Attachment – Draft Summary of Initial Reconnaissance of Habitat Upstream of Shasta Lake

Upstream Habitat Assessment Group Reconnaissance Trip to Shasta Lake Tributaries (McCloud and Sacramento rivers) October 5-8, 2010

Matt Brown (FWS), Jess Newton (FWS), and John Hannon (USBR) with assistance from Greg Gotham (USBR) made an initial trip to check access and get a feel for the habitat present in the major tributaries to Shasta Lake. The following are observations and initial impressions of the areas covered. Based on this cursory observational survey of a small portion of the accessible habitat, the Sacramento River appears to offer greater opportunity (compared to the McCloud) for a Chinook salmon reintroduction. The Sacramento has an overall slightly lower gradient, smaller substrates, greater likely rearing habitat opportunity, and a longer accessible mainstem reach accessing higher elevation areas (although water temperature data in the upper Sacramento is yet to be obtained). The Sacramento is highly accessible, although the railroad and roads paralleling the river could constitute some habitat quality challenges. The McCloud is harder to access but contains high quality riparian habitat. Both rivers need to be more thoroughly assessed and habitat quantified to reach any conclusions regarding upstream habitat suitability for a reintroduction program.

10-5-2010

Lower McCloud River

Walked in from fishing lodge near the confluence with Shasta Lake on private property upstream of the Gilman road bridge over the McCloud.

We covered first 4.7 miles up from the high water line with another half mile of river clearly visible upstream from the end of the reach walked. Drove in first mile on private land (permission required) and hiked the trail adjacent to the river the rest of the way up. The reach contains mostly large cobble and boulder substrate, too large for spawning. Water temperatures in the area would likely be high for winter Chinook spawning (Figures 4, 5, and 6). Some limited nearshore rearing habitat is present with a small amount of area for overbank flow during high water. The most significant patch of spawning gravel noted was a river spanning patch of spawning gravel with space for at least 30 Chinook redds at the top of reach walked. The patch occurs at a 90 degree bend in the river. Estimate space for ~200 total Chinook redds within the reach walked.

Little large wood is present in the channel, likely due to the contained and high energy nature of most of the reach. The reach is generally well contained by steep sideslopes with a mature forest riparian area.

MSS Flow gauge near the mouth: Flow = 370 cfs, water temp 53-54F

10-6-2010

McCloud River below McCloud Dam

Flow at Ah-Di-Nah = 220cfs

Kayaked from put in below the lake (Ash Camp) down to the Nature Conservancy Preserve entrance. Steep section between dam and Ah-Di-Nah flow gauge (2.4 miles between walking bridge at put-in and the flow gauge). We had to portage around steep sections (about five places). The channel is predominantly bedrock controlled with fairly steep sideslopes. One patch of river- spanning spawning gravel was observed. There are sparse patches of spawning gravel spaced periodically down the channel, but spawning sized gravel is generally lacking. The channel appears to be marginal Chinook spawning and rearing habitat. The reach downstream of the flow gauge is flatter gradient but still predominantly boulder and cobble substrate. The reach covered between the Ash Camp and a spur road at the parking for the Nature Conservancy preserve is 3.8 miles (1.4 miles in the lower gradient section from the flow gauge to the spur road). Estimate space for roughly 100 Chinook redds interspersed in small patches in this reach. Little lwd is present in the active channel. Large timber along banks; fairly pristine looking riparian area. The moderate gradient contained channel appears to transport lwd down to the lake from what we can ascertain so far. The are small backwater eddy areas that could be used by rearing juveniles but the rearing habitat is limited. Floodplain habitat is pretty much absent. There appear to be adequate areas for holding adult Chinook and steelhead. A walking trail lies on the slope above the river on the north bank probably the entire reach through here; used predominantly by anglers.

The reach between the walking bridge and McCloud Dam is one mile long. We made only cursory observations of this reach from the road above. It appears similar to the habitat we covered….mostly cobble/boulder substrate and a well-contained channel. The water in this reach is somewhat turbid and glacial silt colored (but still clear enough to snorkel), apparently from glacial sediment laden runoff from a tributary upstream of McCloud Dam. The turbidity seemed to subside by the time the water reaches the lower five miles of river above Shasta Lake.

10-7-2010

Upper Sac flow = 255 cfs at the Delta gauge (at confluence of river and reservoir) – flow too low for kayaks

Upper Sacramento River near Mt. Shasta city.

