



December 6, 2010

To: Interested Tuolumne River parties

Subject: Overbank (2-D) study site selection for FERC Instream Flow Study pursuant to
May 12, 2010 FERC Order

Dear All,

As a follow-up to initial study site selection discussions at the first Lower Tuolumne River Instream Flow Study Coordination Meeting of August 26, 2010, we have reviewed several options for sites to be used in the overbank flow portions of the above-referenced Instream Flow Study this winter and spring. As described in the October 2009 Study Plan (Stillwater Sciences 2009), "Study sites for the pulse flow assessment will include up to four (4) locations upstream of RM 29 (including the gravel-bedded portion of the river used most extensively by salmonids between RM 34.2 to RM 51.7), in addition to other restoration sites (e.g., special run/pool [SRP] 9) where there is existing 2-D modeling data." The preliminary list of sites discussed at the August 26 meeting included: R5A/5B¹ (RM 48.0), Zanker property (RM 45.5), Reardon property (RM 44.5), and R46 (RM 34.0). Also discussed at the meeting were restoration sites at Bobcat Flat (RM 43.0), SRP9/10 (RM 25.5), and Big Bend (RM 5). These sites may be located by river mile on the Tuolumne River Inundation Maps on the TRTAC website at the link below:

http://www.tuolumnerivertac.com/Photos/TID_ReferenceMapBook.pdf

To refine the initial site list discussed at the August 26 meeting, we looked at additional sites identified in the TRTAC stranding report (TID/MID 2001; Report 2000-6), including RA3/RA4 (RM 51.7 above OLG), R2 (RM 49.8 below La Grange Bridge), R4A/R4B (RM 48.5), R5A/5B (RM 48.0), and at the Zanker property (RM 45.5). Using these sites as a guide, part of the rationale for site selection is that there is some combination of slope/substrate at these sites in combination with higher juvenile salmon rearing densities in the river that may have resulted in an increased incidence of stranding in historical surveys. Since the channel gradient is reduced considerably in the river downstream of RM 29, we examined additional sites that may more closely approximate regional floodplain inundation studies of the Central Valley (Sommer et al. [2001, 2005], Jeffres et al. 2006). Historical air photos and monitoring reports were reviewed for the SRP 9/10 (RM 25.5), Big Bend (RM 6.5), and Grayson River Ranch (RM 5.5) sites.

Due to increased early season snowpack in the upper watershed, the Districts were recently required to make flood control releases from Don Pedro Reservoir that resulted in flows at La Grange from 3,500–4,000 cfs beginning on December 1–2. Fisheries biologists were on-site December 2–3 to examine the inundation extent, depth, and fish habitat suitability of potential sites. In general, inundation extent corresponded very well with prior mapping from the historical air-photo series of inundation at various flows. However, flows in the range of 2,000–5,000 cfs identified in the final study plan were not sufficient to inundate the floodplain surfaces of the sites nearest to the San Joaquin River

¹ Since site naming conventions for areas in the lower Tuolumne River differ among agencies and the Districts, please refer to river mile designations when specifying site locations.

850 G Street
Suite K
Arcata, CA 95521
707.822.9607
fax 707.822.9608

279 Cousteau Place
Suite 400
Davis, CA 95616
530.756.7550
fax 530.756.7586

404 SE 6th Avenue
Portland, OR 97214
503.719.2435

1314 NE 43rd Street
Suite 210
Seattle, WA 98105
206.632.0107
fax 206.632.0108

confluence. On-the ground surveys confirmed flows on the order of 3,500 cfs at Modesto were insufficient to initiate overbank flow conditions due to the influence of lower San Joaquin River flows upon channel hydraulics. For this reason, data collection for the 2-D modeling effort will focus on the sites within the reaches originally identified in the study plan.

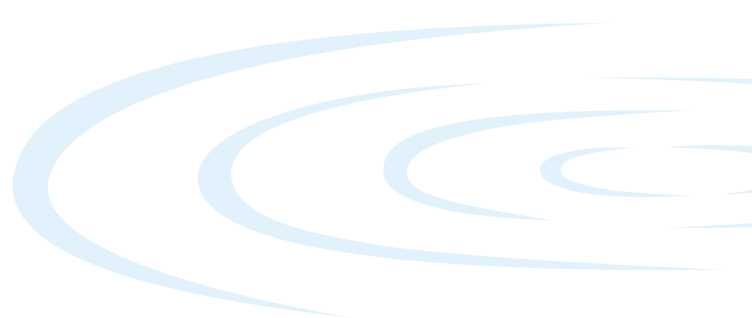
Based upon this field evaluation and review of prior studies, the following new sites are recommended for use in 2-D hydraulic modeling to examine habitat suitability for juvenile salmon, *O. mykiss* and predator fish.

- 1) R4B (RM 48.5)
- 2) R5A (RM 48.0),
- 3) Zanker (RM 45.5)

These sites are shown with historical inundation surfaces on Map Tiles 3 through 5 of the Tuolumne River Inundation Maps hyperlinked above. In accordance with the final study plan, high flow study transects will be established at the upstream and downstream portions of these sites with level logging pressure transducers established at in-channel and overbank flow locations by January 2011. Continuous stage data and available digital elevation model (DEM) data will be used to construct 2-D hydraulic models of these sites in conjunction with on-the-ground surveys of water surface slopes at flows within the range indicated in the study plan.

In summary, we have identified three broad study sites where significant floodplain inundation is expected to occur at flow ranges up to 5,000 cfs. Understanding the limitations of available digital topographic and bathymetric data, we believe modeling at these sites will provide useful insights regarding floodplain habitat conditions for rearing salmon. In addition to data collection and modeling at the three new sites identified above, we will examine available 2-D hydraulic modeling results carried out previously at R64 (RM 29.5), SRP 9 (RM 25.8), SRP 10 (RM 25.3), and Charles Rd. (RM 23). These sites are shown on Map Tiles 16, 19, and 21 of the Inundation Maps hyperlinked above.

Please direct any comments regarding the suitability of the selected study sites to Noah Hume at Stillwater Sciences by Friday December 17, 2010 (noah@stillwatersci.com)



REFERENCES

Jeffres, C., J. Opperman, and P. B. Moyle. 2008. Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. *Environmental Biology of Fishes* 83: 449-458.

Sommer, T. R., M. L. Nobriga, W. C. Harrell, W. Batham, and W. J. Kimmerer. 2001. Floodplain rearing of juvenile chinook salmon: evidence of enhanced growth survival. *Canadian Journal of Fisheries and Aquatic Sciences* 58: 325-333.

Sommer, T.R, W.C. Harrell and M.L. Nobriga. 2005. Habitat use and stranding risk of juvenile Chinook salmon on a seasonal floodplain. *North America Journal of Fisheries Management* 25:1493-1504

Stillwater Sciences. 2009. Tuolumne River Instream Flow Studies. Final Study Plan. Prepared by Stillwater Sciences, Davis, California for Turlock Irrigation District and Modesto Irrigation Districts, California.

TID/MID. 2001. Tuolumne River Chinook salmon fry and juvenile salmon stranding report. Report 2000-6 *In* 2000 Report of Turlock Irrigation District and Modesto Irrigation District pursuant to Article 39 of the license for the Don Pedro Project. Turlock, California. 2 Volumes. March.

