

## ATTACHMENT 1

### LICENSEES’ RESPONSES TO FERC’S FEBRUARY 23, 2021 SCHEDULE A – REQUESTS FOR ADDITIONAL INFORMATION

#### Developmental Analysis

##### 1. FERC-1 Comment:

*The Final License Application (FLA), Exhibit D, Section 6.1.1 No Action, states the co-licensees paid \$4,361,000 for electricity to pump water from Elderberry Forebay to Pyramid Lake. Please provide the amount of energy in megawatt-hours required to pump the water.*

##### **Licensees’ Response:**

The annual average amount of energy required to pump water from Elderberry Forebay to Pyramid Lake that corresponds to the average annual costs of \$4,361,000 as presented for the No Action Alternative discussed in the Licensees FLA, Exhibit D, Section 6.1.1, is 154,852 megawatt-hours.

#### Water Quantity

##### 2. FERC-2 Comment:

*In their Preliminary Terms and Conditions Provided Under Section 4(e), Forest Service indicates that the amount of groundwater that seeps into the Angeles Tunnel during drainage events (e.g., routine maintenance) is significant enough to warrant measurement. The FLA, page 5-24, Exhibit E, indicates groundwater seepage into the Angeles Tunnel during construction was reported but was generally minor. To facilitate our analysis of this issue, please provide the frequency at which the Angeles Tunnel is dewatered and estimated rates of seepage (either in gallons per minute or cfs) into the Angeles Tunnel, if available.*

##### **Licensees’ Response:**

Since the Project began operation in 1972, the Angeles Tunnel has been pressurized for approximately 17,900 days and dewatered for inspection for approximately 18 days (about 0.001 percent of the time). The inspection duration is typically three days about once every 10 years. Past inspections of the Angeles Tunnel occurred in 1974, 1984, 1994-1995<sup>1</sup>, 2006, and 2016. During the inspections, the inspectors do not normally measure seepage volume, rather they focus on corrosion and signs of tunnel instabilities, which can include large seepage areas. No large seepage areas have been observed to date. During the most recent inspection in 2016, the inspectors’ report noted 125 locations where

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<sup>1</sup> The 1994-1995 inspection of the Angeles Tunnel occurred on December 15, 1994 and January 17, 1995 and is considered to be one inspection.

slow leaks were present over the 7.15-mile-long tunnel, concluding “For the most part, the Angeles Tunnel [during the inspection] was watertight, had slow leaks, or small pinhole-sized spouts of water.” The inspectors estimated that one of the four areas “that showed a larger flow rate” was seeping at a rate of about 2 gallons per minute (gpm). As a very gross approximation, assuming each of the other three areas that showed a larger flow rate had similar seepage rates and the other 121 leaks had seepage rates of 1 gpm each (which the Licensees believe to be a conservative estimate), the Licensees estimate that during the 3-day-long 2016 dewatering event, approximately 2 acre-feet of water seeped into the Tunnel. As context, this equates to approximately 0.003 percent of the total volume of the tunnel when pressurized, or in other words at a minimum, 99.997 percent of the water in the tunnel is State Water Project (SWP) water. It should be noted that during normal operation when the tunnel is pressurized, the effect of seepage into the tunnel is reduced or stopped altogether and it is more likely the pressure in the tunnel is pushing SWP water into the aquifer.

### **Aquatic Resources**

#### **3. FERC-3 Comment:**

*In their respective comment letters providing terms and conditions for the project, NMFS, Forest Service and California DFW recommend various measures to enhance large woody debris (LWD) quantities in Piru Creek downstream from Pyramid Dam. In the Study Plan Determination, Commission staff determined that a stand-alone LWD study was not needed, in part, because the co-licensees stated the proposed Pyramid Reach Fish Populations Study would collect information on fish habitat and LWD within the reach. Staff reviewed the information presented in the FLA as well as Study 4.1.3 Pyramid Reach Fish Population Study and 4.1.21 Pyramid Reach Benthic Macroinvertebrate Study to better understand the existing availability of LWM in Piru Creek. Staff found the LWM information available in these documents to be minimal. Based on photographs of sampling sites from these two studies as presented in the August 8, 2018, filing South SWP Hydropower: Documentation of Compliance with Selection of Sampling Sites for Pyramid Reach Fish Populations Study, staff expects more LWM may be available in Piru Creek between Pyramid Dam and Lake Piru than discussed in the Final License Application and study reports. Therefore, to provide Staff with a more accurate understanding of the existing availability of LWM in Piru Creek, please file any available information on the quantity, size, length, and quality of LWM in Piru Creek between Pyramid Dam and Lake Piru.*

#### **Licensees’ Response:**

Although the Licensees collected information on aquatic habitat in Pyramid reach, direct measurements were not made of the size and length of large woody material (LWM) in Piru Creek during Study 4.1.3, Pyramid Reach Fish Population Study. Among the data gathered, the Licensees collected information on trees

and saplings greater than five meters high in the stream channel or banks. For the multiple transects at each of three sampling sites in Pyramid reach for Study 4.1.3, Pyramid Reach Fish Population Study and Study 4.1.21, Pyramid reach Benthic Macroinvertebrate Study, an average of between 1.3 and 2.5 saplings or trees greater than five meters high were found (for more information see Study 4.1.21 results in Appendix B to Exhibit E of the FLA).

The Licensees’ studies found the presence of a variety of aquatic habitat and substrate types throughout Pyramid reach, indicating that sufficient mechanisms for the maintenance of aquatic habitat variety and complexity currently exists and continues to persist downstream of Pyramid Dam

Appendix A to this attachment provides additional information and photo documentation of the habitat in Pyramid reach collected during the Licensees’ study efforts at select study sites in the reach. Transect characteristics of the Pyramid Reach Benthic Macroinvertebrate Study sampling sites 1, 2, and 3 were reported to have 79 percent, 88 percent, and 63 percent riparian canopy cover, respectively. The dominant thalweg composition of sampling sites 1 and 2 were one percent and two percent wood, respectively. Woody material was not reported at sampling site 3. However, it should be noted that the Surface Water Ambient Monitoring Program (SWAMP) data collected as part of the Pyramid Reach Benthic Macroinvertebrate Study includes only LWM in the stream or immediately adjacent to the stream touching the water. Qualitative data for debris adjacent to the stream and not touching the water was not captured in the SWAMP data. Habitat features within Pyramid reach during Study 4.1.4, Special-Status Aquatic Amphibians and Semi-Aquatic Snakes Study at select sampling sites were reported to have between 10 percent and 20 percent aquatic cover and between 25 percent and 90 percent terrestrial cover, which included woody debris and rootwads. Vegetation overhanging the reach, which included willow, cottonwood, and alder were reported between 7 and 70 percent during Study 4.1.4. The photographs in Appendix A show that at most locations visited during the Study 4.1.3, Pyramid Reach Fish Population Study, Study 4.1.21, Pyramid Reach Benthic Macroinvertebrate Study, Study 4.1.9, ESA-listed Amphibians, California Red-legged Frog Study, and Study 4.1.4, Special-Status Aquatic Amphibians and Semi-Aquatic Snakes Study contain substantial amounts of vegetation including various sized woody material in the reach.