Walked 1.7 miles of the river from a public access (state land) south of Mount Shasta city running through the Cantara Loop of the railroad track. The gradient is fairly low in this reach with patches of what appears to be spawning sized gravel spanning the channel. The majority of the channel is cobble substrate with boulders and bedrock in areas. There are small areas of floodplain. We still need to determine dam operations. Habitat appears suitable for Chinook and steelhead spawning with some small areas of rearing habitat and sufficient holding pools present.

Mossbrae Falls area

Walked a 1.7 mile reach at Mossbrae Falls on the north side of Dunsmuir (about two miles downstream of the previously described reach). Spawning gravels and holding pools are present. Rearing habitat is present but limited. Mossbrae Falls are spring fed and may be a year round source of cold water. Temperature loggers should be installed upstream and downstream of the area if temperature data is not found for this reach. There is an approximately half mile reach of the river here with springs entering from along the east bank. The railroad parallels the river and contains sections of unstable sideslopes that likely deposit fill material into the river.

Central Dunsmuir area

A popular put and take trout fishery exists here according to anglers at the site under the I-5 bridge. One holding pool in a reach of predominantly shallow cobble/boulder run (the river is too shallow to kayak at this flow) appears to hold a high abundance of rainbow trout based on observed angler success under the I-5 bridge.

South Dunsmuir and Soda Creek Area

The river runs wide and shallow through much of the reach with spawning gravel more abundant downstream of Soda Creek. Much of the reach is composed of cobble substrate. Soda Creek is a small flat floodplain channel type stream entering from the east. Juvenile fish habitat is good but Soda Creek is likely a bit small for adult Chinook. It's more of a nice coho type stream. Temperature loggers should be placed in Soda Creek. Private land limits access upstream of the mouth.

10-8-2010

Sacramento River confluence with Shasta Lake

Boated in from the Antlers boat ramp to the current lake water line and walked upstream 1.25 mile to the bend upstream of the railroad bridge. The wetted channel width was about 40 meters and the high water line channel width about 95 meters at the old railroad bridge piers. The old railroad piers could offer an opportunity for anchoring a juvenile collector in the channel but debris management would probably be problematic in the flowing stream channel reach. An abandoned boat ramp 0.8 miles upstream from Antlers boat rental marina could offer an opportunity for an in-lake juvenile collector close to the tributary mouth. Recreational use in the area appears to be fairly high so access through the site could be an issue. The high water channel width is about 170 meters and the wetted width currently is about 90 meters. The lake channel width is fairly consistent out to the confluence with the next arm from the east. A narrow section 200 meters wide at Sugarloaf is just upstream from the confluence with the next tributary from the east (six miles downstream of the current lake/river confluence and 6.8 miles downstream of the railroad bridge. The inundated area widens substantially downstream (south) of there. Stream water temperatures at the confluence with Shasta Lake reach greater than 70F during summer (Figure 7).

McCloud River confluence with Shasta Lake

Boated up the McCloud Arm from the Bailey Cove boat ramp. The current lake level is 13 miles up the arm from the Bailey Cove ramp and 0.4 miles downstream of the Gilman Road bridge. The wetted channel width at the mouth is 36 meters and high water channel width at the mouth is 80 meters. Channel width is 61m at a narrow spot downstream of the bridge and wetted width is 27m. Gradient at the mouth is slightly higher than in the Sacramento river arm making a juvenile collector in the river likely even more challenging. Similar to the Sacramento River juvenile collector would have debris issues in the flowing channel. This arm also receives fairly high recreational boating use. An area with a 115 m wide channel is at 2 miles downstream of the Gilman Road bridge. This could be a potential head of lake collector site. The McCloud arm is about 14 miles long upstream of the confluence with the Pit River. It appears that much of the historic spawning habitat in the McCloud Arm is now under the lake (Figure 8). Shasta Reservoir inflows during winter and spring (peak emigration time periods for spring-run and winter-run can be large (Figure 9). Capturing juveniles, many of which would likely be fry-sized fish, during high flow periods will be a challenge. The value of the lake habitat for juvenile rearing and the potential for in-lake survival and collection of juveniles away from stream mouths should be considered.

