Lower Tuolumne River Instream Flow Study
Site Selection Meeting Summary
Tuesday, October 5, 2010, 10 AM – 3 PM
Turlock Irrigation District
333 East Canal Drive, Room 152, Turlock, CA

Attendees:

Scott Wilcox (Stillwater)
Russ Liebig (Stillwater)
Wayne Swaney (Stillwater)
Noah Hume (Stillwater)
Robert Nees (TID)
Allison Boucher (TRC)
Alison Willy (USFWS)
Bob Hughes (CDFG)
Jenny O'Brien (CDFG)
Mark Gard (USFWS) phone

[italicized names attended for part of the meeting]

Scott Wilcox suggested an agenda and provided a general overview of the recent mesohabitat mapping results.

Target Habitat Types

The river was recently re-mapped using the new mesohabitat types recommended by USFWS. The habitat mapping results include percent occurrence (by length) of the various habitat types (see Attachment 1).

During the discussion of which habitat types to include in the model, the group discussed the minimum percent occurrence needed. Generally, the goal was to include habitat types with >10% occurrence, per the FERC-approved study plan. Mark Gard suggested a >5% occurrence with a lower number of transects in rare habitats (i.e., include habitat types down to 5% occurrence, but do not allocate as many transects to them).

Decision:

The group decided to sample habitat types with a minimum of 5% percent occurrence, but with a reduced number of replicates/transects for those less than 10%. This resulted in an initial selection of 13-15 replicate units (based on groupings listed below). The group also decided that it is desirable, where reasonably efficient, to divide transects allocated to a "single replicate" habitat type between two different units in order to encourage more heterogeneity in sampling (e.g., if only one Glide unit was to be sampled, try to divide the transects between two different Glide units if practical).

Glide (lumped between Bar Complex and Flatwater): 1 Replicate unit
Bar Complex Pool: 1 Replicate unit (e.g., 2 transects, one in middle, one in tail)
Bar Complex Riffle: 3 Replicate units (prioritize spawning riffles)
Bar Complex Run: 3 Replicate units

Flatwater Pool: 2 Replicate units
Flatwater Riffle: 1 Replicate unit (prioritize spawning riffles)
Flatwater Run: 3 Replicate units

Side Channel habitat (lumped between Bar Complex and Flatwater) included 2.9% occurrence and was therefore not included as a separate habitat type.

Proposed Habitat Units

The group discussed distributing the selected habitat units selected into four river sections based on the spawning survey data delineations, in order to spread the sites along the length of the study reach and encourage better representation of the entire reach:

Section 1: units 1-39
Section 2: units 40-106
Section 3: units 107-193
Section 4: units >193

Based on the 14 replicate units being targeted, and grouping of 3-5 units per "site", approximately 4-5 sites were anticipated.

Initial habitat units for each site were randomly selected by targeting either (1) key spawning riffles, or (2) other limited habitat unit types (e.g., bar complex spawning riffle) and then selecting contiguous habitat units upstream or downstream from that habitat unit until the desired number (~3 or more) and type of units for that river section were obtained. Units were typically contiguous unless an intervening unit was (1) not required for sampling and therefore skipped, or (2) exceptionally long and therefore effectively acted as a "boundary" to the local collection of transects.

"Backup" units were selected near the randomly selected sites (and were not required to be contiguous) in order to provide more options during field transect selection, in the event that an originally selected random unit was less acceptable for some reason (access, hydraulics, logistics, habitat characteristics, etc.). However, it was understood that during field transect selection the backup units and initially selected units would be equally acceptable, and the group would place transects (as appropriate) in whichever unit was reviewed first (to avoid backtracking).

"Extra" units were selected as candidates for transects for those habitat unit types that are only targeted for one replicate. Transects would be divided between the originally selected unit and the "extra" unit.