Additionally, the Licensees’ Whitewater Boating Study collected information on the amount of vegetation, including woody material, in Pyramid reach. Information collected from interviews with participants of the Whitewater Boating Level 3 Controlled-Flow Boating Study conducted in 2019 indicate the large amount of brush and trees present in the reach were the greatest problem they encountered navigating the reach during the Study. Boaters indicated that the upper 3-mile section of the reach, from below Pyramid Dam to Frenchmans Flat, contained enough fallen trees, wood, and brush to cause multiple portages and posed a potential safety hazard to the boaters.

Appendix B to this attachment provides additional photo documentation of the habitat in Pyramid reach collected during the Licensees’ Whitewater Boating Study efforts. Of note, the photos show a substantial amount of vegetation including LWM in the reach.

As noted in FERC’s January 23, 2007 Environmental Assessment for the relicensing of the downstream Santa Felicia Project (FERC No. 2153), it was documented that substantial amounts of LWD were found on selected banks and coves within Lake Piru indicating woody debris in Pyramid reach and its tributaries has been of sufficient volume to collect in this downstream reservoir.

Additionally, in the United States Department of Agriculture, Forest Service (USFS) Burn Area Emergency Response (BAER) presentation on the 2006 Day Fire, the USFS illustrated that after the 2004 Piru Fire, Lake Piru accumulated woody debris, which entered the lake, mostly through Pyramid reach. A photo of the accumulated wood debris after the 2004 Piru Fire is provided in Appendix C to this attachment. This accumulation of woody debris is likely to occur in the future following similar fire events.

In contrast, relatively small amounts of LWM are actually captured in Pyramid Lake itself, as indicated in the Licensees FLA, Exhibit E, Section 5.3.3, Page 5-258. The Licensees rarely remove LWM from Pyramid Lake, which suggests that LWM abundance in Pyramid reach is not substantially reduced by the Project. As evidence that very little woody material enters Pyramid Lake, after the 2006 Day Fire occurred, which burned approximately 40 percent of the Upper Pyramid Lake watershed, DWR deployed debris booms across the Piru Creek arm of Pyramid Lake to contain debris that may be washed into the lake. This was done in anticipation of winter rains and resultant debris flows from the burned Upper Piru Creek watershed. These debris booms were installed prior to the winter seasons of 2006/2007 and 2007/2008. In most California reservoirs, the amount of woody material debris flow is usually greatest in the high spring runoff following wildfires in the upper watershed. However, after the Day Fire, the debris booms were unnecessary as no floating debris entered the reservoir in either winter season. The photo documentation of the deployment of these booms in response to this catastrophic event are provided in Appendix C to this attachment. For further information see the Licensees’ Reply to the Large Woody Material Augmentation in their March 17, 2021 Reply to REA Response (FERC Accession # 20210317-5172).

As such, given that the riparian system is supplemented with debris following post-fire and large flow events, there is no reason to assume that Pyramid reach is limited in woody debris. As noted in their March 17, 2021 Reply to REA Response, the Licensees’ do not object to the USFS Condition 43 (Downstream Passage of Large Woody Material) as filed in the USFS’s January 28, 2021 Preliminary Terms and Conditions, that would require the Licensees to transport LWM entering Pyramid Lake to Pyramid reach downstream of Pyramid Dam,

thus assuring the Project will further enhance possible LWM recruitment in Pyramid reach.

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## **Attachment 1, Appendix A**

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***Additional Available Information on LWM in Pyramid reach from the Licensees' Study 4.1.3 Pyramid Reach Fish Population Study, Study 4.1.9 ESA-listed Amphibians, California Red-legged Frog Study, Study 4.1.21 Pyramid Reach Benthic Macroinvertebrate, and Study 4.1.4, Special-Status Aquatic Amphibians and Semi-Aquatic Snakes Study***

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## **ATTACHMENT 1**

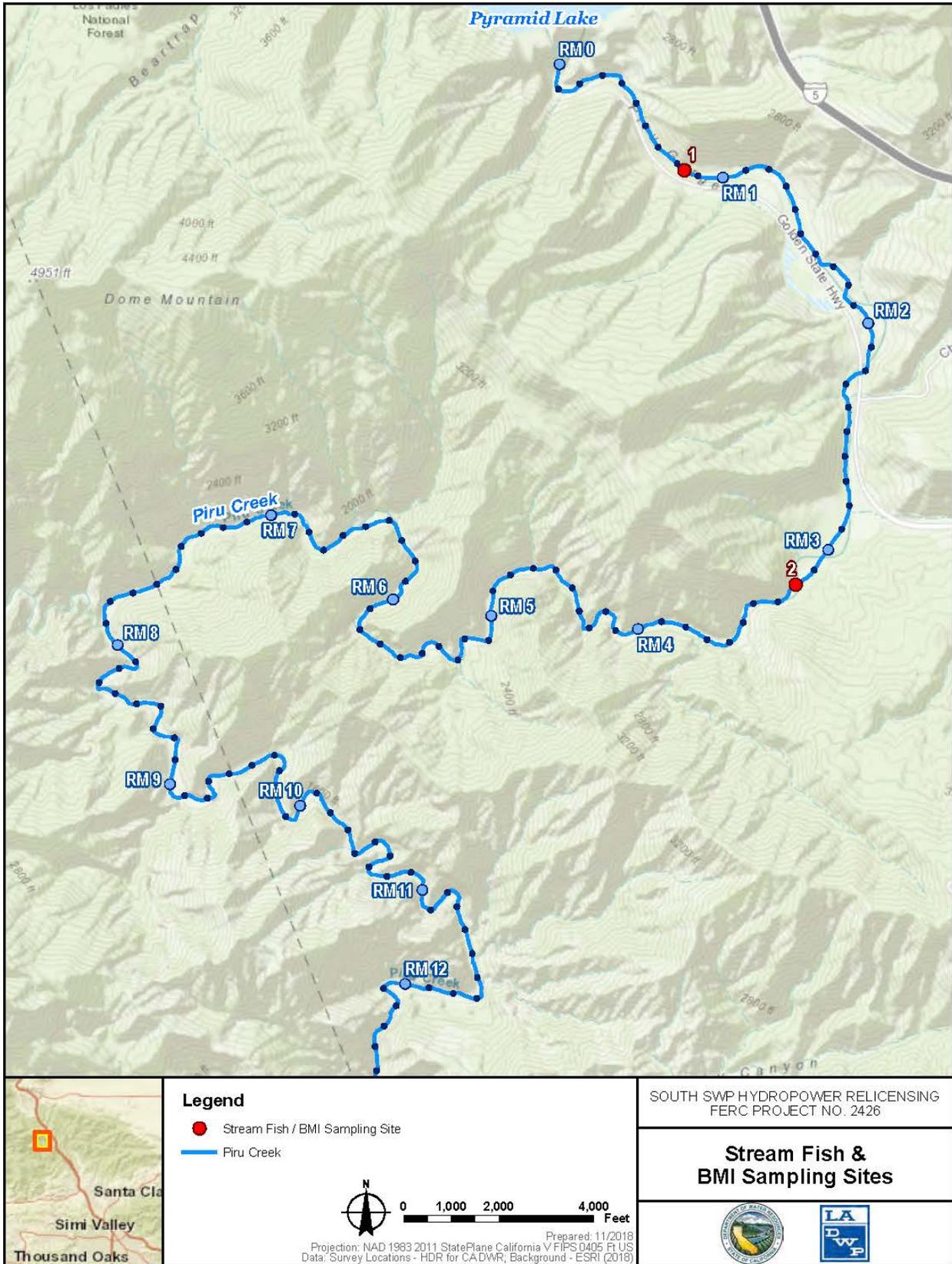
### **APPENDIX A**

Appendix A includes additional available information of LWM in Pyramid reach from the Licensees' Study 4.1.3 Pyramid Reach Fish Population Study, Study 4.1.9 ESA-listed Amphibians, California Red-legged Frog Study, Study 4.1.21 Pyramid Reach Benthic Macroinvertebrate, and Study 4.1.4, Special-Status Aquatic Amphibians and Semi-Aquatic Snakes Study.