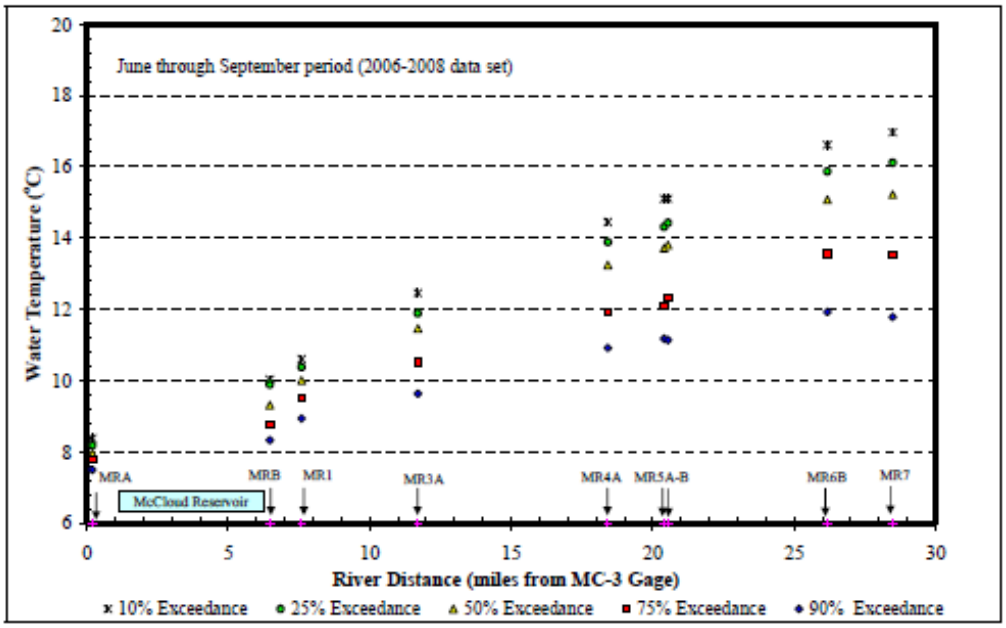


Figure 4. Water temperature frequency distribution at McCloud River stations, June-September 2006-2008. It appears that approximately 10 miles of the mainstem below McCloud Dam may provide water temperatures suitable for winter Chinook egg incubation. Chart from PG&E.

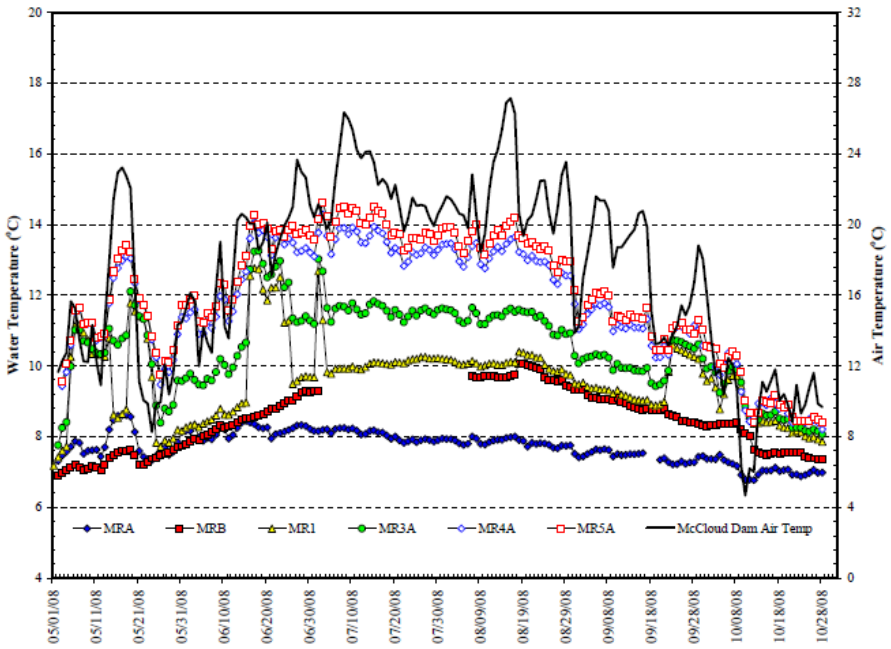


Figure 5. McCloud River water temperatures during 2008. Chart from PG&E.

