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)

Prepared for:

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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 (USFS), 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) 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."

The El Dorado Irrigation District conducted geomorphology monitoring on Caples Creek from August 2-6, 2010. Test flows associated with the geomorphology monitoring had the potential to cause a flow fluctuation on the South Fork American River which in turn would trigger the requirement to conduct foothill yellow-legged frog surveys. In order to collect baseline data prior to the test flow releases, the District conducted foothill yellow-legged frog surveys at the four flow fluctuation monitoring sites on July 26 and 27, 2010. These survey results were intended to be a basis for comparison with subsequent survey data in the event that a flow fluctuation occurred during the test flow releases. The District was able to adjust operations at the diversion dam to avoid a flow fluctuation during the tests flow releases; therefore, a subsequent survey was not required. This report describes the results of the surveys conducted on July 26 and 27, 2010.

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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.

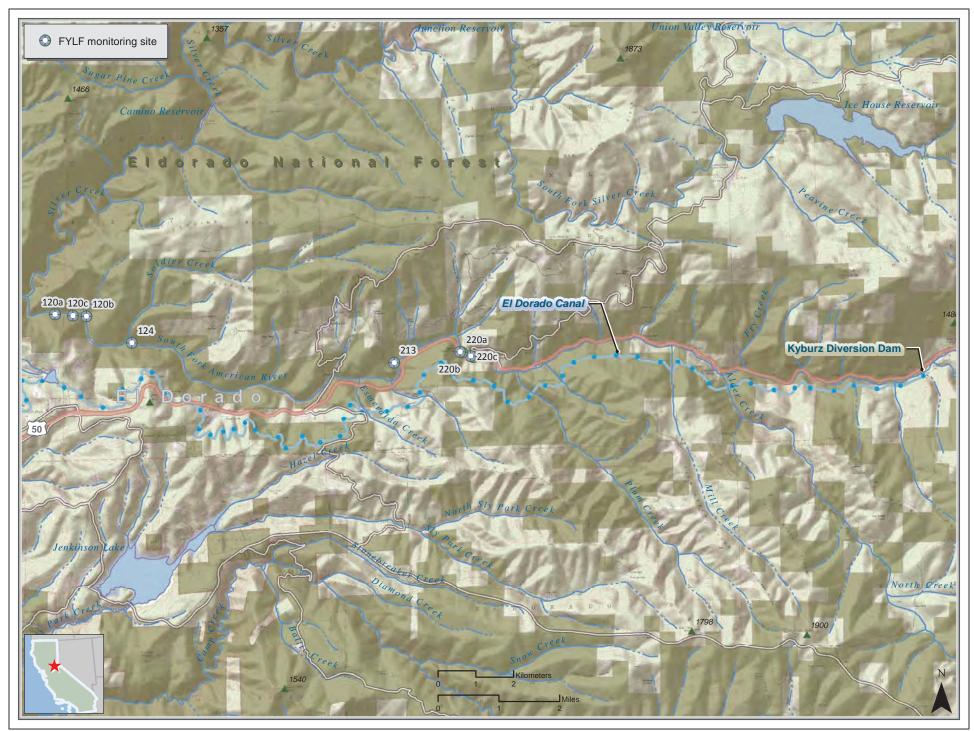


Figure 1. FYLF flow fluctuation monitoring sites.

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 biologist Kevin Wiseman and EID biologist Brian Deason. Subsites 120a, 120b, 120c, 124R were surveyed on July 27, 2010. Subsites 213R, 220a, 220b, and 220c were surveyed on July 26, 2010, with USFS biologists Jann Williams and Rick Evans.

