

4.0 Oregon Creek – Log Cabin Diversion Dam Reach

Log Cabin Diversion Dam Reach of Oregon Creek is 4.1 mi in length and extends from the confluence of the Middle Yuba River to Log Cabin Diversion Dam. Information used to evaluate conditions on this reach and investigate accessibility included a field reconnaissance on March 8 and 9, 2011. Additional information was collected in September 2009 as part of the Habitat Mapping Report (YCWA 2010).

Generally the potential effects of the Project in the reaches are associated with a reduction in flows compared to flows arriving at the diversion dams during runoff when the Project is diverting. Under Article 33 of the current license, YCWA is required to maintain minimum streamflow releases below Log Cabin Diversion Dam in wet and normal water years. From April 15 through June 15 the required flow is 12 cfs, or natural flow, whichever is less; and from June 16 through April 14 the required flow is 8 cfs, or natural flow, whichever is less. YCWA typically operates New Bullards Bar Reservoir by capturing winter and spring runoff from rain and snowmelt. The reservoir normally reaches its peak storage at the end of the spring runoff season, and then is drawn down until its lowest elevation in early to mid-winter. Storm runoff operations occur during the storm season, typically between October and May, and include operations to avoid or reduce uncontrolled flows. The difference in capacity between the Lohman Ridge Diversion Tunnel from the Our House Diversion and the Camptonville Diversion Tunnel at Log Cabin Diversion is 240 cfs. Storm flows that exceed the diversion capacity are spilled. As such, spills generally occur only during the wet season and rarely occur after early April. During the period of record (1968-2998), spills occurred as late as May in only three years (1995, 1998, and 2005).

Based on channel classification and habitat mapping performed for the PAD (YCWA 2010) (Figure 4.0-1), the Log Cabin Diversion Dam Reach of Oregon Creek can be divided into sections (Table 4.0-1) and is characterized as follows. Relatively steep (3-8 percent gradient), confined channel type occurs near the downstream end of the reach (approximately 1 mi) which is designated here as Section 1 and below Log Cabin Dam at the upstream end of the reach (0.5 mi), designated here as Section 3. In between these steeper sections, a lower gradient (1-3 percent), confined section (2.6 mi) (Section 2) occurs through Celestial Valley (Figure 4.0-2). There is a short 4.6 percent gradient section just above the confluence with the Middle Yuba River, and a 3.7 percent gradient section upstream of Celestial Valley. Celestial Valley appears to be a long-term depositional area and has an overall gradient of 1.6 percent. The Celestial Valley area is highly modified by human settlement, and channel location has been modified by roads, grazing, berms, and suburban development; the riparian zone is also heavily vegetated with blackberry vines. The stream reach is confined throughout between either terraces or steep valley walls. The steeper sections are dominated by cascades, falls, and plunge pools, whereas the Celestial Valley section is dominated by long planar runs and low gradient riffles, with little three-dimensional heterogeneity. In total, eleven seasonal/intermittent tributaries are located along the reach; five of them occur between RM 1.9 and RM 3.0.

The reach is accessible at multiple points, although some sections may be difficult to traverse at higher flows. In addition, portions of the stream through Celestial Valley are surrounded by private parcels where constant human activity was observed during March 2011 field

investigations. Because of this, access would be limited to traversing in-stream, particularly to get to sections of Oregon Creek above RM 2.8. Likewise, due to limited access from roads and steep terrain between RM 2.8 and 4.1, the remaining reach would need to be traversed in-stream to get to an upstream survey site.

Analysis of available stream habitat mapping data and the March 2011 reconnaissance indicates that suitable habitat for FYLF is concentrated in Section 2, with good accessibility upstream of Ridge Road and at various points along Celestial Valley Road. A survey site of 1,000 m length could be easily situated in this area. Upstream of Section 2, access is more limited and habitat is generally unsuitable. Suitable habitat is also present in Section 1, extending and accessible from just upstream of the confluence with Middle Yuba River, although no more than about 800 m of relatively contiguous suitable habitat is present. The potential effects of the Project on FYLF in the Log Cabin Diversion Dam Reach of Oregon Creek should be approximately the same throughout the reach, with base flows somewhat higher in the lower reach due to accretion.

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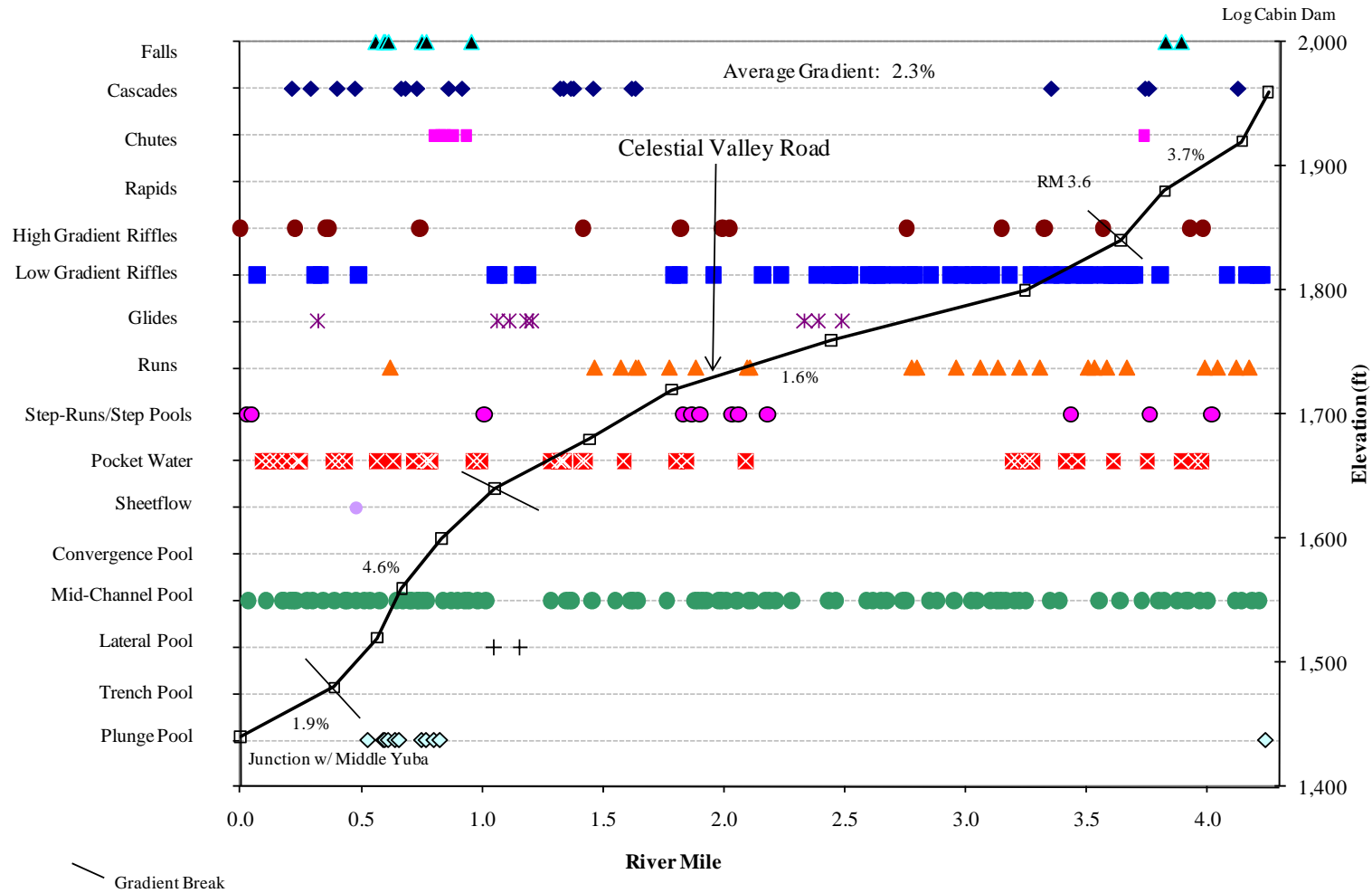


Figure 4.0-1. Oregon Creek – Log Cabin Diversion Dam Reach longitudinal profile and habitat types from Stream Habitat Mapping Report (YCWA 2010).