Decision:

Selected habitat unit replicates for the Lower Tuolumne River IFIM Study

Habitat Type*	No. of replicates	Units[1]	Backup	Transects/notes
Glide	1	**29**, 202[e]	24, 205	Possibly split transects between two units
BC Pool	1	**155**[e], **163**	92, 145	Possibly split transects between two units
BC Riffle	3	**25**, **81**, **160**	91, **162**	
BC Run	3	**26**, **85**, **161**	**83**	
FW Pool	2	**86, 196**	22, 225	Unit 22 was moved to a backup when the number of replicates was reduced from 3 to 2.
FW Riffle	1	**30**, 227[e]	197	Possibly split transects between two units
FW Run	3	**28**, **82**, **84**	198	Unit 82-potential overbank issues

* BC = Bar Complex, FW = Flatwater

[1] **Bold** signifies the randomly selected unit and adjacent contiguous units.

[e] Extra unit, which may be used to split transects between two replicates.

Habitat unit groupings for IFIM sites on the Lower Tuolumne River.

Site	Units		Backup	Section.
1	25-30	25-BC riffle; 26-BC run; 28-FW run; 29-glide; 30-FW riffle	22-FW pool; 24-glide	1
2	81-86	81-BC riffle; 82-FW run; 83-BC run; 84-FW run; 85-BC run; 86-FW pool	91-BC riffle; 92- BC pool	2
3	155[e], 160-163	155[e]-BC pool; 160-BC riffle; 161-BC run; 163-BC pool	145-BC pool; 162-BC riffle	3
4	196, 202[e]	196-FW pool; 202[e]-BC glide	197 FW riffle; 198-FW run; 205-BC glide	4
5	227[e]	227[e]-FW riffle	225-FW pool	4

[e] Extra unit, which may be used to split transects between two replicates.

Transect Selection

Site selection in field: Nov 17-18, 2010

Action Items

Wayne to make mapbook files available on the TRTAC website.

Russ to make meeting materials available as an attachment to this meeting summary.

Attachment 1

Tuolumne River 2010 mesohabitat mapping summary

Chanel Form	Habitat	Count	Length (ft)	Percent
Bar Complex	Glide	8	2,085	1.73
Bar Complex	Pool	18	9,607	7.96
Bar Complex	Riffle	60	21480	17.80
Bar Complex	Run	40	24045	19.93
Flatwater	Glide	14	3,390	2.81
Flatwater	Pool	19	20,190	16.73
Flatwater	Riffle	17	6,660	5.52
Flatwater	Run	35	33,205	27.52
		211	120,662	100.00