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	7/27/10	1115	1140	25	23	24	20	20	0	0	0	0
120b	7/27/10	1315	1340	25	26	26	26	_	0	0	0	0
120c	7/27/10	1220	1245	25	26	27	21	21	0	0	0	0
124R	7/27/10	1545	1605	20	22	22	21	21	0	0	0	0
213R	7/26/10	1335	1400	25	32.5	32.5	23.5	21	0	0	0	0
220a	7/26/10	1130	1152	22	30	30	19.5	18.5	0	0	0	0
220b	7/26/10	1200	1220	20	30	30	20	18.5	0	0	0	0
220c	7/26/10	1230	1250	20	30.5	30.5	22.5	19.5	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 contained a relatively large amount of flowing water on July 27, 2010, compared to surveys conducted in 2009 (Photos 1-2, App. B). No FYLF life stages were

observed during the survey. One juvenile Sierra garter snake (*Thamnophis couchii*, ~35 cm SVL), signal crayfish (*Pacifasticus leniusculus*), and cyprinid young-of-the-year (YOY) were also observed at the site.

Subsite 120b contained a relatively large amount of water in the pools on July 27, 2010, compared to surveys conducted in 2009 (Photos 3-4, App. B). No FYLF life stages were observed during the survey, however many of the pools contained Pacific chorus frog (*Pseudacris regilla*) tadpoles. Two juvenile and one adult Sierra garter snake (*T. couchii*) were also observed in addition to cyprinid YOY and western sucker (*Catostomus occidentalis*) juveniles.

Subsite 120c contained a relatively large amount of water in the pools on July 27, 2010, compared to surveys conducted in 2009 (Photos 5-6, App. B). No FYLF lifestages were observed at this site. One juvenile Sierra garter snake (*T. couchii*) and cyprinid YOY were 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 7-8, App. B). No FYLF lifestages were observed at this site on July 27, 2010, however, cyprinid YOY and crayfish were observed.

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). No FYLF lifestages were observed at this site on July 26, 2010. Cyprinid fish were observed at this site, and one juvenile Sierra garter snake (*T. couchii*; 40 cm SVL) was captured and regurgitated a juvenile brown trout (*Salmo trutta*; 56 mm total length) that was consumed head-first.

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 July 26, 2010. No FYLF lifestages were observed during the survey. Cyprinid YOY, dead crayfish, a juvenile Sierra garter snake (*T. couchii*), and another adult Sierra garter snake was observed enroute to the site.

Subsite 220b was surveyed on July 26, 2010 (Photos 11-12, App. B). No FYLF lifestages were observed during the survey. No FYLF lifestages were observed during the survey, however cyprinid YOY and dead crayfish were observed.

Subsite 220c was surveyed on July 26, 2010 (Photos 13-14, App. B). No FYLF lifestages were observed during the survey. Fish observed at this site included cyprinids and speckled dace (*Rhinichthys osculus*).

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Appendix A: Visual Encounter Survey Data Sheets

Foothill Yellow-Legged Frog River and Creek Visual Encounter Survey Data Sheet

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Weather: Photograp	Weather: Sky: Overcast Partly Overcast Clear. Photograph # (index to notebook):	Partly O	vercast Cle		Wind: Inclement Fair (Ideal		Past 24 hrs: Sky: Overcast Partly Overcast Roll/I	reast Partly Ove	Clear Disc/Card	12
Number of Frogs	Distance ¹	Sex (M/F)	Age ² (J, A)	Snout-Vent Length (mm)	Activity ³	River or Creek Habitat	Microhabitat Type ⁵	Dominant Substrate ⁶	Comments	
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		<i>b.</i>								T
										T
Distance –	Distance – distance from bottom of site/subsite to frogs	om of site/s	ubsite to frogs	s			•			
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Dominant S	Dominant Substrate – (I) silt/cl	day/mud, (2) sand, (3) gra	avel/pebble, (4) co	bble, (5) boulder	; (6) bedrock, (7) sma	all woody debris, (8) large	woody debris, (9) a	quatic vegetation, (10) margin vegetation, (11) other	
Fish Present Herpetofauna	Fish Present (Yes No Herpetofauna & Lifestage (A J T E)	No (A J	T E) to	Type: Salmon tree frog	nid Centr bullfrog	rarchid Cyr western po	Cyprinid 1013 Other:	garter snake	ish Present Ves No Type: Salmonid Centrarchid Cyprinid 1045 Other: Herpetofauna & Lifestage (A J T E) tree frog bullfrog western pond turtle garter snake 17 Other	
Other Spec	Other Species Observed:		Craybish						T. Conchi. 2 35 CM 5VC	
Comments:			-						no stomant conten	K
									(shings 309-212)	1

years

view

120A

308:

