UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Klamath River Renewal Corporation **Project No. 14803-001**

LICENSE SURRENDER ORDER
LOWER KLAMATH PROJECT

Terrestrial and Wildlife Management Plan
(1 of 2)

December 2022

KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project
FERC Project No. 14803

Terrestrial and Wildlife Management Plan

Klamath River Renewal Corporation
2001 Addison Street, Suite 317
Berkeley, CA 94704

December 2022

This page intentionally left blank.

Table of Contents

1.0 Introduction **1**

2.0 Regulatory Context **8**

2.1 Organizational Structure 8

2.2 Specific Regulatory Interests 8

2.3 Modifications to the Approved Plan 9

2.4 Regulatory Approval Process 11

3.0 Force Majeure **11**

4.0 Reporting **12**

List of Tables

Table 2-1. Lower Klamath River Management Plans 8
Table 2-2. Modifications to the Approved Plan 9

List of Figures

Figure 1-1. Lower Klamath Project Location 3
Figure 1-2. J.C. Boyle Development Facility Details 4
Figure 1-3. Copco No.1 Development Facility Details 5
Figure 1-4. Copco No.2 Development Facility Details 6
Figure 1-5. Iron Gate Development Facility Details 7

Appendices

Appendix A California Terrestrial and Wildlife Management Plan
Appendix B Oregon Terrestrial and Wildlife Management Plan
Appendix C Bald and Golden Eagle Conservation Plan
Appendix D Consultation Record

1.0 Introduction

The Lower Klamath Project (FERC No. 14803) consists of four hydroelectric developments on the Klamath River: J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate (Figure 1-1). Specifically, the reach between J.C. Boyle Dam and Iron Gate Dam is known as the Hydroelectric Reach. In September of 2016, the Renewal Corporation filed an *Application for Surrender of License for Major Project and Removal of Project Works,* FERC Project Nos. 2082-063 & 14803-001 (License Surrender). The Renewal Corporation filed the License Surrender Application as the dam removal entity for the purpose of implementing the Klamath River Hydroelectric Settlement (KHSA). In November of 2020, the Renewal Corporation filed its Definite Decommissioning Plan (DDP) as Exhibits A-1 and A-2 to its Amended License Surrender Application (ALSA). The DDP is the Renewal Corporation's comprehensive plan to physically remove the Project and achieve a free-flowing condition and volitional fish passage, site remediation and restoration, and avoidance of adverse downstream impacts (Proposed Action). In November 2022, the Commission approved the ALSA and issued the License Surrender Order (LSO) approving facility removal and habitat restoration.

The Proposed Action includes the deconstruction of the J.C. Boyle Dam and Powerhouse (Figure 1-2), Copco No. 1 Dam and Powerhouse (Figure 1-3), Copco No. 2 Dam and Powerhouse (Figure 1-4), and Iron Gate Dam and Powerhouse (Figure 1-5), as well as associated features. Associated features vary by development, but generally include powerhouse intake structures, embankments and sidewalls, penstocks and supports, decks, piers, gatehouses, fish ladders and holding facilities, pipes and pipe cradles, spillway gates and structures, diversion control structures, aprons, sills, tailrace channels, footbridges, powerhouse equipment, distribution lines, transmission lines, switchyards, original cofferdams, portions of the Iron Gate Fish Hatchery, residential facilities, and warehouses. Facility removal will be completed within an approximately 20-month period.

This Terrestrial and Wildlife Management Plan describes the measures that the Renewal Corporation will implement to protect terrestrial and wildlife species as part of the Proposed Action. The Renewal Corporation prepared 16 Management Plans to implement the DDP, and the Commission reviewed and approved these plans as conditions of its License Surrender Order. These Management Plans were developed in consultation with federal, state, and county governments and tribes.

The LSO Ordering Paragraph (W) approves the Terrestrial and Wildlife Management Plan as filed on December 14, 2021. The Renewal Corporation now submits limited modifications to this approved plan as stated in Table 2-2. These modifications comply with the two requirements in Ordering Paragraph (W) and include refinement in means and methods due to further consultation with the Oregon Department of Environmental Quality, California State Water Resources Control Board, and U.S. Fish and Wildlife Service pursuant to the requirements in Ordering Paragraphs (D), (E), and (H), respectively. The Renewal Corporation has also added the Bald and Golden Eagle Conservation Plan as Appendix C, pursuant to the requirements in Ordering Paragraph (J). Table 2-2 herein shows the material modifications to the approved

version of this Terrestrial and Wildlife Management Plan. An updated Consultation Record for the Terrestrial and Wildlife Management Plan is included as Appendix D.

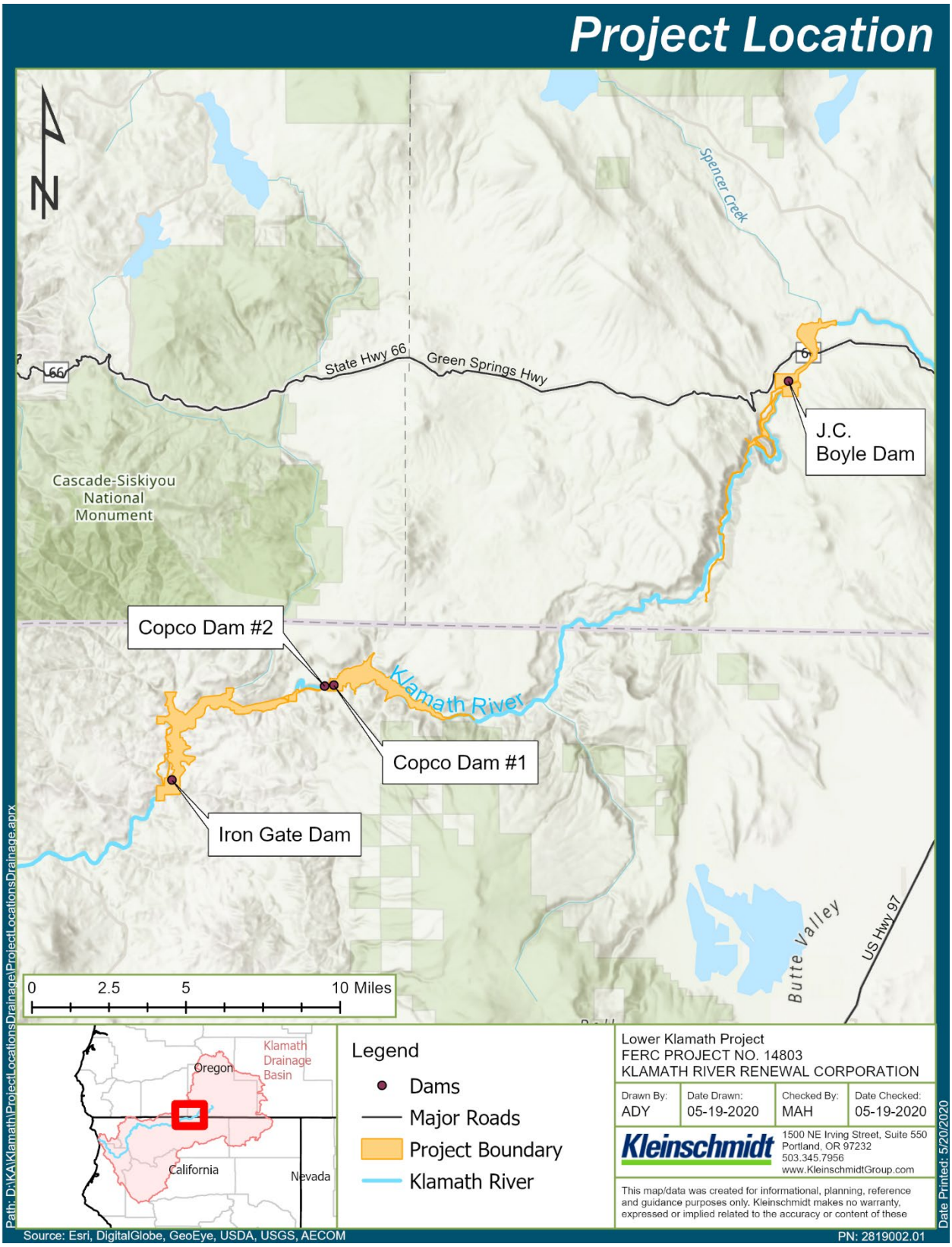


Figure 1-1. Lower Klamath Project Location

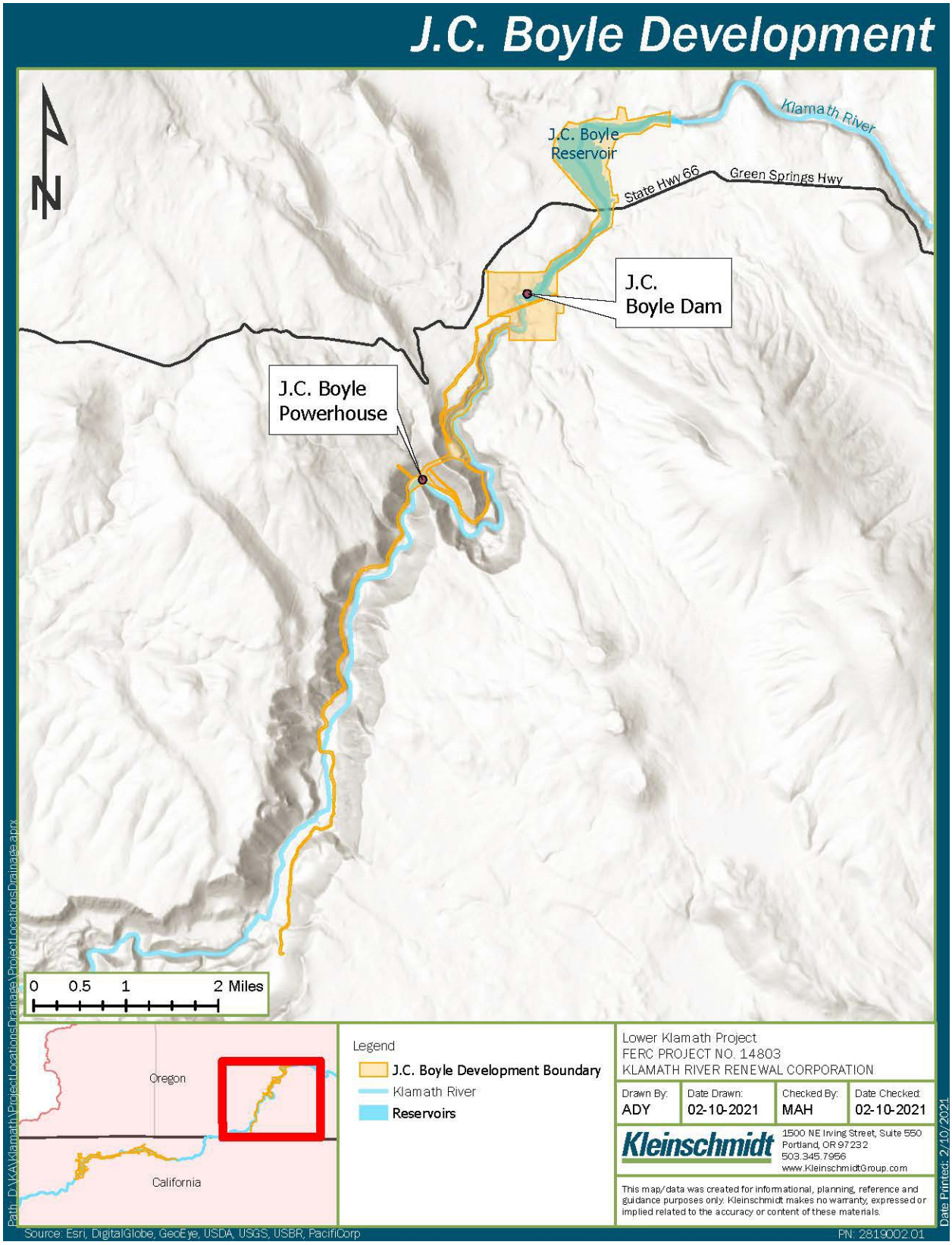


Figure 1-2. J.C. Boyle Development Facility Details

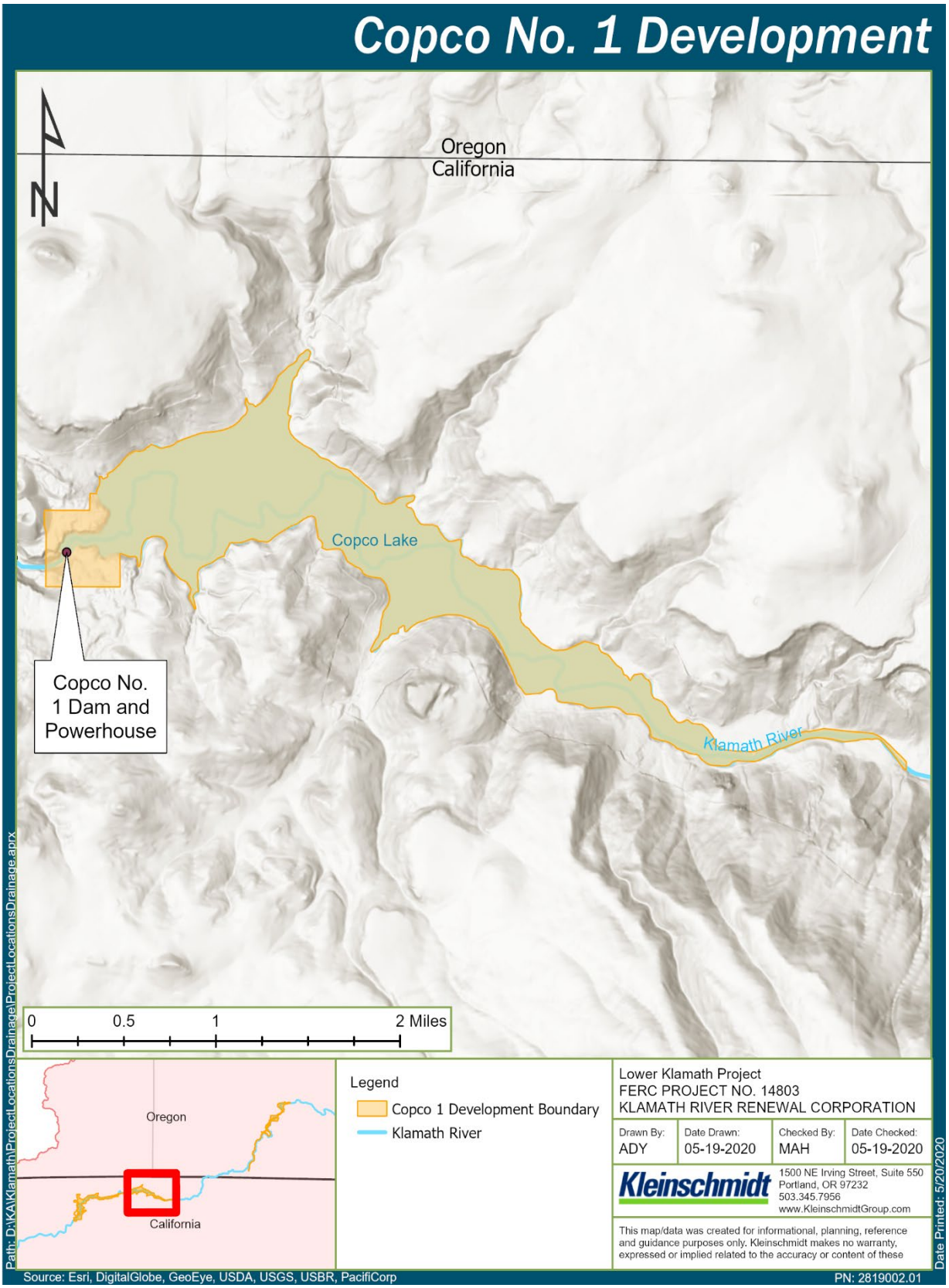


Figure 1-3. Copco No.1 Development Facility Details

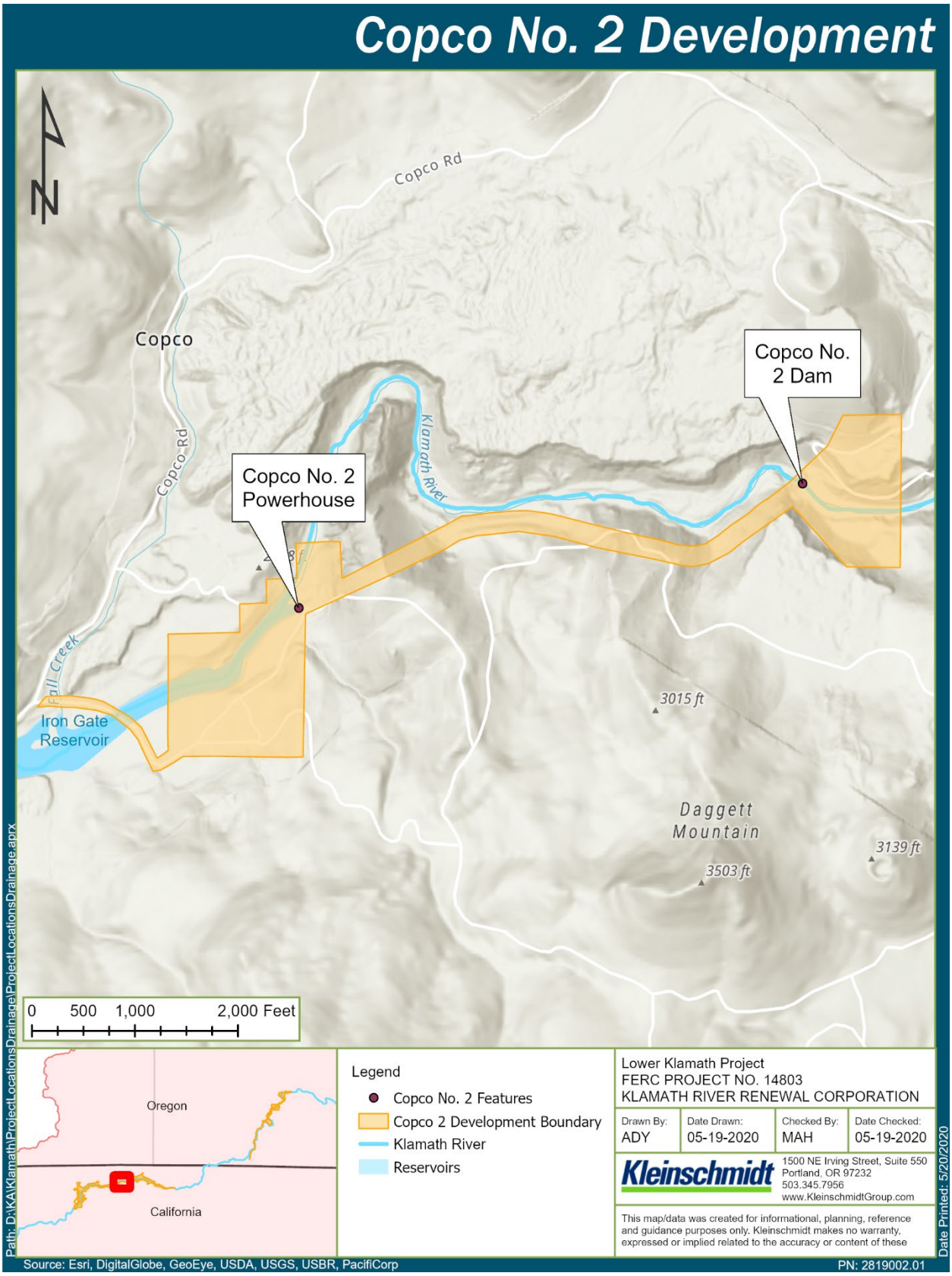


Figure 1-4. Copco No.2 Development Facility Details

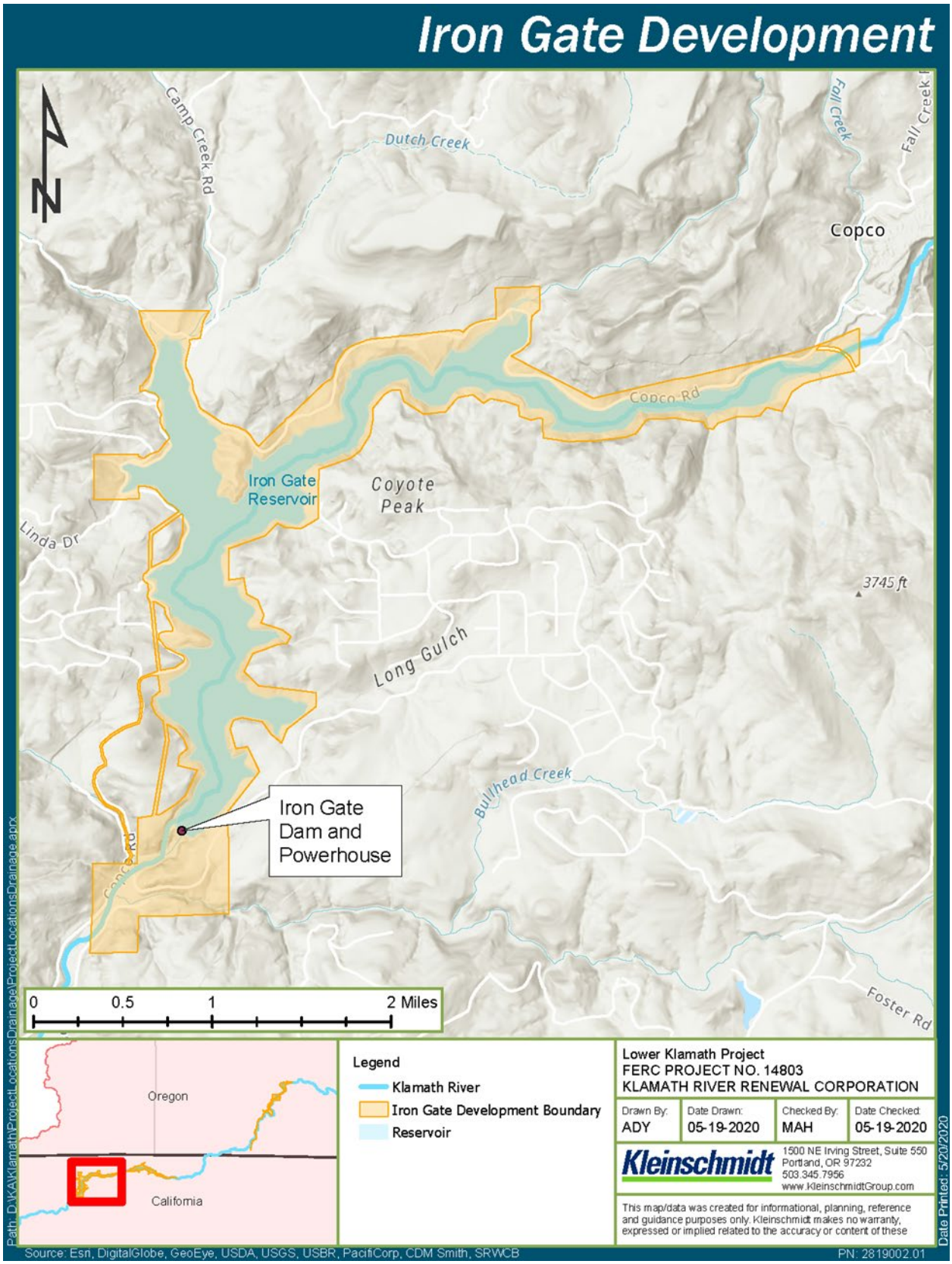


Figure 1-5. Iron Gate Development Facility Details

2.0 Regulatory Context

The Terrestrial and Wildlife Management Plan is one of 16 Management Plans implementing the DDP.

Table 2-1. Lower Klamath River Management Plans

1. Aquatic Resources Management Plan	9. Remaining Facilities Plan
2. Construction Management Plan	10. Reservoir Area Management Plan
3. Erosion and Sediment Control Plan	11. Reservoir Drawdown and Diversion Plan
4. Hatcheries Management and Operations Plan	12. Sediment Deposit Remediation Plan
5. Health and Safety Plan	13. Terrestrial and Wildlife Management Plan
6. Historic Properties Management Plan	14. Waste Disposal and Hazardous Materials Management Plan
7. Interim Hydropower Operations Plan	15. Water Quality Monitoring and Management Plan
8. Recreation Facilities Plan	16. Water Supply Management Plan

2.1 Organizational Structure

The Terrestrial and Wildlife Management Plan identifies measures the Renewal Corporation will implement to protect species with special status (state or federally protected) known or suspected to be present within the Limits of Work. The Limits of Work is a geographic area that encompasses dam removal and restoration related activities associated with the Proposed Action. The Limits of Work may extend beyond the Commission boundary associated with the Lower Klamath Project where specifically noted. The Terrestrial and Wildlife Management Plan also contains best management practices related to bats, nesting birds, and other species that will be implemented by the Renewal Corporation. Specifically, the Terrestrial and Wildlife Management Plan includes an updated Consultation Record and three sub-plans, included amongst the Appendices identified below.

- Appendix A: California Terrestrial and Wildlife Management Plan
- Appendix B: Oregon Terrestrial and Wildlife Management Plan
- Appendix C: Bald and Golden Eagle Conservation Plan
- Appendix D: Consultation Record

2.2 Specific Regulatory Interests

The Renewal Corporation considered the following regulatory interests in the development of the Terrestrial and Wildlife Management Plan:

- California Section 401 Water Quality Certification

- Oregon Section 401 Water Quality Certification
- USACE Section 404 Clean Water Act Individual Permit
- California Department of Fish and Wildlife Memorandum of Understanding
- Oregon Memorandum of Understanding
- U.S. Fish and Wildlife Service (USFWS) Biological Opinion
- National Marine Fisheries Service (NMFS) Biological Opinion
- California Environmental Quality Act, Final Environmental Impact Report
- Federal Energy Regulatory Commission Final Environmental Impact Statement
- USFWS Final Environmental Assessment for the Issuance of an Eagle Take Permit for the Lower Klamath Project
- Federal Energy Regulatory Commission License Surrender Order

2.3 Modifications to the Approved Plan

The Renewal Corporation has modified the December 2021 version of this plan in the following material respects to comply with the November 17, 2022, License Surrender Order.

Table 2-2. Modifications to the Approved Plan

SUB-PLAN	MODIFICATIONS
Appendix A: California Terrestrial and Wildlife Management Plan	• Added obligation for the Renewal Corporation to provide translation services to non-English speaking personnel during training. • Added obligation for the Renewal Corporation to develop, in consultation with the CDFW, a map identifying suitable habitat for relocation of non-listed reptiles and amphibians. • VES survey area for nesting birds expanded to include a 50-foot buffer area from the disturbance area. • VES survey area for nesting raptors expanded to include a 250-foot buffer area from the disturbance area. • Added obligation for the Renewal Corporation to conduct northern spotted owl surveys prior to the use of helicopter flight paths within 1 mile of habitat that is known to be suitable for northern spotted owl nesting, roosting or foraging during the breeding and nesting season from February 1 – September 15. • Added obligation for the Renewal Corporation to implement the National White-Nose Syndrome Decontamination Protocol when working in structures, caves or tunnels where bats are known to occur. • Revised the preferred time frame for removal of structures that provide roosting habitat for bats to September 1 – March 31 per USFWS' recommendation. • Added obligation for the Renewal Corporation to install exclusion measures and deterrents prior to March 15 in structures known or suspected to be utilized as bat maternity roosts if scheduled for removal between April 1 and August 31.

SUB-PLAN	MODIFICATIONS
	• Added obligation for the Renewal Corporation to conduct visual surveys of bat-containing structures removed between April 1 and August 31 if exclusion measures and deterrents had not previously been installed. If a maternity roost is identified during a survey, removal of the structure will, subject to limited exceptions, be delayed until the maternity colony has disbanded. • Added requirements that the Renewal Corporation only remove fabricated structures with bats when temperatures are above 45°F and less than 0.5 inch of rain is predicted within the following 24 hours. • Added obligation for the Renewal Corporation to install bat access in the Copco No. 2 overflow spillway outlet portal and the surge vent opening as shown in the 100% Design Completion Drawings. • Added obligations for the Renewal Corporation to notify the Commission and other relevant agencies of observations of monarch butterflies, direct construction activities away from areas in which monarch butterflies are observed, to the extent practicable, and implement the management measures set forth in the Reservoir Area Management Plan related to monarch butterflies. • Added obligation for the Renewal Corporation to notify CDFW and the Yurok Tribe of observations of California condors. • Added obligation for the Renewal Corporation to notify USFWS if it locates a dead, injured or sick specimen of a species listed under the Endangered Species Act.
Appendix B: Oregon Terrestrial and Wildlife Management Plan	• Added obligation for the Renewal Corporation to develop, in consultation with the ODFW, a map identifying suitable habitat for relocation of non-listed reptiles and amphibians. • VES survey area for nesting birds expanded to include a 50-foot buffer area from the disturbance area. • Added obligation for the Renewal Corporation to conduct VES surveys for nesting raptors in Oregon prior to tree removal from February 1 – March 31. VES survey area was defined to include a 250-foot buffer area from the disturbance area. • Added obligation for the Renewal Corporation to implement the National White-Nose Syndrome Decontamination Protocol when working in structures, caves or tunnels where bats are known to occur. • Revised the preferred time frame for removal of structures that provide roosting habitat for bats to September 1 – March 31 per USFWS' recommendation. • Added obligation for the Renewal Corporation to install exclusion measures and deterrents prior to March 15 in structures known or suspected to be utilized as bat maternity roosts if scheduled for removal between April 1 and August 31.

SUB-PLAN	MODIFICATIONS
	• Added obligation for the Renewal Corporation to conduct visual surveys of bat-containing structures removed between April 1 and August 31 if exclusion measures and deterrents had not previously been installed. If a maternity roost is identified during a survey, removal of the structure will, subject to limited exceptions, be delayed until the maternity colony has disbanded. • Added requirements that the Renewal Corporation only remove fabricated structures with bats when temperatures are above 45°F and less than 0.5 inch of rain is predicted within the following 24 hours. • Added obligations for the Renewal Corporation to notify the Commission and other relevant agencies of observations of monarch butterflies, direct construction activities away from areas in which monarch butterflies are observed, to the extent practicable, and implement the management measures set forth in the Reservoir Area Management Plan related to monarch butterflies. • Added obligation for the Renewal Corporation to notify CDFW and the Yurok Tribe of observations of California condors. • Added obligation for the Renewal Corporation to notify USFWS if it locates a dead, injured or sick specimen of a species listed under the Endangered Species Act.
Appendix C: Bald and Golden Eagle Conservation Plan	• Replaced the Bald and Golden Eagle Management Plan Status Updated filed in December 2021 with the Bald and Golden Eagle Conservation Plan previously filed with the Commission in January 2022. • A standalone page and a copy of the Eagle Take Permit was added to the Bald and Golden Eagle Conservation Plan noting that USFWS issued an Eagle Take Permit, MBPER0055522, for the incidental take of eagles under the Bald and Golden Eagle Protection Act on October 17, 2022.

2.4 Regulatory Approval Process

The Renewal Corporation will implement the Terrestrial and Wildlife Management Plan as approved by the Commission in the License Surrender Order. The Renewal Corporation will obtain and report to the Commission any required approvals from other agencies.

3.0 Force Majeure

The Terrestrial and Wildlife Management Plan includes metrics, objectives, and obligations that are dependent upon natural systems, which are inherently variable. Acts of God, natural disasters, flooding, fire, drought, labor shortages, and other events beyond the control of the Renewal Corporation (Force Majeure Event) may affect or delay compliance with a given obligation in the plan. If there is a Force Majeure Event, the Renewal Corporation will report to

the Commission and the California State Water Resources Control Board, the Oregon Department of Environmental Quality, and/or USFWS, as applicable, proposing a variance or other appropriate adjustment of the plan.

4.0 Reporting

By April 15th of each year, the Renewal Corporation will prepare and submit to the Commission an Annual Report which will include information pertaining to implementation of the Terrestrial and Wildlife Management Plan.

Appendix A

California Terrestrial and Wildlife Management Plan

KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project
FERC Project No. 14803

California Terrestrial and Wildlife Management Plan

Klamath River Renewal Corporation
2001 Addison Street, Suite 317
Berkeley, CA 94704

Prepared By:
RES
2125 19th Street, Suite 200
Sacramento, CA 95818

Camas LLC
680 G Street, Suite C
Jacksonville, OR 97530

December 2022

This page intentionally left blank

Table of Contents

1.0 Introduction 1

1.1 Purpose of Terrestrial and Wildlife Management Plan 1

1.2 Relationship to Other Management Plans 1

2.0 Designated Biologist(s) 2

2.1 Construction Crew Training 2

3.0 Management Measures 2

3.1 Western Pond Turtle Management Measures 6

3.1.1 VES Surveys and Rescue and Relocation – Pre-Construction 6

3.1.2 VES Surveys and Rescue and Relocation - Drawdown 7

3.1.3 Rescue and Relocation Plan 7

3.2 Amphibian and Reptile Rescue Management Measures 8

3.2.1 VES Surveys 8

3.2.2 Rescue and Relocation 8

3.3 Nesting Birds – Management Measures 9

3.3.1 VES Surveys 9

3.3.2 Nesting Bird Disturbance Avoidance 10

3.4 Northern Spotted Owl 12

3.5 Gray Wolf 13

3.6 Bats 13

3.7 Other Special Status Species 17

3.7.1 Wildlife 17

3.7.2 Plants 18

3.8 Entrapment Prevention and Exclusion 18

3.9 Herbicide Application 19

3.10 Wetland Buffer 19

4.0 Reporting 19

4.1 Monthly Reports 20

4.2 Annual Reporting 21

4.3 Western Pond Turtle Reporting 21

4.4 California Natural Diversity Database 21

5.0 References 22

List of Tables

Table 3-1. Special Status Species Covered in the California Terrestrial and Wildlife Management Plan.... 3

Table 3-2. Species Specific Management Measures 3

Table 3-3. Bat Roosting Locations 13

Table 3-4. California Rare Plants (Rank 1B and 2) within the California Terrestrial and Wildlife Management Plan Boundary 18

Appendices

Appendix A Figures

Appendix B Agency Contacts

Appendix C Terrestrial Resources Technical Reports

1.0 Introduction

This California Terrestrial and Wildlife Management Plan is one of three sub-plans of the Terrestrial and Wildlife Management Plan to be implemented as part of the Proposed Action for the Lower Klamath Project (Proposed Action). The geographic area that encompasses dam removal-related activities associated with the Proposed Action is referred to as the Limits of Work. The Renewal Corporation will implement the management measures described herein within the portions of the Limits of Work that are within the state of California, including any associated buffers for specific species as described in the following sections (together, the California Terrestrial and Wildlife Management Plan Boundary).

For purposes of this California Terrestrial and Wildlife Management Plan, Year 1 refers to the year before drawdown, Year 2 refers to the drawdown year and Year 3 refers to the year following the drawdown year.

1.1 Purpose of Terrestrial and Wildlife Management Plan

The purpose of the California Terrestrial and Wildlife Management Plan is to state the measures the Renewal Corporation will implement to avoid and minimize impacts to terrestrial and wildlife species (excluding bald and golden eagles) within the California Terrestrial and Wildlife Management Plan Boundary from the Proposed Action. Avoidance and minimization measures as well as compensatory/offsetting mitigation requirements for bald and golden eagles are set forth in the Incidental Take Permit Number MBPER0055522 (Eagle Permit) issued by the United States Fish and Wildlife Service (USFWS) on October 17, 2022 (USFWS 2022). The Bald and Golden Eagle Conservation Plan, a subplan of the Terrestrial and Wildlife Management Plan, is incorporated by reference into the Eagle Permit.

The impacts from the Proposed Action are set forth in the *Amended Application for Surrender of License for Major Project and Removal of Project Works,* FERC Project Nos. 14803-001 & 2082-063 (KRRC and PacifiCorp, 2020). The California State Water Resources Control Board (SWRCB) found that the Proposed Action will have long-term beneficial impacts, in part due to implementation of the proposed measures set forth in the California Terrestrial and Wildlife Management Plan and the Bald and Golden Eagle Conservation Plan (SWRCB 2020b). In particular, the Renewal Corporation anticipates that approximately 2,000 acres of terrestrial habitat will be created as a result of the Proposed Action, including dry uplands, riparian and wetland habitat. See Table 6-17 in the Reservoir Area Management Plan.

1.2 Relationship to Other Management Plans

The California Terrestrial and Wildlife Management Plan supports elements of all construction-related management plans. So as not to duplicate information, elements from those management plans are not repeated herein but are, where appropriate, referred to in this California Terrestrial and Wildlife Management Plan.

2.0 Designated Biologist(s)

The Renewal Corporation will use designated biologists (each a DB) with appropriate species-related qualifications to undertake the management measures described herein. DB qualifications will vary depending on the species-specific management measure. The Renewal Corporation will review DB qualifications with the California Department of Fish and Wildlife (CDFW) and SWRCB at least 60 days prior to starting any work activities that will require the implementation of any of the management measures described herein.

2.1 Construction Crew Training

Before any ground-disturbing work (including vegetation clearing and grading) begins within the California Terrestrial and Wildlife Management Plan Boundary, a DB will conduct mandatory biological resources awareness training for all site superintendents and construction foremen. The training will teach the construction crews to identify special status species that could be on site and to support the Renewal Corporation's implementation of the California Terrestrial and Wildlife Management Plan. The training will include a discussion of:

- Species identification, including identification of the special status species listed on Table 3-1, foothill yellow-legged frogs, monarch butterflies, California condors, bald eagles, golden eagles, great blue herons, cliff swallows, osprey, and other nesting birds;
- Habitat requirements;
- Protection status;
- Management measures; and
- Necessary response actions if a crew member identifies any special status species listed on Table 3-1 or any of the non-special status species listed on Table 3-2 within the California Terrestrial and Wildlife Management Plan Boundary during construction activities, and
- What to do if an injured species is found.

Upon completing the training, all employees will sign an acknowledgment form stating that they attended the training and understand the applicable management measures. The Renewal Corporation will give similar training to any new personnel and updated training to all personnel if there is a change in the status of a special status species. The Renewal Corporation will also issue species identification cards for the species identified in Table 3-1 to site superintendents and construction foremen. These cards will have photos and descriptions of species and describe the actions that will be taken if a special status species is identified during construction. Translation services (including translated written training materials) will be provided to non-English speaking personnel during training if required under applicable law.

3.0 Management Measures

Proposed Action work activities during the pre-drawdown, drawdown and restoration phases have the potential to impact special and non-special status species within the California

Terrestrial and Wildlife Management Plan Boundary. For purposes of the California Terrestrial and Wildlife Management Plan, "drawdown phase" refers to the calendar year in which drawdown occurs. "Pre-drawdown phase" refers to the period of time from the commencement of pre-drawdown activities until the beginning of the drawdown phase. "Restoration phase" refers to the period of time from the end of the drawdown phase until completion of the restoration activities under the Reservoir Area Management Plan. Table 3-2 below summarizes the management measures the Renewal Corporation will implement within the California Terrestrial and Wildlife Management Plan Boundary to avoid and minimize impacts to terrestrial and wildlife species, including the special status species specifically identified on Table 3-1 below. Sections 3.1 - 3.6 provide a full description of the management measures summarized in Table 3-2. Appendix A contains all figures referenced in Section 3.

In addition, this California Terrestrial and Wildlife Management Plan includes information relating to herbicide application guidelines and the establishment of wetland buffers within the California Terrestrial and Wildlife Management Plan Boundary.

Table 3-1. Special Status Species Covered in the California Terrestrial and Wildlife Management Plan

COMMON NAME	SCIENTIFIC NAME	CALIFORNIA STATE LISTING	FEDERAL STATUS
Western Pond Turtle	*Actinemys marmorata*	Species of Special Concern	Under Review[1]
Willow Flycatcher	*Empidonax traillii*	Endangered	Not Listed
Northern Spotted Owl	*Strix occidentalis caurina*	Threatened	Threatened
Gray Wolf	*Canis lupus*	Endangered	Endangered[2]

1. The western pond turtle's status is under review for possible listing as threatened or endangered under the federal Endangered Species Act.
2. The gray wolf was de-listed as of January 4, 2021 – Federal Register 85 FR 69778 & 69895. On February 10, 2022, the Northern District Court of California vacated and remanded the USFWS' delisting of the gray wolf, restoring the gray wolf's status as an endangered species in California under the federal Endangered Species Act.

Table 3-2. Species Specific Management Measures

SPECIES IMPACTED	MANAGEMENT MEASURE	PHASE(S)
Western Pond Turtle (WPT)	Visual Encounter Surveys (VES surveys, as defined below in Section 3.1.1) prior to construction	Pre-Drawdown and Drawdown
	VES surveys during the reservoir drawdown phase	Drawdown
	VES survey upon the completion of reservoir drawdown	Drawdown
	Rescue and relocation	Pre-Drawdown and Drawdown

SPECIES IMPACTED	MANAGEMENT MEASURE	PHASE(S)
	Entrapment prevention and exclusion	Pre-Drawdown and Drawdown
Non-listed Reptiles and Amphibians	VES surveys in conjunction with WPT VES surveys and prior to use of heavy equipment	Pre-Drawdown, Drawdown and Restoration
	Rescue and relocation to suitable habitat identified in consultation with CDFW	Pre-Drawdown, Drawdown and Restoration
	Entrapment prevention and exclusion	Pre-Drawdown and Drawdown
Nesting Birds (including Cliff Swallow, Osprey and Great Blue Heron)	VES surveys if tree removal or vegetation clearing activities will occur during the primary nesting period of April - August	Pre-Drawdown, Drawdown and Restoration
	VES surveys for raptors if tree removal will occur in February or March	Pre-Drawdown, Drawdown and Restoration
	Limit vegetation clearing to areas where maintenance activities are necessary or construction or restoration actions (ground disturbance) will occur	Pre-Drawdown, Drawdown and Restoration
	Limit vegetation clearing (other than willow cutting and harvesting) to September - March (i.e., outside the nesting season)	Pre-Drawdown, Drawdown and Restoration
	Limit willow cutting and harvesting to September – January during the pre-drawdown and drawdown phases	Pre-Drawdown and Drawdown
	Avoid willow cutting and harvesting in June and July (i.e., the willow flycatcher nesting season) during the restoration phase	Restoration
	Leave transmission/distribution poles with active osprey nests in place	Pre-Drawdown, Drawdown and Restoration
	With respect to transmission/distribution poles without active osprey nests in place, install nest deterrents or remove nesting platforms prior to osprey nesting season (March – September)	Pre-Drawdown, Drawdown and Restoration
	Establish a set-back for construction actions and/or alter timing of construction, if required to avoid disturbing an active nest	Pre-Drawdown, Drawdown and Restoration
	Avoid disturbance to great blue heron rookery near Copco No. 2 wood-stave penstock	Drawdown

SPECIES IMPACTED	MANAGEMENT MEASURE	PHASE(S)
	Outside of the cliff swallow nesting season, remove unoccupied cliff swallow nests from structures scheduled to be modified or removed	Drawdown
Willow Flycatcher	Limit vegetation clearing to areas where maintenance activities are necessary or construction actions (ground disturbance) will occur	Pre-Drawdown, Drawdown and Restoration
	Limit vegetation clearing (other than willow cutting and harvesting) to September - March (i.e., outside the nesting season)	Pre-Drawdown, Drawdown and Restoration
	Limit willow cutting and harvesting to September – January during the pre-drawdown and drawdown phases	Pre-Drawdown and Drawdown
	Avoid willow cutting and harvesting in June and July (i.e., the willow flycatcher nesting season) during the restoration phase	Restoration
	Establish a set-back for construction actions and/or alter timing of construction, if required to avoid disturbing an active nest	Pre-Drawdown, Drawdown and Restoration
Northern Spotted Owl	Helicopter flight path restrictions	Pre-Drawdown, Drawdown and Restoration
Gray Wolves	Contact CDFW regarding wolf observations	Pre-Drawdown, Drawdown and Restoration
	Determine best management measures in coordination with CDFW	Pre-Drawdown, Drawdown and Restoration
Bats	Visual surveys prior to structure and tree removal	Pre-Drawdown and Drawdown
	Remove structures within designated seasonal timeframes (i.e., March 1 to April 15 and September 1 to October 15)	Pre-Drawdown and Drawdown
	Phased removal of structures and trees	Pre-Drawdown and Drawdown
	Install bat access in the Copco No. 2 overflow spillway outlet portal and surge vent opening	Pre-Drawdown

SPECIES IMPACTED	MANAGEMENT MEASURE	PHASE(S)
	With respect to remaining structures, permanently close and barricade after evicting bats	Pre-Drawdown
	Install bat boxes and/or bat condos provided by USFWS	Pre-Drawdown
	Implement the National White-Nose Syndrome Decontamination Protocol	Pre-Drawdown, Drawdown and Restoration

3.1 Western Pond Turtle Management Measures

Previous surveys have documented western pond turtle (WPT) presence throughout the California Terrestrial and Wildlife Management Plan Boundary (PacifiCorp 2004b; AECOM 2019; 2020) as described in Appendix C. WPT utilization of habitat within the California Terrestrial and Wildlife Management Plan Boundary includes nesting, over-wintering, foraging, and basking and is fully described in the WPT study report (AECOM 2019).

Pre-drawdown, drawdown and restoration work activities may impact WPT located in the California Terrestrial and Wildlife Management Plan Boundary. Management measures to be implemented by the Renewal Corporation include pre-construction surveys, drawdown surveys, and rescue and relocation. These measures are described in more detail within this section. In addition, the Renewal Corporation will implement the management measures for entrapment prevention and exclusion set forth in Section 3.8.

The structure and contents of the WPT database will be developed and agreed by CDFW, ODFW and the Renewal Corporation no later than three (3) months prior to the start of pre-drawdown activities. The Renewal Corporation will then create the WPT database and provide CDFW with access to the WPT database prior to the start of pre-drawdown activities. The WPT database will include a map of previously identified overwintering sites (AECOM 2019). The Renewal Corporation will regularly update the WPT database with the field data collected during the VES surveys (as defined below in Section 3.1.1) and rescue and relocation efforts.

All WPT-related work performed by the Renewal Corporation, including VES surveys and rescue and relocation efforts, will be performed pursuant to the WPT checklist developed by CDFW, ODFW, SWRCB and the Renewal Corporation no later than three (3) months prior to the start of pre-drawdown activities (VES Checklist).

3.1.1 VES Surveys and Rescue and Relocation – Pre-Construction

The Renewal Corporation will conduct pre-construction Visual Encounter Surveys (VES surveys) for WPT no more than 24 hours prior to the commencement of pre-construction activities that require heavy equipment operation within WPT habitat (see Appendix A – Figure 1). “VES surveys” means surveys completed using the VES Checklist. The VES Checklist will

state that the Renewal Corporation will visually inspect the entire WPT habitat within a work area prior to heavy equipment operation. Depending upon the timing of the VES survey, individuals may or may not be easily located. For example, it is unlikely that hibernating/aestivating individuals will be observed during VES surveys in the winter months. The probability of observation is expected to increase with the seasonal transition to spring and summer, increasing the likelihood of WPT individuals, nest sites, dens and burrows being observed. The VES Checklist is expected to account for this seasonality and cover multiple WPT life stages.

Upon discovery of a WPT during a VES survey for WPT, a DB or a trained member of the construction crew under the guidance of a DB will alert work crews and attempt to relocate the individual out of harm's way. The DB will use their best professional judgment to determine if an individual should be relocated based on the nature of the work and the risk to the individual. All relocation will be done in accordance with the VES Checklist.

3.1.2 VES Surveys and Rescue and Relocation - Drawdown

Reservoir drawdown will occur during winter and spring of Year 2. The Renewal Corporation will conduct VES surveys during the winter and spring of Year 2. VES surveys will be conducted in the areas identified as WPT habitat in Appendix A – Figure 1. Within these areas, the Renewal Corporation will survey the reservoir's Normal Operating Pool Elevation (NOPE), to the extent practicable based on safety considerations, terrain, the Renewal Corporation's ability to access the habitat, and other considerations. In addition, the Renewal Corporation will survey a subset of potential WPT habitat within a minimum of 300 meters and a maximum of 500 meters of the NOPE. The Renewal Corporation will determine the final distance, in consultation with CDFW, based on relevant factors, including topography. Specific survey dates, frequency of surveys and the location of the subset areas will be determined during the development of the VES Checklist. Finally, the Renewal Corporation will conduct a final VES survey of WPT habitat (as described in this paragraph) within 30 days of when the Klamath River lowers to, and permanently occupies, its original 100-year flood channel.

Upon discovery of a WPT during a reservoir drawdown VES survey, a DB or a trained member of the construction crew under the guidance of a DB will determine if an individual should be relocated. Such decision will be made using the DB's best professional judgment and in accordance with the VES Checklist. In determining if relocation is warranted, the Renewal Corporation will identify stranding behavior (for example, the individual is not moving towards water or has retracted its head and legs). If stranding behavior is identified and an appropriate escape route is not feasible, qualified personnel will attempt to capture and relocate the individual.

3.1.3 Rescue and Relocation Plan

If capture is required, the Renewal Corporation will attempt to capture the individual in accordance with the VES Checklist, which is anticipated to permit hand capture, dip-net, or drift fence traps. Captured WPT will be checked for injuries, sexed, measured, weighed, and aged

by counting plastron scute annuli before being released. Data collected on WPT will be regularly uploaded into the WPT database and provided in the reports described in Section 4.

The Renewal Corporation will relocate WPT that are captured in connection with pre-construction or drawdown VES surveys to previously identified WPT habitat on public land outside of the California Terrestrial and Wildlife Management Plan Boundary, as shown in Appendix A – Figure 1. The Renewal Corporation will coordinate with CDFW prior to drawdown to confirm appropriate relocation areas and will update Appendix A – Figure 1 if required. Relocation will be done in accordance with the VES Checklist. The VES Checklist will describe ideal relocation areas, timing of release and means and methods for capture and release. For example, ideal relocation areas are anticipated to include slow-moving water, basking sites, aquatic refugia, streamside refugia, and upland nesting habitat. The Renewal Corporation will release captured WPT on the banks near water features within 12 hours of initial capture. WPT captured for relocation will be placed in sturdy plastic containers or coolers with ventilation holes. Gloves will be worn and plastic containers will be washed between each use. WPT held in captivity will be handled in accordance with the VES Checklist and kept at an appropriate location based on meteorological conditions. For example, WPT will be kept in shaded locations during hot sunny days until the time of release. Upon release, individuals will be set on the bank near cover objects and allowed to either enter the water or seek refuge under the cover objects.

3.2 Amphibian and Reptile Rescue Management Measures

3.2.1 VES Surveys

The Renewal Corporation will conduct VES surveys for non-listed reptiles and amphibians in conjunction with the VES surveys for WPT. In addition, prior to the start of any work activities that require the use of heavy equipment, the Renewal Corporation will conduct a VES survey for non-listed reptiles and amphibians in the relevant construction area. Construction personnel will be trained on avoidance and minimization measures during the mandatory biological resources awareness training described in Section 2.1.

3.2.2 Rescue and Relocation

If the Renewal Corporation observes native, non-listed reptiles or amphibians in the California Terrestrial and Wildlife Management Plan Boundary during a VES survey or during construction activities, the reptile or amphibian will be avoided and encouraged to leave the area on its own volition. If the amphibian or reptile is not capable of leaving the work area of its own volition or does not promptly leave the work area, either a DB or a trained member of the construction crew under the guidance of a DB will, to the extent practicable and safe for the animal and staff attempting the relocation, attempt to relocate the individual to suitable habitat outside the work area. Suitable habitat for relocation of non-listed reptiles and amphibians will be identified by the Renewal Corporation in consultation with the CDFW. Once the map showing the areas of suitable habitat is completed, it will be provided to the CDFW and SWRCB. In addition, the Renewal Corporation will implement the management measures for entrapment prevention and exclusion set forth in Section 3.8. Avoidance, rescue, relocation, entrapment prevention and

exclusion measures will be undertaken in coordination with construction activities to avoid delays to construction. The Renewal Corporation will have no obligation to relocate reptiles or amphibians that are non-native and/or invasive.

3.3 Nesting Birds – Management Measures

Previous surveys within the California Terrestrial and Wildlife Management Plan Boundary have identified nesting bird utilization (AECOM 2019; 2020), as described in Appendix C. During these surveys, species identified included, but were not limited to, great blue heron (*Ardea herodias*), cliff swallow (*Petrochelidon pyrrhonota*), osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos),* and willow flycatcher (*Empidonax traillii*). Proposed Action work activities may affect these species. To avoid and minimize these impacts, the Renewal Corporation will implement the following management measures with respect to all nesting birds during the Proposed Action work activities. See the Eagle Permit and Bald and Golden Eagle Conservation Plan for additional management measures for bald eagles and golden eagles. Additional provisions for the great blue heron, cliff swallow, willow flycatcher and northern spotted owl are described below.

3.3.1 VES Surveys

A DB or a trained member of the construction crew under the guidance of a DB will conduct VES surveys for native nesting birds if tree removal and/or material vegetation clearing activities will occur during the primary nesting period of April 1 - August 31. For purposes of the California Terrestrial and Wildlife Management Plan, clearing activity does not include activities related to invasive exotic vegetation (IEV) management. The VES surveys will focus on identifying active and inactive nests as well as potential nesting habitats located within areas where construction and/or restoration crews will remove trees or clear vegetation. The VES surveys will determine if any nesting birds may potentially be affected by the tree removal and/or vegetation clearing activities.

To maximize visual survey coverage, the VES surveys will consist of walking evenly spaced transects within the survey area, which will include both the disturbance area and a buffer zone that extends 50 feet out from the disturbance area. The boundaries of the disturbance area shall be determined by the DB based on the nature of the work, species of nesting birds, topography and habitat type. The DB may, in their best professional judgment, reduce the size of the buffer zone based on field observations. The Renewal Corporation will conduct these VES surveys in the morning after sunrise no more than one week prior to tree removal and vegetation clearing. The Renewal Corporation will visually inspect brush, grassland, and canopy for nests and avian nesting behavior. Duration of the survey will be sufficient (in the professional judgment of the surveyor) to ensure coverage of the area to be surveyed. If the Renewal Corporation observes a nest during the nesting period, subsequent VES surveys may occur prior to construction to monitor the nest for activity or to further determine its status (e.g., eggs have hatched, nestlings present). A nest with eggs, chicks, or nestlings will be considered “active”.

If tree removal activities will occur between February 1st and March 31st, the Renewal Corporation will conduct a VES survey for nesting raptors prior to tree removal. The survey area will include both the disturbance area and a buffer zone that extends 250 feet out from the disturbance area. The boundaries of the disturbance area shall be determined by the DB based on the nature of the work, topography and habitat type. The DB may, in their best professional judgment, reduce the size of the buffer zone based on field observations.

3.3.2 Nesting Bird Disturbance Avoidance

To avoid disturbance to nesting birds, the Renewal Corporation will implement the following management measures, in each case to the extent practicable given, among other things, the construction schedule and nature of construction:[1]

- The Renewal Corporation will limit material vegetation clearing to areas where maintenance activities are necessary or construction or restoration actions (i.e., ground disturbance) will occur based on the 100% Design Completion Drawings.
- The Renewal Corporation will limit material vegetation clearing (other than willow cutting and harvesting) to September 1st to March 31st (i.e., outside the primary nesting period).
- The Renewal Corporation will limit willow cutting and harvesting to September 1st to January 31st.
- The Renewal Corporation will leave transmission/distribution poles with active osprey nests in place.
- With respect to transmission/distribution poles without active osprey nests in place, the Renewal Corporation will install nest deterrents or remove nesting platforms prior to osprey nesting season (March 1st – September 30th).
- If construction activities are expected to disturb an active nest identified during a VES survey, the Renewal Corporation will establish a set-back for construction actions.
- If it is not practicable to establish a set-back that will avoid disturbing the active nest, the Renewal Corporation will attempt to alter the timing of construction activity.
- If it is not practicable to either establish a set-back that will avoid disturbing the active nest or alter the timing of construction activity, a site superintendent or foreman trained and supported by a DB will observe active nests of special status species and species protected under the Migratory Bird Treaty Act (MBTA) during construction to determine if any nesting birds are exhibiting stress behaviors, including visual displays, human interactions, and other visual behavioral indicative of agitation *(Cornell Ornithology 2019).* If special status birds or species protected under the MBTA are exhibiting stress behaviors, the Renewal Corporation will promptly contact CDFW and discuss a potential resolution that will not delay construction.

In certain circumstances tree removal and/or material vegetation clearing may occur during the nesting season (e.g., unanticipated construction activities due to schedule changes, vegetation re-grew during the growing season or removal of vegetation to remediate fish passage barriers). If so, the Renewal Corporation will conduct a VES survey prior to tree removal and/or vegetation

[1] These dates were established in consultation with CDFW.

clearing as required under Section 3.3.1 and follow the avoidance measures described above to limit impacts on active nests.

During the drawdown and restoration phases, the Renewal Corporation may, to the extent permissible under applicable law, remove nests that are deemed inactive. The purpose of removing inactive nests is to decrease the likelihood that nesting birds will return or reuse nests located in trees or vegetation scheduled to be removed or cleared.

If an active nest is observed in an area that needs to be cleared to facilitate construction and the avoidance measures described above are not practical (e.g., it is not feasible to delay construction), the Renewal Corporation will promptly inform CDFW and discuss a potential resolution that will not delay construction.

Specific avoidance measures for great blue heron, cliff swallows, northern spotted owl and willow flycatcher are described below.

3.3.2.1 Great Blue Heron

A great blue heron rookery was identified near the Copco No 2 wood stave penstock (AECOM, 2019). This rookery is located outside of the California Terrestrial and Wildlife Management Plan Boundary but could be disturbed by construction noise. Removal of the Copco No. 2 wood stave flowline will occur after final reservoir drawdown and is anticipated to occur in late June of Year 2 or later, which is after the juveniles have fledged. Given the timing of the removal of the Copco No. 2 wood stave flowline, such removal is not anticipated to affect breeding or nesting within the rookery.

3.3.2.2 Cliff Swallow

Copco No. 1, Copco No. 2, and Iron Gate and their dam crest facilities have known, or have the potential for, cliff swallow nests. The Renewal Corporation will survey these facilities between October of Year 1 and February of Year 2 (i.e., non-nesting season) prior to the removal of the dam crest facilities and remove, to the extent practicable and safe for the staff attempting the removal, all unoccupied nests from structures planned for modification or removal. The purpose of removing nests is to decrease the likelihood that cliff swallows will return to, or reuse, nests on the structures that are scheduled to be modified or removed. While Cliff swallows are known to use bridges for nesting habitat, the proposed bridge improvement activities are not anticipated to significantly impact nesting behavior. Therefore, the Renewal Corporation does not expect to remove nests from the bridges scheduled for improvement.