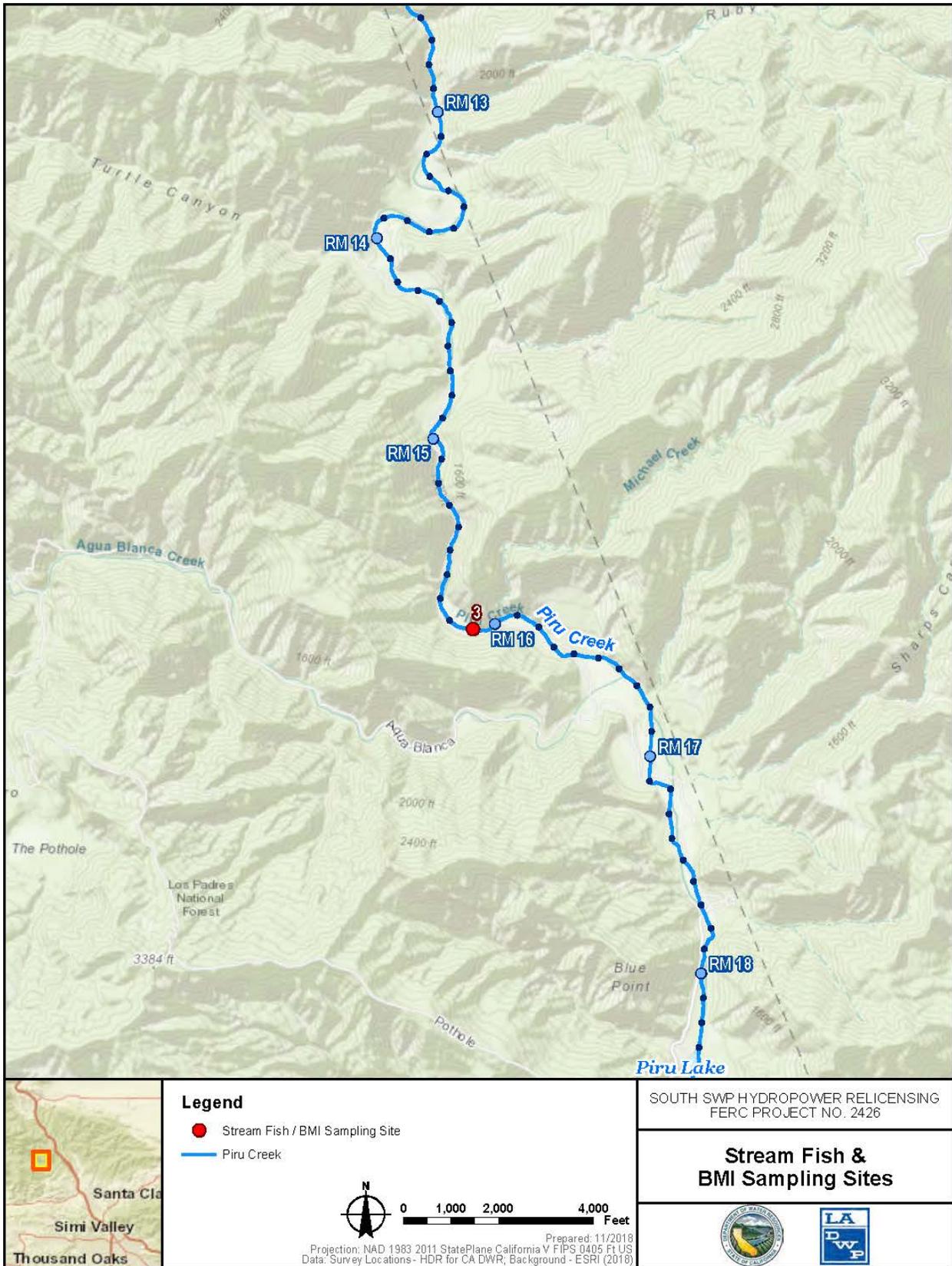
**Additional Available Information on LWM in  
Pyramid reach from the Licensees' Study 4.1.3  
Pyramid Reach Fish Population Study and  
Study 4.1.21 Pyramid Reach Benthic  
Macroinvertebrate: Stream Fish &  
BMI Sampling Sites**

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***Figures Depicting Sampling Sites 1 - 3***



**Figure A-1. Stream Fish & BMI Sampling Sites – Site 1 and Site 2**



**Figure A-2. Stream Fish & BMI Sampling Sites – Site 3**

**Additional Available Information on LWM in  
Pyramid reach from the Licensees' Study 4.1.3  
Pyramid Reach Fish Population Study, Study  
4.1.9 ESA-listed Amphibians, California Red-  
legged Frog Study, and Study 4.1.21 Pyramid  
Reach Benthic Macroinvertebrate: Stream Fish &  
BMI Sampling Sites**

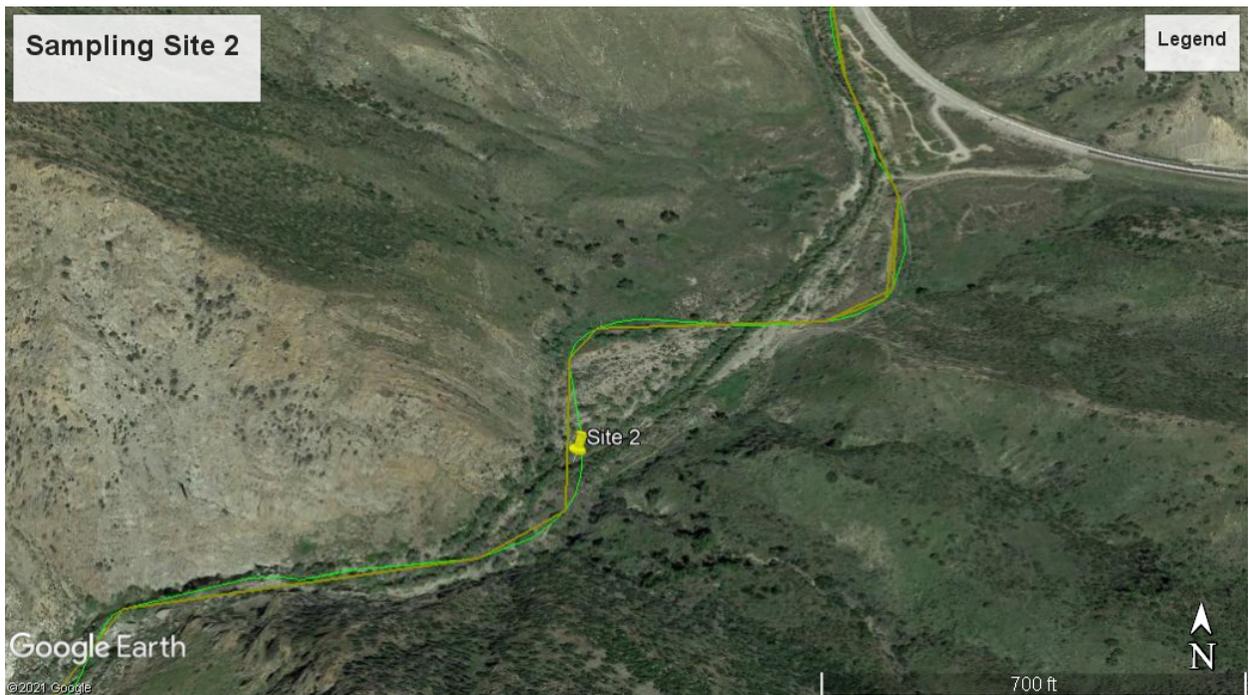
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***Aerial Imagery Depicting Sampling Sites***