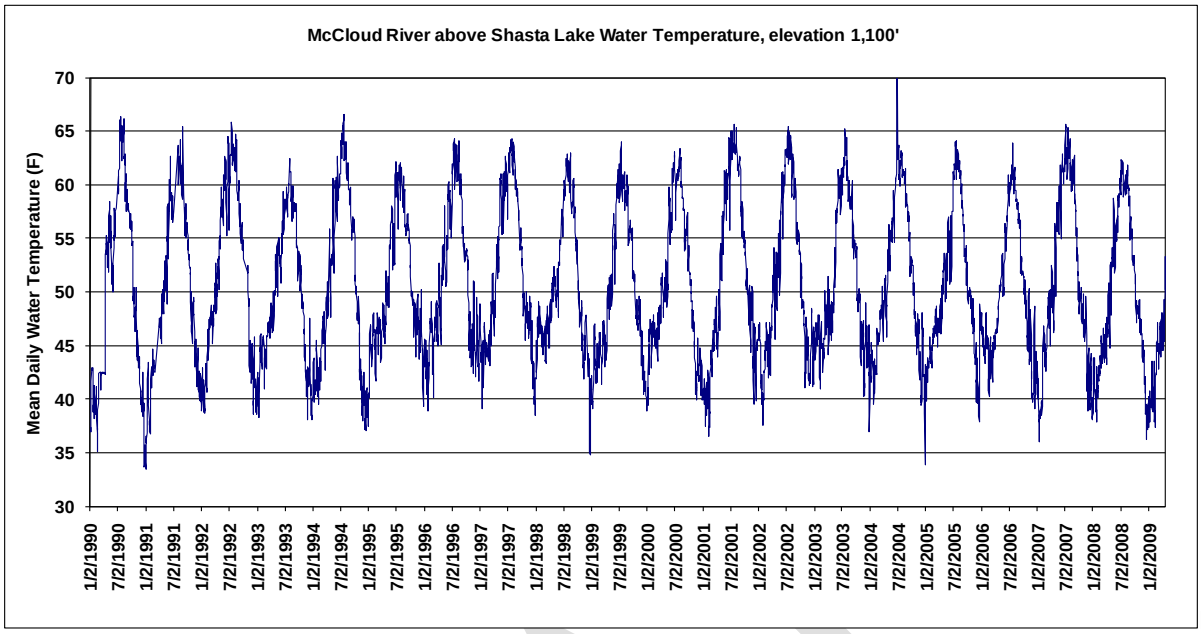


Figure 6. McCloud River above Shasta Lake at elevation 1,100’ water temperature, 1990-2009.