3.3.2.3 Willow Flycatcher

Pre-Drawdown and Drawdown Phases: Tree removal and vegetation clearing may occur in willow flycatcher habitat (see Appendix A – Figure 2) during the pre-drawdown and drawdown phases of the Proposed Action. Such clearing may be necessary for a number of reasons, including staging area accommodation, equipment storage, and road realignment. If tree

removal or vegetation clearing is required in willow flycatcher habitat, the Renewal Corporation will follow the avoidance measures described in Section 3.3.2.

Restoration Phase: After Year 2, restoration activities may require the removal and/or clearing of a minimal amount of trees and vegetation suitable as willow flycatcher habitat. During the restoration phase, the Renewal Corporation will follow the avoidance measures described in Section 3.3.2 and avoid removal of willow flycatcher suitable habitat (see Appendix A – Figure 2) during the willow flycatcher nesting season (i.e., June 1 – July 31), except as required for IEV management and fish passage barrier remediation or otherwise permitted in the paragraphs below.[2]

If construction activities or the removal of established riparian vegetation is required within 300 feet of potentially suitable willow flycatcher habitat during the willow flycatcher nesting season (i.e., June 1 – July 31) in any year following Year 2, the Renewal Corporation will conduct protocol-level surveys of the areas in and adjacent to the suitable willow flycatcher habitat prior to the construction activity and/or vegetation removal (Bombay et. al. 2003).

Because the restoration phase will extend several years, there may be newly established riparian vegetation that needs to be cleared to prevent volitional fish passage barriers from forming or to remove newly formed barriers to volitional fish passage. Because (1) newly established riparian patches would not likely provide habitat for willow flycatcher due to their early growth state, small patch size, and overall lack of structural complexity and (2) the actions will be temporary and minimal in scale, neither VES survey nor protocol surveys will be conducted before removing newly established riparian vegetation.

If the Renewal Corporation documents an active willow flycatcher nest in a proposed or active disturbance area within the California Terrestrial and Wildlife Management Plan Boundary, the Renewal Corporation will follow the avoidance disturbance actions described above in Section 3.3.2. In addition, the Renewal Corporation will coordinate with CDFW to identify an appropriate buffer to be implemented as well as appropriate protective measures to take if construction or restoration activities need to occur within the buffer.

3.4 Northern Spotted Owl

In California, there is a northern spotted owl activity center approximately 1.3 miles southeast of the eastern end of Copco Lake (CNDDB SIS0301 and BLM MSNO 2191). During all work activities within the breeding and nesting season (i.e., February 1-September 15), the Renewal Corporation will require helicopter flight paths to stay at least 1 mile away from the owl activity center. See Appendix A – Figure 3 for a description of helicopter flight restriction zones.

During the breeding and nesting season, the Renewal Corporation will also require helicopter flight paths to stay at least 1 mile away from habitat that is known to be suitable for northern spotted owl nesting, roosting, or foraging (NRF) to prevent disturbance. If it is necessary to use

[2] These dates were established in consultation with CDFW.

a helicopter flight path within 1 mile of NRF habitat during the breeding and nesting season, the Renewal Corporation will first conduct a survey to confirm that northern spotted owls are not nesting within 1 mile of the proposed helicopter flight path.

If northern spotted owls are observed within the California Terrestrial and Wildlife Management Plan Boundary, the Renewal Corporation will determine, in coordination with CDFW and USFWS, the best management measures, which may include disturbance buffers and avoidance of key areas. Such measures will be coordinated so as not to unduly interfere with the dam removal construction and restoration schedule.

3.5 Gray Wolf

While gray wolves do not, to the Renewal Corporation's knowledge, currently rendezvous or den in the California Terrestrial and Wildlife Management Plan Boundary, previous observations have documented wolves in Siskiyou County. The Renewal Corporation will contact the CDFW staff identified in Appendix B – Agency Contacts prior to construction activities to determine if there is potential wolf activity in the area where construction will occur. During Proposed Action work activities, CDFW is expected to provide the Renewal Corporation with all relevant information regarding gray wolves' status. If the Renewal Corporation observes any gray wolves within one mile of the California Terrestrial and Wildlife Management Plan Boundary, the Renewal Corporation will immediately contact CDFW.

If gray wolves, rendezvous sites, or denning sites are observed within the California Terrestrial and Wildlife Management Plan Boundary, the Renewal Corporation will determine, in coordination with CDFW's wolf biologist, the best management measures, which may include reduced driving speeds, signage on haul roads, limited operating periods, disturbance buffers, and avoidance of key areas. Such measures will be coordinated so as not to unduly interfere with the dam removal construction and restoration schedule.

3.6 Bats

The Renewal Corporation has conducted bat occupancy surveys at facilities impacted by the Proposed Action. During these surveys, surveyors assessed potential bat roosting features (e.g., buildings, bridges, trees) for bat utilization. A total of 17 structures were confirmed to have bat activity associated with them, as shown in Table 3-3, Appendix A – Figure 4 (AECOM 2020).

Table 3-3. Bat Roosting Locations

PROJECT FEATURE	STRUCTURE	HABITAT FEATURES AND ENTRY POINTS
Copco No. 1	Maintenance Building	Cavity in open interior roof spaces, crevices in potential gaps under corrugated metal roof, openings at garage door, and windows that are open/missing panes.

PROJECT FEATURE	STRUCTURE	HABITAT FEATURES AND ENTRY POINTS
	Gatehouse C-12	Cavity in attic space and crevice beneath copper roof material.
	Gatehouse C-11	Cavity in attic space and crevice beneath copper roof material.
	Diversion Tunnel Outlet	Cavity in interior and crevices in rock.
	Powerhouse	Cavities in interior rooms and spaces, walls, top of walls at roof perimeter, and lower floor rooms and spaces; crevices in roll-up doors, cable hoists, and top of walls beneath corrugated metal roofing; and small bore holes in lower floor concrete deck and walls.
	Vacant House #21601	Cavities in attic, interior rooms, and beneath corrugated roofing material.
Copco No. 2	Powerhouse	Cavities in ground floor interior rooms and spaces, walls, top of walls at roof perimeter, and lower floor rooms and spaces; and crevices in roll-up doors and cable hoists.
	Vacant House #4 (peach)	Cavities in attic, garage, and soffit; crevices in siding, roof fascia, gable vent between louvers and screen, and beneath corrugated roofing material above underlayment.
	Vacant House #3 and Garage (yellow-green)	Cavity in attic; crevices in gaps behind siding and roof facias.
		Cavity in detached garage interior.
	Cookhouse	Crevices in gaps at gutter edge of roofing, gaps at flashing, gable wall, and gap at side door awning.
	Vacant House #2 (blue)	Cavities in the attic, garage, and potentially in interior rooms; and crevices in gaps behind siding, gutters, and fascia.
	Vacant House #1 (tan)	Cavity potential in interior rooms, garage, and attic; and crevices in gaps behind warped or cupped siding, window flower box, and roof fascia.
Iron Gate	Penstock Intake Structure	Interior cavity, crevices. Entry at side of exterior trash rack into space in concrete base, up into building through floor grates.
	Powerhouse	Many large spaces and crevices in interior rooms in upper floor and lower floor, including draft pipe channels

PROJECT FEATURE	STRUCTURE	HABITAT FEATURES AND ENTRY POINTS
		below grade. Entry through wire mesh covers over windows and access doors.
	Diversion Tunnel Outlet	Cavity in interior of tunnel, crevices in rock.
	Barn/Garage	Cavity/crevice interior spaces; crevices in exterior wall boards/battens; and crevices between roof shingles and corrugated roof above.
	Lakeview Road Bridge	Expansion joints – crevices.
	Residence 2 (occupied)	Behind clock on back porch.

As described below, the Renewal Corporation's management measures include decontamination protocols, seasonal considerations with respect to structure removal, visual surveys prior to structure and tree removal, protection for maternity roosts, phased removal, bat access at certain Copco No. 2 locations, and barricading remaining structures to exclude bats and building replacement habitat.

When working in structures, caves or tunnels where bats are known to occur, the Renewal Corporation will implement the National White-Nose Syndrome Decontamination Protocol (WNS Response Team, 2020).

The Renewal Corporation will also implement structure removal activities with consideration of seasonal bat behavior. This will minimize potential impacts to bats in their maternity state, bat pups, and hibernating bats. September 1 to March 31 represents the preferred time period for structure removal. If the construction schedule requires the removal of a structure between April 1 and August 31 that is known or suspected to be utilized as a maternity roost, the Renewal Corporation will install exclusion measures and deterrents (e.g., ultrasonic emitters, lights, fans, etc.) in the structure prior to March 15 to keep bats from occupying it. The exact type and location of the deterrents and exclusion measures will be determined in coordination with CDFW.

If the Renewal Corporation has not installed exclusion measures and deterrents in a bat-containing structure that needs to be removed between April 1 and August 31, removal will occur at such time as is determined in consultation with CDFW. If the Renewal Corporation and CDFW agree that it is necessary to remove a bat-containing structure between April 1 and August 31, the Renewal Corporation will conduct a visual survey of the structure to determine whether it is being utilized as a maternity roost. If a maternity roost is not identified during the survey, the Renewal Corporation may remove the structure so long as the Renewal Corporation follows the other management measures described below during structure removal. If a

maternity roost is identified during the survey, removal of the structure will be delayed until the maternity colony has disbanded. If it is not practicable to delay removal due to the construction schedule, the Renewal Corporation will consult with CDFW to determine the best methods to humanely remove the bats prior to structure removal.

Prior to structure and tree removal construction activities, the Renewal Corporation's DB will conduct visual surveys at the appropriate time of day or night for bats or signs of recent use to determine if the surveyed structures and/or trees are subject to the time period restrictions set forth above.

If the Renewal Corporation detects bats in a fabricated structure, removal will occur in two phases when (1) temperatures are above 45°F and (2) less than 0.5 inch of rain is predicted within the following 24 hours.

> **Phase 1:** Construction crew will remove windows, doors, roof, and siding/walls from the structure as necessary to alter the temperature, ambient light, and natural airflow. The structure will then be left undisturbed overnight to allow bats to vacate. If warranted, the Renewal Corporation will install acoustic disrupter units and/or high-intensity LED floodlights to repel bats. To the extent practicable, all phase 1 activities shall take place in the evening when bats are active to minimize the likelihood that bats are flushed from the structure during daylight hours. Prior to implementation, the Renewal Corporation will coordinate with the CDFW regarding the partial removal and bat exclusion activities described in this paragraph.
>
> **Phase 2:** Construction crew will perform the final demolition of the structure within ten (10) days following confirmation that bats are no longer present.

Likewise, if the Renewal Corporation detects bats in trees designated for removal, construction crew will remove these trees in two phases. Construction crew will remove tree branches in the initial phase. The tree will then be left undisturbed overnight to allow bats to vacate the tree. Construction crew will fell the tree on the following day. An alternative phased tree removal method involves allowing a felled tree to remain in place for 24-hours prior to chipping or removal. Construction crew will carry out one of these phased tree removal methods when practicable. To the extent practicable, branch and tree removal shall take place in the evening to minimize the likelihood that bats are flushed from the tree during daylight hours.

Structures that will remain intact include portal outlets, tunnels, and other water conveyance structures. The Renewal Corporation will install bat access in the Copco No. 2 overflow spillway outlet portal and the surge vent opening as shown in the 100% Design Completion Drawings. Otherwise, these structures will be permanently closed and barricaded with concrete rubble, earth fill, and/or steel plates. To the extent practicable, the Renewal Corporation will attempt to evict all bats from the remaining structures prior to barricading them.

Finally, the Renewal Corporation has concluded that the Proposed Action will not have an adverse impact on native bat species within the California Terrestrial and Wildlife Management Plan Boundary, given the abundance of natural habitat. Nonetheless, in recognition that the Proposed Action will result in the loss of some artificial habitat currently found within structures that will be fully or partially demolished in connection with the Proposed Action, the Renewal Corporation will install (as a discretionary enhancement measure) bat boxes and/or condos, pursuant to subsequent agreement with state and federal agencies. The Renewal Corporation expects the bat boxes and/or condos to be provided by USFWS and installed by the Renewal Corporation at least three months prior to full or partial structure demolition.

3.7 Other Special Status Species

3.7.1 Wildlife

Special status species that were not identified during previous wildlife monitoring but have the potential to occur in the California Terrestrial and Wildlife Management Plan Boundary include the foothill yellow-legged frog (*Rana boylii*); a CDFW species of special concern (SSC, CDFW 2019, AECOM 2019; AECOM 2020).[3] While the Renewal Corporation will not perform any formal surveys for the foothill yellow-legged frog, observations of the species during VES surveys for WPT and other species will be noted and reported to the Commission, USFWS, SWRCB, and CDFW in the monthly status report (Section 4.1). If the foothill yellow-legged frog is observed in or near a construction area during a VES survey, the Renewal Corporation will determine, in consultation with CDFW, the best management measures to minimize impact on the species. If CDFW recommends that individuals be relocated, such relocations will be conducted pursuant to the guidelines developed in coordination with CDFW.

In addition, the monarch butterfly (*Danaus plexippus*) is included in CDFW's Terrestrial and Vernal Pool Invertebrates of Conservation Priority List and is identified as a Species of Greatest Conservation Need in California's Wildlife Action Plan.[4] While the Renewal Corporation will not perform any formal surveys for the monarch butterfly, all observations of monarch butterflies made by DBs within the California Terrestrial and Wildlife Management Plan Boundary will be noted and reported to the Commission, USFWS, SWRCB, and CDFW in the monthly status report (Section 4.1). The Renewal Corporation will, to the extent practicable, direct construction activities away from areas in which monarch butterflies are observed by DBs. In addition, the Renewal Corporation will implement the management measures set forth in the Reservoir Area Management Plan related to monarch butterflies, including planting of larval host plant milkweed and other native plants used for nectar by the monarch butterfly and limiting herbicide application to avoid impacts to milkweed and other suitable nectar plants. See Section 5.3.3.2 (IEV Control Methods, Including Targeted Use of Exclusion Fencing) and Appendix C of the

[3] The foothill yellow-legged frog's status is under review for possible listing as threatened or endangered under the federal Endangered Species Act.

[4] The monarch butterfly is a candidate for listing as threatened or endangered under the federal Endangered Species Act.

Reservoir Area Management Plan for a list of the BMPs related to Herbicide Application that will be implemented by the Renewal Corporation.

3.7.2 Plants

The Renewal Corporation commissioned special status plant species surveys in and around the California Terrestrial and Wildlife Management Plan Boundary in 2018 and 2019 (AECOM 2019; 2020) as described in Appendix C. Surveyors did not identify any federally or state-listed plant species during these surveys. The California Rare Plant Rank 1B and 2 Species located within the California Terrestrial and Wildlife Management Plan Boundary are set forth below in Table 3-4 (CDFW 2021). In addition, Appendix A – Figure 5 provides the general locations where such species were located. Known occurrences of special status plant populations will be avoided to the extent practicable.

Table 3-4. California Rare Plants (Rank 1B and 2) within the California Terrestrial and Wildlife Management Plan Boundary

COMMON NAME	SCIENTIFIC NAME	TOTAL OCCURRENCES	FEDERAL STATUS	STATE RANK	RARE PLANT RANK[1]
Detling's Silverpuffs	*Microseris laciniata ssp. detlingii*	1	None	S1	2B.2
Greene's mariposa-lily	*Calochortus greenei*	50	None	S2S3	1B.2
Holzinger's orthotrichum moss	*Orthotrichum holzingeri*	7	None	S2	1B.3

[1]California Native Plant Society, Inventory of Rare and Endangered Plants of California (CNPS 2021)

3.8 Entrapment Prevention and Exclusion

The Renewal Corporation will fence construction areas such as trenches or pipes that could entrap small mammals, large mammals, amphibians or reptiles, when feasible. The Renewal Corporation will implement additional exclusion fencing or other appropriate measures determined by the Renewal Corporation in consultation with CDFW to be necessary to reduce the likelihood that special status species access areas within the California Terrestrial and Wildlife Management Plan Boundary. The Renewal Corporation will make daily observations of the fenced construction areas for any entrapped species.

In addition, construction crews will either cover or place escape ramps in any material open hole or trench left open overnight. The escape ramps can be in the form of a 2" x 6" board. All constructed holes and trenches that are open will be inspected daily for entrapped wildlife throughout the construction period and prior to fill. Any wildlife discovered will first be allowed to escape voluntarily. If an entrapped individual will not voluntarily escape, the Renewal

Corporation will use its best professional judgment in removing and relocating the entrapped individual.

3.9 Herbicide Application

The Renewal Corporation may apply herbicides approved by BLM, EPA and California Department of Pesticide Regulation to control the spread of IEV in the California Terrestrial and Wildlife Management Plan Boundary, as needed. The Renewal Corporation will comply with all requirements set forth in both the USFWS and National Marine Fisheries Service Biological Opinions regarding the application of herbicides and will apply all BLM, EPA and California Department of Pesticide Regulation approved herbicides according to labeling directions. The Reservoir Area Management Plan identifies the management measures related to herbicide application that will be undertaken by the Renewal Corporation to avoid impacts to special status species. See Appendix C of the Reservoir Area Management Plan for a list of the BMPs related to Herbicide Application that will be implemented by the Renewal Corporation.

3.10 Wetland Buffer

Non-dam removal construction activities (e.g., staging areas, temporary spoils and construction trailer sites) may occur near wetland habitats. The Renewal Corporation will review construction designs and delineated wetland locations within the California Terrestrial and Wildlife Management Plan Boundary to determine if any temporary construction sites are near existing non-reservoir dependent wetlands, see Appendix A – Figure 6. If temporary construction sites are near non-reservoir dependent wetlands, the Renewal Corporation will establish wetland buffers that meet all applicable legal requirements prior to the start of construction activities. Independent of the legal requirements, the wetland buffer established by the Renewal Corporation will be a minimum of 20 feet in order to minimize unnecessary impacts to wetlands. The Renewal Corporation will demarcate the wetland buffer with flagging or fencing, as needed.

4.0 Reporting

The Renewal Corporation will report the activities outlined in the California Terrestrial and Wildlife Management Plan as described below. The Renewal Corporation will also promptly notify USFWS if it observes a species listed under the Endangered Species Act (ESA) within the California Terrestrial and Wildlife Management Plan Boundary. In addition, the Renewal Corporation will promptly notify CDFW and the Yurok Tribe if it observes a California condor within the California Terrestrial and Wildlife Management Plan Boundary. If a California condor is observed, the Renewal Corporation will determine, in consultation with USFWS, CDFW and the Yurok Tribe, measures to minimize impact on the species, including hazing, anti-perching, debris management, and avoiding entanglement/entrapment hazards.

If the Renewal Corporation finds a special status species that needs to be transported to an appropriate wildlife rehabilitation center for care, it will promptly notify CDFW and USFWS.

If the Renewal Corporation locates a dead, injured or sick specimen of a species listed under the ESA, it will promptly be reported to USFWS' Law Enforcement Division, USFWS' Law Enforcement Office in Wilsonville, Oregon, the Klamath Falls Fish and Wildlife Office, and the Yreka Fish and Wildlife Office. In addition, the Renewal Corporation will notify USFWS in writing within three working days if a dead or injured species listed as threatened or endangered is found during implementation of the Proposed Action or if a listed species accidently dies or is injured during implementation of the Proposed Action. The Renewal Corporation's written notification will include the date, time, and location (including GPS location information in UTM, NAD 83) of the incident or discovery, as well as any pertinent information on circumstances surrounding the incident or discovery. The Renewal Corporation will use care in handling all listed specimen that are sick or injured (to ensure effective treatment) or dead (to preserve biological material in the best possible state for later analysis of cause of death) and will carry out the instructions (if any) provided by USFWS to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed. The reporting and mitigation measures in this paragraph do not apply to Lost River suckers and shortnose suckers captured and/or killed in connection with the implementation of the California AR-6 Adaptive Management Plan-Suckers, a subplan of the Aquatic Resources Management Plan.

4.1 Monthly Reports

The Renewal Corporation will provide monthly status reports to the Commission, USFWS, SWRCB and CDFW no later than ten (10) days after the end of each month. Monthly reports will be provided during Year 1, Year 2, and Year 3. Reporting after Year 3 will only occur for months in which the management measures identified by the California Terrestrial and Wildlife Management Plan are required in connection with construction activities have the potential to disturb the special status species listed in the California Terrestrial and Wildlife Management Plan.

Monthly status reports will include a summary of the following:

1. WPT VES survey methods, conditions and results, including WPT observations, weather conditions during surveys, frequency and duration of survey efforts to date, actions taken to rescue/relocate WPT (including the number of WPT relocated and which relocation area they were released) and data collected on handled individuals as identified in Section 3.1.3. This will be in addition to the WPT reporting described in Section 4.3.
2. Avian nesting VES survey methods, conditions and results, including weather conditions during surveys, survey efforts to date, duration of surveys, any active or inactive nests encountered, any CDFW coordination to date and measures implemented.
3. With respect to willow flycatcher protocol-level surveys undertaken during the restoration period pursuant to Section 3.3.2.3, survey methods, conditions and results, including weather conditions during surveys, survey efforts to date, any active or inactive nests encountered, any CDFW coordination to date and measures implemented.
4. Bat visual survey results, including weather conditions during surveys, measures taken to exclude bats from facilities prior to removal and removal activities.
5. Special status species observations made during VES surveys.

6. Observations of foothill yellow-legged frogs made by the Renewal Corporation during VES surveys for WPT and other species.
7. Observations of monarch butterflies made by DBs within the California Terrestrial and Wildlife Management Plan Boundary.
8. Location of wetland buffers established pursuant to Section 3.10.
9. Crew training completed since the last monthly status report.

4.2 Annual Reporting

The Renewal Corporation will provide annual status reports by April 1 of every year to the USFWS, SWRCB and CDFW detailing the application of management measures, construction status and agency consultation. The Renewal Corporation will prepare annual reports beginning Year 1 and ending the year that license surrender is effective.

4.3 Western Pond Turtle Reporting

The Renewal Corporation will submit a WPT Rescue and Relocation Report to the Commission, SWRCB and CDFW no later than 60 days after completion of the post-drawdown surveys. This report will include the following information:

- Survey timing (which covers multiple life stages),
- Survey frequency,
- Survey locations,
- Relocation areas with suitable habitat, and
- Survey methodology.

The Renewal Corporation will submit the Final WPT Compliance Report to the Commission, CDFW, SWRCB, and USFWS within 30 days of Proposed Action completion. The final report will identify all activities that took place in connection with the pre-construction and drawdown VES surveys for WPT. The final report will include the following:

- All individuals handled during rescue and relocation,
- Location, date, time, and duration of the handling,
- Enumeration of species handled,
- Identification of species life stage and health,
- Identification of capture personnel,
- Stream, transport, and receiving water temperatures, and
- Location, date, and time of release.

4.4 California Natural Diversity Database

The Renewal Corporation will report observations of special-status species in the California Terrestrial and Wildlife Management Plan Boundary to the California Natural Diversity Database (CNDDB) online through the duration of restoration.

5.0 References

AECOM and CDM Smith (AECOM). 2019. Klamath River Renewal Project 2018 Annual Terrestrial Resources Survey Report. Portland, Oregon.

AECOM and CDM Smith (AECOM). 2020. Klamath River Renewal Project 2019 Annual Terrestrial Resources Survey Report. Portland, Oregon.

Bombay, H.L., Benson, T.M., Valentine, B.E., Stefani, R.A.. 2003. A Willow Flycatcher Survey Protocol for California. Available online at: https://www.birdpop.org/docs/pubs/Bombay_et_al_2003_A_WIFL_Protocol_for_CA.pdf. Accessed November 2021.

California Department of Fish and Wildlife (CDFW). 2017. California Natural Diversity Database (CNDDB) Commercial, spotted owl observations. Online database. Prepared by CDFW, Sacramento, California.

CDFW. 2018. Gray wolf. Website. https://www.wildlife.ca.gov/conservation/mammals/gray-wolf [Accessed November 2018]. Prepared by CDFW, Sacramento, California.

CDFW. 2019. A Report to the Fish and Game Commission. A Status Review of the Foothill Yellow-Legged Frog (*Rana boylii*) in California. Prepared by Charlton H. Bonham, Director CDFW. September 20, 2019.

CDFW. 2021. California Natural Diversity Database (CNDDB) Special-Status Plants within the California Terrestrial and Wildlife Management Plan Boundary. Online database. Prepared by CDFW, Sacramento, California.

California Native Plant Society (CNPS), Rare Plant Program. 2021. Inventory of Rare and Endangered Plants of California (online edition, v9-01 0.0). Website https://www.rareplants.cnps.org [Accessed July 22, 2021].

Federal Energy Regulatory Commission (FERC). 2018 Order Amending License and Deferring Consideration of Transfer Application FERC Project Nos. 2082-062 and 14803-000. 162 FERC ¶ 61,236. Washington, DC, Federal Energy Regulatory Commission, Office of Energy Projects, Division of Hydropower Licensing.

Klamath River Renewal Corporation (KRRC). 2020. Biological Assessment. Berkeley, California.

KRRC and PacifiCorp. 2020. Amended Application for Surrender of License for Major Project and Removal of Project Works and Request for Expedited Review; FERC Project Nos. 14803-001 and 2082-063. November 17.

PacifiCorp. 2004a. Environmental Report. Final License Application, Volume 2, Exhibit E. Klamath Hydroelectric Project (FERC Project No. 2082).

PacifiCorp. 2004b. Final Technical Report. Klamath Hydroelectric Project (FERC Project No. 2082), Terrestrial Resources. PacifiCorp, Portland, Oregon. February. Available at: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/hydro/klamath-river/relicensing/terrestrial-resources/TR_Report.pdf

Stanford University. N.d. National Performance of Dams Program Dam Dictionary. Available at: http://npdp.stanford.edu/dam_dictionary?page=22

SWRCB. 2020a. Lower Klamath Project License Surrender Final Environmental Impact Report. Volume III. Prepared by Stillwater Sciences, Berkeley, CA, for State Water Resources Control Board, Sacramento, CA. April.

SWRCB. 2020b. Water Quality Certification for Federal Permit or License. Klamath River Renewal Corporation, Lower Klamath Project License Surrender Federal Energy Regulatory Commission Project No. 14803.

U.S. Army Corps of Engineers (USACE). 2016. Ordinary High-Water Mark Delineation. Available at: https://www.spk.usace.army.mil/Portals/12/documents/regulatory/Reg_workshop/2016-02-16-Durango/OHWM.pdf

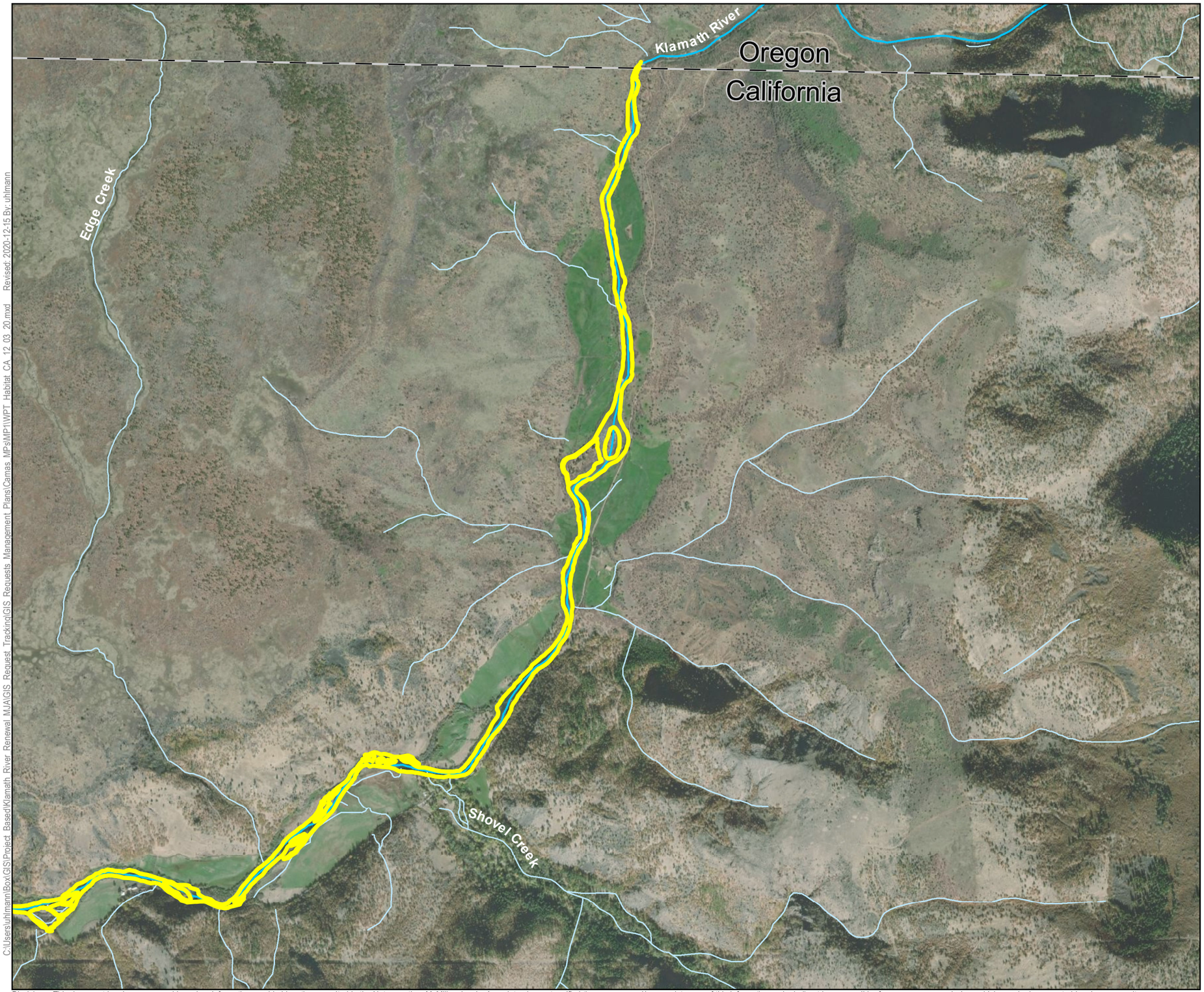
USFWS. 2012. Endangered and threatened wildlife and plants; designation of revised critical habitat for the northern spotted owl; final rule. Federal Register 77: 233, 71876-72067.

USFWS. 2022. Permit Number MBPER0055522. Eagle Take Associated with But Not the Purpose of an Activity. October 17, 2022.

WNS Response Team. 2020. National White-Nose Syndrome Decontamination Protocol. October 2020. Available at https://s3.us-west-2.amazonaws.com/prod-is-cms-assets/wns/prod/dfb0a4f0-ff7e-11eb-9953-191cff2d5300-WNS%20Decon%20Protocol_October2020.pdf [Accessed July 13, 2022].

Appendix A

Figures



KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 1. Western Pond Turtle Pre-construction Survey and Relocation Areas in California

December, 2020

Klamath River

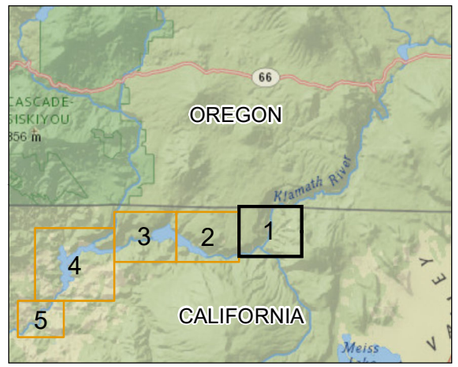
(At original document size of 11x17)
1:20,910

N

0 0.25 0.5 Miles

PRELIMINARY DESIGN
(NOT FOR CONSTRUCTION)

- WPT Relocation Habitat
- Survey prior to construction activity
- Klamath River
- Streams
- CA-OR State Boundary



Notes

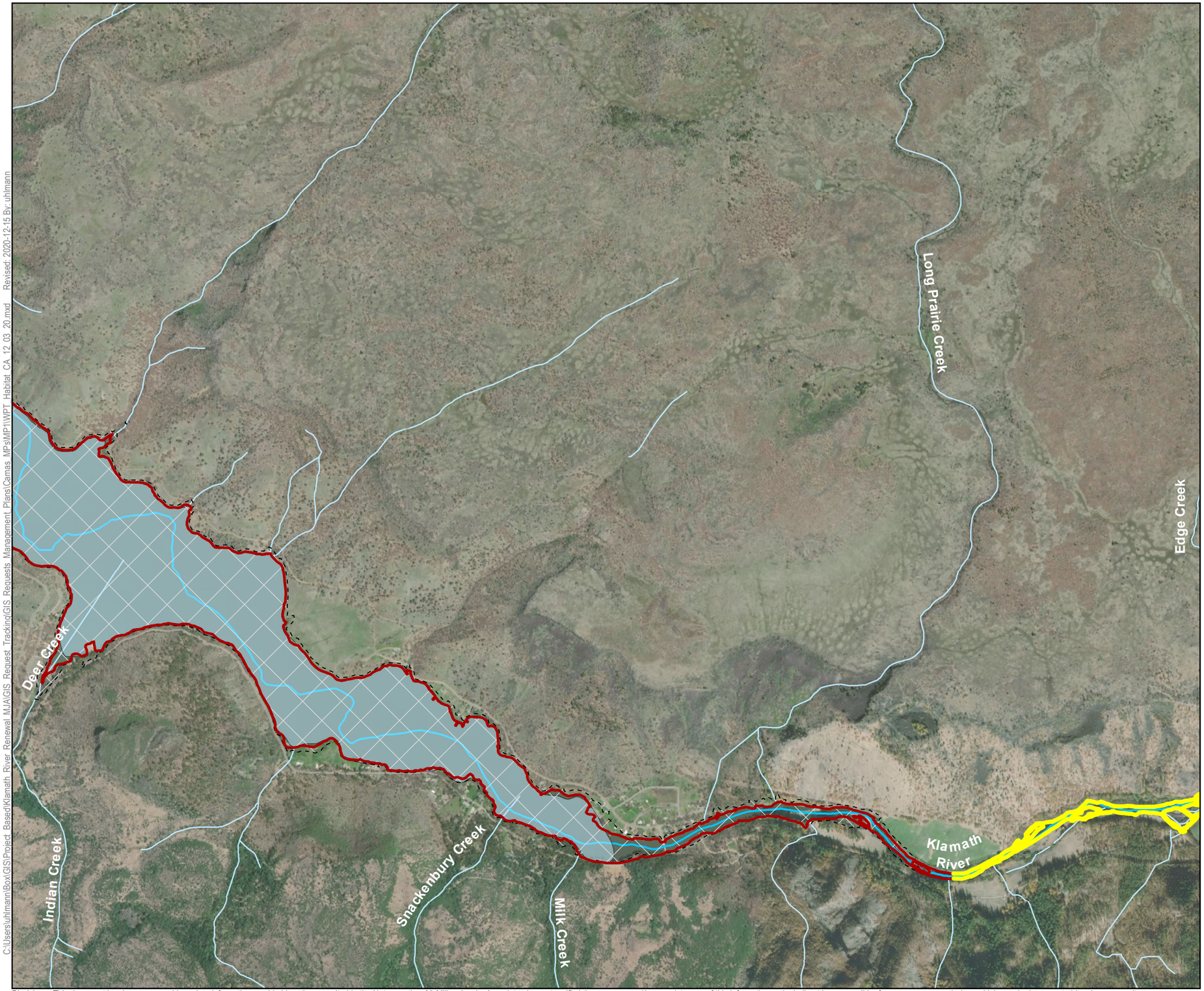
1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html*
National Hydrography Dataset; Pond Turtle Habitat: Pacificorp and EDAW; Limot of Work: 90% Design Draft (6/19/20) Knight Piesold

3. *Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community*
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Sheet 1 of 5

C:\Users\uhlmannBox\GIS\Project Based\Klamath River Renewal MJA\GIS Request Tracking\GIS Requests Management Plans\Camas MPs\MP1\WPT Habitat CA 12 03 20.mxd Revised: 2020-12-15 By: uhlmann



C:\Users\uhlmannBox\GIS\Project_Based\Klamath_River_Renewal_MJA\GIS_Request_Tracking\GIS_Requests_Management_Plans\Camas_MPs\MP1\WPT_Habitat_CA_12_03_20.mxd Revised: 2020-12-15 By: uhlmann

KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 1. Western Pond Turtle Pre-construction Survey and Relocation Areas in California

December, 2020

Copco Reservoir

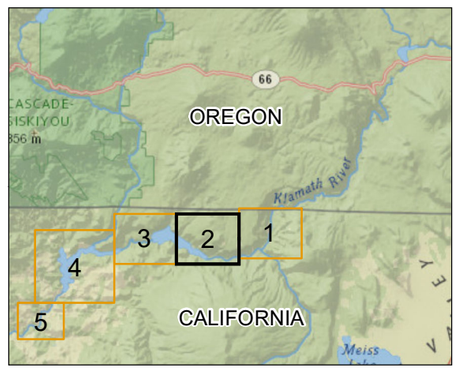
(At original document size of 11x17)
1:20,910

N

0 0.25 0.5 Miles

PRELIMINARY DESIGN
(NOT FOR CONSTRUCTION)

- WPT Relocation Habitat
- Survey prior to construction activity
- Limits of Work
- Reservoir Area
- Klamath River
- Streams
- CA-OR State Boundary



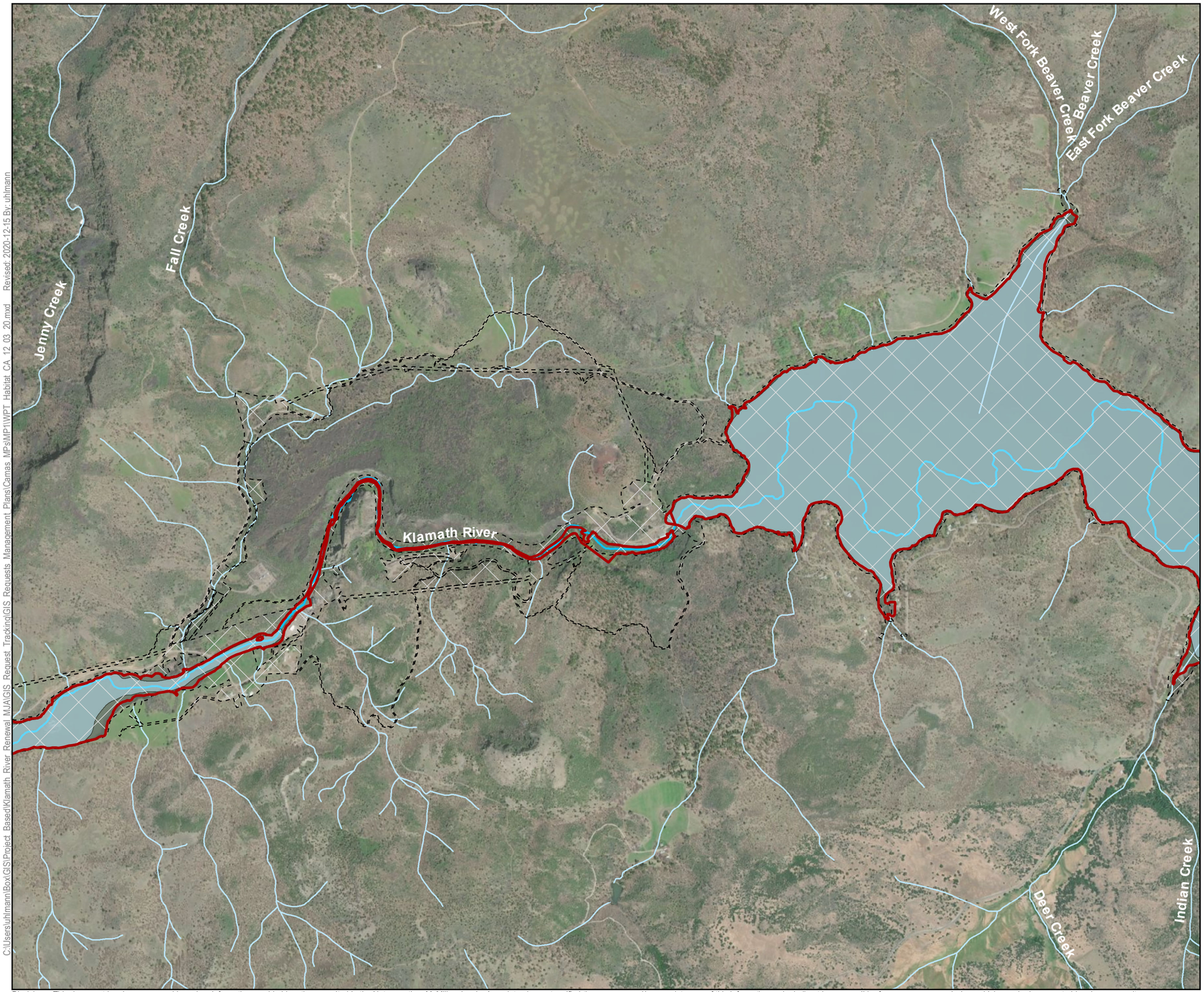
Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html*
National Hydrography Dataset; Pond Turtle Habitat: Pacificorp and EDAW; Limot of Work: 90% Design Draft (6/19/20) Knight Piesold

3. *Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community*
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Sheet 2 of 5



C:\Users\uhlmann\Box\GIS\Project_Based\Klamath_River_Renewal_MJA\GIS_Request_Tracking\GIS_Requests_Management_Plans\Camas_MPs\MP1\WPT_Habitat_CA_12_03_20.mxd Revised: 2020-12-15 By: uhlmann

KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 1. Western Pond Turtle Pre-construction Survey and Relocation Areas in California

December, 2020

Copco Dams 1 and 2

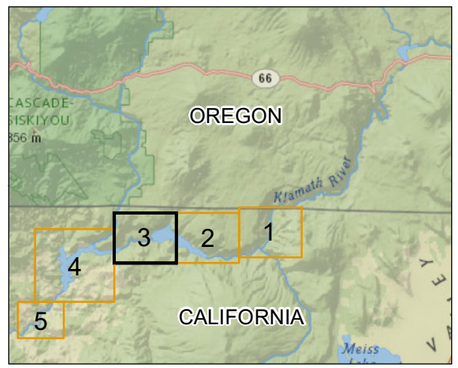
(At original document size of 11x17)
1:20,910

N

0 0.25 0.5 Miles

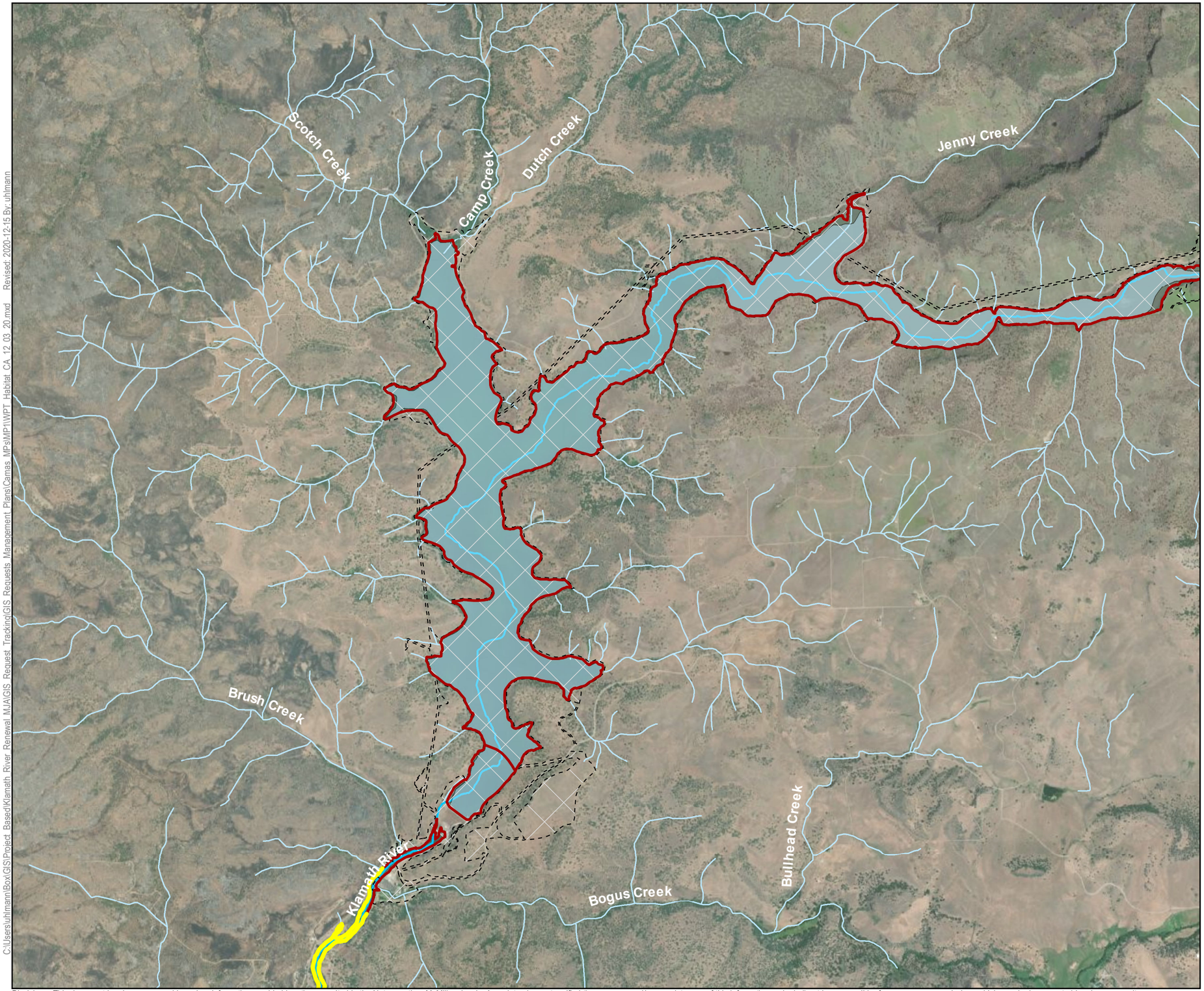
PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

- Survey prior to construction activity
- Limits of Work
- Reservoir Area
- Klamath River
- Streams
- CA-OR State Boundary



Notes

1. Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US
2. Data Sources: Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset; Pond Turtle Habitat: Pacificorp and EDAW; Limot of Work: 90% Design Draft (6/19/20) Knight Piesold
3. Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



C:\Users\uhlmann\Box\GIS\Project Based\Klamath River Renewal MJA\GIS Request Tracking\GIS Requests Management Plans\Camas_MPs\MP1\WPT Habitat_CA_12_03_20.mxd Revised: 2020-12-15 By: uhlmann

KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 1. Western Pond Turtle Pre-construction Survey and Relocation Areas in California

December, 2020

Iron Gate

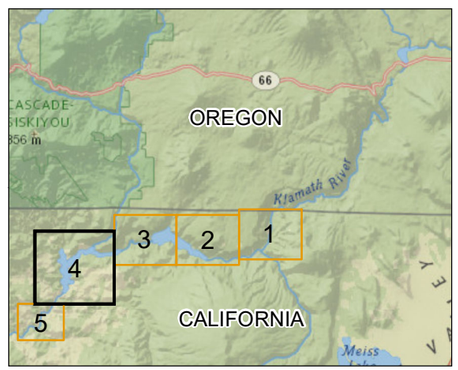
(At original document size of 11x17)
1:29,500

N

0 0.25 0.5 0.75 Miles

PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

- WPT Relocation Habitat
- Survey prior to construction activity
- Limits of Work
- Reservoir Area
- Klamath River
- Streams
- CA-OR State Boundary



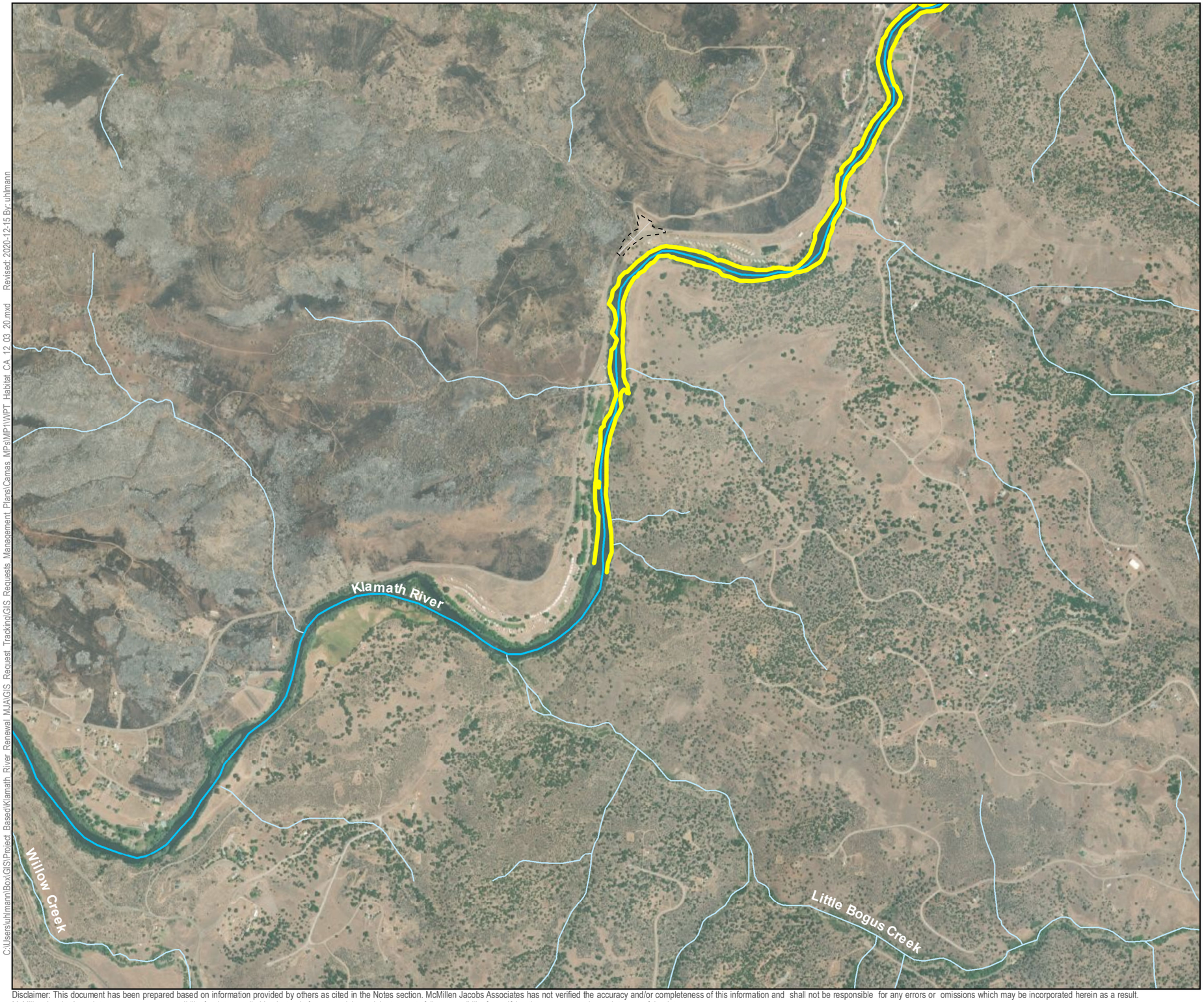
Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html*
National Hydrography Dataset; Pond Turtle Habitat: Pacificorp and EDAW; Limot of Work: 90% Design Draft (6/19/20) Knight Piesold

3. *Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community*
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Sheet 4 of 5



C:\Users\uhlmann\Box\GIS\Project Based\Klamath River Renewal MJ\GIS Request Tracking\GIS Requests Management Plans\Camas_MPs\MP1\WPT Habitat CA 12 03 20.mxd Revised: 2020-12-15 By: uhlmann

KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 1. Western Pond Turtle Pre-construction Survey and Relocation Areas in California

December, 2020

Klamath River

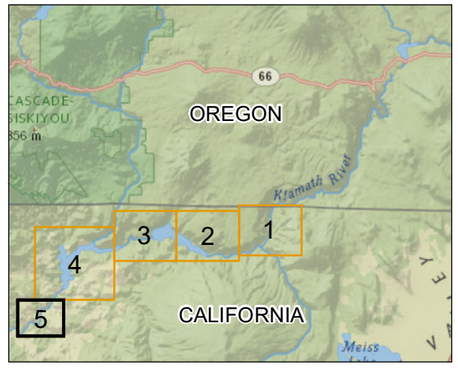
(At original document size of 11x17)
1:15,430

N

0 0.25 Miles

PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

- WPT Relocation Habitat
- Survey prior to construction activity
- Limits of Work
- Klamath River
- Streams
- CA-OR State Boundary



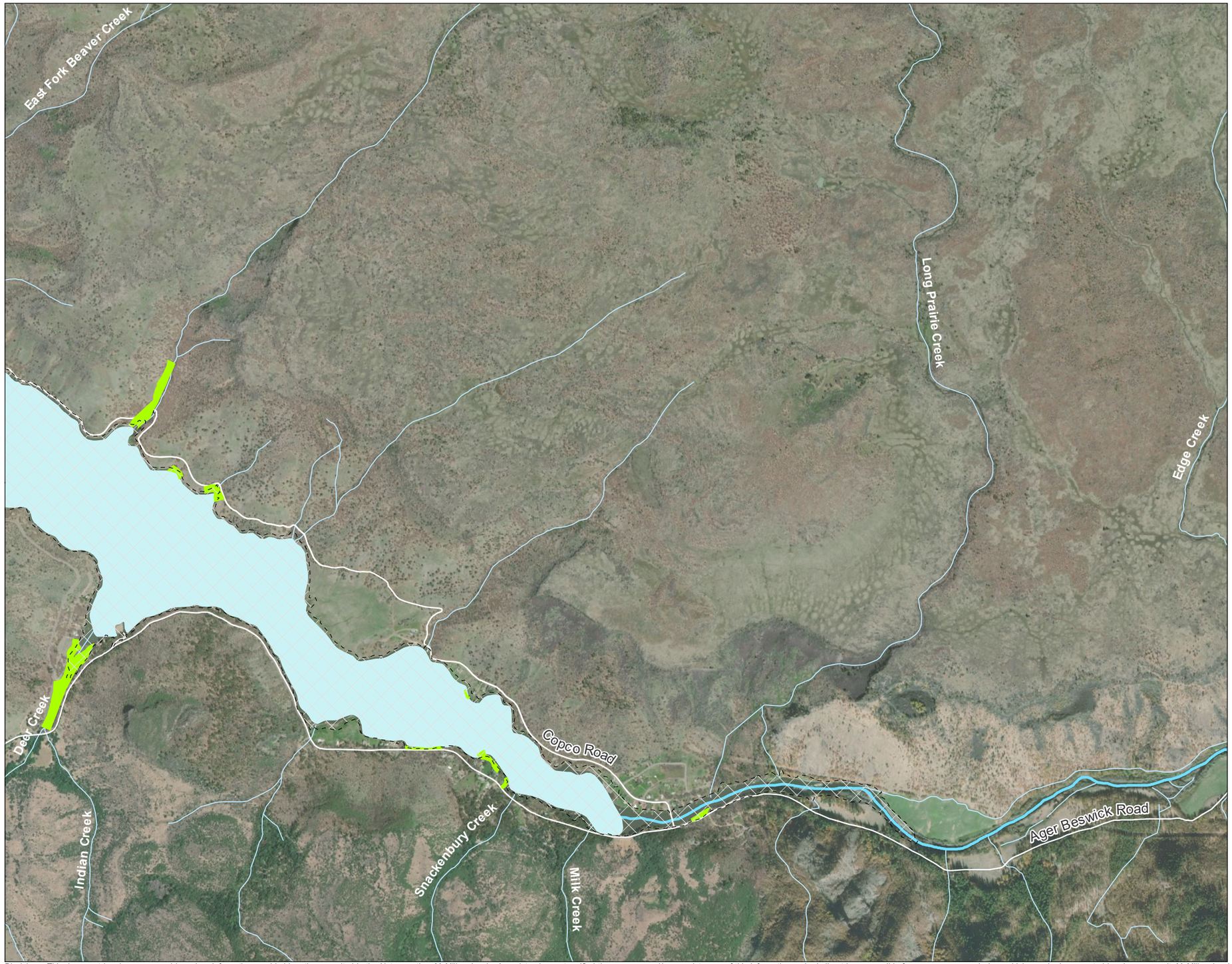
Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html*
National Hydrography Dataset; Pond Turtle Habitat: Pacificorp and EDAW; Limot of Work: 90% Design Draft (6/19/20) Knight Piesold

3. *Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community*
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Sheet 5 of 5



C:\Users\uhlmann\Box\GIS\Project_Based\Klamath_River_Renewal_MJA\GIS_Request_Tracking\GIS_Requests_Management_Plans\Camas_MPs\MP1\WFC_20210105_CA.mxd Revised: 2021-02-19 By: uhlmann

KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 2. Willow Flycatcher Habitat

Copco Reservoir

February, 2021

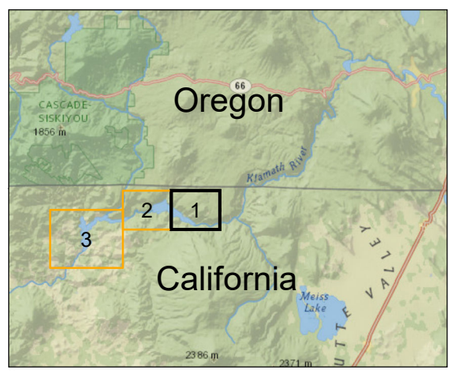
(At original document size of 11x17) 1:22,210