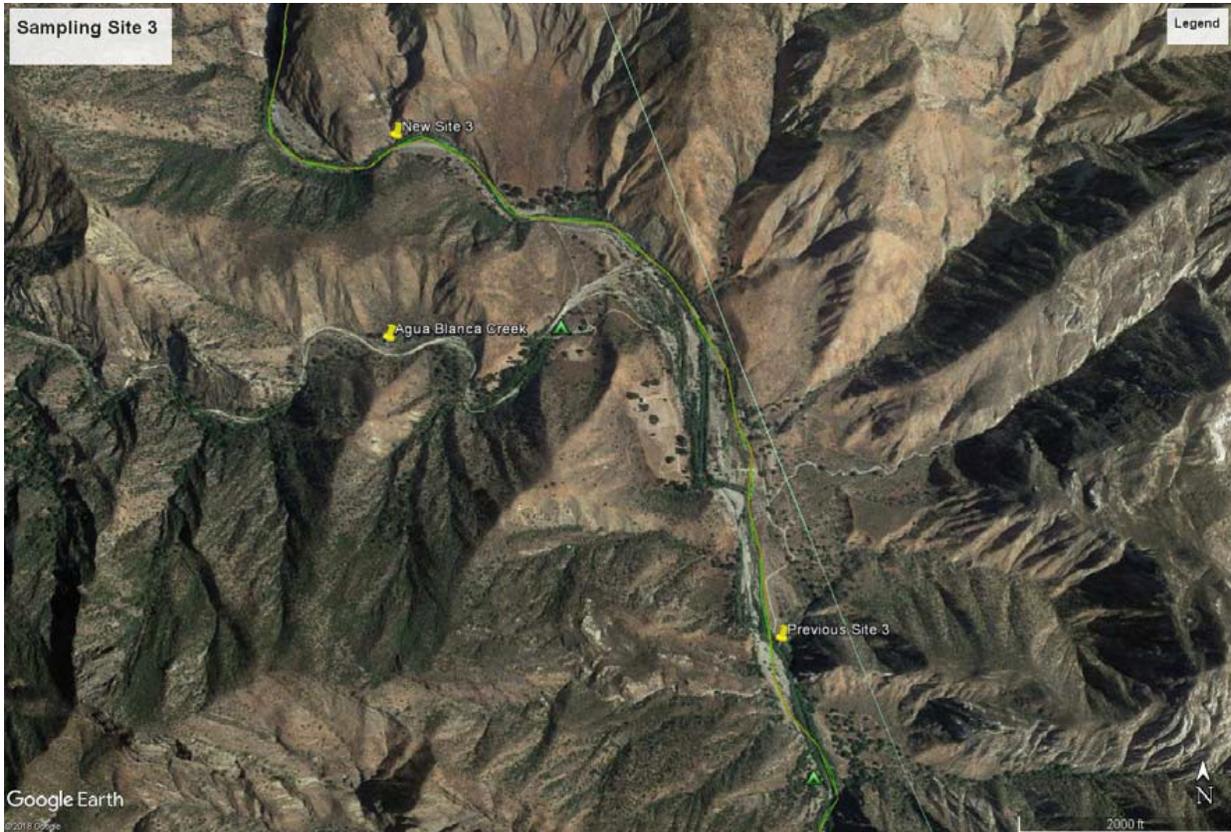


*Note: This aerial image was provided to the agencies in an email in June 25, 2018, to document the changes in Sampling Sites 1 and 3. Sampling Site 2 was unchanged.*

**Photo A-1. Stream Fish & BMI Sampling Site 1**



**Photo A-2. Stream Fish & BMI Sampling Site 2**



*Note: This aerial image was provided to the agencies in an email in June 25, 2018, to document the changes in Sampling Sites 1 and 3. Sampling Site 2 was unchanged.*

**Photo A-3. Stream Fish & BMI Sampling Site 3**

**Additional Available Information on LWM in  
Pyramid reach from the Licensees' Study 4.1.3  
Pyramid Reach Fish Population Study, and  
Study 4.1.21 Pyramid Reach Benthic  
Macroinvertebrate: Stream Fish & BMI Photo  
Log**

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***Photo Log for Sampling Sites***



**Photo A-4. Pyramid Reach BMI Study Site 1B, looking upstream. Photo taken between June 25 to June 27, 2018**



**Photo A-5. Pyramid Reach BMI Study Site 1C, looking upstream. Photo taken between June 25 to June 27, 2018**



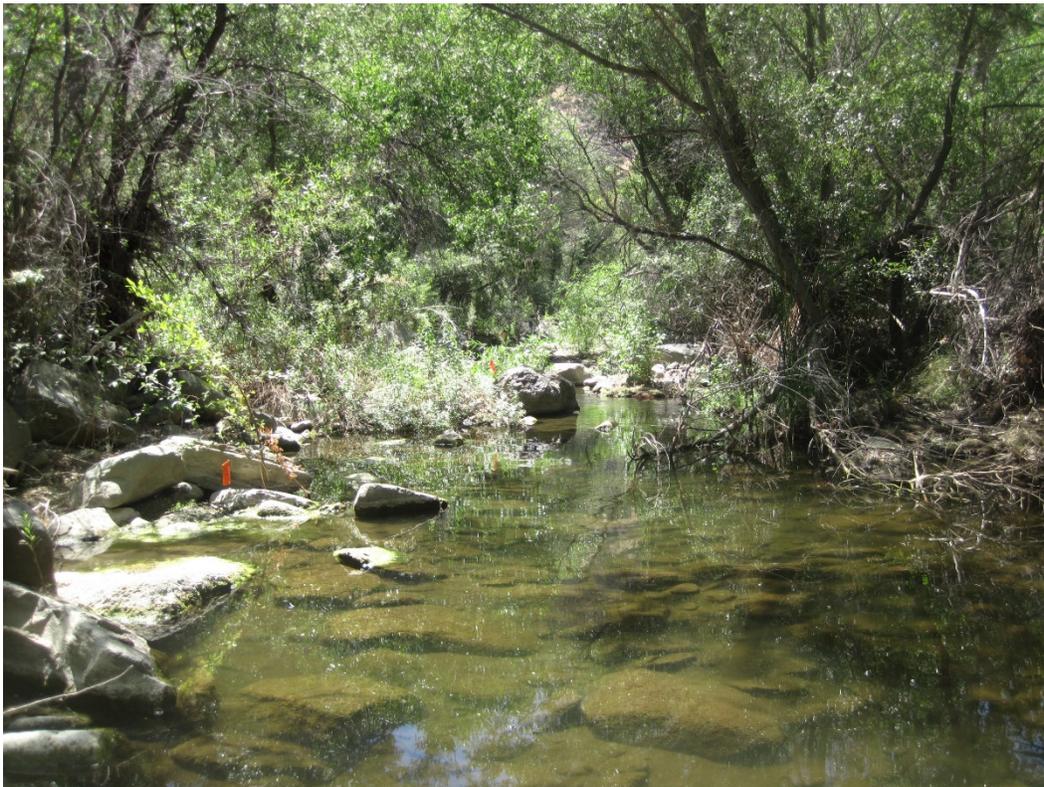
**Photo A-6. Pyramid Reach BMI Study Site 1D, looking upstream. Photo taken between June 25 to June 27, 2018**