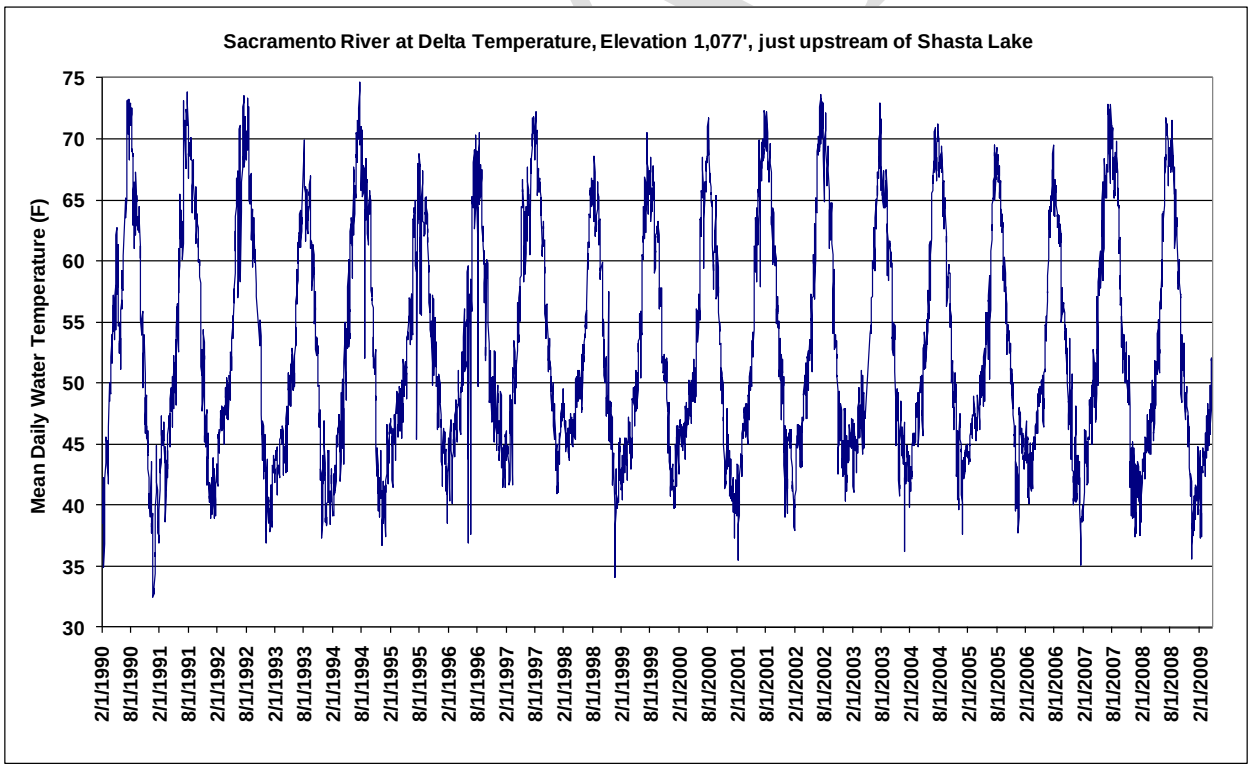


Figure 7. Sacramento River above Shasta Lake at elevation 1,077’ water temperature, 1990-2009.

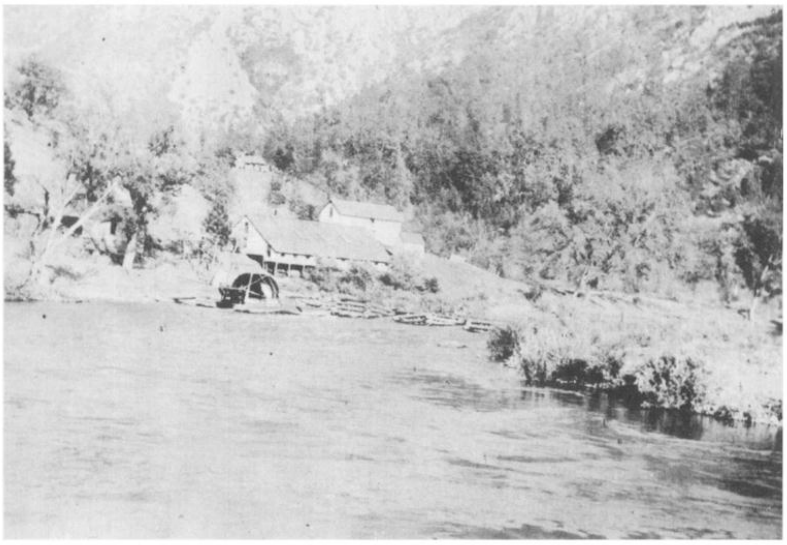
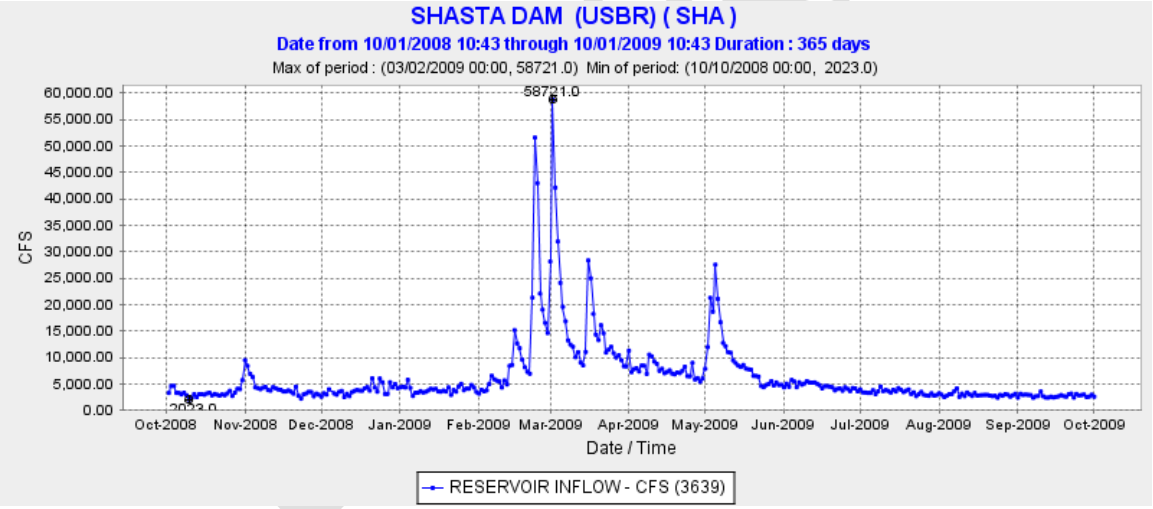
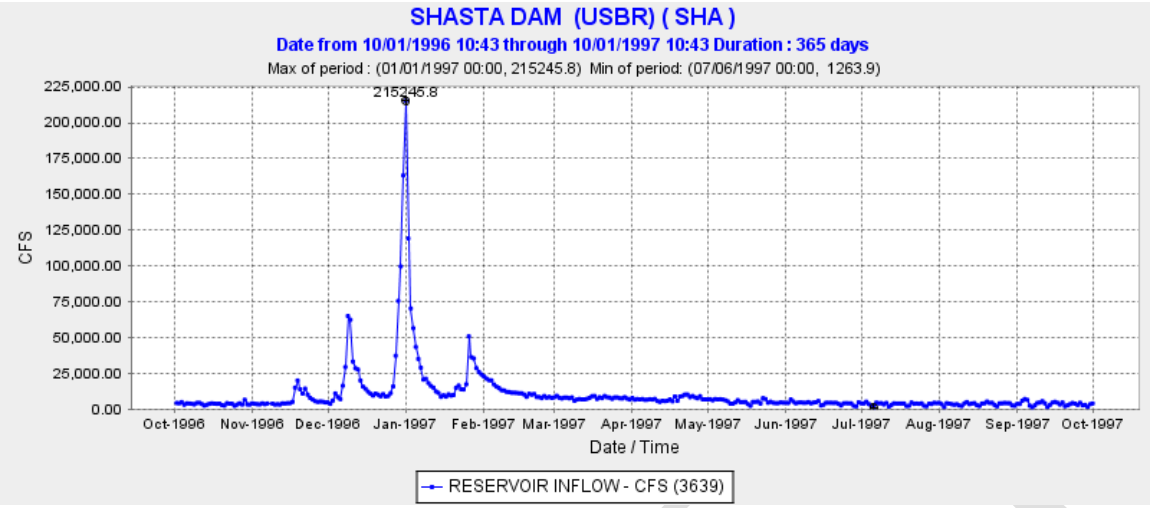