N

0 0.25 0.5 Miles

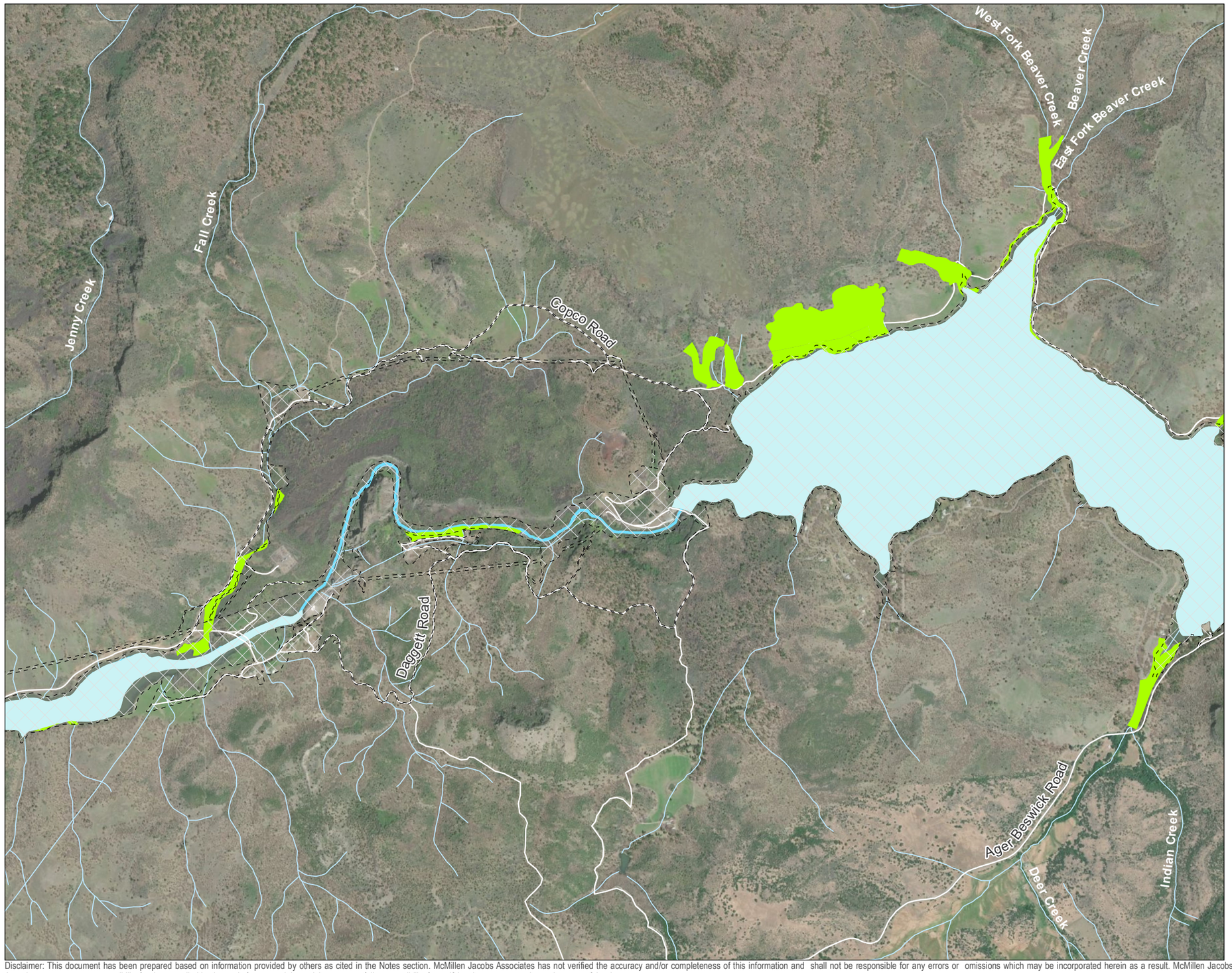
PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

- Limits of Work
- Willow Flycatcher Habitat
- Access Routes
- Reservoir
- Klamath River
- Streams



Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*
2. *Data Sources: Limits of Work: Knight Piesold 100 Design Draft; Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset; Willow Fly Catcher: CDM Smith Field-collected Survey Data; Access Routes: AECOM.*
3. *Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*



KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 2. Willow Flycatcher Habitat

Copco Dams 1 and 2

February, 2021

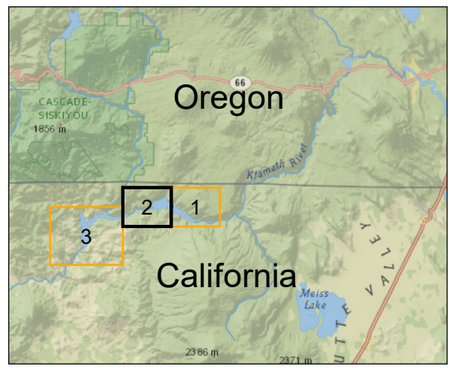
(At original document size of 11x17) 1:22,210

N

0 0.25 0.5 Miles

PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

- Limits of Work
- Willow Flycatcher Habitat
- Access Routes
- Reservoir
- Klamath River
- Streams

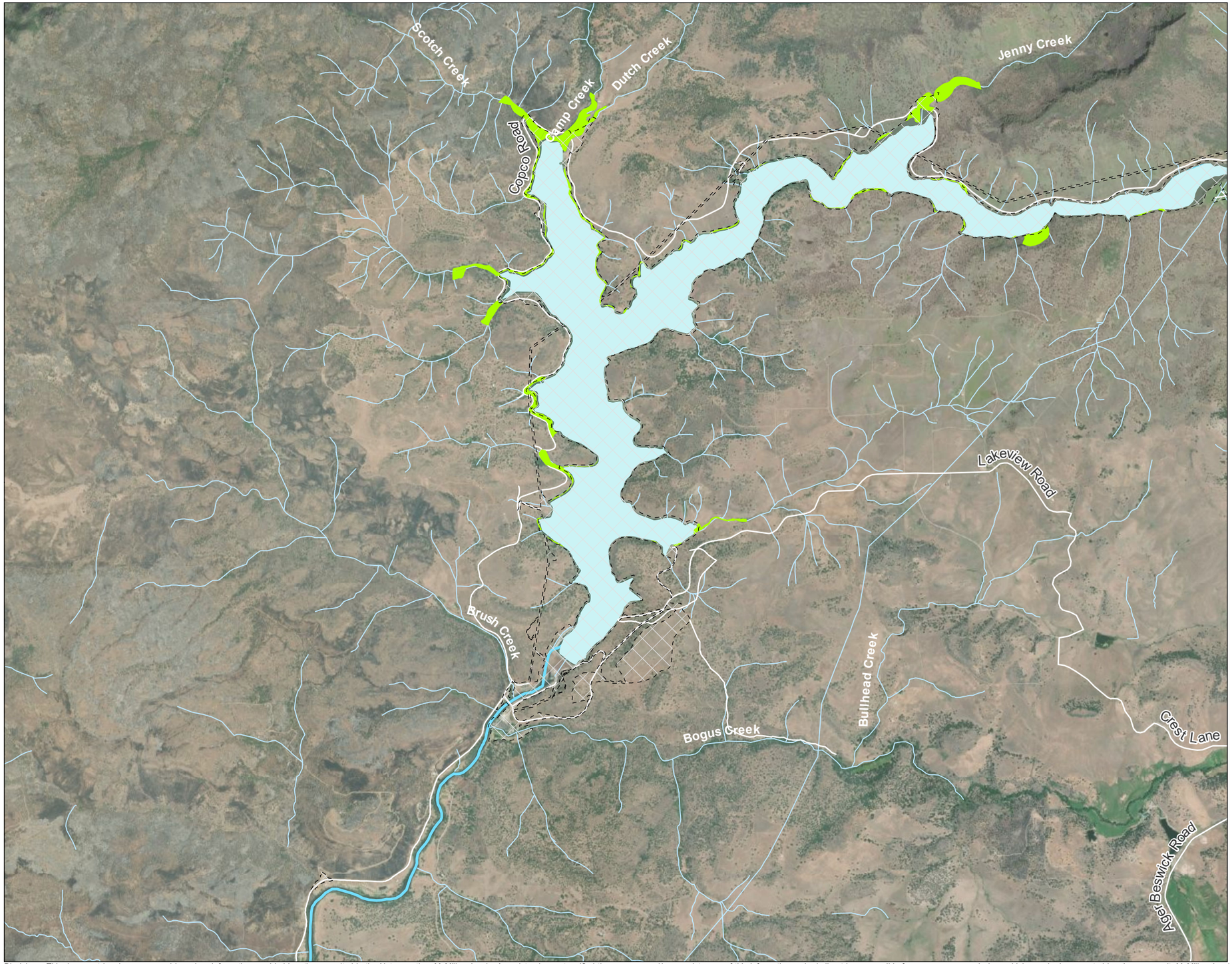


Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: Limits of Work: Knight Piesold 100 Design Draft; Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset; Willow Fly Catcher: CDM Smith Field-collected Survey Data; Access Routes: AECOM.*

3. *Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*



KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 2. Willow Flycatcher Habitat

Iron Gate

February, 2021

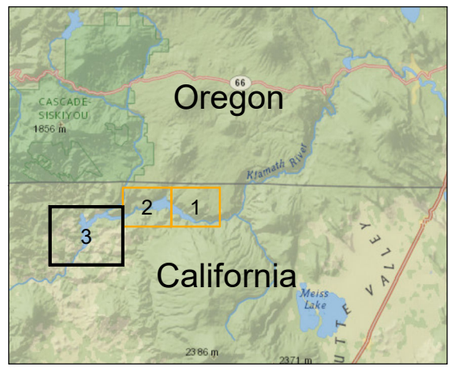
(At original document size of 11x17) 1:33,310

N

0 0.25 0.5 0.75 Miles

PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

- Limits of Work
- Willow Flycatcher Habitat
- Access Routes
- Reservoir
- Klamath River
- Streams

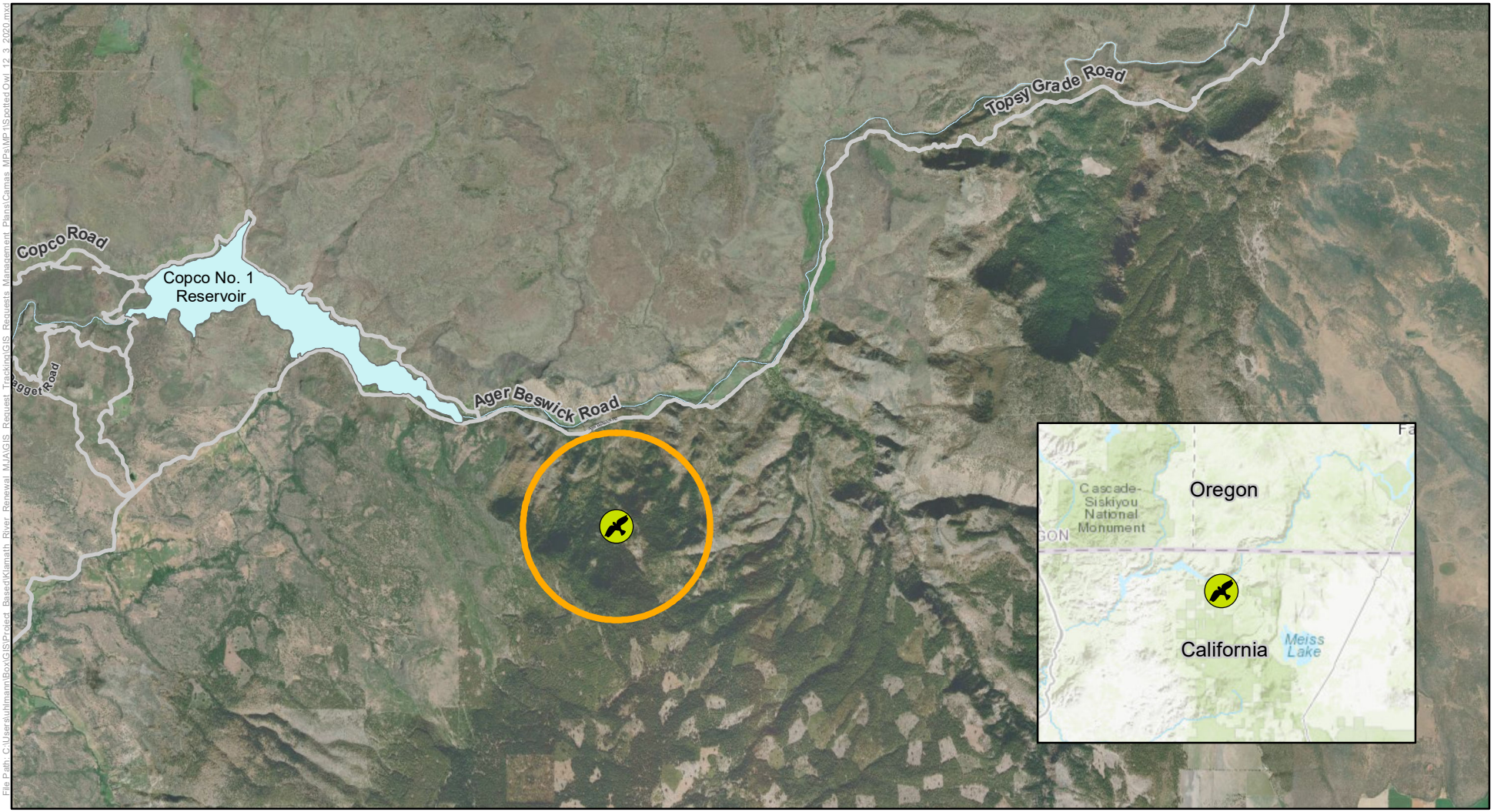


Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: Limits of Work: Knight Piesold 100 Design Draft; Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset; Willow Fly Catcher: CDM Smith Field-collected Survey Data; Access Routes: AECOM.*

3. *Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*



Lower Klamath Project

Figure 3. Helicopter Flight Restriction Zone

December, 2020
(At original document size of 11x17)
1:100,000

KLAMATH RIVER RENEWAL CORPORATION

PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

0 1 2 Miles

- Northern Spotted Owl Activity Center
- Helicopter Exclusion Zone
- Reservoir Area
- Access Routes
- Klamath River

N

Notes

1. *Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere*

2. *Data Sources: Spotted Owl Activity Center: Klamath River Renewal Project 2018 Annual Terrestrial ResourcesSurvey Report; Klamath River: AECOM, 3/21/2019'; Roads: AECOM 6/2017, combined Tiger, Oregon state data, and California state data improved using aerial imagery.*

3. *Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community*

KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 4. Structures with Potential Bat Roosts California

January, 2021

(At original document size of 11x17)
1:3,620

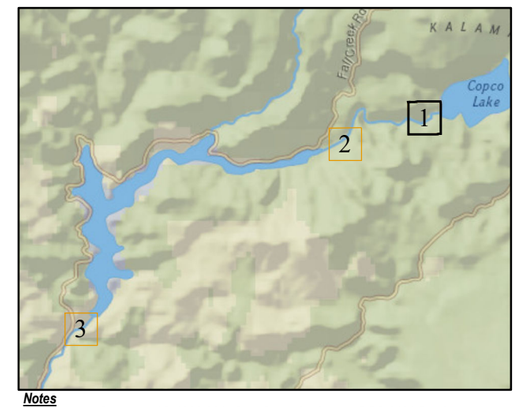
N

0 0.1 Miles

PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

Structures with Potential Bat Roosts

- 2 Diversion Tunnel Outlet
- 3 Gatehouse C-11
- 4 Gatehouse C-12
- 5 Maintenance Building
- 6 Vacant House #21601
- 7 Powerhouse
- Limits of Work
- Reservoir Area
- Klamath River

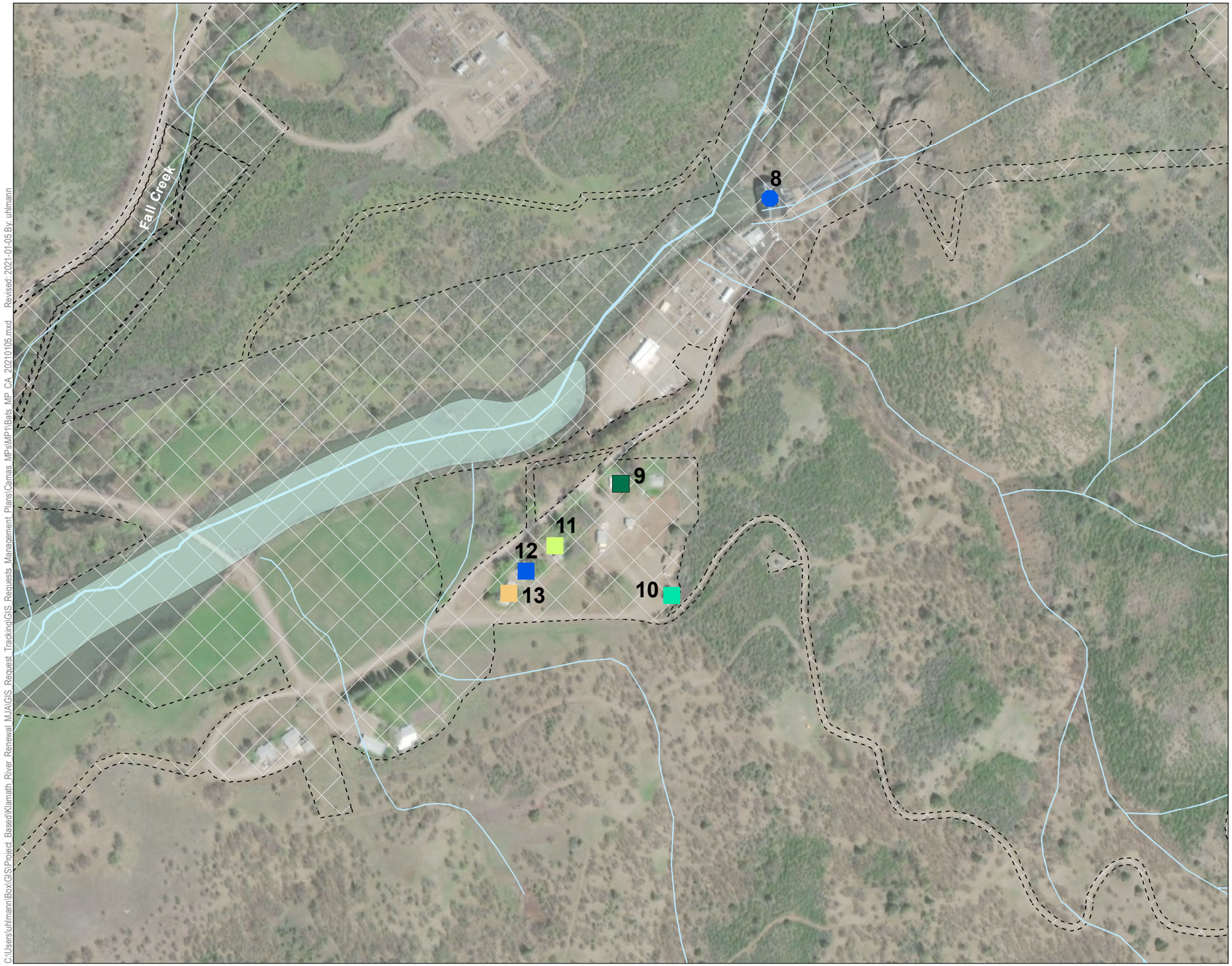


Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset; Bat Roosts: Shannon Leonard AECOM 2019; Access Routes: AECOM; Limits of Work; Knight Piesold 90 Design Draft*

3. *Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*



KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 4. Structures with Potential Bat Roosts California

January, 2021

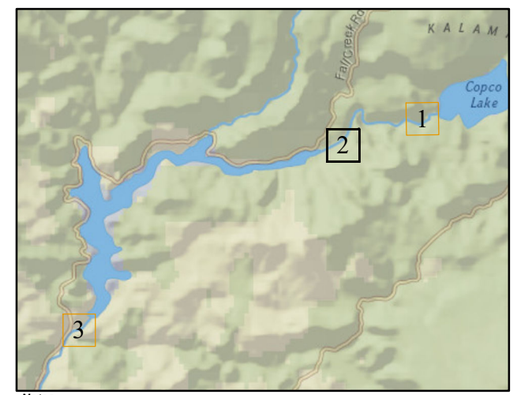
N

(At original document size of 11x17)
1:3,620
0 0.1 Miles

PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

Structures with Potential Bat Roosts

- 10 Cookhouse
- 11 Vacant House 3 (yellow green)
- 12 Vacant House 2 (blue)
- 13 Vacant House 1 (tan)
- 8 Powerhouse
- 9 Vacant House 4 (peach)
- Limits of Work
- Reservoir Area
- Klamath River



Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset; Bat Roosts: Shannon Leonard AECOM 2019; Access Routes: AECOM; Limits of Work; Knight Piesold 90 Design Draft*

3. *Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*

KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 4. Structures with Potential Bat Roosts California

January, 2021

N

(At original document size of 11x17)

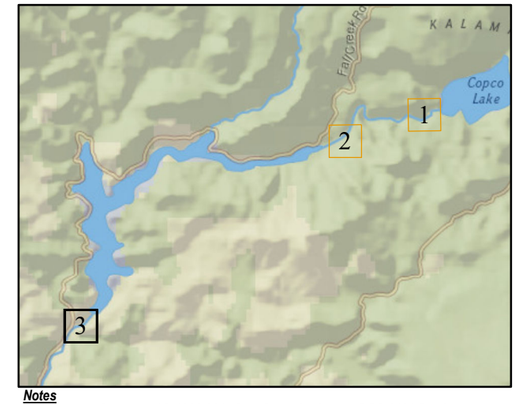
1:3,610

0 0.1 Miles

PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

Structures with Potential Bat Roosts

- 14 Penstock Intake Structure
- 15 Diversion Tunnel Outlet
- 16 Powerhouse
- 17 Barn/Garage
- 18 Lakeview Road Bridge
- Limits of Work
- Reservoir Area
- Klamath River

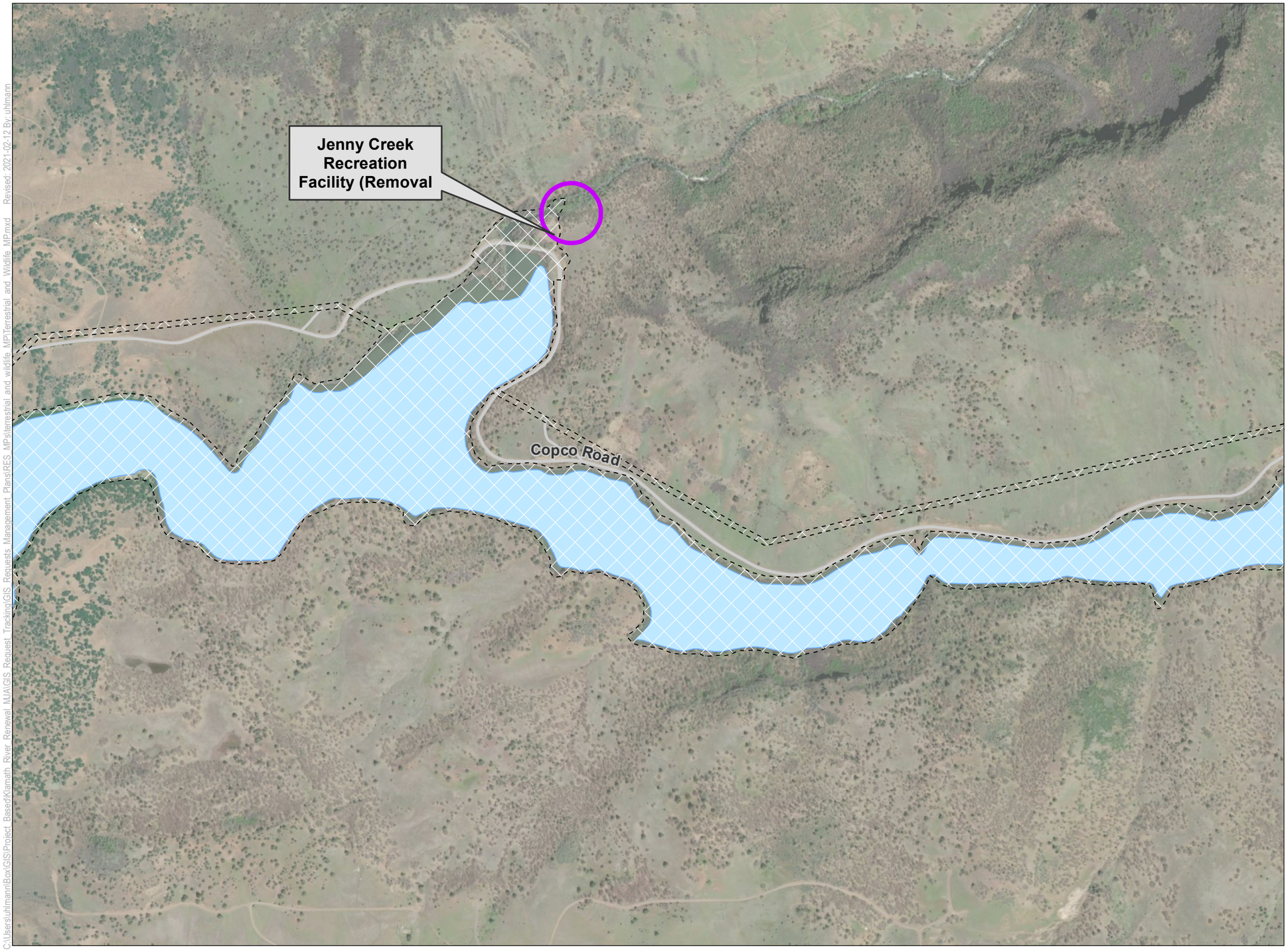


Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset; Bat Roosts: Shannon Leonard AECOM 2019; Access Routes: AECOM; Limits of Work; Knight Piesold 90 Design Draft*

3. *Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*



KLAMATH
RIVER RENEWAL
CORPORATION

Lower Klamath Project

Figure 5.
Special Status Plant Occurrences within Limits of Work

February, 2021

(At original document size of 11x17)
1:10,580

N

0 400 800 1,200 1,600 Feet

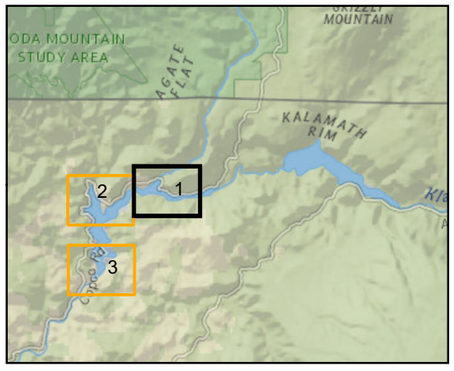
PRELIMINARY DESIGN
(NOT FOR CONSTRUCTION)

Limits of Work

Klamath River

Special Status Plants

Holzinger's orthotrichum moss

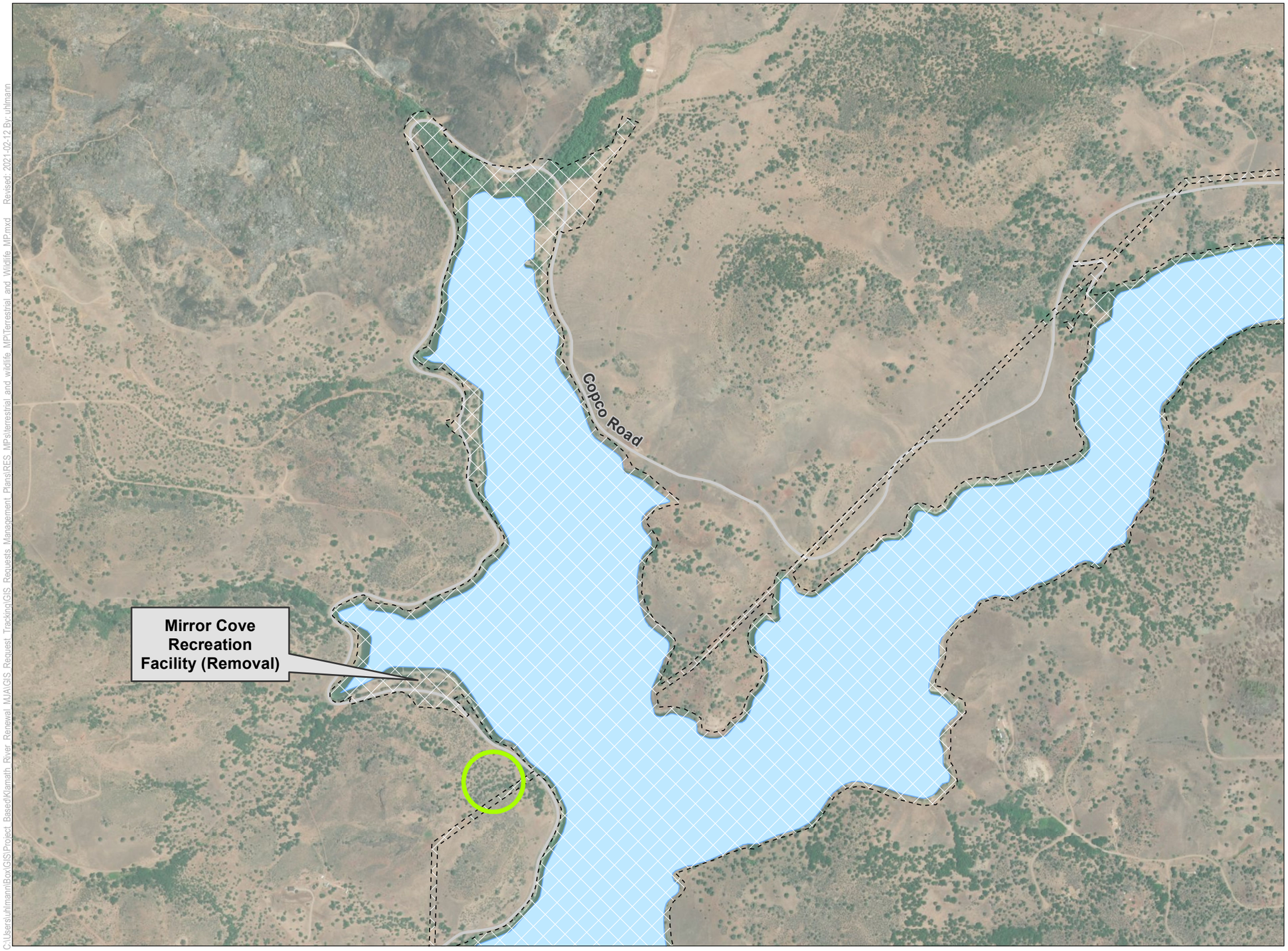


Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: California Natural Diversity Database (CNDDB); Downloaded on 1/31/2021; Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset*

3. *Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Gamin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*



KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 5.
Special Status Plant Occurrences within Limits of Work

February, 2021

(At original document size of 11x17)
1:10,580

N

0 400 800 1,200 1,600 Feet

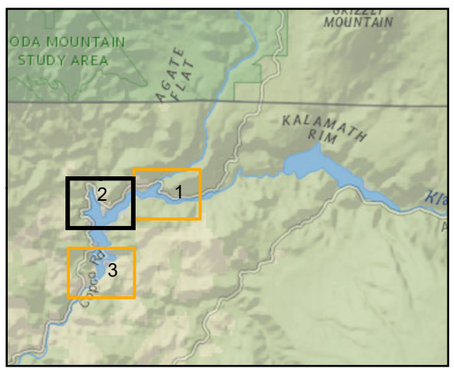
PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

Limits of Work

Klamath River

Special Status Plants

Greene's mariposa-lily

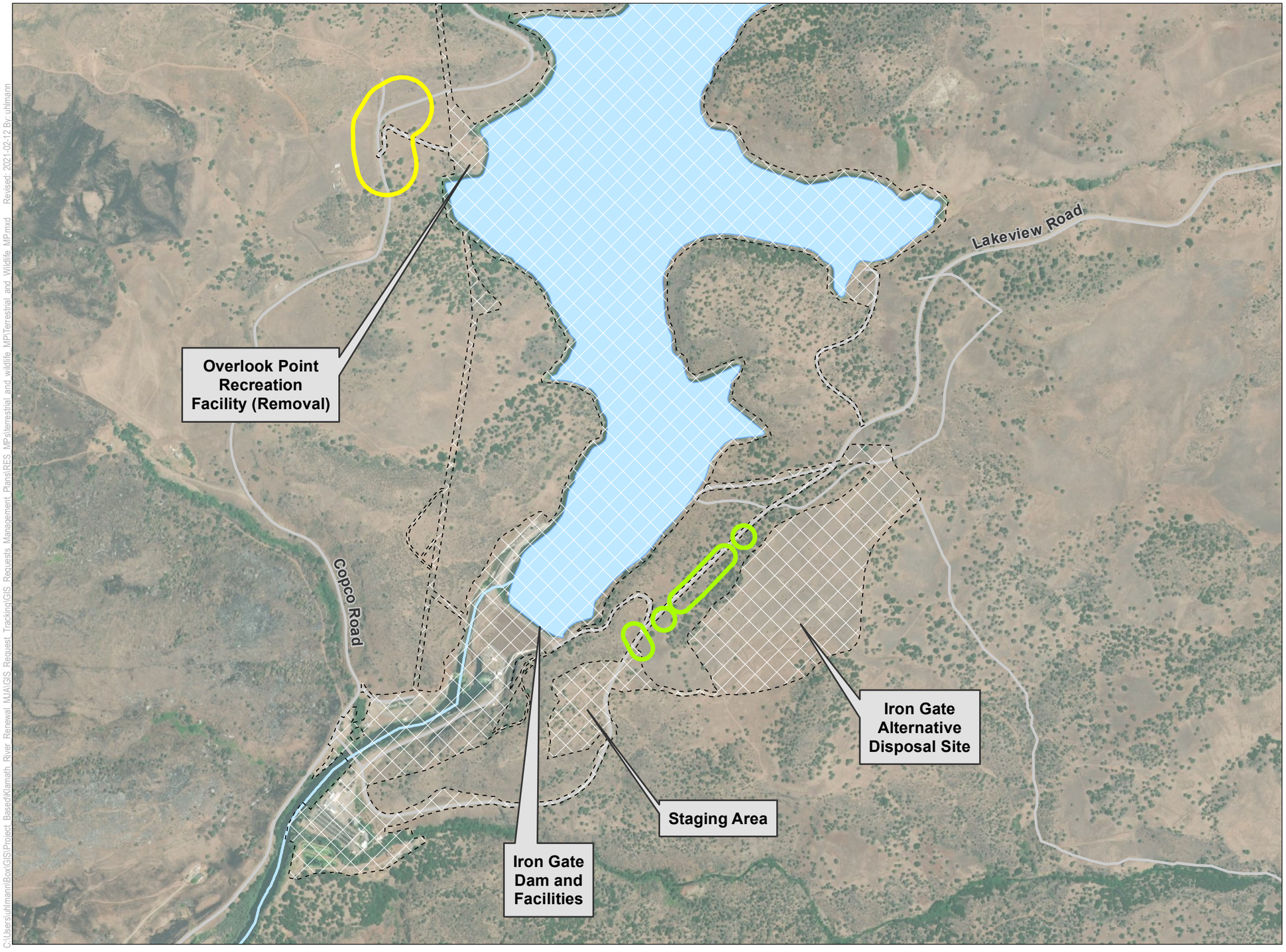


Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: California Natural Diversity Database (CNDDB); Downloaded on 1/31/2021; Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset*

3. *Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Gamin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*



KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 5.
Special Status Plant Occurrences within Limits of Work

February, 2021

N

(At original document size of 11x17)
1:10,580

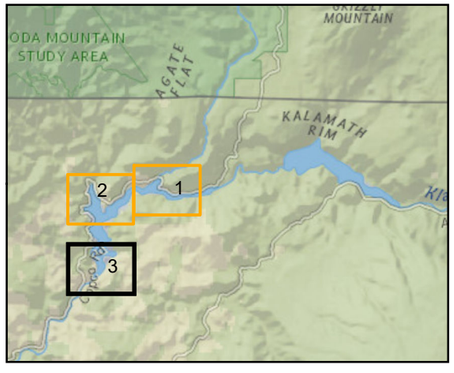
0 400 800 1,200 1,600 Feet

PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

- Limits of Work
- Klamath River

Special Status Plants

- Detling's silverpuffs
- Greene's mariposa-lily

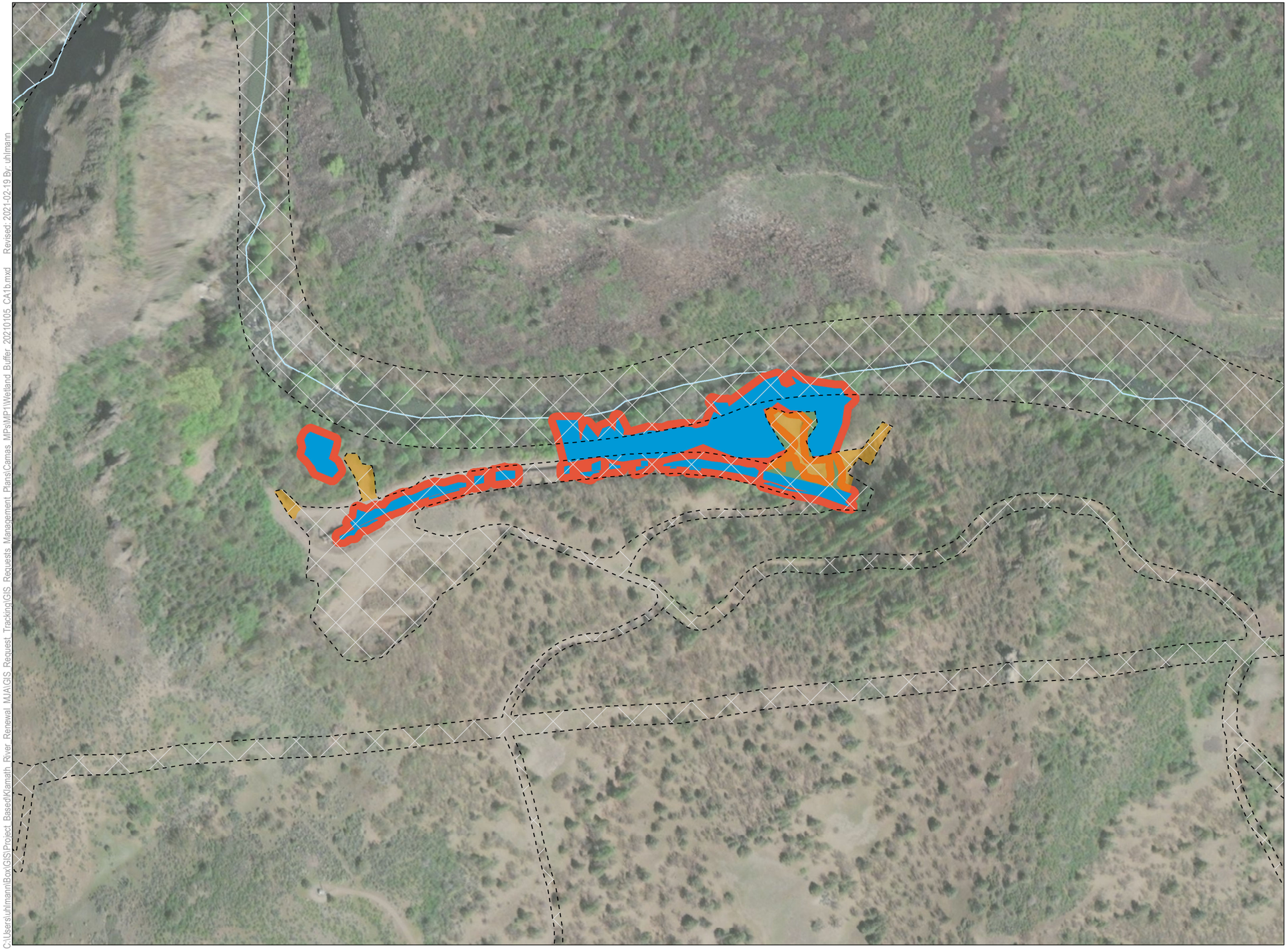


Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: California Natural Diversity Database (CNDDB); Downloaded on 1/31/2021; Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset*

3. *Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*



KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 6. Wetland Buffers

Copco No. 2

February, 2021

(At original document size of 11x17)

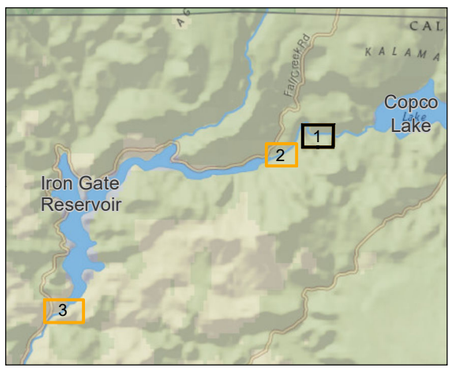
N

1:2,980

0 200 400 Feet

PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

- Wetlands
- 20 ft buffer
- Staging Areas
- Limits of Work
- Klamath River



Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset; Wetlands: JonesJM@cdmsmith.com, field survey data May 2019; Staging and Limits of Work: Knight Piesold 100 Design Draft.*

3. *Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*

KLAMATH RIVER RENEWAL CORPORATION

Lower Klamath Project

Figure 6. Wetland Buffers

Copco No. 2

February, 2021

(At original document size of 11x17)

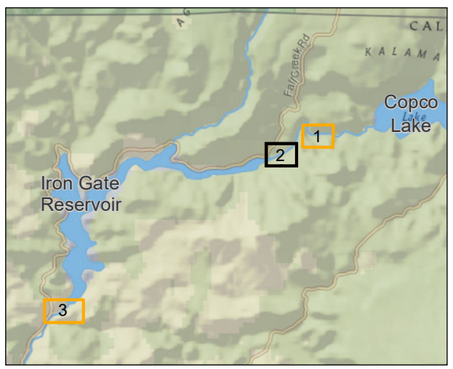
N

1:2,980

0 200 400 Feet

PRELIMINARY DESIGN (NOT FOR CONSTRUCTION)

- Wetlands
- 20 ft buffer
- Staging Areas
- Limits of Work
- Klamath River



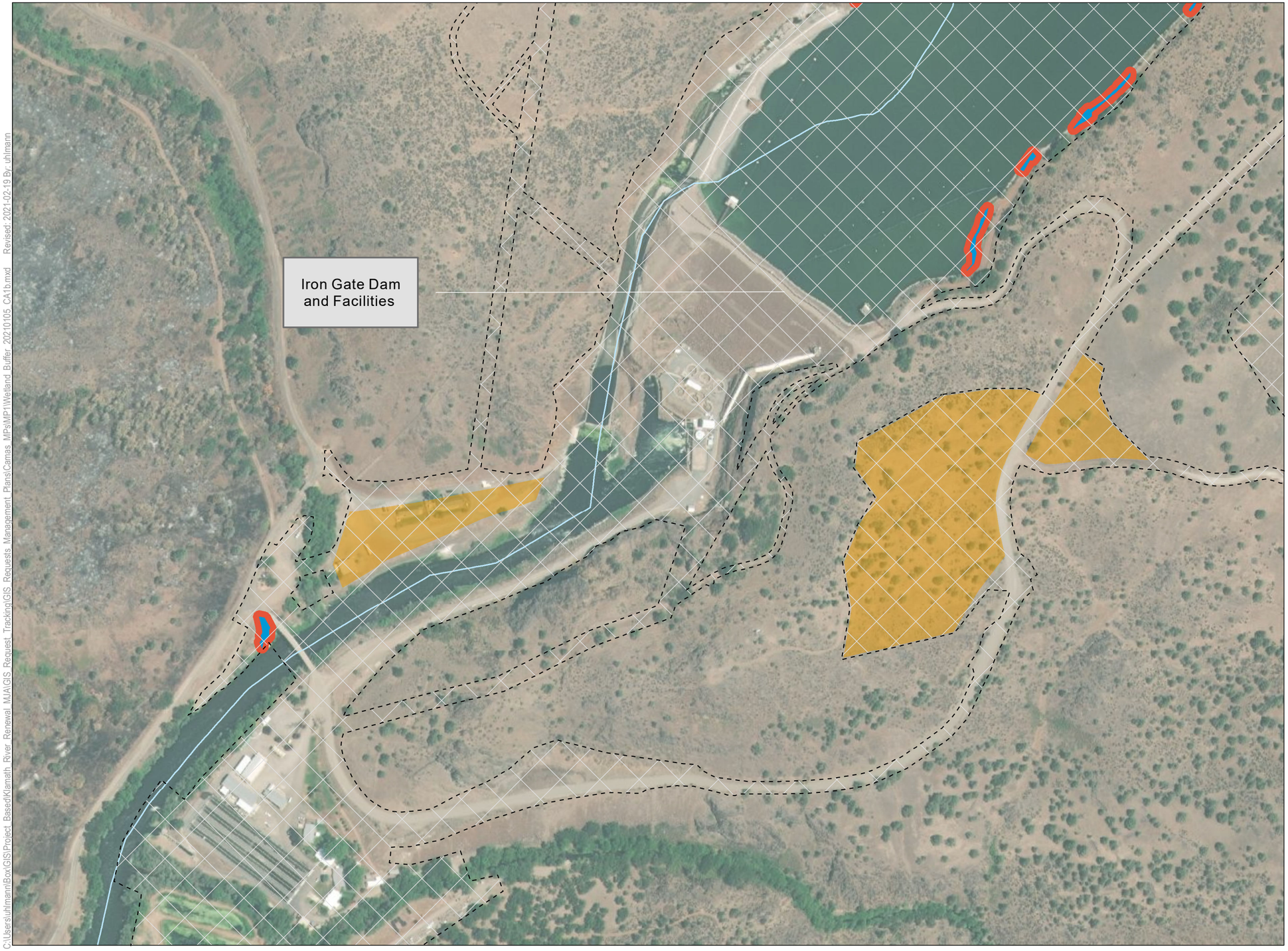
Notes

1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*

2. *Data Sources: Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset; Wetlands: JonesJM@cdmsmith.com, field survey data May 2019; Staging and Limits of Work: Knight Piesold 100 Design Draft*

3. *Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*

C:\Users\uhlmann\Box\GIS\Project Based\Klamath River Renewal_MUA\GIS Request Tracking\GIS Requests_Management Plans\Camas_MPs\MP1\Wetland Buffer_20210105_CA1b.mxd Revised: 2021-02-19 By: uhlmann



KLAMATH
RIVER RENEWAL
CORPORATION

Lower Klamath Project

Figure 6. Wetland Buffers

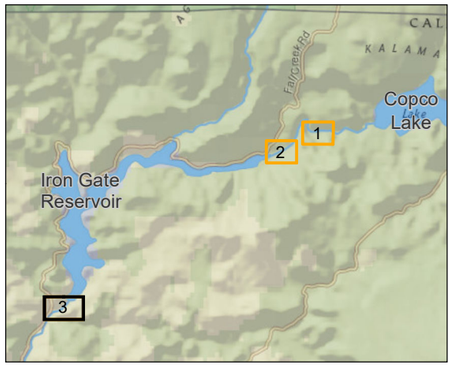
Iron Gate
February, 2021
(At original document size of 11x17)
1:3,820

N

0 200 400 600 Feet

PRELIMINARY DESIGN
(NOT FOR CONSTRUCTION)

- Wetlands
- 20 ft buffer
- Staging Areas
- Limits of Work
- Klamath River



Notes
1. *Coordinate System: NAD 1983 2011 StatePlane California I FIPS 0401 Ft US*
2. *Data Sources: Klamath River Hydrology: Developed by AECOM with https://nhd.usgs.gov/NHD_High_Resolution.html National Hydrography Dataset; Wetlands: JonesJM@cdmsmith.com, field survey data May 2019; Staging and Limits of Work: Knight Piesold 100 Design Draft*
3. *Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.*

Appendix B

Agency Contacts

Western Pond Turtle

California Department of Fish and Wildlife
Name: Kurt Bainbridge
Email: kurt.bainbridge@wildlife.ca.gov
Telephone Number: (530) 515-2794

Willow Flycatcher

California Department of Fish and Wildlife
Name: Kurt Bainbridge
Email: kurt.bainbridge@wildlife.ca.gov
Telephone Number: (530) 515-2794

Non-Special Status Nesting Birds

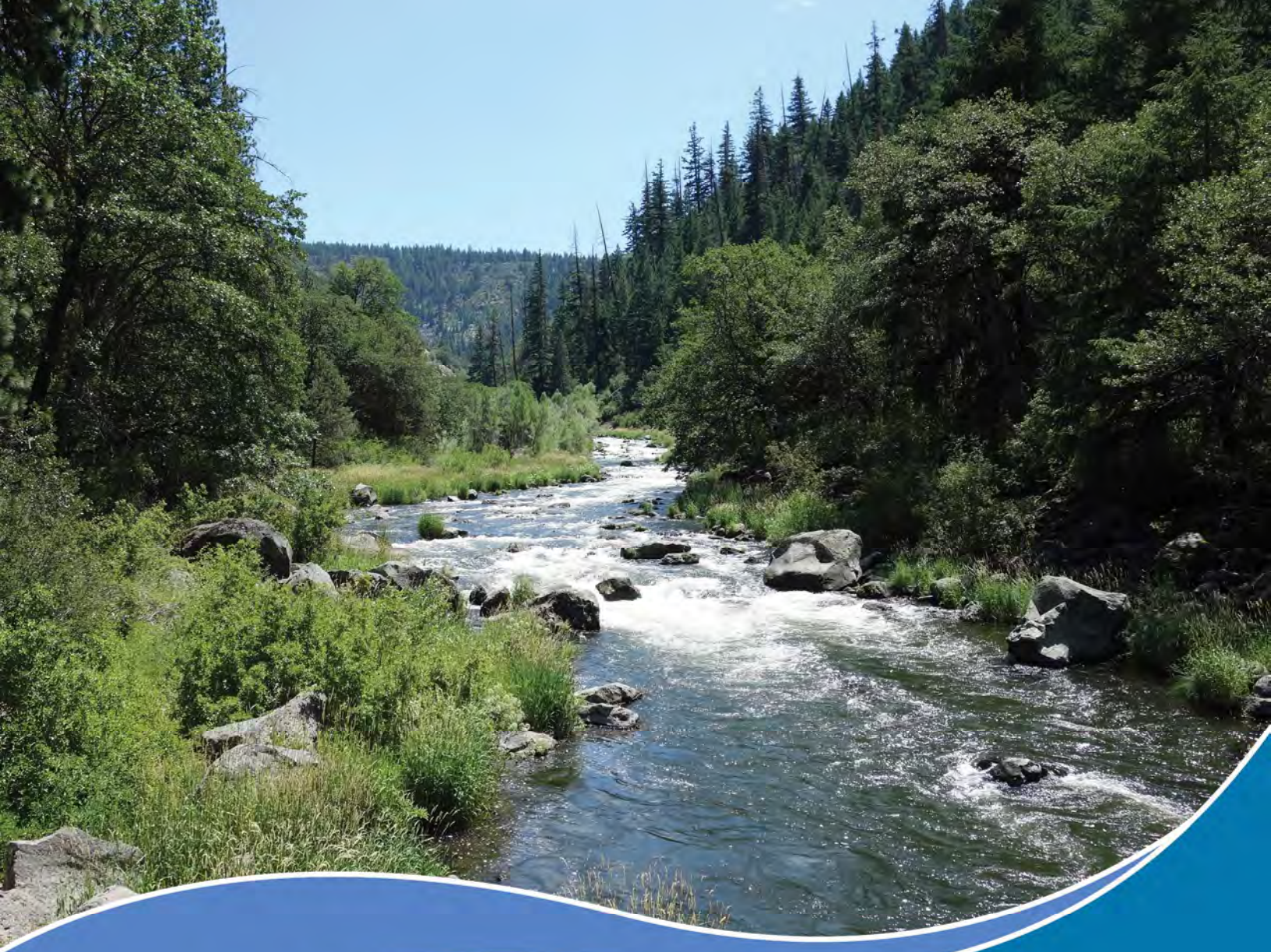
California Department of Fish and Wildlife
Name: Kurt Bainbridge
Email: kurt.bainbridge@wildlife.ca.gov
Telephone Number: (530) 515-2794

Gray Wolf

California Department of Fish and Wildlife
Name: Pete Figura
Email: californiawolfsightings@wildlife.ca.gov
Telephone Number: (530) 227-3980

Appendix C

Terrestrial Resources Technical Report



Klamath River Renewal Project

2018 Annual Terrestrial Resources Survey Report

April 2019

KLAMATH
RIVER RENEWAL
CORPORATION

Prepared for:

Klamath River Renewal Corporation

Prepared by:

KRRC Technical Representative:

AECOM Technical Services, Inc.
300 Lakeside Drive, Suite 400
Oakland, CA 94612

CDM Smith
1220 SW Morrison Street, Suite 200
Portland, OR 97205

Table of Contents

1. Introduction 10
1.1 Purpose of the Terrestrial Resources Surveys 10
1.2 Study Area 10
2. Special-Status Wildlife 13
2.1 Methods 14
2.2 Findings 15
2.2.1 Osprey 18
2.2.2 Willow Flycatcher 19
2.2.3 Nesting Great Blue Heron 19
2.2.4 Peregrine Falcon 20
2.2.5 Sandhill Crane 20
2.2.6 Tricolored Blackbird 20
2.3 Conclusions 21
3. Northern Spotted Owl 24
3.1 Methods 24
3.2 Findings 25
3.3 Conclusions 25
4. Eagles 27
4.1 Existing Information 27
4.1.1 Bald Eagle 27
4.1.2 Golden Eagle 28
4.2 Methods 28
4.3 Findings 30
4.4 Conclusions 34
5. Bats 37
5.1 Methods 37
5.1.1 Winter 2018 37
5.1.2 Summer 2018 38
5.1.3 Fall 2018 38
5.2 Findings 38

5.2.1 Winter 2018 47
5.2.2 Summer 2018 48
5.2.3 Fall 2018 49
5.3 Conclusions 49
6. Western Pond Turtle 51
6.1 Methods 51
6.1.1 Western Pond Turtle Surveys and Habitat 51
6.1.2 Western Pond Turtle Tracking Study at J.C. Boyle Reservoir 51
6.2 Findings 53
6.3 Conclusions 54
7. Special-Status Plants 57
7.1 Methods 57
7.2 Findings 60
7.3 Conclusions 61
8. Vegetation Communities 63
8.1 Methods 63
8.2 Findings 63
8.3 Conclusions 64
9. Invasive Exotic Vegetation 67
9.1 Methods 67
9.2 Findings 73
9.3 Conclusions 75
10. References 77

List of Tables

Table 2-1: Special-Status Species Observed in the Study Area during 2018 Surveys....15
Table 4-1: Total Number of Eagle Observations by Site,[1] Survey, Species, and Age....31
Table 4-2: Active and Inactive Bald and Golden Eagle Nests Observed in 2018 Field Surveys....32
Table 4-3: Number of Nestlings Observed at Each Active Nest in 2018....32
Table 5-1: 2017-2018 Bat Findings....39
Table 7-1: Special-Status Plants with Potential to Occur in or near the Project Area....57
Table 8-1: Vegetation Community Alliances Recorded in the Study Area....64
Table 9-1: Prioritized List of IEV Species....68
Table 9-2: Invasive Exotic Vegetation Extent in the J.C. Boyle Reservoir Uplands....73
Table 9-3: Invasive Exotic Vegetation Extent in Copco Lake Uplands....74
Table 9-4: Invasive Exotic Vegetation Extent in the Iron Gate Reservoir Uplands....74

List of Photographs

Photograph 2-1: Active Osprey Nest on a Utility Pole in the Staging Area West of the Iron Gate Dam....18
Photograph 2-2: Active Great Blue Heron Colony near the Copco No. 2 Penstock....20
Photograph 5-1: Garage of Vacant House 3, Copco Village....46
Photograph 5-2: Vacant House #21601, Copco Access Road....46
Photograph 5-3: Penstock Intake, Iron Gate....46
Photograph 5-4: Spillway Control Center, J.C. Boyle....46
Photograph 5-5: C-12 Gatehouse, Copco No. 1....46
Photograph 5-6: Iron Gate Diversion Tunnel Interior Section of Unlined Rock, February 13, 2018....47
Photograph 5-7: Copco Diversion Tunnel Interior Substrate and Cliff Swallow Nests, February 14, 2018....48

Appendices

Appendix A Figures
Appendix B Northern Spotted Owl Survey Data Sheets
Appendix C Western Pond Turtle Trapping Study Summary Data and Photographs

List of Figures (Appendix A)

Figure 1-1: Overall Project Map and Terrestrial Resources Study Area
Figure 2-1: Osprey (Pandion haliaetus) Observations and Nest Locations – Klamath River (below Iron Gate Dam)
Figure 2-2: Osprey (Pandion haliaetus) Observations and Nest Locations – Iron Gate Reservoir
Figure 2-3: Osprey (Pandion haliaetus) Observations and Nest Locations – Copco Lake
Figure 2-4: Osprey (Pandion haliaetus) Observations and Nest Locations – J.C. Boyle Reservoir
Figure 3-1: 2018 Willow Flycatcher Habitat and Observations – Iron Gate Reservoir
Figure 3-2: 2018 Willow Flycatcher Habitat and Observations – Copco Lake
Figure 3-3: 2018 Willow Flycatcher Habitat and Observations – J.C. Boyle Reservoir and Canal
Figure 4-1: Other Special-Status Wildlife Observations – Iron Gate Reservoir
Figure 4-2: Other Special-Status Wildlife Observations – Klamath River (below J.C. Boyle Dam)
Figure 4-3: Other Special-Status Wildlife Observations – J.C. Boyle Reservoir
Figure 5-1: Northern Spotted Owl (NSO) Calling Stations – J.C. Boyle Lower Stations
Figure 5-2: Northern Spotted Owl (NSO) Calling Stations – J.C. Boyle Upper Stations
Figure 6-1: 2018 Eagle Nest Survey Results Overview
Figure 6-2 2018 Eagle Nest Survey Results Sheet 1 of 6
Figure 6-3 2018 Eagle Nest Survey Results Sheet 2 of 6
Figure 6-4 2018 Eagle Nest Survey Results Sheet 3 of 6
Figure 6-5 2018 Eagle Nest Survey Results Sheet 4 of 6
Figure 6-6 2018 Eagle Nest Survey Results Sheet 5 of 6
Figure 6-7 2018 Eagle Nest Survey Results Sheet 6 of 6
Figure 7-1: 2017-2018 Bat Surveys – Iron Gate Dam Area
Figure 7-2: 2017-2018 Bat Surveys – J.C. Boyle Forebay and Spillway Area, Penstocks and Powerhouse Area
Figure 7-3: 2017-2018 Bat Surveys – J.C. Boyle Dam Area
Figure 7-4: 2017-2018 Bat Surveys – Copco No. 2 Powerhouse Area
Figure 7-5: 2017-2018 Bat Surveys – Copco No. 1 Dam Area and Copco No. 2 Dam Area
Figure 8-1A: Western Pond Turtle Sightings and Habitat – Iron Gate Reservoir
Figure 8-1B: Western Pond Turtle Sightings and Habitat – Iron Gate Reservoir
Figure 8-2A: Western Pond Turtle Sightings and Habitat – Copco Lake
Figure 8-2B: Western Pond Turtle Sightings and Habitat – Copco Lake
Figure 8-3A: Western Pond Turtle Sightings and Habitat – J.C. Boyle Reservoir
Figure 8-3B: Western Pond Turtle Sightings and Habitat – J.C. Boyle Reservoir
Figure 9-1: 2018 Western Pond Turtle Survey Summary – J.C. Boyle Reservoir – South
Figure 9-2: 2018 Western Pond Turtle Survey Summary – J.C. Boyle Reservoir – North
Figure 10-1: 2018 Special-Status Plant Surveys – Iron Gate Reservoir
Figure 10-2: 2018 Special-Status Plant Surveys – Copco Lake
Figure 10-3: 2018 Special-Status Plant Surveys – J.C. Boyle Reservoir
Figure 11-1: Vegetation Communities – Iron Gate Reservoir
Figure 11-2: Vegetation Communities – Iron Gate Reservoir
Figure 11-3: Vegetation Communities – Iron Gate Reservoir

Figure 11-4: Vegetation Communities – Iron Gate Reservoir
Figure 11-5: Vegetation Communities – Iron Gate Reservoir
Figure 11-6: Vegetation Communities – Copco Lake
Figure 11-7: Vegetation Communities – Copco Lake
Figure 11-8: Vegetation Communities – Copco Lake
Figure 11-9: Vegetation Communities – Copco Lake
Figure 11-10: Vegetation Communities – Copco Lake
Figure 11-11: Vegetation Communities – Copco Lake
Figure 11-12: Vegetation Communities – J.C. Boyle Reservoir
Figure 11-13: Vegetation Communities – J.C. Boyle Reservoir
Figure 11-14: Vegetation Communities – J.C. Boyle Reservoir
Figure 11-15: Vegetation Communities – J.C. Boyle Reservoir
Figure 11-16: Vegetation Communities – J.C. Boyle Reservoir
Figure 12-1: Invasive Exotic Vegetation Observations
Figure 12-2: Invasive Exotic Vegetation Observations
Figure 12-3: Invasive Exotic Vegetation Observations
Figure 12-4: Invasive Exotic Vegetation Observations
Figure 12-5: Invasive Exotic Vegetation Observations
Figure 12-6: Invasive Exotic Vegetation Observations
Figure 12-7: Invasive Exotic Vegetation Observations
Figure 12-8: Invasive Exotic Vegetation Observations
Figure 12-9: Invasive Exotic Vegetation Observations
Figure 12-10: Invasive Exotic Vegetation Observations
Figure 12-11: Invasive Exotic Vegetation Observations
Figure 12-12: Invasive Exotic Vegetation Observations
Figure 12-13: Invasive Exotic Vegetation Observations
Figure 12-14: Invasive Exotic Vegetation Observations
Figure 12-15: Invasive Exotic Vegetation Observations
Figure 12-16: Invasive Exotic Vegetation Observations
Figure 12-17: Invasive Exotic Vegetation Observations
Figure 12-18: Invasive Exotic Vegetation Observations
Figure 12-19: Invasive Exotic Vegetation Observations
Figure 12-20: Invasive Exotic Vegetation Observations
Figure 12-21: Invasive Exotic Vegetation Observations
Figure 12-22: Invasive Exotic Vegetation Observations
Figure 12-23: Invasive Exotic Vegetation Observations
Figure 12-24: Invasive Exotic Vegetation Observations
Figure 12-25: Invasive Exotic Vegetation Observations
Figure 12-26: Invasive Exotic Vegetation Observations

Acronyms and Abbreviations

BLM	Bureau of Land Management
Cal-IPC	California Invasive Plant Council
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CE	California Endangered
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
COTO	Corynorhinus townsendii (Townsend's big-eared bat)
EIS/EIR	Environmental Impact Statement/Environmental Impact Report
°F	degrees Fahrenheit
FE	Federal Endangered
FSC	Federal Species of Concern
GNR	Global not reported
GPS	Global Positioning System
IEV	invasive exotic vegetation
IPaC	USFWS Information for Planning and Consultation database
KCBC	Klamath County Board of Commissioners
KNF	Klamath National Forest
KRRC	Klamath River Renewal Corporation
MYYU	Myotis yumanensis (Yuma myotis)
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
NSO	Northern Spotted Owl
OC	Candidate listing by Oregon Department of Agriculture
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ONHP	Oregon Natural Heritage Program
ORBIC	Oregon Biodiversity Information Center
Project	Klamath River Renewal Project
SDA	Siskiyou Department of Agriculture
SNR	State not reported
USBR	United States Bureau of Reclamation
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

Chapter 1 Introduction

1. INTRODUCTION

This report summarizes the terrestrial resources surveys conducted in 2018 for the Klamath River Renewal Project (Project). The Klamath River Renewal Corporation (KRRC) and its consultants carried out field investigations to collect existing condition information on the following terrestrial resources:

- Special-status wildlife
- Northern spotted owl
- Bald and golden eagles
- Bats
- Western pond turtle
- Special-status plants
- Vegetation communities
- Invasive exotic vegetation

1.1 Purpose of the Terrestrial Resources Surveys

The KRRC and project stakeholders require information on the existing condition of terrestrial resources to inform the ongoing Project design and regulatory permit processes, as described in previous studies and regulatory compliance documents, including the 2012 Environmental Impact Statement/Environmental Impact Report (EIS/EIR) (USBR and CDFW 2012) and the Joint Preliminary Biological Opinion (NMFS and USFWS 2012). As described in the Definite Plan, Appendix J (KRRC 2018), the KRRC has incorporated terrestrial resources surveys and avoidance and minimization measures into the Project as Terrestrial Resources Measures. These measures include the 2018 surveys described in this annual report. This report provides the findings of the surveys, along with conclusions based on an analysis of the information collected with regard to its suitability for informing the design and meeting regulatory requirements.

