FLOW FLUCTUATION MONITORING FOR FOOTHILL YELLOW-LEGGED FROG (*Rana boylii*) ON THE SOUTH FORK AMERICAN RIVER, EL DORADO COUNTY, CALIFORNIA FOR THE EL DORADO HYDROELECTRIC PROJECT (FERC NO. 184)

*Prepared for:*

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JOB 1342-11
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1.0 INTRODUCTION

1.1 Monitoring Requirements

The El Dorado Irrigation District (District) owns and operates the El Dorado Hydroelectric Project (Project) in El Dorado County, California. The Project is licensed by the Federal Energy Regulatory Commission (Project 184). The District, in coordination with the U.S. Forest Service, the California State Water Resources Control Board, and the Ecological Resources Committee, developed the Project 184 Foothill Yellow-legged Frog Monitoring Plan (Plan) as required by the Project 184 License1.

The Plan requires monitoring for foothill yellow-legged frog (FYLF) to be conducted at four sites “June through September at any time the SFAR flow is 100 cfs or less and the reach between Kyburz Diversion Dam and Silver Creek changes 50 cfs or more in 1 day.” Two separate flow fluctuations occurred on July 1 and July 8, 2013, which triggered FYLF monitoring.

On July 1, 2013, at approximately 5:15 p.m., the wide-spread power outage associated with the wildfire in the Cameron Park area caused the El Dorado Powerhouse (Powerhouse) to shutdown. With the shutdown, it was not possible to make releases from the Powerhouse and it was then necessary to store inflows from the canal in the El Dorado Forebay. To maintain the El Dorado Forebay below the maximum allowable reservoir storage elevation as required by the Federal Energy Regulatory Commission and California Division of Safety of Dams, the District released water from the canal at Spillway 44. Spillway 44 is identified as a preferred spillway in the Project 184 Preferred Canal Drainage Structure and Release Point Plan and is located on the lower reach of the canal approximately 4 miles east of the El Dorado Forebay. The maximum release was estimated at 128 cfs. The duration of the release from Spillway 44 was approximately 2 ½ hours. Flows measured below Kyburz Diversion Dam (gage A-12) during this event were approximately 46 cfs. The maximum release from Spillway 44 was greater than 50 cfs. Therefore, a flow fluctuation, as defined by the Project No. 184 license, occurred and triggered the need to conduct FYLF monitoring downstream of where Spillway 44 releases enter the SFAR. These sites include 120R, upstream of Silver Creek, and 124R at confluence with Soldier Creek (Figure 1).

On July 8, 2013, at approximately 8:00 a.m., during canal patrol, the District observed a 4 inch diameter hole in the lining of Flume 46. The District determined it was necessary to repair the hole immediately to protect the integrity of the flume. To facilitate the safe repair of the flume, the District released water from the canal at Spillway 10 and Spillway 27. Both spillways are identified as preferred spillways in the Project 184 Preferred

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1 United States Forest Service Section 4(e) Conditions 37 and 38; State Water Resources Control Board 401 Water Quality Certification Condition 13; Project 184 Settlement Agreement Sections 7 and 8.
Canal Drainage Structure and Release Point Plan. Spillway 10 is located on or near Camp 1 just east of Alder Creek and Spillway 27 is located at Camp 3 at Ogilby Creek. The maximum release from Spillway 10 was estimated at 128 cfs for 4.25 hours. The maximum release from Spillway 27 was estimated at 20 cfs for 5 minutes. Flows measured below Kyburz Diversion Dam (gage A-12) during this event were approximately 45 cfs. The maximum release from Spillway 10 was greater than 50 cfs. Therefore, a flow fluctuation, as defined by the Project No. 184 license, occurred and triggered the need to conduct FYLF monitoring. The District was already scheduled to conduct FYLF monitoring on July 9 associated with the power outage flow fluctuation that occurred a week prior. The District expanded that monitoring effort to include the upper flow fluctuation monitoring sites located on the SFAR upstream of Ogilby Creek (213R) and the SFAR at Maple Grove (220R) (Figure 1).
Figure 1. Flow Fluctuation Monitoring Sites and Spillway Locations.
1.2 FYLF Status, Distribution and Current Threats to Populations

