

Yukon River Canadian Sub-basin: 2011 Environmental Conditions

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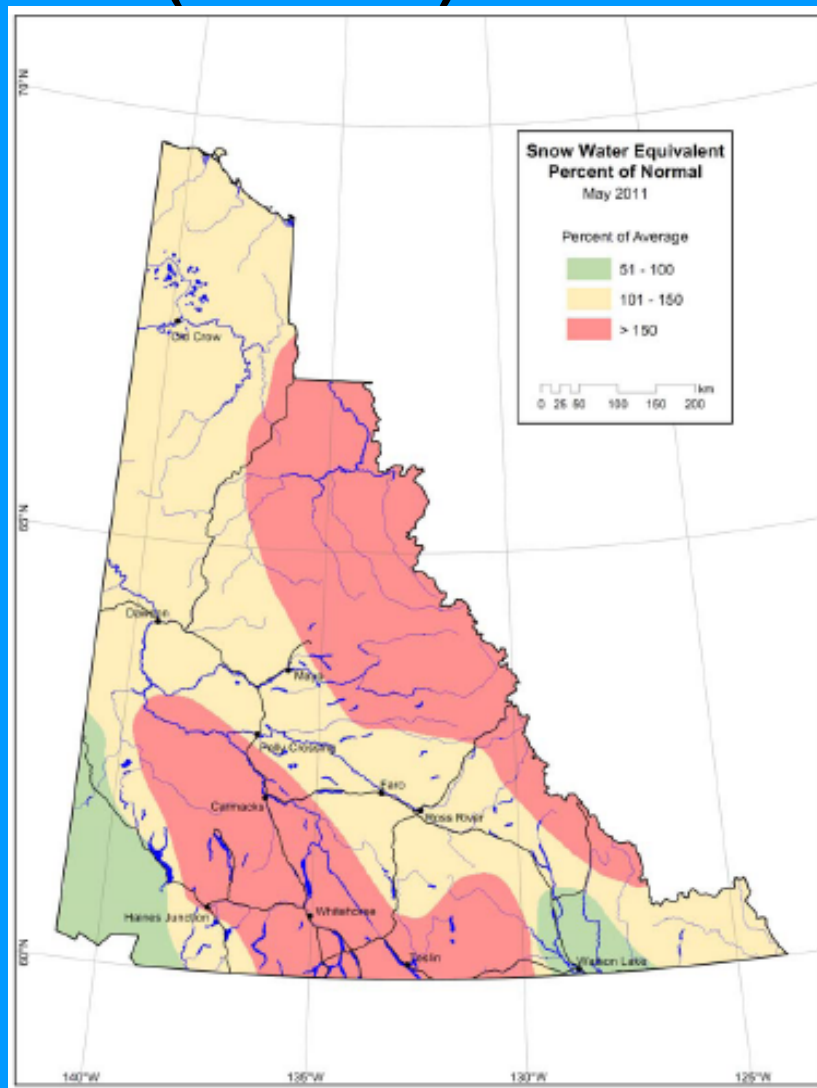
Introduction

Annual Fish Habitat Description using:

- Description of 2011 weather conditions and resulting streamflows
- Observations of significant events noted
- Communication with public and colleagues

October - May accumulated Snowpacks (SWE)

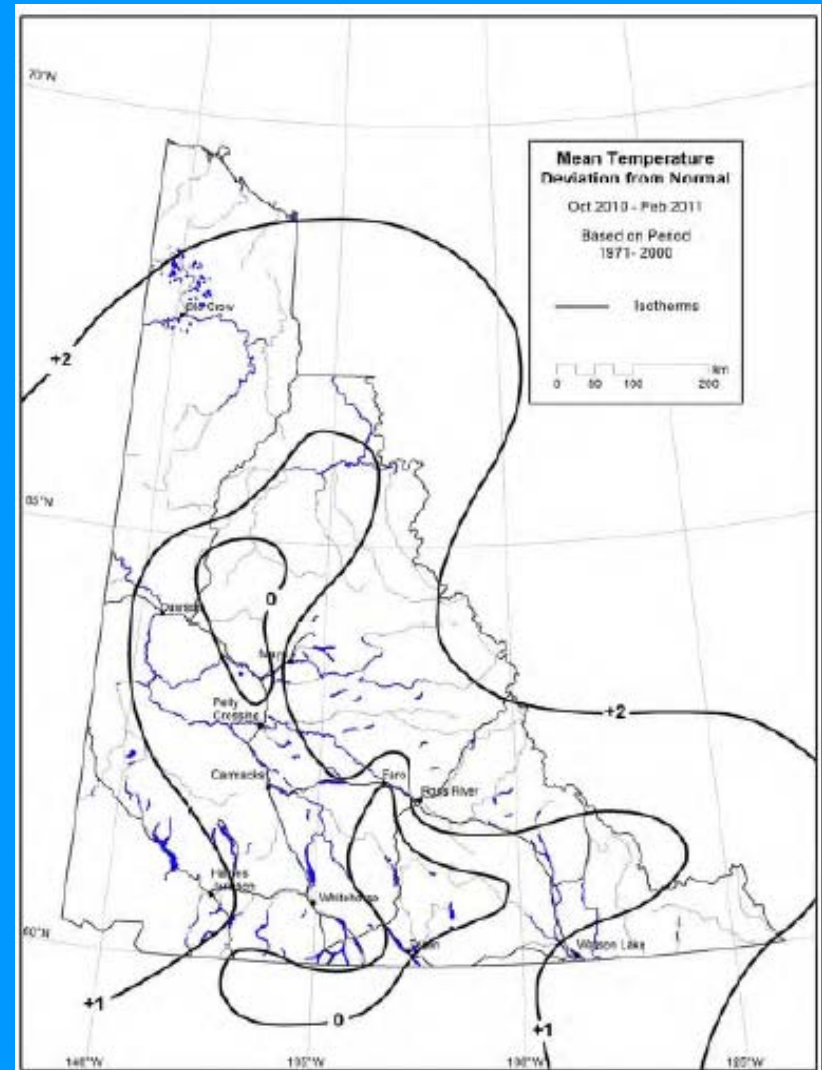
- Above normal (1971-2000) in majority of Yukon River
 - March SWE measurements were normal to above normal except in area from Swift River to Mayo (71-90%)



