Lower Tuolumne River Instream Flow Study
Study Coordination Meeting #2 — Summary
Monday, September 20, 2010, 10 AM – 5 PM Stillwater Sciences
279 Cousteau Place, Davis, CA

Attendees:

Scott Wilcox (Stillwater)
Russ Liebig (Stillwater)
Bob Hughes (CDFG)
Ron Yoshiyama (CCSF-SF)
Allison Boucher (TRC)
Zac Jackson (USFWS)
Shaara Ainsley (FishBio)

The purpose of this meeting was to compile, review, and discuss available salmon and steelhead Habitat Suitability Criteria (HSC) for the lower Tuolumne River, select HSC where possible, identify additional HSC literature data gathering needs, and discuss related topics. Scott Wilcox provided a brief overview of HSC and why they were needed for the IFIM study.

The technical group sequentially reviewed HSC and associated metadata from various sources for each species and lifestage, and either (1) selected HSC, (2) reduced the sources of HSC being considered, and/or (3) identified data needs and next steps. Decisions and/or actions on HSC for each species and lifestage are noted below.

Chinook Salmon Spawning

- A wide range of HSC from various sources were reviewed, and the CDFG site-specific Tuolumne curves matched the central tendencies of the other data sets well.
- **Action Item**: confirm that the number of observations and the methodology used in the CDFG spawning study were sufficiently robust. [Subsequent data searches by Stillwater revealed that 318 observations were used for the curves, and 10 study sites were spread over 9.2 miles that represented all of the dominant spawning reach. Thus, there does not seem to be an issue with data robustness.]
- **Decision**: Use site-specific Tuolumne River data for depth and velocity, from the CDFG study conducted in ~1982.

Tuolumne River Chinook Salmon Spawning Depth and Velocity Criteria*

Depth	Suitability Index	Velocity	Suitability Index
0.00	0.00	0.00	0.00

0.50	0.00	0.70	0.00
0.60	0.12	0.80	0.06
0.70	0.23	0.90	0.17
0.80	0.27	1.05	0.36
0.90	1.00	1.25	0.42
2.60	1.00	1.40	1.00
2.70	0.15	2.60	1.00
2.80	0.12	2.70	0.62
2.90	0.08	2.80	0.56
3.00	0.00	2.90	0.45
		3.05	0.22
		3.20	0.17
		3.80	0.07
		4.40	0.00

*From CDFG 1982

- **Decision:** Adopt, with small modifications based on data from other streams, the site-specific substrate HSC from CDFG. Other streams indicated frequent use of 1-2 inch gravel, which the site-specific Tuolumne data did not (perhaps due to availability limitations). Final substrate criteria agreed to by the technical group are specified below.

Tuolumne River Chinook Salmon Spawning Substrate Criteria*

Substrate	Size (inches)	Suitability Index
Organic, silt, sand, small gravel	Up to 1.0	0.0
Medium gravel	1-2	0.5
Large gravel	2-3	1.0
Very small cobble	3 – 4.5	1.0
Small cobble	4.5-6	0.7
Medium Cobble	6-9	0.0
Large cobble, boulder, bedrock	>9	0.0

*Adapted from CDFG 1982 with minor expansion to indicate suitability of 1-2 inch gravel.

- The technical group agreed that additional site-specific data collection for spawning would not lead to a decision narrow the HSC curves, and that sufficient additional data to justify expanding the curves was not possible given the current size of the population. Therefore, given that the current data set is robust at 318 observations, and is already site-specific, no additional site-specific data collection for spawning is planned.

Chinook Salmon Juveniles

The Stanislaus velocity HSC provided good representation of the central tendencies of the larger data set. Stanislaus depth HSC curve peaked slightly more to the right of most of the rest of the data sets.

- **Decisions:** (1) Use the Stanislaus HSC for velocity. (2) Use the Stanislaus HSC for depth, with a minor modification to include the peaks of other curves in the 1.31 – 2.10 foot depth range. (3) Do not apply substrate criteria to juveniles, since they do not typically select habitat based on substrate and may occur over the entire range of substrate possibilities.

Tuolumne River Chinook Salmon Juvenile Depth and Velocity Criteria*

Depth	Suitability Index	Velocity	Suitability Index
0.00	0.00	0.00	0.92
0.10	0.01	0.10	0.96
0.20	0.02	0.20	1.00
0.30	0.05	0.30	0.99
0.40	0.10	0.40	0.99
0.50	0.17	0.50	0.98
0.60	0.27	0.60	0.97
0.70	0.36	0.70	0.97
0.80	0.42	0.80	0.96
1.31	1.00	0.90	0.96
2.10	1.00	1.00	0.95
2.20	0.93	1.10	0.94
2.30	0.86	1.20	0.94
2.40	0.78	1.30	0.93
2.50	0.71	1.40	0.92
2.60	0.64	1.50	0.92
2.70	0.57	1.60	0.91
2.80	0.49	1.70	0.79
2.90	0.42	1.80	0.68
3.00	0.41	1.90	0.56
3.10	0.39	2.00	0.44
3.20	0.38	2.10	0.33
3.30	0.36	2.20	0.28
3.40	0.35	2.30	0.24
3.50	0.34	2.40	0.19
3.60	0.32	2.50	0.15
3.70	0.31	2.60	0.10
3.80	0.29	2.70	0.06
3.90	0.28	2.80	0.01
4.00	0.25	3.40	0.01
4.10	0.18	3.50	0.00

4.20	0.12		
4.30	0.08		
4.40	0.05		
4.50	0.03		
4.60	0.03		
4.70	0.02		
7.00	0.02		
7.10	0.00		

*From Stanislaus River. Depth curve modified.

Chinook Salmon Fry

Site-specific Tuolumne River HSC for fry are available. These HSC were compared to the fry HSC from the Stanislaus River (Stanislaus River data were used for juvenile HSC). The similarity between the two data sets, and their similarity to the central tendency of other data sets, was not as great as the technical group had hoped, and some type of hybrid curve was considered. Decisions on depth and velocity HSC for this life stage were deferred to the next meeting, pending review of the reports and metadata that may provide some insight on reasons for the differences.

Decision: As specified for the juvenile life stage, do not apply substrate criteria to fry.

Steelhead Adults

The technical group reviewed a few HSC from the literature, and initially focused on resident rainbow trout curves provided by the USFWS that are being used for steelhead on the Merced project, since they already had some level of agency concurrence. Several questions were raised about the origin of the curves, and the rationale for their use.

Since the Tuolumne River O. mykiss population is almost entirely resident, the technical group concurred that review of some Central Valley rainbow trout curves should be considered as well.

Action: Zac Jackson will research the background and source of the HSC being used for the Merced Project. Stillwater will compile some rainbow trout HSC for consideration. These will all be reviewed at the next HSC meeting.

Upcoming meeting dates:

Site Selection Meeting, October 5, 2010
HSC development 2nd meeting, October 20, 2010 at Stillwater in Davis, 9:00.