FLOW FLUCUATION 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)

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TABLE OF CONTENTS

1.0 INTRODUCTION..... 1

1.1 Monitoring Requirements..... 1
1.2 FYLF Status, Distribution and Current Threats to Populations..... 3

2.0 METHODS..... 3

2.1 Visual Encounter Surveys..... 3

3.0 RESULTS..... 4

3.1 Visual Encounter Survey Results..... 4
3.1.1 Site 120R – SFAR upstream of Silver Creek..... 4
3.1.2 Site 124R – SFAR at confluence with Soldier Creek..... 5
3.1.3 Site 213R – SFAR upstream of Ogilby Creek..... 5
3.1.4 Site 220R – SFAR at Maple Grove..... 5

4.0 LITERATURE CITED..... 6

FIGURES:

Figure 1. Flow fluctuation monitoring sites and Spillway 10..... 2

TABLES:

Table 1. Survey results for the flow fluctuation monitoring..... 4

APPENDICES:

Appendix A: VES Data sheets
Appendix B: Site Photographs

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 License[1]. The Plan requires monitoring for foothill yellow-legged frog (FYLF) 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."

On September 16 at 10:28 am, Spillway 10 was inadvertently opened for approximately 12 minutes. Spillway 10 is identified as a preferred spillway in the Project 184 Preferred Canal Drainage Structure and Release Point Plan (Figure 1). The release was approximately 79 cfs for 12 minutes (~1.3 af). Spillway 10 was accidentally opened during a software upgrade to the program that controls the gates. The release from Spillway 10 resulted in a flow fluctuation on the SFAR that triggered monitoring as required by the Plan. This report summarizes the results of monitoring conducted pursuant to the Plan.

[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.