**Photo A-7. Pyramid Reach BMI Study Site 1H, looking upstream. Photo taken on June 26, 2018**



**Photo A-8. Pyramid Reach BMI Study Site 1I, looking upstream. Photo taken on June 26, 2018**



**Photo A-9. Pyramid Reach BMI Study Site 2C, looking upstream. Photo taken between June 25 to June 27, 2018**



**Photo A-10. Pyramid Reach BMI Study Site 2D, looking upstream. Photo taken between June 25 to June 27, 2018**



**Photo A-11. Pyramid Reach BMI Study Site 2E, looking upstream. Photo taken between June 25 to June 27, 2018**



**Photo A-12. Pyramid Reach BMI Study Site 2J, looking downstream. Photo taken between June 25 to June 27, 2018**



**Photo A-13. Pyramid Reach BMI Study Site 2K, looking upstream. Photo taken between June 25 to June 27, 2018**



**Photo A-14. Pyramid Reach BMI Study Site 3A, looking downstream. Photo taken on June 27, 2018**



**Photo A-15. Pyramid Reach BMI Study Site 3G, looking downstream. Photo taken on June 27, 2018**



**Photo A-16. Pyramid Reach BMI Study Site 3H, looking downstream. Photo taken on June 27, 2018**



**Photo A-17. Pyramid Reach BMI Study Site 3I, looking upstream. Photo taken on June 27, 2018**

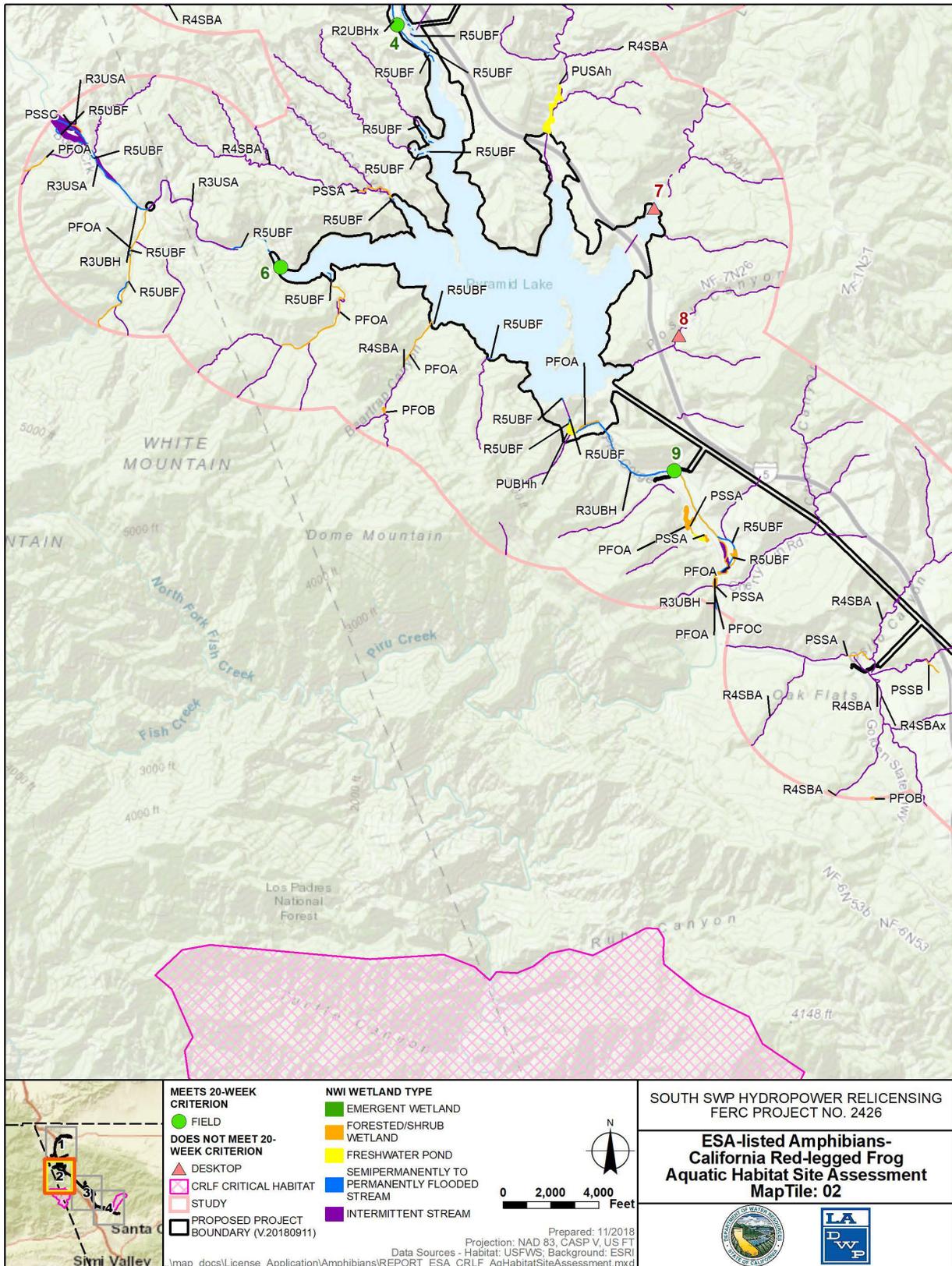


**Photo A-18. Pyramid Reach BMI Study Site 3J, looking upstream. Photo taken on June 27, 2018**

**Additional Available Information on LWM in  
Pyramid reach from the Licensees'  
Study 4.1.9 ESA-listed Amphibians, California  
Red-legged Frog**

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***Figure Depicting Sampling Site 9 (Pyramid Reach)***



**Figure A-3. ESA-listed Amphibians – California Red-legged Frog Aquatic Habitat Site Assessment**

**Additional Available Information on LWM in  
Pyramid reach from the Licensees'  
Study 4.1.9 ESA-listed Amphibians, California  
Red-legged Frog**

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***Photos of Sampling Site 9***



**Photo A-19. California Red-legged Frog Site 9-1: Looking downstream at a riffle.  
Photo taken on September 24, 2018**



**Photo A-20. CRLF Site 9-2: Isolated side channel pool. Photo taken on September 24, 2018**



**Photo A-21. CRLF Site 9-3: Looking at riparian vegetation bordering the creek.  
Photo taken on September 24, 2018**



**Photo A-22. CRLF Site 9-4: Looking through dense underbrush at the creek.  
Photo taken on September 24, 2018**

**Additional Available Information on LWM in  
Pyramid reach from the Licensees'  
Study 4.1.4, Special-Status Aquatic Amphibians  
and Semi-Aquatic Snakes Study**

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*Photos of Sampling Sites*

Study 4.1.4, Special-Status Aquatic Amphibians and Semi-Aquatic Snakes Study  
Pyramid Dam to upstream of Frenchman's Flat sampling site included two contiguous sites representing a total distance of 2,300 feet on surveyed on April 3, May 15, and May 29, 2018.