: 418

Date:

QA/QC (initials):

120 A

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

Date: mm 7 dd 27 yy 10 Site #: 120 Subsite #: 120B River Name/Location: 5FAR	Observers: MW RD
Survey Method: tandem separate Start Time: 1315 End Time: 1340 Actual VES Time: 25 min Start Air Temp: 26° End Air Temp:	-6 ° End Air Temp: 26 °C
_	Subsite Length:
Total Area Sea	3 4
Weather: Sky: Overcast Partly Overcast Clear Wind: Inclement Fair Idea Past 24 hrs: Sky: Overcast Partly Overcast Clear Wind: Inclement Fair Ideal	Wind: Inclement Fair Ideal
Photograph # (index to notebook):]#:

	(mm) Activity ³ Habitat ⁴
Distance – distance from bottom of site/subsite to frogs Age – J = Juvenile/Subadult (<= 39 mm), A = Adult (>= 40 mm), snout-vent length Activity – (1) sitting in shade, (2) basking, (3) hiding, (4) calling, (5) swimming, (6) foraging, (7) amplexus, (8) floating, (9) underwater, (10)	
Distance – distance from bottom of site/subsite to frogs Age – J = Juvenile/Subadut (<= 39 mm), A = Adult (>= 40 mm), snout-vent length Activity – (1) sitting in shade, (2) basking, (3) hiding, (4) calling, (5) swimming, (6) foraging, (7) amplexus, (8) floating, (9) underwater, (10)	
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9 (1) (2) (3) (4) (4) (6) (6) (7) (6) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7	A = Adult (>= 40 mm), snout-vent length (3) hiding (4) calling (5) swimming (6) foraging (7) amplexus (8) floating (9) underwater (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	riffle, (2) high gradient riffle, (3) run, (4) glide, (5) main channel pool, (6) step-pool, (7) other
Microhabitat – (1) isolated side pool, (2) connected side pool, (3) scour pool, (4) backwater pool, (5) side channel, (6) boulder/sedge, (7) edg (11) protected bank, (12) other	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

Dominant Substrate – (1) sith/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

Other garter snake 3 Cyprinid 1045 Other: western pond turtle Centrarchid Type: Salmonid Centree frog 20 ± 0 bullfrog Fish Present (Yes / No Herpetofauna & Lifestage (A J T E) Other Species Observed: Comments:

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Date: QA/QC (initials):

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Foothill Yellow-Legged Frog River and Creek Visual Encounter Survey Data Sheet

Juveniles/Subadults and Adults

Observers: 1999 BD	End Time: 1245 Actual VES Time: 25 Min. Start Air Temp: 26°C End Air Temp: 27°C	Subsite Length:	2 3 4	Past 24 hrs. Sky: Overcast Partly Overcast Clear Wind: Inclement Fair Ideal	Card #:
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ion: SFAR	Actual VES Time: 25	Discharge: 170 cfs		Past 24 hrs: Sky: Overc	
River Name/Locat	End Time: 1245	ol) Dis	Total Area Searched: (m ²):		
120 Subsite #: 12	Start Time: 1220	1	Search Area Width:	Clear Wind: Inclement Fair Ideal	
Date: mm dd 1/3y 10 Site #: 120 Subsite #: 120C River Name/Location: 5 FAPA	: tandem separate	Water Temp: (edgewater) 2/ (main channel) 2/		Weather: Sky: Overcast Partly Overcast Clear	ndex to notebook):
Date: mm	Survey Method	Water Temp: (Search Area Length:	Weather: Sky:	Photograph # (index to notebook):

