

September 6, 2013

Dear Joy, Nate, & Larry,

The following is my summary of the topics we covered. I focus on the two primary issues needing resolution to inform the Yakutat Salmon Enhancement Plan and to advance the selection of stock and water source for the ADF&G hatchery application: Hatchery water sources and chum/pink stocks for hatchery brood source. I likely have some place and person names spelled incorrectly. I am sorry for any errors.

Joy, Nate, and Larry,

Trip Report for Yakutat Regional Aquaculture Association

Recommendations

- 1. Hire engineering firm/individual to conduct hydrology evaluation of water sources at YKI cold storage, Log Transfer/Broken Oar Cove site, and possibly Puget Cove**
- 2. Develop program using pink and chum stock for diversity and multiyear variability**
- 3. Develop parallel broodstock options for existing summer run chum (Macaulay & Hidden Falls), and local chum at East Alsek/Doame Rivers**
- 4. Pursue use of Humpy Creek for pink broodstock (a); if resistance insurmountable look for second tier pink stock (b), or move release location (c)**

YRAA contacts during September 4&5 visit: Joy Klushkan, Nate Endicott, John Pavlik, Herb Holcomb, and Larry Bemis (sp?)

City contacts during visit: Bill Lucey

Other contacts: Greg (Yakutat Seafood), Gordy Woods

Assumption for scope of program: 40 million eggs (either pink and/or chum). Water needs = 800 gallons/min or 1.7 cubic feet/sec from August 1st to March 15th (~7 ½ months). Hatchery could be cleaned and water turned off March to July. The greater the water source the greater numbers of eggs. Each 200 gallons/min can incubate 10 million eggs.

Hatchery Water Sources

**All water sources need to have standard water chemistry conducted. See ADF&G hatchery permit for standard parameters.

YKI Cold Storage (Kwan owned and leased by Greg)



Might be best location for hatchery due to proximity to infrastructure, including a water source. Two options need to be evaluated: 1) existing water tower pumped water for volume and feasibility of bypassing chlorine, and 2) small lakes upslope from cold storage which appear to be +40' to 50' elevation above. A pump test should be conducted for this site to understand lake/pond draw down. The cold storage has a large water holding tank that could be used to buffer water deficits. **water volume will be at its lowest in January/February and therefore is the critical time to conduct pump tests. We have a contract with a hydrologist doing similar work in Haines this winter. He has installed vertical pipes with Temp., water level, and pump connection for flow tests. Contact info: Todd Buxton (360) 296-0735, riverwildflow@gmail.com

Log Transfer Facility (Broken Oar Cove)



This site appears to have potential for a hatchery water source along the hillside in vicinity of log transfer and former log storage. I have walked this area and water seeps along most of the cove, several

small streams are visible in Broken Oar Cove and along shoreline to Log Transfer. I spoke to Don Beard today about this location and possible options for learning more about it. We have both been involved or know of similar sites (Cedar River, Seattle; Gulkana, Ak; and Port Camden, Kuiu Is.). In all these cases, what was done I would call seat of your pants hydro engineering. We/they started by putting in perforated pipes of various length to capture the water, with slope to a collection area/vault. This allows development of assessing water volume per unit of time and various of volume by dates.

**In my estimation this should be done as soon as possible.

Lake Redfield



Apparently, Lake Redfield was investigated by the City of Yakutat for hydropower potential. Bill Lucey should be contacted for information and report, if one exists. The anadromous stream catalog (<http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?adfg=maps.interactive>) lists Redfield as a sockeye system draining into the Situk. Sockeye carry IHN, a potentially deadly virus to chum but not pink salmon. A water source with sockeye is generally not used in hatcheries and would need to have UV or ozone disinfection if it was used, a cost prohibitive option in Yakutat with \$0.60/kwh utility costs. The hydro potential is attractive and further investigation via the report (I hope exists) is warranted. It was mentioned that perhaps Redfield Lake no longer connects to the Situk; this should be confirmed one way or the other.

Redfield Cove could have potential similar to the Log Transfer site for a collection gallery and delivery system. Seeps and small streams emanate all around the cove.