1.2 Study Area

This report describes the methods followed during field investigations for each resource listed above, which were based on survey work plans developed in close coordination with federal and state resource agencies, including the United States Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and Oregon Department of Fish and Wildlife (ODFW). Unless otherwise noted, surveys were conducted by KRRC biologists within a specific buffer around the limits of work (hereinafter referred to as study areas) for each resource. The KRRC developed these study areas in cooperation with the resource agencies listed above during development of the survey work plans (Appendix J of the Definite Plan [KRRC 2018]). Each of the following sections of this report focuses on a different terrestrial resource; the study area for each resource is described in the corresponding section. The limits of work (or Project area) include the dams and structures to be removed, the disposal sites, the haul and access roads that may undergo improvements, and the reservoirs, and are defined in the Definite Plan (KRRC 2018). The limits of work represent the physical extent of on-the-ground construction activities, including demolition, removal, and

restoration activities proposed as a part of this Project, as well as the extent of the J.C. Boyle Reservoir, Iron Gate Reservoir, and Copco Lake (see Figure 5.1-1 of the Definite Plan [KRRC 2018]). The 0.25-mile buffer shown in the overall Project map (Figure 1-1, Appendix A) represents the study area applied to general wildlife surveys and vegetation community surveys, as detailed in Sections 2 and 8, respectively. Surveys for osprey, northern spotted owl, eagles, and bats used different study areas, which are described in their respective sections and specified in related figures.

Figures cited in the text of this report are provided in Appendix A.

Chapter 2 Special-Status Wildlife

2. SPECIAL-STATUS WILDLIFE

The KRRC identified special-status wildlife species with potential to occur in or near the Project area from a variety of sources. PacifiCorp identified several special-status wildlife species as occurring in or near the Project area (PacifiCorp 2004), and the United States Bureau of Reclamation and CDFW compiled this in the 2012 EIS/EIR (USBR and CDFW 2012). The KRRC also obtained information on the occurrences of special-status wildlife from USFWS, CDFW, ODFW, the Bureau of Land Management (BLM), and the United States Forest Service (USFS) from sources that include the Oregon Biodiversity Information Center (ORBIC), the California Natural Diversity Database (CNDDB), and the USFWS Information for Planning and Consultation (IPaC) database. Special-status wildlife species that were considered during survey planning included those that are federal and/or state threatened, endangered, proposed, or candidate species, California Species of Special Concern, Oregon Natural Heritage Program (ONHP) List 1 and 2 species, and Oregon Sensitive species. BLM and USFS Sensitive Species, Assessment Species, Tracking Species, and Survey and Manage species were also considered, where BLM and USFS lands occur in the study area; however, not all of these species trigger a regulatory concern.

Most of the special-status species are birds; some are year-round residents while others are migratory, using the study area either for nesting or for overwintering. In addition, a small number of special-status invertebrate, amphibian, reptile, and mammal species have the potential to occur in or near the Project area. A comprehensive list of special-status species with potential to occur in or near the Project area is provided in Appendix J of the definite plan (KRRC 2018); this document focuses more narrowly on presenting the results of 2018 field surveys.

The primary objective of the 2018 surveys for special-status wildlife was to collect baseline information on the species using the study area and on the habitats present that have potential to support special-status wildlife. This information is needed to identify potential impacts on species and/or habitats from Project activities, identify federal and state permit requirements, and develop measures needed to avoid or minimize potential impacts on species and habitats. The KRRC applied a 0.25-mile buffer around the Project area to generate the study area for the special -status wildlife surveys. The rationale for this study area is described in more detail in Section 2.1. Based on input from USFWS, CDFW, and ODFW, the KRRC did not conduct focused surveys requiring trapping or other invasive methods, with the exception of surveys for western pond turtle (see Section 6). Rather, field surveys focused on identifying suitable habitats for these species, to determine whether and to what extent suitable habitat exists in the study area and where it may be modified, affected, or destroyed by Project activities.

Northern spotted owls, bald eagles, golden eagles, bats, western pond turtle, and special-status plants are discussed in separate sections of this document.

2.1 Methods

KRRC biologists conducted general wildlife surveys from May 14 through 24 and June 11 through 15, 2018. Biologists established transects to cover the 0.25-mile study area described in Section 1.2. The KRRC developed the 0.25-mile study area in cooperation with the resource agencies during development of the survey work plans, which are provided in Appendix J of the Definite Plan (KRRC 2018). Biologists walked the length of each transect, recording all wildlife observations, including direct visual and auditory observations, scat, and other signs of presence. Field teams recorded wildlife behaviors, particularly breeding activity. In addition to land-based transects, biologists surveyed reservoir shorelines and open water by boat to record observations of aquatic and semi-aquatic species (e.g., western pond turtle, waterfowl, etc.). Biologists noted all special-status species seen or heard, and their approximate number, location, and behavior (e.g., roosting, loafing, foraging, courtship, mating, incubating eggs, or feeding young).

The following special-status species received additional focus:

- Osprey (Pandion haliaetus): There are several osprey nest platforms within 0.25 mile of the limits of work that may be removed or disturbed during construction. Biologists surveyed all nest platforms, transmission line towers, and reservoir and river shorelines within a slightly larger 0.75-mile study area for osprey nests.
- Willow flycatcher (Empidonax traillii): Because willow flycatcher is a California endangered species, its habitat is protected. Biologists noted and mapped willow flycatcher habitat during wildlife and vegetation surveys.
- Nesting great blue heron (Ardea herodias): Nesting bird colonies are protected under California and Oregon state laws. Biologists visually surveyed the study area for great blue heron colonies during wildlife surveys.
- Peregrine falcon (Falco peregrinus): Peregrine falcons may use the same nest for multiple years, and these nest sites are protected under state laws. Biologists visually surveyed the study area for nesting peregrine falcon during wildlife surveys.
- Greater sandhill crane (Grus canadensis tabida): Sandhill crane is a California threatened species, and nest sites are protected. Biologists visually surveyed the study area for nesting sandhill crane during wildlife surveys.
- Tricolored blackbird (Agelaius tricolor): Tricolored blackbird is a California threatened species, and nesting colonies are protected. Biologists visually surveyed the study area for tricolored blackbird colonies during wildlife surveys.

2.2 Findings

Biologists observed a total of 32 special-status wildlife species in the study area during the special-status wildlife surveys conducted in May and June 2018 (Table 2-1). For the purposes of this report, species observations were organized in association with the three Project reservoirs closest to the observation (i.e., if a species was observed in a tributary to the Iron Gate Reservoir, it was grouped with other species observed in the vicinity of the Iron Gate Reservoir). Some species were found at all three reservoirs, while others were only observed at one or two reservoirs. Of the 33 special-status wildlife species observed, there were 3 reptile species, 29 bird species, and 1 mammal species.

Table 2-1: Special-Status Species Observed in the Study Area during 2018 Surveys

Species	Iron Gate Reservoir Area	Copco Lake Area	J.C. Boyle Reservoir Area
Reptiles			
Western Pond Turtle Actinemys marmorata	Observed throughout reservoir shorelines; noted in Mirror Cove and near Camp and Jenny Creeks. Observed in Jenny Creek near the Copco Road bridge.	Observed throughout reservoir shorelines, typically within coves.	Observed throughout reservoir shorelines; occurring in higher numbers at the southernmost portion of the reservoir on top of the boom near the dam.
Northern Sagebrush Lizard Sceloporus graciosus	Observed throughout the reservoir area. Noted near the fish hatchery, Long Gulch Cove shoreline, Jenny Creek shorelines, and recreational areas.	Observed throughout the reservoir area, particularly on dry, rocky slopes. Noted in rocky areas to the east of Fall Creek.	Observed throughout the reservoir area on dry, rocky slopes. Noted in the dam spillway area.
California Mountain Kingsnake Lampropeltis zonata			Observed on a rocky outcrop below the dam.
Birds			
Bufflehead Bucephala albeola	Observed throughout reservoir in mixed rafts with other waterfowl.	Observed throughout the reservoir in mixed rafts with other waterfowl.	Observed in the northern portion of reservoir.
Mountain Quail Oreotyx pictus		Observed throughout the reservoir area; a large covey was observed just east of Beaver Creek cove.	Observed throughout the reservoir area; noted along the utility line corridor west of the canal and at the Topsy Campground near the Highway 66 bridge.
Vaux's Swift Chaetura vauxi			Observed flying over the eastern shore of the reservoir.
Greater Sandhill Crane Grus canadensis tabida			Active nest observed on the northwestern shore of reservoir; adults also heard calling from the emergent wetlands along the northeastern shore.
Caspian Tern Sterna caspia	Observed throughout the reservoir, flying overhead and foraging.	Observed throughout the reservoir, flying overhead and foraging.	Observed throughout the reservoir, flying overhead and foraging.
Forster's Tern Sterna forsteri		Observed throughout the reservoir.	Observed in the southern portions of the reservoir.

Species	Iron Gate Reservoir Area	Copco Lake Area	J.C. Boyle Reservoir Area
Common Loon Gavia immer		Observed throughout the reservoir; noted in Keaton Cove.	
Double-crested Cormorant Phalacrocorax auritus	Observed throughout the reservoir; noted in Long Gulch Cove, Camp Creek, and on the boom near the dam.	Observed throughout the reservoir; most often flying overhead or foraging/resting in the northern coves.	Observed throughout the reservoir; noted along the northeastern shore, and on the boom near the dam.
American White Pelican Pelecanus erthorhynchos	Observed throughout the reservoir; noted in Mirror Cove, Juniper Point, and the upstream extent of the reservoir, as well as on the boom near the dam.	Observed throughout the reservoir; noted near the dam and in Keaton Cove.	Observed throughout the reservoir; noted in the vicinity of the Highway 66 bridge and on the boom near the dam.
Great Blue Heron Ardea herodias	Observed throughout the reservoir; noted in Mirror Cove, Jenny Creek, and Bogus Creek.	Observed throughout the reservoir area; noted perching atop the canyon along the Copco Bypass Reach. Active nesting colony observed in the riparian area near the Copco No. 2 penstock.	Observed throughout the reservoir area; noted near Spencer Creek, along the northeastern shore, and near Topsy Campground.
Great Egret Casmerodius albius	Observed along the Klamath River immediately downstream of the fish hatchery.	Observed throughout the reservoir area.	
Osprey Pandion haliaetus	Observed throughout the reservoir. Several active nests observed on platforms atop utility poles.	Observed throughout the reservoir. Several active nests observed on platforms atop utility poles.	Observed throughout the reservoir. Several active nests observed on platforms atop utility poles.
Golden Eagle Aquila chrysaetos	A pair observed along the southern shoreline of the upstream extent of the reservoir.	Observed perched on a slope above the northern shoreline of the reservoir. A pair was also observed near a northern cove; one bathing in the shallow water.	
Northern Harrier Circus hudsonius	Observed along the northern shoreline in the northeast portion of the reservoir and just downstream of the dam.		
Cooper's Hawk Accipiter cooperii	Observed along the northern shoreline of the reservoir. A potential nest was observed near the confluence of Camp and Dutch Creek.	Observed throughout the reservoir area; noted in the forested seep area along the northern shoreline of the reservoir.	Observed throughout the reservoir; noted on the southeastern side of the reservoir in the dense mixed woodlands just north of the dam spillway.
Bald Eagle Haliaeetus leucocephalus	Observed throughout the reservoir area; noted flying over Long Gulch Cove, along the southeastern side of reservoir, and near the dam.	Observed throughout the reservoir area; noted flying overhead near Keaton Cove.	Observed throughout the reservoir area; most frequently observed flying overhead or perched in pines in the vicinity of the Highway 66 bridge.
Lewis Woodpecker Melanerpes lewis	Observed throughout the reservoir area; noted at the fish hatchery.	Observed throughout the reservoir area; noted along the northern shoreline at Beaver Creek cove.	Observed along the eastern shoreline of the reservoir.

Species	Iron Gate Reservoir Area	Copco Lake Area	J.C. Boyle Reservoir Area
Acorn Woodpecker Melanerpes formicivorus	Observed along the eastern shoreline of the reservoir, southwest of Horseshoe Ranch Wildlife Area, and near the fish hatchery.	Observed throughout the reservoir area in relatively dense oak and mixed forests.	
Pileated Woodpecker Drycopus pileatus			Observed throughout the reservoir area in densely forested habitats.
American Peregrine Falcon Falco peregrinus anatum	An active nest was observed on the northeastern side of the reservoir in a rocky outcrop above Copco Road.		An active nest was reported by BLM on a cliff along the eastern side of the Klamath River Canyon, less than 1 mile southeast of the end of the canal.
Olive-sided Flycatcher Contopus cooperi		Observed in riparian woodlands along the northern shoreline, particularly at Beaver Creek cove.	Observed throughout the reservoir area.
Willow Flycatcher Empidonax traillii	Observed in willow riparian habitat at Jenny Creek near the confluence with the reservoir.	Observed in reservoir fringe willow habitat at the confluence of Beaver Creek.	
Purple Martin Progne subis	Observed on a utility pole just west of reservoir; possibly nesting there.	Nesting activity observed in a cavity in a utility pole near the intersection of Copco Road and dam access road. Also observed nesting in a utility pole along the Copco No. 2 bypass reach.	
Bank Swallow Riparia riparia		One individual observed among a group of tree and cliff swallows near the dam.	
Black-capped Chickadee Parus atricapillus			Observed throughout the reservoir area.
Pygmy Nuthatch Sitta pygmaea	Observed in a few locations around the reservoir, including in the woodland south of Jenny Creek.	Observed throughout the reservoir area, including in forested areas near the dam and near the upstream extent of the reservoir.	Observed throughout the reservoir area in ponderosa pine forests.
Yellow-breasted Chat Icteria virens	Observed in a northern cove of the reservoir near Camp Creek and Horseshoe Ranch Wildlife Area. Also observed near the fish hatchery.	Observed in riparian habitats throughout the reservoir, mostly along the southern shoreline east of Keaton Cove. Also observed along Fall Creek.	Observed in dense riparian areas; noted near the proposed staging area in the southeastern corner of the reservoir.
Tricolored Blackbird Agelaius tricolor	One individual observed just downstream of the Copco No. 2 powerhouse along the north bank of the River.		
Yellow Warbler Dendroica petechial	Observed throughout the reservoir area near tributaries including Brush Creek, Camp Creek, and Jenny Creek, and at the fish hatchery.	Observed throughout the reservoir area, typically in riparian woodlands and the hillside seep area.	Observed throughout the reservoir area; noted nesting in the willow riparian area near the dam spillway.

Species	Iron Gate Reservoir Area	Copco Lake Area	J.C. Boyle Reservoir Area
Mammals			
Western Gray Squirrel Sciurus griseus	Observed in densely forested habitats associated with tributaries to the reservoir.	Observed in densely forested habitats; noted near the falls at Fall Creek, along the northern shoreline in the seep area, and along the southern shoreline near Ager Beswick Road.	Observed throughout the reservoir in forested stands with dense canopies, including near the disposal area. An individual and a nest were observed in the staging area just east of the dam.

Note:

BLM = Bureau of Land Management

2.2.1 Osprey

KRRC biologists observed osprey throughout the study area for osprey (i.e., within 0.75 mile of the limits of work; see Figures 2-1 through 2-4), and found a total of 17 active osprey nests. Active nests were those with adults and/or chicks observed at the nest. Biologists also observed several inactive nests. All nests were on utility poles, typically but not always on platforms installed on the pole to provide for osprey nesting.

Biologists observed three active osprey nests in the vicinity of the Iron Gate Reservoir (Figures 2-1 and 2-2). Of these, one was on a utility pole in the staging area west of the Iron Gate Dam (Photograph 2-1); one was on a utility pole along the western side of the Iron Gate Reservoir; and one was on a utility pole along Copco Road where it turns north at the upstream end of the Iron Gate Reservoir. In addition, biologists observed four active osprey nests along the Klamath River downstream of Iron Gate Dam (excluding the one described above near the dam itself). These four nests were on utility poles along Copco Road between Iron Gate Dam and Interstate 5 (Figure 2-1).

Photograph 2-1: Active Osprey Nest on a Utility Pole in the Staging Area West of the Iron Gate Dam

Biologists observed a total of five active nests in the vicinity of Copco Lake (Figure 2-3). Of these, one was on a utility pole in the parking area for the Copco No. 1 powerhouse and a second was on a utility pole along the eastern side of the Copco No. 1 Reservoir, directly upslope from the Copco No. 1 Dam. The three other active nests are atop utility poles along Copco Road along the northern side of Copco Lake. Biologists observed one inactive osprey nest atop a utility pole upslope from the Copco No. 2 Dam on the southern side of the river.

Biologists observed a total of five active osprey nests in the vicinity of the J.C. Boyle Reservoir (Figure 2-4). Of these, one nest was on a utility pole along the Klamath River just south of the J.C. Boyle Dam, and two others were atop utility poles along the southern end of the J.C. Boyle Reservoir east of the dam. Biologists observed an additional inactive nest on a utility pole in that vicinity. Biologists observed an active nest along the southeastern side of the J.C. Boyle Reservoir and an active nest atop a utility pole in the proposed J.C. Boyle disposal site.

2.2.2 Willow Flycatcher

Biologists observed a single willow flycatcher at two locations: in willow riparian habitat at the confluence of Jenny Creek and Iron Gate Reservoir (Figure 3-1) and along the northern shoreline of Copco Lake just south of the confluence with Beaver Creek (Figure 3-2). Willow flycatcher nesting habitat typically consists of dense riparian vegetation (e.g., Geyer and Shining willow thickets), with foraging taking place in these areas or in other riparian habitats (e.g., bigleaf maple or Oregon ash groves). The locations of these willow flycatcher habitat types are shown on Figures 3-1 through 3-3. Biologists found these habitats along the shoreline of Iron Gate Reservoir, most notably at the larger stream confluences (e.g., Scotch Creek, Camp/Dutch Creek, and Jenny Creek). Biologists also noted patches of willows along the shoreline of Copco Lake, particularly at the confluences with Beaver Creek, Raymond Gulch, and at Mallard Cove. In addition, willow flycatcher habitat is present along Fall Creek. Suitable habitat is also present just below the J.C. Boyle Dam and patches of willows occur along portions of the J.C. Boyle power canal.

2.2.3 Nesting Great Blue Heron

During helicopter surveys for eagles (see Section 4) biologists observed a great blue heron colony along the Klamath River in the Copco No. 2 bypass reach (Figure 4-1). Biologists noted at least 12 nests during the helicopter survey, and herons were heard vocalizing in this area by ground crews. This colony is located in riparian habitat approximately 100 feet north of the Copco No. 2 penstock (Photograph 2-2).

Photograph 2-2: Active Great Blue Heron Colony near the Copco No. 2 Penstock

2.2.4 Peregrine Falcon

Biologists observed a peregrine falcon nest in a rocky outcrop north of Iron Gate Reservoir, east of Jenny Creek (Figure 4-1). A second peregrine falcon nest is known by BLM to be located on a cliff along the eastern side of the Klamath River canyon below J.C. Boyle (Hayner 2018) (Figure 4-2). BLM also provided the general location of a prairie falcon (Falco mexicanus) nest approximately 1 mile upstream, also along the eastern side of the canyon (Hayner 2018). Although prairie falcon is not a sensitive species in Oregon, it is protected along with nearly all other bird species under the Migratory Bird Treaty Act, and nest disturbance must be avoided.

2.2.5 Sandhill Crane

KRRC biologists observed an active sandhill crane nest along the northwestern shore of the J.C. Boyle Reservoir (Figure 4-3). In May 2018, the nest was occupied by two adults brooding three eggs. Biologists also heard sandhill cranes vocalizing from the dense bulrush habitat along the northeastern shore of the J.C. Boyle Reservoir, where the cranes were likely nesting.

2.2.6 Tricolored Blackbird

The KRRC biologists did not observe tricolored blackbird colonies in the study area. However, in June 2018, biologists observed a flock of 25 tricolored blackbirds in an agricultural field along the Yreka-Ager Road, approximately 12 miles southwest of the Iron Gate Dam. In addition, biologists observed a single male

tricolored blackbird in June 2018 among a flock of red-winged blackbirds in the bulrush habitat near the confluence of Fall Creek and the Klamath River, within the limits of work along Daggett Road.

2.3 Conclusions

KRRC biologists observed several special-status wildlife species in the study area during 2018 surveys, as listed in Table 2-1. Of the 33 special-status species observed, three were reptiles, 29 were birds, and one was mammalian.

Biologists observed 15 active osprey nests in the osprey study area (i.e., within 0.75 mile of proposed limits of work) (Figures 2-1 through 2-4). This number is consistent with previous PacifiCorp surveys that noted 16 active nests in the hydroelectric reach (PacifiCorp 2004). All osprey nests were on utility poles or towers, typically on platforms installed for that purpose. These osprey nests have the potential to be disturbed during proposed construction activities. Biologists will evaluate each nest site to determine the potential for disturbance; relocation or removal of some nests and nesting platforms may be needed. During the 2019 breeding season, additional nest surveys will be conducted to confirm the locations of active nests, collect additional information to determine the potential for nest disturbance during construction, and develop a plan for nest removal, exclusion, or relocation and monitoring activities.

KRRC biologists observed willow flycatchers on two occasions during the 2018 surveys. Both detections were of individual birds in willow riparian habitat. Biologists observed suitable willow flycatcher habitat most often around the Iron Gate Reservoir, but also along Copco Lake (Figures 3-1 and 3-2). Habitat was primarily associated with the confluences of larger streams, but patches of willow thickets were also found along reservoir shorelines away from streams or other apparent surface water sources. Some proposed Project activities overlap with these locations, such as bridge improvements and reservoir drawdown. As construction plans are developed, avoidance and minimization measures will be developed, if necessary. Wetland investigations in 2019 will focus on mapping and quantifying suitable willow flycatcher habitat along with other wetland habitats (e.g., tule/bulrush communities).

KRRC biologists observed several other special-status bird species during the 2018 surveys, and many are assumed to be breeding in the study area. During 2019 surveys, biologists will confirm specific nest sites and further evaluate them for potential impacts from Project activities, including:

- Great blue heron colony near the Copco No. 2 penstock – potential for disturbance from demolition activities
- Peregrine falcon nest above Iron Gate Reservoir near Copco Road – potential for disturbance from truck traffic and hauling activities
- Peregrine and prairie falcon nests in the Klamath River Canyon – potential for disturbance from demolition of J.C. Boyle power canal and/or powerhouse

KRRC biologists will continue to coordinate with CDFW, ODFW, and USFWS to obtain any new information on special-status wildlife use of the study area. One such species is the gray wolf (Canis lupus). Gray wolves

may occur transiently in the study area. In Oregon, the Rogue pack uses the Wood River Valley more than 10 miles northeast of Upper Klamath Lake (ODFW 2017). In California, the only currently known gray wolf pack is the Lassen Pack, which inhabits portions of Lassen and Plumas counties to the southeast of the study area (CDFW 2018a).

Chapter 3 Northern Spotted Owl

3. NORTHERN SPOTTED OWL

Northern spotted owl (NSO) (Strix occidentalis), a federally threatened species, has the potential to occur in or near the Project area. If an NSO activity center (i.e., an area of concentrated activity of either a pair of NSO or a single territorial NSO) is located within established disturbance distances from proposed construction activities, there could be an adverse effect, such as nest abandonment. Based on USFWS guidelines, established disturbance distances are as follows: 1 mile from blasting (e.g., at the dams), 0.5 mile from helicopter use (e.g., at the reservoirs during restoration work), and 0.25 mile from heavy equipment use, rock crushing, and hauling (USFWS 2006).

The 2012 Joint Preliminary Biological Opinion included several measures specifically addressing potential effects on NSO (measures NSO 1 through 4) (NMFS and USFWS 2012). These measures included protocol-level surveys to identify any NSO activity centers (including any nesting sites) that are near proposed construction and disposal areas, to avoid or minimize the potential for disturbance during NSO nesting, roosting, or foraging activities. The KRRC developed the NSO survey plan in coordination with USFWS to outline protocol surveys to be conducted during the 2018 breeding season, as described below.

3.1 Methods

Based on a desktop evaluation and field reconnaissance conducted in 2017 with USFWS, the KRRC determined that NSO protocol surveys would focus on suitable habitat around J.C. Boyle Dam and associated facilities, the disposal site, and haul and access roads. Facilities associated with Copco No. 1 Dam, Copco No. 2 Dam, and Iron Gate Dam and associated reservoirs were not included based on the lack of suitable habitat for NSO. Because the Project is not anticipated to result in modification of NSO habitat, the KRRC conducted protocol surveys for noise-only disturbance following the 2012 USFWS NSO Survey Protocol (USFWS 2012).

Biologists confirmed calling routes and stations in the field to achieve complete coverage of all habitat in the survey area, allowing biologists to hear responding owls within the entire survey area. The spacing of calling stations was determined by the topography and acoustical characteristics of the area (e.g., background noise such as creeks); stations were spaced between 0.25 and 0.5 mile apart. Eighteen calling stations were initially identified, as shown on Figures 5-1 and 5-2. One calling station (Number 2) was subsequently determined to be on inaccessible private property and was therefore eliminated from the survey route.

During the 2018 breeding season, KRRC biologists conducted six NSO protocol surveys at eighteen calling stations. Field teams conducted visits in April, May, June, July (two visits), and August 2018. As required by the 2012 USFWS NSO Survey Protocol, teams of two, led by a biologist with experience conducting NSO protocol surveys, conducted all surveys. Beginning in June, field teams conducted calling at an additional location near the J.C. Boyle forebay at the end of the power canal. The new location is along the west access road, approximately 800 feet north of the junction with the east access road. The lead biologist (as defined

in the USFWS protocol) recommended calling at this location due to the presence of large conifers on the slope up toward the west from the access road.

Field teams initiated NSO surveys approximately one-half hour following sunset, and recorded weather conditions, including wind, precipitation, cloud cover, and moon phase. Surveys were not conducted under inclement weather, including rain, heavy fog, or high (> 12-mile-per-hour) winds. At each calling station, field teams used a calling device to broadcast NSO calls. Calls were broadcast for approximately 1 minute, and then biologists listened for responses for approximately 1 minute, alternating this for a total of 10 minutes at each station. Following the calling session at each station, field teams used high-intensity flashlights to briefly scan nearby trees for the presence of owls. Teams noted observations of other wildlife, including visual observations and vocalizations. Field teams also noted noises from the river or other sources (e.g., vehicles on nearby roads).

3.2 Findings

Field teams did not note any calling responses or visual identifications of NSO during the 2018 NSO protocol surveys. Biologists heard and saw great horned owls during several visits, and one follow-up daytime stand search confirmed the presence of a great horned owl fledgling in the vicinity of an NSO calling station. Field data sheets are provided in Appendix B.

3.3 Conclusions

Field teams did not detect northern spotted owls, NSO nests, or activity centers during the 2018 NSO surveys. KRRC biologists conducted surveys consistent with the 2012 USFWS NSO Survey Protocol (USFWS 2012), with six visits spaced out over the 2018 breeding season.

USFWS has the authority to determine whether additional follow up surveys are warranted in 2019. Based on the findings of the 2018 surveys, the KRRC does not propose additional NSO surveys for the Project. If the proposed construction locations are changed in such a way that suitable habitat would be modified, or if additional information on the presence of NSO in the study area is obtained, additional NSO surveys may be warranted in 2019.

Chapter 4 Eagles

4. EAGLES

Bald eagles (Haliaeetus leucocephalus) and golden eagles (Aquila chrysaetos) are protected under the Bald and Golden Eagle Protection Act (16 Code of Federal Regulations 668) and the Migratory Bird Treaty Act (16 United States Code §§ 701-12), and are fully protected under California law. Bald eagles are listed as Endangered under the California Endangered Species Act but are not listed in the State of Oregon. The Upper Klamath Basin provides suitable habitat for and is known to support bald eagle and golden eagle populations.

The 2012 EIS/EIR (USBR and CDFW 2012) describes measures to reduce Project impacts on bald and golden eagles. The objective of the eagle surveys was to identify, document, and confirm eagle presence and eagle use of areas that may be directly or indirectly disturbed by Project construction.

4.1 Existing Information

4.1.1 Bald Eagle

The upper Klamath Basin provides extensive bald eagle nesting and foraging habitat and supports the largest wintering population of bald eagles in the coterminous United States (Shuford et al. 2004). In some years, as many as 117 bald eagle pairs nest and 1,100 individuals winter in the Klamath Basin (PacifiCorp 2004). Shorelines provide a rough approximation of bald eagle habitat extent as they breed, forage, and roost near water (Isaacs and Anthony 2011). Bald eagles often nest in large trees with a line of sight to water; however, nests have also been documented on rocky outcrops, on the ground, on cliffs, and on artificial structures such as power poles (USFWS 2007). Bald eagles often use the same nests for multiple years, and nesting sites are known to exist in the vicinity of the Project area.

The Oregon Cooperative Fish and Wildlife Research Unit conducted bald eagle nest surveys in the Klamath River area on March 27, 2002, and May 29, 2002 (PacifiCorp 2004). Surveyors recorded six known nests within a 10-mile buffer of the Project area, with distances to the nearest facility ranging from approximately 0.7 mile to 7.1 miles (two near J.C. Boyle Reservoir, three near the J.C. Boyle peaking reach, and one near Copco Lake). Aerial surveys conducted in 2003 found another nest approximately 540 feet southeast of Copco No. 1 Dam.

PacifiCorp (2004) documented additional bald eagle observations at the Iron Gate Reservoir, Copco Lake, and J.C. Boyle Reservoir, and at other locations along the middle and lower Klamath River. Targeted avian surveys recorded at least 37 individual sightings of bald eagles in flight, perched, or foraging in 2002, and numerous incidental sightings occurred during general wildlife surveys, facility surveys, and other field studies (PacifiCorp 2004). These data were used to establish the presence of historical nesting and foraging habitat throughout the limits of work and the surrounding area. By agency request, exact nesting locations were not published in the PacifiCorp 2004 report.

4.1.2 Golden Eagle

Golden eagles occur throughout northern California and Oregon, preferring open and semi-open habitats. Nesting habitat includes cliffs and trees large enough to support nest structures (e.g., pine juniper and oak trees). Foraging and nesting habitats occur throughout the vicinity of the Project area. Though natural densities for this species in southern Oregon and northern California are low, historical records indicate the presence of nesting activity on cliffs from the J.C. Boyle bypass reach to Iron Gate Reservoir (USBR and CDFW 2012). During PacifiCorp surveys, biologists observed golden eagles in several locations, including Copco Lake, Iron Gate Reservoir, and near J.C. Boyle powerhouse, but no nests were found (PacifiCorp 2004).

4.2 Methods

Prior to initiating field surveys, KRRC biologists reviewed existing databases (CNDDB and ORBIC) and reports on bald and golden eagles to locate historically known nests and territories. During 2017, the USFWS and the BLM provided an updated dataset of bald and golden eagle nests and territories that have been monitored in the region (Willy 2017 and Hayner 2017). In addition, the KRRC obtained data from previous aerial helicopter surveys conducted in the Klamath Basin by Frank Isaacs of the Oregon Eagle Foundation (Isaacs 2017; Willy 2017).

Biologists conducted a viewshed analysis to identify the potential impact area. Using ArcGIS (ESRI, Version 10.4.1), biologists generated visibility extents using a 30-foot resolution National Elevation Dataset topographic surface and observer points derived from the limits of work (see Survey Area section below).

In defining the study area for the eagle surveys, KRRC biologists considered the viewshed analysis and the nature, timing, and location of proposed construction activities. The study area included areas of high and low potential impact

- High-Impact Areas: High-impact areas include a 0.5-mile buffer surrounding the limits of work, as well as those access roads that are anticipated to have an increase in traffic and movement of heavy equipment. High-impact activities include proposed construction and demolition activities associated with the decommissioning of the dams and facilities and creation of disposal sites.
- Low-Impact Areas: Low-impact areas include a 2-mile buffer surrounding the limits of work, excluding the extent of each reservoir where minimal or no work will occur.

The study area encompassed the extent of the viewshed in these high- and low-impact areas and represents the portion of the habitat that may be affected by Project activities. In the 2018 surveys, biologists also opportunistically surveyed beyond the study area boundaries to account for the wide-ranging nature of the eagle species and to gain a general understanding of eagle use and occupancy in the study area.

Biologists conducted concurrent bald and golden eagle surveys. The surveys focused on areas with suitable nesting, roosting, or foraging habitat for bald and golden eagles, as well as known nest locations. The survey goals were to identify nest site locations, characterize baseline eagle nesting activity, and document other

key habitat features. Field surveys employed a variety of techniques and multiple temporal windows to capture dynamic seasonal activity. All survey data were digitally recorded through Collector for ArcGIS, using iPads (Apple, Inc.), which preserve the location and survey time for each observation. The KRRC biologists conducted field reconnaissance surveys from July 24 to 26, 2017, and from November 6 to 8, 2017. Surveyors assessed habitats in the study area, noted bird activity, and attempted to locate all previously identified nests. Additionally, because the viewshed analysis considered bare earth topography (i.e., it did not account for existing vegetation), biologists used the reconnaissance surveys to ground-truth the results of the viewshed analysis to determine where trees further limited the viewshed. Biologists spent 1 day at each dam and associated facilities and reservoir.

The 2018 bald and golden eagle survey protocol was informed by the review of existing data, information obtained during the 2017 reconnaissance surveys, discussions with the wildlife agencies, and established protocols including:

- Bald Eagle Nest Survey and Reporting Guide: Reporting Observations at Nest Sites in Oregon (Isaacs 2009),
- Protocol for Evaluating Bald Eagle Habitat and Populations in California (Jackman and Jenkins 2004), and
- Interim Golden Eagle Inventory and Monitoring Protocols (Pagel et al. 2010).

Field teams collected data using a combination of ground-based and aerial surveys (via a helicopter). Field surveys emphasized microhabitats that could support nesting eagles (e.g., rocky cliffs for golden eagles and large conifers for bald eagles). Survey efforts included:

1. Two breeding season surveys (late January through July 2018).

    a. An initial nest search was conducted early in the breeding season (i.e., from January 29 to February 1, 2018) to determine occupancy. Two biologists conducted ground-based observations from vehicles and on foot, spending 1 day at each reservoir and corresponding dam. Surveys included observing historical nests and recording all eagle detections. For this early-breeding season survey, the survey area included all known golden eagle nests within 10 miles of the limits of work, and bald eagle nests within 2 miles. Survey distances were established in coordination with USFWS.

    b. Two teams of two biologists conducted a second survey from June 4 to 7, 2018, to observe eagle behavior and mid-season nesting activity, and to determine the number of active nests and nestlings in the survey area. One team conducted ground-based surveys, spending 1 day at each reservoir. The second team conducted aerial helicopter surveys for 2 days, covering all reservoirs, and a ground-based survey for 1 day. All historical and newly discovered nests and locations where eagle pairs or territorial behavior had been previously observed were revisited from the ground and helicopter.

2. To identify adult and sub-adult habitat use, one additional survey was conducted from August 20 to 22, 2018, after the young had fledged. Three teams of two biologists each conducted ground-based surveys.

4.3 Findings

Observations of bald and golden eagles are summarized in Table 4-1. Results are summarized by location, date, species, and age. The status of each nest site observed is summarized in Table 4-2, including the proximity of the nest to the Project area and noting whether the nest was determined to be active or inactive in 2018. The number of nestlings observed at active nests is summarized in Table 4-3 by species. Observations and behavioral notes not captured in the tables are noted in the following sections.

Reconnaissance Surveys 2017

- During the July 2017 survey, biologists located three of the four known nests within a 0.5-mile radius of the Project area (nests BE1-36, BE1-31, and BE1-32). Biologists observed one sub-adult bald eagle near nest BE1-36. This nest was presumed active for this year because substantial whitewash and prey remains (fish bones) were found under the nest. The other two nests did not exhibit conspicuous indications of activity; no whitewash, prey remains, or sub-adults were observed.
- During the November 2017 survey, biologists located one golden eagle nest and three bald eagle nests. Bald eagle nest BE1-36 contained abundant whitewash and there were prey remains at the nest site. The other two nests (BE1-31 and BE1-32) did not have signs of recent activity but were in good structural condition. The assumed golden eagle nest (GE4-206) was notably small and did not appear to be recently active. Biologists observed two nests that were not included in historical data and had the potential to be active eagle nests. Biologists attempted to view 14 historic nests that were either inaccessible or were not found.

January – February 2018

Eagle Activity

- Observers recorded approximately 50 eagles, including 30 bald eagles and 20 golden eagles; however, some may have been resightings of the same individuals. Both species of eagles appeared to prefer certain perches, and surveyors noted the use of these same perches during different survey times and dates.
- Common bald eagle behavior included:
  - perching on trees and utility poles close to and within sight of the reservoirs, with several adult bald eagle pairs perched together;.
  - soaring on thermals with other bald eagles and golden eagles, usually near the reservoirs but also over the Klamath River;
  - foraging in Iron Gate Reservoir; and
  - vocalizing from a perch at Copco Lake.

Table 4-1: Total Number of Eagle Observations by Site,[1] Survey, Species, and Age

Iron Gate Reservoir						
Survey Date	**Golden Eagle Adults**	**Golden Eagle Sub-Adults**	**Golden Eagle Young of the Year**	**Bald Eagle Adults**	**Bald Eagle Sub-Adults**	**Bald Eagle Young of the Year**
July 2017	0	0	0	0	0	0
November 2017	0	0	0	0	0	0
January – February 2018[2]	12	0	0	6	1	0
June 2018	8	0	2	18	5	0
August 2018	0	0	0	2	0	0
Total	**20**	**0**	**2**	**26**	**6**	**0**
Copco Lake						
Survey Date	**Golden Eagle Adults**	**Golden Eagle Sub-Adults**	**Golden Eagle Young of the Year**	**Bald Eagle Adults**	**Bald Eagle Sub-Adults**	**Bald Eagle Young of the Year**
July 2017	0	0	0	0	0	0
November 2017	1	0	0	1	2	0
January – February 2018[2]	8	0	0	6	10	0
June 2018	10	2	3	4	2	2
August 2018	0	0	4	5	0	1
Total	**19**	**2**	**7**	**16**	**13**	**3**
J.C. Boyle Reservoir						
Survey Date	**Golden Eagle Adults**	**Golden Eagle Sub-Adults**	**Golden Eagle Young of the Year**	**Bald Eagle Adults**	**Bald Eagle Sub-Adults**	**Bald Eagle Young of the Year**
July 2017	0	0	0	0	1	0
November 2017	1[3]	0	0	0	1	0
January – February 2018[2]	0	0	0	6	1	0
June 2018	1	0	1	6	2	5
August 2018	2	1	0	3	1	0
Total	4	1	1	15	6	5

Notes:

1 The number of eagles observed is influenced by the visibility at each site and should not be interpreted as relative abundance across sites. Visibility at J.C. Boyle Reservoir is poorer than at Copco Lake and Iron Gate Reservoir.

2 The number of eagles detected during the winter survey period is likely to include wintering and migratory individuals.

3 Species identification unconfirmed.

Table 4-2: Active and Inactive Bald and Golden Eagle Nests Observed in 2018 Field Surveys

Nest Name	Golden Eagle		Bald Eagle		Bald or Golden Eagle – Species not Confirmed
Nest Status in 2018	Active	Inactive	Active	Inactive	Inactive
Within 0.5 mile of Project area	1	0	1	3	2
Between 0.5 and 2 miles from Project area	2	3	0	3	0
Total Nests within 2 Miles	**3**	**3**	**1**	**6**	**2**
Outside of 2-mile buffer surrounding Project area, but within 0.5 mile of haul roads	2	0	3	0	0

Table 4-3: Number of Nestlings Observed at Each Active Nest in 2018

Nest Name	Golden Eagle Nestlings	Bald Eagle Nestlings
BE1-32	–	2
BE1-15	–	1
GE4-206	1	–
BE1-43	–	2
F_GE3	2	–
GE3-3	1	–
GE3-5	2	–
F_GE4	2	–
F_BE2 (outside of survey area)	–	2
Total Number of Nestlings	**8**	**7**

Notes:
BE = Bald eagle nest
GE = Golden eagle nest
F_GE = New golden eagle nest found during these 2017 – 2018 surveys, not included in historically active data
F_BE = New bald eagle nest found during these 2017 – 2018 surveys, not included in historically active data

- Golden eagle activity included:
  - perching on trees and cliffs that were not typically near or within sight of the reservoirs;
  - foraging on the ground;
  - soaring on thermals with other eagles;
  - flying in pairs; and
  - performing undulating flight behavior (i.e., breeding behavior).
- Biologists identified three potential golden eagle territories around Iron Gate Reservoir, one of which was in the 0.5-mile high-impact area. Territories were identified by observations of high levels of

golden eagle activity and/or undulating flight behavior, and observations of birds perching for long periods. At Iron Gate Reservoir, field teams identified two potential bald eagle territories, where they observed pairs of bald eagles perched. At Copco Lake, biologists identified two potential golden and bald eagle territories, based on high golden and bald eagle activity.

- Although biologists observed substantial eagle activity during the early 2018 surveys, it is difficult to determine how many of the observed birds represented resident birds, due to the potential presence of wintering and migratory birds.
- At J.C. Boyle Reservoir, there was notably less eagle activity observed than at the other two sites; however, this may have been due to low visibility at J.C. Boyle Reservoir, due to the high density of trees and limited road access. Biologists were unable to define areas of high eagle activity at J.C. Boyle Reservoir during the survey period.

Eagle Nests

- Biologists were unable to access 26 historically active nests due to poor visibility resulting from dense tree cover, limited access through private property, or poor road conditions. Observers were able to survey the area around 15 other historical nests, including six historically active nests. The conditions of the nests varied. Some appeared old and unused, while others appeared to have been recently active.
- At J.C. Boyle Reservoir, biologists found a pair of bald eagle adults less than 100 feet from the known nest BE1-15, which was visibly in good condition. Field teams found a sub-adult bald eagle perched near what was likely an active nest, BE1-36 (based on July 2017 survey information). In a few cases where a nest was likely active and could not be observed from a distance, biologists did not approach the nest, so as not to disturb the eagles. This occurred often at J.C. Boyle due to low visibility and dense tree cover. Figures 6-1 through 6-7 present the eagle nest survey results for the 2018 survey season.

June 2018

Eagle Activity

- With the exception of nestlings, some of the observations noted in Table 4-1 may have been resightings of the same eagle.
- Observed eagle activities were similar to those described above. More golden eagles were observed in the vicinity of the reservoirs during this survey than during previous surveys. Golden eagles also exhibited territorial behavior toward bald eagles and were observed vocalizing.
- Bald eagles exhibited territorial behavior toward other eagles and raptors. Most bald eagle observations were close to the reservoirs; however, there were some observations near the Klamath River or over ridgelines.

Eagle Nests

- At J.C. Boyle Reservoir, biologists observed three bald eagle nests and one golden eagle nest, with one to two chicks observed per nest. At both Copco Lake and Iron Gate Reservoir, biologists observed three active golden eagle nests, with one to two nestlings per nest.

- Biologists estimated golden eagle nestlings to be 5 to 8 weeks old, and bald eagle nestlings to be 8 to 11 weeks old at the time of the survey. Biologists often observed adults perched or flying near these nests and occasionally visiting the nests to feed nestlings. Field teams also found several inactive nests, as well as many potential alternate nests. One of the active golden eagle nests identified was not previously recorded as an active nest. Additionally, there were several historically active nests that no longer exist. This may be a result of the nest being abandoned, the nest structure falling, the tree or surrounding forest being disturbed or logged, or the effects of a wildfire.

August 2018

Due to several fires in the surrounding areas, conditions during the August 2018 surveys were smoky, and visibility became especially poor in the afternoon, making long-distance observations difficult.

Eagle Activity

- Biologists observed two young-of-the-year golden eagles flying over a nest that was classified as active during the June 2018 surveys (F_GE3). Additionally, field teams observed two young-of-the-year golden eagles flying over a new nest that was not found during previous surveys (F_GE4). This suggests that young-of-the-year golden eagles stayed near their territories following fledging for at least a few weeks and can be detected by post-fledging surveys.

- Biologists did not observe any young-of-the-year bald eagles near their nest territories during these surveys; however, one young-of-the-year bald eagle was observed begging food from an adult bald eagle, indicating that young-of-the-year bald eagles and their parents had moved farther from their nest territories to forage elsewhere at the time of the August 2018 surveys.

Eagle Nests

- Golden eagle nest (F_GE4) was located on a cliff face that was surveyed by helicopter in June 2018. The nest was apparently missed at that time, although an adult golden eagle was observed nearby. The nest structure was found during the ground-based survey in August 2018, and there were two fledged eaglets in close proximity.

4.4 Conclusions

Biologists observed a total of nine active nests surrounding Copco Lake, Iron Gate Reservoir, and J.C. Boyle Reservoir in 2018 (Table 4-2). Five of these were golden eagle nests and four were bald eagle nests. Of the nine active nests, seven were within 0.5 mile of the Project area or more than 2 miles from the Project area

but within 0.5 mile of a haul road (high-impact areas), and two were between 0.5 mile and 2 miles from the Project area (low-impact area).

Additionally, biologists observed a total of nine inactive nests within 2 miles of the Project area (Table 4-2). It is not uncommon for eagles to suspend breeding in some years or use alternative nest sites (USFWS 2004); therefore, these inactive nests will continue to be surveyed in 2019.

Project activities (e.g., site preparation) are scheduled to begin in early 2020. Biologists will conduct three bald and golden eagle surveys in 2019 to determine nest occupancy, and to gather more information on baseline eagle activity immediately prior to construction. If the start of construction is delayed, this field schedule will be reevaluated.

Similar to the field surveys conducted in 2018, a synthesized field survey to encompass bald and golden eagle nesting habitat will include:

1. One courtship/early-breeding season survey between late January and late February. Biologists will conduct ground-based surveys on foot and in vehicles when eagles are most likely to be found near nest sites and displaying courtship behavior, to determine territory occupancy.

2. One mid-nesting season survey will be conducted between late April and early May. Biologists will conduct ground-based surveys on foot and in vehicles, and aerial surveys from a helicopter. This survey will be conducted at a time when the number and age of nestlings at each active nest, as determined from previous surveys, can be estimated.

3. One late-nesting season survey will be conducted between late June and early July. Biologists will conduct ground-based surveys on foot and in vehicles, and aerial surveys from a helicopter. This survey will be conducted at a time when the number of fledglings can be estimated, and behavior and habitat use following fledging can be observed.

Chapter 5 Bats

5. BATS

Based on a review of California and Oregon occurrence records, presence of suitable habitat, species range overlap, and previous survey results, eight bat species have potential to occur in the Project area. Yuma myotis have been previously documented at structures in the Project area (PacifiCorp 2004). Townsend's big-eared bat and Yuma myotis have been previously documented in the Klamath Basin outside of the Project area, in maternity roosts at Hoover Ranch and Salt Caves (approximately 6 miles east of Copco Lake and 9 miles downstream from the J.C. Boyle powerhouse) (Cross et al. 1998; PacifiCorp 2004).

Oregon and California state regulations provide protection for bats through general wildlife protection policies. TER-6 of the 2012 EIS/EIR (USBR and CDFW 2012) describes measures to reduce Project impacts on bats. The 2012 EIS/EIR recommended surveys to identify the locations of active bat roosts in facilities that may be affected by the dam removal. KRRC has incorporated this measure into the Project. Structures with the potential to support bats include all built structures in the Project area, bridges, and diversion tunnels. All of these features were included in the surveys.

5.1 Methods

The KRRC biologists conducted surveys for all bat species with potential to occur at Project structures. The objectives of the surveys were to identify which species occupy the habitat throughout the year, understand how the habitat is used throughout the year, and quantify habitat usage. A reconnaissance-level assessment was conducted from July 24 to 26, 2017. The KRRC planned a follow-up visit during the 2017 maternity season to conduct emergence surveys, but the survey was canceled due to lack of right-of-entry to PacifiCorp property for the specific survey task.

Biologists conducted four focused, seasonal bat surveys in 2018: one in late winter, two in summer, and one in fall. The 2018 seasonal bat roost surveys assessed habitat suitability and determined roosting activity at Project structures. Additionally, a biologist accompanied interior inspections of the Iron Gate and Copco diversion tunnels in February 2018.

During all surveys, KRRC biologists conducted daytime visual inspections of the interior and exterior of each facility proposed for removal or modification for indications of bat use (e.g., occupancy, guano, staining, smells, or sounds). Dead specimens were identified in the field using a dichotomous key. When live bats were found, species were identified visually to the extent possible, using night vision when needed to minimize disturbance. All surveys were conducted cautiously to avoid disturbing bats at potential roost sites. Because interior access to human-occupied houses was prohibited, those structures were assessed from the exterior only.

5.1.1 Winter 2018

On February 13 and 14, 2018, a KRRC biologist participated in inspections inside the Iron Gate and Copco diversion tunnels to assess the interior habitat features. Both tunnels were accessed by a small inflatable boat, and inspections were attended by one engineer and one safety/confined space entry specialist, in addition to the KRRC biologist.

On March 1, 2018, two KRRC biologists conducted interior and exterior inspections of structures at Copco No. 1 and Copco No. 2. These winter bat surveys were originally planned for late January/early February but were delayed and were ultimately limited to the Copco No. 1 and Copco No. 2 dams due to access constraints. Care was taken to target areas where guano and staining had been seen during the 2017 survey and to minimize the potential for disturbance of hibernating bats.

5.1.2 Summer 2018

A team of three KRRC biologists conducted surveys from May 14 through 18, 2018, and a team of four biologists conducted surveys from June 16 through 22, 2018. In addition to interior/exterior inspections, summer efforts included dusk emergence surveys and acoustic detection at structures known to house roosting bats, and at structures where suitable roosting habitat or sign was found but occupancy was uncertain based on previous surveys. Night vision was used during all emergence surveys, and an infrared camera was used to capture images of an emergence at the Copco No. 1 C-12 gatehouse. Points of egress were documented during all emergence surveys. Two iPads (Apple, Inc.) running Echo Meter Touch 2 Pro (Wildlife Acoustics) and one Dell laptop running Sonobat software (Version 4) with a Binary Acoustics ultrasonic microphone (Binary Acoustic Technology, LLC) were deployed during all emergence surveys. Field teams conducted emergence surveys when weather conditions were suitable for the evening emergence of bats (e.g., warm temperatures and minimal rain and wind).

In May, biologists placed drop cloths around significant roost locations and inspected them during the June visits to passively assess bat activity levels. Field teams installed long-term temperature and humidity data loggers in structures with significant roosts. Biologists discussed maintenance routines, bat observations, and previous bat management techniques with PacifiCorp staff. Bridges in the Project area that are scheduled for removal or modification were also inspected.

5.1.3 Fall 2018

Two KRRC biologists conducted surveys from October 29 through November 1, 2018, to support the development of the Project Bat Management Plan (currently in draft). The team inspected the interior and exterior of all buildings being used by bats, and other structures that may be removed and that provide suitable roosting habitat (such as buildings that contain suitable crevices and cavities without evidence of recent bat use, bridges, and trees). Previously installed temperature data loggers were checked for maintenance and continued operation. Detailed photographs and notes were taken at each structure to document specific locations for exclusion, and to record other structural characteristics such as roofing and other building construction materials.

5.2 Findings

Bat survey findings are summarized in Table 5-1. Summaries of the results from the winter, summer, and fall 2018 surveys follow the table. Bat roosts were confirmed in ten buildings at Copco No. 1 and Copco No. 2, the diversion tunnel at Copco No. 1, three buildings and the diversion tunnel at Iron Gate, and one building at J.C. Boyle (Figures 7-1 through 7-5). Photographs 5-1 through 5-5 depict the exterior view of some of the structures with large roosts. Photographs 5-6 and 5-7 show the interior conditions of the diversion tunnels.

Table 5-1: 2017-2018 Bat Findings

Building Name	Suitability[1]	Evidence of Bat Use?	Live Bats Present?	Species Confirmed	Survey Dates	Additional Notes
Copco No. 1 and Copco No. 2						
Vacant House 1 (tan)	high	Yes	Yes – small numbers of bats present under exterior side panels in summer. Absent in fall and winter.	MYYU (visual, acoustic)	July 2017, February 2018, May and June 2018, October through November 2018	None
Vacant House 2 (blue)	high	Yes	Yes – small numbers of bats present under exterior side panels in summer. Absent in fall and winter.	MYYU (visual, acoustic)	July 2017, February 2018, May and June 2018, October through November 2018	None
Vacant House 3 (yellow-green)[2]	high	Yes	Yes – large colony in garage behind wood window framing and under rotting wood panels. Present in summer. Absent in fall and winter.	MYYU (visual, acoustic)	July 2017, February 2018, May and June 2018, October through November 2018	None
Vacant House 4 (peach)	high	Yes	Yes – present between flashing and fascia board all around roof edge in summer. Absent in fall and winter.	MYYU (visual, acoustic)	July 2017, February 2018, May and June 2018, October through November 2018	None
Vacant House #21601 (light yellow)[2]	high	Yes	Yes – 200 to 300 bats roosting in attic in summer. Absent in fall and winter.	MYYU (visual, acoustic)	July 2017, February 2018, May and June 2018, October through November 2018	Temperature/humidity data logger installed.
C-11 Gatehouse (at Copco No. 1)	high	Yes	About 20 Myotis clustered in exposed roof apex (interior) in fall. Not found in summer. Not surveyed in winter.	MYYU (visual)	July 2017, June 2018, October through November 2018	None

Building Name	Suitability[1]	Evidence of Bat Use?	Live Bats Present?	Species Confirmed	Survey Dates	Additional Notes
C-12 Gatehouse (at Copco No. 1)[2]	high	Yes	Yes – 2,000 to 3,000 bats present in summer. Several dozen present in fall. Not surveyed in winter.	MYYU (visual, acoustic)	July 2017, June 2018, October through November 2018	Temperature/humidity data logger installed. Infrared images of emergence.
Copco No. 1 powerhouse	high	Yes	Yes – several dozen bats clustered on walls in transformer bays and small numbers in lower level in summer. Absent in fall and winter.	MYYU (visual, acoustic)	July 2017, February 2018, June 2018, October through November 2018	Abundant staining/guano on lower level but no large roosts found. Small number of COTO detected acoustically during summer emergence, but not confirmed to be present in the powerhouse.
Diversion Tunnel Outlet[2]	high	Yes – via emergence only.	Yes – ~100 bats emerged in summer, absent in winter.	MYYU (visual, acoustic)	February 2018 inspection, June 2018 emergence.	Small number of COTO detected acoustically on summer emergence, but not confirmed to be present inside tunnel. Highly suitable habitat.
Copco No. 2 powerhouse	high	Yes	Yes – not found during interior inspections, but confirmed summer use by evening emergence of ~50 bats.	MYYU (visual, acoustic)	July 2017, February 2018, June 2018, October through November 2018	Six dead Myotis adults and pups found on ground level and lower level in summer. Small number of COTO detected acoustically during summer emergence, but not confirmed to be present in the powerhouse.
House 19038 (next to schoolhouse)	high	Yes – abundant guano in garage.	No	NA	July 2017, February 2018, June 2018, October through November 2018	Potential entry points noted.
Maintenance Building (next to switchyard)	high	Yes – guano and staining in garage.	No	NA	July 2017, June 2018, October through November 2018	Potential entry points noted.