The FYLF is designated as a Federal Species of Concern, a Forest Service Sensitive species, and a California Species of Special Concern. FYLF occur in the Coast Ranges from the Santiam River in Oregon south to the San Gabriel River in Los Angeles County and along the west slopes of the Sierra/Cascade crest in most of central and northern California. Other isolated populations have been reported in Baja California Norte (Loomis 1965), in southern California, and at Sutter Buttes in Butte County, California (Stebbins 2003). The elevational range of FYLF extends from sea level to 2,042 m (6,700 ft.) in Baja California Norte. In California, FYLF have been recorded in the Sierras as high as 1,830 m (6,000 ft.) near McKessick Peak in Plumas County and 1,940 m (6,365 ft.) at Snow Mountain in Trinity County (Stebbins 2003). In the Project Area, FYLF are currently known to occur along the mainstem SFAR and associated tributaries from the upstream end of Slab Creek Reservoir upstream to Riverton at 975 m (3,200 ft.) elevation (GANDA 2011).

In the Sierra Nevada, FYLF have disappeared from an estimated 66 percent of their former range (Stebbins 2003). Non-native predators, land use conversion, pesticide use, and modification of hydrology are considered the main threats to FYLF populations (Jennings and Hayes 1994, Davidson et al. 2002). Non-native bullfrogs (*Lithobates catesbeiana*) negatively affect FYLF populations via larval competition and direct predation (Moyle 1973, Kupferberg 1997, Crayon 1998). Signal crayfish feed on FYLF eggs and tadpoles (Rombough and Hayes, 2005; Wiseman et al. 2005) and have been shown to negatively affect other amphibians through direct predation and egg mass displacement in ponds (Nyström et al. 2001). Invasive fish, particularly centrarchids, are suspected to feed upon FYLF (Werschkul and Christensen 1977, Van Wagner 1996). Construction of dams and altered hydrological systems continue to threaten FYLF populations by reduction of breeding habitat and scouring of egg masses by untimely water releases (Lind et al. 1996, GANDA 2005).

2.0 METHODS

2.1 Visual Encounter Surveys

Visual Encounter Surveys (VES) were conducted at a total of eight subsites on the SFAR including subsites 120a, 120b, 120c, 124R, 213R, 220a, 220b, and 220c (Figure 1). Surveys were conducted according to *A Standardized Approach for Habitat Assessments and Visual Encounter Surveys for the Foothill Yellow-Legged Frog (Rana boylii)* (Seltenrich and Pool 2002). All VES were conducted by GANDA biologists Kevin Wiseman and Michael Mulroy on July 9, 2013.
Survey data were recorded onto Visual Encounter Survey Data Sheets for each subsite surveyed. Separate data sheets were completed for tadpoles, while data for juveniles and adults were recorded on separate data sheets. Juvenile and subadult frogs were defined as frogs from previous years’ cohorts, ranging approximately 30-40 mm SVL, but not considered of adult size. Adults were defined as frogs ≥ 40 mm SVL.

Data parameters collected for tadpoles included: tadpole group location in site; number of tadpoles in each group; distance from the shore; velocity; total length; substrate; percent algae and detritus; and, water depth. The data parameters collected for juvenile and adult FYLF included: number of frogs observed; frog location within the site; sex; age; snout-vent length; habitat type; activity; percent cover of vegetation; percent shade; and, substrate.

3.0 RESULTS

3.1 Visual Encounter Survey Results

Results for the visual encounter surveys are summarized in Table 1. Copies of survey data sheets are provided in Appendix A, and site photographs are located in Appendix B.

Table 1. Survey results for the flow fluctuation monitoring.