Table 4.0-1. Log Cabin Diversion Dam Reach section descriptions and access considerations

Section/ River Mile	Description of Section	Presence of potential FYLF breeding habitat	FYLF Records	Site Access
Section 1 RM 0.0 to 1.0	Predominant stream habitat types are mid-channel pool, pocket water, and cascades. Bankfull width ranges from less than 5 to 10 m. Dominant substrate consists of boulders and bedrock. Margin vegetation predominantly forbs and blackberry. Overhanging vegetation consists of deciduous shrubs, and mainly occurs in downstream part of section. No tributaries occur along this section.	Potential breeding and rearing habitat is mainly present from RM 0 to 0.5, where the stream gradient is lower and the substrate suitable. RM 0.5-1 is higher gradient and has stream habitat and substrate indicative of higher-velocity flows. Margin and overhanging vegetation does not preclude sun exposure along most of this section.	<ul style="list-style-type: none"> • USFS and CDFS occurrence records near confluence with Middle Yuba River and near RM 0.8 	<ul style="list-style-type: none"> • Accessible from Oregon Creek Day Camping area near confluence with Middle Yuba River.
Section 2 RM 1.0 to 3.6 (Celestial Valley)	Predominantly low-gradient riffles and mid-channel pools, and runs to a lesser extent. Bankfull width generally ranges between 5 to 10 m. Dominant substrate consists of cobbles and boulders. Margin vegetation comprised of sparse to moderately dense blackberry. Overhanging vegetation is deciduous shrubs and saplings. Four tributaries occur along this section.	Lowest overall stream gradient in reach. Potential breeding and rearing habitat such as pools and low-velocity edgewater are abundant in this section. Boulder and cobble/gravel substrate are present throughout. Sufficient sun exposure likely is present along most of section.	<ul style="list-style-type: none"> • Female FYLF observed on cobble bar near RM 2.1 on March 7, 2011 • USFS and CDFG occurrence records near RM 2.1 • USFS occurrence record near RM 3.2 	<ul style="list-style-type: none"> • Accessible from Walker Mill Rd near RM 2.0, upstream of Ridge Road Bridge. Access points also present along Celestial Valley Road. • Gated private road upstream of RM 2.8. Access upstream becomes limited to wading in-stream.
Section 3 RM 3.6 to 4.1	Predominant stream habitat types are mid-channel pool, pocket water, and low-gradient riffles. Bankfull width ranges from 5 to over 15m. Boulders and bedrock are dominant substrates. Margin vegetation consists of patchy grasses/forbs. Overhanging vegetation is patchy deciduous shrubs and saplings. One tributary occurs along this section.	Higher-gradient stream segment with patchy areas of low-velocity pools and edgewater. Numerous areas have stream macrohabitat indicative of higher-velocity flows. Substrate is predominantly bedrock through this segment. Sufficient sun exposure likely is present along most of section.	<ul style="list-style-type: none"> • USFS occurrence record near RM 3.2. 	<ul style="list-style-type: none"> • Primary access by wading from Celestial Valley. Difficult during higher flows. • Difficult access near Log Cabin Diversion Dam via Log Cabin Road, which adjoins steep hillslopes. RM 3.7 to 4.1 is located on SPI land.

Figure 4.0-2. Oregon Creek – Log Cabin Diversion Dam Reach. The approximate extent of the March 2011 reconnaissance area is demarcated by red dots.

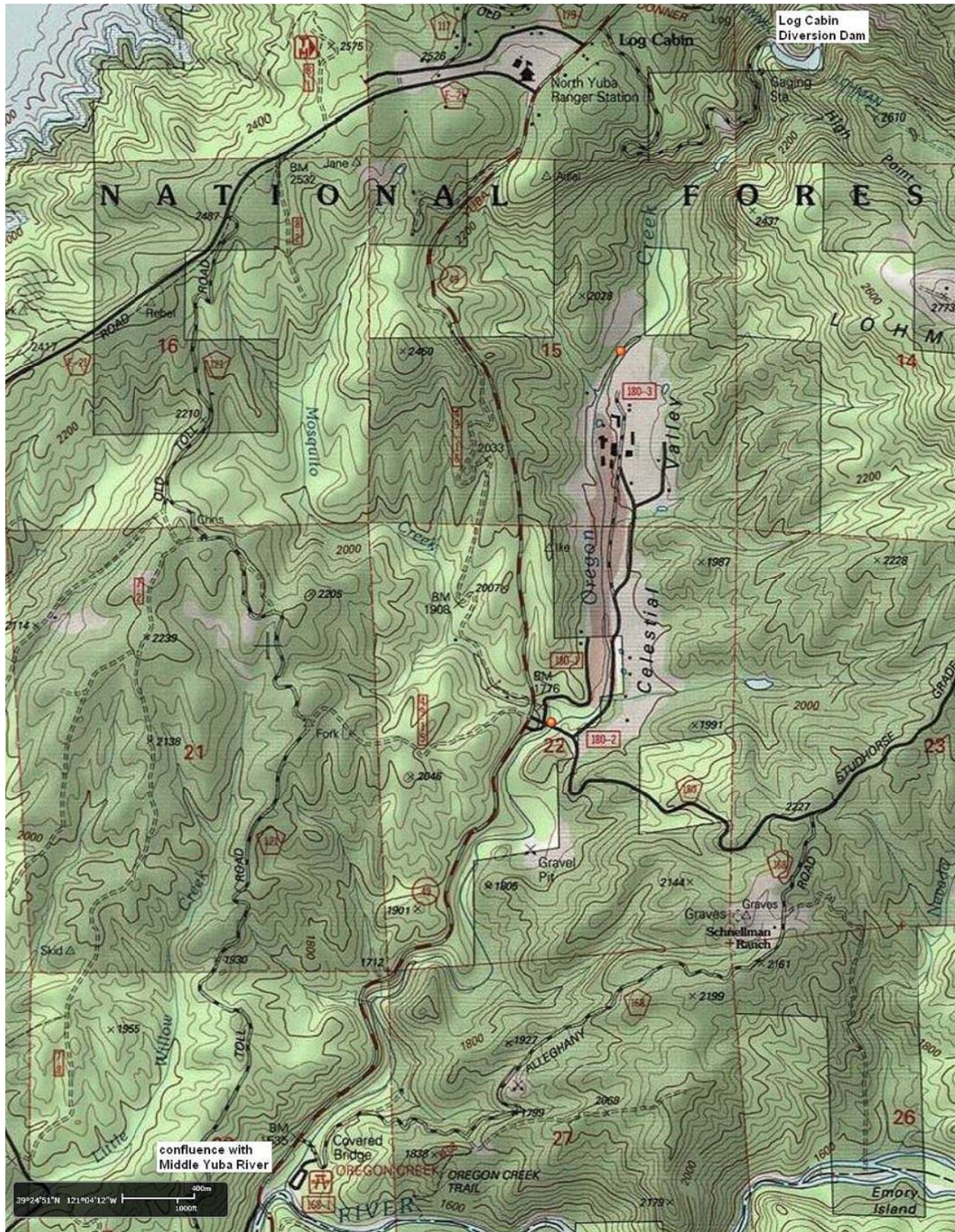


Figure 4.0-3. Oregon Creek – Log Cabin Diversion Dam Reach: overview aerial image. The approximate extent of the March 2011 reconnaissance area is demarcated by red dots.