Building Name	Suitability[1]	Evidence of Bat Use?	Live Bats Present?	Species Confirmed	Survey Dates	Additional Notes
Bunkhouse	mod	No	No	NA	July 2017, February 2018, June 2018, October through November 2018	Potential entry points noted.
Cookhouse	mod	Yes	Yes – small number of bats present in awning over side door outside in summer. Absent in fall and winter.	MYYU (visual)	July 2017, February 2018, May and June 2018, October through November 2018	No signs of interior use. Potential entry points noted.
Vacant House (light blue) on Access Road	mod	No	No	NA	July 2017	None
Occupied House next to Vacant House 4	mod	Unknown	Unknown	NA	July 2017 exterior only.	No interior survey access to occupied residences. Resident stated he is not aware of any bats in the attic.
Schoolhouse	low-mod	No	No	NA	July 2017	None
Haz Waste Storage/Wood Shop	low-mod	No	No	NA	July 2017, February 2018, June 2018	None
Groundwater Well House (at entrance to Copco Village)	low-mod	No	No	NA	July 2017, October through November 2018	Small amount of guano on roof indicates bat use of rock crevices above/behind the structure.
Maintenance Building (next to Copco No. 2 powerhouse)	low	No	No	NA	July 2017, June 2018	None
Equipment Shed (in front of bunkhouse/cookhouse)	low	No	No	NA	July 2017, February 2018, June 2018	None
Copco No. 2 Dam (concrete dam and associated structures)	low	No	No	NA	July 2017	None

Building Name	Suitability[1]	Evidence of Bat Use?	Live Bats Present?	Species Confirmed	Survey Dates	Additional Notes
Tin Pumphouse (across from light blue house on Access Road)	low	No	No	NA	July 2017	None
Control Center at Copco No. 2 powerhouse	low	No	No	NA	July 2017, February 2018, June 2018	None
Iron Gate						
Diversion Tunnel Outlet[2]	high	Yes – via summer evening emergence only.	Yes – several hundred bats emerged during May and June 2018 surveys. Absent in winter.	MYYU (visual, acoustic)	February 2018 inspection, May 2018 emergence, June 2018 emergence	Small number of COTO detected acoustically on summer emergence, but not confirmed to be roosting inside tunnel. Highly suitable habitat.
Penstock Intake Structure[2]	high	Yes	Yes – several hundred bats roosting inside at top of structure in summer. Absent in fall.	MYYU (visual, acoustic)	July 2017, June 2018, October through November 2018	Temperature/humidity data logger installed.
Communication Building/ Powerhouse	high	Yes	Yes – several hundred bats emerged from concrete shaft in lower portion of powerhouse in summer. Heavy guano/staining.	MYYU (visual, acoustic)	July 2017, May and June 2018, October through November 2018	Temperature/humidity data logger installed. Lowest, subterranean level of powerhouse not accessed due to confined space entry restriction.
Barn/Garage at Iron Gate Village	high	Yes	Yes – bats present in rafters/ ceiling in summer, abundant guano. Absent in fall.	MYYU (visual, acoustic)	July 2017, May and June 2018, October through November 2018	Temperature/humidity data logger installed.
Residence 1 (occupied) blue/gray	mod-high (attic)	Unknown	Unknown	NA	June 2017 exterior only	No interior survey access to occupied residences.
Residence 2 (occupied) tan with green roof	mod-high (attic)	Yes	Yes – ~15 bats huddled behind clock on back porch. Potential attic access through loose screen over vent.	MYYU (visual, acoustic)	July 2017 exterior only	No interior survey access to occupied residences.

Building Name	Suitability[1]	Evidence of Bat Use?	Live Bats Present?	Species Confirmed	Survey Dates	Additional Notes
Fish Holding Facilities	mod	No	No	NA	July 2017, June 2018, October through November 2018	None
Diversion Tunnel Gate Structure	mod	No	No	NA	July 2017, June 2018, October through November 2018	None
Restrooms (near powerhouse)	low-mod	No	No	NA	July 2017, June 2018	None
Emergency Spill Equipment shed	low	No	No	NA	July 2018	None
J.C. Boyle						
Spillway Control Center[2]	high	Yes	Yes – several hundred bats present in summer. Absent in fall.	MYYU (visual)	July 2017, May and June 2018, October through November 2018	Temperature/humidity data logger installed.
Office/Red Barn	high	Yes – abundant guano in attic.	No	MYYU (visual – dead specimen)	July 2017, May and June 2018, October through November 2018	Found two dead Myotis sp. adults inside the attic – desiccated.
Fish Screen House	mod-high	No	No	NA	July 2017, June 2018, October through November 2018	None
Fire Protection Building	mod	Yes	Yes – outside only, a few bats in exterior crevice near roof edges (western side and eastern side) in summer. Absent in fall.	MYYU (visual)	July 2017, June 2018, October through November 2018	

Building Name	Suitability[1]	Evidence of Bat Use?	Live Bats Present?	Species Confirmed	Survey Dates	Additional Notes
Dam Communications	mod	No	No	NA	July 2017, June 2018, October through November 2018	None
J.C. Boyle powerhouse	mod	No	No	NA	July 2017, June 2018, October through November 2018	None
Maintenance Building (next to powerhouse)	low-mod	No	No	NA	July 2017, June 2018, October through November 2018	None
Truck Shop	low-mod	No	No	NA	July 2017, May 2018 and June 2018, October through November 2018	Maintenance staff have found a few dead bats inside over the years, but no roosting. No sign found inside. Multiple potential access points along roof at the covered parking area.
Headgate Control	low-mod	No	No	NA	July 2017, June 2018	None
Gate Control and Communications	low-mod	No	No	NA	July 2017, October through November 2018	None
Power Canal/Spillway	low	No	No	NA	July 2017, June 2018	None
HazMat Storage Shed	low	No	No	NA	July 2017	None
Pump House	low	No	No	NA	July 2017	None
Two occupied residences	Unknown	Unknown	Unknown	NA	NA	No interior survey access to occupied residences.

Building Name	Suitability[1]	Evidence of Bat Use?	Live Bats Present?	Species Confirmed	Survey Dates	Additional Notes

Notes:

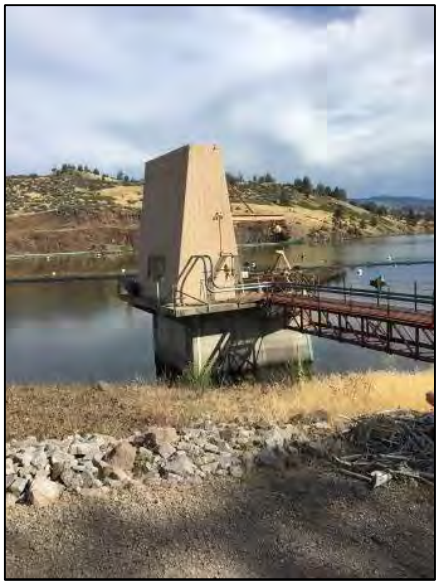
1 "High" suitability was assigned to structures with bats present and/or where signs of heavy bat use were found, or to structures that showed little or no sign of use or could not be accessed but contain external or internal features generally preferred by roosting bats, such as attics/roof spaces, soffits, fascias, weather boarding, spaces between roof felt/membrane and tiles/slates, window frames, cave/cavity walls, flashing, and the like. "Moderate" suitability was assigned to structures where no bats or very few bats were found, with little or no sign of bat use, that contain points of entry/exit and limited internal and external features preferred by roosting bats. "Low" suitability for roosting was assigned to well-sealed structures with no points of entry/exit, and generally lacking cavities, crevices, and other features generally preferred by roosting bats.

2 Photograph included in report

NA = Not Applicable
MYYU = Myotis yumanensis (Yuma myotis)
COTO = Corynorhinus townsendii (Townsend's big-eared bat)

Photograph 5-1: Garage of Vacant House 3, Copco Village

Photograph 5-2: Vacant House #21601, Copco Access Road



Photograph 5-3: Penstock Intake, Iron Gate

Photograph 5-4: Spillway Control Center, J.C. Boyle

Photograph 5-5: C-12 Gatehouse, Copco No. 1

Although there is potential for other bat species to be present, the only species confirmed to be roosting in structures were Yuma myotis (Myotis yumanensis) (Table 5-1). The Lakeview Road Bridge at Iron Gate contains expansion joints that indicate bat use, and emergence surveys at this bridge are planned for summer 2019. The KRRC biologists did not detect any roosting bats or signs of bat use at any other Project bridges where removal or modifications are planned.

5.2.1 Winter 2018

On February 13, 2018, conditions were sunny and clear. Air temperatures outside the Iron Gate tunnel were 48 degrees Fahrenheit (°F) at 12:50 P.M. Inside the tunnel, temperatures were 67°F at the entrance (1:35 P.M.) and 52°F at the terminus (1:51 P.M.). Most of the Iron Gate tunnel is rock, except for the entrance and just before the closure gate, where it is lined with reinforced concrete (25 feet at the entrance and 120 feet leading to the closure gate) (Photograph 5-6). Water depths in the tunnel ranged from 2.7 feet to 5.5 feet. The full length of the accessible portion of the tunnel—approximately 500 feet in length from the entrance to the closure gate, of which approximately 354 feet is unlined, exposed rock— was surveyed. Cliff swallow nests were observed just inside the tunnel entrance. Pigeons were present at various locations throughout the tunnel. No bats or signs of bat use were found; however, both the rock- and concrete-lined portions of the tunnel provide interior spaces and/or irregular rock surfaces suitable for use by roosting bats.

Photograph 5-6: Iron Gate Diversion Tunnel Interior Section of Unlined Rock, February 13, 2018

On February 14, 2018, conditions were sunny and clear. Air temperatures outside the Copco tunnel were 41°F at 10:15 A.M. Inside the tunnel, temperatures were 48°F at the entrance (10:20 A.M.) and 44°F at the terminus (10:30 A.M.). The entire length of the Copco tunnel is unlined, exposed rock (~160 feet) (Photograph 5-7). Water depths in the tunnel ranged from 1.1 feet to 3.2 feet. The full length of the accessible portion of the tunnel was surveyed, from the entrance to the closure gate. Cliff swallow nests and a few pigeons were observed in the tunnel. No bats or signs of bat use were found; however, the tunnel provides suitable habitat.

Photograph 5-7: Copco Diversion Tunnel Interior Substrate and Cliff Swallow Nests, February 14, 2018

On March 1, 2018, the midday outdoor temperature was 45°F. No bats were observed in any structures at Copco No. 1 and Copco No. 2, and no new signs of bat activity were found at these sites.

5.2.2 Summer 2018

During the May surveys, the average high daytime outdoor temperature was 74°F. In June, the average high during the day was 83°F. Biologists observed evening emergences of several hundred bats from both the Copco and Iron Gate diversion tunnels and an attic at Copco "Vacant House #21601." More than 2,000 Myotis spp. emerged from the Copco No. 1 C-12 gatehouse, the interior of which had not previously been inspected due to access constraints.

Field teams heard small numbers of Townsend's big-eared bats (Corynorhinus townsendii) during acoustic surveys outside the diversion tunnel outlets and the Copco No. 1 and Copco No. 2 powerhouses; however, it is not certain that these bats came from inside the structures or tunnels. Particularly at the Copco diversion tunnel, access limitations prohibit targeted placement of recording equipment at or near the mouth of the tunnel. Only small numbers of roosting bats have been observed emerging from the Copco powerhouses during summer surveys, despite abundant sign of previous bat use in these structures. Maintenance staff reported that sonic deterrents (Bird-X Transonic Pro) and mothballs and other naphthalene products were used in the past few years in these powerhouses in an attempt to deter bats, but that these efforts were not effective.

5.2.3 Fall 2018

During the week of October 29, 2018, the average high daytime outdoor temperature was 63°F. Bats were only present in two structures: the C-11 and C-12 gatehouses at Copco No. 1. Several dozen bats were counted in the attic at C-12, and about a dozen were seen in the open, at the roof apex inside C-11.

5.3 Conclusions

Significant bat roosts are present in many structures across the Project area. The KRRC biologists will continue coordinating with Project engineers on plans for structure retention, modification, and removal. Sufficient information was collected to provide recommendations for take avoidance, humane exclusion, and compensatory roosting habitat for each structure. The KRRC will provide these site-specific details in a Bat Management Plan. Seasonal surveys in 2019 will focus on structures that will require exclusion, modification, and/or replacement.

The KRRC will develop and finalize a Bat Management Plan in 2019, prior to commencement of any Project activities that could disturb roosting bats. According to the current Project timeline, site preparation is scheduled to begin in early to mid-2020, which will include work in the diversion tunnels. Therefore, humane exclusion in these locations is anticipated to occur in fall-winter 2019. Building removal is currently scheduled to occur after reservoir drawdown, in March 2021. Therefore, exclusion and installation of replacement habitat in these locations is anticipated to occur in 2020.

The KRRC will assess significant roosting habitat outside of buildings as Project activities such as tree removal are further refined. Although no roosting trees have yet been identified, the KRRC will provide general recommendations for removal of potential tree-roosting habitat in the Bat Management Plan. The KRRC will evaluate significant roosting habitat in the vicinity of major Project disturbances for its potential to be affected by noise or vibrations during ongoing survey efforts, or as otherwise dictated by the Project schedule.

Chapter 6 Western Pond Turtle

6. WESTERN POND TURTLE

Western pond turtles are known to occur at Project reservoirs. The United States Geological Survey conducted visual surveys of basking turtles at J.C. Boyle Reservoir in the mid- to late-1990s and recorded turtle use (Wray 2017). The 2001-2003 PacifiCorp surveys also noted the presence of western pond turtles and suitable basking and nesting habitat at Project reservoirs (PacifiCorp 2004), as shown on Figure 8-1 through 8-3.

The western pond turtle is listed on the Oregon Sensitive Species List and is a species of special concern in California. A petition for listing under the federal Endangered Species Act is currently being considered by USFWS, with a decision regarding listing expected by 2021. In light of its special status, the KRRC conducted an evaluation of potential risks to western pond turtles during drawdown when turtles would be hibernating. In coordination with ODFW, CDFW, and USFWS, the KRRC concluded that there is potential for impacts, including mortality, to western pond turtles from the effects of drawdown and other components of the proposed action. Based on this evaluation, it was determined that the following additional investigations were warranted:

- Conduct surveys of Project reservoirs for basking western pond turtles during special-status wildlife surveys. Document turtle observations and map suitable habitat.
- Conduct a mark/recapture survey and tracking study at J.C. Boyle Reservoir to a) estimate the abundance of western pond turtles in the J.C. Boyle Reservoir area and b) obtain data on western pond turtle overwintering locations and behaviors. The methodology for the study was developed in coordination with ODFW, as described further below.

6.1 Methods

6.1.1 Western Pond Turtle Surveys and Habitat

The KRRC biologists noted observations of western pond turtles in the 0.25-mile study area during general wildlife surveys. Biologists recorded the number of turtles, behavior, and other observations. Surveyors observed habitat along reservoir shorelines via boat.

6.1.2 Western Pond Turtle Tracking Study at J.C. Boyle Reservoir

The western pond turtle tracking study was led by the KRRC, with assistance from ODFW biologists. The study was initiated during late summer, when turtles would have finished breeding but would still be active prior to the hibernation season. In coordination with ODFW, two primary objectives were identified:

1. Capture enough western pond turtles (30+) for a mark-recapture study, to produce a population estimate for the J.C. Boyle Reservoir.

2. Capture 14 western pond turtles (8 females and 6 males) and attach radio transmitters and temperature data loggers to them for a telemetry tracking study. The purpose of the telemetry study was to determine the timing and locations of western pond turtle overwintering in the J.C. Boyle Reservoir.

Field teams conducted initial trapping in August 2018, with an additional capture effort conducted in September 2018.

Trap locations are shown on Figures 9-1 and 9-2. During the August trapping event (August 6 through 12, 2018), field teams focused trapping in areas of J.C. Boyle Reservoir where turtles had been observed in the greatest numbers during previous visual surveys, including those conducted by the KRRC biologists in 2018 and historical PacifiCorp surveys (PacifiCorp 2004). This included along the western shore of the reservoir, north of the Highway 66 bridge (referred to as the "west" site, as shown on Figure 9-2); and the southeastern cove near Topsy Campground and the southwestern cove behind the floating log barrier immediately upstream of the dam (referred to together as the "south" site, as shown on Figure 9-1). During the September trapping event (September 4 through 7, 2018), field teams also deployed traps in other areas around the reservoir, including the western and eastern shores south of the bridge, the northernmost shore of the reservoir, and the mouth of Spencer Creek.

The August trapping event consisted of six nights of trapping. Field teams deployed traps in the south or west sites on alternating nights. On the first night of trapping (August 6, 2018), field teams deployed 12 traps in the south site. Due to the low capture rate, teams deployed 20 traps on each subsequent trapping night. Field teams deployed traps in the evenings between approximately 7:00 and 9:00 P.M. and collected them the next morning between approximately 7:30 and 9:30 A.M. Overnight traps were deployed for at least 12 hours each.

Due to the low capture rate, the trapping strategy was altered during the September trapping event to include day trapping, longer trap deployment, and trapping in areas outside the south and west sites. Field teams deployed traps overnight as described above for three nights (September 4 through September 6, 2018), and also deployed traps during the day on September 5 and September 6, 2018. Some of the day traps were deployed around 8:00 A.M. and retrieved in the afternoon approximately 8 hours later; others were left in place, rebaited, and allowed to run another night. In addition, field teams used hand nets to attempt to catch turtles from kayaks and during snorkeling.

The primary trapping method employed commercial opera house-style crab traps baited with canned sardines, diced clams, or cat food. Field teams placed traps near downed trees, snags, and other refugia where turtles tend to forage, and placed traps away from the shore so that terrestrial predators could not easily reach the bait. Field teams also employed hand capture, dip nets, and seine nets as secondary trapping methods. Inflatable kayaks were used to access trap sites around the reservoir.

When caught, turtles were collected in tubs and taken to land for processing in accordance with the methods described in Bury et al. (2012). Processing included recording morphometric data (e.g., size, weight, age, and gender), taking photographs, and making qualitative observations about turtle morphology

and health. Biologists took photographs of each turtle to document size, coloration, growth rings, plastron patterns, and other identifying features. Notches were filed into the marginal shields according to the notching code described by Holland (1994), to provide identifying marks for future studies.

For the telemetry study, biologists affixed suitably sized turtles with a radio transmitter (Holohil Ltd. Model RI-2B, up to 12-month battery life) and temperature logger (Thermochron Model DS1922L). A two-part epoxy was used to affix the transmitter and temperature logger to a suitably sized costal scute toward the back of the turtle. The epoxy was nonexothermic and did not produce heat that could harm the turtle. Application of epoxy to scute sutures (where carapace growth occurs) was avoided. The epoxy was colored black with printer toner to improve camouflage. The epoxy was allowed to dry and harden before releasing the turtle back to the site where it was caught. Field teams confirmed the functionality of the radio transmitter prior to deployment. The transmitter, temperature logger, and epoxy were allowed to make up a maximum of 5 percent of total turtle body weight; smaller turtles were not considered suitable for tracking.

In accordance with the permit restrictions, the KRRC biologists turned over live bycatch of any nonnative, nonfish animals, which included only American bullfrogs (Lithobates catesbeianus), to ODFW for euthanization. Live bycatch of fishes included three nonnative species identified by ODFW staff as goldfish, largemouth bass, and pumpkinseed. On three occasions, small fish were found dead in traps; these all appeared to be the same species and were later identified as goldfish.

To provide environmental baseline temperature data, teams attached temperature data loggers to 250-foot cables which were deployed along a transect in the south and west trapping areas during the August event (Figures 9-1 and 9-2). Along each transect, three temperature loggers were deployed in the upland area in suitable terrestrial overwintering habitat, one data logger was placed on shore, and three were deployed in the reservoir along the weighted cable to provide information about the temperature gradient across potential in-water overwintering habitats.

6.2 Findings

Biologists observed western pond turtles in all three Project reservoirs during the 2018 wildlife surveys in May and June (Figures 8-1 through 8-3). Observations of turtle habitat generally agreed well with historical PacifiCorp turtle habitat mapping.

Western pond turtles were observed in the following numbers at each reservoir:

- Iron Gate Reservoir: 8
- Copco Lake: 42
- J.C. Boyle Reservoir: 46

The KRRC did not conduct formal basking surveys, so these numbers do not represent a population estimate.

During the August 2018 trapping event at J.C. Boyle, field teams deployed 112 traps over the six nights of trapping. Biologists captured a total of five individuals (three at the west site and two at the south site), for a capture rate of 4.5 percent. All turtles were caught within the first three nights of trapping. Traps with each of the three baits (sardines, clams, and cat food) resulted in captures. Attempts to capture turtles via hand capture and seine nets were unsuccessful, mainly due to the abundance of aquatic vegetation on and below the water surface. No turtles were recaptured during this event. Preliminary radio telemetry indicated that the two turtles caught and tagged at the north site had moved south of the bridge (approximately 0.5 river mile from where they were released) over the course of 2 days.

Only four of the five turtles captured during the August event were tagged with radio transmitters and temperature data loggers. One female turtle exhibited signs of an unknown shell disorder; her vertebral scutes were detaching from the carapace. The costal scutes appeared intact, but there was concern that the shell integrity would continue to deteriorate, so the team did not affix a transmitter or temperature logger to this animal.

During the September trapping event, the team deployed an equivalent of 89 traps (i.e., 89 trap deployments lasting 12 hours) over 3 days and nights of trapping. Biologists caught five turtles in traps, four of which were tagged with radio transmitters and temperature loggers. One juvenile turtle caught with a hand net was too small for a radio transmitter.

In summary, biologists outfitted a total of eight western pond turtles with transmitters and temperature loggers during the two 2018 trapping events. Trap locations and successful capture sites are shown on Figures 9-1 and 9-2. Trapping effort details and photographs are provided in Appendix C.

The trapping study did not include a formal visual survey; however, biologists observed western pond turtles throughout the J.C. Boyle Reservoir in numbers comparable to those observed in previous visual surveys. Areas of concentrated turtle use were identified by field teams near the dam and along the western shore north of the Highway 66 bridge. In addition to these areas, biologists observed 5 to 10 turtles in the large southeastern cove, and groups of 3 to 6 turtles in smaller coves around the reservoir. Biologists most commonly observed turtles basking on logs or stumps, or basking aquatically at the water surface.

6.3 Conclusions

Biologists observed western pond turtles in all three Project reservoirs during 2018 wildlife surveys in May and June. Field teams observed the highest number of turtles in the J.C. Boyle Reservoir.

The number of turtles caught during the two trapping events at the J.C. Boyle Reservoir (11 caught in total, eight tagged with tracking equipment) was below the targets set for the telemetry study (14 turtles) and population study (30+ turtles). Possible explanations for the low capture rate include:

- Other prey sources (aquatic snails, tadpoles, small fish, and various invertebrates) were already abundant throughout the reservoir, so turtles were not attracted to the bait. The unusually fast

growth rate and large average size of western pond turtles noted in J.C. Boyle Reservoir indicated a consistently high availability of food sources.

- Successful trapping with baited traps has been widely reported during fall months, but baited traps are generally more successful in the spring. Western pond turtles typically feed less as the summer goes on because they cannot digest food while overwintering. If the J.C. Boyle Reservoir population typically initiates overwintering in late summer, then they would likely have reduced their feeding rates and been less prone to capture in baited traps.

As part of the tracking study, the KRRC biologists are conducting winter field visits to the J.C. Boyle Reservoir to locate radio-tagged turtles. The locations of turtles will be determined to the extent feasible from shore; however, if turtles are found to be overwintering in deeper waters far from shore and more precise locations are desired, a boat may be used. The locations of overwintering radio-tagged turtles will help determine whether western pond turtles at J.C. Boyle Reservoir tend to overwinter on land or in reservoir sediments. If turtles are found overwintering in shallow sediments, the specific locations of those turtles in the reservoir will aid in determining whether they could be affected by erosion and other potential effects during drawdown.

In spring 2019, the KRRC biologists will conduct additional trapping for approximately six nights, to attempt to capture enough turtles to enable a population estimate and to recover data loggers. As with the initial trapping effort, traps will be set by inflatable kayak or by shore to the extent possible. Radio-transmitters will be used to locate the radio-tagged turtles and set traps nearby. If trapping efforts are insufficient to capture enough additional untagged turtles for a population estimate, additional efforts such as snorkeling may be used.

Biologists will also retrieve environmental data loggers measuring ambient air and water temperatures in spring 2019. Thermographs from environmental data loggers will be compared to those carried by turtles, to aid in determining whether turtles are overwintering on land or in water (and potentially at what depth in the water/sediment), and if they remain stationary or are active for part of the winter.

Chapter 7 Special-Status Plants

7. SPECIAL-STATUS PLANTS

Several special-status plant species have been identified as occurring in the Project area. PacifiCorp (2004) documented several special-status plant species during extensive surveys in 2002 and 2003. In addition, the KRRC biologists identified occurrences of special-status plant species through state and federal databases (ORBIC 2017; CNDDB 2018; IPaC 2018); the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (CNPS 2018a); and information obtained from USFWS (Yreka), BLM (Klamath Falls), and USFS (Klamath National Forest).

For the purposes of the surveys, special-status plants were defined to include those species with federal status (federally listed as threatened, endangered, or proposed for listing), state threatened or endangered species, species included in ONHP Lists 1 and 2, and species listed as California Rare Plant Rank 1 and 2. Where BLM and USFS lands occur in the study area, BLM and USFS Sensitive Species are also considered.

The objective of the surveys was to identify any special-status plants that are present 1) in the study area (i.e., within a 0.25-mile buffer around the Project area) and/or 2) in areas such as reservoir shorelines that may be affected by the Project.

7.1 Methods

Based on documented occurrences and the presence of suitable habitat, the KRRC biologists developed a focused list of special-status plant species, as shown in Table 7-1.

Table 7-1: Special-Status Plants with Potential to Occur in or near the Project Area

Species	Status	Habitat	Location of Documented Occurrence(s)	Bloom Time	Survey Effort
Greene's mariposa-lily Calochortus greenei	FSC, BLM, OC, ONHP List 1, CNPS List 1B	Occurs primarily in annual grassland, wedgeleaf ceanothus chaparral, and oak and oak-juniper woodlands	Several locations around Iron Gate Reservoir	May through July	Within the limits of work in suitable habitat
Bristly Sedge Carex comosa	ONHP List 2	Marshes, lake shore, and wet meadows	Eastern shore of J.C. Boyle Reservoir in two locations (east of dam and south of Highway 66); also, west of dam	May through September	Along reservoir margins and within the limits of work in suitable habitat
Mountain Lady's Slipper Cypripedium montanum	ONHP List 4, CNPS List 4	Dry, open conifer forests, more often in moist riparian habitats	J.C. Boyle peaking reach (location details unknown)	March through August	Within the limits of work in suitable habitat

Species	Status	Habitat	Location of Documented Occurrence(s)	Bloom Time	Survey Effort
Gentner's fritillary Fritillaria gentneri	FE, CNPS List 1B	Cismontane woodland, chaparral; mixed hardwood-conifer vegetation dominated by Oregon oak	Habitat present in the reach along Copco Lake and Iron Gate Reservoir; no known locations	Late March to early April; April and May at higher elevations	Within the limits of work in suitable habitat
Bolander's sunflower Helianthus bolanderi	BLM, ONHP List 3	Occurs in yellow pine forest, foothill oak woodland, chaparral, and occasionally in serpentine substrates or wet habitats.	South of Iron Gate Reservoir near proposed disposal site; J.C. Boyle peaking reach (location details unknown)	June through October	Within the limits of work in suitable habitat
Bellinger's meadow-foam Limnanthes floccosa ssp. bellingerana	FSC, BLM, OC, ONHP List 1, CNPS List 1B	High elevation vernal pools in shallow soiled rocky meadows in spots that are at least partially shaded in the spring	J.C. Boyle peaking reach (location details unknown)	April through June	Within the limits of work in suitable habitat
Detling's silverpuffs Microseris laciniata ssp. detlingii	CNPS List 2	Chaparral and grassy openings among Oregon white oak trees	One location on the western side of Iron Gate Reservoir	May through June	Within the limits of work in suitable habitat
Egg Lake monkeyflower Mimulus pygmaeus	FSC, CNPS List 4	Occurs in damp areas or vernally moist conditions in meadows and open woods	East of J.C. Boyle Reservoir in two locations (north of Highway 66 and southeast of dam); west of dam in two locations in damp mudflats; also west of canal near access road in one location	May through August	Along reservoir margins and within the limits of work in suitable habitat
Holzinger's orthotrichum moss Orthotrichum holzingeri	CNPS List 1B.3	Found on vertical calcareous rock surfaces and at the bases of Salix bushes just above rock that is frequently inundated by seasonally high water in dry coniferous forests	Just upstream of Iron Gate Reservoir on Jenny Creek		Where in-stream work could occur at Jenny Creek at bridge
Western yampah Perideridia erythrorhiza	FSC, BLM, OC, ONHP List 1	Occurs in moist prairies, pastureland, seasonally wet meadows, and oak or pine woodlands, often in dark wetland soils and clay depressions	Along three drainages into the western side of J.C. Boyle Reservoir and in two locations west of canal near access road	Mid July through August	Along reservoir margins and within the limits of work in suitable habitat
Howell's yampah (Howell's false caraway) Perideridia howelii	ONHP List 4	Moist meadows, stream banks	One location along the drainage southeast of J.C. Boyle Reservoir; one location along the northern side of Copco Lake north of the road	July and August	Along reservoir margins and within the limits of work in suitable habitat

Species	Status	Habitat	Location of Documented Occurrence(s)	Bloom Time	Survey Effort
Yreka phlox Phlox hirsuta	FE, CE, CNPS List 1B	Open areas on dry serpentine soils, found at elevations ranging from 2,500 to 4,400 feet.	Not known to occur near the limits of work; no suitable ultramafic soils occur within 0.5 mile of the limits of work (NRCS 2017)	March and April	None – suitable soils not present within the limits of work
Strapleaf willow Salix ligulifolia	ONHP List 3	Riverbanks, wetlands, floodplains	One location west of J.C. Boyle Dam in a boulder flood channel in the dam release zone	March through June	Along reservoir margins and within the limits of work in suitable habitat
Fleshy sage Salvia dorrii var. incana	CNPS List 3	Occurs in silty to rocky soils in great basin scrub, pinyon, and juniper woodland	Three locations around Iron Gate Reservoir	May through July	Within the limits of work in suitable habitat
Pendulous bulrush Scirpus pendulus	BLM, ONHP List 2, CNPS List 2	Occurs along streambanks and in wet meadows	One location along Fall Creek	June through August	Along reservoir margins and within the limits of work in suitable habitat
Lemmon's silene lemmonii	ONHP List 3	Open pine woodlands	J.C. Boyle peaking reach to J.C. Boyle Reservoir (location details unknown)	Spring and summer	Within the limits of work in suitable habitat
Western yellow cedar Callitropsis nootkatensis	Petitioned for federal listing, CNPS List 4.3	Wet to moist sites, from the coastal rainforests to rocky ridgetops near the timberline in the mountains	Not documented during PacifiCorp surveys or listed on CNDDB or ORBIC for the Project area; may occur based on information from USFWS Yreka office (May 23, 2017)		Within the limits of work in suitable habitat

Key:

BLM: Bureau of Land Management sensitive species—species that could easily become endangered or extinct
CE: California Endangered
CNDDB: California Natural Diversity Database
CNPS List 1A: California Native Plant Society (CNPS)—presumed extinct in California
CNPS List 1B: rare, threatened, or endangered in California and elsewhere
CNPS List 2: rare, threatened, or endangered in California, but more common elsewhere
CNPS List 3: on the review list—more information needed
CNPS List 4: on the watch list—limited distribution
FE: Federal Endangered
FSC: Federal Species of Concern
OC: Candidate listing by Oregon Department of Agriculture
ONHP List 1: Oregon Natural Heritage Program (ONHP) threatened with extinction or presumed to be extinct throughout their entire range
ONHP List 2: threatened with extirpation or presumed to be extirpated from the State of Oregon
ONHP List 3: more information is needed before status can be determined, but may be threatened or endangered in Oregon or throughout their range
ONHP List 4: of conservation concern but not currently threatened or endangered
ORBIC: Oregon Biodiversity Information Center
USFWS: United States Fish and Wildlife Service

In consideration of the various peak bloom times of the species listed in Table 7-1, the KRRC biologists planned three surveys: early season (April), mid-season (May), and late season (July). The mid-season and part of the late season surveys were conducted in 2018. The early season survey was not conducted, due to

lack of access to PacifiCorp lands. A wildfire in the California portion of the study area in July restricted the late season survey to the J.C. Boyle Reservoir study area.

The KRRC biologists conducted focused surveys for special-status plants in the areas where construction would occur. These focused surveys followed the CDFW "Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Sensitive Natural Communities" (CDFW 2018b). In areas along reservoir shorelines, where changes in hydrology and geomorphology could occur due to the Project, biologists focused surveys on the locations of known and potential occurrences of special-status plants documented during surveys conducted by PacifiCorp (2004) and data obtained from a desktop review of existing databases (CNDDB, ORBIC, and CNPS).

In accordance with the CDFW protocol, detailed floristic surveys conducted in areas where construction would occur entailed identification of every plant taxon observed, to the taxonomic level necessary to determine rarity and listing status. These planned construction areas include proposed disposal sites, staging areas, utility line corridors, facility removal areas, and locations where clearing could occur for road modifications such as road widening, turnouts, equipment and material storage, and bridge replacement or modification. In these areas, biologists walked parallel transects generally spaced 5 to 10 meters apart and recorded plant species observed. Biologists also surveyed reservoir shorelines from a boat, focusing on areas of suitable habitat and locations of known and potential occurrences of special-status plants. Biologists recorded Global Positioning System (GPS) coordinates for all special-status plants found, along with descriptions of habitat conditions and proximity to proposed work activities or other notable features.

7.2 Findings

As shown on Figures 10-1 through 10-3, the KRRC biologists identified seven special-status plant species (including one potential observation) in the study area, as follows:

- Calochortus greenei (Greene's mariposa-lily) was observed in several locations in the vicinity of the Iron Gate Reservoir, including in the footprint of the Iron Gate disposal site. The species was also observed along utility corridors between the Copco No. 1 and Copco No. 2 Dams. A Calochortus species was observed along the southeastern side of Copco Lake in two locations, which will be revisited to confirm species identification in future surveys during the appropriate bloom time. In addition, there is one known historical observation of the species northeast of the staging areas for the Copco No. 1 Dam; however, this area could not be accessed during the 2018 surveys and will be visited in 2019.
- Salvia dorrii var. incana (fleshy sage) was observed in two locations near Iron Gate Reservoir; both locations are in proximity to but outside of the potential disturbance area associated with proposed removal of utility poles.
- A previously documented population of Perideridia erythrorhiza (western yampah) north of the J.C. Boyle Dam was verified. The plants are in a dry meadow and will likely be outside the area of impact from the drawdown of the reservoir.

- Carex comosa (bristly sedge) was observed along the J.C. Boyle Reservoir at the location of a previously documented occurrence. The plants were not in bloom during the survey, so that area will be revisited during future surveys to confirm species identification.

In addition to the species with known potential to occur discussed above, the KRRC botanists observed three other rare plant species in the study area:

- Mirabilis greenei (Greene's four o'clock), CNPS 4.2, was observed in four locations along the northern side of the Klamath River, downstream of the Copco No. 2 Dam.
- Iris longipetala (coast iris), CNPS 4.2, was observed in one location along the northwestern shoreline of the J.C. Boyle Reservoir.
- Lilium washingtonianum ssp. purpurascens (purple-flowered Washington lily), CNPS 4.3, was observed in two locations: near the Fall Creek diversion and along the northern side of Copco Lake.

7.3 Conclusions

The KRRC biologists documented special-status plants in the study area, including some locations near or in the Project area, as shown on Figures 10-1 through 10-3. Additional special-status plant surveys will be conducted in 2019 to complete surveys within the early (April) and the late (July) bloom times. In addition, biologists will visit the locations of unconfirmed sightings during the appropriate bloom times to confirm occurrences of specific species (e.g., Carex comosa). Additional areas insufficiently surveyed during 2018 will be covered, including the proposed Fall Creek hatchery area and bypass river reaches.

Chapter 8 Vegetation Communities

8. VEGETATION COMMUNITIES

The KRRC biologists classified and mapped vegetation communities to identify the location of sensitive natural communities that may be affected by the Project.

8.1 Methods

PacifiCorp mapped existing vegetation cover types/wildlife habitat in a primary study area of 0.25 mile surrounding the reservoirs, facilities, and river reaches (PacifiCorp 2004). The intent of the 2018 vegetation community mapping conducted by the KRRC was to verify the general extent of vegetation communities and classify them to the alliance level in accordance with the Manual of California Vegetation (CNPS 2018b). An alliance is a floristically defined vegetation type identified by its dominant and/or characteristic species.

In June 2018, the KRRC biologists conducted vegetation community mapping in the 0.25-mile study area. During mapping efforts, the KRRC biologists walked the length of proposed construction areas and visually classified the vegetation communities into similar (or dissimilar) groups. The team mapped polygons to delineate each area where vegetation communities and percent cover were internally consistent. In each polygon, the dominant and characteristic plant species were recorded, and the percent cover for the ground, understory, and canopy layers was noted. A list of all identified species was compiled for each polygon. Upon encountering an area with different dominant species and/or percent coverage, a new polygon, denoting a new alliance, was established. Vegetation community and coverage data were then used to classify each area by alliance in accordance with CNPS methods.

8.2 Findings

Biologists recorded 17 alliances in the 0.25-mile study area (Table 8-1). Vegetation communities (as alliances) are depicted on Figures 11-1 through 11-16.

Table 8-1: Vegetation Community Alliances Recorded in the Study Area

Alliance Scientific Name	Alliance Common Name	Lifeform	California Rarity	Global Rarity
Pinus ponderosa	Ponderosa pine forest	Tree	S4	G5
Fraxinus latifolia	Oregon ash groves	Tree	S3.2	G4
Acer macrophyllum	Bigleaf maple forest	Tree	S3	G4
Quercus garryana	Oregon white oak woodland	Tree	S3	G4
Juniperus occidentalis	Western juniper woodland	Tree	S4	G5
Ceanothus cuneatus	Wedgeleaf ceanothus chaparral	Shrub	S4	G4
Cercocarpus montanus	Birchleaf mountain mahogany chaparral	Shrub	S4	G5
Purshia tridentata	Bitterbrush scrub	Shrub	S3	G4
Prunus subcordata	Klamath plum shrubland	Shrub	NA	NA
Prunus virginiana	Chokecherry thicket	Shrub	S2	G4
Salix lucida	Shining willow grove	Tree	S3.2	G4
Salix geyeriana	Geyer willow thicket	Shrub	S2	G4
Salix sp.	Willow thicket	Tree/Shrub	NA	NA
Schoenoplectus acutus	Hardstem bulrush marsh	Herb	S4	G5
Carex sp.	Sedge meadow	Herb	NA	NA
Bromus tectorum – Taeniatherum caput-medusae	Cheatgrass – medusahead grassland	Herb	SNR	GNR
Bromus (diandrus, hordeaceus)	Annual brome grassland	Herb	SNR	GNR

Key

California Rarity/Global Rarity
S1/G1: Statewide/Worldwide <6 viable occurrences and/or <518 hectares
S2/G2: 6 to 20 occurrences and/or 518 to 2,590 hectares
S3/G3: 21 to 100 occurrences and/or 2,590 to 12,950 hectares
S4/G4: >100 occurrences and/or > 12,950 hectares
S5/G5: Demonstrably secure because of its worldwide abundance
SNR – State not reported
GNR –Global not reported
NA – Alliance not identified by CNPS

8.3 Conclusions

CDFW has ranked natural communities according to their rarity in the state of California. Natural Communities with ranks of S1-S3 are considered Sensitive Natural Communities (CDFW 2018c). Biologists identified the following sensitive natural communities in the study area:

- Oregon ash groves
- Bigleaf maple forest
- Oregon white oak woodland

- Bitterbrush scrub
- Chokecherry thicket
- Shining willow grove
- Geyer willow thicket

The KRRC did not conduct wetland surveys or focused delineations during the 2018 field season. Biologists mapped emergent wetlands along the fringes of the reservoirs and riparian habitat primarily associated with streams and drainages that flow into the reservoirs. Additional sensitive vegetation communities may be identified during wetland investigations to be carried out in 2019.

In 2019, the KRRC will delineate wetlands in the Project area in accordance with the 1987 United States Army Corps of Engineers Wetland Delineation Manual and applicable Regional Supplements (i.e., Western Mountains, Valleys, and Coast Region and Arid West). Additionally, the KRRC will use the Oregon Rapid Wetland Assessment Protocol to assess functional values of wetlands, as applicable to areas in Oregon. In addition, the KRRC will conduct additional mapping of wetlands and riparian habitats adjacent to reservoirs and/or associated with streams but outside the direct limits of work.

Chapter 9 Invasive Exotic Vegetation

9. INVASIVE EXOTIC VEGETATION

After a close review of invasive exotic vegetation (IEV) survey findings for the Project area documented by PacifiCorp in 2002-2003 (PacifiCorp 2004), the KRRC determined that surveys reflecting current IEV conditions were required. Information on IEV locations and extent are needed to effectively plan for control of IEV in the Project area, to support restoration success.

9.1 Methods

In 2017 and 2018, KRRC biologists conducted surveys of invasive exotic plant species targeted by federal, state, and county agencies. The timing of these surveys corresponded to when IEV were positively identifiable (by leaf or flower) (Table 9-1). The study area included uplands around the reservoir edges and other areas within the limits of work.

Biologists conducted a partial survey in late fall of 2017, between November 10 and December 8. At that time, 15 to 20 percent of the shoreline at each reservoir was surveyed on foot. A principal survey was conducted between May 19 and June 22, 2018, in a study area that included all areas where construction activities are planned and along reservoir shorelines. Early spring surveys were planned but not executed because access was not granted by PacifiCorp.

The November 2017 surveys were conducted by two biologists, but the 2018 surveys were conducted by three to four biologists at a time. Biologists surveyed approximately 566 acres in total, which included the Project acreage above the water surface (uplands). When feasible, biologists divided into teams of two. A two-person team allowed for a fast, systematic survey of Project shorelines with one biologist walking near the shoreline below riparian vegetation and the second biologist walking in parallel along the upper portion of the bank, closer to the boundary of the Project area. Biologists kept in constant communication to ensure that each invasive species of concern was recorded accurately, and that no data were repeated or skipped.

The KRRC developed a prioritized list of invasive species (Table 9-1) based on historical data and on lists of IEV species with a potential to occur in the Project area derived from data available from the California Department of Food and Agriculture, Oregon Department of Agriculture, California Invasive Plant Council, Klamath and Siskiyou County Departments of Agriculture, and the Klamath National Forest. Biologists logged the presence of high- and medium-priority invasive species (as designated in Table 9-1, last column) with either a point representing an 8-foot-diameter circle for smaller populations, or a polygon representing a larger IEV population. If multiple species were present in the same area, they were all included in the GPS data of either the point or polygon. Because areas of invasive vegetation can serve as seed banks for the Project site, areas of dense invasive coverage outside the limit of work were also recorded. These areas will be used to inform the invasive species removal plan but were not used to calculate the area of IEV coverage.

Table 9-1: Prioritized List of IEV Species

Scientific Name	Common Name	CDFA[1]	ODA[2]	Cal-IPC[3]	Klamath County[4]	Siskiyou County[5]	Klamath NF[6]	# of Agencies[7]	Priority[8]
Chondrilla juncea	skeleton weed	AW	B & T	Moderate	A	CA-A	High	5	High
Centaurea diffusa	diffuse knapweed	AW	B	Moderate	A	CA-A	High	4	High
Centaurea virgata ssp. squar.	squarrose knapweed	NR	A & T	Moderate	A	CA-A	High	4	High
Euphorbia esula	leafy spurge	AW	B & T	NR	B	CA-A	High	4	High
Onopordum acanthium	Scotch thistle	AW	B	High	B	CA-A	High	4	High
Acroptilon repens	Russian knapweed	BW	NR	Moderate	A	CA-A	High	3	High
Carduus acanthoides	plumeless thistle	AW	NR	limited	A	NR	High	3	High
Centaurea stoebe ssp. micr.	spotted knapweed	NR	B	High	B	CA-A	High	3	High
Cytisus scoparius	Scotch broom	BW	B	High	A	CA-C	High	3	High
Lepidium latifolium	perennial pepperweed	BW	B & T	High	B	NR	High	3	High
Lythrum salicaria	purple loosetrife	BW	B	High	A	NR	High	3	High
Carduus nutans	musk thistle	AW	B	Moderate	B	CA-A	High	2	High
Fallopia japonica	Japanese knotweed	BW	NR	Moderate	A	NR	High	2	High
Linaria dalmatica	Dalmatian toadflax	NR	B	Moderate	B	CA-A	High	2	High
Onopordum tauricum	Taurian thistle	AW	A	NR	NR	NR	High	2	High
Sonchus arvensis	field sowthistle	AW	NR	NR	NR	NR	High	2	High
Tamarix parviflora	small flower tamarisk	NR	NR	High	NR	NR	High	2	High
Anchusa officinalis	alkanet	NR	B & T	NR	NR	NR	NR	1	Medium
Bromus madritensis ssp. rubens	foxtail brome	NR	NR	High	NR	NR	NR	1	Medium
Bromus tectorum	cheatgrass	NR	NR	High	NR	NR	NR	1	Medium
Centaurea solstitialis	yellow starthistle	CW	B	High	B	CA-C	Moderate	1	Medium
Cirsium ochrocentrum	Beaumont thistle	AW	NR	NR	NR	NR	NR	1	Medium
Convolvulus arvensis	field bindweed	CW	B & T	NR	NR	NR	NR	1	Medium
Crupina vulgaris	bearded creeper	AW,Q	B	Limited	NR	NR	NR	1	Medium
Dipsacus fullonum	teasel	NR	B	Moderate	A	NR	NR	1	Medium
Elymus caput-medusae	medusahead	CW	B	High	C	NR	NR	1	Medium
Foeniculum vulgare	fennel	NR	NR	Moderate	NR	NR	High	1	Medium

Scientific Name	Common Name	CDFA[1]	ODA[2]	Cal-IPC[3]	Klamath County[4]	Siskiyou County[5]	Klamath NF[6]	# of Agencies[7]	Priority[8]
Halogeton glomeratus	saltlover	AW	B	Moderate	NR	NR	NR	1	Medium
Isatis tinctoria	dyer's woad	BW	B	Moderate	A	CA-B	Moderate	1	Medium
Linaria vulgaris	butter and eggs	NR	B	Moderate	A	NR	NR	1	Medium
Phalaris arundinacea	reed canary grass	NR	B & T	Not Listed	NR	NR	NR	1	Medium
Rubus armeniacus	Himalayan blackberry	NR	B	High	NR	NR	NR	1	Medium
Salvia aethiops	Mediterranean sage	BW	B	Limited	B	NR	High	1	Medium
Tribulus terrestris	puncture vine	CW	B	Limited	B	NR	High	1	Medium
Xanthium spinosum	spiny clotbur	NR	B	None	A	NR	NR	1	Medium
Aegilops cylindrica	goatgrass	BW	B	Watch	NR	NR	NR	0	Low
Avena barbata	slender oat	NR	NR	Moderate	NR	NR	NR	0	Low
Brassica nigra	black mustard	NR	NR	Moderate	NR	NR	NR	0	Low
Bromus diandrus	ripgut grass	NR	NR	Moderate	NR	NR	NR	0	Low
Cirsium arvense	Canada thistle	BW	B	Moderate	B	CA-B	Moderate	0	Low
Cirsium vulgare	bull thistle	NR	B	Moderate	C	CA-C	Low	0	Low
Conium maculatum	poison hemlock	NR	B	Moderate	B	NR	Low	0	Low
Festuca arundinacea	tall fescue	NR	NR	Moderate	NR	NR	NR	0	Low
Hirschfeldia incana	summer mustard	NR	NR	Moderate	NR	NR	NR	0	Low
Hordeum murinum	foxtail barley	NR	NR	Moderate	NR	NR	NR	0	Low
Hypericum perforatum	Klamath weed	CW	B	Limited	B	NR	Low	0	Low
Lepidium draba	hoary cress	BW	NR	Moderate	B	NR	Moderate	0	Low
Leucanthemum vulgare	oxeye daisy	NR	NR	Moderate	NR	NR	NR	0	Low
Marrubium vulgare	white horehound	NR	B	Limited	NR	NR	NR	0	Low
Mentha pulegium	pennyroyal	NR	NR	Moderate	NR	NR	NR	0	Low
Persicaria wallichii	Himalayan knotweed	BW	NR	Watch	NR	NR	NR	0	Low
Rumex acetosella	common sheep sorrel	NR	NR	Moderate	NR	NR	NR	0	Low
Torilis arvensis	field hedge parsley	NR	NR	Moderate	NR	NR	NR	0	Low

Notes: (Lighter cells indicate a high priority to the corresponding agency)

1. CDFA: California Noxious Weed List (CDFA 2018); Ratings descriptions as follows:

"A"	A pest of known economic or environmental detriment and is either not known to be established in California or it is present in a limited distribution that allows for the possibility of eradication or successful containment. If found entering or established in the state, A-rated pests are subject to state (or commissioner when acting as a state agent) enforced action involving eradication, quarantine regulation, containment, rejection, or other holding action.
"B"	A pest of known economic or environmental detriment and, if present in California, it is of limited distribution. At the discretion of the individual county agricultural commissioner they are subject to eradication, containment, suppression, control, or other holding action.
"C"	A pest of known economic or environmental detriment and, if present in California, it is usually widespread. If found in the state, they are subject to regulations designed to retard spread or to suppress at the discretion of the individual county agricultural commissioner. There is no state enforced action other than providing for pest cleanliness.
"Q"	An organism or disorder suspected to be of economic or environmental detriment, but whose status is uncertain because of incomplete identification or inadequate information.
"W"	This notation indicates that a plant is included in the CCR Section 4500 list of California State Noxious Weeds.

2. ODA Noxious Weed Policy and Classification System (ODA 2018). (Equivalent to the Pacific Northwest Invasive Plant Council (PNW-IPC). Ratings descriptions as follows:

A	A weed of known economic importance which occurs in the state in small enough infestations to make eradication or containment possible; or is not known to occur, but its presence in neighboring states make future occurrence in Oregon seem imminent. Recommended action: Infestations are subject to eradication or intensive control when and where found.
B	A weed of economic importance which is regionally abundant, but which may have limited distribution in some counties. Recommended action: Limited to intensive control at the state, county or regional level as determined on a site specific, case-by-case basis. Where implementation of a fully integrated statewide management plan is not feasible, biological control (when available) shall be the primary control method.
T	A designated group of weed species that are selected and will be the focus for prevention and control by the Noxious Weed Control Program. Action against these weeds will receive priority.

3. Cal-IPC. The Cal-IPC Plant Inventory (Cal-IPC 2018). Ratings descriptions as follows:

High	These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment.
Moderate	These species have substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance.
Limited	These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Alert	An Alert is listed on species with High or Moderate impacts that have limited distribution in California, but may have the potential to spread much further.
Watch	These species have been assessed as posing a high risk of becoming invasive in the future in California.

4. KCBC. Noxious Weeds in Klamath County for the year 2019 (KCBC 2019). Ratings descriptions as follows:

A	A weed of known economic importance which occurs in the county in small enough infestations to make eradication/containment possible, or if not known to occur, but its presence in neighboring counties make future occurrence in Klamath County seem imminent.
B	A weed of economic importance which in some parts of the county is abundant but may have limited distribution in other parts of the county. Where implementation of a fully integrated county wide management plan is infeasible, biological control shall be the main control approach.
C	A weed which in most parts of the county is abundant. While not subject to enforcement regulations, these species can cause similar economic and ecological impacts as other noxious weed species. Education and control recommendations will be the main approach.

5. SDA. Identification and Characteristics of Invasive Noxious Weed Infestations. (SDA 2015). Ratings:

A	"A" Rated: A pest of known economic or environmental detriment and is either not known to be established in California or it is present in a limited distribution that allows for the possibility of eradication or successful containment. A-rated pests are prohibited from entering the state. A-rated pests are subject to state (or commissioner) enforced action involving eradication, quarantine regulation, containment, rejection, or other holding action.
B	"B" Rated: A pest of known economic or environmental detriment and it is of limited distribution. Subject to state endorsed holding action and eradication to provide for containment. At the discretion of the individual county agricultural commissioner they are subject to eradication, containment, suppression, control, or other holding action.
C	"C" Rated: A pest of known economic or environmental detriment and is usually widespread. They are subject to regulations designed to retard spread or to suppress at the discretion of the individual county agricultural commissioner. There is no state enforced action other than providing for pest cleanliness.

6. USFS-KNF: KNF Noxious Weed and Non-native Invasive Plant List (USFS 2013). Ratings descriptions as follows:

High	These species are currently either limited in distribution, highly invasive, or not present on the KNF. Treatment may vary by location.
Moderate	These species are generally common and are treated on a case by case basis depending on location (Wilderness and Research Natural Area (RNA) increase the priority for treatment).
Low	These species are either widespread throughout the KNF or are not considered to be highly invasive in our area. Usually not treated unless located in a high priority area, such as Wilderness or RNA.

7. Number of Agencies Considering Plant a High Priority for Eradication

8. IEV Survey and Control Priority

Cal-IPC = California Invasive Plant Council
CDFA = California Department of Food and Agriculture
IEV = Invasive Exotic Vegetation
KCBC = Klamath County Board of Commissioners
KNF = Klamath National Forest
ODA = Oregon Department of Agriculture
SDA = Siskiyou Department of Agriculture
USFS = United States Forest Service

The majority of the study area was accessible by foot, except for the southern end of J.C. Boyle Reservoir and the southeastern side of Iron Gate Reservoir. South of Highway 66, J.C. Boyle Reservoir narrows between two rock face cliffs for approximately 0.75 mile. The majority of the southeastern side of Iron Gate is inaccessible because there are no roads, and steep cliffs border the reservoir. For these areas, biologists surveyed from a boat, landing along the shoreline to walk selected accessible areas. For areas too steep to survey by foot, biologists carefully maneuvered the boat to the shoreline and used a pair of binoculars to identify plants.

Ninety percent of the area surrounding Copco Lake is privately owned; consequently, access from the landside was not permitted in most areas. However, during the summer survey in 2018, the water levels in the reservoir were 10 to 15 feet lower than the high water mark, and the biologists were able to use this extended shoreline area to walk along the reservoir without trespassing on any private land.

9.2 Findings

Tables 9-2, 9-3, and 9-4 list the IEV species found in the areas surrounding the J.C. Boyle Reservoir, Copco Lake, and Iron Gate Reservoir, respectively. The area values were calculated as the area where each species was dominant in the survey area. Percent cover represents the area of the dominant species in the study area, divided by the total area of the study area (excluding the reservoir footprints themselves). Figures 12-1 through 12-26 depict the IEV vegetation communities, based on the dominant species, as shown in the tables. Although the figures show invasive species recorded beyond the Project boundary, only areas of invasive species within the limits of work were used to calculate the extent of each species.

Table 9-2: Invasive Exotic Vegetation Extent in the J.C. Boyle Reservoir Uplands

Scientific Name	Common Name	Area (square feet)	Area (acres)	Percent Cover
Bromus tectorum	cheatgrass	288,780	6.629	4.29%
Dipsacus fullonum	teasel	209,250	4.804	3.11%
Phalaris arundinacea	reed canarygrass	206,210	4.734	3.07%
Elymus caput-medusae	medusa head	190,960	4.384	2.84%
Centaurea solstitialis	yellowstar thistle	61,690	1.416	0.92%
Cirsium vulgare	bull thistle	49,260	1.131	0.73%
Lepidium draba	whitetop	46,510	1.068	0.69%
Mentha pulegium	pennyroyal	17,040	0.391	0.25%
Onopordum acanthium	Scotch thistle	13,620	0.313	0.20%
Rumex acetosella	sheep sorrel	6,370	0.146	0.09%
Convolvulus arvensis	field bindweed	1,670	0.038	0.02%
Linaria dalmatica	Dalmatian toadflax	1,530	0.035	0.02%
Rubus armeniacus	Himalayan blackberry	1,330	0.030	0.02%
Acroptilon repens	Russian knapweed	990	0.023	0.01%
	Total	**1,095,210**	**25.142**	**16.26%**

Table 9-3: Invasive Exotic Vegetation Extent in Copco Lake Uplands

Scientific Name	Common Name	Area (square feet)	Area (acres)	Percent Cover
Centaurea solstitialis	yellowstar thistle	262,320	6.022	4.42%
Elymus caput-medusae	medusa head	237,180	5.445	4.00%
Rubus armeniacus	Himalayan blackberry	234,590	5.385	3.96%
Phalaris arundinacea	reed canarygrass	199,440	4.578	3.36%
Dipsacus fullonum	teasel	91,680	2.105	1.55%
Bromus tectorum	cheatgrass	56,790	1.304	0.96%
Lepidium draba	whitetop	8,010	0.184	0.14%
Mentha pulegium	pennyroyal	6,680	0.153	0.11%
Cirsium vulgare	bull thistle	2,210	0.051	0.04%
Conium maculatum	poison hemlock	1,260	0.029	0.02%
Tribulus terrestris	puncture vine	730	0.017	0.01%
Bromus madritensis ssp. rubens	foxtail chess	240	0.006	0.00%
Carduus nutans	musk thistle	100	0.002	0.00%
	Total	**1,101,230**	**25.281**	**18.57%**

Table 9-4: Invasive Exotic Vegetation Extent in the Iron Gate Reservoir Uplands

Scientific Name	Common Name	Area (square feet)	Area (acres)	Percent Cover
Centaurea solstitialis	yellowstar thistle	4,331,510	99.438	36.13%
Elymus caput-medusae	Medusa head	3,631,210	83.361	30.29%
Dipsacus fullonum	teasel	321,720	7.386	2.68%
Bromus tectorum	cheatgrass	318,740	7.317	2.66%
Rubus armeniacus	Himalayan blackberry	179,260	4.115	1.50%
Convolvulus arvensis	field bindweed	64,500	1.481	0.54%
Phalaris arundinacea	reed canarygrass	43,300	0.994	0.36%
Conium maculatum	poison hemlock	29,730	0.682	0.25%
Xanthium spinosum	spiny cocklebur	16,040	0.368	0.13%
Tribulus terrestris	puncture vine	9,200	0.211	0.08%
Isatis tinctoria	dyers woad	3,230	0.074	0.03%
Lepidium draba	whitetop	2,860	0.066	0.02%
Mentha pulegium	pennyroyal	150	0.003	0.00%
Linaria vulgaris	butter and eggs	50	0.001	0.00%
Cirsium vulgare	bull thistle	50	0.001	0.00%
	Total	**8,951,550**	**205.498**	**74.67%**

9.3 Conclusions

Yellowstar thistle (106.88 acres and 18.89 percent cover of Project uplands) and medusa head (93.19 acres and 16.47 percent cover of Project uplands) were dominant throughout the entire Project area. Cheatgrass, teasel, reed canary grass, and Himalayan blackberry each cover between 9 and 16 acres (i.e., 1 to 3 percent) of the total Project upland area. IEV species present in the upland areas of the Project having less than 2 acres of coverage each include field bindweed, whitetop, bull thistle, poison hemlock, pennyroyal, spiny cocklebur, Scotch thistle, puncture vine, sheep sorrel, dyer's woad, Dalmatian toadflax, Russian knapweed, foxtail chess, musk thistle, and butter and eggs.