Broodstock Sources

Chum Stocks

- Summer run – late June to mid July fishery harvest dates; July 20 to August 15 spawn dates
DIPAC – Eric Prestegard 907-463-5114. Not sure how much space they have available. What this option and the Hidden Falls summer run chum option require is: 1) taking 10,000 fish out of the fishery

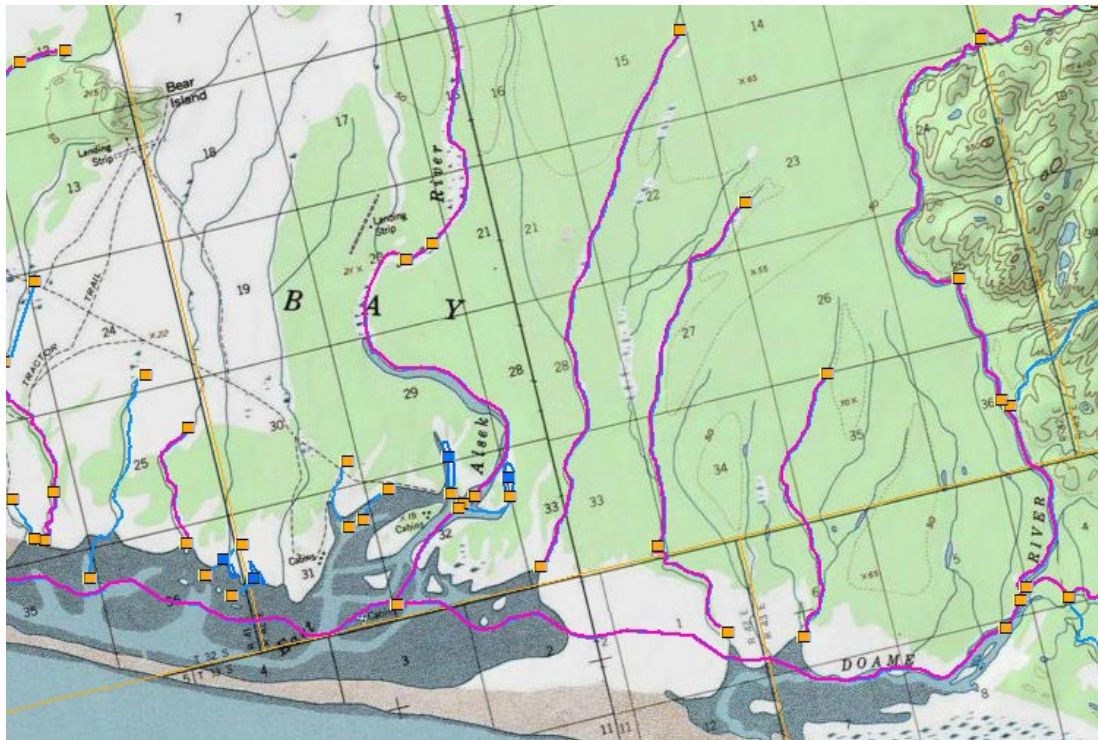
for every 10 million eggs (value of 10k adults = $8 \times 10^4 = 80,000$ lbs \times $\$0.65/\text{lb}$ or $\$52,000.00$, 2) incubators they/we don't have now = 50 incubators for every 10 million eggs = $\$1,200.00/\text{incubator} = \$60,000$ 3) assumption that hatchery has water and space in hatchery to place incubators. An option within this option is when done after a 4 year cycle the incubators go to YRAA.

Hidden Falls – see above. We do have space but same issues above apply.

- Fall Run – August to early September fishery harvest dates; September spawn dates

Medvejie – Medvejie does not have the water or the space within its buildings. We are already 'busting at the seams' to do what we do. Water management is difficult as it is.

