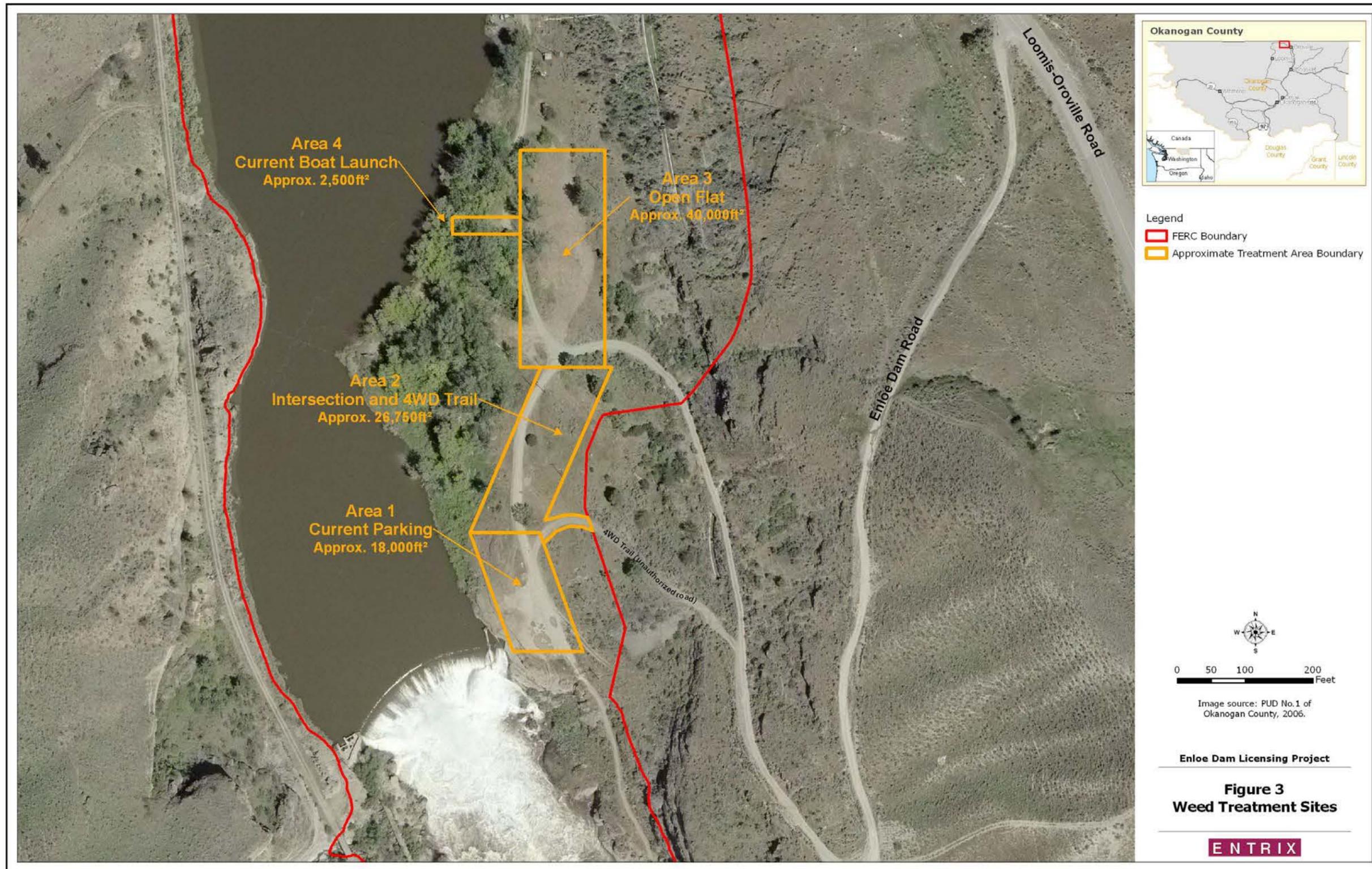
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## 7.0 FIGURES

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## **8.0 APPENDICES**

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## **APPENDIX A: FENCING PLAN**

## ***FENCE PLAN***

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### **Introduction**

The lands within the boundary of the Enloe Hydroelectric Project (FERC Project No. 12569) on the Similkameen River (Project Area) and adjacent lands are currently not fenced. Cattle have free access to the river wherever the topography allows. In order to protect riparian/wetland mitigation sites for the project from grazing and trampling damage while mitigation plantings are establishing, livestock fencing is proposed for most of the eastern side of the Project Area along the Similkameen River between Enloe Dam and Shanker's Bend (Figure 1). An additional security/safety fence section is proposed for the landward side of the new powerhouse.

### **Cattle Fencing**

The configuration of the cattle fence will be consistent with BLM guidelines for livestock fencing installed in areas inhabited by common ungulate species (BLM Manual Handbook H-1741-1 Fencing). The fence will consist of three well-stretched horizontal wires with the top wire no more than 38 inches above the ground. The other wires will be spaced at intervals 16 and 26 inches above the ground. The bottom wire will be smooth and the other two wires will be barbed. This configuration will reduce injury to fawns and yearling deer who often try to move between lower fence wires. Adult deer easily jump a fence with a top wire 38 inches above the ground. One access point through the fence for pedestrians will be provided near the north end of the recreation site.

The District will install a stock watering tank approximately 300 upslope from the river, just inside the Project Boundary and north of the proposed recreation site, as an alternative source of drinking water for grazing cattle. The tank will be supplied with water from an existing pump and water line located on the east bank of the river. The pump and water line is owned by one of the grazing lessees. The grazing lessee has an existing water right to withdraw water from the river for stock watering purposes. The District will monitor the need to install a security fence around the pump and electrical power system to discourage vandalism and theft if it becomes a problem.