Credit: Yukon Environment, Yukon Gov

October – February Temperatures

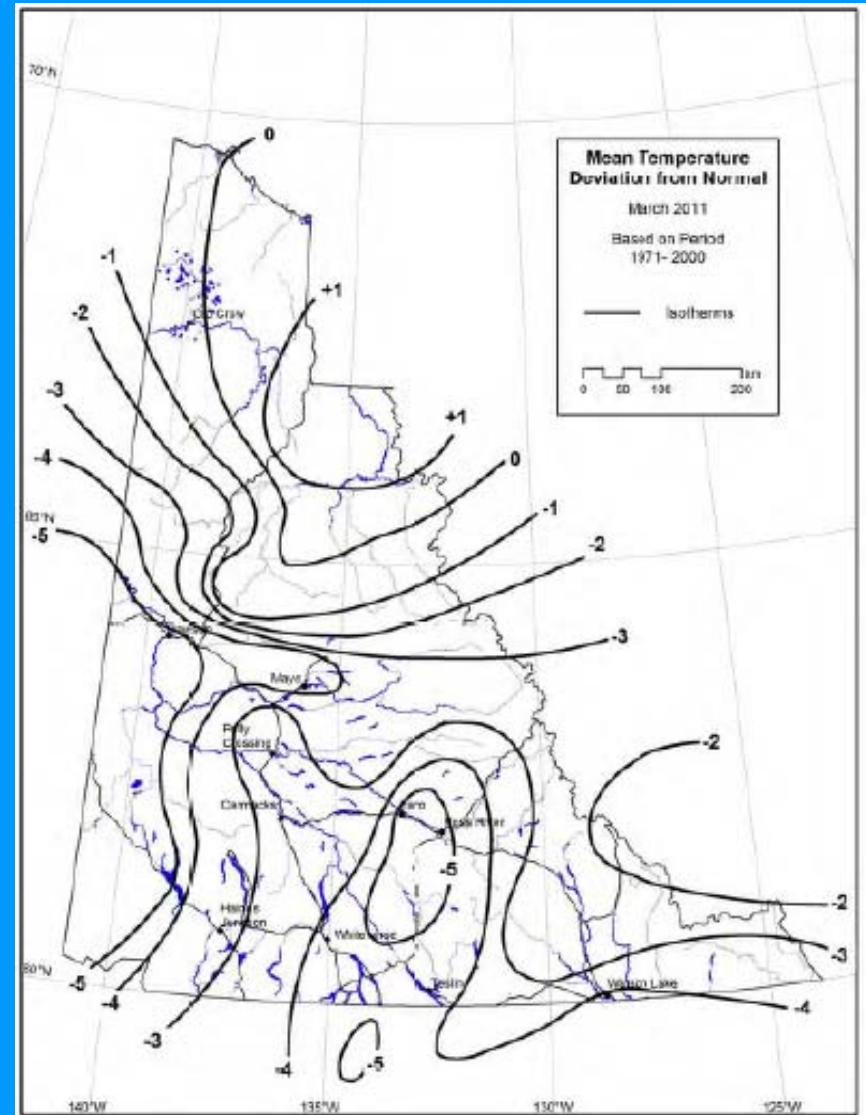
- A traditional Winter for much of the Territory
- November period was unusually warm while latter months exhibited normal cold temperatures (1971-2000 YTGov and 1948-present Env Canada)