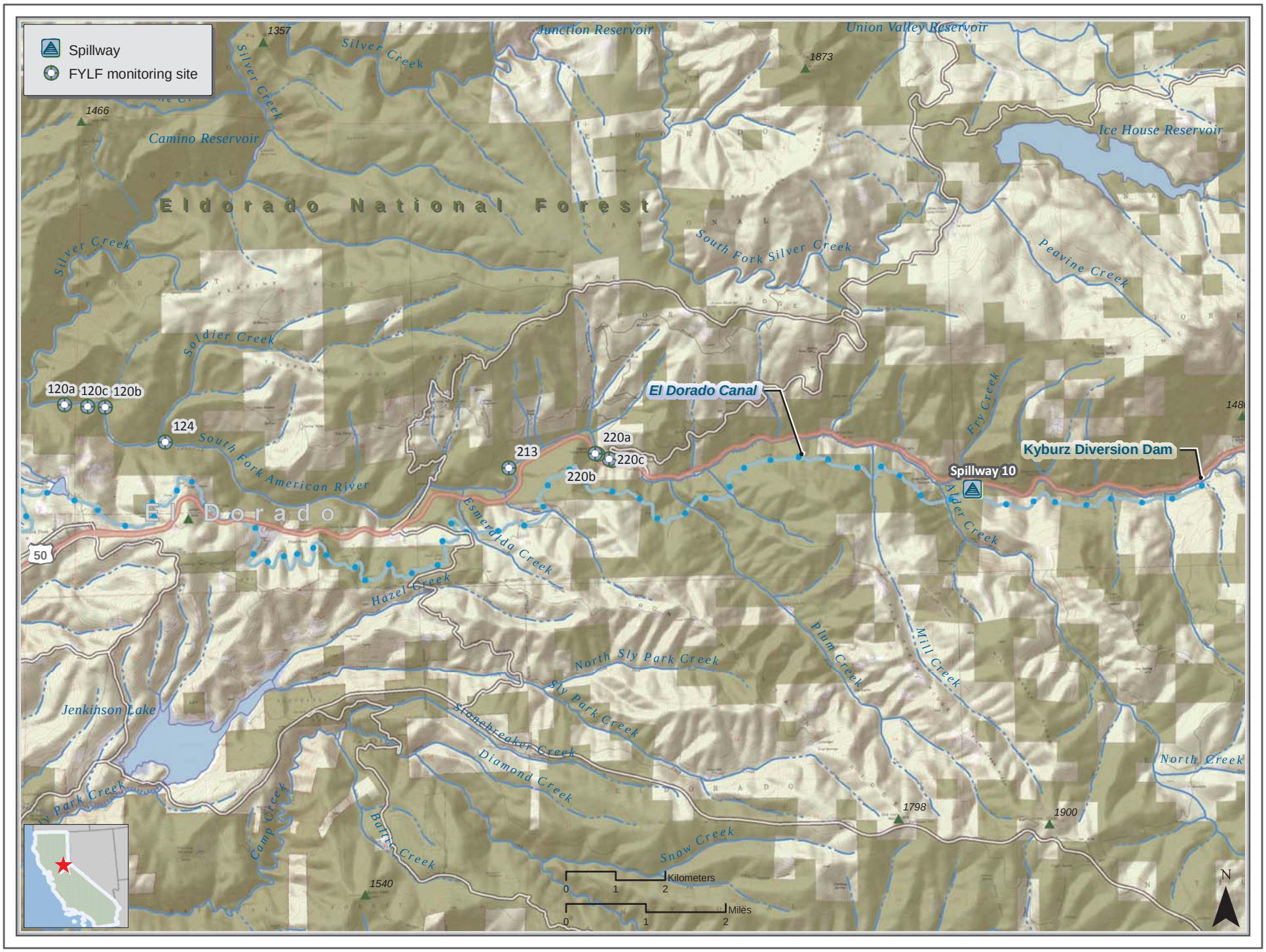

Figure 1. Flow fluctuation monitoring sites and Spillway 10.

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 Sierra as high as 1,830 m (6,000 ft.) near McKessick Peak, Plumas National Forest and 1,940 m (6,365 ft.) at Snow Mountain in Trinity County (Stebbins 2003). In the Project Area, FYLF are recorded along the mainstem SFAR as far upstream as Riverton and downstream to Slab Creek Reservoir (USFS, file data).

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 Ian Chan and Ben Kryzer. Subsites 120a, 120b, 120c, 124R were surveyed on September 21, 2009, and subsites 213R, 220a, 220b, and 220c were surveyed on September 22, 2009.
Survey data were recorded onto Visual Encounter Survey Data Sheets for each subsite surveyed. Separate data sheets were completed for tadpoles, while data for young-of-the-

year (YOY), juveniles and adults were recorded on separate data sheets. YOY were defined as recently metamorphosed frogs, 20-29 mm snout-vent length (SVL). 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 $\geq$ 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.

Subsite #	Date	Beg. Time	End Time	Actual VES time (min.)	Beg. Air Temp. (°C)	End Air Temp. (°C)	Water Temp. (edgew.) (°C)	Water Temp. (channel) (°C)	# Egg Masses	# Tadpoles/ # groups	# Juvenile /YOY Frogs	# Adult Frogs
120a	9/21/09	1140	1200	20	23	23	15	17	0	0	0	0
120b	9/21/09	1315	---	---	28	---	18.5	17	0	0	0	**1**
120c	9/21/09	1230	1250	20	23	24.5	15	17	0	0	0	0
124R	9/21/09	1440	1510	30	23	23	17	18	0	0	**1**	0
213R	9/22/09	1015	1055	40	23	19	15	16	0	0	**3**	0
220a	9/22/09	1230	1250	20	27	27	21	18	0	0	0	0
220b	9/22/09	1210	1230	20	26	26	20	18	0	0	0	0
220c	9/22/09	1300	1320	20	27	28	20	18	0	0	0	0

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 was largely dry on September 21, 2009, except for a few isolated wet areas (Photos 1-2, App. B). No FYLF life stages were observed during the survey. Crayfish were observed in addition to cyprinids and suckers.

Subsite 120b was largely dry on September 21, 2009, except for a few connected side pools located at the top 50 m of the subsite (Photos 3-4, App. B). One adult FYLF was observed approximately 30 meters from the top of the site (Photo 5, App. B). Fish observed at this site included salmonids, cyprinids, and suckers.