MESOHABITAT	%
Pool	24.69
Riffle	23.32
Run/Glide	51.98
	100.00

Side channels with 20% of flow at 300 cfs

Chanel Form	Habitat	Count	Length (ft)	% SC
Side Channel	n/a	10	3490	2.9%

Mesohabitats mapped for IFIM									
RM	**ID**	**CHFORM**	**HABITAT**	**Length**	**Access**	**Group**	**Suggested**	**Notes**	**Reference**
51.68	1	Flatwater	Pool	610	poor	n/a		steep descent from powerhouse	
51.59	2	Flatwater	Pool	475	TID	A		split channel tail	
51.47	4	Flatwater	Riffle	660	TID	A			
51.05	5	Flatwater	Run	2225	TID	A			
50.96	6	Flatwater	Pool	450	TID	B	yes		
50.80	7	Flatwater	Run	850	TID	B	yes		
50.78	8	Flatwater	Glide	105	TID	B	"		
50.65	11	Flatwater	Riffle	710	TID	B	yes		snorkel RA7
50.49	12	Flatwater	Pool	855	TID	B			
50.44	13	Bar Complex	Glide	220	TID	B			
50.28	14	Bar Complex	Riffle	840	TID	B			
50.24	16	Bar Complex	Pool	230	TID	C	yes		
50.11	17	Bar Complex	Run	700	TID	C	yes		
50.07	18	Bar Complex	Riffle	230	TID	C	yes		
49.87	19	Bar Complex	Run	1005	TID	D			
49.82	20	Flatwater	Glide	285	TID	D			
49.71	21	Flatwater	Riffle	560	TID	D	yes		snorkel R2
49.64	22	Flatwater	Pool	410	TID	D	yes	Backup unit	
49.37	23	Flatwater	Run	1410	TID	D			
49.34	24	Flatwater	Glide	165	TID	D		Backup unit	
49.22	25	Bar Complex	Riffle	645	TID	E	yes	Selected	
49.16	26	Bar Complex	Run	320	TID	E	yes	Selected	snorkel R3B
49.12	27	Flatwater	Riffle	165	TID	F	yes		
49.10	28	Flatwater	Run	145	TID	F	yes	Selected	
49.07	29	Flatwater	Glide	120	TID	F	"	Selected	
48.87	**30**	**Flatwater**	**Riffle**	**1085**	**TID**	**G**		**Randomly Selected**	**R4A**
48.75	31	Flatwater	Run	625	TID	G	yes		
48.71	32	Flatwater	Glide	215	TID	G	"		
48.45	33	Flatwater	Riffle	1360	TID	H			R4B
48.33	34	Flatwater	Run	670	TID	H			
48.25	35	Flatwater	Glide	405	TID	H			
48.18	36	Bar Complex	Riffle	340	TID	H	yes		snorkel R5A
48.08	37	Bar Complex	Pool	530	TID	H	yes		
48.04	38	Bar Complex	Riffle	215	TID	H			R5B
47.31	39	Flatwater	Pool	3895	TID	H		long pool above/below Basso	
47.22	40	Flatwater	Glide	445	poor	n/a			
46.94	41	Bar Complex	Riffle	1490	poor	n/a			snorkel R7
46.88	43	Flatwater	Riffle	320	poor	n/a			
46.83	44	Flatwater	Run	260	poor	n/a			
46.81	45	Flatwater	Glide	120	poor	n/a			
46.76	46	Flatwater	Riffle	260	poor	n/a			
46.00	48	Flatwater	Run	4025	poor	n/a			
45.98	52	Bar Complex	Riffle	95	Zanker	n/a		complex channel, poor transects	
45.95	53	Bar Complex	Riffle	165	Zanker	n/a		complex channel, poor transects	
45.88	54	Bar Complex	Riffle	360	Zanker	n/a		complex channel, poor transects	
45.83	55	Bar Complex	Run	240	Zanker	n/a		complex channel, poor transects	
45.82	56	Flatwater	Riffle	40	Zanker	n/a		complex channel, poor transects	
45.76	57	Bar Complex	Riffle	330	Zanker	n/a		complex channel, poor transects	
45.71	58	Bar Complex	Run	285	Zanker	n/a		complex channel, poor transects	
45.68	59	Bar Complex	Riffle	135	Zanker	n/a		complex channel, poor transects	snorkel Zanker
45.65	60	Bar Complex	Run	160	Zanker	I			
45.59	61	Bar Complex	Riffle	310	Zanker	I	yes		
45.38	62	Flatwater	Run	1115	Zanker	I			
45.32	66	Flatwater	Pool	310	Zanker	I	yes	pool at Peaslee Creek confluence	
45.14	67	Flatwater	Run	970	poor	n/a			
45.06	69	Flatwater	Pool	420	poor	n/a			
44.99	70	Bar Complex	Riffle	385	poor	n/a			
44.94	71	Bar Complex	Pool	235	poor	n/a			