Noll/Disc/Card #:	Comments						
	Dominant Substrate ⁶						
	Microhabitat Type ⁵						
	River or Creek Habitat ⁴						
	Activity ³						
	Snout-Vent Length (mm)						
	Age ² (J, A)						
	Sex (M/F)						
.(woodana a)	Number Sex of Frogs Distance ¹ (M/F)						
0	Number of Frogs	0	. ,		2.50		V 16

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

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

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

Dominant Substrate - (1) silu/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 J Other garter snake Cyprinid VOY5 Other: western pond turtle Centrarchid bullfrog Type: Salmonid tree frog Herpetofauna & Lifestage (A J T E) Yes No Fish Present

Other Species Observed:

120 315 dibbicult Crossina Comments:

12/2 missite -Norma ThonanonT + Irmina

QA/QC (initials): Date:

Foothill Yellow-Legged Frog

River and Creek Visual Encounter Survey Data Sheet Juveniles/Subadults and Adults

Survey M Water Ter	ethod: tander	m separa	te Star	Survey Method: tandem separate Start Time: 545 En	End Time:	605 Act	Time: 605 Actual VES Time: 20 Actual Air Te	O Min. Start	mp: 22 %
Search Ar	Search Area Length:		Search A	Search Area Width:	T	Total Area Searched: (m ²):	rge: crs ed: (m²):	I otal Site I Site V	Site Visit: 1 2 3 4
Weather: Photograp	Weather: Sky: Overcast Partly Overcast Clear Photograph # (index to notebook):	t Partly O tebook):	vercast Ole		Wind: Inclement Fair Ideal		st 24 hrs: <i>Sky</i> : Ove	rcast Partly Ove	Past 24 hrs: Sky: Overcast Partly Overcast Clear Wind: Inclement Fair Ideal Roll/Disc/Card #:
Number of Frogs	Sex Distance ¹ (M/F)	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
R									
Mar set use									
Distance – (Distance – distance from bottom of site/subsite to frogs	om of site/su	ubsite 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

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

SMicrohabitat – (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

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 Other garter snake Other: western pond turtle Centrarchid bullfrog Salmonid tree frog Herpetofauna & Lifestage (A J T Yes No Other Species Observed: Fish Present

Comments:

confluence 0 Mond aknole uls 2 vien r. Ver 124R 200% CAM Pon a bo Hom 8000 7 335; 333 334: co moare 150 here 04070 20 Mer Date: QA/QC (initials):