Subsite 120c was dry at the uppermost portion of the site (Photos 6-7, App. B). No FYLF lifestages were observed at this site. Fish observed at this site included salmonids, cyprinids, suckers, and one smallmouth bass was tentatively observed.

3.1.2 Site 124R – SFAR at confluence with Soldier Creek

Site 124R is located on the SFAR at the confluence with Soldier Creek at an elevation of 755 m (2,480 ft) (Photos 8-9, App. B). One young-of-the-year FYLF was observed (22 mm SUL; Photo 10, App. B) 35 m from the top of the site. Fish observed at this site included salmonids and cyprinids. One adult mountain garter snake (*Thamnophis elegans elegans*, ~40 cm SVL) and crayfish were also observed at the 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 11-12, App. B). Biologists from U.C. Davis identified at least two FYLF egg masses at this site in 2009, noted by the pink flagging left behind, dated June 24. Three young-of-the-year FYLF were observed (Photo 13, App. B) at the top of the site. Fish observed at this site included salmonids, cyprinids and suckers. One juvenile Sierra garter snake (*Thamnophis couchii*, ~20 cm SVL) and crayfish were also observed at the site.

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 were established within the site: 220a, 220b, and 220c. The total site length is 286 m.

Subsite 220a was surveyed on September 22, 2009 (Photos 14-15, App. B). No FYLF lifestages were observed during the survey. Fish observed at this site included salmonids, cyprinids and suckers. One mountain garter snake (*T. elegans elegans*, ~35 cm SVL) was observed approximately 25 m upstream of the bottom of the site and crayfish were also observed at the site.

Subsite 220b was surveyed on September 22, 2009 (Photos 16-17, App. B). No FYLF lifestages were observed during the survey. Fish observed at this site included salmonids, cyprinids and suckers. One mountain garter snake (*T. elegans elegans*, ~45 cm SVL)

was observed approximately 15 m upstream of the bottom of the site and crayfish were also observed at the site.

Subsite 220c was surveyed on September 22, 2009(Photos 18-19, App. B). No FYLF lifestages were observed during the survey. Fish observed at this site included salmonids, cyprinids and suckers. One mountain garter snake (*T. elegans elegans*, ~40 cm SVL) was observed approximately 30 m upstream of the bottom of the site and crayfish were also observed at the site.

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Appendix A: Visual Encounter Survey Data Sheets

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

Date: mm 09 dd 21 yy 09 Site #: 120 Subsite #: A River Name/Location: SFAR Observers: JAC BJK
Survey Method: (tandem) separate Start Time: 1140 End Time: 1200 Actual VES Time: 20 Start Air Temp: 23 End Air Temp: 23
Water Temp: (edgewater) 16 (main channel) 17 (pool) _____ Discharge: _____ cfs Total Site Length: _____ Subsite Length: _____
Search Area Length: _____ Search Area Width: _____ Total Area Searched: (m^2): _____ Site Visit: 1 2 3 4
Weather: *Sky*: Overcast Partly Overcast (Clear) *Wind*: Inclement Fair (Ideal) Past 24 hrs: *Sky*: Overcast Partly Overcast (Clear) *Wind*: Inclement Fair (Ideal)
Photograph # (index to notebook): _____ Roll/Disc/Card #: _____

Number of Frogs	Distance[1]	Sex (M/F)	Age[2] (J, A)	Snout-Vent Length (mm)	Activity[3]	River or Creek Habitat[4]	Microhabitat Type[5]	Dominant Substrate[6]	Comments
0									

JAC BOTTOM
(1) US of BOTTOM
(2) DS

TOP
(3) DS
(4) US

[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) No Type: Salmonid Centrarchid (Cyprinid) Other: SUCKER
Herpetofauna & Lifestage (A J T E) tree frog _____ bullfrog _____ western pond turtle _____ garter snake _____ Other _____
Other Species Observed: CRAYFISH
Comments: LOCALLY DRY (JUST A FEW ISOLATED WET SPOTS