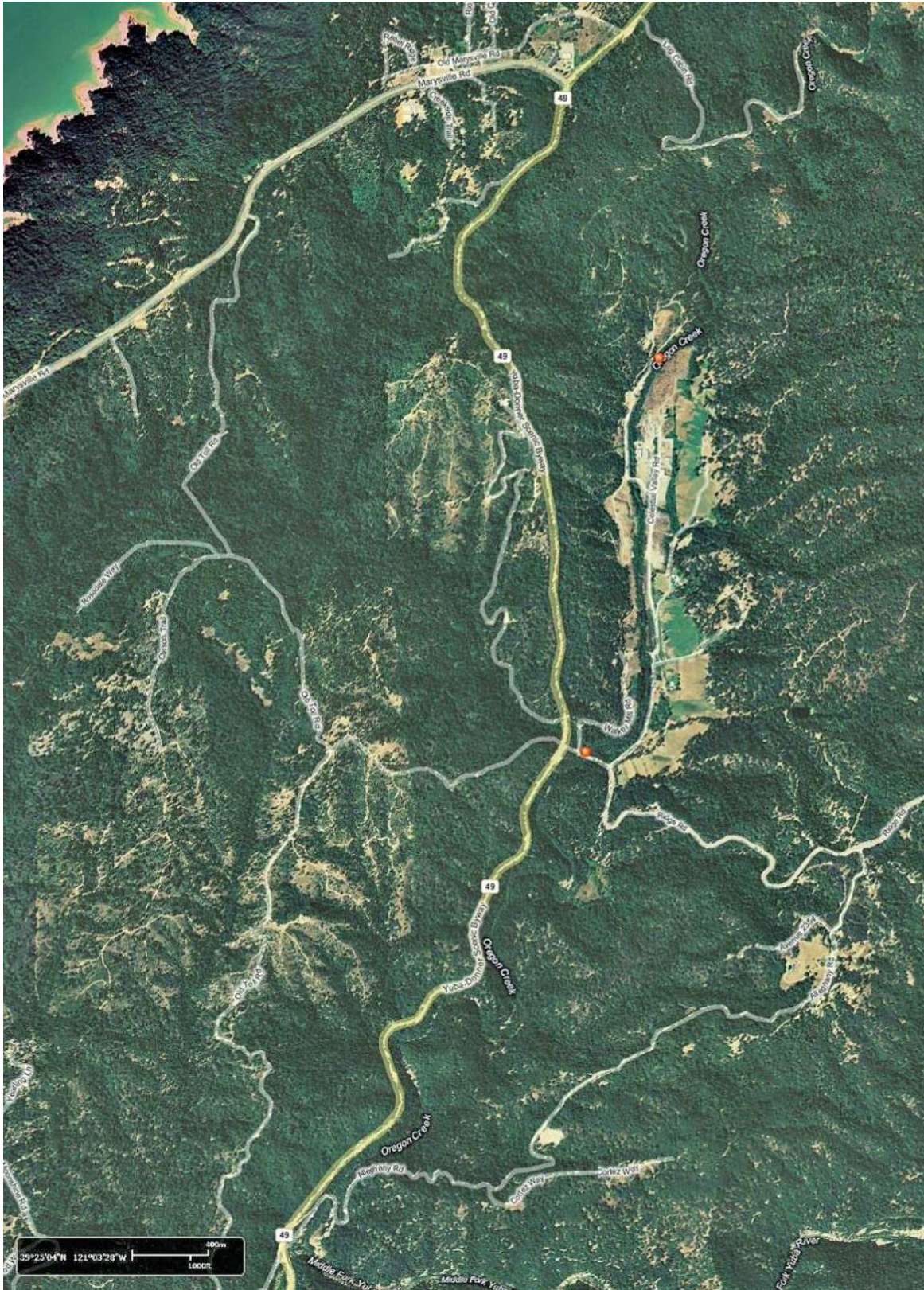
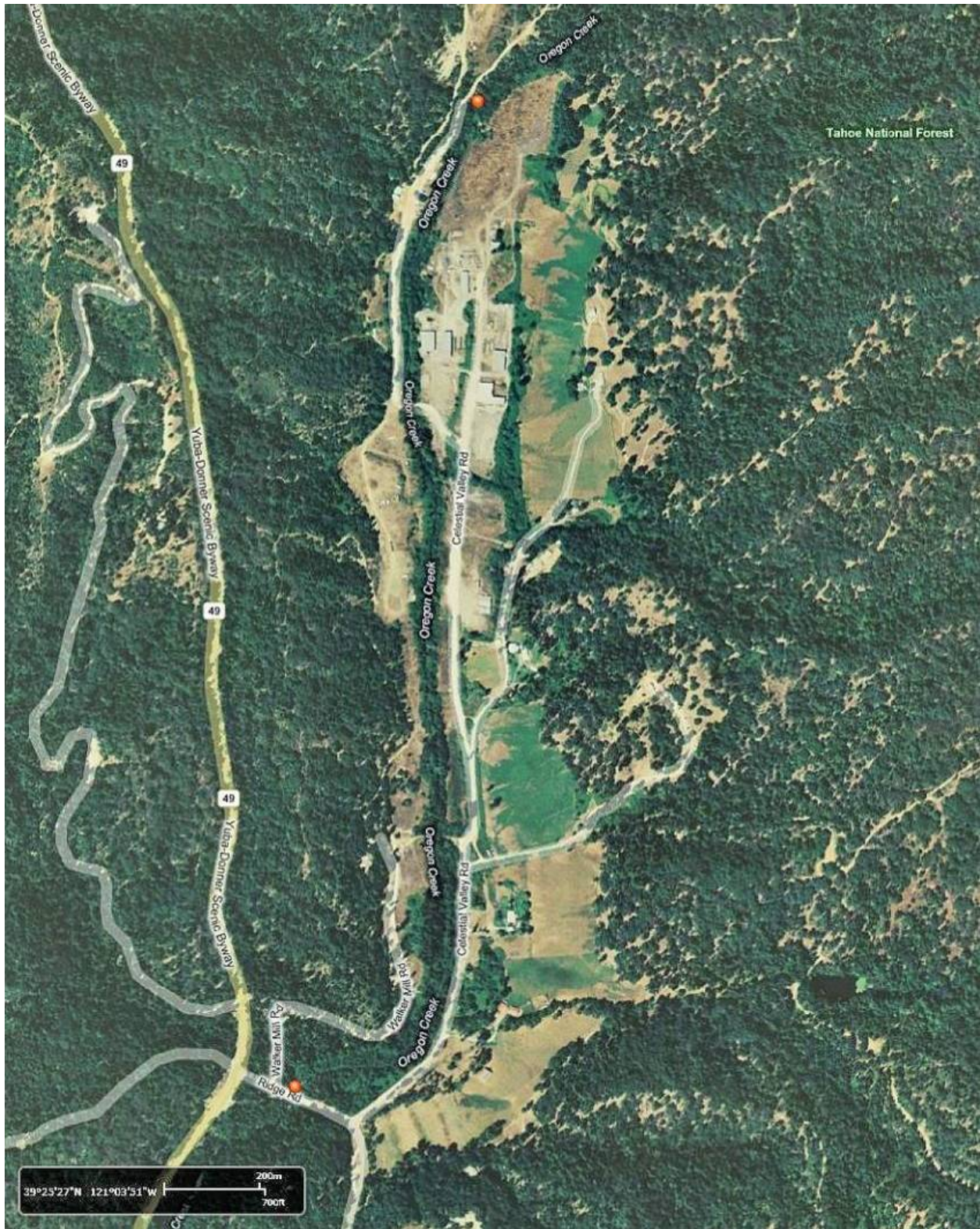


Figure 4.0-4. Oregon Creek – Log Cabin Diversion Dam Reach: aerial image with upstream and downstream extent of Celestial Valley segment investigated in March 2011. The total length of this segment is approximately 1,500 m.



Aerial video captures: Oregon Creek - Log Cabin Diversion Dam Reach (LCDDR)

Figure 4.0-5. Oregon Creek LCDDR, Section 1 at RM 0.1.



Figure 4.0-6. Oregon Creek LCDDR, Section 1 at RM 0.6.



Figure 4.0-7. Oregon Creek LCDDR, Section 1 at RM 0.8.



Figure 4.0-8. Oregon Creek LCDDR, Section 2 at RM 2.0.



Figure 4.0-9. Oregon Creek LCDDR, Section 2 at RM 2.3.



Figure 4.0-10. Oregon Creek LCDDR, Section 2 near RM 3.0.



Figure 4.0-11. Oregon Creek LCDDR, Section 2 near RM 3.7.



Figure 4.0-12. Oregon Creek LCDDR, Section 3 near RM 3.9.



Figure 4.0-13. Oregon Creek LCDDR, Section 3 near RM 4.0.



Ground photos: Oregon Creek - Log Cabin Diversion Dam Reach (LCDDR)

Figure 4.0-14. Oregon Creek LCDDR, Section 1 at RM 0.1, high-gradient riffle with boulder-dominant substrate, looking upstream, August 15, 2009.



Figure 4.0-15. Oregon Creek LCDDR, Section 1 at RM 0.6, mid-channel pool with bedrock-dominant substrate, looking downstream, August 15, 2009.



Figure 4.0-16. Oregon Creek LCDDR, Section 1 at RM 0.9, cascade with bedrock-dominant substrate, looking upstream, September 12, 2009.



Figure 4.0-17. Oregon Creek LCDDR, Section 2 at RM 2.1, low-gradient riffle with boulder-dominant substrate, looking downstream, March 8, 2011.



Figure 4.0-18. Oregon Creek LCDDR, Section 2 near RM 2.1, looking upstream, September 15, 2009.



Figure 4.0-19. Oregon Creek LCDDR, Section 2 at RM 2.3, mid-channel pool with cobble/boulder-dominant substrate, looking upstream, March 8, 2011.



Figure 4.0-20. Oregon Creek LCDDR, Section 2 at RM 2.3, looking upstream, September 15, 2009.



Figure 4.0-21. Oregon Creek LCDDR, Section 2 near RM 3, low-gradient riffle/run with boulder-dominant substrate, looking downstream March 8, 2011.



Figure 4.0-22. Oregon Creek LCDDR, Section 2 near RM 3, looking upstream September 15, 2009.



Figure 4.0-23. Oregon Creek LCDDR, Section 3 near RM 3.7, pocket water with bedrock-dominant substrate, looking upstream October 4, 2009.



Figure 4.0-24. Oregon Creek LCDDR, Section 3 near RM 3.9, low-gradient riffle with boulder-dominant substrate, looking upstream October 4, 2009.



Figure 4.0-25. Oregon Creek LCDDR, Section 3 near RM 4.0, mid-channel pool with boulder-dominant substrate (bedrock mainly found on banks), looking upstream October 4, 2009.