At J.C. Boyle Reservoir, the dominant IEV species differ from those identified throughout the rest of the study area. The reason for this may be J.C. Boyle Reservoir's higher elevation, closed canopy forest coverage, and gradual slopes. Cheatgrass, teasel, reed canarygrass, and medusa head make up the dominant species at the J.C. Boyle Reservoir area.

The dominant IEV species at the Copco Lake area are yellowstar thistle, medusa head, and Himalayan blackberry. In comparison to the landscape surrounding the J.C. Boyle Reservoir, uplands surrounding Copco Lake are drier due to their lower elevation, lack of overstory cover, and higher evapotranspiration rate.

The dominant IEV species at the Iron Gate Reservoir are yellowstar thistle, medusa head, and teasel. The upland areas at this reservoir are the driest of all due to their low elevation, openness, and high evapotranspiration rate.

The findings and conclusions of the IEV surveys are being used to inform the Reservoir Area Management Plan, including selecting methods for IEV eradication and control during Project implementation.

Chapter 10 References

10. REFERENCES

Bury, R.B., H.H. Welsh, D.J. Germano, and D.T. Ashton, eds., 2012. Western Pond Turtle: Biology, sampling techniques, inventory and monitoring, conservation, and management. Society for Northwestern Vertebrate Biology. Northwest Fauna 7. Pp. 128.

California Department of Food and Agriculture (CDFA). 2018. California Noxious Weeds. Available at: https://www.cdfa.ca.gov/plant/ipc/encycloweedia/weedinfo/winfo_table-sciname.html.

California Department of Fish and Wildlife (CDFW). 2018a. Approximate Area of Gray Wolf Activity, October 2018. Available at: https://www.wildlife.ca.gov/Conservation/Mammals/Gray-Wolf.

CDFW. 2018b. Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Sensitive Natural Communities. March.

CDFW. 2018c. List of Natural Communities. Available at: https://www.wildlife.ca.gov/data/vegcamp/natural-communities.

California Invasive Plant Council (Cal-IPC). 2018. The Cal-IPC Inventory. Available at: https://www.cal-ipc.org/plants/inventory/.

California Native Plant Society (CNPS). 2018a. Inventory of Rare and Endangered Plants. Available at: http://www.rareplants.cnps.org/.

CNPS. 2018b. Manual of California Vegetation. Available at: http://vegetation.cnps.org/.

California Natural Diversity Database (CNDDB). 2018. Available at: https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data.

Cross, S.P., J. Lauchstedt, and M. Blankenship. 1998. Final Report: Numerical Status of Townsend's Big-Eared Bats at Salt Caves in the Klamath River Canyon and Other Selected Sites in Southern Oregon, 1997. Southern Oregon University. 42 pp.

Hayner, S. 2017. Unpublished Bald and Golden Eagle Nesting Data. Sent from Stephen Hayner, BLM to Jennifer Jones, CDM Smith by email on August 24, 2017.

Hayner, S. 2018. Wildlife Biologist, BLM, Lakeview District. Personal Communication with Kate Stenberg, October 26, 2018.

Holland, D.C. 1994. The western pond turtle: Habitat and history. Final Report DOE/BP-62137 Bonneville Power Administration, U.S. Dept. Energy and Wildlife Diversity Program, Oregon Department of Fish and Wildlife, Portland, Oregon. Pp. 302.

Information for Planning and Consultation (IPaC). 2018. Available at: https://ecos.fws.gov/ipac/.

Isaacs, F. 2009. Bald Eagle Nest Survey and Reporting Guide: Reporting Observations at Nest Sites in Oregon. Version: 3/16/09.

Isaacs, F. 2017. Oregon Eagle Foundation, Inc. Personal Communication with Tammy Lim, September 11, 2017.

Isaacs, F. and R.G. Anthony. 2011. Bald Eagles (Haliaeetus leucocephalus) Nesting in Oregon and along the Lower Columbia River, 1978-2007. Final Report.

Jackman, R.E., and J.M. Jenkins. 2004. Protocol for evaluating bald eagle habitat and populations in California. Prepared for U.S. Fish and Wildlife Service Endangered Species Division. Sacramento. June 2004.

Klamath County Board of Commissioners (KCBC). 2019. Noxious Weed Lists. Available at: http://www.klamathcounty.org/621/Weed-Control-Advisory-Committee.

Klamath River Renewal Corporation (KRRC). 2018. Definite Plan for the Lower Klamath Project. January 2018. 316 pp.

National Marine Fisheries Service (NMFS) and United States Fish and Wildlife Service (USFWS). 2012. Joint preliminary biological opinion on the proposed removal of four dams on the Klamath River. NMFS Southwest Region and USFWS Region 8.

Natural Resources Conservation Service (NRCS). 2017. Web Soil Survey. Available at: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed June 29, 2017.

Oregon Biodiversity Information Center (ORBIC). 2017. Report of sensitive species records for the project area. Obtained May 8, 2017.

Oregon Department of Agriculture (ODA). 2018. Noxious Weed Policy and Classification System 2018.

Oregon Department of Fish and Wildlife (ODFW). 2017. Oregon wolf conservation and management 2017 annual report. Prepared by ODFW, Salem, Oregon.

PacifiCorp. 2004. Terrestrial Resources Final Technical Report Klamath Hydroelectric Project FERC No. 2082. February 2004.

Pagel, J. E., D.M. Whittington, and G.T. Allen. 2010. Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations. U. S. Fish and Wildlife Service. February 2010.

Shuford, W.D., D.L Thomson, D.M. Mauser, and J. Beckstrand. 2004. Abundance, distribution, and phenology of nongame waterbirds in the Klamath Basin of Oregon and California in 2003. Point Reyes Bird Observatory Conservation Science.

Siskiyou Department of Agriculture (SDA). 2015. Identification and Characteristics of Invasive Noxious Weed Infestations. Available at: https://www.co.siskiyou.ca.us/sites/default/files/fileattachments/agriculture/page/4671/ag-20150427_noxiousweedid.pdf.

United States Bureau of Reclamation (USBR) and CDFW. 2012. Klamath Facilities Removal. Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR). U.S. Bureau of Reclamation and California Department of Fish and Wildlife, December.

United States Forest Service (USFS). 2013. Klamath National Forest Noxious Weed and Non-native Invasive Plant list. Available at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd496400.pdf.

USFWS. 2004. Protocol for Evaluating Bald Eagle Habitat and Populations in California. June 2004. 40 pp.

USFWS. 2006. Estimating the effects of auditory and visual disturbance to northern spotted owls and marbled murrelets in northwestern California. USFWS, Arcata Fish and Wildlife Office, Arcata, California.

USFWS. 2007. National Bald Eagle Management Guidelines. May 2007. 23 pp.

USFWS. 2012. Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls. Endorsed by the U.S. Fish and Wildlife Service. February 2, 2011, Revised January 9, 2012.

Willy, E. 2017. Unpublished Bald and Golden Eagle Nesting Data. Sent from Elizabeth Willy, USFWS to Jennifer Jones, CDM Smith by email on June 29, 2017.

Wray, Simon. 2017. Wildlife Biologist, ODFW. Personal communication with Jennifer Jones, KRRC, June 22, 2017.

Appendix A Figures

Spencer Creek
J.C. Boyle Reservoir
State Hwy 66 Bridge
Topsy Campground
Copco Lake
Klamath Canyon
Camp Creek
Dutch Creek
Fall Creek
Beaver Creek
Jenny Creek
Beaver Creek Cove
Raymond Gulch
Horseshoe Ranch Wildlife Area
Juniper Point
Mirror Cove
Iron Gate Reservoir
Long Gulch Cove
Brush Creek
Iron Gate Fish Hatchery
Bogus Creek
Copco No. 2 Bypass
Copco No. 2 Penstock
Keaton Cove
Ager Beswick Rd
Jackson County
Klamath County
Siskiyou County
Klamath National Forest
Johnson Crk
Sheepy Crk
Camp 3 Crk
Trim Crk
Hayden Crk
Dry Prairie Crk
Klamath Riv
Rock Crk
Ash Crk
Slide Crk
Dutch Crk
Jenny Crk
Fall Crk
Beaver Crk
Milk Crk
Eddy Crk
Silver Crk
Bullfrog Crk
Brush Crk
Dry Crk
Hutton Crk
Shelton Crk
Ditch Crk
Cottonwood Crk
Cole Hollow Crk
Willow Crk
Little Bogus Crk
Iron Crk
Bear Crk
Shovel Crk
Negro Crk
Shasta Valley Crk
Deer Crk
Cedar Crk
Juniper Crk
Washington
Montana
Oregon
Idaho
Wyoming
Nevada
Utah
California
Arizona
Map Location

N
0 2.5 5
Miles

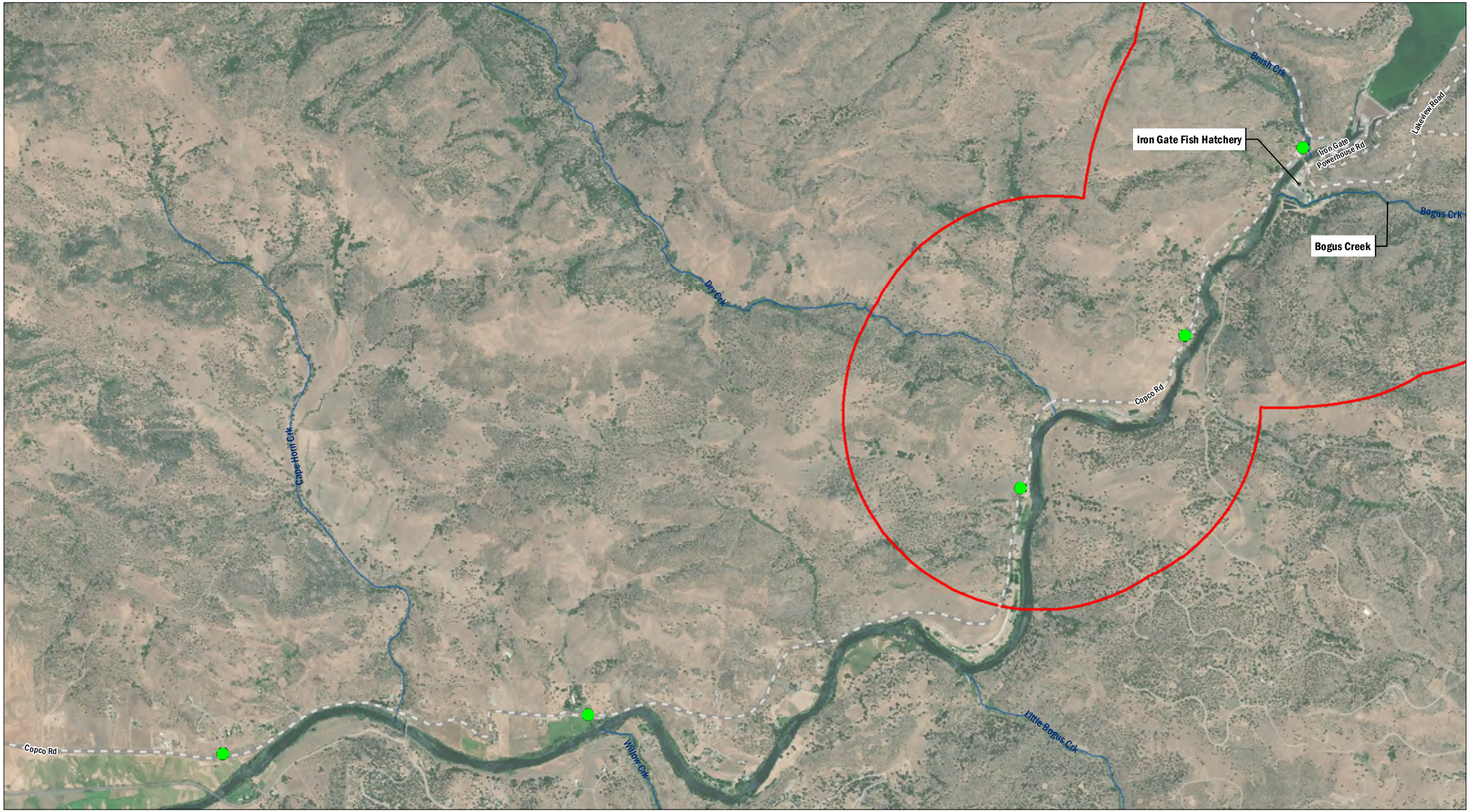
Data Source: 2018 TIGER/Line Shapefiles
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project

Primary Road
Access Route
Stream
Water Body
State
County
National Forest
Wildlife Area
0.25 Mile Study Area Buffer

FIGURE 1-1

Overall Project Map and Terrestrial Resources Study Area



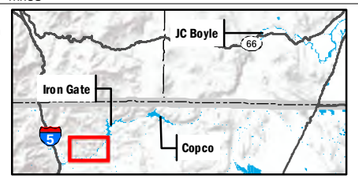
N

0 0.5 1

Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



Osprey Nest Active Status
- Active, Osprey
- Inactive, Osprey

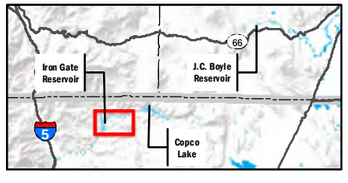
- State
- County
- Stream
- Access Route
- 0.75 Mile Study Area Buffer

FIGURE 2-1

Osprey (Pandion haliaetus) Observations and Nest Locations Klamath River (Below Iron Gate Dam)

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project

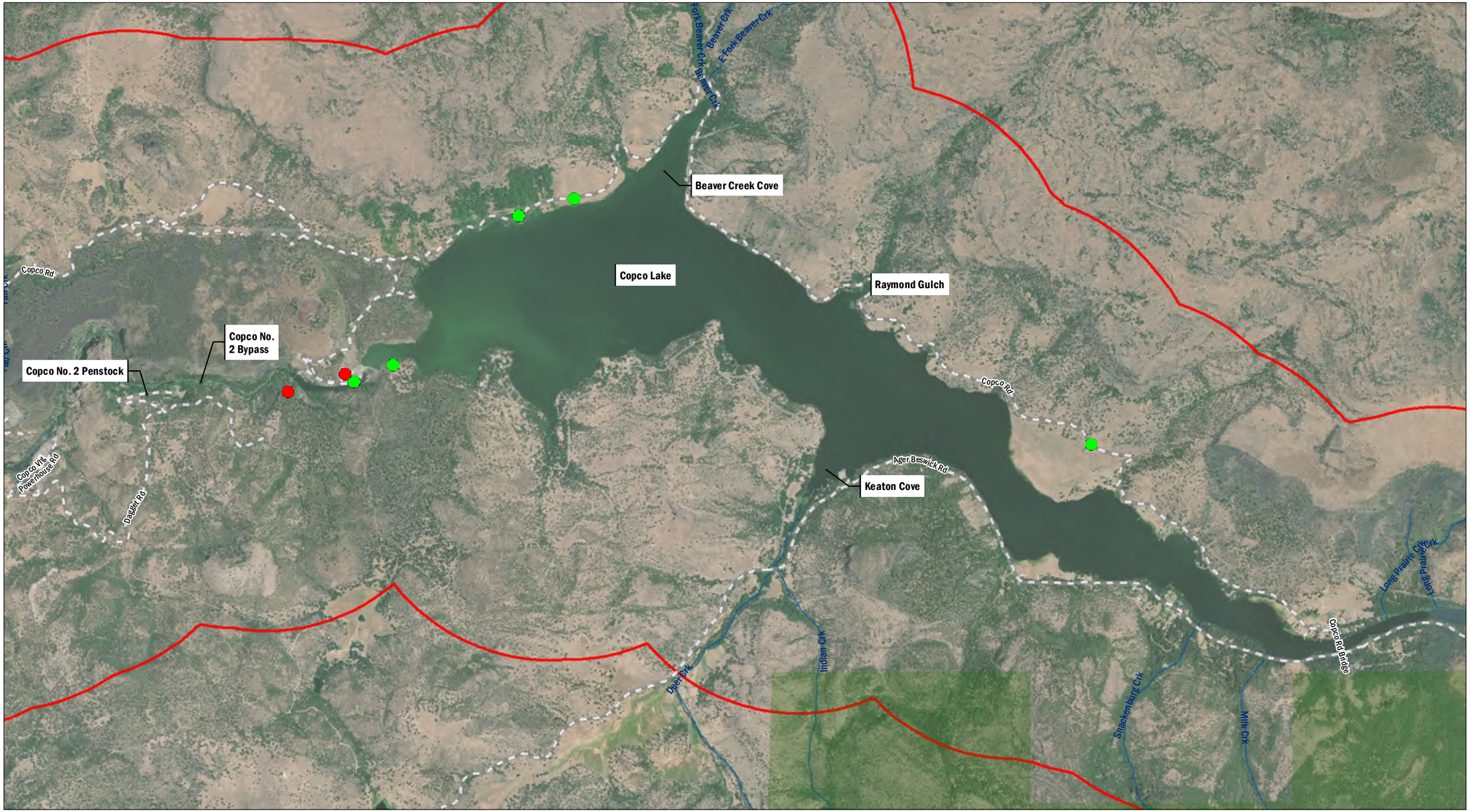


Osprey Nest Active Status
- Active, Osprey
- Inactive, Osprey

- State
- County
- Access Route
- Stream
- 0.75 Mile Study Area Buffer

FIGURE 2-2

Osprey (Pandion haliaetus) Observations and Nest Locations Iron Gate Reservoir



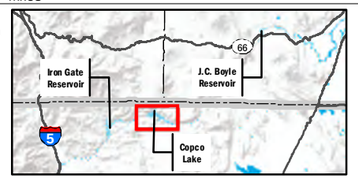
N

0 0.5 1

Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



Osprey Nest Active Status
- Active, Osprey
- Inactive, Osprey

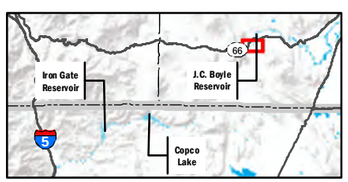
- State
- County
- Stream
- Access Route
- 0.75 Mile Study Area Buffer

FIGURE 2-3

Osprey (Pandion haliaetus) Observations and Nest Locations Copco Lake

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



Osprey Nest Active Status
- Active, Osprey
- Inactive, Osprey

- State
- County
- Primary Road
- Access Route
- 0.75 Mile Study Area Buffer

FIGURE 2-4

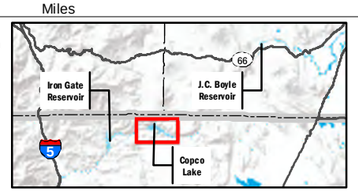
Osprey (Pandion haliaetus) Observations and Nest Locations J.C. Boyle Reservoir

Dutch Creek
Camp Crk
Dutch Crk
Jenny Crk
Jenny Creek
Fall Crk
Copco Vly Powerhouse Rd
Dagger Rd
Copco Rd
Juniper Point
Copco Rd
Mirror Cove
Copco Rd
Long Gulch Cove
Iron Gate Reservoir
Bullhead Crk

N
0 0.5 1
Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



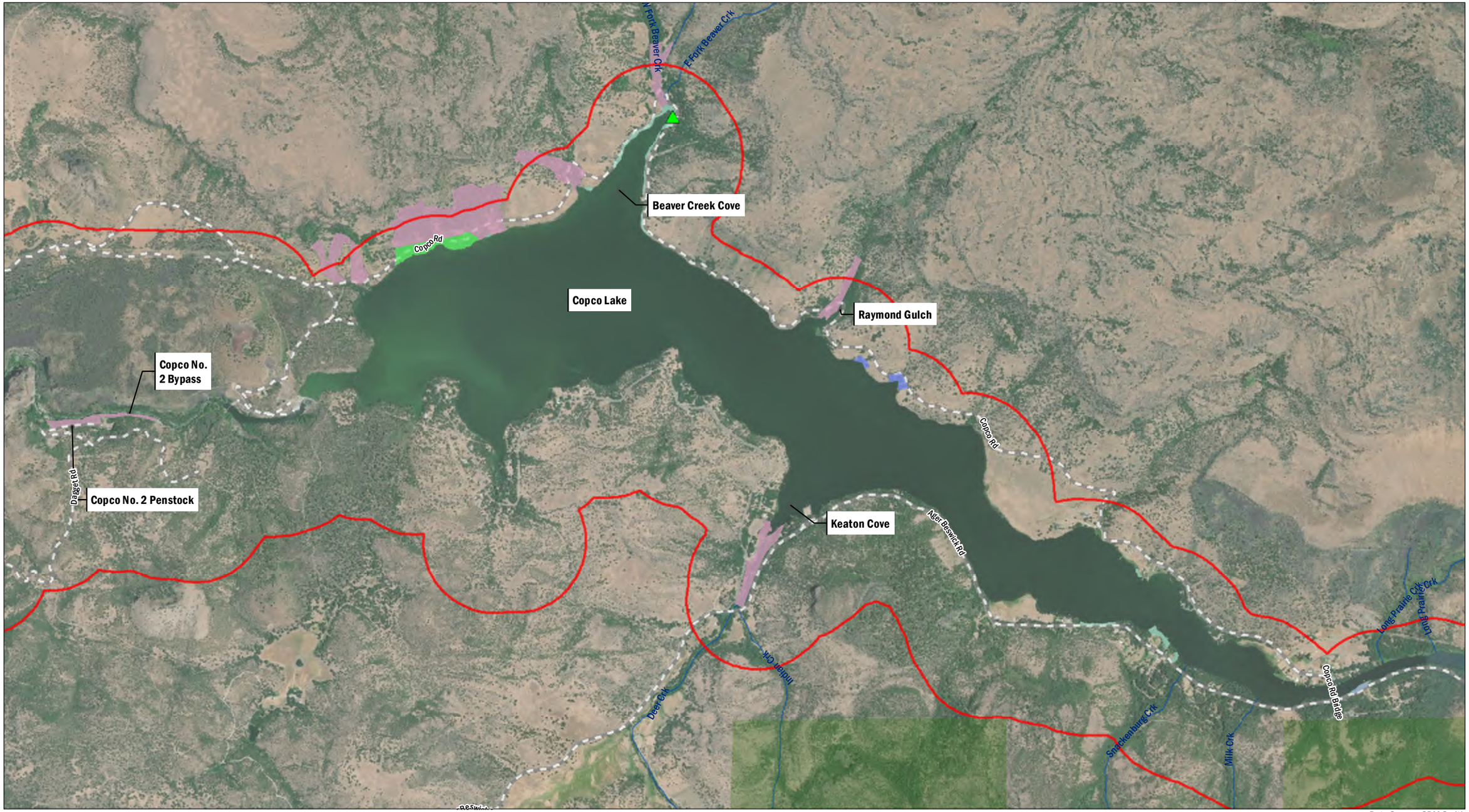
Willow Flycatcher Observation

Willow Flycatcher Habitat
- Bigleaf maple forest
- Geyer willow thicket
- Oregon ash grove
- Shining willow grove
- Willow thickets

- State
- County
- Stream
- Access Route
- 0.25 Mile Study Area Buffer

FIGURE 3-1

2018 Willow Flycatcher Habitat and Observations
Iron Gate Reservoir



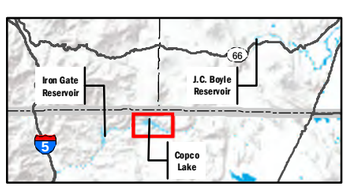
N

0 0.5 1

Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



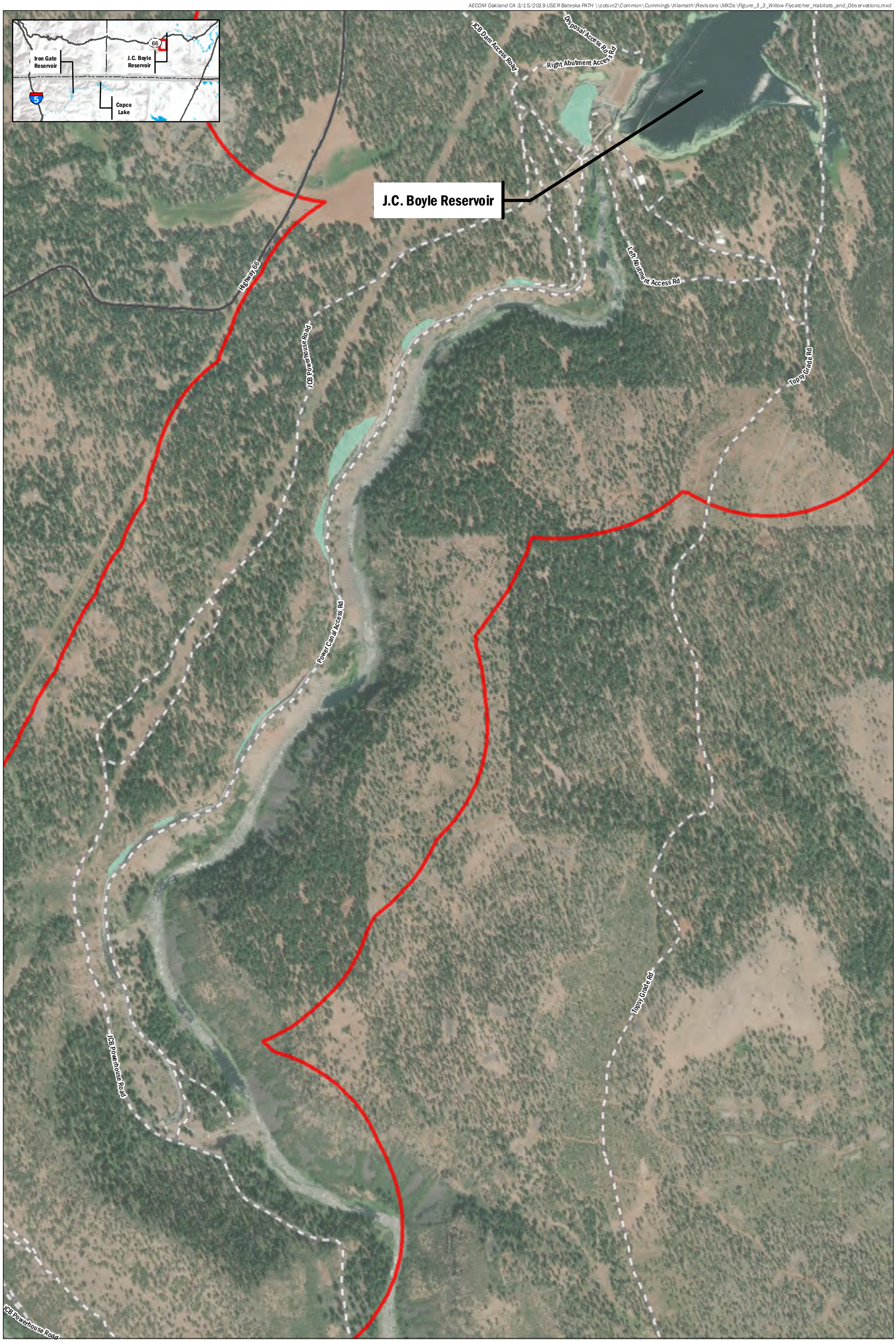
Willow Flycatcher Observation

Willow Flycatcher Habitat
- Bigleaf maple forest
- Geyer willow thicket
- Oregon ash grove
- Shining willow grove
- Willow thickets

- State
- County
- Stream
- Access Route
- 0.25 Mile Study Area Buffer

FIGURE 3-2

2018 Willow Flycatcher Habitat and Observations
Copco Lake



Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project

Willow Flycatcher Observation

Willow Flycatcher Habitat
- Bigleaf maple forest
- Geyer willow thicket
- Oregon ash grove
- Shining willow grove
- Willow thickets

- State
- County
- Stream
- 0.25 Mile Study Area Buffer
- Access Route

FIGURE 3-3

2018 Willow Flycatcher Habitat and Observations
J.C. Boyle Reservoir and Canal

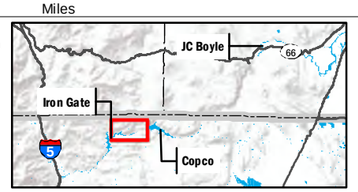
N

0 0.5 1

Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



- Great Blue Heron Colony
- Sand Hill Crane Nest
- Peregrine Falcon Nest

- State
- County
- Stream
- Access Route
- 0.25 Mile Study Area Buffer

FIGURE 4-1

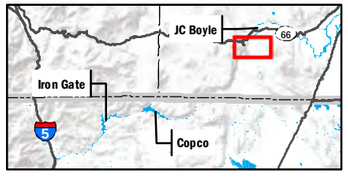
Other Special Status Wildlife Observations
Iron Gate Reservoir

N

0 0.5 1
Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

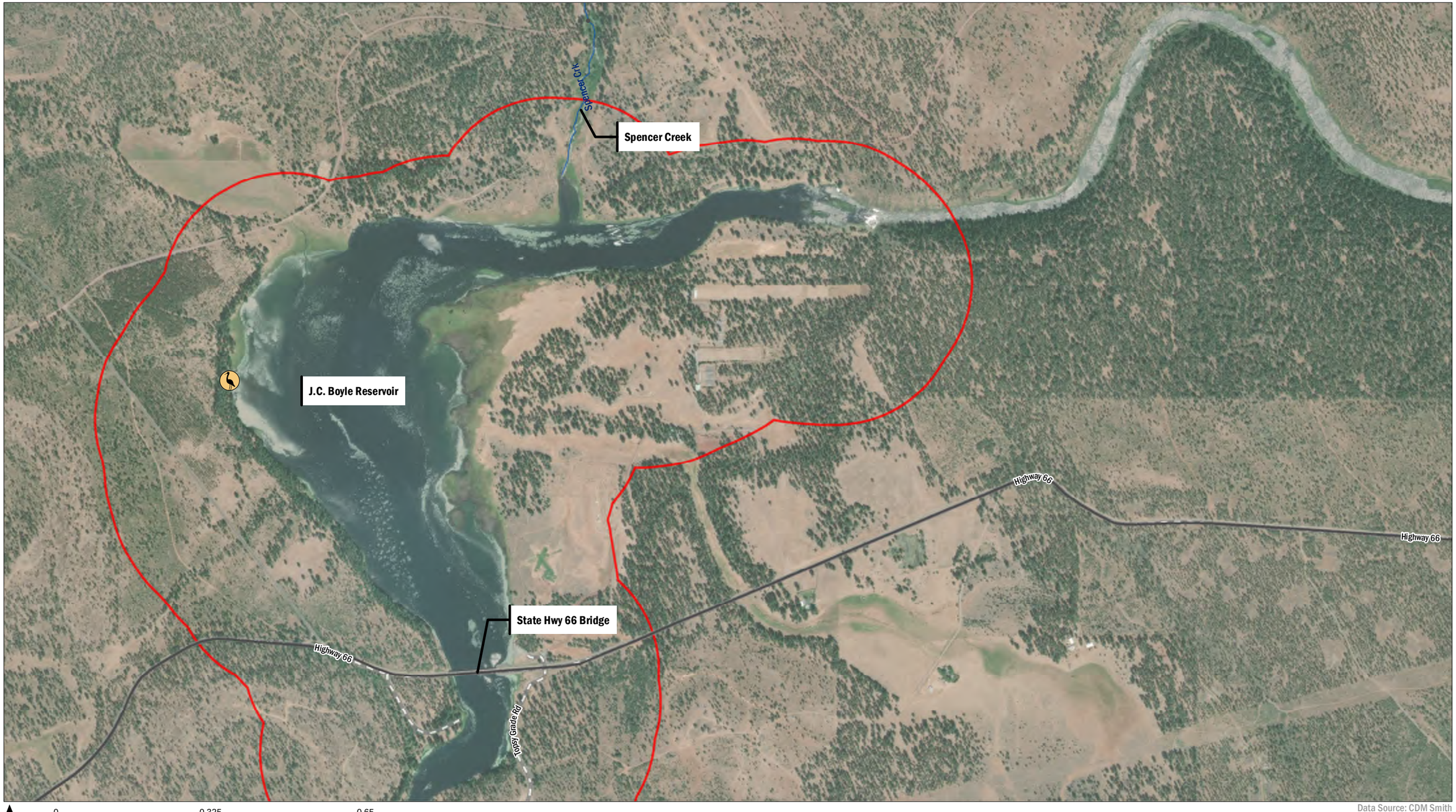
Klamath River Renewal Corporation
Klamath River Renewal Project



- Great Blue Heron Colony
- Sand Hill Crane Nest
- Peregrine Falcon Nest

- State
- County
- Primary Road
- Access Route
- 0.25 Mile Study Area Buffer

FIGURE 4-2
Other Special-Status Wildlife Observations
Klamath River (Below J.C. Boyle Dam)



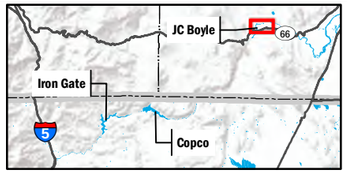
N

0 0.325 0.65

Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



- Great Blue Heron Colony
- Sand Hill Crane Nest
- Peregrine Falcon Nest

- State
- County
- Stream
- Primary Road
- Access Route
- 0.25 Mile Study Area Buffer

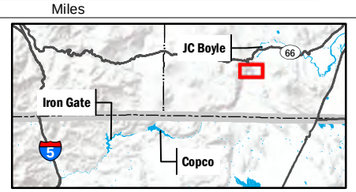
FIGURE 4-3

Other Special Status Wildlife Observations
J.C. Boyle Reservoir

CDM Smith 3/18/2019 USER KHALAFA PATH \\colsvr2\Common\Cummings\Klamath\Revisions\MXDs\Figure_5_2_Nothern_Spotted_Owl_Calling_Stations.mxd

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



NSO Callling Station

State
County
Secondary Road
Access Route

FIGURE 5-1

Northern Spotted Owl (NSO) Calling Stations
J.C. Boyle Lower Stations

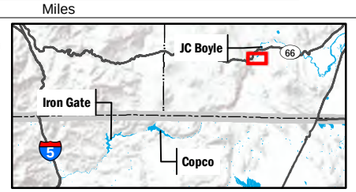
N

0 0.25 0.5

Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



NSO Callling Station

State
County
Stream
Primary Road
Access Route

FIGURE 5-2

Northern Spotted Owl (NSO) Calling Stations
J.C. Boyle Upper Stations

Stream
State Boundary
County Boundary
Access Route
Sheet Extent

Limits of Work Buffers
0.5-miles
2 miles
5 miles

Impact Areas
Low Impact Area
High Impact Area

Jackson County
Klamath County
Siskiyou County
Oregon
California

6-7
6-6
6-5
6-4
6-3
6-2

J.C. Boyle Reservoir
J.C. Boyle Dam
Copco No. 1 Dam
Copco No. 2 Dam
Iron Gate Reservoir
Iron Gate Dam
Copco Lake

Topsy Grade Road
Keno Warden Road
Ager Beswick Road
Copco Road
Klamath River

5
66
97
39
140
161
96

Washington
Montana
Idaho
Oregon
Wyoming
Map Location
Utah
Nevada
California
Arizona

N
0
5
Miles

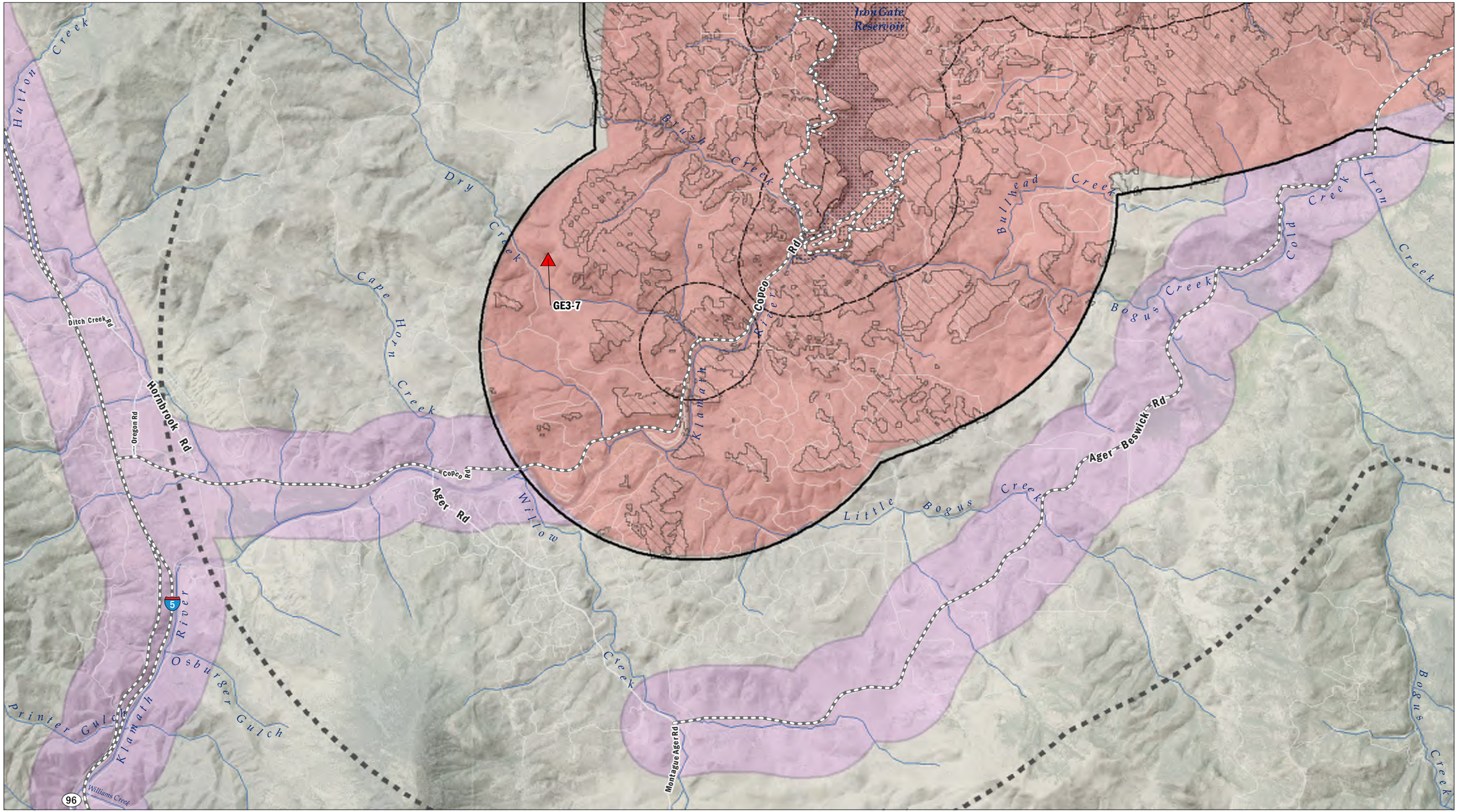
DATA SOURCE
NAIP, 2014; USGS (NED), 2015

MAP PREPARED BY:
AECOM Alex Remar, 3/20/2019

PROJECTION
NAD 1983 HARN StatePlane California I FIPS 0401 Feet

AECOM
Klamath River Renewal Corporation
Klamath River Renewal Project

FIGURE 6-1
2018 Eagle Nest Survey Results Overview



N

0 2

Miles

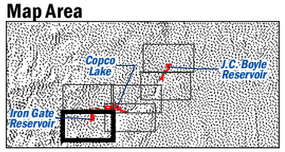
NAIP Imagery, 2014

AECOM

Klamath River Renewal Corporation

Klamath River Renewal Project

Map Area



- Access Routes
- Limits of Work
- 2-Mile Viewshed from Limits of Work

Impact Areas

- Low Impact Area
- High Impact Area

Eagle Nest Active Status

- Inactive, Golden Eagle

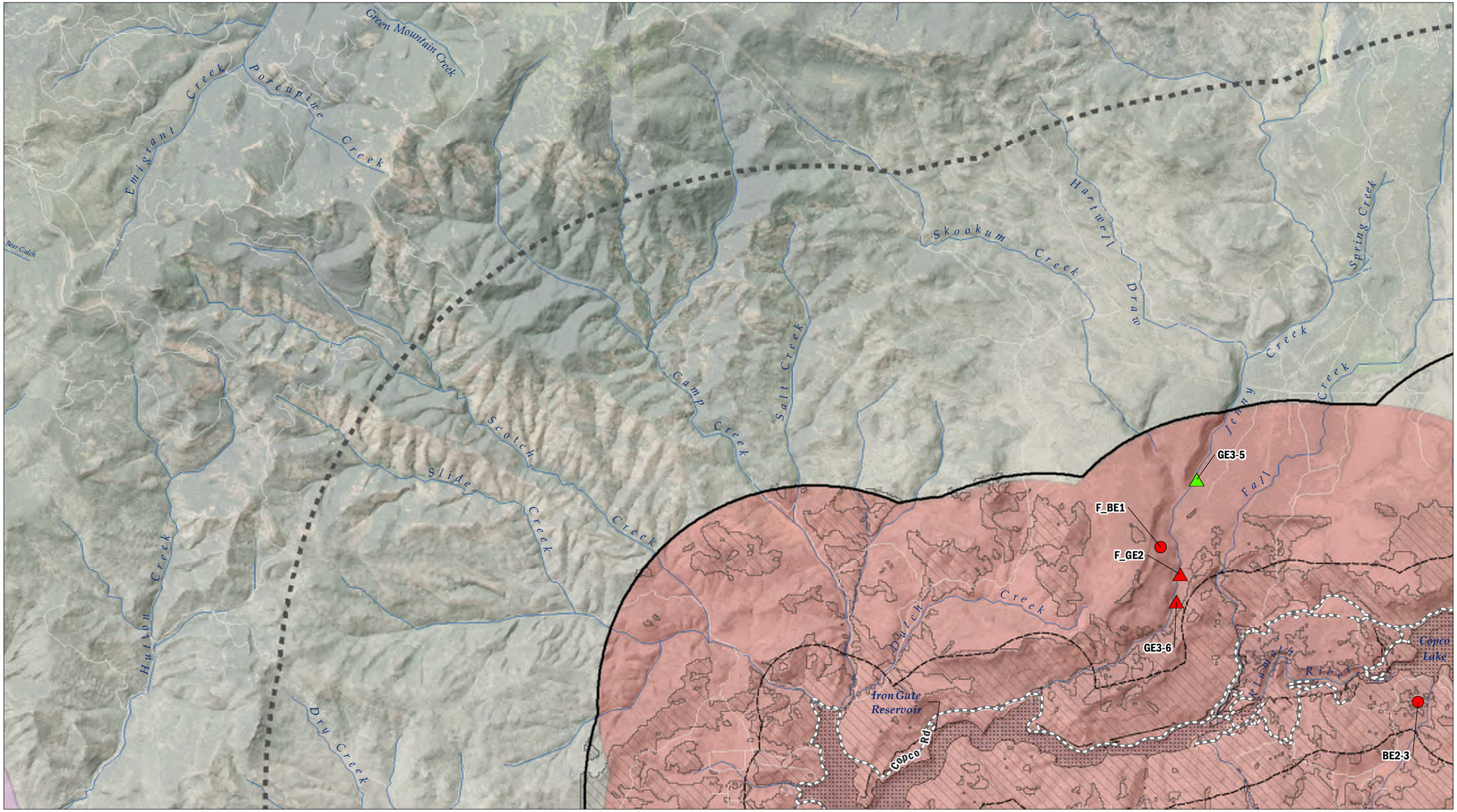
Limits of Work Buffers

- 0.5-miles
- 2 miles
- 5 miles

FIGURE 6-2

2018 Eagle Nest Survey Results

Sheet 1 of 6



N

0 2

Miles

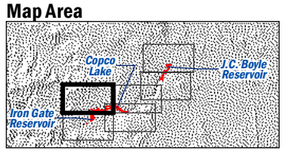
NAIP Imagery, 2014

AECOM

Klamath River Renewal Corporation

Klamath River Renewal Project

Map Area



- Access Routes
- Limits of Work
- 2-Mile Viewshed from Limits of Work

Impact Areas

- Low Impact Area
- High Impact Area

Eagle Nest Active Status

- Active, Golden Eagle
- Inactive, Bald Eagle
- Inactive, Golden Eagle

Limits of Work Buffers

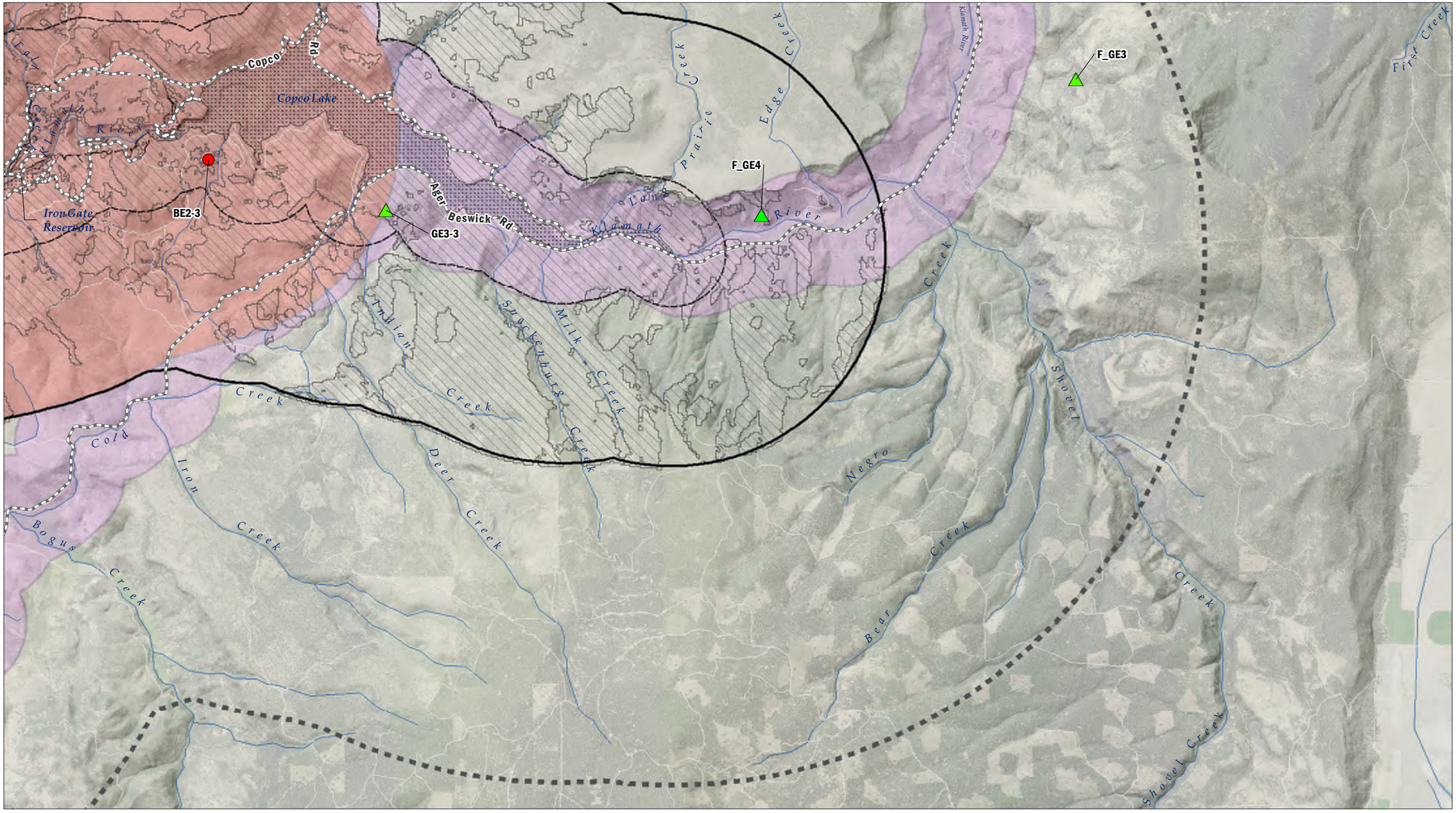
- 0.5-miles
- 2 miles
- 5 miles

FIGURE 6-3

2018 Eagle Nest Survey Results

Sheet 2 of 6

AECOM Oakland CA 12/4/2018 USER alexander.remar PATH \\Oakland\Oakland\Projects\Secure\Water\Klamath Dam\400-Technical\440 GIS\02_Maps\02_Map_Production_and_Reports\Biology\Eagles\Figure_5-2-7_EagleNests_Mapbook.mxd



N

0 2

Miles

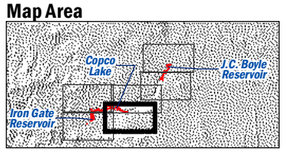
NAIP Imagery, 2014

AECOM

Klamath River Renewal Corporation

Klamath River Renewal Project

Map Area



- Access Routes
- Limits of Work
- 2-Mile Viewshed from Limits of Work

Impact Areas

- Low Impact Area
- High Impact Area

Eagle Nest Active Status

- Active, Golden Eagle
- Inactive, Bald Eagle

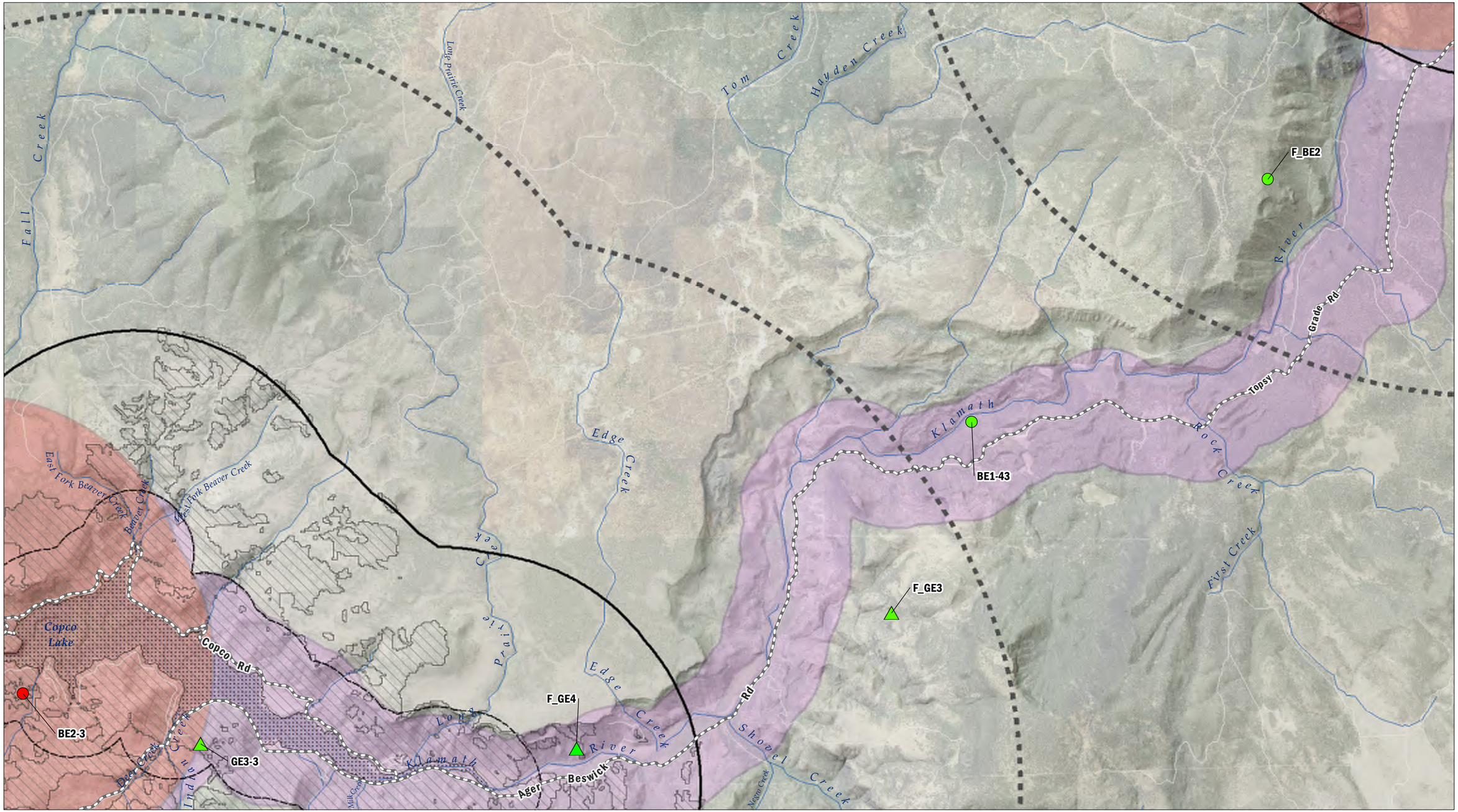
Limits of Work Buffers

- 0.5-miles
- 2 miles
- 5 miles

FIGURE 6-4

2018 Eagle Nest Survey Results

Sheet 3 of 6



N

0 2

Miles

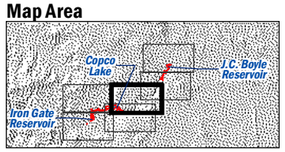
NAIP Imagery, 2014

AECOM

Klamath River Renewal Corporation

Klamath River Renewal Project

Map Area



- Access Routes
- Limits of Work
- 2-Mile Viewshed from Limits of Work

Impact Areas

- Low Impact Area
- High Impact Area

Eagle Nest Active Status

- Active, Bald Eagle
- Active, Golden Eagle
- Inactive, Bald Eagle

Limits of Work Buffers

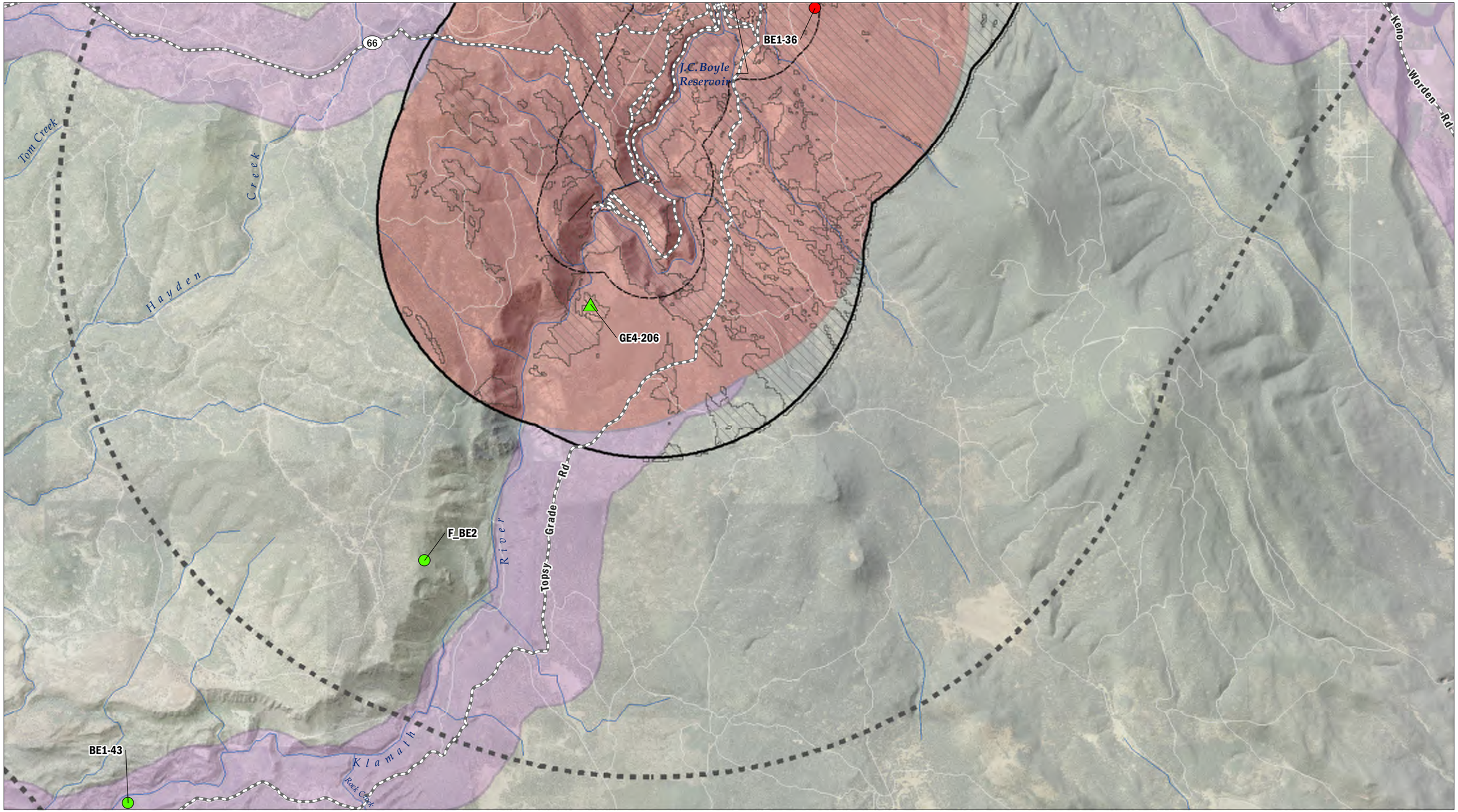
- 0.5-miles
- 2 miles
- 5 miles

FIGURE 6-5

2018 Eagle Nest Survey Results

Sheet 4 of 6

AECOM Oakland CA 12/4/2018 USER alexander.remar PATH \\Oakland\Oakland\Projects\Secure\Water\Klamath Dam\400-Technical\440 GIS\02_Maps\02_Map_Production_and_Reports\Biology\Eagles\Figure_5-2-7_EagleNests_Mapbook.mxd