RM	ID	CHFORM	HABITAT	Length	Access	Group	Suggested	Notes	Reference
44.81	72	Bar Complex	Riffle	710	poor	n/a			
44.74	74	Bar Complex	Run	350	poor	n/a			
44.71	75	Bar Complex	Riffle	150	poor	n/a			
44.69	76	Bar Complex	Run	150	poor	n/a			
44.66	77	Bar Complex	Pool	130	poor	n/a			
44.62	78	Bar Complex	Run	225	poor	n/a			
44.58	79	Bar Complex	Riffle	190	poor	n/a			
44.54	80	Bar Complex	Run	240	poor	n/a			
44.45	81	Bar Complex	Riffle	470	poor	n/a		Selected	
44.36	82	Flatwater	Run	450	poor	n/a		Selected	
44.27	83	Bar Complex	Run	500	poor	n/a		Selected	
44.02	84	Flatwater	Run	1320	poor	n/a		Selected	
43.91	85	Bar Complex	Run	545	poor	n/a		Selected	
43.71	**86**	**Flatwater**	**Pool**	**1055**	**poor**	**n/a**		**Randomly Selected**	
43.51	87	Flatwater	Pool	1075	poor	n/a			
43.30	88	Bar Complex	Run	1140	poor	n/a			
43.23	89	Bar Complex	Riffle	335	poor	n/a			
43.05	90	Bar Complex	Run	965	Bobcat	G	yes		
43.00	91	Bar Complex	Riffle	240	Bobcat	G	yes	Backup unit	snorkel R21
42.96	92	Bar Complex	Pool	245	Bobcat	G	yes	Backup unit	
42.89	93	Bar Complex	Run	360	Bobcat	G	yes		
42.87	94	Bar Complex	Riffle	120	Bobcat	G			
42.68	95	Flatwater	Run	975	Bobcat	G	yes		
42.66	96	Bar Complex	Riffle	120	Bobcat	G			
42.40	97	Flatwater	Run	1360	TRR	H		currently no access, but potential	
42.35	98	Flatwater	Glide	275	TRR	H		currently no access, but potential	
42.31	99	Bar Complex	Riffle	215	TRR	n/a		side channel area, poor transects	snorkel TRR
42.29	101	Bar Complex	Run	100	TRR	n/a		side channel area, poor transects	
42.24	102	Bar Complex	Riffle	265	TRR	n/a		side channel area, poor transects	
42.19	103	Flatwater	Run	285	TRR	n/a		side channel area, poor transects	
42.15	104	Flatwater	Riffle	205	TRR	I		currently no access, but potential	
42.06	105	Flatwater	Run	455	TRR	I		currently no access, but potential	
42.02	106	Flatwater	Glide	205	TRR	I		currently no access, but potential	
41.92	107	Bar Complex	Riffle	560	TLSRA	J	yes		
41.74	108	Bar Complex	Run	935	TLSRA	J	yes		
41.67	109	Bar Complex	Riffle	360	TLSRA	J	yes		
41.43	110	Flatwater	Run	1255	poor	n/a			
41.17	111	Bar Complex	Pool	1410	poor	n/a			
41.10	113	Bar Complex	Glide	340	poor	n/a			
40.99	114	Bar Complex	Run	565	poor	n/a			
40.95	115	Bar Complex	Glide	250	poor	n/a			
40.90	116	Bar Complex	Riffle	260	poor	n/a			
40.40	118	Bar Complex	Run	2625	poor	n/a			
40.16	120	Bar Complex	Riffle	1265	poor	n/a			
39.86	121	Flatwater	Run	1605	poor	n/a			
39.77	122	Flatwater	Glide	475	poor	n/a			
39.67	123	Flatwater	Run	505	poor	n/a			
39.61	124	Bar Complex	Riffle	305	poor	n/a			
39.43	125	Bar Complex	Run	945	7/11	K	yes		
39.42	285	Bar Complex	Riffle	85	7/11	K			
39.26	286	Bar Complex	Run	825	7/11	L	yes		
39.20	126	Bar Complex	Riffle	350	7/11	L	yes		
38.89	127	Bar Complex	Pool	1607	7/11	L			
38.86	128	Flatwater	Riffle	170	7/11	L	yes		
38.77	129	Flatwater	Run	485	7/11	L	yes		
38.73	130	Flatwater	Pool	215	7/11	L	yes		
38.65	131	Flatwater	Run	415	7/11	M	yes		
38.63	132	Flatwater	Riffle	75	7/11	M			
38.58	133	Flatwater	Pool	265	7/11	M	yes		