<table>
<thead>
<tr>
<th>Subsite #</th>
<th>Date</th>
<th>Beg. Time</th>
<th>End Time</th>
<th>Actual VES time (min.)</th>
<th>Beg. Air Temp. (°C)</th>
<th>End Air Temp. (°C)</th>
<th>Water Temp. (edgew.) (°C)</th>
<th>Water Temp. (channel) (°C)</th>
<th># Egg Masses</th>
<th># Tadpoles/ # groups</th>
<th># Juvenile /YOY Frogs</th>
<th># Adult Frogs</th>
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<tr>
<td>120a</td>
<td>7/09/13</td>
<td>1010</td>
<td>1030</td>
<td>20</td>
<td>26</td>
<td>29</td>
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<td>28</td>
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* Observed incidentally approx. 50 m upstream of the top of Site 213R.

3.1.1 Site 120R – SFAR upstream of Silver Creek

Site 120R is located on the SFAR approximately 1.0 km upstream of the confluence with Silver Creek at an elevation of 685 m (2,240 ft). The total site length is 352 m and includes three subsites: 120a, 120b, and 120c.

Subsite 120a contained several small (approximately 1-3m²) isolated pools along the lateral cobble bar near the river margin (Photos 1-2, App. B). Signal crayfish (*Pacifasticus leniulsculus*), damselfly larvae, gerrids, cyprinids, smallmouth bass...
Micropterus dolomieu) and sucker (Catostomus occidentalis) young-of-the-year (YOY) were observed. No FYLF life stages were observed during the survey.

Subsite 120b was largely dry during the survey, except for several isolated pools (2-28m²) and a few connected side pools located at the top 50 m of the subsite (Photos 3-4, App. B). Chorus frog (Pseudacris regilla) tadpoles and a metamorph were observed in the isolated pools in addition to a larval Sierra newt (Taricha sierrae), a juvenile Sierra garter snake (Thamnophis couchii) and a dead crayfish. Fish observed at this site included cyprinids and sucker YOY. No FYLF life stages were observed during the survey.

Subsite 120c was largely dry at the downstream portion of the site, consisting of several small, isolated pools (Photos 5-6, App. B). Rainbow trout (Oncorhynchus mykiss), cyprinids, sucker YOY and juveniles, speckled dace (Rhinichthys osculus), river otter (Lontra canadensis) scat and crayfish were observed. No FYLF lifestages were observed at this site.

3.1.2 Site 124R – SFAR at confluence with Soldier Creek

Site 124R is located on the left bank of the SFAR across from the confluence with Soldier Creek at an elevation of 755 m (2,480 ft) (Photos 7-8, App. B). Crayfish, gerrids, smallmouth bass and sucker YOY and juveniles were observed. No FYLF lifestages were observed at this site.

3.1.3 Site 213R – SFAR upstream of Ogilby Creek

Site 213R is located on the left bank of the SFAR about 0.6 km (1,970 ft) upstream of the confluence with Ogilby Creek, at an elevation of 930 m (3,050 ft) (Photos 9-10, App. B). Two FYLF tadpoles were observed (Photo 11, App. B) 45 m upstream of the bottom of the site. One spent adult female (67 mm snout-urostyle-length; 28.5 g) was observed incidentally 50 m upstream of the top of Site 213R (Photo 12, App. B). Great blue herons (Ardea herodias), speckled dace, a juvenile Sierra garter snake, Western pearlshell mussels (Margaritifera falcata), and crayfish were also observed.

3.1.4 Site 220R – SFAR at Maple Grove

Site 220R is located near Maple Grove Campground at an elevation of 965 m (3,160 ft). Three subsites are included within the site: 220a (Photos 13-14, App. B), 220b (Photos 16-17, App. B), and 220c (Photos 18-19, App. B). The total site length is 286 m.

One FYLF tadpole was observed at Subsite 220a (Photo 15, App. B), 25 m upstream of the bottom of the site, 1.8 m from the edgewater. Cyprinid YOY and crayfish were also observed.
No FYLF lifestages were observed at Subsites 220b and 220c, however, crayfish, mussels and cyprinid YOY were observed.