N

0 2 Miles

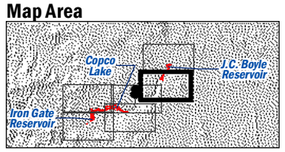
NAIP Imagery, 2014

AECOM

Klamath River Renewal Corporation

Klamath River Renewal Project

Map Area



Access Routes
Limits of Work
2-Mile Viewshed from Limits of Work

Impact Areas
Low Impact Area
High Impact Area

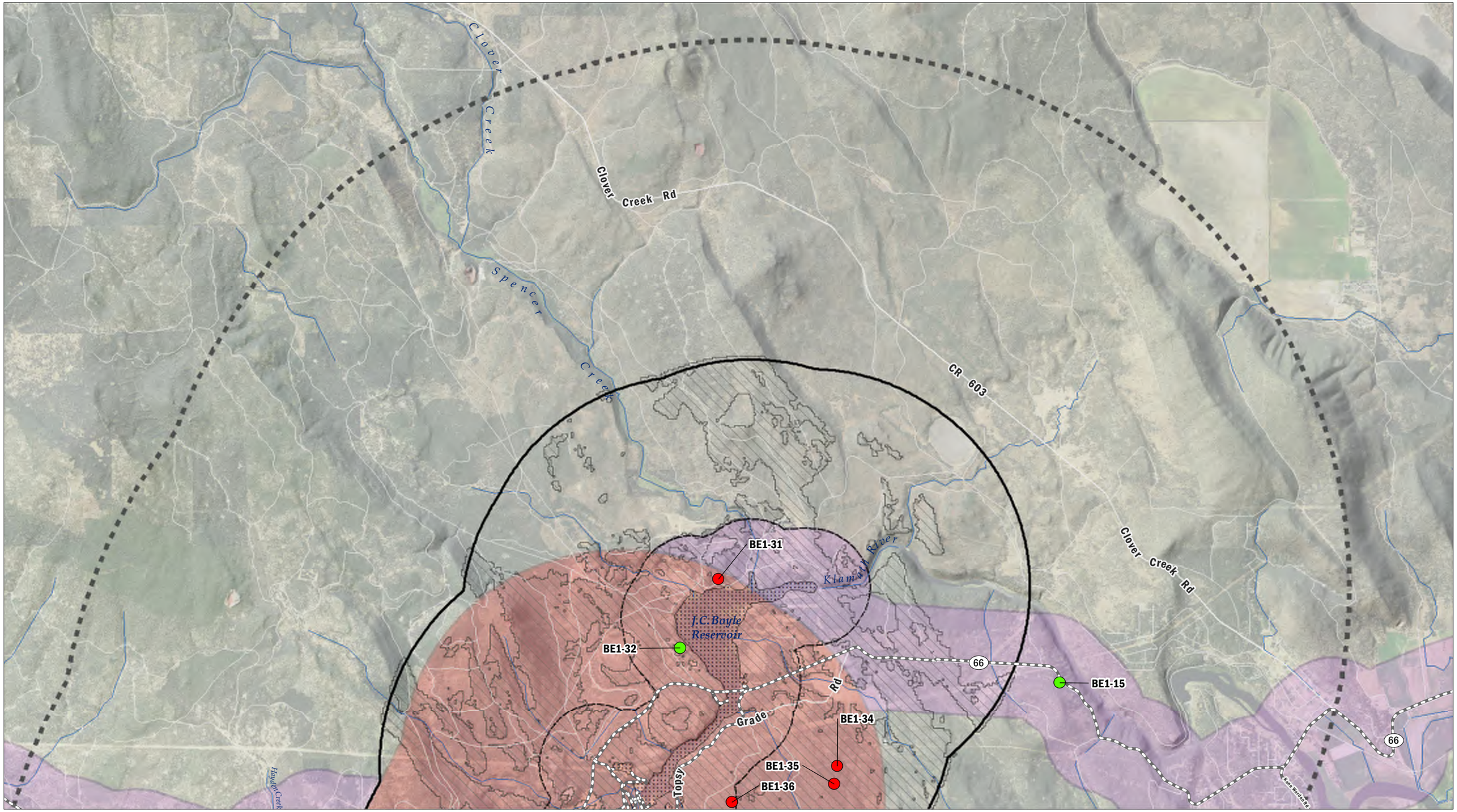
Eagle Nest Active Status
Active, Bald Eagle
Active, Golden Eagle
Inactive, Bald Eagle

Limits of Work Buffers
0.5-miles
2 miles
5 miles

FIGURE 6-6

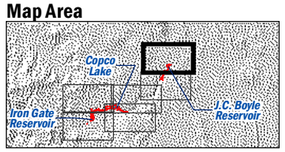
2018 Eagle Nest Survey Results

Sheet 5 of 6



AECOM
Klamath River Renewal Corporation
Klamath River Renewal Project

Map Area



- Access Routes
- Limits of Work
- 2-Mile Viewshed from Limits of Work

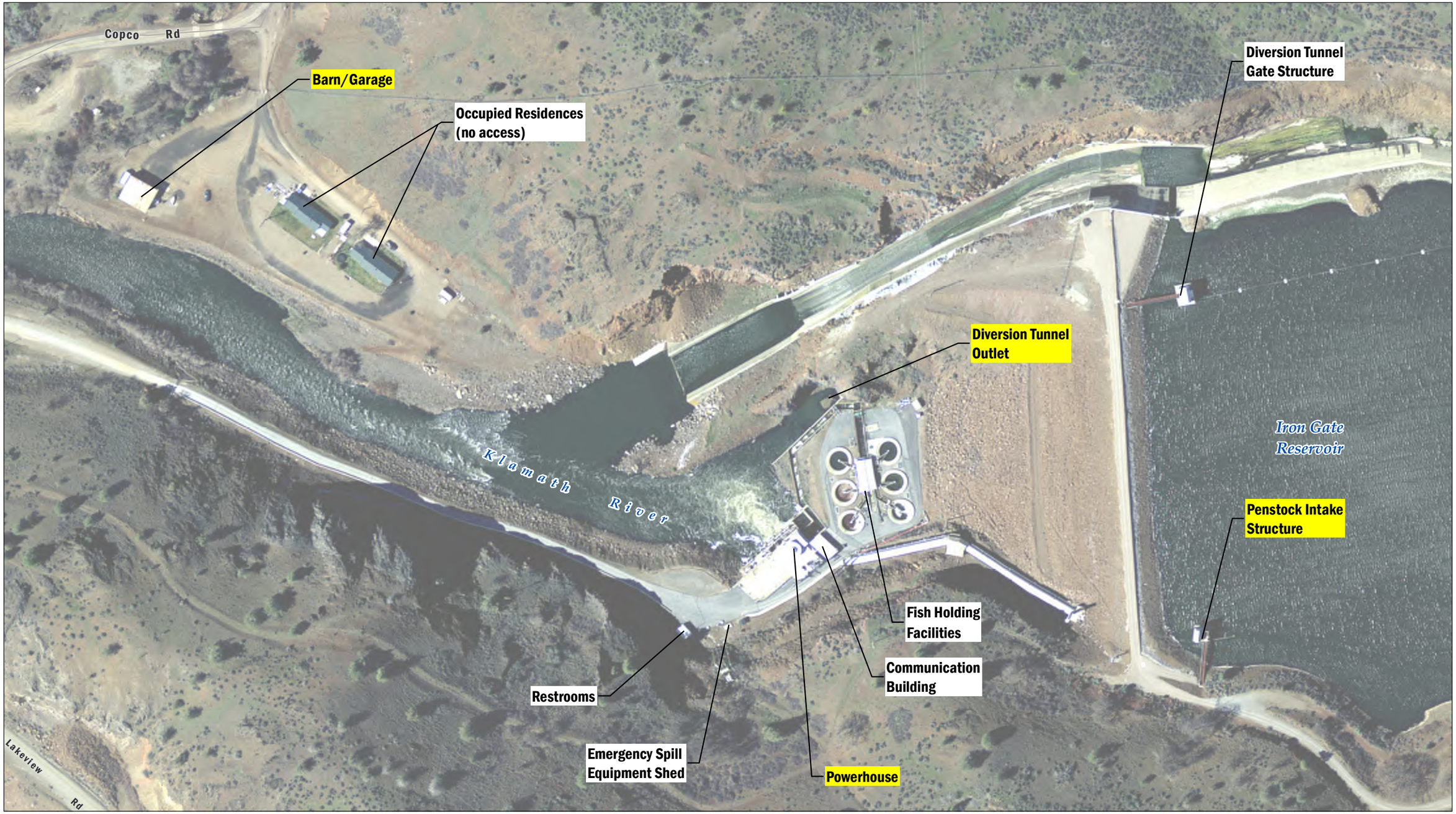
Impact Areas
- Low Impact Area
- High Impact Area

Eagle Nest Active Status
- Active, Bald Eagle
- Inactive, Bald Eagle

Limits of Work Buffers
- 0.5-miles
- 2 miles
- 5 miles

FIGURE 6-7

2018 Eagle Nest Survey Results
Sheet 6 of 6



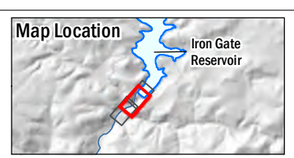
0 300
Feet

DATA SOURCE
NAIP, 2014; USGS (NED), 2015

MAP PREPARED BY:
AECOM Alex Remar, 2/28/2019

PROJECTION
NAD 1983 HARN StatePlane California I FIPS 0401 Feet

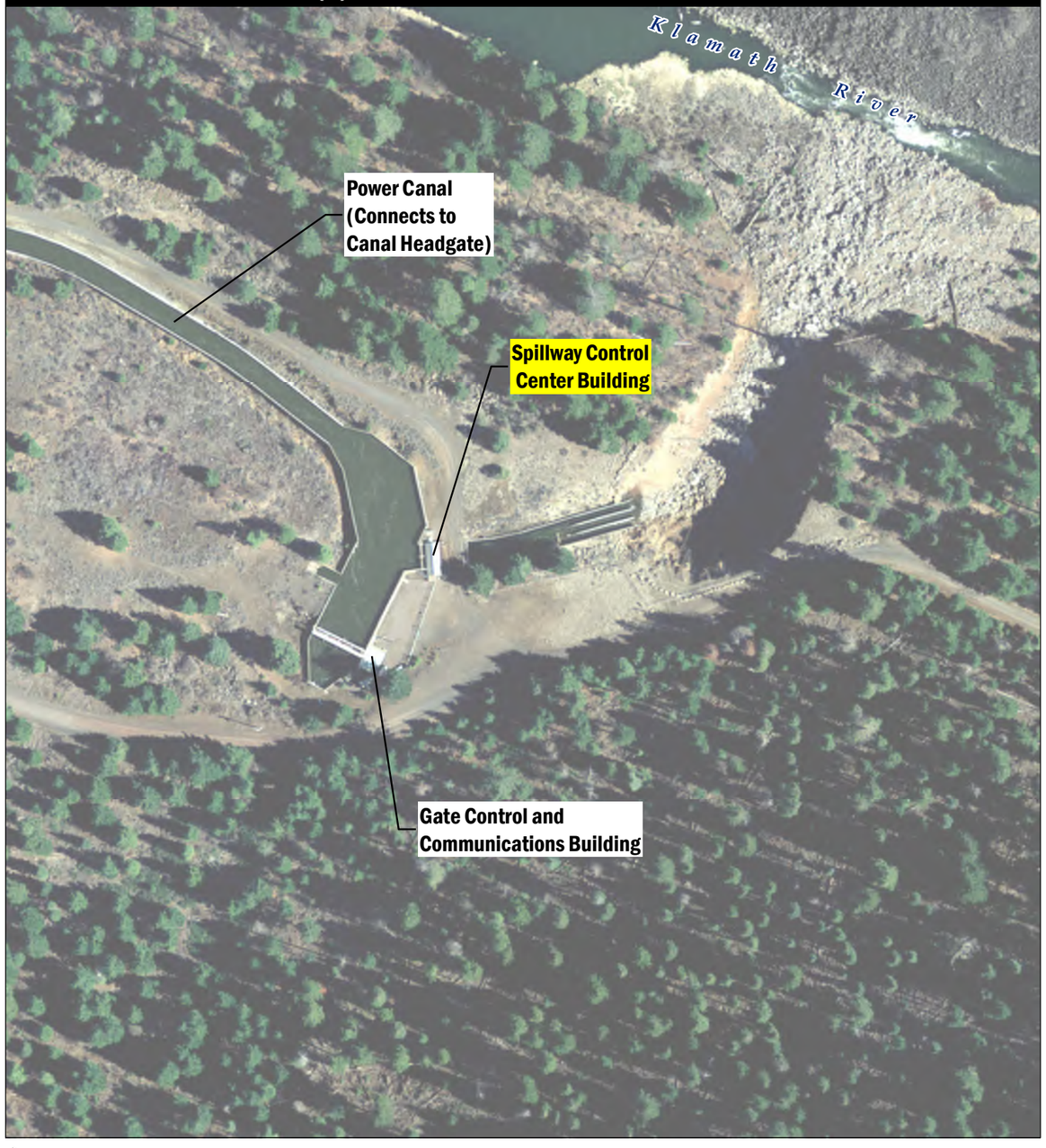
AECOM
Klamath River Renewal Corporation
Klamath River Renewal Project

Map Location


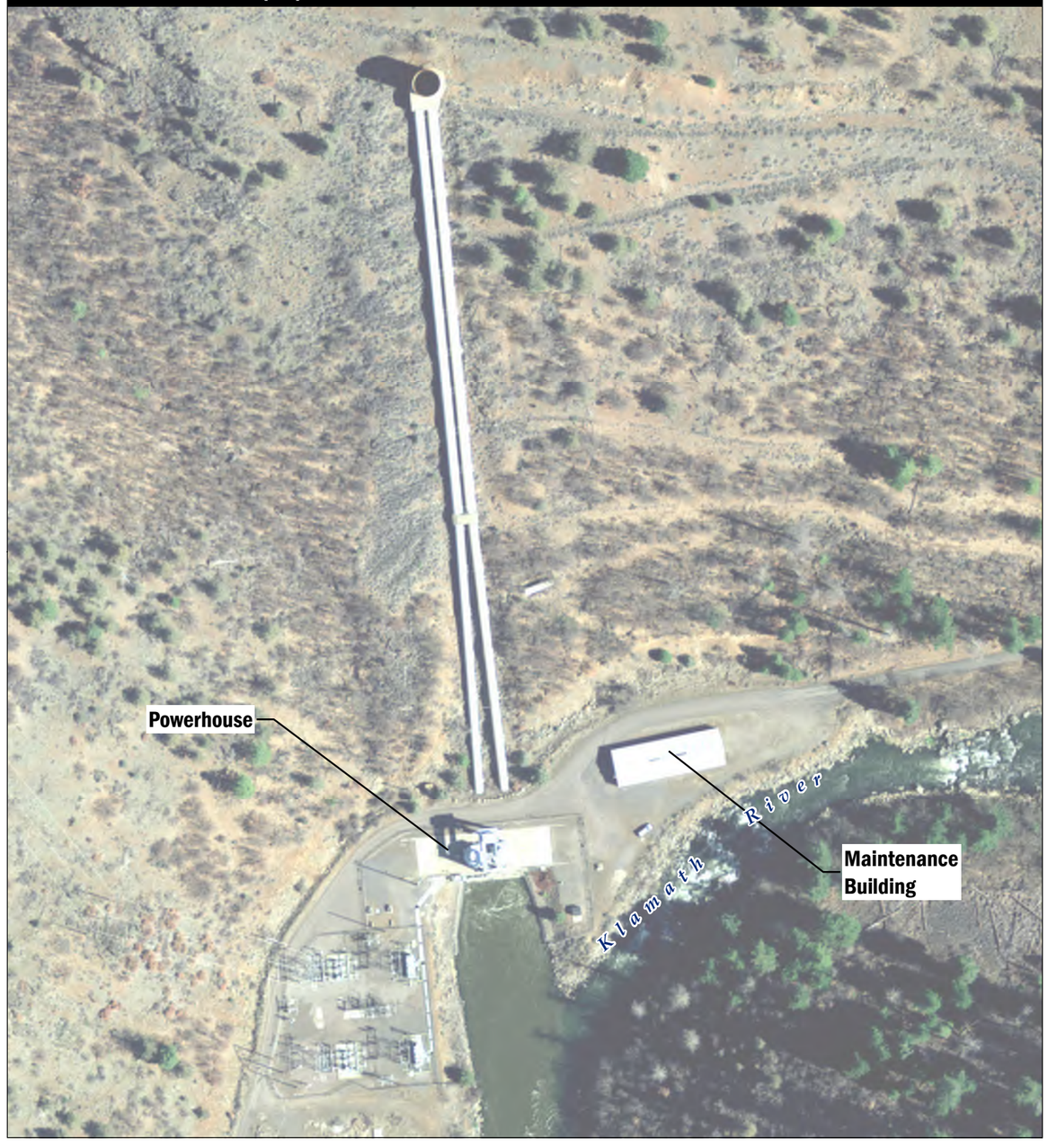
Labels
- Active Bat Roost Confirmed
- Roosting Bats Not Found

FIGURE 7-1
2017-2018 Bat Surveys
Iron Gate Dam Area

(I) FOREBAY AND SPILLWAY



(II) PENSTOCKS AND POWERHOUSE



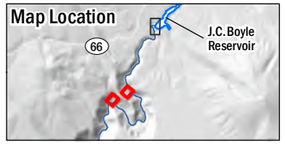
0 300
Feet

DATA SOURCE
NAIP, 2014; USGS (NED), 2015

MAP PREPARED BY:
AECOM Alex Remar, 2/28/2019

PROJECTION
NAD 1983 HARN StatePlane California I FIPS 0401 Feet

AECOM
Klamath River Renewal Corporation
Klamath River Renewal Project

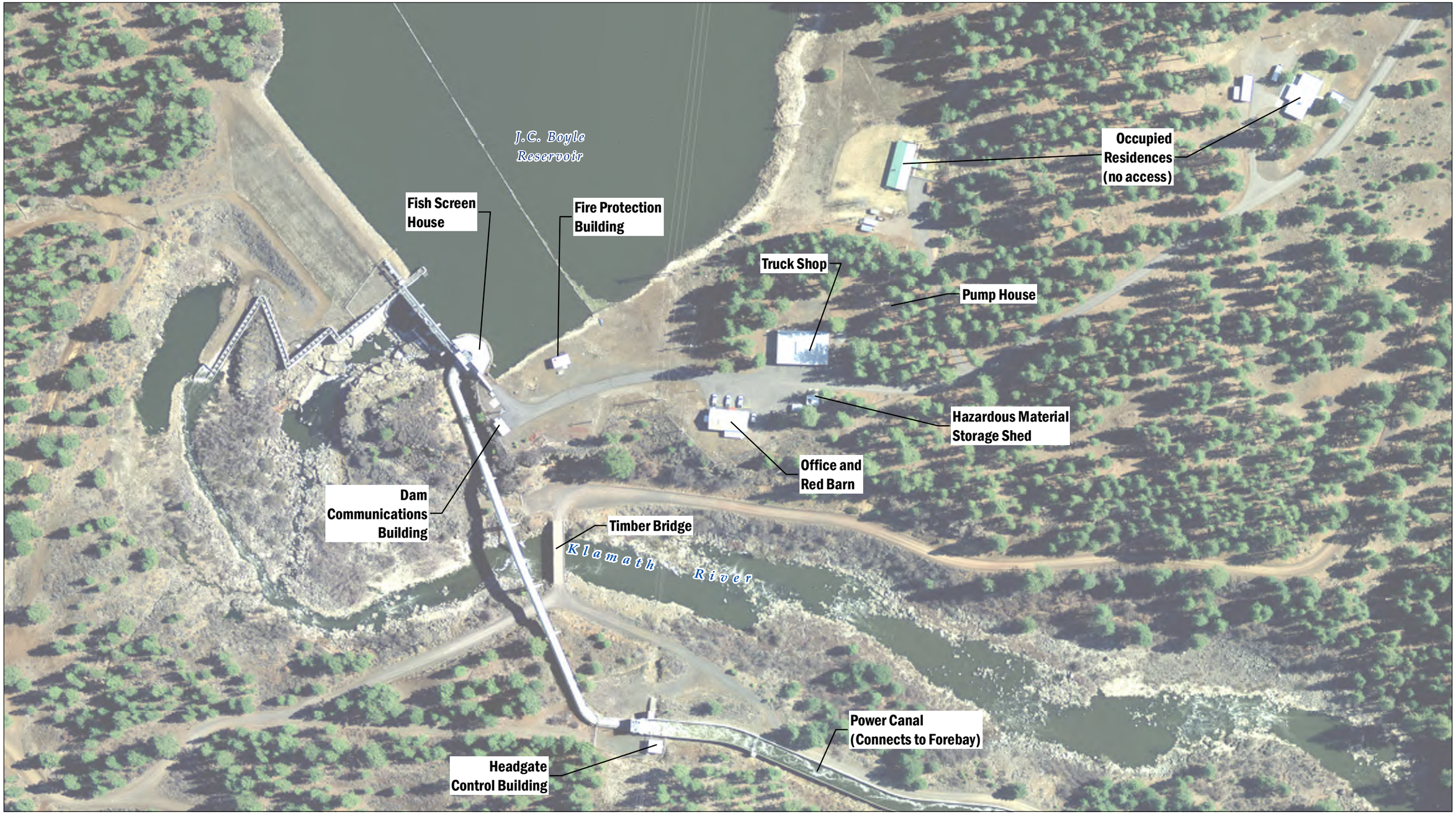


Labels

- Active Bat Roost Confirmed
- Roosting Bats Not Found

FIGURE 7-2

2017-2018 Bat Surveys
J.C. Boyle Forebay and Spillway Area, Penstocks and Powerhouse Area



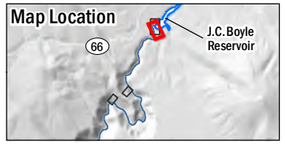
0 300
Feet

DATA SOURCE
NAIP, 2014; USGS (NED), 2015

MAP PREPARED BY:
AECOM Alex Remar, 2/28/2019

PROJECTION
NAD 1983 HARN StatePlane California I FIPS 0401 Feet

AECOM
Klamath River Renewal Corporation
Klamath River Renewal Project

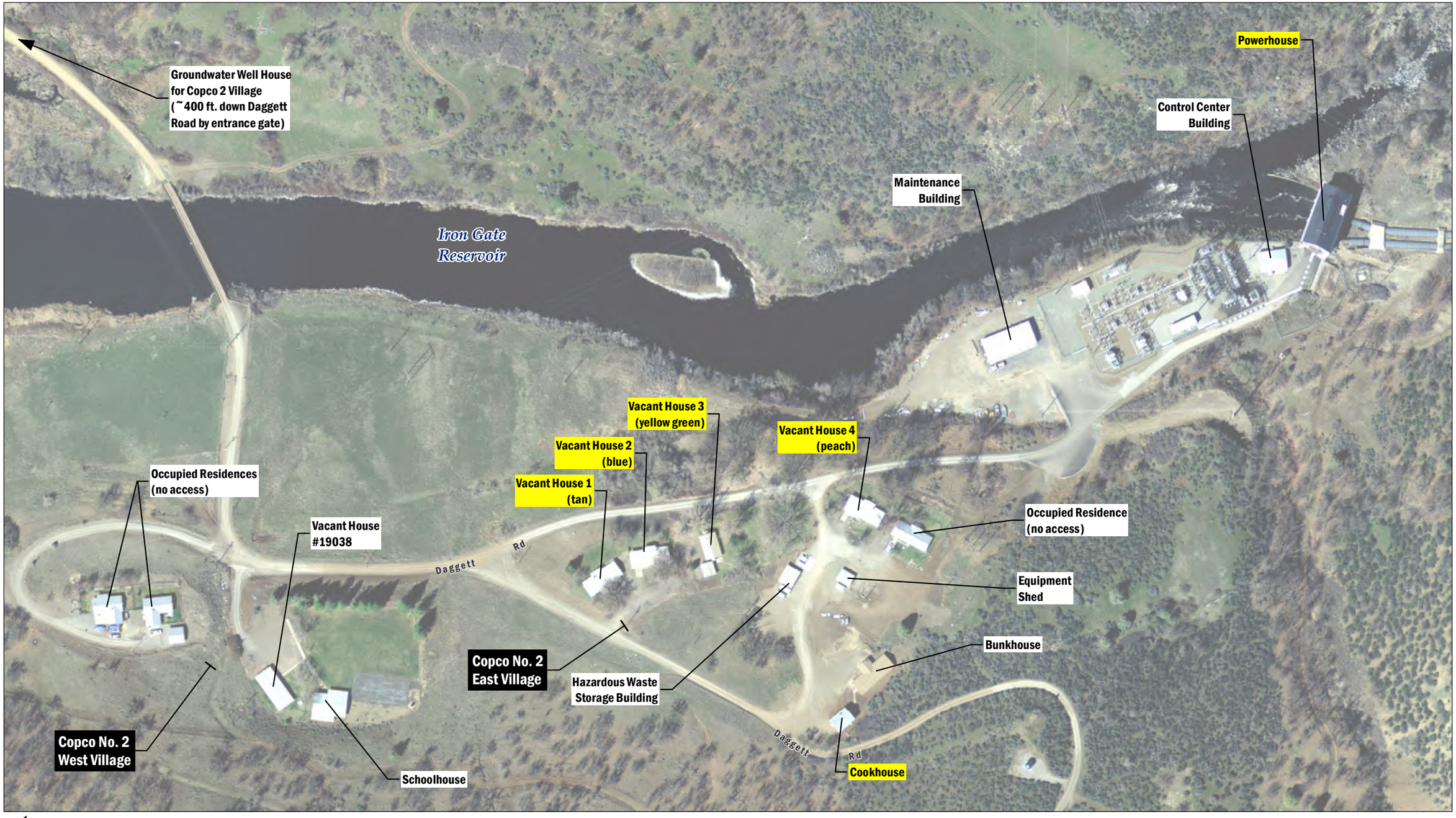
Map Location


Labels

Roosting Bats Not Found

FIGURE 7-3

2017-2018 Bat Surveys
J.C. Boyle Dam Area



N

0 300

Feet

DATA SOURCE
NAIP, 2014; USGS (NED), 2015

MAP PREPARED BY:
AECOM Alex Remar, 2/28/2019

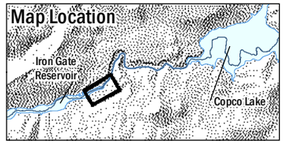
PROJECTION
NAD 1983 HARN StatePlane California I FIPS 0401 Feet

AECOM

Klamath River Renewal Corporation

Klamath River Renewal Project

Map Location

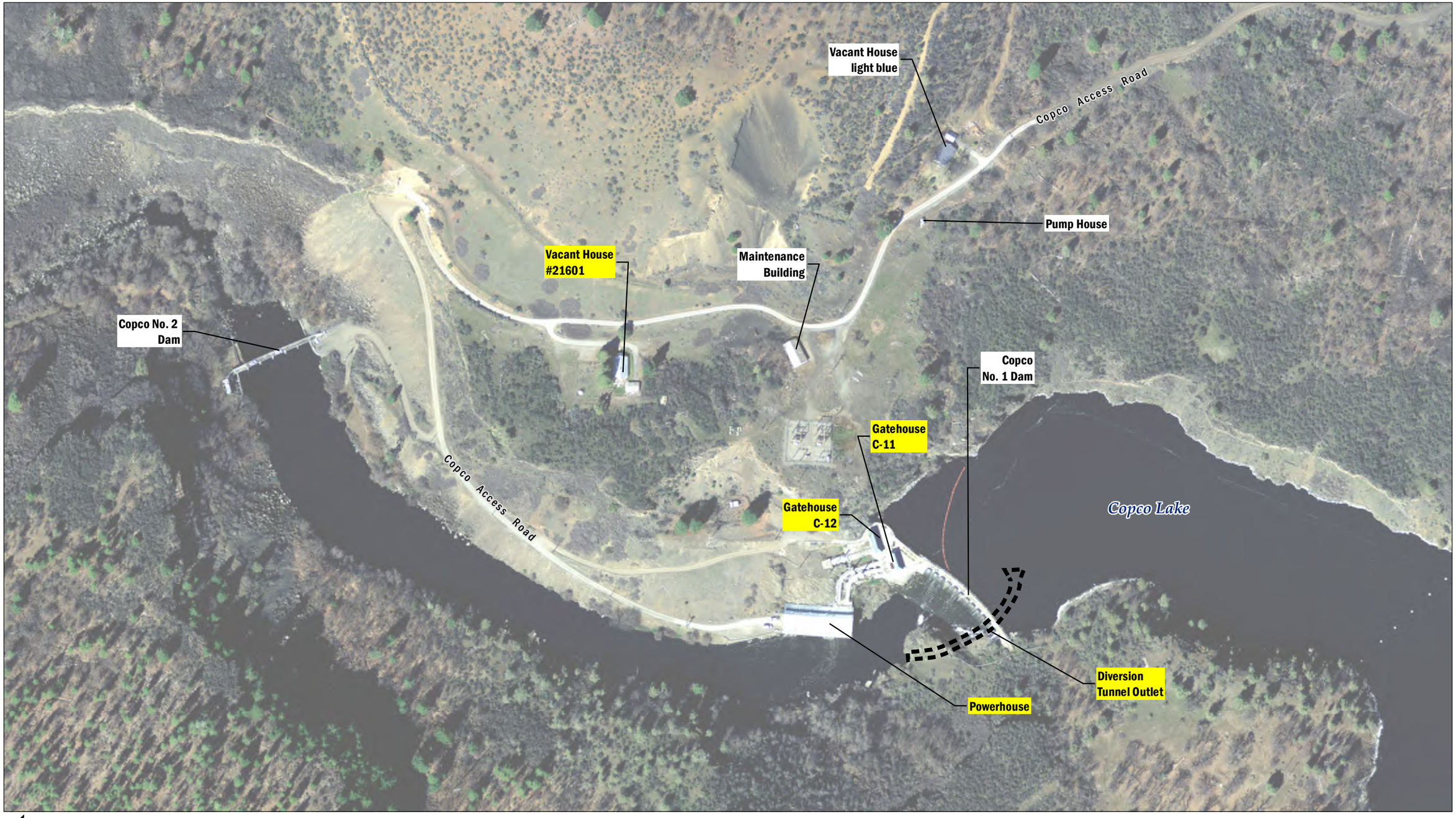


Labels

- Active Bat Roost Confirmed
- Roosting Bats Not Found

FIGURE 7-4

2017-2018 Bat Surveys
Copco No. 2 Powerhouse Area



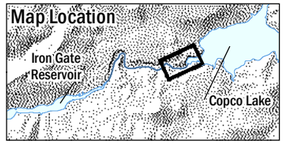
0 300
Feet

DATA SOURCE
NAIP, 2014; USGS (NED), 2015

MAP PREPARED BY:
AECOM Alex Remar, 2/28/2019

PROJECTION
NAD 1983 HARN StatePlane California I FIPS 0401 Feet

AECOM
Klamath River Renewal Corporation
Klamath River Renewal Project

Map Location


Labels
- Active Bat Roost Confirmed
- Roosting Bats Not Found

FIGURE 7-5

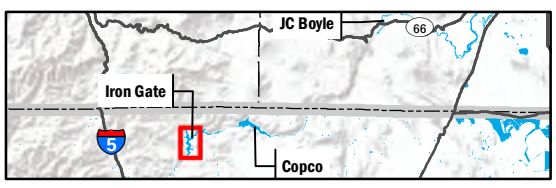
2017-2018 Bat Surveys
Copco No. 1 Dam Area and
Copco No. 2 Dam Area

Camp Crk
Ditch Crk
Juniper Point
Mirror Cove
Iron Gate Reservoir
Long Gulch Cove
Copco Rd
Upstream Left Abutment Access Rd
Brush Crk
Lakeview Road
Siskiyou County
Iron Gate Powerhouse Rd
1
5

2018 Western Pond Turtle Observations
Historical Western Pond Turtle Observations (PacifiCorp 2004)
Historical Turtle Habitat (PacifiCorp 2004)
Basking
Basking & Nesting
No Habitat
State
County
Stream
Access Route
0.25 Mile Study Area Buffer

N
0 0.5
Miles

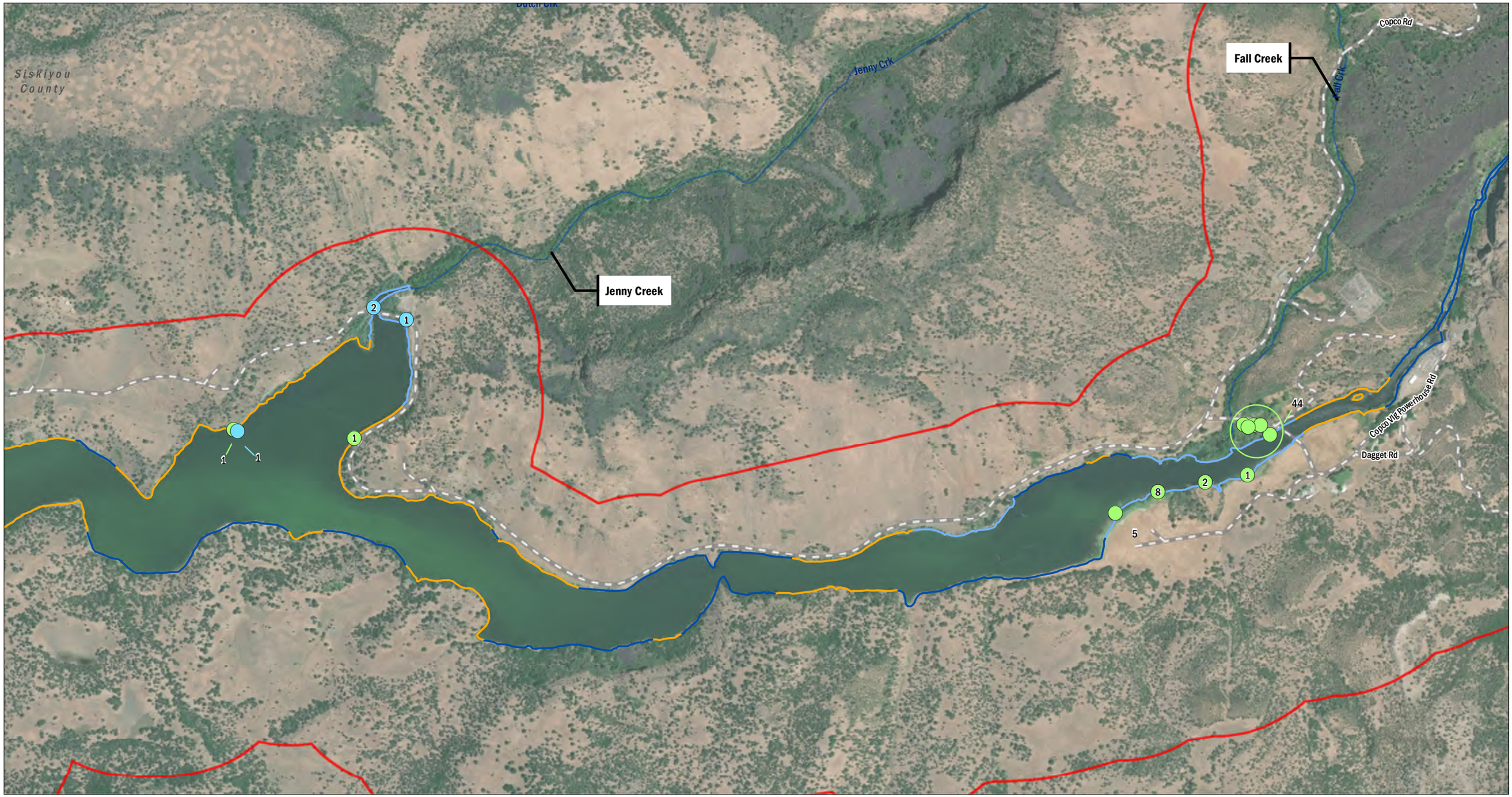
Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA



Klamath River Renewal Corporation
Klamath River Renewal Project

FIGURE 8-1A

Western Pond Turtle Sightings and Habitat
Iron Gate Reservoir



Klamath River Renewal Corporation
Klamath River Renewal Project

FIGURE 8-1B

Western Pond Turtle Sightings and Habitat
Iron Gate Reservoir

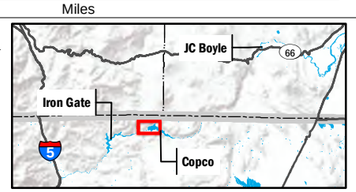
N

0 0.325 0.65

Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



- 2018 Western Pond Turtle Observations
- Historical Western Pond Turtle Observations (PacifiCorp 2004)

Historical Turtle Habitat (PacifiCorp 2004)
- Basking
- Basking & Nesting
- No Habitat
- Not Surveyed

- State
- County
- Stream
- Access Route
- 0.25 Mile Study Area Buffer

FIGURE 8-2A

Western Pond Turtle Sightings and Habitat
Copco Lake

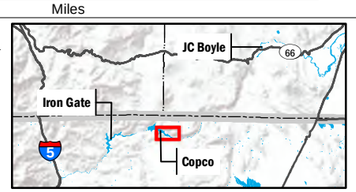
N

0 0.325 0.65

Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



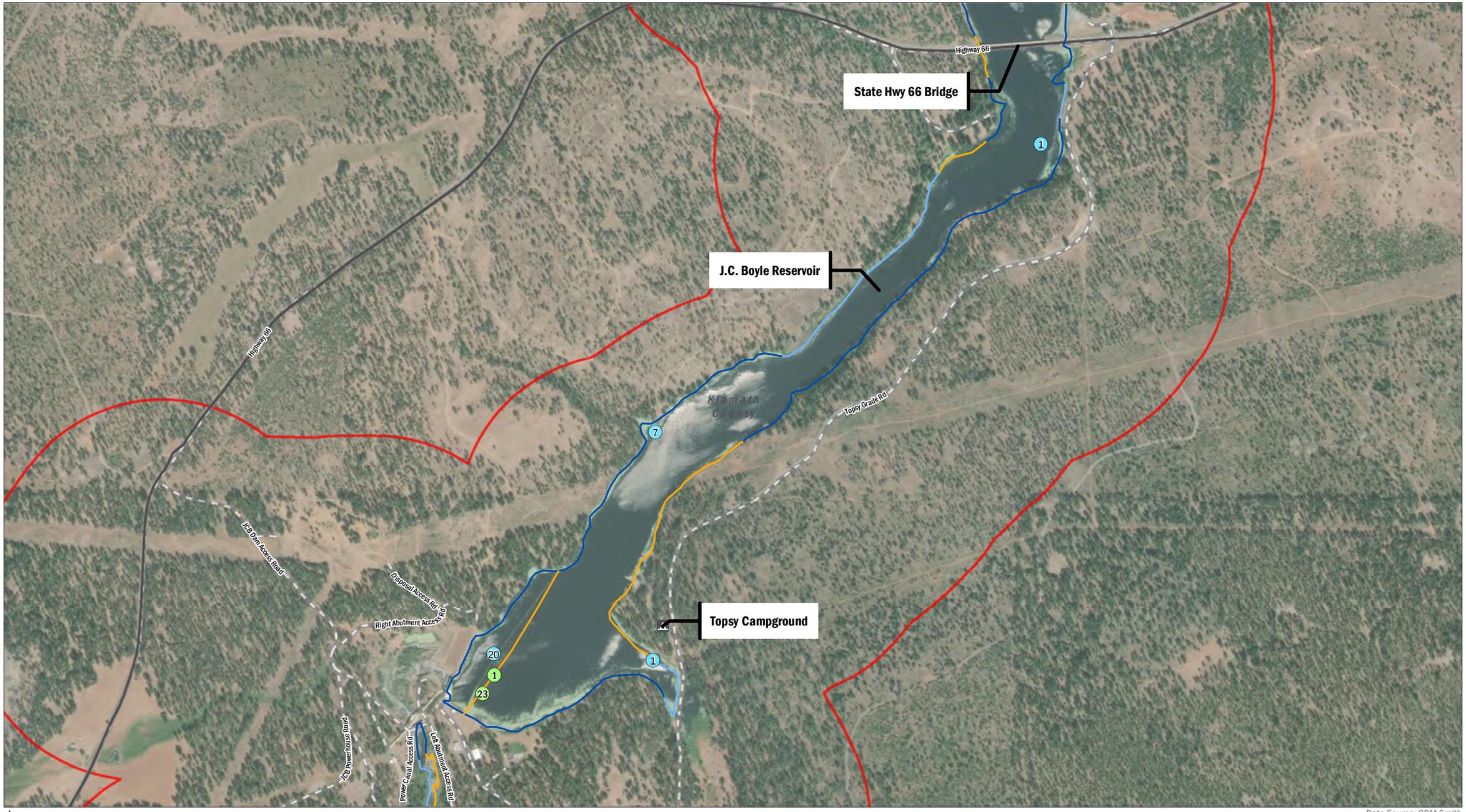
- 2018 Western Pond Turtle Observations
- Historical Western Pond Turtle Observations (PacifiCorp 2004)

Historical Turtle Habitat (PacifiCorp 2004)
- Basking
- Basking & Nesting
- No Habitat
- Not Surveyed

- State
- County
- Stream
- Access Route
- 0.25 Mile Study Area Buffer

FIGURE 8-2B

Western Pond Turtle Sightings and Habitat
Copco Lake



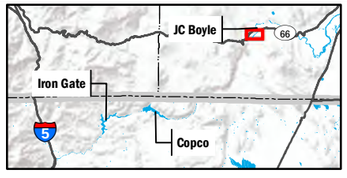
N

0 0.225 0.45

Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



- 2018 Western Pond Turtle Observations
- Historical Western Pond Turtle Observations (PacifiCorp 2004)

Historical Turtle Habitat (PacifiCorp 2004)

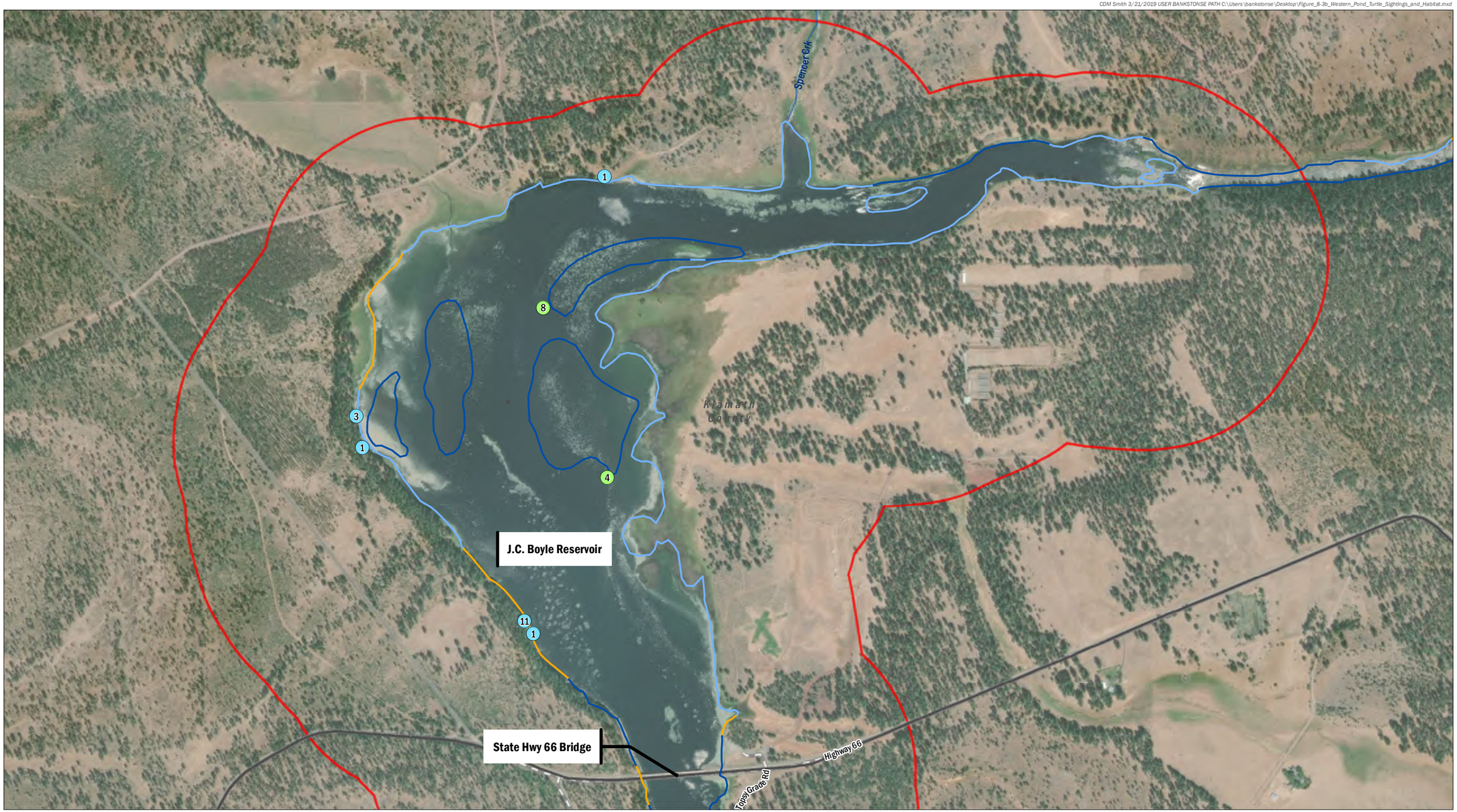
- Basking
- Basking & Nesting
- No Habitat
- Not Surveyed

- State
- County
- Primary Road
- Access Route
- 0.25 Mile Study Area Buffer

FIGURE 8-3A

Western Pond Turtle Sightings and Habitat
J.C. Boyle Reservoir

CDM Smith 3/21/2019 USER BANKSTONSE PATH C:\Users\bankstonse\Desktop\Figure_8-3b_Western_Pond_Turtle_Sightings_and_Habitat.mxd

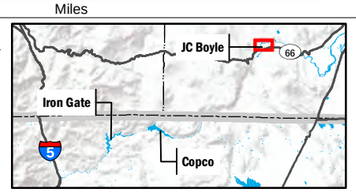


N

0 0.25 0.5
Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



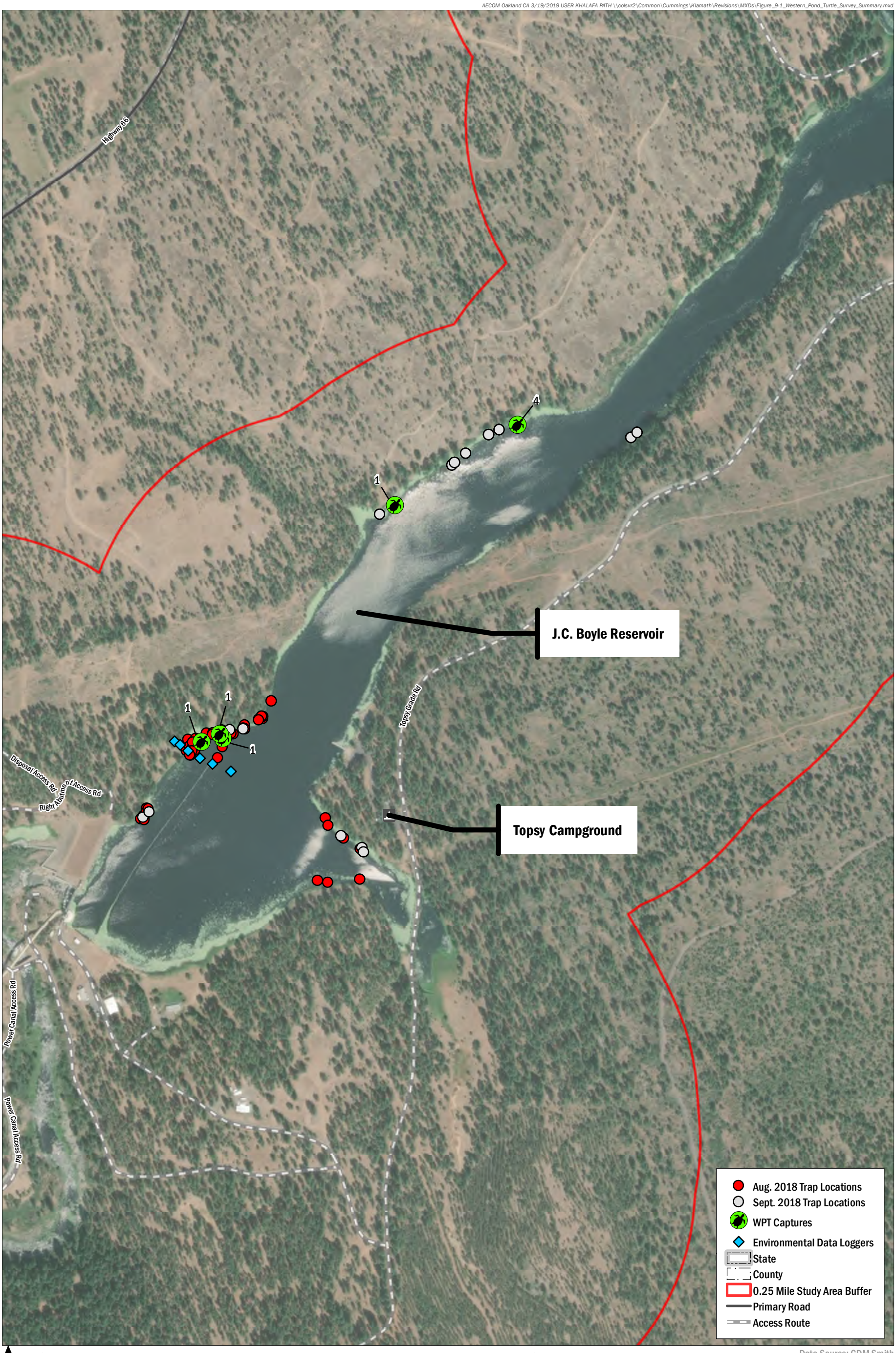
- 2018 Western Pond Turtle Observations
- Historical Western Pond Turtle Observations (PacifiCorp 2004)

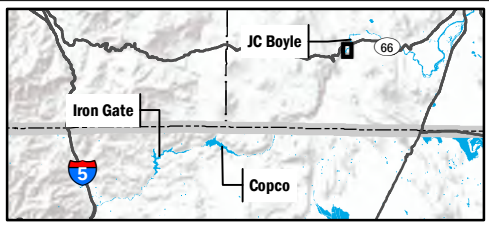
Historical Turtle Habitat (PacifiCorp 2004)
- Basking
- Basking & Nesting
- No Habitat
- Not Surveyed

- State
- County
- Stream
- Primary Road
- Access Route
- 0.25 Mile Study Area Buffer

FIGURE 8-3B

Western Pond Turtle Sightings and Habitat
J.C. Boyle Reservoir

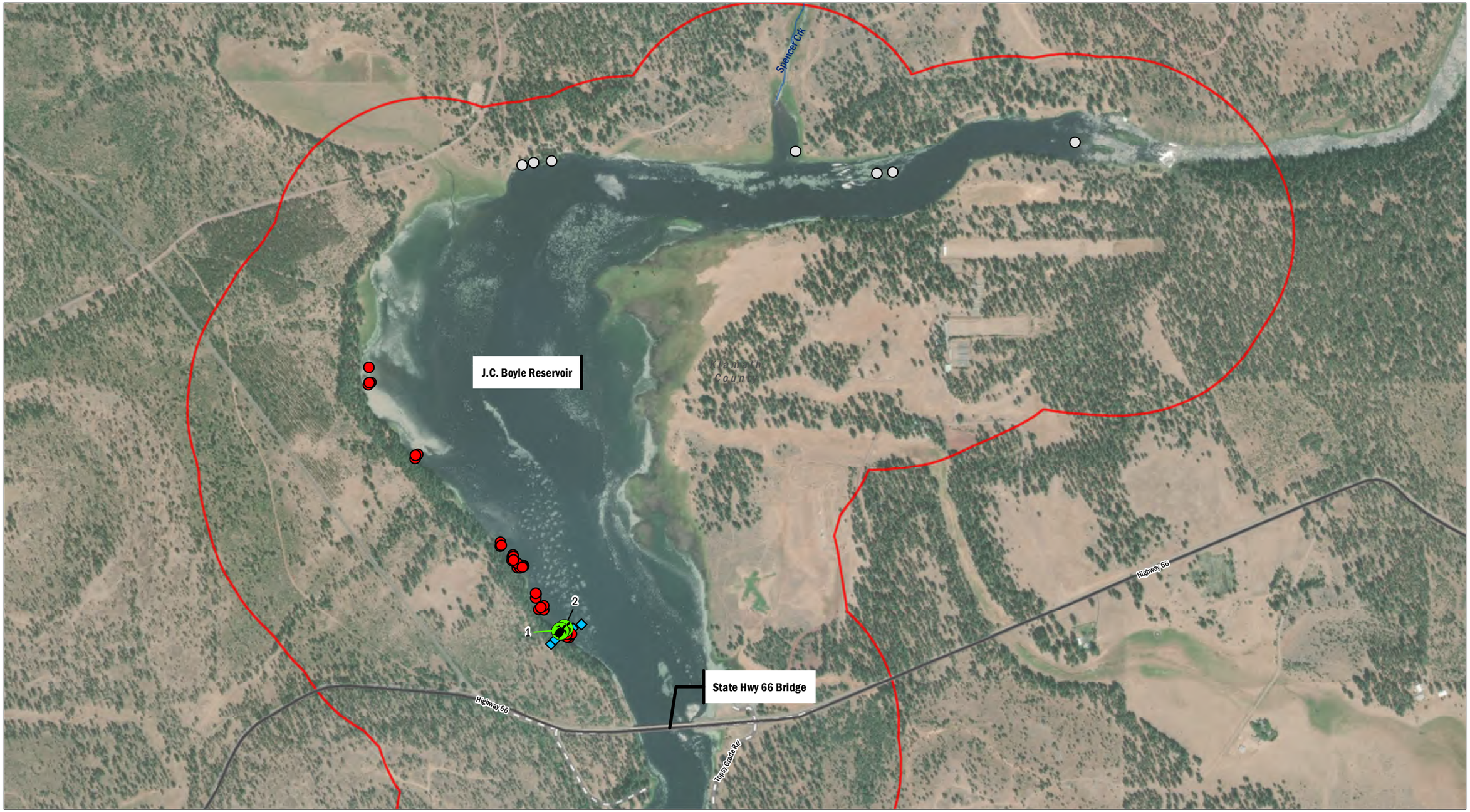




Klamath River Renewal Corporation
Klamath River Renewal Project

FIGURE 9-1

2018 Western Pond Turtle Survey Summary
J.C. Boyle Reservoir - South

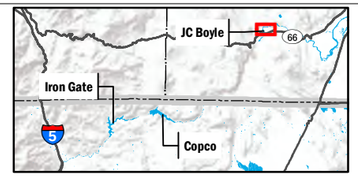


N

0 0.25 0.5
Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

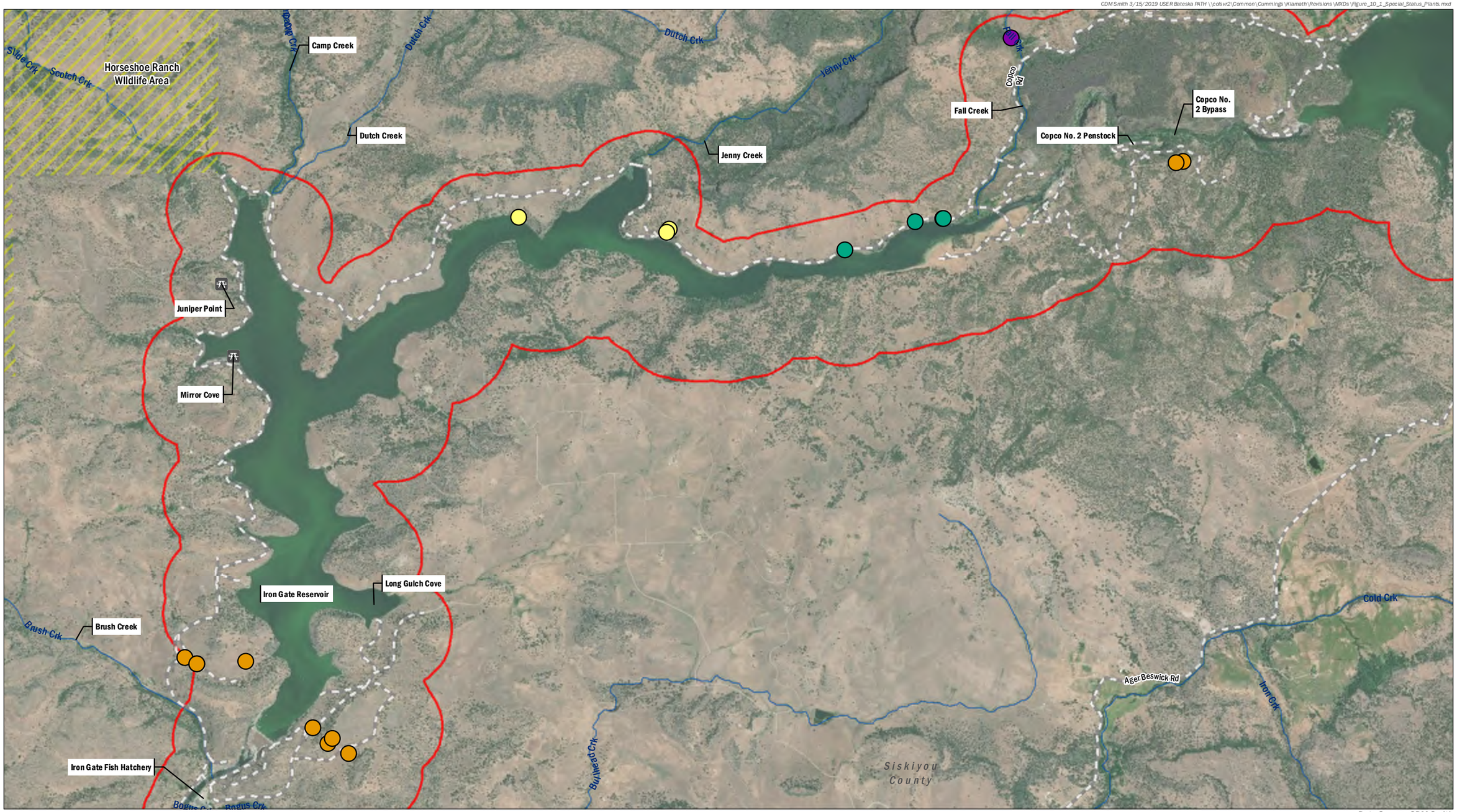
Klamath River Renewal Corporation
Klamath River Renewal Project