RM	ID	CHFORM	HABITAT	Length	Access	Group	Suggested	Notes	Reference
38.55	134	Bar Complex	Glide	200	7/11	M	"		
38.47	135	Bar Complex	Riffle	400	7/11	M	yes		
38.33	137	Bar Complex	Run	740	7/11	M	yes		
38.26	138	Bar Complex	Pool	380	7/11	M	yes		
38.18	139	Bar Complex	Run	395	7/11	M			
38.12	140	Bar Complex	Riffle	310	7/11	N			snorkel 7/11
38.05	141	Bar Complex	Pool	415	7/11	N	yes		
37.93	142	Bar Complex	Pool	610	7/11	N	yes		
37.87	143	Bar Complex	Run	320	7/11	N	yes		
37.81	144	Bar Complex	Riffle	305	7/11	N	yes		
37.58	145	Bar Complex	Pool	1240	Sante Fe	O		Backup unit	
37.55	146	Bar Complex	Riffle	140	Sante Fe	O			
37.39	147	Flatwater	Run	850	Sante Fe	O	yes		
37.31	148	Bar Complex	Riffle	420	Sante Fe	P			
37.17	149	Bar Complex	Run	730	Sante Fe	P			
37.01	151	Bar Complex	Run	850	Sante Fe	P			
36.97	152	Bar Complex	Riffle	235	Sante Fe	P		Pit/Pool	snorkel Ruddy
36.91	154	Bar Complex	Pool	295	Sante Fe	n/a		Pit/Pool	
36.86	**155**	**Bar Complex**	**Pool**	**280**	**Sante Fe**	**Q**		**Randomly Selected Extra Unit**	
36.79	156	Bar Complex	Riffle	340	Sante Fe	Q			
36.62	157	Flatwater	Run	895	Sante Fe	Q	yes		
36.59	158	Bar Complex	Riffle	185	Sante Fe	R			
36.33	159	Flatwater	Run	1345	Sante Fe	R			
36.29	**160**	**Bar Complex**	**Riffle**	**225**	**Sante Fe**	**R**		**Randomly Selected**	
36.23	161	Bar Complex	Run	335	Sante Fe	R	yes	Selected	
36.18	162	Bar Complex	Riffle	235	Sante Fe	R	yes	Backup unit	
36.13	163	Bar Complex	Pool	280	Sante Fe	R	yes	Selected	
35.58	164	Flatwater	Pool	2885	Sante Fe	S	yes		
35.52	165	Flatwater	Riffle	350	Sante Fe	S	yes		
35.17	166	Flatwater	Run	1810	Sante Fe	S			
35.16	167	Bar Complex	Riffle	80	Deardorff	n/a		complex channel, poor transects	snorkel Deardorff
35.12	169	Bar Complex	Pool	195	Deardorff	n/a		complex channel, poor transects	
35.03	170	Bar Complex	Riffle	495	Deardorff	T			
34.96	171	Bar Complex	Run	365	Deardorff	T		good Q	
34.93	172	Bar Complex	Riffle	180	Deardorff	T			
34.66	173	Bar Complex	Run	1400	poor	n/a			
34.57	174	Flatwater	Pool	475	poor	n/a			
34.52	175	Bar Complex	Riffle	290	poor	n/a			
34.48	176	Bar Complex	Pool	190	poor	n/a			
34.42	177	Bar Complex	Run	320	poor	n/a			
34.37	178	Bar Complex	Glide	235	poor	n/a			
34.30	179	Bar Complex	Run	410	poor	n/a			
34.19	180	Bar Complex	Glide	575	poor	n/a			
34.07	181	Bar Complex	Run	640	poor	n/a			
34.00	182	Bar Complex	Riffle	345	poor	n/a			
33.91	183	Flatwater	Run	480	poor	n/a			
33.82	185	Bar Complex	Riffle	500	poor	n/a			
33.75	186	Bar Complex	Run	340	poor	n/a			
33.65	187	Bar Complex	Riffle	550	poor	n/a			
33.47	188	Flatwater	Run	945	poor	n/a			
33.43	189	Flatwater	Glide	225	poor	n/a			
33.39	190	Bar Complex	Riffle	165	poor	n/a			
33.20	191	Bar Complex	Pool	1045	poor	n/a			
33.16	192	Bar Complex	Riffle	180	poor	n/a			
33.05	193	Bar Complex	Run	590	poor	n/a			
32.96	194	Bar Complex	Riffle	460	poor	n/a			
32.46	195	Flatwater	Pool	2635	poor	n/a			
32.09	196	Flatwater	Pool	1990	poor	n/a		**Randomly Selected**	Hickman spill
32.03	197	Flatwater	Riffle	295	poor	n/a		Backup unit	