5.0 Non-Project Affected Stream Reaches

As stated in the Study Plan, the study area will also include one study site on each of two stream reaches unaffected by the Project: 1) Oregon Creek immediately upstream of the Log Cabin Diversion Dam Impoundment, and 2) a stream reach in the Yuba River watershed with comparable geomorphic attributes to at least some of the larger Project-affected stream reaches. For the latter, Licensee evaluated two reaches: 1) North Yuba River upstream of the Project boundary and 2) Middle Yuba River upstream of Our House Diversion Dam. Information used to evaluate conditions on these reaches and accessibility included review of existing FYLF data (NID and PG&E 2010a) for Middle Yuba River upstream of Our House Diversion Dam, and a field reconnaissance of non-Project affected reaches of Oregon Creek on March 8, 2011 and the North Yuba River on March 7 and 10, 2011.

5.1 Oregon Creek

The non-Project affected reach of Oregon Creek is located upstream of the Log Cabin Diversion Dam Impoundment (Figures 5.0-1 and 5.0-2). Sections were investigated from RM 4.2 to 4.4 and at RM 5.6 in March 2011 (Figures 5.0-3 and 5.0-4). Stream habitat mapping data and aerial video are not available for the non-Project affected reach. Based on aerial photos, this reach of Oregon Creek appears to be mainly comprised of mid-channel pools and low-gradient riffles interspersed amongst steeper sections with high-gradient riffles and cascades. One tributary, Grizzly Gulch, is located at RM 4.2, and one unnamed tributary is located at RM 5.6.

The reach is easily accessible from Log Cabin Road at the downstream end and Pike City Road Crossing at the upstream end. Access between these two points may be limited and some sections may be difficult to traverse at higher flows.

Based on the available information, suitable habitat for FYLF that could be included in a survey site is located in at least two locations (Table 5.0-1), with good accessibility at both points. A survey site at location 1 would include approximately 500 m with suitable habitat with steeper gradient, less suitable habitat upstream. Suitable habitat at location 2 is limited in extent – at least 100 m extending upstream of Pike City Crossing. Stream habitat downstream of Pike City Crossing appeared to primarily be unsuitable habitat such as cascade plunge pools.

5.2 Middle Yuba River

The non-Project affected reach of the Middle Yuba River extends upstream from Our House Diversion Dam at RM 12 (Figures 5.0-9 and 5.0-10). The Middle Yuba River upstream of Our House Diversion Impoundment was previously investigated as part of the relicensing studies for FERC Project Nos. 2310 (Pacific Gas & Electric Company) and 2266 (Nevada Irrigation District), including an FYLF study (NID and PG&E 2010a). This part of the Middle Yuba River¹ is low-gradient and predominantly comprised of pools (mid-channel and lateral) and riffles (mostly low gradient), with some runs (Figure 5.0-11). Dominant substrates are cobble

¹ Defined as the Kanaka Creek Sub-reach of the Milton Diversion Dam Reach of the Middle Yuba River

and boulder, and there are long lateral and mid-channel cobble and boulder bars. The reach is accessible from Our House Diversion Dam, and is wadeable during lower flows.

Information was derived from NID and PG&E (2010a) that describes the FYLF survey site MY-2 situated 14.1 mi upstream of Our House Diversion Dam. Site MY-2 was characterized by abundant potential FYLF breeding and rearing habitat associated with pools and shallow edgewater at the edges of low relief cobble bars. The site did not include a tributary. Site MY-2 is located more than 30 mi downstream of Milton Diversion Dam, an NID facility.

Based on the available information, suitable habitat for FYLF is abundant and accessibility for a 1,000 m site is good except at high flows.

The geomorphic comparability of this non-Project affected reach to the larger Project-affected stream reaches is summarized in Table 5.0-3. There are areas with comparable geomorphic attributes in the Middle Yuba River Our House Diversion Dam Reach and Oregon Creek Dam Reach, but not in the other large stream reaches.

5.3 North Yuba River

The non-Project affected reach of North Yuba River is located upstream of the FERC Boundary at RM 18.1 (Figures 5.0-16 and 5.0-17). Sections of this reach were investigated from RM 24 to ~RM 25.6 in March 2011 (Figure 5.0-18). Stream habitat mapping and aerial video data are not available for the non-Project affected reach. Based on aerial photos and field reconnaissance, the downstream portion of this reach below Highway 49 (Section 1) appears to be moderately low-gradient and mainly comprised of mid-channel pools and low- to high-gradient riffles and intermittent cascades. Most of this section appears to be confined by steep to very steep terrain on both sides of the river. Upstream of Highway 49 (Section 2), North Yuba River flows through a less confined valley. The section is low-gradient and mainly consists of long stretches of runs and low-gradient riffles with a predominantly boulder/cobble substrate. At least four tributaries are associated with Section 1; seven tributaries are associated with Section 2.

Section 1 is accessible by foot from Indian Creek Road at Highway 49 downstream several miles; wadeability of this section is unknown. Downstream of Indian Valley Road, Section 1 becomes increasingly difficult to access due to limited access from roads and steep terrain. Section 2 is accessible from numerous Forest Service campgrounds and likely is wadeable at lower flows.

Analysis of available stream habitat mapping data and the March 2011 reconnaissance indicates that suitable habitat for FYLF is located Section 2 with good accessibility throughout the reach. A survey site of 1,000 m in length could be situated in several areas in Section 2. Section 1 was inaccessible during the March 2011 reconnaissance.

The geomorphic comparability of this non-Project affected reach to the larger Project-affected stream reaches is summarized in Table 5.0-3. Both Section 1 and Section 2 share geomorphic attributes with parts of the Middle Yuba River Our House Diversion Dam Reach and Oregon Creek Dam Reach. Section 1 is also comparable to a small portion of the North Yuba River New Bullards Bar Dam Reach.

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Table 5.0-1. Oregon Creek Non-Project Affected Reach descriptions and access considerations

Section/ River Mile	Description of Section	Presence of potential FYLF breeding habitat	FYLF Records	Site Access
Oregon Creek non-Project affected reach				
Location 1 RM 4.2 to ~4.5	Predominant stream habitat types are mid-channel pools and splits, and low-gradient riffles. Bankfull width averages 5 to 10 m. Dominant substrate consists of boulders and cobbles. Margin vegetation is predominantly blackberry. Overhanging vegetation consists of deciduous shrubs. One tributary (Grizzly Gulch) occurs along this section.	Potential breeding and rearing habitat is present throughout this section and mainly consists of pools and low-velocity edgewater with suitable substrate such as cobbles and boulders. Margin and overhanging vegetation does not preclude sun exposure along most of this section.	<ul style="list-style-type: none"> • USFS record just upstream of Log Cabin Diversion Dam (RM 4.0) 	<ul style="list-style-type: none"> • Access from Log Cabin Road. • Only accessible to RM 4.4 during higher flows. • Likely accessible to at least RM 4.5 during lower flows.
Location 2 RM 5.6 to ~5.7	Predominant stream habitat type is low-gradient riffles. Bankfull width averages 5 to 10 m. Dominant substrate consists of boulders and cobbles. Margin vegetation consists of scattered forbs. Overhanging vegetation consists of deciduous trees. One tributary occurs along this section.	Potential breeding and rearing habitat is present throughout this section and mainly consists of pools and low-velocity edgewater with suitable substrate such as cobbles and boulders. Margin and overhanging vegetation does not preclude sun exposure along most of this section.	<ul style="list-style-type: none"> • One male and one female FYLF observed on left bank near RM 4.6 on March 8, 2011 • USFS and CDFG records near tributary at RM 5.6. 	<ul style="list-style-type: none"> • Access from Pike City Road Crossing. • Only accessible at RM 5.6 during higher flows. • Accessible to at least RM 5.7 during lower flows.

Table 5.0-2. North Yuba River and Middle Yuba River Non-Project Affected Reach descriptions and access considerations

Section/ River Mile	Description of Section	Presence of potential FYLF breeding habitat	FYLF Records	Site Access
Middle Yuba River non-Project affected reach (NID and PG&E 2010a)				
Site MY-2 ~RM 13.0 to 13.7	Low-gradient (1%); with numerous low-relief lateral and point bars in lower half of site, which is largely a depositional area. Several split channels and bedrock outcrops. Habitat comprised primarily of runs, glides, and low-gradient riffles, with occasional mid-channel, lateral, and backwater pools. Substrate primarily boulder and cobble. Substrate moderately embedded. Moderate amount of margin vegetation comprised of willow, sedges, and grasses. Some overhanging deciduous shrub vegetation. No tributary present.	Potential breeding and rearing habitat associated with pools and shallow edgewater and suitable substrate such as boulders and cobbles is abundant throughout site. Margin and overhanging vegetation does not preclude sun exposure along most of this section.	<ul style="list-style-type: none"> • 2008 FYLF survey results: 18 egg masses on June 9, abundant tadpoles (777 on June 24), young of year (397 on August 27), and good numbers of juveniles/adults in the three surveys (37/43, 25/25, 7/32) • CDFG records throughout reach to ~RM 14.5 • USFS records near RM 12.5 and 13.5 	<ul style="list-style-type: none"> • Accessible from Our House Diversion Dam road. Entire reach is wadeable at lower flows.