4.0 LITERATURE CITED


Van Wagner, T.J. 1996. Selected life history and ecological aspects of a population of foothill yellow-legged frogs (*Rana boylii*) from Clear Creek, Nevada County, California. Masters Thesis, Department of Biological Sciences, California State University, Chico. 143 pp.


Appendix A: Visual Encounter Survey Data Sheets
Foothill Yellow-Legged Frog
River and Creek Visual Encounter Survey Data Sheet
Juveniles/Subadults and Adults

| Date: 7/15/13 | Site #: 120A | Subsite #: 120A | River Name/Location: San Francisco | Observers: KMM | Date: 7/15/13 |
| Start Time: 10:10 | End Time: 10:30 | Actual VES Time: 20 min. | Start Air Temp: 76°C | End Air Temp: 29°C |
| Water Temp: (edgewater) 21.5°C (main channel) | 22°C (pool) 21.5°C | Discharge: 45 cfs | Total Site Length: 352 m | Subsite Length: 82 m |
| Search Area Length: 82 m | Search Area Width: X=5 m | Total Area Searched: (m²): 410 m² | Site Visit: 1234 |
| Weather: Sky: Overcast | Partly Overcast | Wind: Inclement | Fair | Ideal |
| Photograph # (index to notebook): | | | | |

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<th>Number of Frogs</th>
<th>Distance¹</th>
<th>Sex (M/F)</th>
<th>Age² (J, A)</th>
<th>Snout-Vent Length (mm)</th>
<th>Activity³</th>
<th>River or Creek Habitat⁴</th>
<th>Microhabitat Type⁵</th>
<th>Dominant Substrate⁶</th>
<th>Comments</th>
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¹ Distance – distance from bottom of site/subsite to frogs
² Age – J = Juvenile/Subadult (< 39 mm), A = Adult (> = 40 mm), snout-vent length
³ Activity – (1) sitting in shade, (2) basking, (3) hiding, (4) calling, (5) swimming, (6) foraging, (7) amphibian, (8) floating, (9) underwater, (10) other
⁴ River or Creek Habitat – (1) low gradient riffle, (2) high gradient riffle, (3) run, (4) slide, (5) main channel pool, (6) step-pool, (7) other
⁵ Microhabitat – (1) isolated side pool, (2) connected side pool, (3) scour pool, (4) backwater pool, (5) side channel, (6) boulder/bedrock, (7) edgewater, (8) pool tail-out, (9) riffle, (10) exposed bank, (11) protected bank, (12) other
⁶ Dominant Substrate – (1) silt/clay/mud, (2) sand, (3) gravel/pebble, (4) cobble, (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris, (9) aquatic vegetation, (10) margin vegetation, (11) other

Fish Present: Yes | Type: Salmonid Centrarchid Cyprinid Other: sucker, yellow

Herpetofauna & Lifestage (A J T E) | tree frog bullfrog western pond turtle garter snake

Other Species Observed: bass, lamprey

Comments:

QA/QC (initials): KMM Date: 7/15/13
Foothill Yellow-Legged Frog
River and Creek Visual Encounter Survey Data Sheet

Juveniles/Subadults and Adults

Date: mm/dd 7/9 Site #: 120 Subsite #: 120B River Name/Location: SF American Below Kyburz Observers: Kow Mom
Water Temp: (edgewater) 22.5°C (main channel) 22.5°C (pool) 20.5°C Discharge: 45 cfs Total Site Length: 352 m Subsite Length: 95 m
Search Area Length: 95 m Search Area Width: 4 m Total Area Searched: (m²): 380
Photograph #: (index to notebook):

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<th>Microhabitat Type⁵</th>
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¹ Distance – distance from bottom of site/subsite to frogs
² Age – J = Juvenile/Subadult (<= 39 mm), A = Adult (>= 40 mm), snout-vent length
³ Activity – (1) sitting in shade, (2) basking, (3) hiding, (4) calling, (5) swimming, (6) foraging, (7) amplexus, (8) floating, (9) underwater, (10) other
⁴ River or Creek Habitat – (1) low gradient riffle, (2) high gradient riffle, (3) run, (4) glide, (5) main channel pool, (6) step-pool, (7) other
⁵ Microhabitat – (1) isolated side pool, (2) connected side pool, (3) scour pool, (4) backwater pool, (5) side channel, (6) boulder/sedge, (7) edgewater, (8) pool tail-out, (9) riffle, (10) exposed bank, (11) protected bank, (12) other
⁶ Dominant Substrate – (1) site/sed/mud, (2) sand, (3) gravel/pebble, (4) cobble, (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris, (9) aquatic vegetation, (10) margin vegetation, (11) other