QA/QC (initials): _____ Date: _____

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

Date: mm 09 dd 21 yy 09 Site #: 120 Subsite #: C River Name/Location: SFAR Observers: JAC BSK
Survey Method: (tandem) separate Start Time: 1230 End Time: 1250 Actual VES Time: 20 Start Air Temp: 23 End Air Temp: 24.5
Water Temp: (edgewater) 15 (main channel) 17 (pool) _____ Discharge: _____ cfs Total Site Length: _____ Subsite Length: _____
Search Area Length: _____ Search Area Width: _____ Total Area Searched: (m^2): _____ Site Visit: 1 2 3 4
Weather: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal) Past 24 hrs: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal)
Photograph # (index to notebook): _____ Roll/Disc/Card #: _____

Number of Frogs	Distance[1]	Sex (M/F)	Age[2] (J, A)	Snout-Vent Length (mm)	Activity[3]	River or Creek Habitat[4]	Microhabitat Type[5]	Dominant Substrate[6]	Comments
0									

BOTTOM
(5) U.
(6) DS

TOP
(7) US
(8) DS

[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) No Type: (Salmonid) Centrarchid Cyprinid Other: SUCKER
Herpetofauna & Lifestage (A J T E) tree frog _____ bullfrog _____ western pond turtle _____ garter snake _____ Other _____
Other Species Observed: CRAYFISH POSS. SM. MOUTH BASS SIGHTING
Comments: UPPER PORTION DRY

QA/QC (initials): _____ Date: _____

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

Date: mm 09 dd 21 yy 09 Site #: 120 Subsite #: B River Name/Location: ~~STAR~~ Observers: IAC BJK
Survey Method: (tandem) separate Start Time: 1315 End Time: _____ Actual VES Time: _____ Start Air Temp: 28 End Air Temp: _____
Water Temp: (edgewater) 19-18 (main channel) 17 (pool) _____ Discharge: _____ cfs Total Site Length: _____ Subsite Length: _____
Search Area Length: _____ Search Area Width: _____ Total Area Searched: (m^2): _____ Site Visit: 1 2 3 4
Weather: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal) Past 24 hrs: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal)
Photograph # (index to notebook): _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ Roll/Disc/Card #: _____

Number of Frogs	Distance[1]	Sex (M/F)	Age[2] (J, A)	Snout-Vent Length (mm)	Activity[3]	River or Creek Habitat[4]	Microhabitat Type[5]	Dominant Substrate[6]	Comments
1	30m from TOP	UNK	A	~50	1/2	7	2	5	NOT CAPTURED

BJT
(9) DS
(10) US
(11) HABITAT
TOP
(12) DS
(13) US

[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~~ No Type: (Salmonid) Centrarchid (Cyprinid) (Other: SUCKERS)
Herpetofauna & Lifestage (A J T E) tree frog _____ bullfrog _____ western pond turtle _____ garter snake _____ Other _____
Other Species Observed: CRAYFISH
Comments: SITE ALMOST ENTIRELY DRY EXCEPT UPPERMOST 50 m W ISOLATED OXBOW POOLS

QA/QC (initials): _____ Date: _____

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

Date: mm 09 dd 21 yy 09 Site #: 124 Subsite #: _____ River Name/Location: STAR Observers: JAC BJK
Survey Method: (tandem) separate Start Time: 1440 End Time: 1510 Actual VES Time: 30 Start Air Temp: 23 End Air Temp: 23
Water Temp: (edgewater) 17 (main channel) 18 (pool) _____ Discharge: _____ cfs Total Site Length: _____ Subsite Length: _____
Search Area Length: _____ Search Area Width: _____ Total Area Searched: (m^2): _____ Site Visit: 1 2 3 4
Weather: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal) Past 24 hrs: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal)
Photograph # (index to notebook): _____ Roll/Disc/Card #: _____

Number of Frogs	Distance[1]	Sex (M/F)	Age[2] (J, A)	Snout-Vent Length (mm)	Activity[3]	River or Creek Habitat[4]	Microhabitat Type[5]	Dominant Substrate[6]	Comments
1	35 m from TOP		J	22	2	1	1	5	18°C Photo # (21) MICROHABITAT