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

0										Т	Т		T		Г		_	7
rt Air Temp: 34,5 °c End Air Temp: 34,5	Length: Subsite Length:	Visit: 1 2 3 4	vercast Clear Wind: Inclement Fair Ideal	Roll/Disc/Card #:			Comments											
S Min. Sta	Total Site	Site	ercast Partly O			Dominant	Substrate											
al VES Time:	ge: 170 cfs	:d: (m ²):	24 hrs: Sky: Ove	·		Microhabitat	Type											
1400 Act	Dischar	otal Area Searche			River or	Creek	Habitat											
pu	(looc	T	lement Fajr)		:	Activity											
rt Time: 1335	nnel) 21 (J	rea Width:	ar Wind: Inc		Snout-Vent	Length	(mm)											
ite Sta	🗹 (main cha	Search A	vercast Cle			Age,	(J, A)											
n separa	13.50		Partly	tebook):		Sex	(MI/F)											our of site la
thod: tander	ip: (edgewater	a Length:	Sky: Overcast	1 # (index to not		1	Distance											Diotomos diotomos from Letters 2
Survey Me	Water Ten	Search Are	Weather:	Photograpl		Number	OI Frogs	0	,									1 Dictorca di
	Survey Method: tandem separate Start Time: 1335 End Time: 1400 Actual VES Time: 25 Min. Start Air Temp: 34,5% End Air Temp: 32,5%	End (pool)	End (pool)	End (pool)	End (pool)	rate Start Time: 1335 End "C (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Snout-Vent	rate Start Time: 1335 End (C. (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Age Length	rate Start Time: (33 & End (2 (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Age (J, A) (mm) Activ	rate Start Time: [335 End "C (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Age Length (J, A) (mm) Activ	rate Start Time: [335 End **C (main channel) 2.1 (pool) Search Area Width: Overcast Clear Wind: Inclement Age Length (J, A) (mm) Activ	rate Start Time: [335 End "C (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Age Length (J, A) (mm) Activ	rate Start Time: [335 End "C (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Age Length (J, A) (mm) Activ	rate Start Time: [335 End "C (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Age Length (J, A) (mm) Activ	rate Start Time: [335 End "C (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Age Length (J, A) (mm) Activ	rate Start Time: [335 End "C (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Age Length (J, A) (mm) Activ	rate Start Time: [335 End "C (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Age Length (J, A) (mm) Activ	rate Start Time: [335 End "C (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Age Length (J, A) (mm) Activ	rate Start Time: [335 End "C (main channel) 21 (pool) Search Area Width: Overcast Clear Wind: Inclement Age Length (J, A) (mm) Activ

= 56 MMT 6 Dominant Substrate - (1) silv clay/mud, (2) sand, (3) gravel/pebble (5) boulder, (6) bedrock, (7) small woody debris, (8) large woody debris, (9) aquatic vegetation, (10) margin vegetation, (11) other + non 25 OH conchi Other garter snake Cyprinid YOYs Other: western pond turtle Salmonid bullfrog tree frog Herpetofauna & Lifestage (A J Yes No Other Species Observed: Fish Present Comments:

co-vas

dec.	pho 70 300:	bottom 213R	11/3
	301-305:	Cunninide	in and indicated
	307:	to0 213R	Web 1/5
QA/QC (initials):	Date:		

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

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

Foothill Yellow-Legged Frog River and Creek Visual Encounter Survey Data Sheet

Juveniles/Subadults and Adults

Survey M Water Ter	Survey Method: (andem separate Water Temp: (edgewater)	n separa	Site #: ate Sta	Survey Method: (andem separate Start Time: 1/30 End Time: 1/52 Actual VES Time Water Temp: (edgewater) (9.5 (main channel) (8.5 (mod))	End Time:	Name/Location	Actual VES Time: 22 m/h;	2 MAGUE (Show	Obse mp: 30°C	α M
Search Ar	Search Area Length:		Search A	Search Area Width:		Total Area Searched: (m ²):	ed: (m ²):	Site Visit:	Site Visit: 1 2 3 4	
Weather: Photograp	Weather: Sky: Overcast Partly Overcast Clear Photograph # (index to notebook):	cbook):	Overcast Cle	ear Wind: Inclement	Fai	i	Past 24 hrs: Sky: Overcast Partly/Overcast Clear Roll/Disc/Car	ercast Partly(6)	Þ	
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										
¹ Distance – o	Distance – distance from bottom of site/subsite to frogs	om of site/s	subsite to frog	s						
${}^{2}\operatorname{Age} - J = J_{1}$ ${}^{3}\operatorname{Activity} - ($	uvenile/Subadult (1) sitting in shade,	<= 39 mm) (2) basking	g, (3) hiding, (² Age – J = Juvenile/Subadult (<= 39 mm), A = Adult (>= 40 mm), snout-vent length Activity – (1) sitting in shade, (2) basking, (3) hiding, (4) calling, (5) swimming, (6) bit of the contraction of the	nt length ning, (6) foraging,	(7) amplexus, (8) fi	Age – J = Juvenile/Subadult (<= 39 mm), A = Adult (>= 40 mm), snout-vent length Activity – (1) sitting in shade, (2) basking, (3) hiding, (4) calling, (5) swimming, (6) foraging, (7) amplexus, (8) floating, (9) underwater, (10) other	(10) other		
Microhabita (11) protectu	Microhabitat – (1) los Microhabitat – (1) isolated side (11) protected bank, (12) other	ow gradien le pool, (2) r	t riffle, (2) hig connected sid	gh gradient riffle, (3) r le pool, (3) scour pool	run, (4) glide, (5) I, (4) backwater p	main channel pool, ool, (5) side channel	NIVER OF CIECK Habitat — (1) low gradient rittle, (2) high gradient rittle, (3) run, (4) glide, (5) main channel pool, (6) step-pool, (7) other Microhabitat — (1) isolated side pool, (2) connected side pool, (3) scour pool, (4) backwater pool, (5) side channel, (6) boulder/sedge, (7) of (11) protected bank, (12) other	edgewater, (8) poo	Niver or Creek Habitat—(1) low gradient rittle, (2) high gradient rittle, (3) run, (4) glide, (5) main channel pool, (6) step-pool, (7) other 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	
ODOMINANT Sub Fish Present	ubstrate – (1) silt/clay/n	clay/mud, ((2) sand, (3) gr	ravel/pebble, (4) cobbl. Type: Salmonid	ole, (5) boulder, (6) bed	5) bedrock, (7) small) small woody debris, (8) large	woody debris, (9)	Obminant 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 Tyne: Salmonid Centrarchid	
Herpetofar Other Spec	a & Li s Obso	e (A J	T E) 1		JIInc	wester	Callei	garter snake 17	Other	
Comments:			_							
									= Adult T. Conchii obs.	
									Pro Cost. A 1724	