Table 5.0-2. Continued.

Section/ River Mile	Description of Section	Presence of potential FYLF breeding habitat	FYLF Records	Site Access
North Yuba River non-Project affected reach				
Section 1 RM 18.1 to RM 23.5	Predominant stream habitat type is predominantly mid-channel pools interspersed with low- and/or high-gradient riffles. Bankfull width averages 40 m. No ground data on dominant substrate or margin vegetation. Overhanging vegetation appears limited. At least four tributaries occur along this section.	Potential breeding and rearing habitat may be present throughout this section in mid-channel pools and low-gradient riffles; however, stream substrate is unknown. Aerial signatures of potential suitable substrate, such as boulders/cobble bars, are sparse. Margin and overhanging vegetation does not appear to preclude sun exposure along most of this section.	<ul style="list-style-type: none"> • USFS records on Indian Creek Tributary near RM 22.4 	<ul style="list-style-type: none"> • Upstream end of section accessible from Indian Valley Road. • Wadeability of stream reach unknown.
Section 2 RM 23.5 to 25.7	Predominant stream habitat types are runs, low-gradient riffles, and splits. Cobble bars are present throughout this section. Bankfull width averages 5 to 10 m. Dominant substrate consists of boulders and cobbles. Margin and overhanging vegetation consists of patches of scattered deciduous shrubs. At least seven tributaries occur along this section.	Potential breeding and rearing habitat is present throughout this section and mainly consists low-velocity edgewater with suitable substrate such as cobbles and boulders. Margin and overhanging vegetation does not preclude sun exposure along most of this section.	<ul style="list-style-type: none"> • USFS records near RM 25.2 • CDFG records near RM 24.3 	<ul style="list-style-type: none"> • Section is accessible from numerous Forest Service Campgrounds on the right bank. • Likely wadeable during lower flows.

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Table 5.0-3. Non-Project affected reaches with comparable geomorphic attributes to larger Project-affected stream reaches.

Non-project reach	MYR – Our House Div Dam Reach	MYR – Oregon Creek Reach	NYR- New Bullards Bar Dam Reach	Yuba River – Middle/North Yuba Reach
MYR – Site MY-2	Yes at ~RM 4.5 to 5.5	Yes at ~RM 3.5 to 4.5	No	No
NYR – Section 1	Yes at ~RM 10 to 11	Yes at ~RM 2 to 3	Yes at ~RM 0.5	No
NYR – Section 2	Yes at ~RM 4.5 to 5.5	Yes at ~RM 3.5 to 4.5	No	No

Figure 5.0-1. Oregon Creek Non-Project Affected Reach: overview topographic map. The approximate extent of the March 2011 reconnaissance areas are demarcated by red dots (two short sections; the upstream area is a spot location represented by one dot).

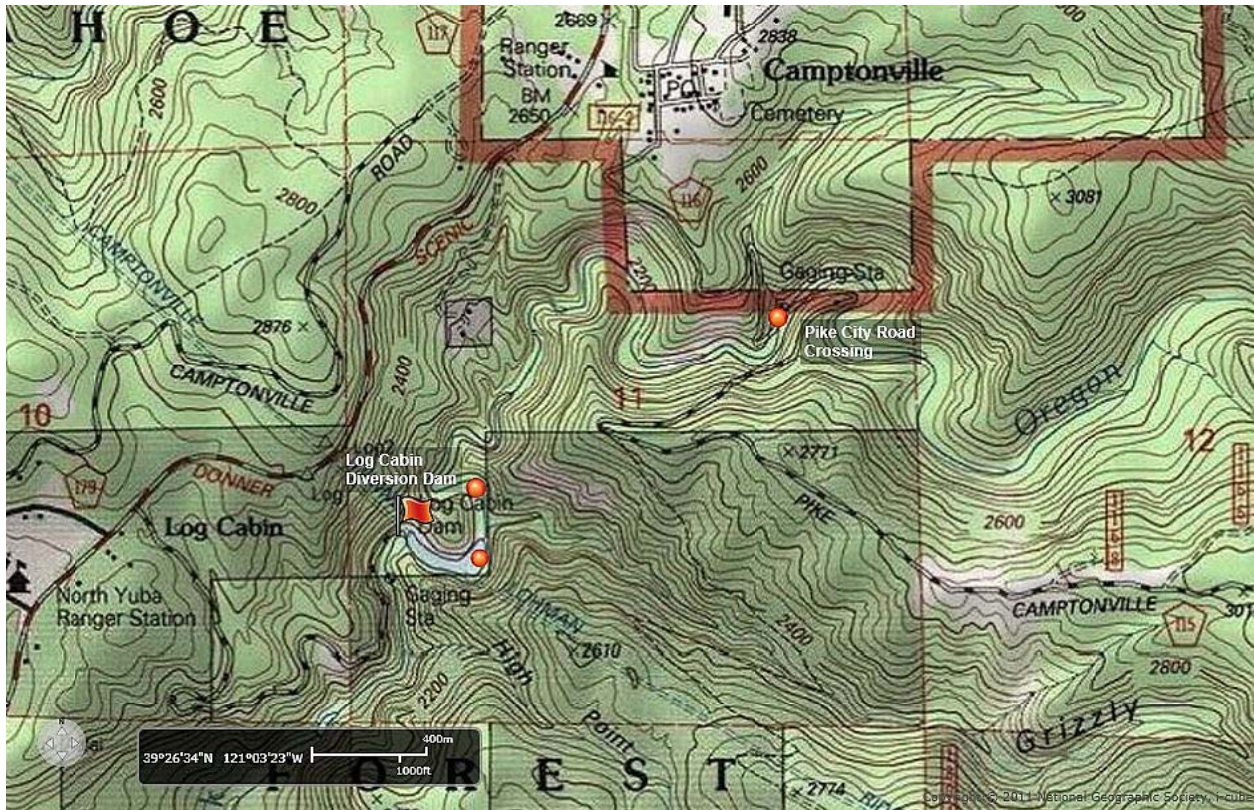


Figure 5.0-2. Oregon Creek Non-Project Affected Reach: overview aerial image. The approximate extent of the March 2011 reconnaissance areas are demarcated by red dots (two short sections; the upstream area is a spot location represented by one dot).

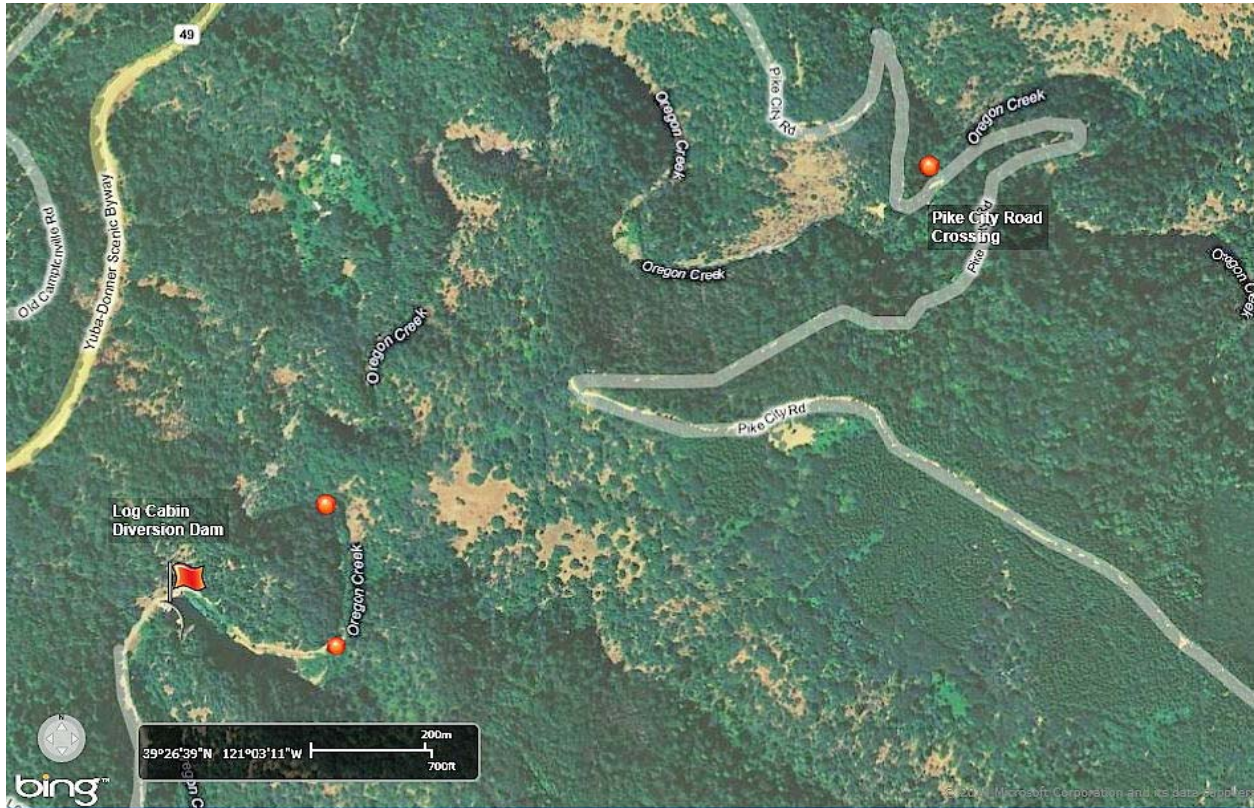


Figure 5.0-3. Oregon Creek Non-Project Affected Reach: aerial image of upstream section investigated in March 2011 (red dot).