FIGURE 2. Baird Hatchery as reconstructed after the flood of 1881. Current wheel in foreground.

Figure 8. Baird Hatchery on the McCloud River, near confluence with the Pit River, now under Shasta Lake, 12 miles down-lake from Gilman Road Bridge on McCloud River. This area is reported to historically have had a high concentration of adult Chinook salmon.





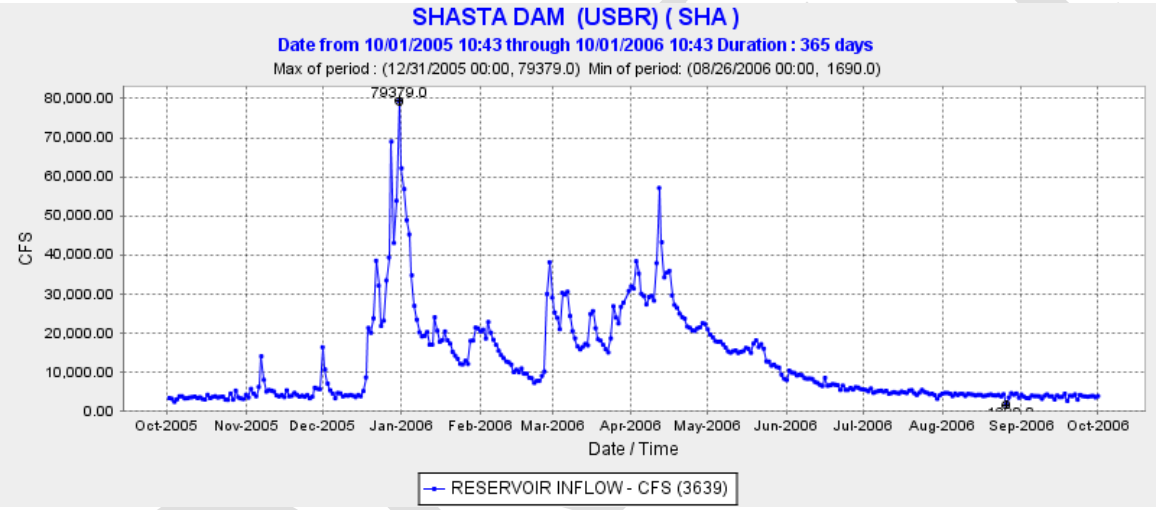


Figure 9. Recent maximum mean daily inflows into Shasta Reservoir.