Lake Chelan Tributary field trip
April 2, 2009

Present:

Art Viola, WDFW
Tony Eldred, WDFW
Gina McCoy, WDFW
Phil Archibald, USDA-FS
Joe Kastenholz, USDA-FS
Wayne Macchus, USDA-FS
Keith Truscott, Chelan PUD
Jeff Osborn, Chelan PUD
Von Pope, Chelan PUD
Chris Fairbanks, Fairbanks Env. Ser.
Craig Cooper, GeoEngineers
Pat Powers, Waterfall Engineering

A site visit to four tributaries to Lake Chelan was made by members of the Lake Chelan Fisheries Forum with Chris Fairbanks, fisheries biologist, Craig Cooper, fluvial geomorphologist, and Pat Powers, fisheries engineer. The objectives of the site visit were to make a qualitative determination if a barrier to upstream fish passage was present at each of the four creeks and to explore alternatives for enhancing or creating upstream fish passage. This site visit was made on April 2, 2009 when the lake surface elevation would be near the annual low operating level and when the streams would have a low discharge. The lake surface elevation was approximately 1,086 feet relative to mean sea level. The four tributaries included:

Mitchell Creek
Gold Creek
Grade Creek
Safety Harbor Creek

Field notes:

<u>Mitchell Creek</u>

Mitchell Creek discharge was approximately 1.8 cubic feet per second (cfs) based on the staff gage that was installed and monitored during the year 2000 field season. The staff gage was intact and in good condition and the stream channel appeared to be very similar to the 2000 season and therefore the discharge estimate should be accurate.

The mouth of the creek at full pool elevation (approximately 1,100 feet) is confined and has adequate depth, velocity and grade for upstream passage. Below this elevation, the creek channel become wider across the alluvial fan, water depth decreases and becomes too shallow for fish passage (Photos 1 and 2). The field team consensus was that upstream fish passage was impeded primarily by shallow water depth.

A solution to improve upstream passage was to confine the stream flow to a narrower channel that would provide depth with some step-pools to allow resting stations. Large angular rocks would be the most appropriate materials that would least likely to be moved by high stream flows or by campground guests. Large woody material would not be an appropriate material; the wood may be used for firewood.

Gold Creek

The Gold Creek channel has been very stable since the 2000 field season. The creek has remained confined to a channel that extends from the full pool level through the alluvial fan to the lake surface. Large rocks along the right bank (looking downstream) keeps the stream channel confined (Photo 3). The overall grade of the stream channel in the alluvial fan was 10% with a short cascade of 16.7% (Photo 4). The staff gage from the 2000 field season has been removed and the stream discharge was not estimated.

The group consensus was that fish passage was impeded by grade and water velocity that could be improved with rock weirs. Rock weirs would create step pools which would reduce the overall grade and water velocity. The step pools would also provide resting stations for upstream migrating fish. Addition parameters that were discussed were:

At what lake elevation should we ensure fish passage? Consensus: 1,086 feet
What size of fish should we design passage? Consensus: 8-10 inch cutthroat and rainbow trout

Grade Creek

Grade Creek is a challenging site. The overall grade of the stream channel in the alluvial fan was 19% with few step pools for resting stations for upstream migrating fish. The stream gage was intact and the channel appears to be fairly similar to the 2000 field season; stream discharge was approximately 7.1 cfs.

The team consensus was that fish passage was impeded by the steep slope and by high water velocity with few resting stations for upstream migrating fish (Photos 5 and 6). Several ideas to lengthen the stream channel were discussed, however; physical constraints of the site's geology and stream energy make alterations of the stream channel unfeasible. Placement of pre-fabricated concrete fishways was accepted as a method to provide upstream passage. Fishways would be placed in the two steepest section of the alluvial fan. These areas would be excavated with a barge-mounted back hoe and fishways placed in the trench and then backfilled with native material. The fishways would need monitoring and servicing to ensure that rock and woody material is not blocking fish passage.

Safety Harbor Creek

The stream channel of Safety Harbor Creek has been greatly down cut compared to the 1999 and 2000 field seasons. The grade, water velocity, and water depth appear to be appropriate for upstream fish passage (Photo 7). Fish passage may however have been impeded by woody material that has accumulated near the full pool level and group members removed key pieces to allow natural processes to keep a section of the channel clear of debris and with adequate water depth and velocity for fish passage (photo 8).

Photo 1.. Mitchell Creek April 2, 2009

Photo 2. Mitchell Creek April 2, 2009

Photo 3. Gold Creek April 2, 2009

Photo 4. Gold Creek April 2, 2009

Photo 5. Grade Creek April 2, 2009

Photo 6. Grade Creek April 2, 2009

Photo 7. Safety Harbor Creek April 2, 2009

Photo 8. Safety Harbor Creek April 2, 2009