Figure 5.0-4. Oregon Creek Non-Project Affected Reach: aerial image of downstream section investigated in March 2011. The approximate extent of the March 2011 reconnaissance area is demarcated by red dots.



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Figure 5.0-5. Oregon Creek Non-Project Affected Reach, Section 1 at RM 4.3, low-gradient riffle with boulder-dominant substrate, looking upstream, March 8, 2011. Grizzly Gulch is visible on the left bank.



Figure 5.0-6. Oregon Creek Non Project-Affected Reach, Section 1 at RM 4.35, split channel with cobble/boulder-dominant substrate, looking upstream, March 8, 2011.



Figure 5.0-7. Oregon Creek Non-Project Affected Reach, Section 1 at RM 4.4, mid-channel pool with cobble/boulder dominant substrate, looking upstream, March 8, 2011.



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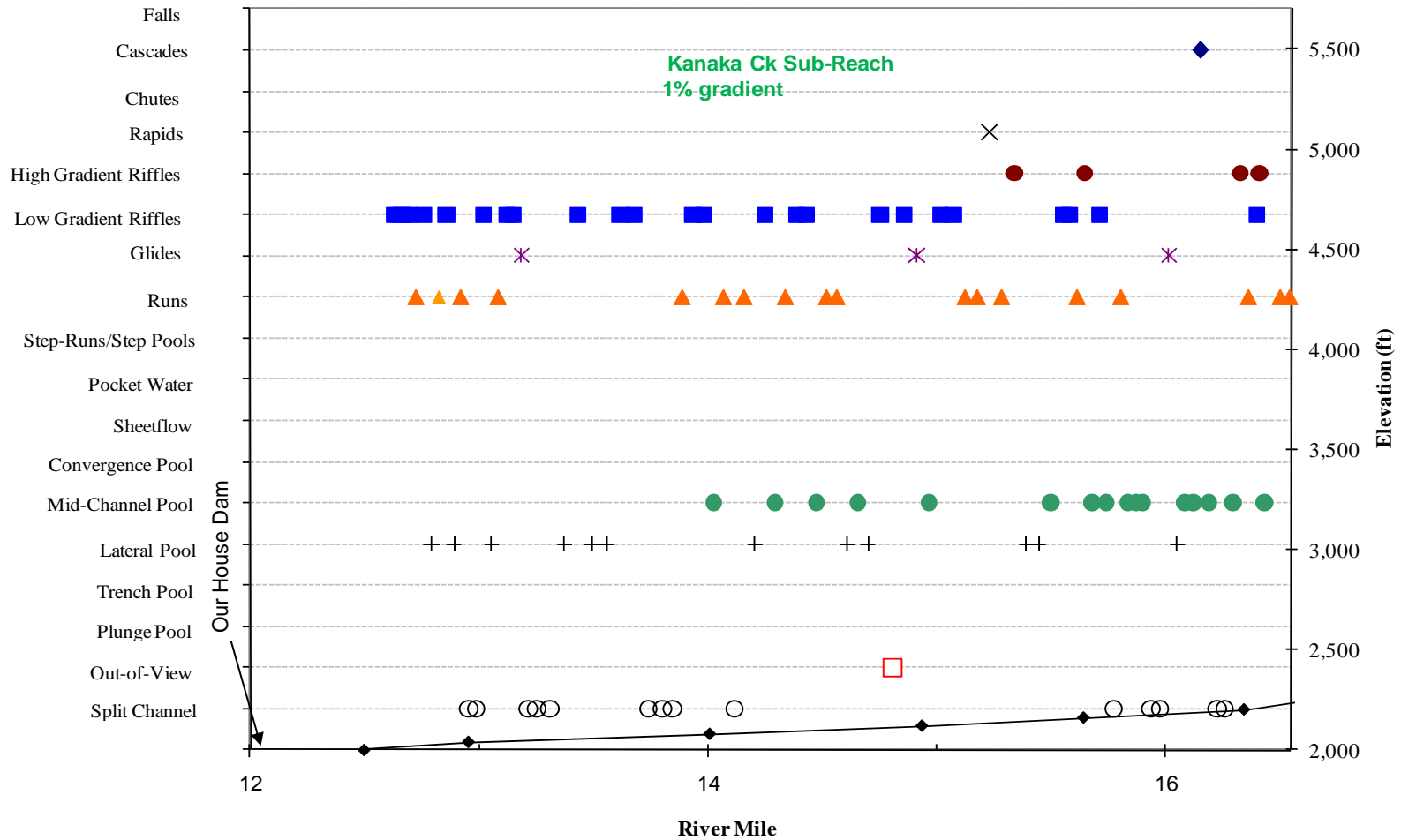


Figure 5.0-8. Middle Yuba River non-Project affected reach: longitudinal profile and stream habitat mapping (NID and PG&E 2010b).

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Figure 5.0-9. Middle Yuba River Non-Project Affected Reach: overview topographic map. Black and white dots indicate upstream and downstream extent of FYLF survey site MY-2 (NID and PG&E 2010a).

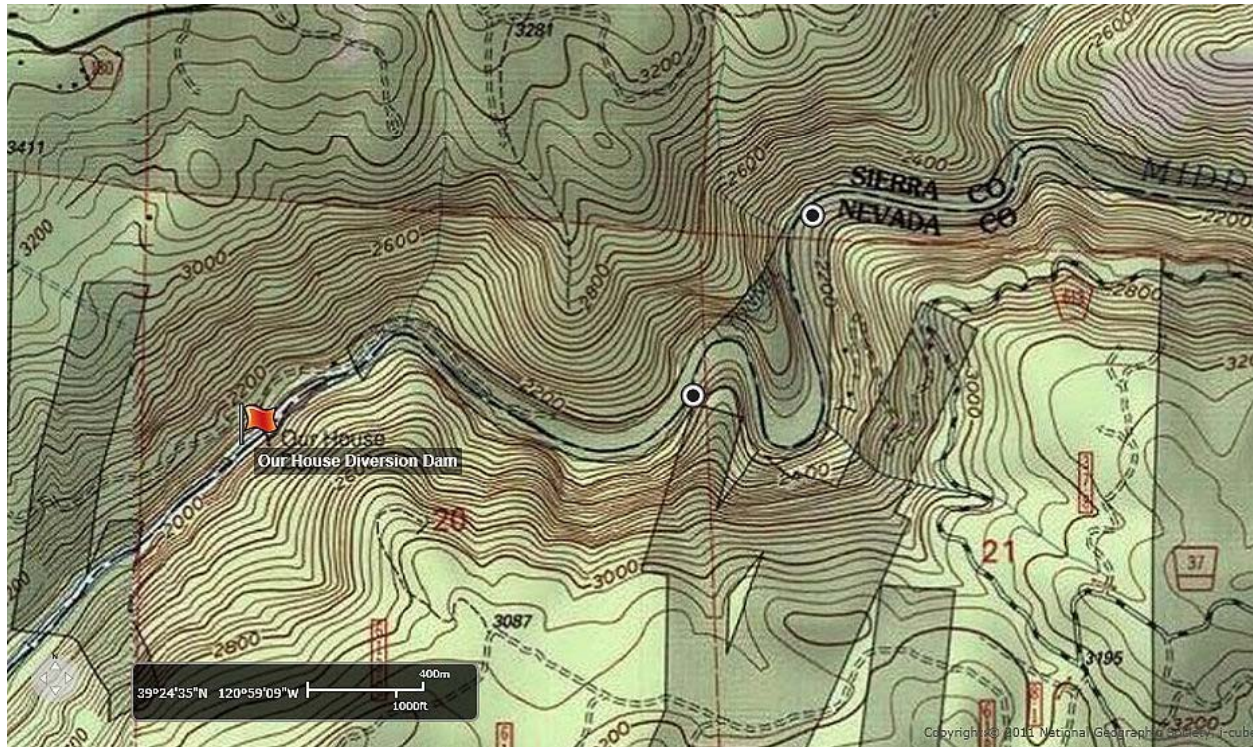


Figure 5.0-10. Middle Yuba River non-Project affected reach: overview aerial image. Black and white dots indicate upstream and downstream extent of FYLF survey site MY-2 (NID and PG&E 2010a).