Fish Present: Yes No Type: Salmonid Centrarchid Cyprinid Other: Sucker Juv. YOY Other: MEET LAKEA
Herpetofauna & Lifestage (A J T E) Tree frog MT bullfrog TAD western pond turtle Garter snake L T. tenchi
Other Species Observed: Catfish Other: Comments: PHOTOS KOO 53: Bottom > 1/pr
4-56: Isolated 1x1m pool
w/ Ressorahis TADs
~ 150-150
57: Isolated Pool
1x2 m W/ 25 TADs
600ppm
58: 4x7m Isolated Pool
W/ TADs
59: MEET LAKEA
60: ? pr > 0.5

QA/QC (initials): PNN Date: 7/15/13
**Foothill Yellow-Legged Frog**

**River and Creek Visual Encounter Survey Data Sheet**

**Juveniles/Subadults and Adults**

Date: mm/dd/yyyy: 7/13 Site #: 120 Subsite #: 120C River Name/Location: South Fork American River Observers: KDH MDM

Survey Method: tandem separate Start Time: 10:45 End Time: 11:10 Actual VES Time: 25 min Start Air Temp: 9°C End Air Temp: 8°C Water Temp: (edgewater) 23.5°C (main channel) 22.5°C (pool) 19.5°C Discharge: 45 cfs Total Site Length: 352 m Subsite Length: 175 m

Search Area Length: 175 m Search Area Width: 2.4 m Total Area Searched: (m²): 700 m² Site Visit: 1/2/13/4 Weather: Sky: Overcast Wind: Inclement Fair Ideal Past 24 hrs: Sky: Overcast Wind: Inclement Fair Ideal

Photograph # (index to notebook): Roll/Disc/Card #: 1

<table>
<thead>
<tr>
<th>Number of Frogs</th>
<th>Distance¹</th>
<th>Sex (M/F)</th>
<th>Age² (J, A)</th>
<th>Snout-Vent Length (mm)</th>
<th>Activity³</th>
<th>River or Creek Habitat⁴</th>
<th>Microhabitat Type⁵</th>
<th>Dominant Substrate⁶</th>
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</table>

¹ Distance – distance from bottom of site/subsite to frogs

² Age: J = Juvenile/Subadult (≤ ≤ 39 mm), A = Adult (≥ 40 mm), snout-vent length

³ Activity: (1) sitting in shade, (2) basking, (3) hiding, (4) calling, (5) swimming, (6) foraging, (7) amplexus, (8) floating, (9) underwater, (10) other

⁴ River or Creek Habitat: (1) low gradient riffle, (2) high gradient riffle, (3) run, (4) glide, (5) main channel pool, (6) step-pool, (7) other

⁵ Microhabitat: (1) isolated side pool, (2) connected side pool, (3) scoured pool, (4) backwater pool, (5) side channel, (6) boulder/sedge, (7) edgewater, (8) pool tail-out, (9) riffle, (10) exposed bank, (11) protected bank, (12) other

⁶ Dominant Substrate: (1) silt/clay/mud, (2) sand, (3) gravel/pellet, (4) cobble, (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris, (9) aquatic vegetation, (10) margin vegetation, (11) other

Fish Present [Yes] No Type: Salmonid Centrarchid Cyprinid Other: Other: Specialized Other

Herpetofauna & Lifestyle (A J T E) Tree frog Bullfrog Western pond turtle Garter snake

Other Species Observed: River Otter (Salto), Common Shad

Comments:

QA/QC (initials): KDH Date: 7/15/13
**Foothill Yellow-Legged Frog**

**River and Creek Visual Encounter Survey Data Sheet**

**Juveniles/Subadults and Adults**

<table>
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<tr>
<th>Date: mm/dd/yy</th>
<th>Site #:</th>
<th>Subsite #:</th>
<th>River Name/Location:</th>
<th>Observers:</th>
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<td>244</td>
<td>124</td>
<td>SF American River @ Soldier Creek</td>
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**Survey Method:** tandem separate

**Start Time:** 1330  **End Time:** 1351  **Actual VES Time:** 21 min

**Start Air Temp:** 59.5°F  **End Air Temp:** 31°F

**Water Temp:** (edgewater) 29.5°C (main channel) 23°C (pool)  

**Discharge:** 45 cfs  **Total Site Length:** 144 m  **Subsite Length:** 144 m

**Search Area Length:** 144 m  **Search Area Width:** 4  **Total Area Searched:** (m²): 576 m²

**Weather:** Sky: Overcast  Partly Overcast  Clear  **Wind:** Inclement  Fair

**Past 24 hrs:** Sky: Overcast  Partly Overcast  Clear  **Wind:** Inclement  Fair

**Photograph #:** (index to notebook):

**Number of Frogs**

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<th>Distance (M/F)</th>
<th>Age (J, A)</th>
<th>Snout-Vent Length (mm)</th>
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<th>Microhabitat Type</th>
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1. Distance – distance from bottom of site/subsite to frogs
2. Age – J = Juvenile/Subadult (< 39 mm), A = Adult (> 40 mm), snout-vent length
3. Activity – (1) sitting in shade, (2) basking, (3) hiding, (4) calling, (5) swimming, (6) foraging, (7) amplexus, (8) floating, (9) underwater, (10) other
4. River or Creek Habitat – (1) low gradient riffle, (2) high gradient riffle, (3) run, (4) glide, (5) main channel pool, (6) step-pool, (7) other
5. Microhabitat – (1) isolated side pool, (2) connected side pool, (3) scour pool, (4) backwater pool, (5) side channel, (6) boulder/sedge, (7) edgewater, (8) pool tail-out, (9) riffle, (10) exposed bank, (11) protected bank, (12) other
6. Dominant Substrate – (1) silt/clay/mud, (2) sand, (3) gravel/pebble, (4) cobble, (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris, (9) aquatic vegetation, (10) margin vegetation, (11) other

**Fish Present:** Yes

**Type:** Salmonid  Centrarchid  Cyprinid  Other: suckermouth bass

**Herpetofauna & Lifestage:** (A J T E)  tree frog  bullfrog  western pond turtle  garter snake  Other:

**Other Species Observed:**

**QA/QC (initials):** YMV  **Date:** 7/15/13
### Foothill Yellow-Legged Frog
#### River and Creek Visual Encounter Survey Data Sheet: Tadpoles

<table>
<thead>
<tr>
<th>Group Letter</th>
<th>Distance² (m)</th>
<th>Approx. No. of Tadpoles³</th>
<th>Distance From Shore⁴</th>
<th>Max. Water Depth⁵ (cm)</th>
<th>Velocity⁶ (cm/sec)</th>
<th>Tadpole Stage⁷</th>
<th>Gosner Stage⁸</th>
<th>Avg. TL⁹ (mm)</th>
<th>% Algae</th>
<th>% Detritus</th>
<th>Dominant Substrate¹⁰</th>
<th>Micro-Habitat¹¹</th>
<th>River or Creek Habitat¹²</th>
<th>Water Temp. (°C)</th>
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<tbody>
<tr>
<td>A</td>
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<td>30</td>
<td>60</td>
<td>5i</td>
<td>7</td>
<td>4</td>
<td>25.50</td>
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</tbody>
</table>