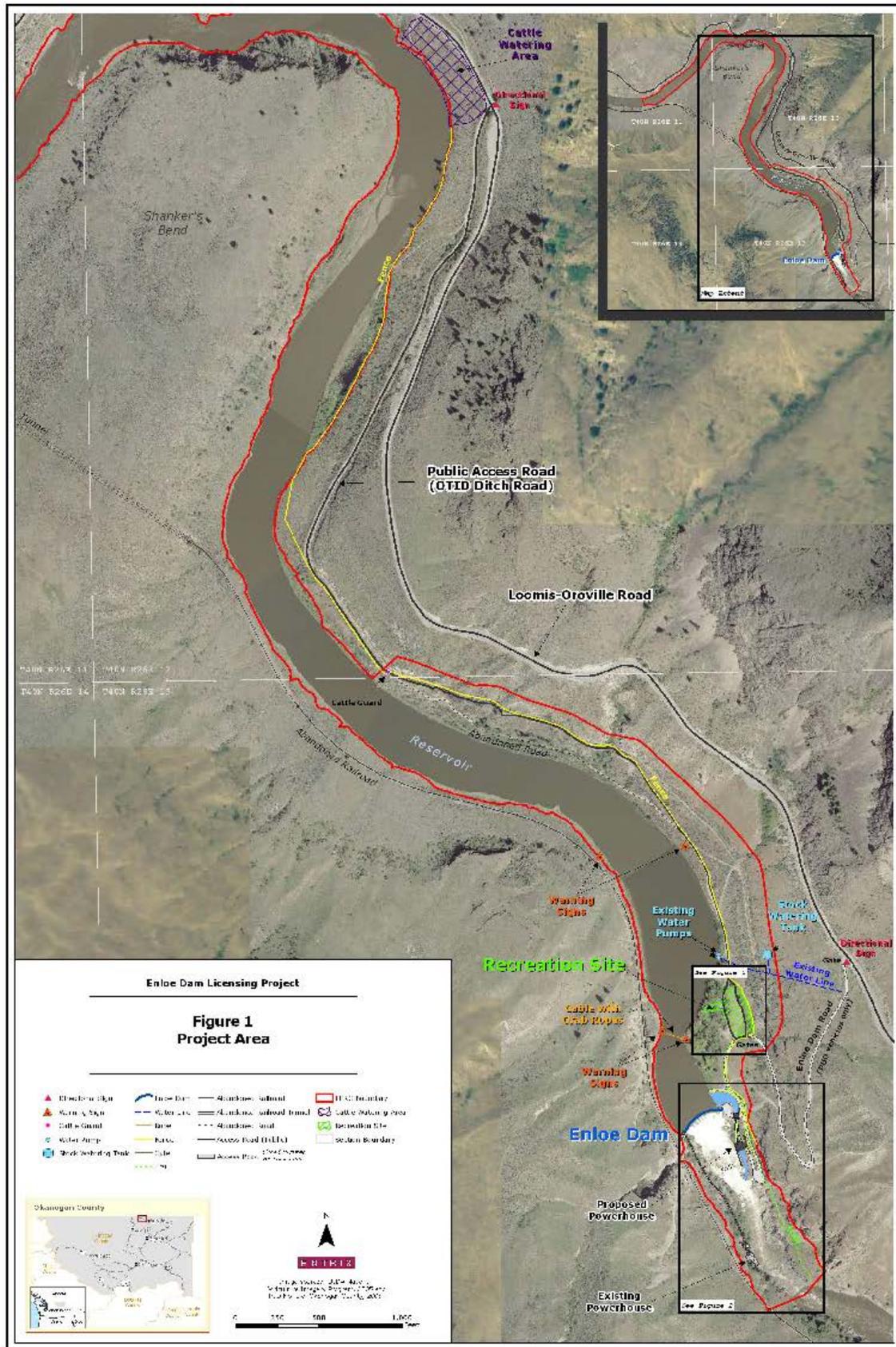
One cattle guard will be installed where the cattle fence crosses the main access road to the dam. The cattle guard grid will be designed to bear the maximum expected vehicle load (which may include construction equipment). A gate (accessible only by authorized personnel) will be installed where the cattle fence crosses Enloe Dam Road.

### **Safety/Security Fence**

Currently, a chest-high approximately 100-foot long chain-link fence separates visitors on the east bank of the river from the dam and the lower reaches of the impoundment. No other fences are currently present on the site. The existing fence will be removed and a new fence (at least six feet high) will be installed along the upland perimeter of the power generating facilities, including the intake channel, penstock intake, penstocks, powerhouse and tailrace (Figure 1). The fence will be constructed of small mesh chain link material finished in traditional galvanized zinc or coated in brown vinyl. A top rail will be installed to keep the fence from sagging. District staff and other authorized personnel will have keys to access selected locked gates. Signs warning the public of high voltage and other hazards will be posted on appropriate fence locations.

### **Maintenance**

Inspection of the livestock and safety/security fences will be conducted routinely by District staff or contractors. Maintenance will be conducted when necessary to preserve the integrity of the fences.



## **APPENDIX B: SAMPLE DATA SHEETS**

### Enloe Project – Riparian Vegetation Monitoring – Tree – Shrub Form

Mitigation Site \_\_\_\_\_ Surveyor: \_\_\_\_\_

Survey Date: \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

Tag #	Species	Comment
001		
002		
003		
004		
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014		
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Other Observations:  
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