BOO
(14) US
(15) DS
(16) (21)
YOY
TOP
(22) DS
(23) US

[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) No Type: (Salmonid) Centrarchid (Cyprinid) Other: _____
Herpetofauna & Lifestage (A J T E) tree frog _____ bullfrog _____ western pond turtle _____ (garter snake) Other _____
Other Species Observed: CRAYFISH T. elegans ~ 40cm SVL
Comments: _____

QA/QC (initials): _____ Date: _____

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

Date: mm 09 dd 22 yy 09 Site #: 213 Subsite #: _____ River Name/Location: STAR ABOVE OGILBY Observers: JAC BJK

SUNNY @ BOTTOM SHADY @ TOP

Survey Method: tandem separate Start Time: 1015 End Time: 1055 Actual VES Time: 40 Start Air Temp: 23° End Air Temp: 19°C

Water Temp: (edgewater) 15 (main channel) 16 (pool) _____ Discharge: _____ cfs Total Site Length: _____ Subsite Length: _____

Search Area Length: _____ Search Area Width: _____ Total Area Searched: (m^2): _____ Site Visit: 1 2 3 4

Weather: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal) Past 24 hrs: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal)

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

Number of Frogs	Distance[1]	Sex (M/F)	Age[2] (J, A)	Snout-Vent Length (mm)	Activity[3]	River or Creek Habitat[4]	Microhabitat Type[5]	Dominant Substrate[6]	Comments
3	@TOP		YOY	22, 21, 23 (A, B, C)	2	1	7	4	ALL 3 W/OUT TAIL BUDS

BOTT
(24) US
(5) DS
YOY A
(26) - (27)
YOY B
(29) - (31)
YOY C
(32) - (35)
TOP
(36) DS
(37) US
(38) YOY "C" AGAIN

[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) No Type: (Salmonid) Centrarchid (Cyprinid) Other: SUCKERS

Herpetofauna & Lifestage (A J T E) tree frog _____ bullfrog _____ western pond turtle 1 garter snake _____ Other _____

Other Species Observed: CRAYFISH 1 T. couchii (220cm SVL) @ 5m from bottom

Comments: _____

QA/QC (initials): _____ Date: _____

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

Date: mm 09 dd 22 yy 09 Site #: 220 Subsite #: B River Name/Location: SFAR @ MAPLE GROVE Observers: JAC BJK
Survey Method: (tandem) separate Start Time: 1210 End Time: 1230 Actual VES Time: 20 Start Air Temp: 26 End Air Temp: 26
Water Temp: (edgewater) 20 (main channel) 18 (pool) _____ Discharge: _____ cfs Total Site Length: _____ Subsite Length: _____
Search Area Length: _____ Search Area Width: _____ Total Area Searched: (m^2): _____ Site Visit: 1 2 3 4
Weather: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal) Past 24 hrs: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal)
Photograph # (index to notebook): _____ Roll/Disc/Card #: _____

Number of Frogs	Distance[1]	Sex (M/F)	Age[2] (J, A)	Snout-Vent Length (mm)	Activity[3]	River or Creek Habitat[4]	Microhabitat Type[5]	Dominant Substrate[6]	Comments
0									

Bottom
39 US
40 DS

Top
41 DS
42 US

[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~~ No Type: (Salmonid) Centrarchid (Cyprinid) (Other: SUCKERS)
Herpetofauna & Lifestage (A J T E) tree frog _____ bullfrog _____ western pond turtle _____ garter snake X Other _____
Other Species Observed: CRAYFISH T. elegans (~45 cm) ~15 m from bottom
Comments: _____

QA/QC (initials): _____ Date: _____

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

Date: mm 09 dd 22 yy 09 Site #: 220 Subsite #: 4 River Name/Location: SFAR @ MAPLE GROVE Observers: JAC BJK

Survey Method: (tandem) separate Start Time: 1230 End Time: 1250 Actual VES Time: 20 Start Air Temp: 27 End Air Temp: 27

Water Temp: (edgewater) 21 (main channel) 18 (pool) ____ Discharge: ____ cfs Total Site Length: ____ Subsite Length: ____