**Photo A-23. Pyramid reach above Frenchmans Flat. Photo of bottom of site looking upstream. Photo taken on April 3, 2018**



**Photo A-24. Pyramid reach upstream of Frenchmans Flat. Photo near top of survey area looking upstream. Photo taken on April 3, 2018**



**Photo A-25. Pyramid reach upstream of Frenchmans Flat looking upstream.  
Photo taken on May 15, 2018**



**Photo A-26. Pyramid reach upstream of Frenchmans Flat looking upstream.  
Photo taken on May 15, 2018**

Study 4.1.4, Special-Status Aquatic Amphibians and Semi-Aquatic Snakes Study  
Frenchman's Flat to Fish Creek confluence sampling consisted of four sites, including two contiguous sites, representing a total distance of approximately 8,500 feet surveyed on April 18, May 30, July 23, September 25, and September 26, 2018.



**Photo A-27. Pyramid reach downstream of Fish Creek looking upstream. Photo taken on April 18, 2018**



**Photo A-28. Pyramid reach upstream of Fish Creek looking upstream. Photo taken on April 18, 2018**



**Photo A-29. Pyramid reach upstream of Fish Creek. Photo taken on July 23, 2018**



**Photo A-30. Pyramid reach upstream of Fish Creek. Photo taken on July 23, 2018**



**Photo A-31. Pyramid reach upstream of Fish Creek. Photo looking upstream.  
Photo taken on May 30, 2018**



**Photo A-32. Pyramid reach upstream of Fish Creek. Photo looking downstream.  
Photo taken on May 30, 2018**

**Attachment 1, Appendix B**

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***Additional Available Photos of LWM in Pyramid reach  
Collected during the Licensees' Whitewater Boating  
Study and Level 3 Controlled-Flow Boating Study***

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## **ATTACHMENT 1**

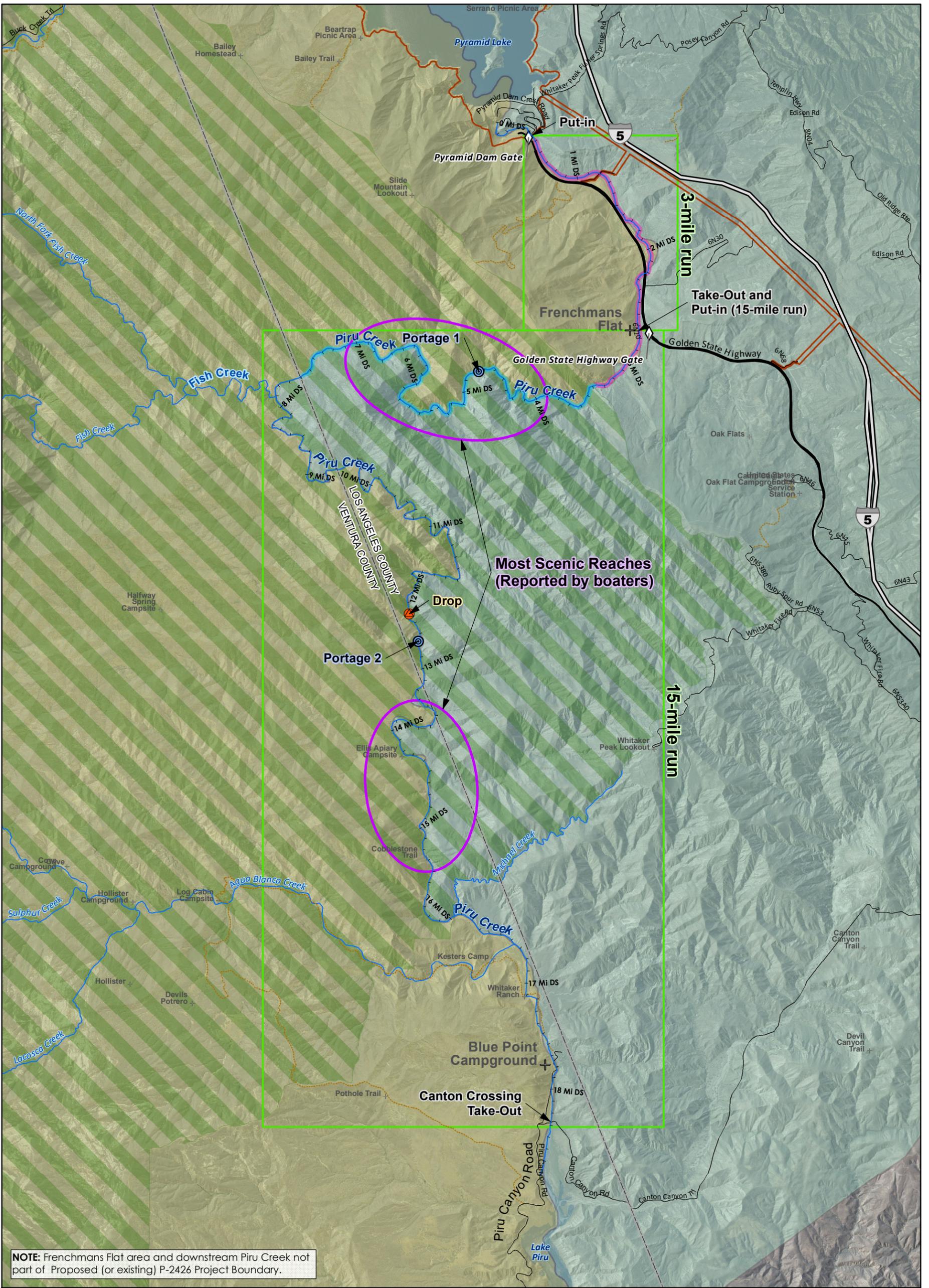
### **APPENDIX B**

Appendix B provides additional photo documentation of the habitat in Pyramid reach collected during the Licensees' Whitewater Boating Study efforts.

**Additional Available Photos of LWM in Pyramid  
reach Collected during the Licensees'  
Whitewater Boating Level 3 Controlled-Flow  
Boating Study**

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***Figure Depicting Piru Creek (Pyramid Reach)  
Whitewater Boating River Mile Locations***



**Legend**

- Portage / Rapids
- Drop
- Proposed Project Boundary (v20190718)
- River Reaches
- Scenic Reaches (Reported by Boaters)
- Sespe Wilderness
- Angeles National Forest
- Los Padres National Forest

**Wild and Scenic River Classification**

- Recreational
- Scenic
- Wild

0 0.75 Miles

Prepared: February 2020  
 Projection: CA State Plane V NAD83  
 Data and/or Background: NAIP (2016)

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SOUTH SWP HYDROPOWER RELICENSING  
 FERC PROJECT NO. 2426

**Piru Creek (Pyramid Reach)  
 Whitewater Boating**

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**Additional Available Photos of LWM in Pyramid  
reach Collected during the Licensees' Study  
4.1.19, Whitewater Boating Study and Level 3  
Controlled-Flow Boating Study (December 19  
and 20, 2020)**

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***Photos Depicting Piru Creek (Pyramid Reach)  
Whitewater Boating River Mile Locations***



**Photo B-1: Pyramid reach above Pyramid Dam Bridge from the end of the turnaround (approximately river mile 0.5 downstream from Pyramid Dam)**



**Photo B-2: Pyramid Reach from Pyramid Dam Bridge (approximately river mile 1 downstream from Pyramid Dam)**



**Photo B-3. Put-in location for the 3-mile run just below Pyramid Dam Bridge (approximately river mile 0.5 downstream from Pyramid Dam)**