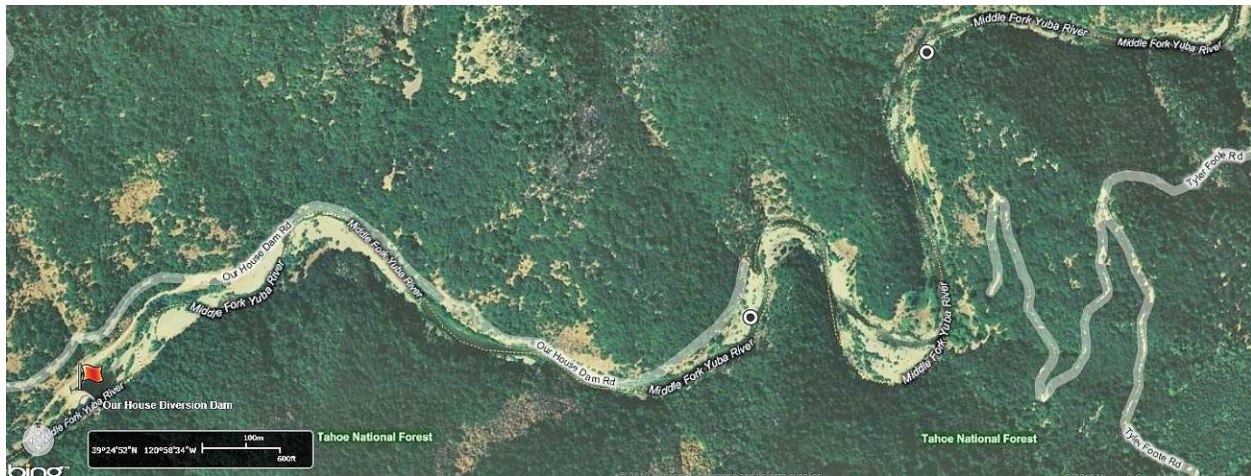
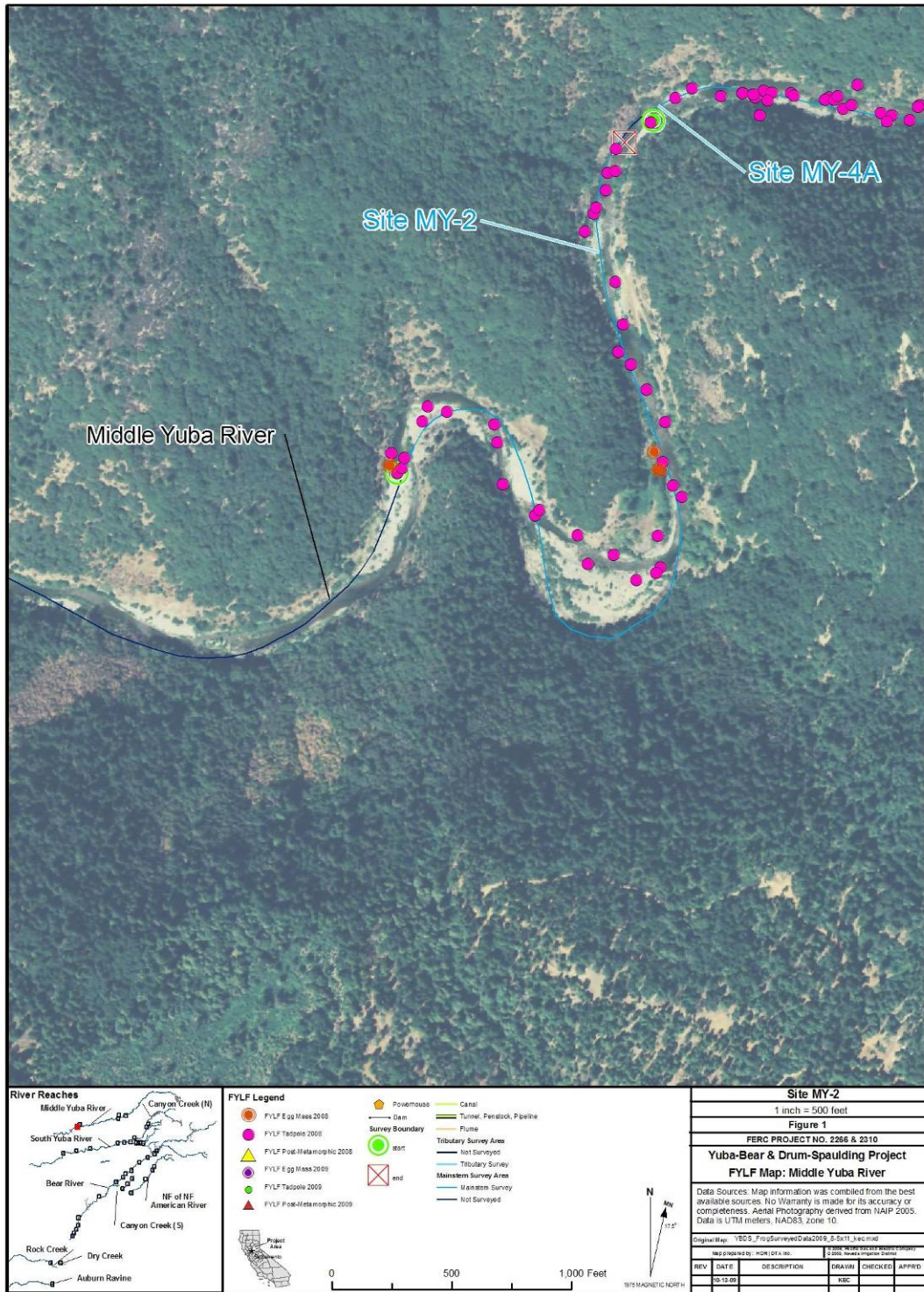


Figure 5.0-11. Middle Yuba River non-Project affected reach: detail aerial image of FYLF survey site MY-2 and locations of FYLF survey detections (NID and PG&E 2010a).



Ground Photos:

Figure 5.0-12. Middle Yuba River Non-Project Affected Reach, near RM 13.0 looking upstream, June 9, 2008.



Figure 5.0-13. Middle Yuba River Non-Project Affected Reach, near RM 13.0 looking downstream, June 24, 2008.



Figure 5.0-14. Middle Yuba River Non-Project Affected Reach, near RM 13.15 looking downstream, June 24, 2008.