East Alsek & Doame

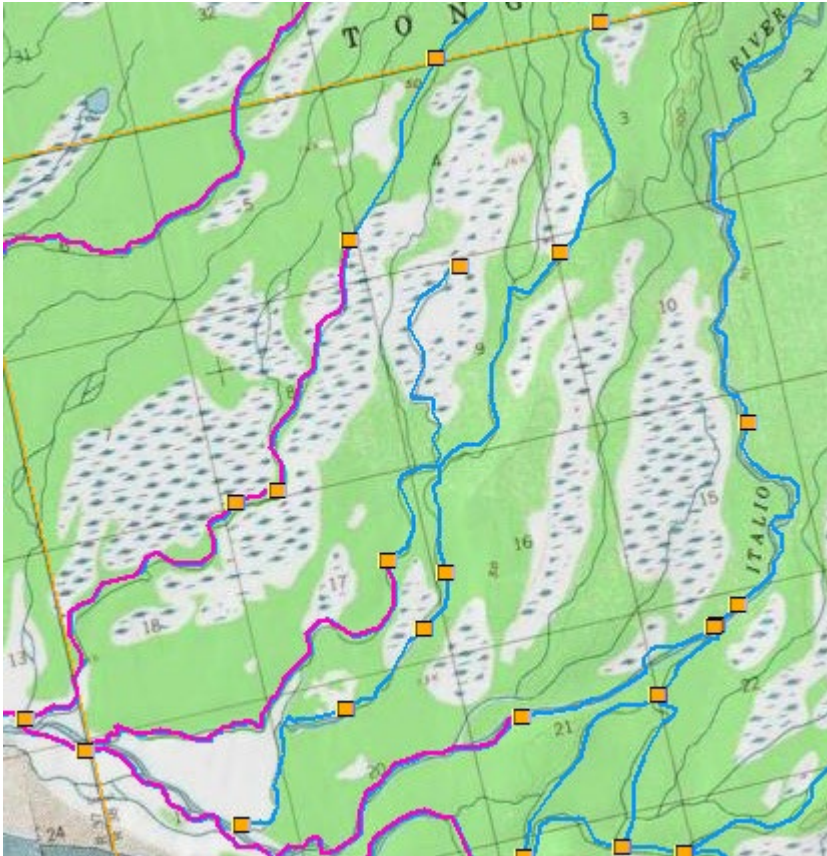


The East Alsek and Doame River require remote egtakes for 4 years in a row. You would like need to put a crew with communications on site with a solid plan on how to capture and hold fish in the river for egtake days. The nuts and bolts of this have been done many times and I will not get into those details now. However, in order to do that you will need to have someone with local knowledge either known currently or developed by someone on the ground who knows where, when, and how to capture the chum. Options we discussed are weir, electroshocker with dipnets, beach seine or other capture device. Live fish need to be evaluated for ripeness and groups of 50 or 100 ripe fish spawned at each event to make the plane trip cost effective.

Fecundity of large chum (if they truly are 12 lb average) would likely be 3,000 eggs \times 50 females would be 150,000 eggs. Average survival to fry would be 90% or 135,000 fry resulting in 2,700 adults over year 3, 4, & 5. If you get 1,000 females through the fishery you would then get 3 million eggs from those original 50 females.

The map above shows numerous streams/tributaries near the East and Doame that might be contributors. If you get the hatchery permit, you will have no trouble getting a permit for this broodstock. The Park service will likely balk but they don't have jurisdiction over the salmon stocks. You likely know more than I about working with the Park service.

Italo River



I do not know anything about the Italo River but Larry and Joy mentioned it so I include here. The resource atlas as you can see shows chum salmon presence. It is closer and if you can find additional local knowledge about abundance it is worth looking at. Considering the spawn timing is some time in August, stream temperatures must be fairly warm in August and September for the fry to emerge in April, as winter temperatures must be very cold on the forelands from December to March.

Pink Stocks

- Late summer run – August fishery harvest dates; late August/September spawn dates
Interestingly there are not a lot of pink salmon stocks identified in Yakutat Bay – Redfield and Humpy Creek and one on the outside of Broken Oar Cove. However, when I was on the ground in 2007 or so it seemed there were pink salmon spawning in all the intertidal waters in Puget, Broken Oar, and Sawmill Cove.

Humpy Creek -

Many other pink streams and systems with pink salmon are possible donor streams. However, given the number of spawners in Humpy Creek and proximity to proposed hatchery I believe this is the best choice. The issue with Humpy Creek for ADF&G is going to be straying of hatchery pinks into Humpy Creek. There may need to be a determination of significant stock. Some should ask Gordy to download escapement numbers for Humpy Creek. I assume he has such data, but may not.

Rearing and Release sites

Hatchery Broodstock



At least 10 million fry need to be released at the hatchery site for broodstock development. This is long term, year after year. You may want to even go to 15 million. When the fish return, you can do adult broodstock management as first priority, followed by cost recovery if there is surplus. Regardless of hatchery location this will apply. One strategy for getting HF or Macaulay eggs would be to request 10 million for 4 consecutive years, rearing and releasing all 10 million at the hatchery site. In year 5 you would have 3 age classes returning and should be able to go to full 40 m production.

Puget Cove – good site for rearing, good exposure, protection, good anchorage, good depth, good fresh water influence, need to have temperature profile for this cove or one or two of the others.

Broken Oar Cove – good site for rearing, good exposure, protection, good anchorage, good depth, good fresh water influence, need to have temperature profile for this cove or one or two of the others.

Redfield Cove – good site for rearing, good exposure, protection, good anchorage, good depth, good fresh water influence, need to have temperature profile for this cove or one or two of the others.

Chicago Harbor – I didn't see this area on the ground. I can see from the topo map that this site is significantly different from the above three in that the upperlands are steep gradient. It also looks like it

could get some weather when/if it blows straight up Yakutat Bay. It isn't as protected as the first three sites.