**Photo B-4. 15-mile run put-in and take-out location for 3-mile run at Frenchmans Flat (approximately river mile 3.5 downstream from Pyramid Dam)**



**Photo B-5. Piru Creek at Golden State Highway Bridge (river mile 2 downstream from Pyramid Dam)**



**Photo B-6. Piru Creek at Golden State Highway Bridge (river mile 2 downstream from Pyramid Dam)**



**Photo B-7. Frenchmans Flat (river mile 2 downstream from Pyramid Dam)**



**Photo B-8. Downstream from Frenchman's Flat (river mile 4 downstream from Pyramid Dam)**

# South East Elevation

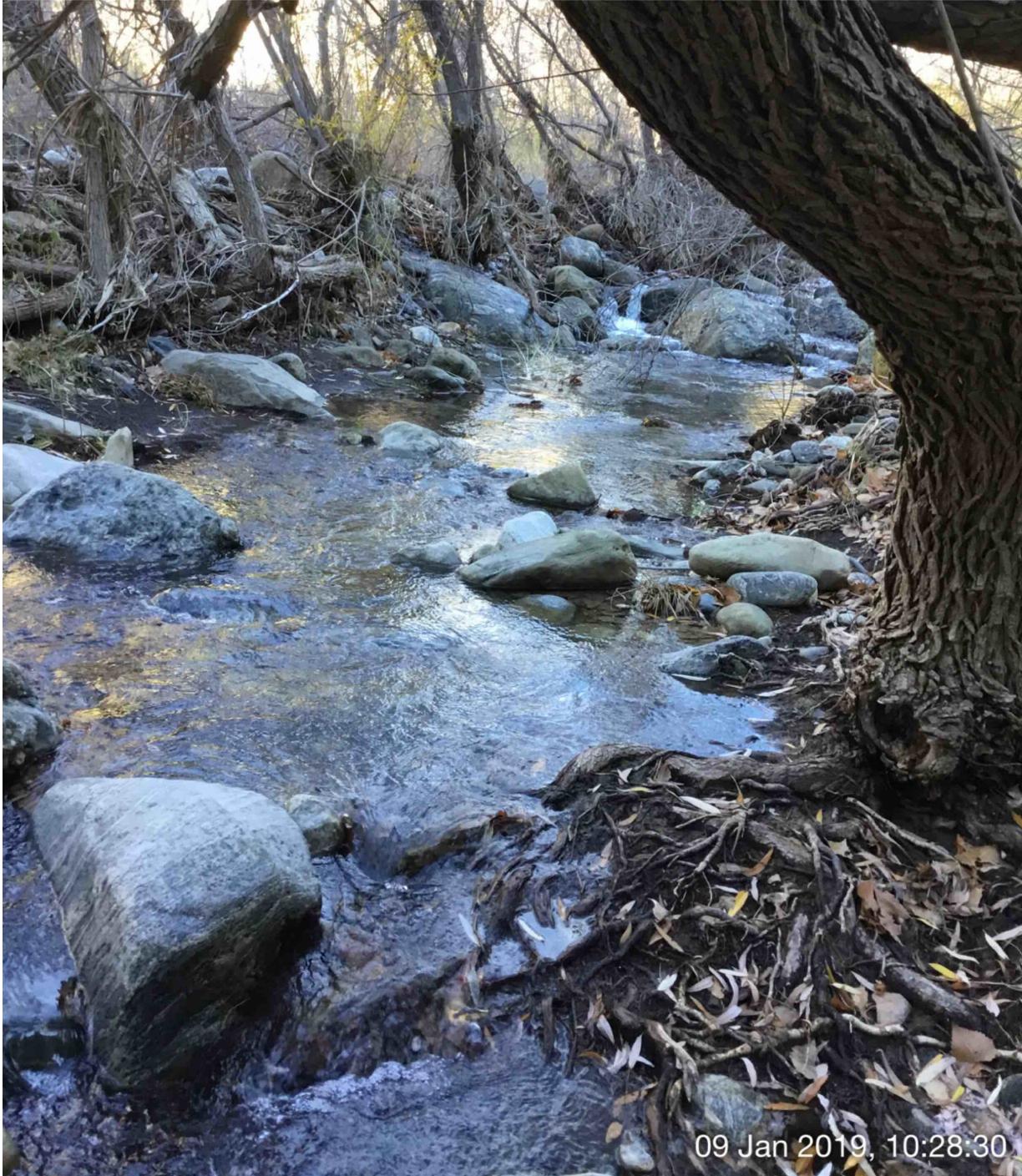
☉ 321°NW (T) ● 34°36'37"N, 118°44'59"W ±32.8ft ▲ 2023ft