Search Area Length: ____ Search Area Width: ____ Total Area Searched: (m^2): ____ Site Visit: 1 2 3 4

Weather: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal) Past 24 hrs: *Sky*: Overcast Partly Overcast (Clear) *Wind:* Inclement Fair (Ideal)

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

Number of Frogs	Distance[1]	Sex (M/F)	Age[2] (J, A)	Snout-Vent Length (mm)	Activity[3]	River or Creek Habitat[4]	Microhabitat Type[5]	Dominant Substrate[6]	Comments
Ø									

Margin notes: 8571 (43) US (44) DS; 7081 (45) DS (46) US

[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) No Type: (Salmonid) Centrarchid (Cyprinid) (Other:) SUCKER
Herpetofauna & Lifestage (A J T E) tree frog ____ bullfrog ____ western pond turtle ____ garter (snake) ____ Other ____
T. elegans (~35cm) 25m from bottom
Other Species Observed: CRAYFISH
Comments: ____

QA/QC (initials): ____ Date: ____

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

Date: mm 09 dd 22 yy 09 Site #: 220 Subsite #: C River Name/Location: SFAR @ MAPLE GROVE Observers: IAC BJK
Survey Method: tandem separate Start Time: 1300 End Time: 1320 Actual VES Time: 20 Start Air Temp: 27 End Air Temp: 28
Water Temp: (edgewater) 20 (main channel) 18 (pool) _____ Discharge: _____ cfs Total Site Length: _____ Subsite Length: _____
Search Area Length: _____ Search Area Width: _____ Total Area Searched: (m^2): _____ Site Visit: 1 2 3 4
Weather: *Sky*: Overcast Partly Overcast Clear *Wind:* Inclement Fair Ideal Past 24 hrs: *Sky*: Overcast Partly Overcast Clear *Wind:* Inclement Fair Ideal
Photograph # (index to notebook): _____ Roll/Disc/Card #: _____

Number of Frogs	Distance[1]	Sex (M/F)	Age[2] (J, A)	Snout-Vent Length (mm)	Activity[3]	River or Creek Habitat[4]	Microhabitat Type[5]	Dominant Substrate[6]	Comments
0									

BJK
(47) US
(48) DS

TOP
(29) DS
(50) US

[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 No Type: Salmonid Centrarchid Cyprinid Other: SUCKER
Herpetofauna & Lifestage (A J T E) tree frog _____ bullfrog _____ western pond turtle _____ garter snake _____ Other _____
Other Species Observed: CRAYFISH Eelgrass (~40cm) ~30 m from TOP
Comments: _____

QA/QC (initials): _____ Date: _____

Appendix B: Site Photographs

Photo 1. Bottom of site 120a, view upstream. 9/21/09

Photo 2. Top of site 120a, view downstream. 9/21/09

Photo 3. Bottom of site 120b, view upstream. 9/21/09

Photo 4. Top of site 120b, view downstream. 9/21/09

Photo 5. Microhabitat at site 120b, where an adult FYLF was observed. 9/21/09

Photo 6. Bottom of site 120c, view upstream. 9/21/09

Photo 7. Top of site 120c, view downstream. 9/21/09

Photo 8. Bottom of site 124, view upstream. 9/21/09

Photo 9. Top of site 124, view downstream. 9/21/09

Photo 10. Young-of-the-year FYLF observed at site 124R. 9/21/09

Photo 11. Bottom of site 213R, view upstream. 9/22/09

Photo 12. Top of site 213R, view downstream. 9/22/09

Photo 13. Young-of-the-year FYLF observed at site 213R. 9/22/09

Photo 14. Bottom of site 220a, view upstream. 9/22/09

Photo 15. Top of site 220a, view downstream. 9/22/09

Photo 16. Bottom of site 220b, view upstream. 9/22/09

Photo 17. Top of site 220b, view downstream of left bank side channel. 9/22/09

Photo 18. Bottom of site 220c, view upstream. 9/22/09

Photo 19. Top of site 220c, view downstream. 9/22/09