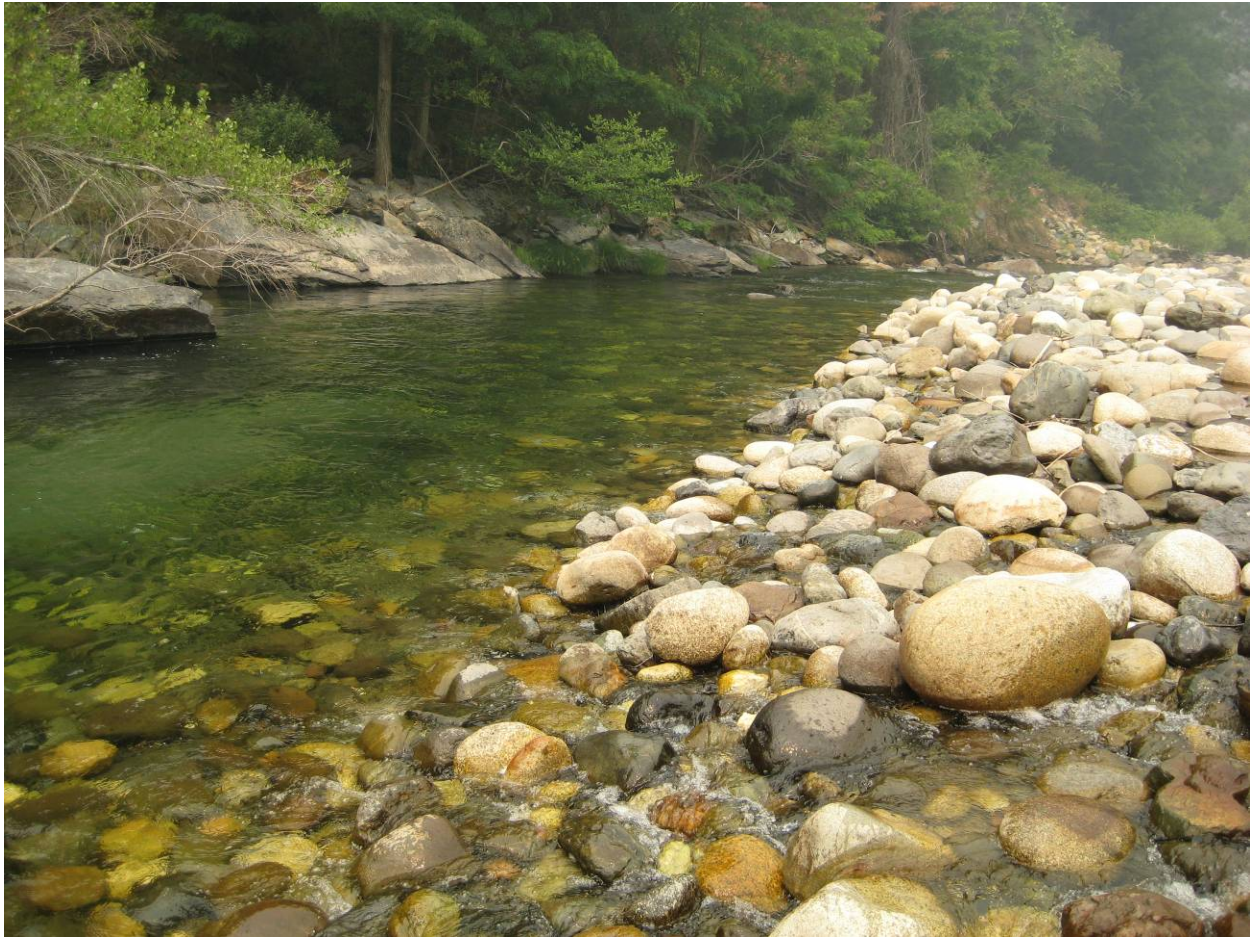


Figure 5.0-15. Middle Yuba River Non-Project Affected Reach, near RM 13.3 looking downstream, June 24, 2008.



Figure 5.0-16. Middle Yuba River Non-Project Affected Reach, near RM 13.35 looking down stream, June 9, 2008.



Figure 5.0-17. Middle Yuba River Non-Project Affected Reach, near RM 13.45 looking downstream, June 9, 2008.



Figure 5.0-18. Middle Yuba River Non-Project Affected Reach, near RM 13.7 looking down stream, August 27, 2008.



Figure 5.0-19. North Yuba River Non-Project Affected Reach: overview topographic map. The approximate extent of the March 2011 reconnaissance areas are demarcated by red dots (one section).

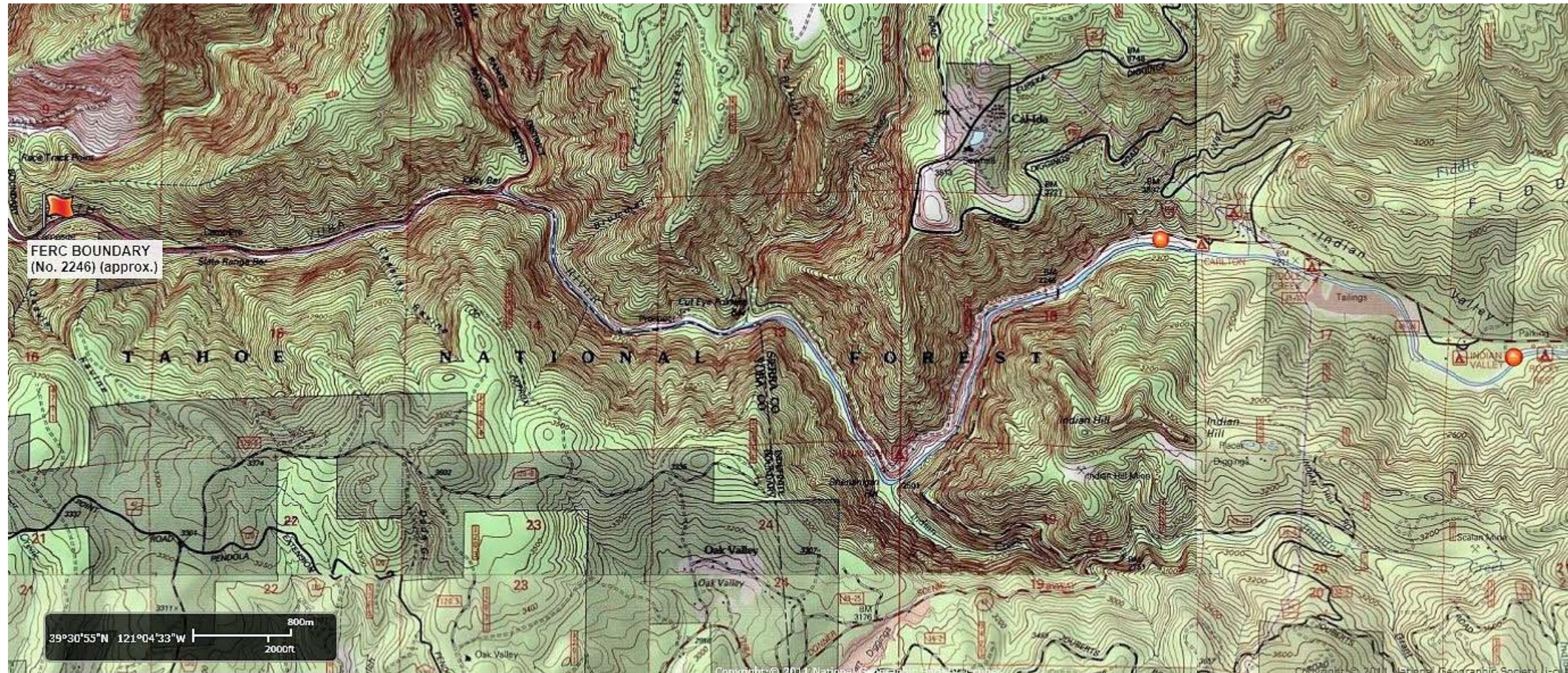


Figure 5.0-20. North Yuba River Non-Project Affected Reach: overview aerial image. The approximate extent of the March 2011 reconnaissance areas are demarcated by red dots (one section).

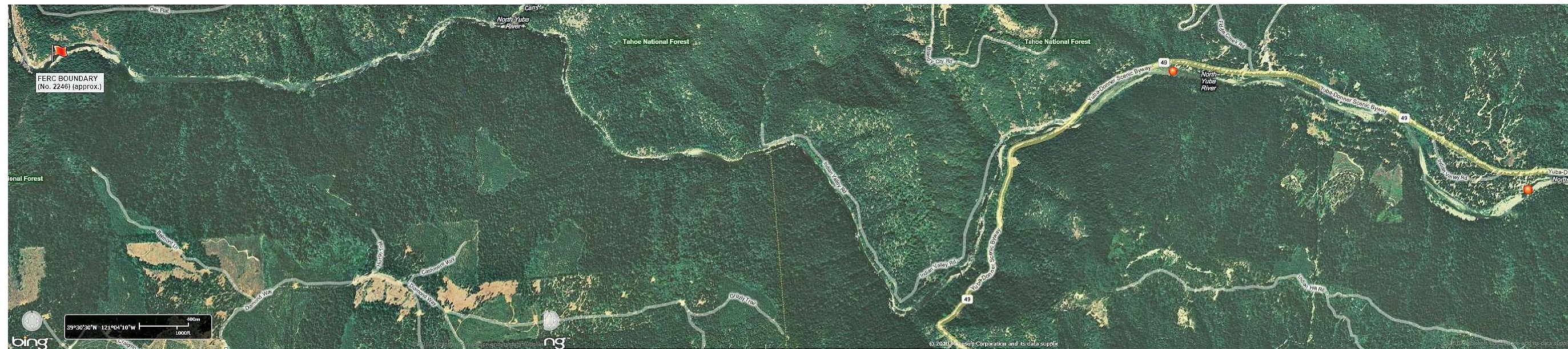


Figure 5.0-21. North Yuba River Non-Project Affected Reach: aerial image of upstream section investigated in March 2011.



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Ground Photos:

Figure 5.0-22. North Yuba River Non-Project Affected Reach, near RM 24, looking upstream at low-gradient riffle during high flows, March 10, 2011.



Figure 5.0-23. North Yuba River Non-Project Affected Reach, near RM 24.2, looking downstream at low-gradient riffle during high flows, March 10, 2011.



Figure 5.0-24. North Yuba River Non-Project Affected Reach, near RM 24.2, looking downstream at mid-channel pool/low-gradient riffle during high flows, March 10, 2011.



Figure 5.0-25. North Yuba River Non-Project Affected Reach, near RM 25.1, looking downstream at low-gradient riffle and cobble bar during high flows, March 10, 2011.



Figure 5.0-26. North Yuba River Non-Project Affected Reach, near RM 25.4, looking upstream at mid-channel pool during high flows, March 10, 2011.



Figure 5.0-27. North Yuba River Non-Project Affected Reach, near RM 25.65, looking downstream at low- and high-gradient riffles during high flows and adjoining cobble bar, March 10, 2011.



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