**Photo B-9. Downstream from Frenchman's Flat (river mile 4 downstream from Pyramid Dam)**

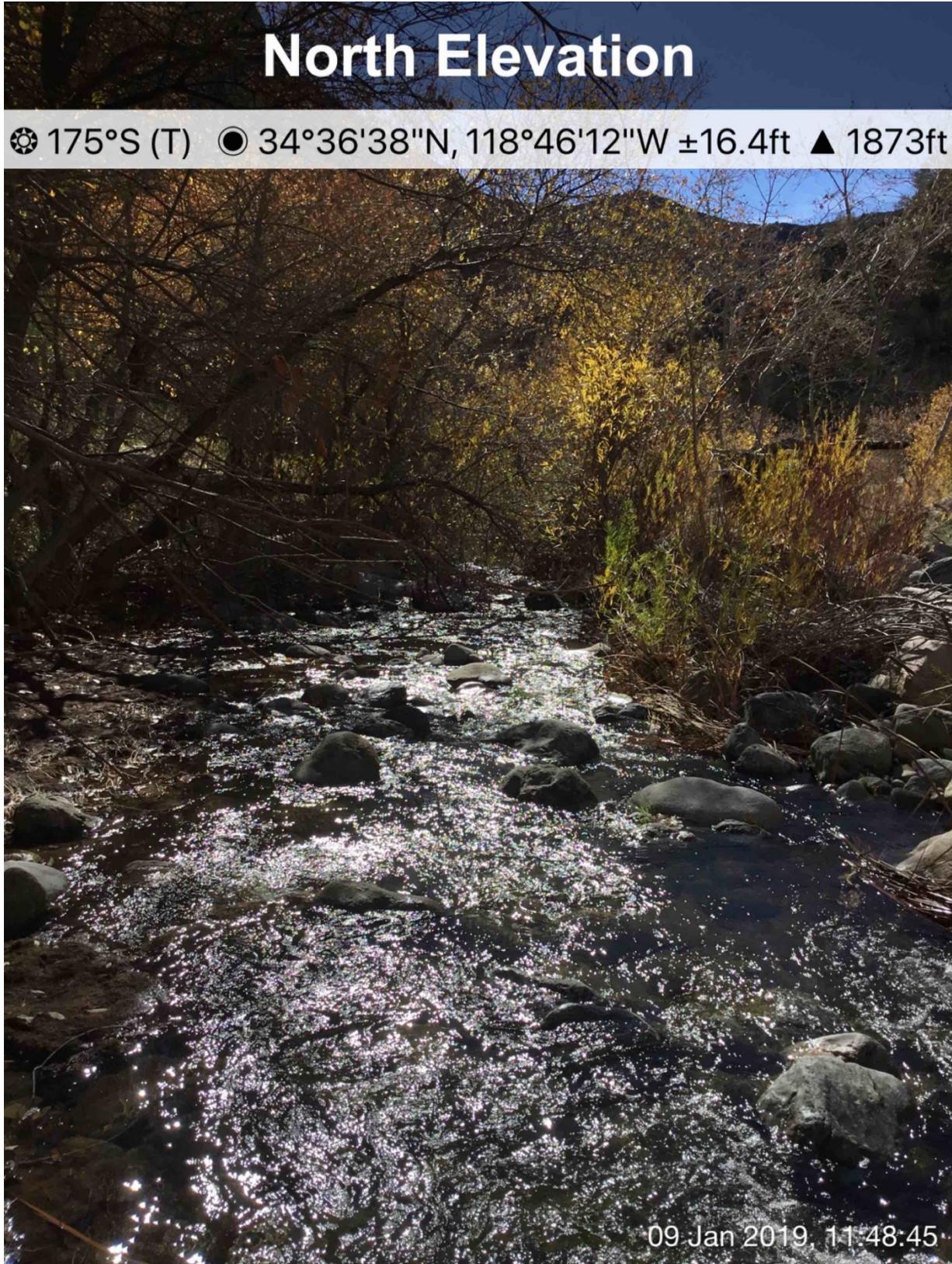
# South West Elevation

☉ 43°NE (T)    ● 34°36'27"N, 118°45'13"W ±32.8ft    ▲ 1982ft



09 Jan 2019, 10:28:30

**Photo B-10. Downstream from Frenchman's Flat (river mile 4.5 downstream from Pyramid Dam)**



**Photo B-11. Downstream from Frenchmans Flat (river mile 5 downstream from Pyramid Dam)**



**Photo B-12. Downstream from Frenchmans Flat (river mile 13 downstream from Pyramid Dam)**



**Photo B-13. Downstream from Frenchmans Flat (river mile 14 downstream from Pyramid Dam)**



**Photo B-14. Downstream from Frenchmans Flat (river mile 14.5 downstream from Pyramid Dam)**

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## **Attachment 1, Appendix C**

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***Photo Documentation of Debris on Lake Piru  
Following the 2004 Piru Fire and DWR Deployed  
Debris Booms in Pyramid Lake After the 2006 Day Fire***

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## **ATTACHMENT 1**

### **APPENDIX C**

Appendix C includes Slide 14 of 32 from the United States Department of Agriculture, Forest Service, Burn Area Emergency Response, 2006 Day Fire Presentation showing debris on Lake Piru following the 2004 Piru Fire and photographs and aerials of DWR deployed debris booms in Pyramid Lake across the Piru Creek arm of the reservoir after the 2006 Day Fire. These debris booms were installed prior to the winter seasons of 2006/2007 and 2007/2008.

## **Photo Documentation of Debris on Lake Piru Following the 2004 Piru Fire**

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## Debris on Lake Piru, 2004 following the Piru Fire.

*Source: United States Department of Agriculture, Forest Service, Burn Area Emergency Response, 2006 Day Fire Presentation, Slide 14 of 32.*

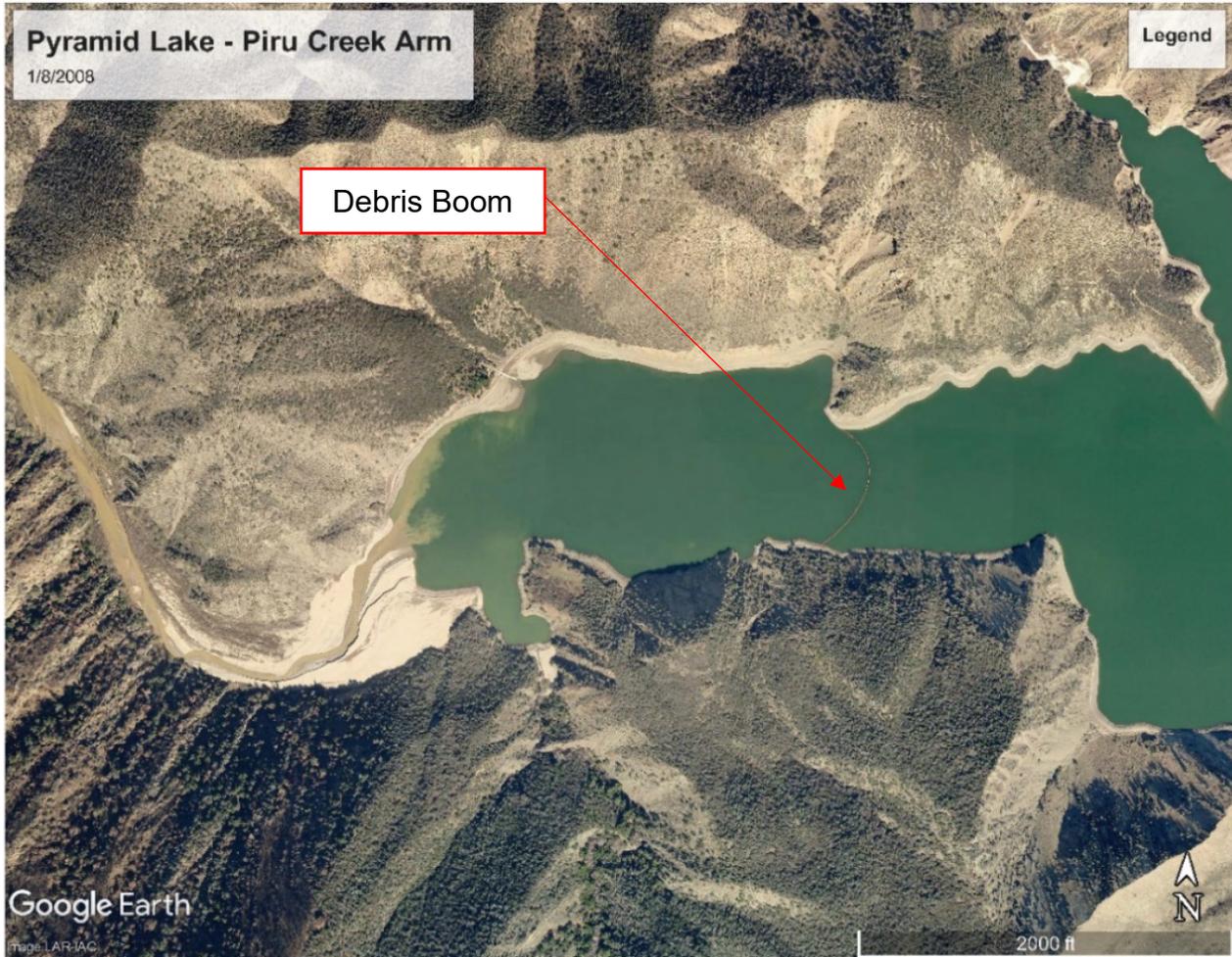
**Photo C-1. Debris on Lake Piru, 2004, following the Piru Fire**

## **DWR Deployed Debris Booms in Pyramid Lake After the 2006 Day Fire**

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**Photo C-2. Debris boom placed at the Piru Creek arm of Pyramid Lake to collect potential floating debris (photo source: Jim Gleim, DWR 10/13/2006)**



**Photo C-3. Aerial view of debris boom placed at the Piru Creek arm of Pyramid Lake to collect potential floating debris (photo source: Google Earth 1/8/2008)**



**Photo C-4. Aerial view of the Piru Creek arm post Day Fire (photo source: Google Earth 8/31/2008)**

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