1. Group Letter – if multiple groups of tadpoles at a site/subsite
2. Distance – distance from bottom of site/subsite
3. No. of Tadpoles – Estimate the total number of tadpoles in the area. If tadpole counts are determined by number/meter², convert number of tadpoles/m² to number of tadpoles/site/subsite
4. Distance From Shore – For an aggregation of tadpoles, measure to the center of the group. If tadpoles are dispersed along the shoreline, record an average distance from the water’s edge.
5. Max. Water Depth – Max. depth at tadpole location
6. Velocity – measure where tadpoles are located
7. Tadpole Stage – (1) no legs, (2) rear legs, (3) rear legs and front stubs, (4) legs fully grown, but with tail, (5) mixed
8. Gosner Stage or Field Stage (e.g., GS 36 or FS 3)
9. Avg. TL – average total length of tadpoles
10. Dominant Substrate – (1) silt/clay/mud, (2) sand, (3) gravel/pebble, (4) cobble, (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris (9) aquatic vegetation
11. Microhabitat – (1) isolated side pool, (2) connected side pool, (3) scour pool, (4) backwater pool, (5) side channel, (6) boulder/edge, (7) edgewater, (8) pool tail-out, (9) riffle, (10) other
12. River or Creek Habitat (1) low gradient riffle, (2) high gradient riffle, (3) run, (4) glide, (5) main channel pool, (6) step-pool, (7) other

**Fish Present:** Yes
**Herpetofauna & LifeStage (A J T E):** tree frog, bullfrog, western pond turtle, garter snake

**Other Species Observed:**
- dead crayfish
- green blue helens roosting in corner, mussel (swim)
- L. tessel(l) (not counting)

**Comments:**
- trap female obs ~ 50 m up of rape of site; observed in edge in edgewater
- 96: tep = 21.5

**QA/QC (initials):** KAW  Date: 7/15/13
## Foothill Yellow-Legged Frog
### River and Creek Visual Encounter Survey Data Sheet
#### Tadpoles

<table>
<thead>
<tr>
<th>Group Letter</th>
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<th>Distance From Shore (cm)</th>
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<th>Tadpole Stage</th>
<th>Gosner Stage</th>
<th>Avg. TL (mm)</th>
<th>% Algae</th>
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<th>Dominant Substrate</th>
<th>Micro-Habitat</th>
<th>River or Creek Habitat</th>
<th>Water Temp. (°C)</th>
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<td>26</td>
<td>26</td>
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</tbody>
</table>

### Notes
- **Group Letter** – if multiple groups of tadpoles at a site/subsite
- **Distance** – distance from bottom of site/subsite
- **No. of Tadpoles** – total number of tadpoles for the area
- **Max. Water Depth** – max. depth at tadpole location
- **Velocity** – measure where tadpoles are located
- **Tadpole Stage** – (1) no legs, (2) rear legs, (3) rear legs and from nubs, (4) legs fully grown, with tail, (5) mixed
- **Gosner Stage** – or Field Stage (e.g., GS 36 or FS 3)
- **Avg. TL** – average total length of tadpoles
- **Dominant Substrate** – (1) silty/mud, (2) sand, (3) gravel/pebble, (4) cobble, (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris, (9) aquatic vegetation
- **Microhabitat** – (1) isolated side pool, (2) connected side pool, (3) scour pool, (4) backwater pool, (5) side channel, (6) boulder/edge, (7) eddy, (8) pool tail-out, (9) riffle, (10) other
- **River or Creek Habitat** – (1) low gradient riffle, (2) high gradient riffle, (3) run, (4) glide, (5) main channel pool, (6) step-pool, (7) other

### Fish Present
- Yes
- No

### Other Species Observed:
- Crayfish
- Tree frog
- Bullfrog
- Western pond turtle
- Garter snake
- Other

### Comments:
- Confirmed
- Photos
- Date: 7/15/13
### Foothill Yellow-Legged Frog

**River and Creek Visual Encounter Survey Data Sheet**

**Tadpoles**

<table>
<thead>
<tr>
<th>Date:</th>
<th>Subsite #:</th>
<th>River Name/Location:</th>
<th>Observers:</th>
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<tr>
<td>07/09/13</td>
<td>220</td>
<td>SEAR @ Maple Glen</td>
<td>MDM</td>
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</table>