- Aug. 2018 Trap Locations
- Sept. 2018 Trap Locations
- WPT Captures
- Environmental Data Loggers
- State
- County
- Stream
- Primary Road
- Secondary Road
- Access Route
- 0.25 Mile Study Area Buffer

FIGURE 9-2

2018 Western Pond Turtle Survey Summary
J.C. Boyle Reservoir - North



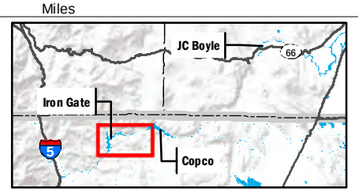
N

0 0.75 1.5

Miles

Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



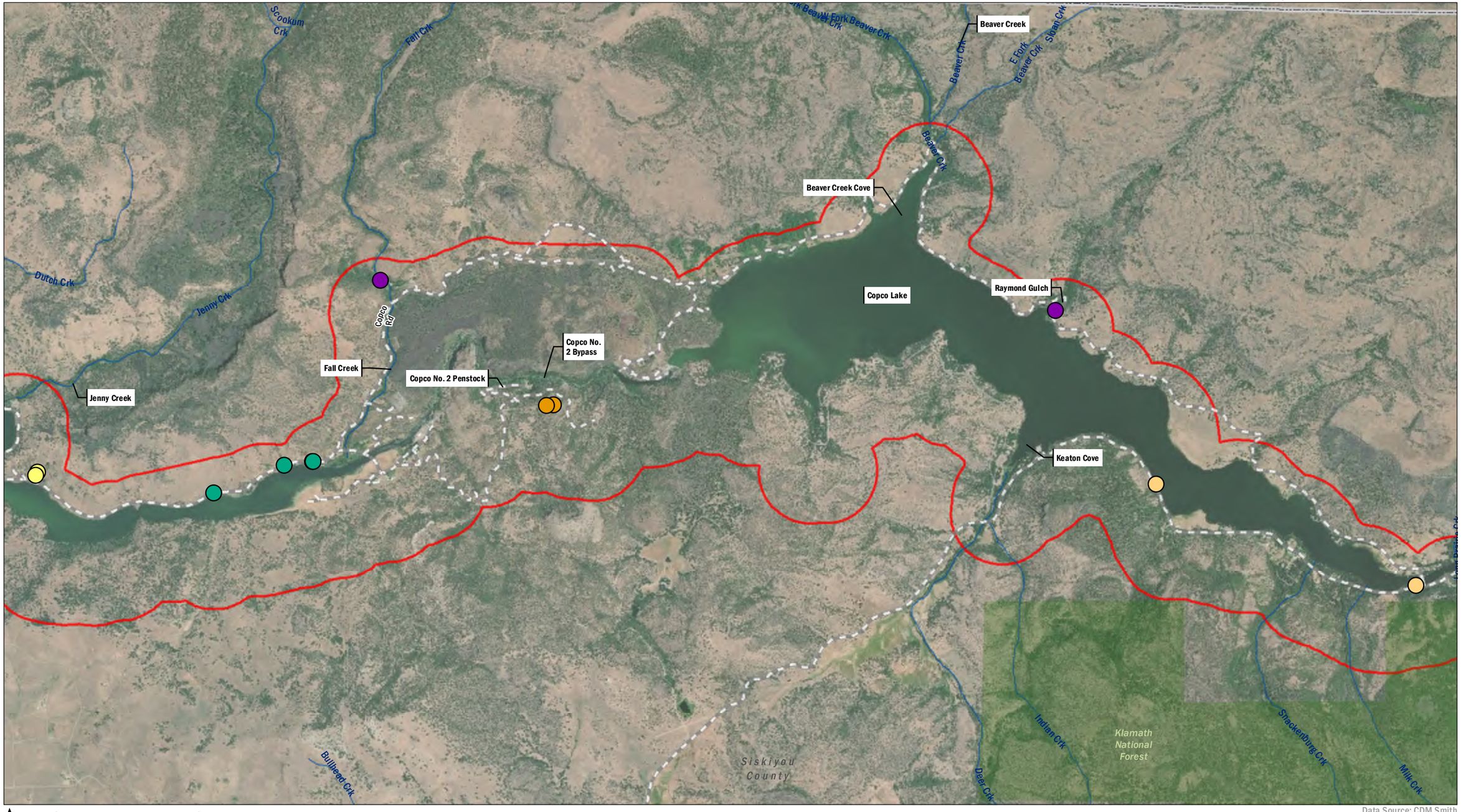
2018 Special Status Plants Observations
- Greene's Mariposa Lily (Calochortus greenei)
- Washingotn Lily (Lilium washingtonianum ssp. purpurascens)
- Greene's Four O'Clock (Mirabilis greenei)
- Fleshy Sage (Salvia dorii)

- Primary Road
- Access Route
- Stream
- 0.25 Mile Study Area Buffer

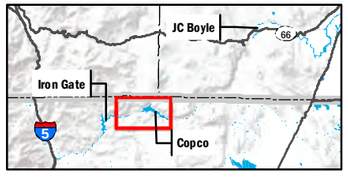
FIGURE 10-1

2018 Special-Status Plant Surveys
Iron Gate Reservoir

CDM Smith 3/15/2019 USER Bateska PATH \\colsvr2\Common\Cummings\Klamath\Revisions\MXDs\Figure_10_2_Special_Status_Plants.mxd



Klamath River Renewal Corporation
Klamath River Renewal Project

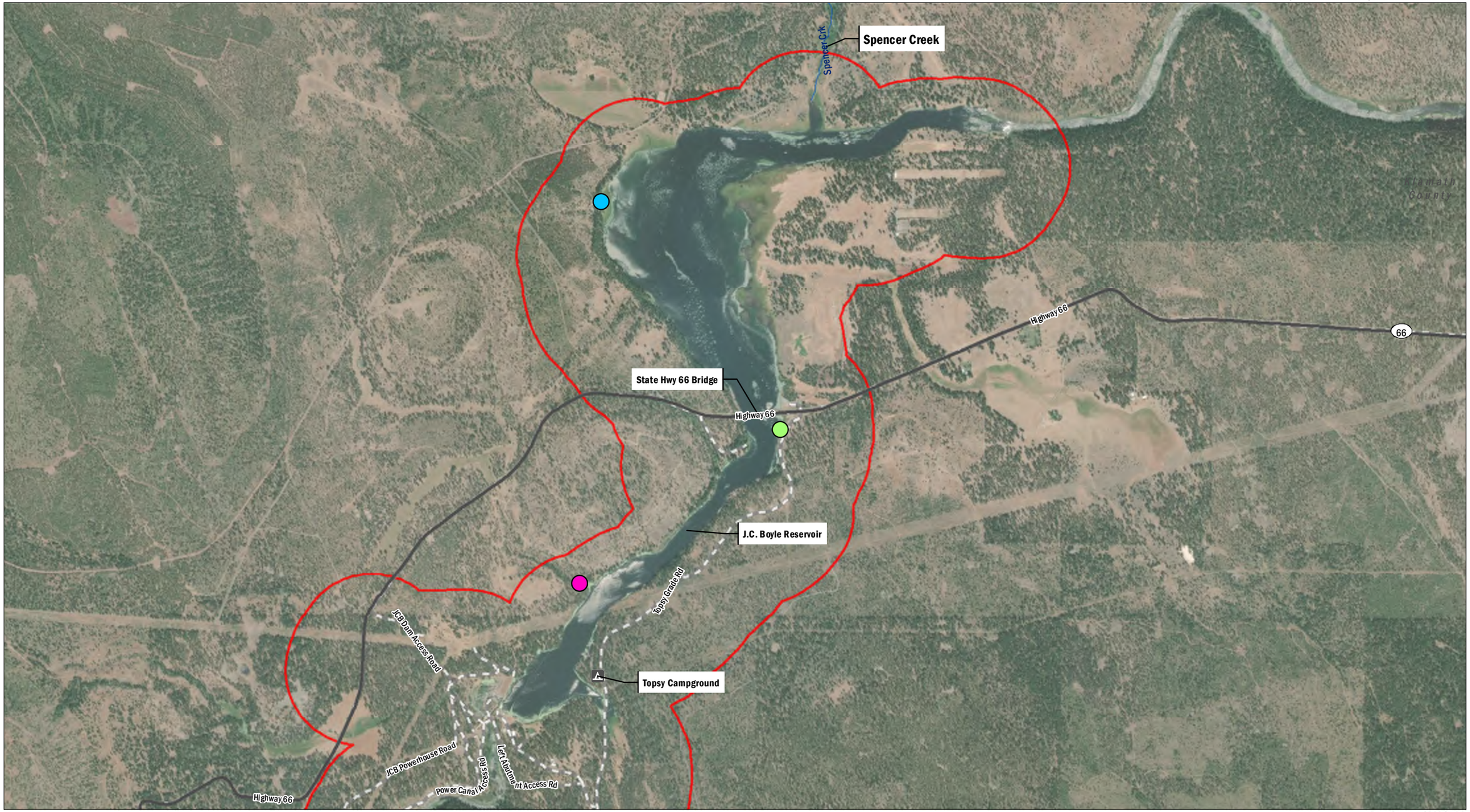


2018 Special Status Plants Observations
- Greene's Mariposa Lily (Calochortus greenei)
- Calochortus sp.
- Washingotn Lily (Lilium washingtonianum ssp. purpurascens)
- Greene's Four O'Clock (Mirabilis greenei)
- Fleshy Sage (Salvia dorii)

- 0.25 Mile Study Area Buffer
- State
- County
- Stream
- Access Route

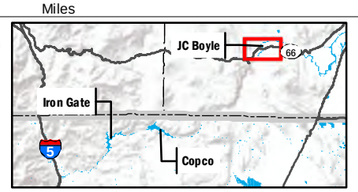
FIGURE 10-2

2018 Special-Status Plant Surveys
Copco Lake



Data Source: CDM Smith
Basemap Source: Esri, USGS, NOAA

Klamath River Renewal Corporation
Klamath River Renewal Project



2018 Special Status Plants Observations
- Bristly Sedge (Carex comosa)
- Coast Irirs (Iris longipetala)
- Western Yampah

- Primary Road
- Access Route
- Stream
- 0.25 Mile Study Area Buffer

FIGURE 10-3

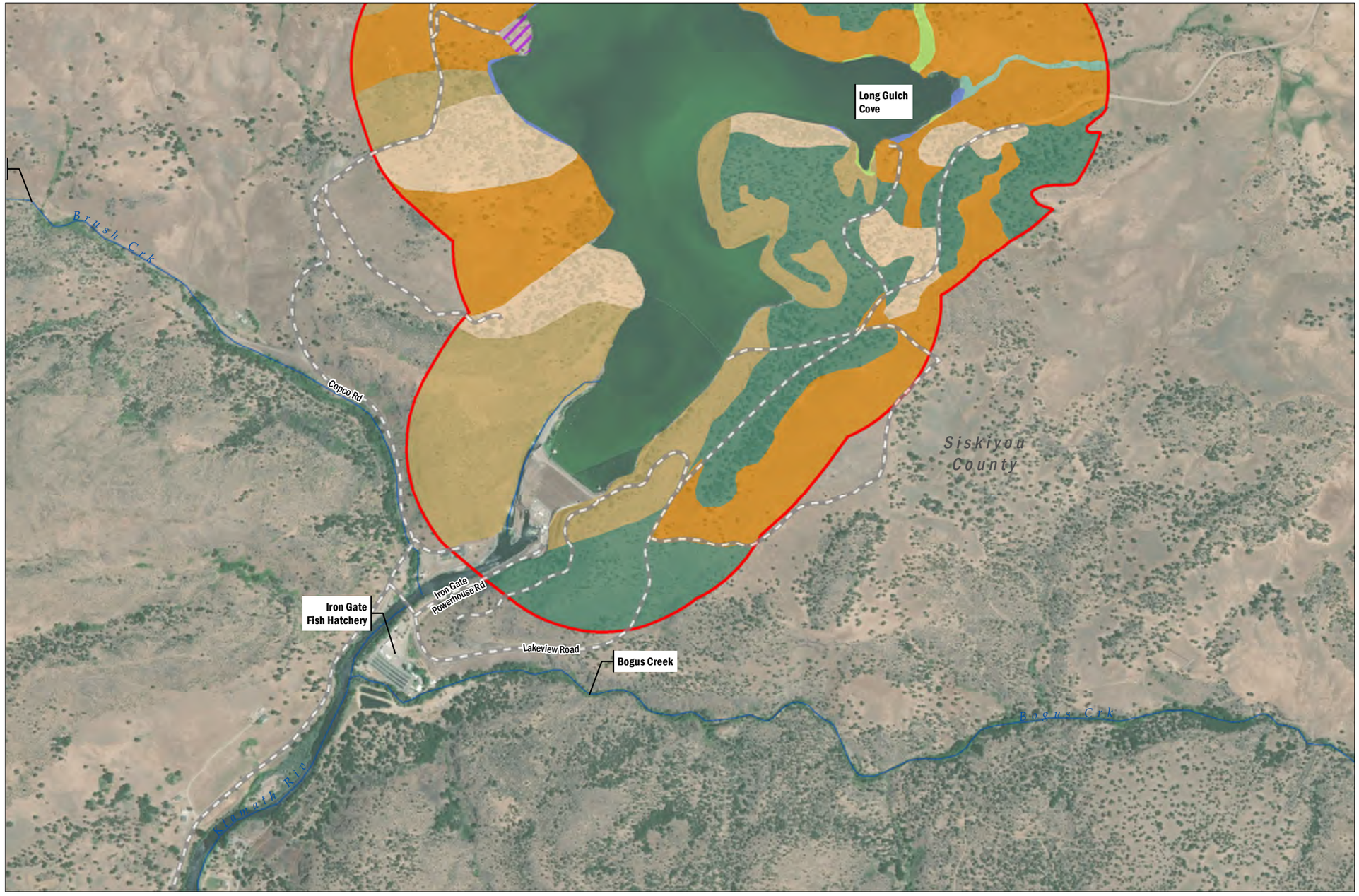
2018 Special-Status Plant Surveys
J.C. Boyle Reservoir

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus



N

0 0.5

Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation

Klamath River Renewal Project

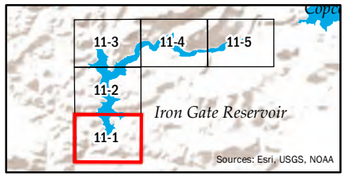


FIGURE 11-1

Vegetation Communities

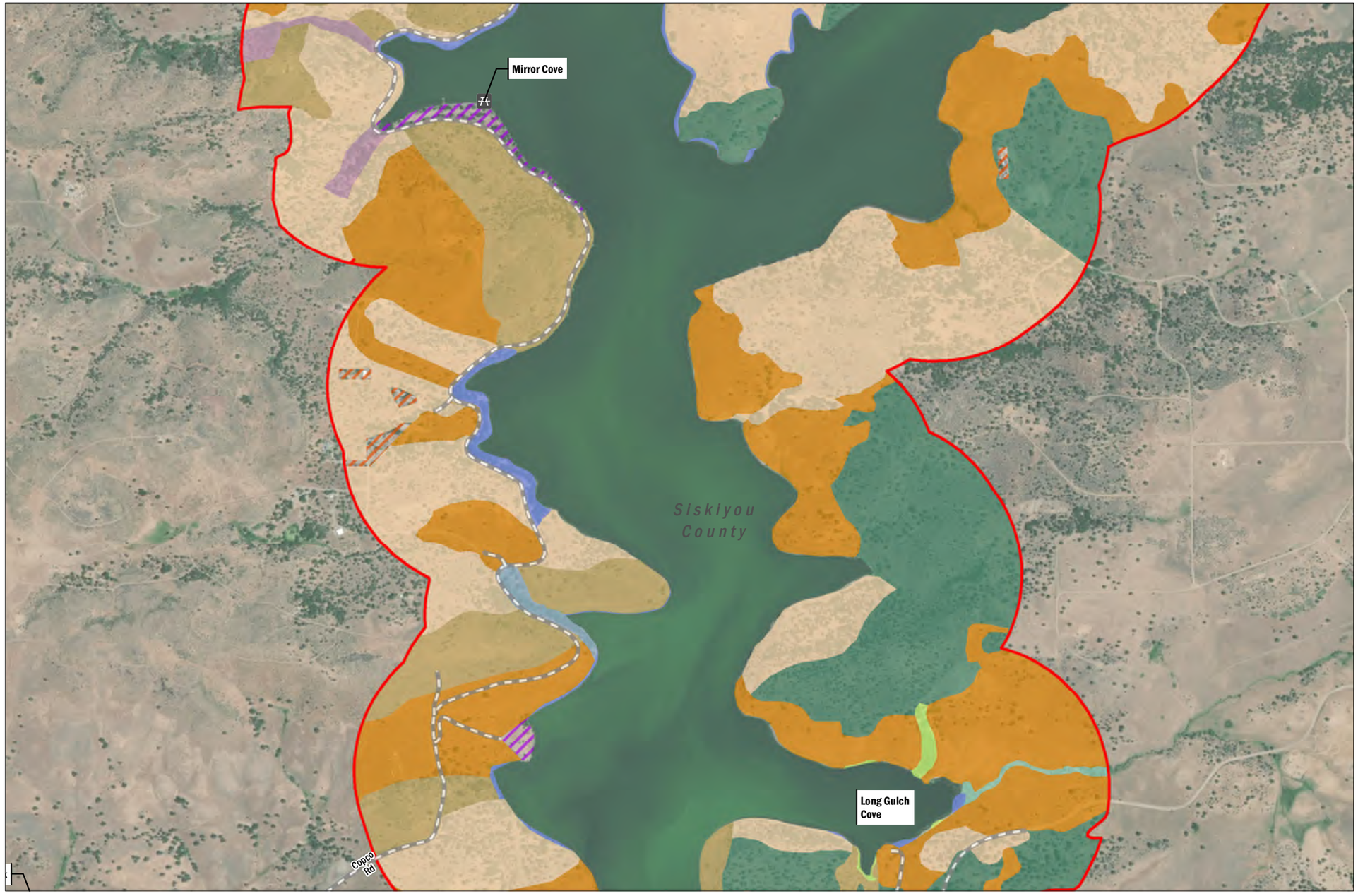
Iron Gate Reservoir

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus



N

0 0.5 Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation
Klamath River Renewal Project

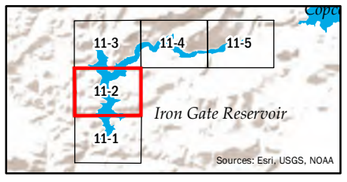


FIGURE 11-2

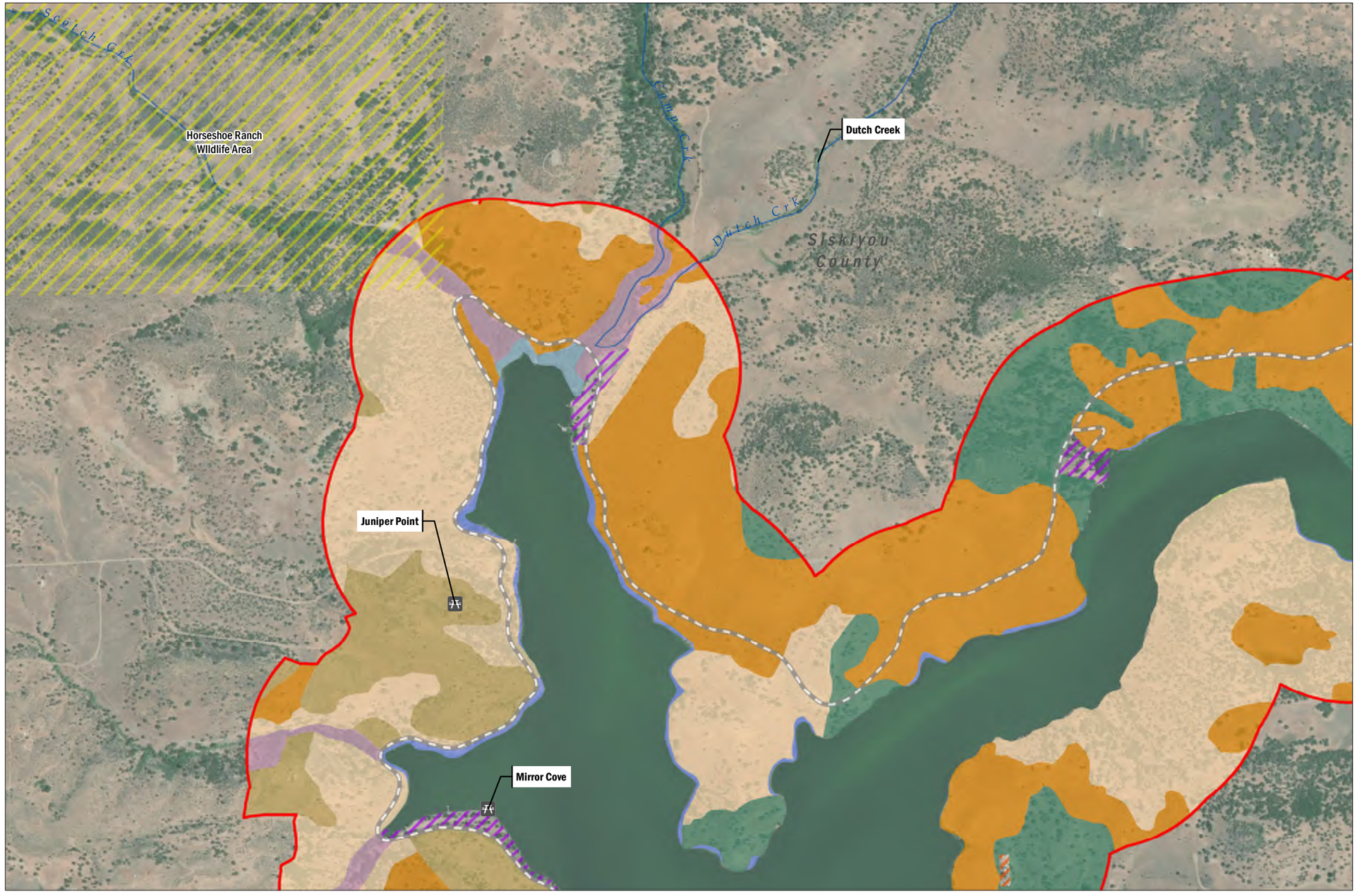
Vegetation Communities
Iron Gate Reservoir

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus



N

0 0.5
Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation
Klamath River Renewal Project

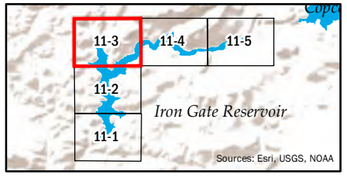


FIGURE 11-3

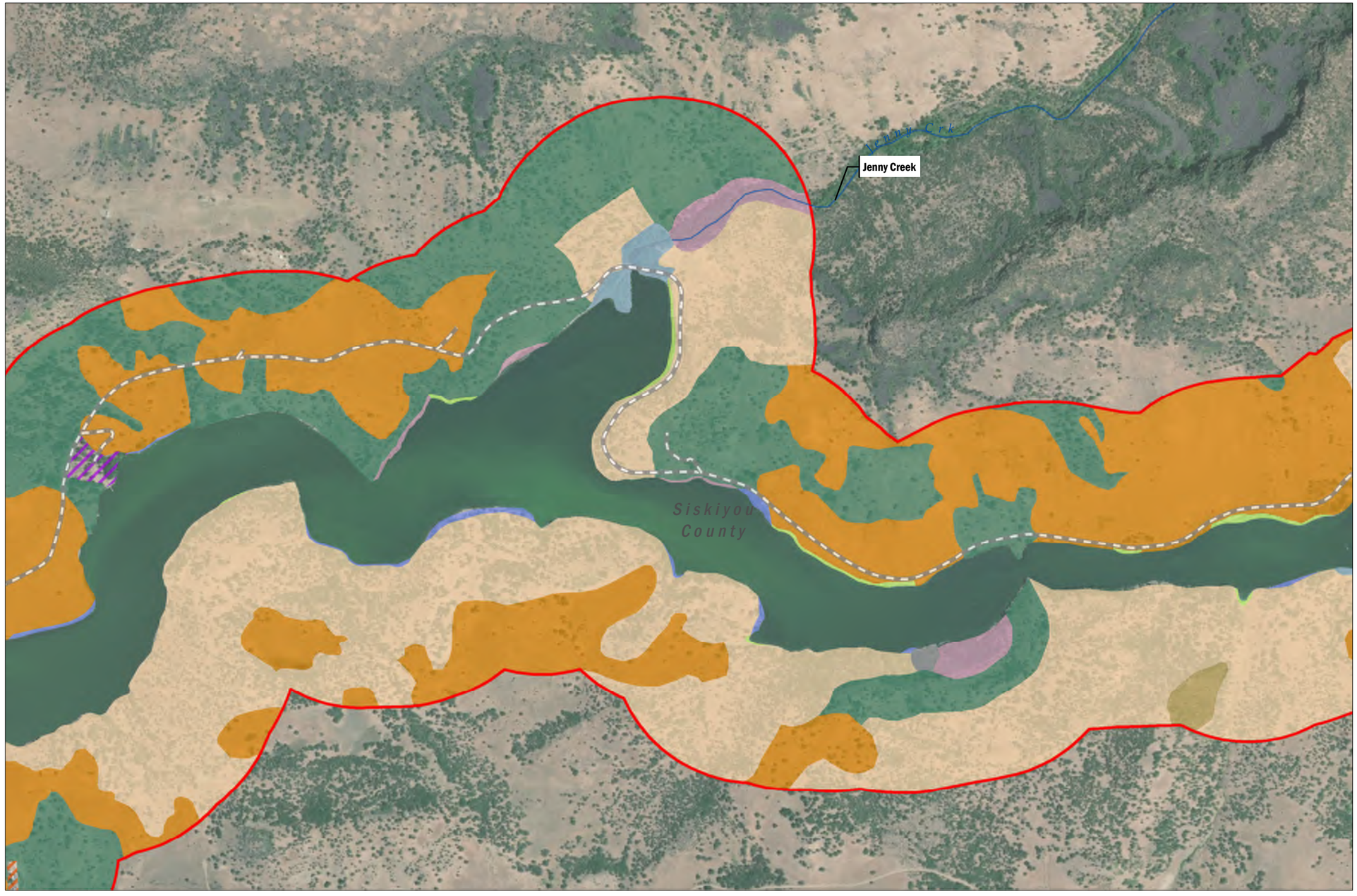
Vegetation Communities
Iron Gate Reservoir

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus



N

0 0.5

Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation

Klamath River Renewal Project

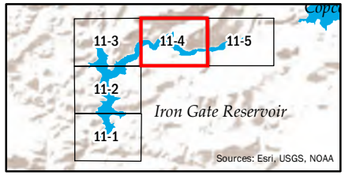


FIGURE 11-4

Vegetation Communities

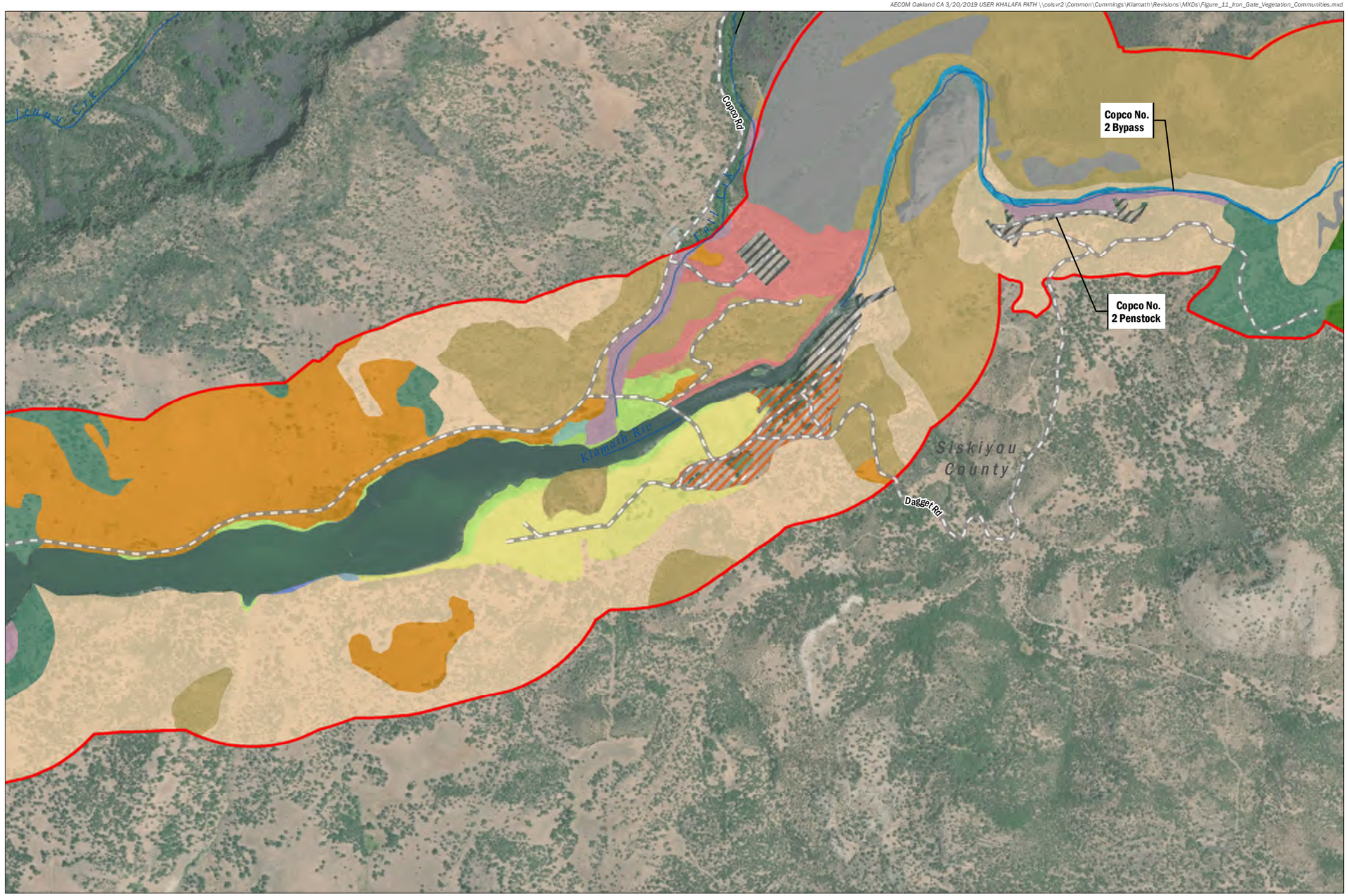
Iron Gate Reservoir

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus



N

0 0.5 Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation
Klamath River Renewal Project

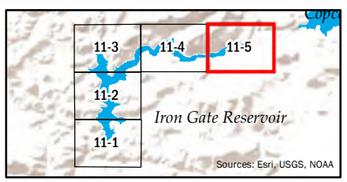


FIGURE 11-5

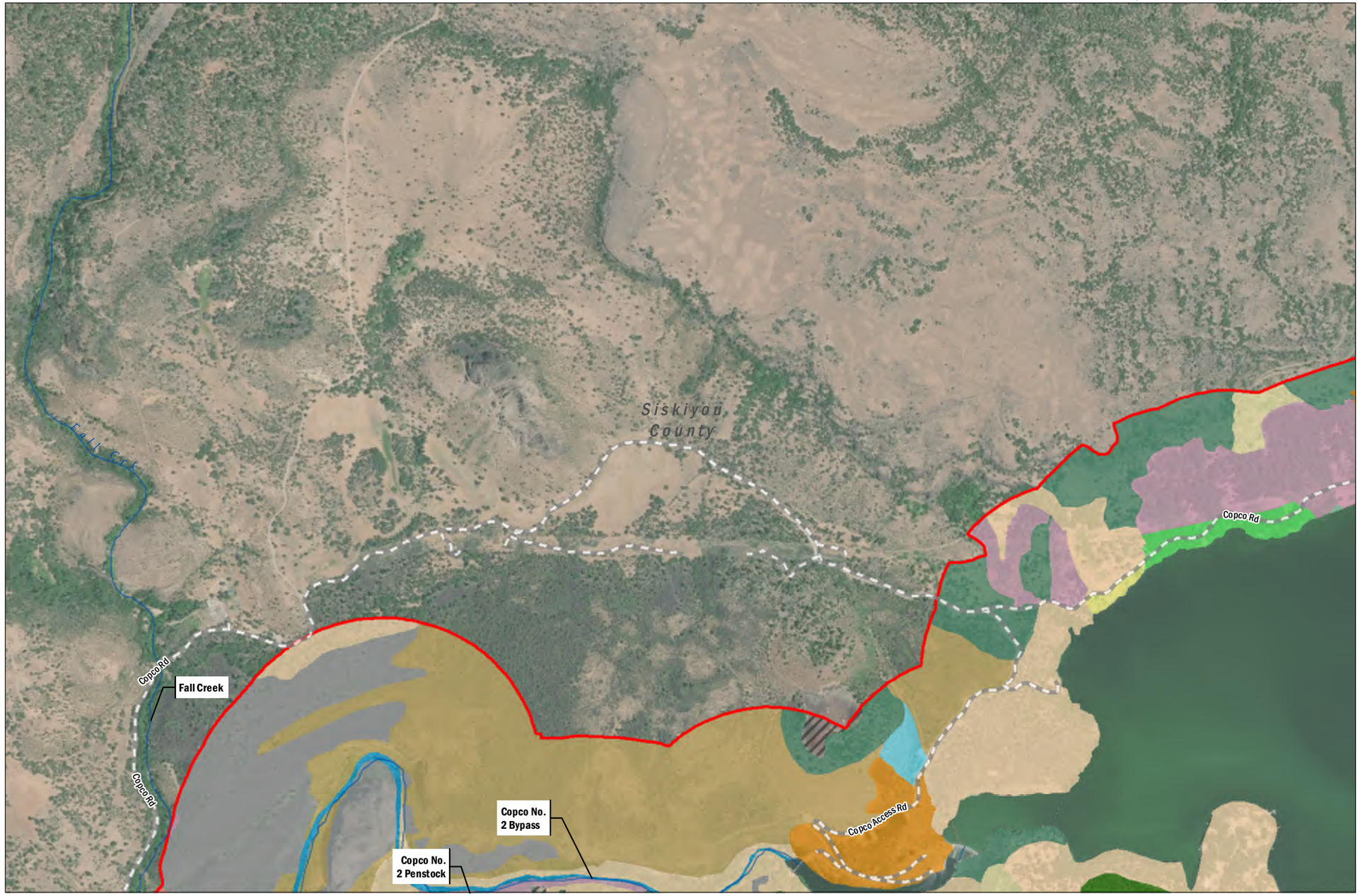
Vegetation Communities
Iron Gate Reservoir

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus



Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

N

0 0.5 Miles

Klamath River Renewal Corporation
Klamath River Renewal Project

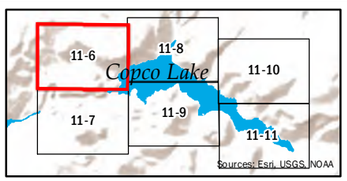


FIGURE 11-6

Vegetation Communities
Copco Lake

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus

N

0 0.5 Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation

Klamath River Renewal Project

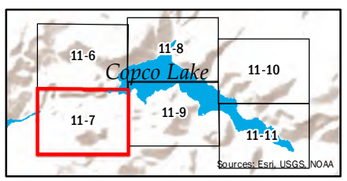


FIGURE 11-7

Vegetation Communities

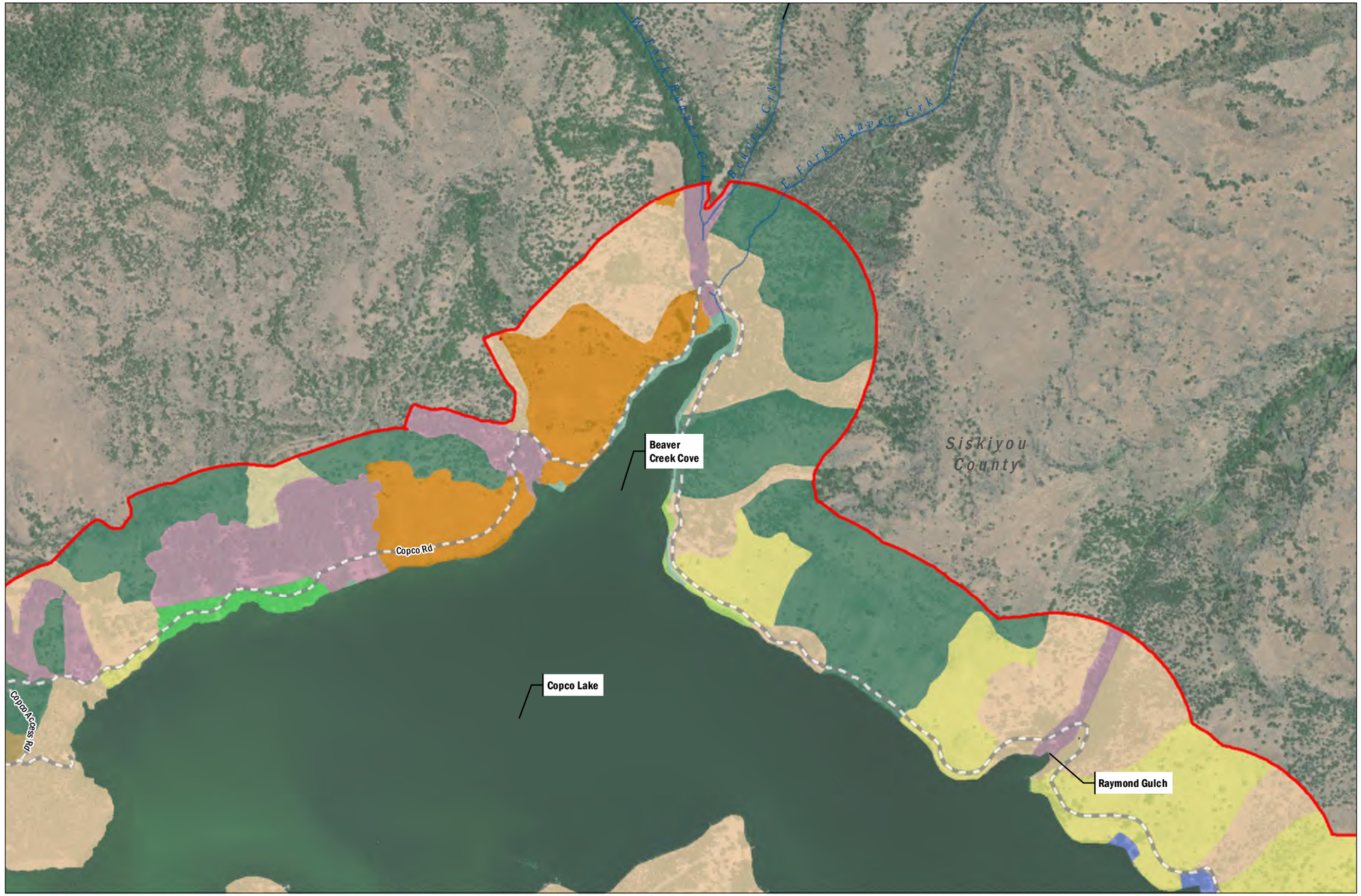
Copco Lake

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus



N

0 0.5 Miles

Klamath River Renewal Corporation

Klamath River Renewal Project

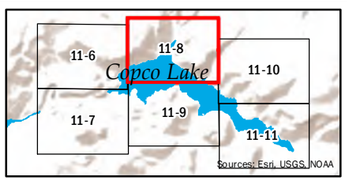


FIGURE 11-8

Vegetation Communities

Copco Lake

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus

N

0 0.5

Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation

Klamath River Renewal Project

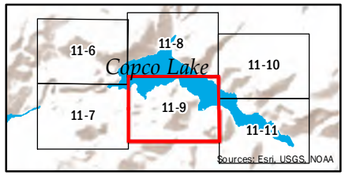


FIGURE 11-9

Vegetation Communities

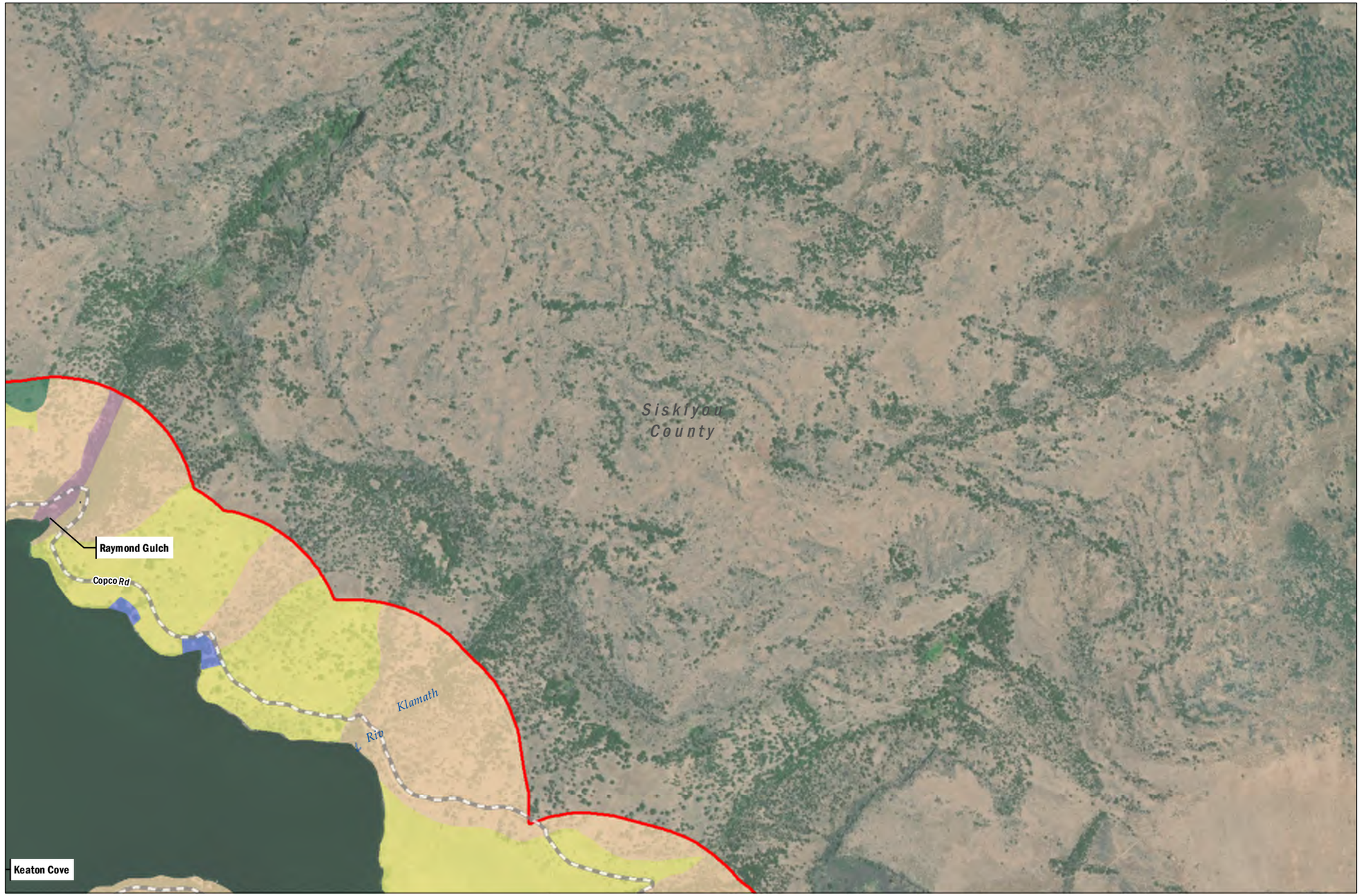
Copco Lake

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus



N

0 0.5 Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation
Klamath River Renewal Project

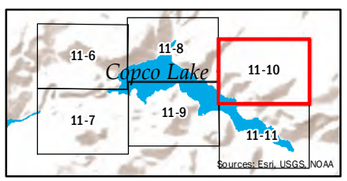


FIGURE 11-10

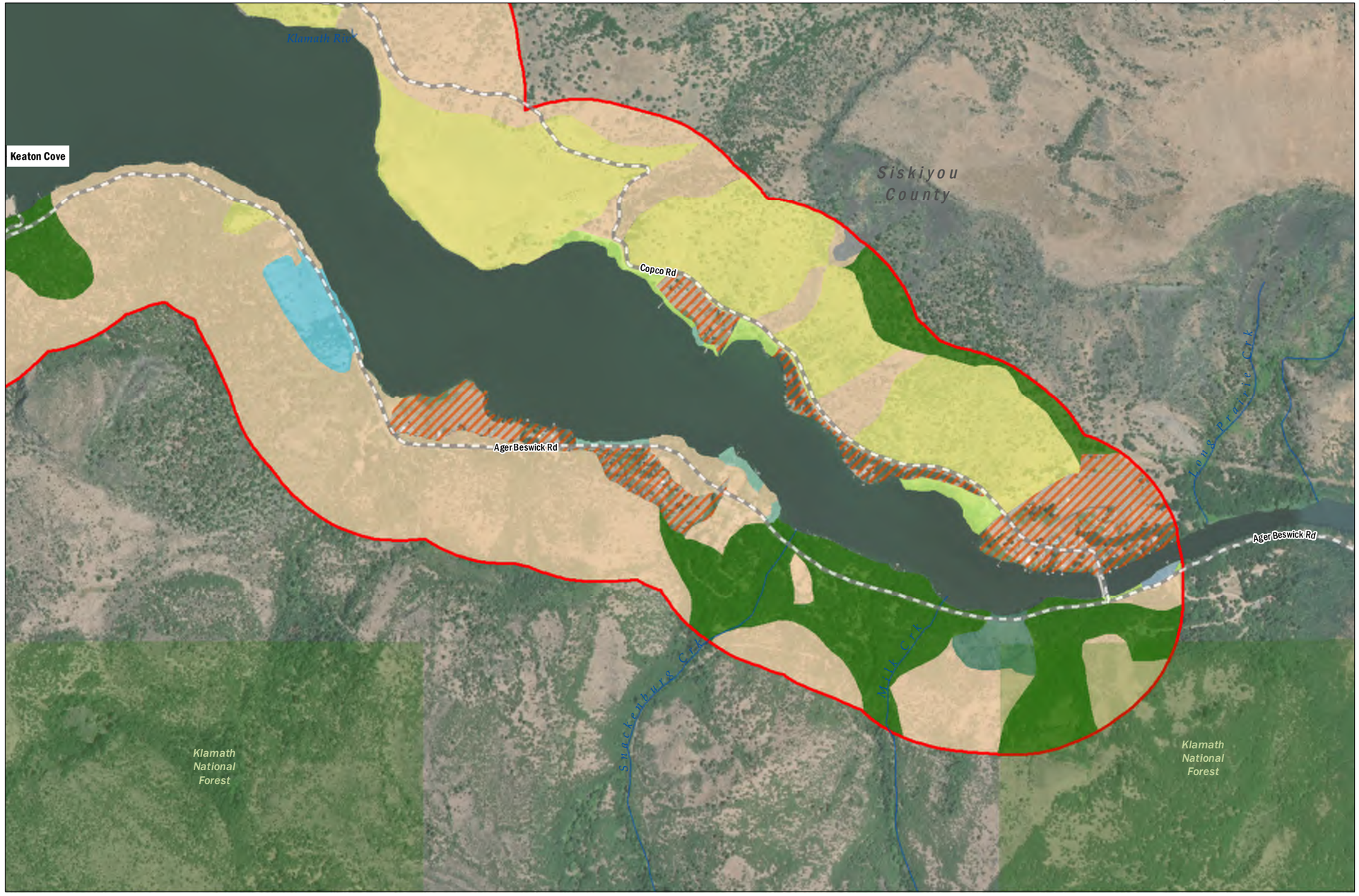
Vegetation Communities
Copco Lake

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus



N

0 0.5

Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation

Klamath River Renewal Project

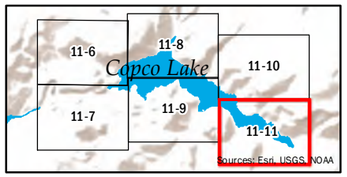


FIGURE 11-11

Vegetation Communities

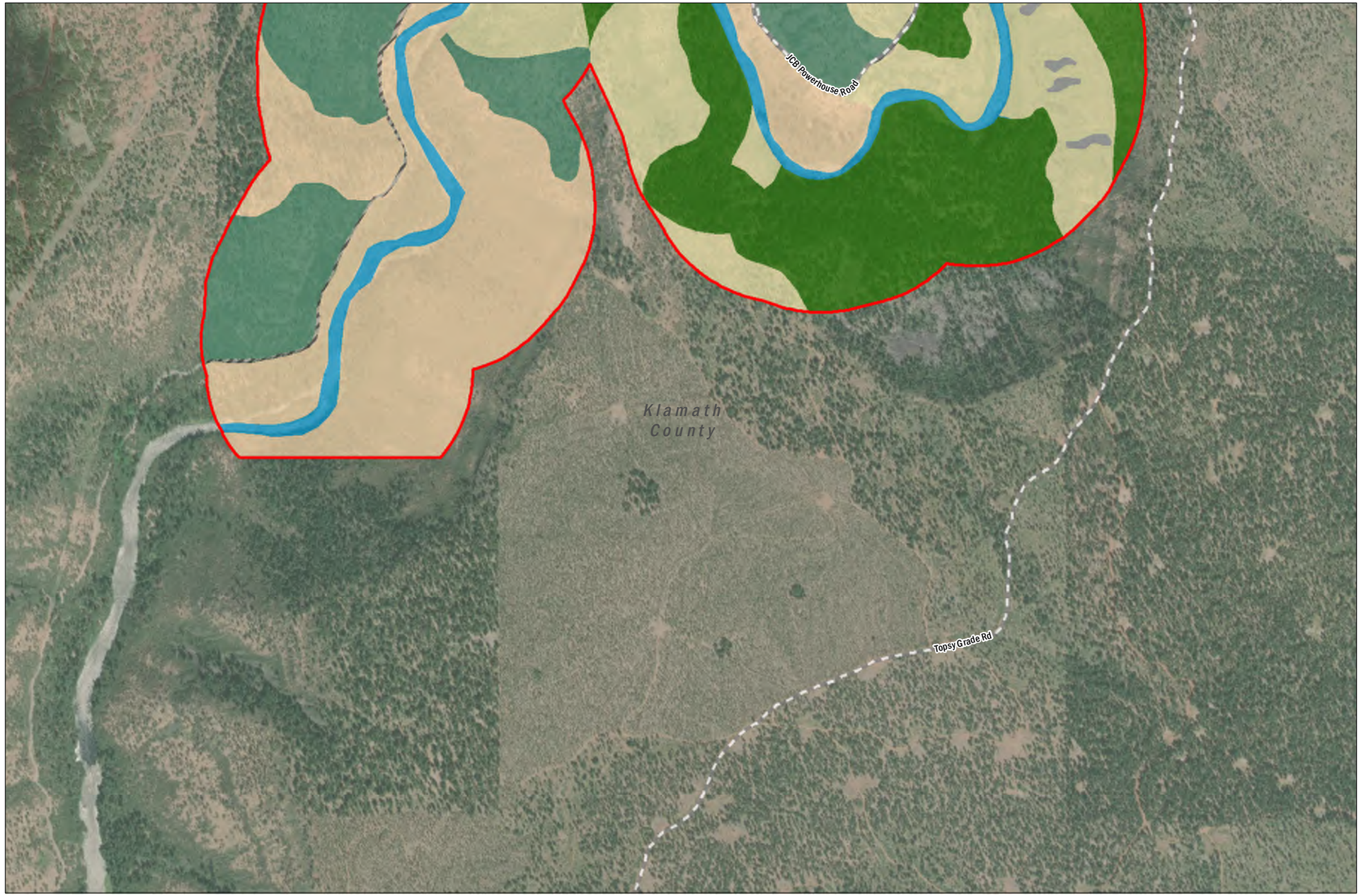
Copco Lake

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus



N

0 0.5
Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation
Klamath River Renewal Project

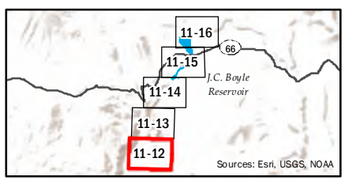


FIGURE 11-12

Vegetation Communities
JC Boyle Reservoir

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus

N

0 0.5

Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation

Klamath River Renewal Project

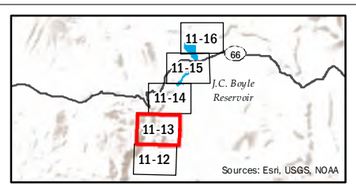


FIGURE 11-13

Vegetation Communities

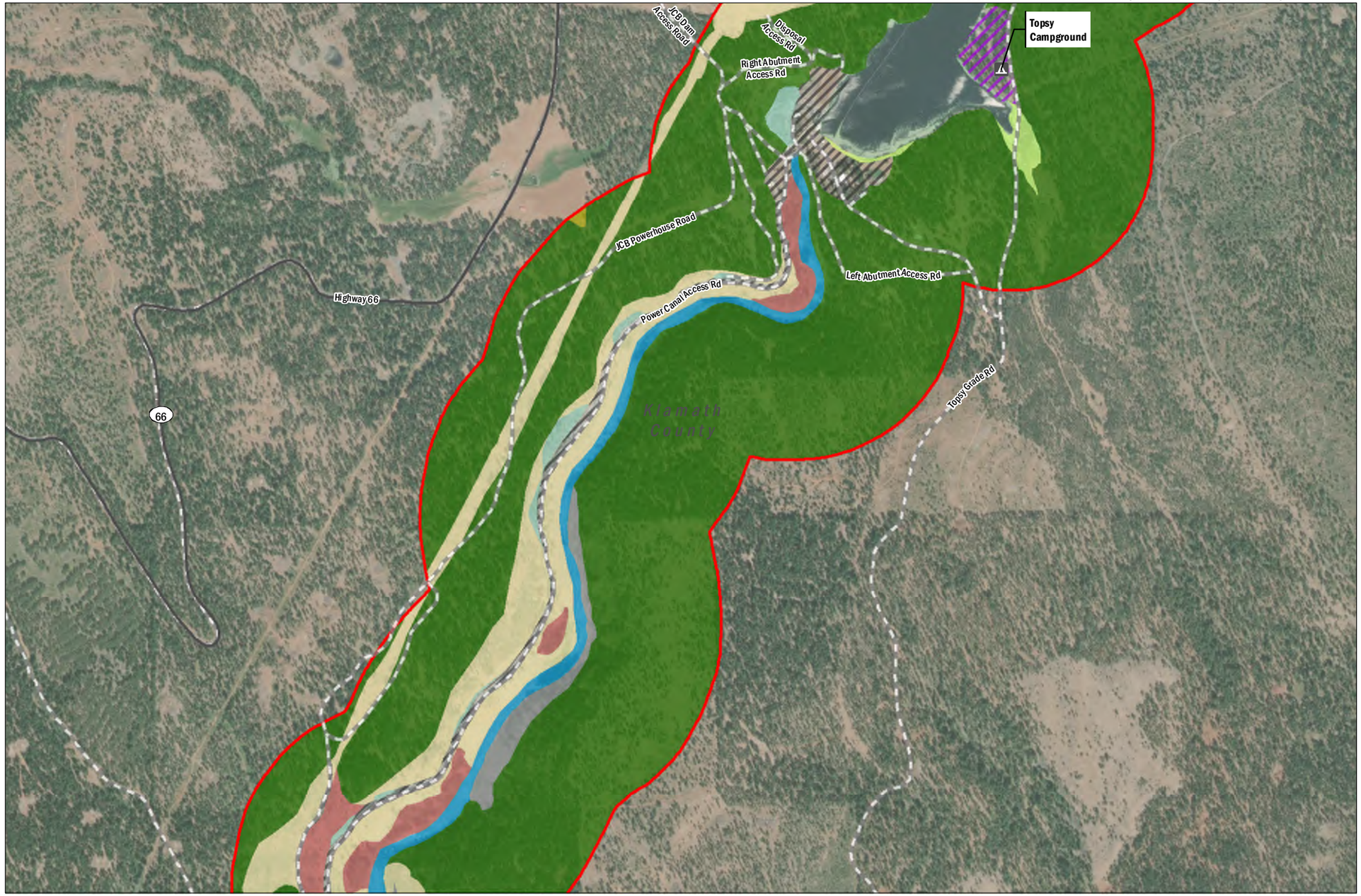
JC Boyle Reservoir

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus



N

0 0.5

Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation

Klamath River Renewal Project

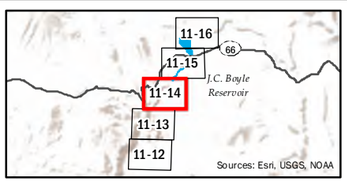


FIGURE 11-14

Vegetation Communities

JC Boyle Reservoir

LEGEND

- Access Route
- State
- County
- Stream
- 0.25 Mile Study Area Buffer

Alliance Name

- Annual brome grasslands
- Bigleaf maple forest
- Birch leaf mountain mahogany
- Bitterbrush scrub
- Cheatgrass - medusahead grassland
- Chokecherry thicket
- Geyer willow thicket
- Hardstem bulrush marsh
- Klamath plum shrubland
- Oregon ash grove
- Oregon white oak woodland
- Ponderosa pine forest
- Sedge meadow
- Shining willow grove
- Wedgeleaf ceanothus chaparral
- Western juniper woodland
- Willow thickets
- Agricultural pasture
- Disturbed
- Recreational
- Residential
- Riverine
- Talus

N

0 0.5

Miles

Data Source: CDM Smith, Basemap (Esri, USGS, NOAA)

Klamath River Renewal Corporation

Klamath River Renewal Project

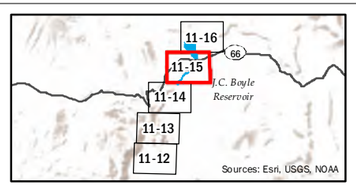


FIGURE 11-15

Vegetation Communities

JC Boyle Reservoir