Date:

QA/QC (initials):

Foothill Yellow-Legged Frog River and Creek Visual Encounter Survey Data Sheet

Juveniles/Subadults and Adults

W													
Show Observers: WM BD JW RE	id:	Length: Subsite Length:	Site Visit: 1 2 3 4	Past 24 hrs. Sky: Overcast Partly Overcast Clear Wind: Inclement Fair Ideal	Roll/Disc/Card #:			Comments					
D MAPLE	o min. Star	Total Site Length:	Site	reast Partly Ov			Dominant	Substrate					
Date: mm / dd 2/6 yy 10 Site #: 220 Subsite #: 220 B River Name/Location: Star - P Marce Grove	ual VES Time: 2	Discharge: (70 cfs	:d: (m ²):	t 24 hrs: Sky. Ove	` 		Microhabitat	Type					
Name/Location:	(220 Act	Dischar	Total Area Searched: (m ²):	Fair Ideal Pas		River or	Creek	Habitat [*]					
20 B River	End Time:	(Jood		Fair	(Activity					
Subsite #: 7	Start Time: 1200	Water Temp: (edgewater) 20 (main channel) 18.5 (pool)	Search Area Width:	ar Wind: Inclement		Snout-Vent	Length	(mm)					
Site #: 72(te Sta	(main cha	Search /	vercast Cle			Age ²	(J, A)					
y 10	n separa	100		Partly O	ebook).		Sex	(M/F)					
/ dd 26 y	Survey Method: tandem separate	np: (edgewater	Search Area Length:	Weather: Sky: Overcast Partly Overcast Clear	Photograph # (index to notebook).		-	Distance					
Date: mm	Survey Me	Water Ten	Search Are	Weather:	Photograpl		Number	of Frogs	Ø				

Distance - distance from bottom of site/subsite to frogs

 $^{2}_{3}$ Age – J = Juvenile/Subadult (<= 39 mm), A = Adult (>= 40 mm), snout-vent length

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

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

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 Cyphinid 70 15 Other: Centrarchid Type: Salmonid

Other garter snake western pond turtle bullfrog_ tree frog_ Herpetofauna & Lifestage (A J T E) Other Species Observed: Comments:

dis	2/2	
vien	11	
midsite	12	
296:	297:	
groyd		

QA/QC (initials): Date:

River and Creek Visual Encounter Survey Data Sheet Juveniles/Subadults and Adults

Date: mm / dd 2/2 xy (0 Site #: 2220 Subsite #: 2200 Survey Method: tandem separate Start Time: 1230 Er Water Temp: (edgewater) 22, (main channel) 19, 5°C (pool)	xy (o sm separ sr) Aλ. S	#: (main	Start Time: 1230 End Time: 1250 Inchannel) 19, 5°C (pool)	End Time:	ŏ I	al VES Time:		Start Air Temp: 30.5° End Air Temp: 30.5° Subsite I enoth:	N. J.
Search Area Length: Weather: Sky: Overcast Partly Overcast Clear Photograph # (index to notebook):	st Partly (Search /	Search Area Width:	ıt Fai	Area Sea	Sk	ercast Partly Ov	3 Win d #:	
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	
									T T
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, (11) protected bank, (12) other	ttom of site/ (<= 39 mm e, (2) baskin low gradien ide pool, (2) er	subsite to frog), A = Adult (5 ig, (3) hiding, (1 t riffle, (2) hig	s>== 40 mm), snout-vent (4) calling, (5) swimm: th gradient riffle, (3) rule le pool, (3) scour pool,	t length ing, (6) foraging un, (4) glide, (5) . (4) backwater p	, (7) amplexus, (8) f main channel pool, ool, (5) side channel	loating, (9) underwater, (6) step-pool, (7) other I, (6) boulder/sedge, (7)	(10) other edgewater, (8) pool	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, (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	7
Dominant Substrate – (1) silv/clay/mud, (2) sand, Fish Present (Festage (A J T E)) Other Species Observed:	(1) silt/clay/mud, (Nes No festage (A Jerved:	(2) sand, (3) gr	ravel/pebble, (4) cobble Type: Salmonid tree frog b	ole, (5) boulder, (6) bec I Centrarchid bullfrog	bedrock, (7) small woody del chid Cyprinid western pond turtle	woody debris, (8) larginid Other:	Other: SPRACE E	Pominant 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: SARACE OACE Herpetofauna & Lifestage (A J T E) tree frog bullfrog western pend turtle garter snake Other Other Species Observed:	
Comments:									
			phore a	298: bo	bottom o	f subsite	2200	vica uls	

399:

Date:

QA/QC (initials):

Appendix B: Site Photographs



Photo 1. Bottom of site 120a, view upstream.





7/27/10



Photo 3. Bottom of site 120b, view upstream.





Photo 4. Top of site 120b, view downstream.

7/27/10



Photo 5. Midsite 120c, view upstream.



Photo 6. Top of site 120c, view downstream.

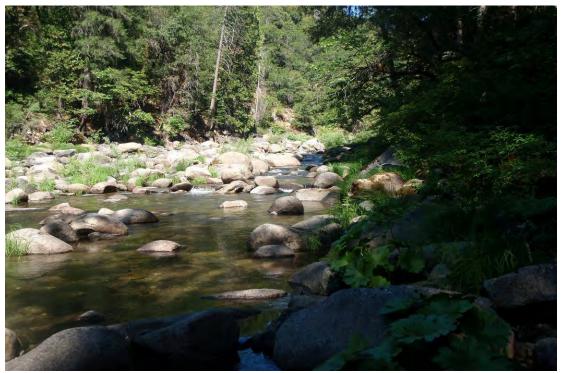


Photo 7. Bottom of site 124, view upstream.



Photo 8. Top of site 124, view downstream.



Photo 9. Bottom of site 213R, view upstream.





Photo 10. Top of site 213R, view downstream.

7/27/10



Photo 11. Midsite 220b, view downstream.



Photo 12. Midsite 220b, view upstream.



Photo 13. Bottom of site 220c, view upstream.



Photo 14. Top of site 220c, view downstream.