**Survey Method:** tandem, separate

**Start Time:** 16:23, **End Time:** 16:55, **Actual VES Time:** 32

**Water Temp:** (edgewater) 25.5°C (main channel) 24.35°C (pool)

**Discharge:** 45 cfs, **Total Site Length:** 286 m, **Subsite Length:** 112 m

**Search Area Length:** 112 m, **Search Area Width:** 4 m, **Total Area Searched:** (m²) 448 m²

**Site Visit:** 123, **Weather:** Sky: Overcast, Partly Overcast

**Clear** Wind: Inclement, **Fair** Ideal

**Past 24 hrs:** Sky: Overcast, Partly Overcast, **Clear** Wind: Inclement, **Ideal**

**Photograph #:** (index to notebook)

<table>
<thead>
<tr>
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**NO FLY OBSERVED**

<table>
<thead>
<tr>
<th>Fish Present</th>
<th>Herpetofauna &amp; Life Stage</th>
<th>Type</th>
<th>Other Species Observed</th>
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<tr>
<td>Yes</td>
<td>(A J T E) tree frog</td>
<td></td>
<td>western pond turtle</td>
</tr>
<tr>
<td></td>
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<td>garter snake</td>
</tr>
<tr>
<td></td>
<td></td>
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<th>Comments:</th>
<th>QA/QC (initials):</th>
<th>Date:</th>
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<tr>
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<td>VAW</td>
<td>7/15/13</td>
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</table>
Foothill Yellow-Legged Frog
River and Creek Visual Encounter Survey Data Sheet

Tadpoles

Date: mm/dd/yy 7/13 Site #: 220 Subsite #: 220C River Name/Location: SE American River & Mayacama Observers: JMM MOM
Survey Method: tandem separate Start Time: 17:00 End Time: 17:15 Actual VES Time: 15 min Start Air Temp: 24°C End Air Temp: 25°C
Water Temp: (edgewater) 24.75°C (main channel) 23.75°C (pool) 25°C Discharge: 45 cfs Total Site Length: 286 m Subsite Length: 72 m
Search Area Length: 72 m Search Area Width: 3 m Total Area Searched: (m²): 216 m² Site Visit: 1 2 3 4

<table>
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<td>S</td>
<td>D</td>
<td>I</td>
<td>O</td>
<td>R</td>
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⁵ Max. Water Depth – Max. depth at tadpole location

Fish Present Yes No Herpetofauna & Life stage (A J T E) tree frog bullfrog Cypriidi Other: garter snake Other Comments:

QA/QC (initials): JMM Date: 7/15/13
Appendix B: Site Photographs
Photo 1. Bottom of site 120a, view upstream.  7/09/13

Photo 2. Top of site 120a, view downstream.  7/09/13
Photo 3. Bottom of site 120b, view upstream.  7/09/13

Photo 4. Top of site 120b, view downstream.  7/09/13
Photo 5. Bottom of site 120c, view upstream. 7/09/13

Photo 6. Top of site 120c, view downstream. 7/09/13
Photo 7. Bottom of site 124R, view upstream. 7/09/13

Photo 8. Top of site 124R, view downstream. 7/09/13
Photo 9. Bottom of site 213R, view upstream. 7/09/13

Photo 10. Top of site 213R, view downstream. 7/09/13
Photo 11. One of two FYLF tadpoles observed at site 213R. 7/09/13

Photo 12. Adult female FYLF observed 50 m upstream of site 213R. 7/09/13
Photo 13. Bottom of site 220a, view upstream. 7/09/13

Photo 14. Top of site 220a, view downstream. 7/09/13
Photo 15. Microhabitat along site 220a, where an FYLF tadpole was observed.  7/09/13

Photo 16. Bottom of site 220b, view upstream.  7/09/13
Photo 17. Top of site 220b, view downstream. 7/09/13

Photo 18. Bottom of site 220c, view upstream. 7/09/13
Photo 19. Top of site 220c, view downstream. 7/09/13