RM	ID	CHFORM	HABITAT	Length	Access	Group	Suggested	Notes	Reference
31.93	198	Flatwater	Run	550	poor	n/a		Backup unit	
31.88	200	Bar Complex	Riffle	225	poor	n/a			
31.69	201	Bar Complex	Run	1045	poor	n/a			
31.67	202	Bar Complex	Glide	110	poor	n/a		**Randomly Selected Extra Unit**	
31.63	203	Bar Complex	Riffle	180	poor	n/a			
31.51	204	Bar Complex	Run	620	poor	n/a			
31.49	205	Bar Complex	Glide	155	poor	n/a		Backup unit	
31.40	206	Bar Complex	Riffle	440	poor	n/a			
31.27	208	Flatwater	Run	720	poor	n/a			
31.15	209	Bar Complex	Riffle	605	Waterford	U			
31.10	210	Bar Complex	Pool	290	Waterford	U			Hickman Bridge
31.06	211	Bar Complex	Riffle	205	Waterford	U			snorkel Hickman
30.68	212	Flatwater	Run	1985	Waterford	U		partial access to u/s portion	
30.64	213	Flatwater	Glide	200	poor	n/a			
30.60	214	Flatwater	Riffle	230	poor	n/a			
30.47	215	Flatwater	Run	675	poor	n/a			
30.41	216	Bar Complex	Riffle	320	poor	n/a			
30.36	217	Bar Complex	Run	265	poor	n/a			
30.18	219	Bar Complex	Riffle	935	poor	n/a		extreme turbulence	
30.10	220	Bar Complex	Run	435	poor	n/a			
30.05	221	Bar Complex	Riffle	270	poor	n/a			
29.92	223	Flatwater	Pool	665	poor	n/a			
29.83	224	Flatwater	Run	485	poor	n/a			
29.72	225	Flatwater	Pool	610	poor	n/a		Backup unit	
29.55	226	Flatwater	Pool	895	poor	n/a			
29.53	227	Flatwater	Riffle	105	poor	n/a		Extra Unit	
29.46	228	Flatwater	Run	345	poor	n/a			
29.45	229	Flatwater	Riffle	70	poor	n/a			
29.37	230	Flatwater	Run	395	poor	n/a			
29.35	231	Flatwater	Glide	150	poor	n/a			
29.29	233	Flatwater	Run	320	poor	n/a			
29.20	234	Bar Complex	Run	460	Short	V	yes		
29.15	235	Bar Complex	Riffle	240	Short	V	yes		
29.04	236	Bar Complex	Run	605	Short	V	yes		RST
28.95	237	Bar Complex	Riffle	480	Short	V	yes		
28.95	238	ds_Flatwater	ds_Run		poor	n/a			downstream SRP