Credit: Yukon Environment, Yukon Gov

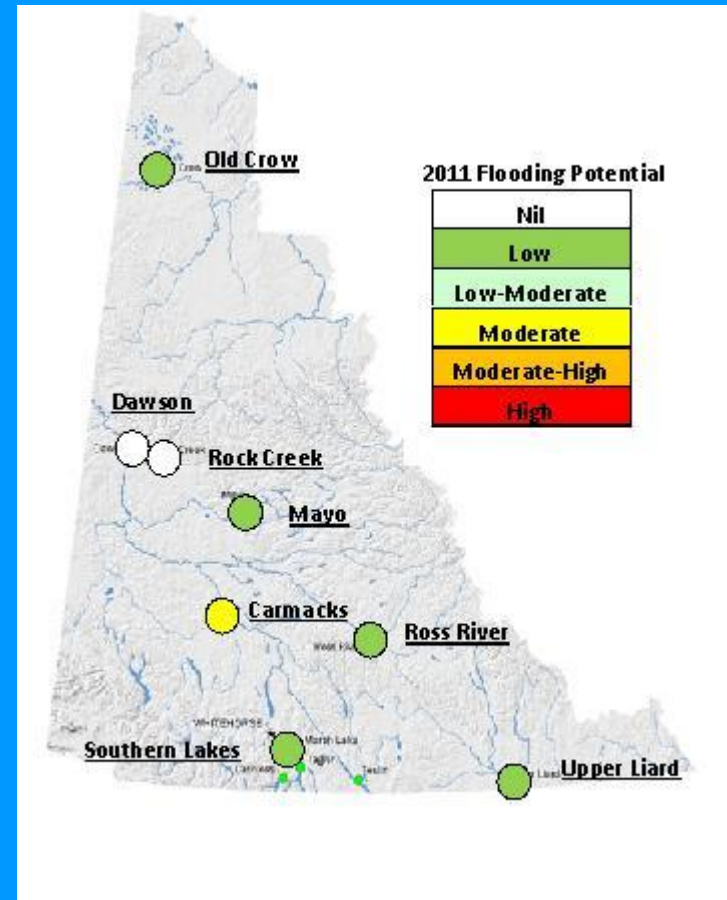
March Temperatures

- Overall a long cold consistent winter, exception was a warm early portion of January
- Cold/Cool weather persisted into spring until June



Spring Freshet Condition

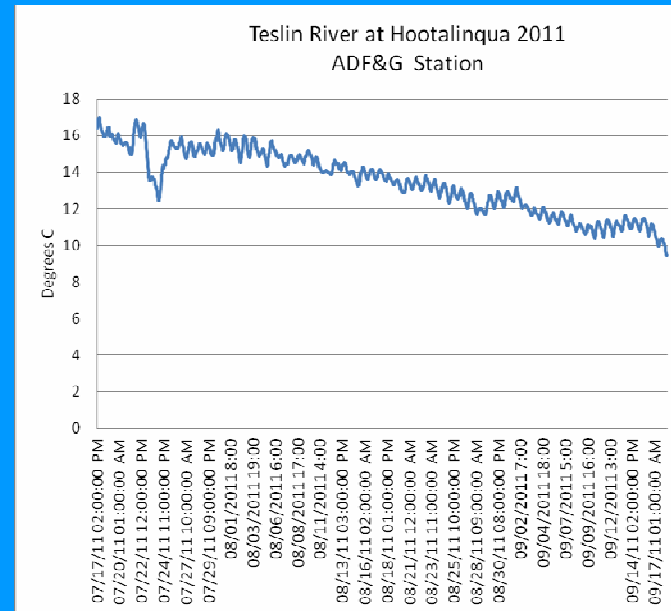
- Majority of snowpack was maintained until late May and June by normal cold temperatures
- Warm weather in June brought about a strong and prolonged freshet
- A thorough dispersal of juvenile Chinook is expected to have occurred



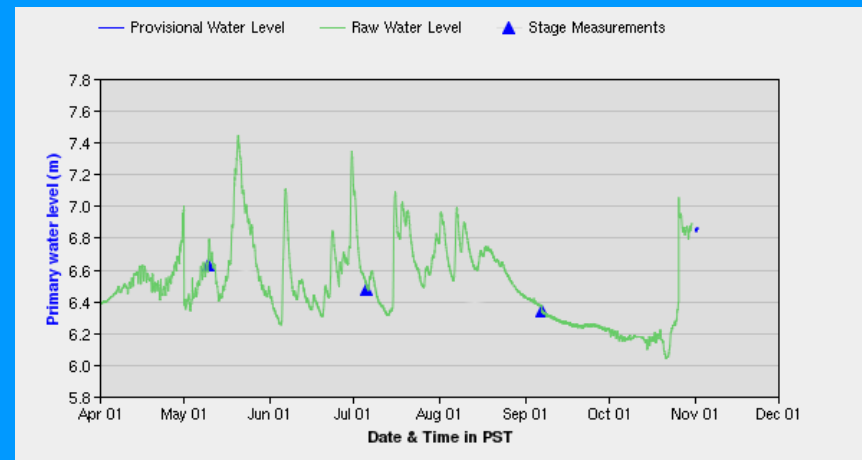
Credit: Yukon Environment, Yukon Gov

Rearing Season Conditions

- Rearing season June to September
- Warm dry June initially then a wet remainder for the summer as of late June
- Wettest summer on record for region, Precip 38% higher than norm. Consistent rains and elevated streamflows (1948-present data)
- Dispersal of 0+ should have been good although elongated high flows may have delayed upstream migration to rearing habitats, some field sampling indicated this may have occurred or played a role in relation to the poor parent brood abundance



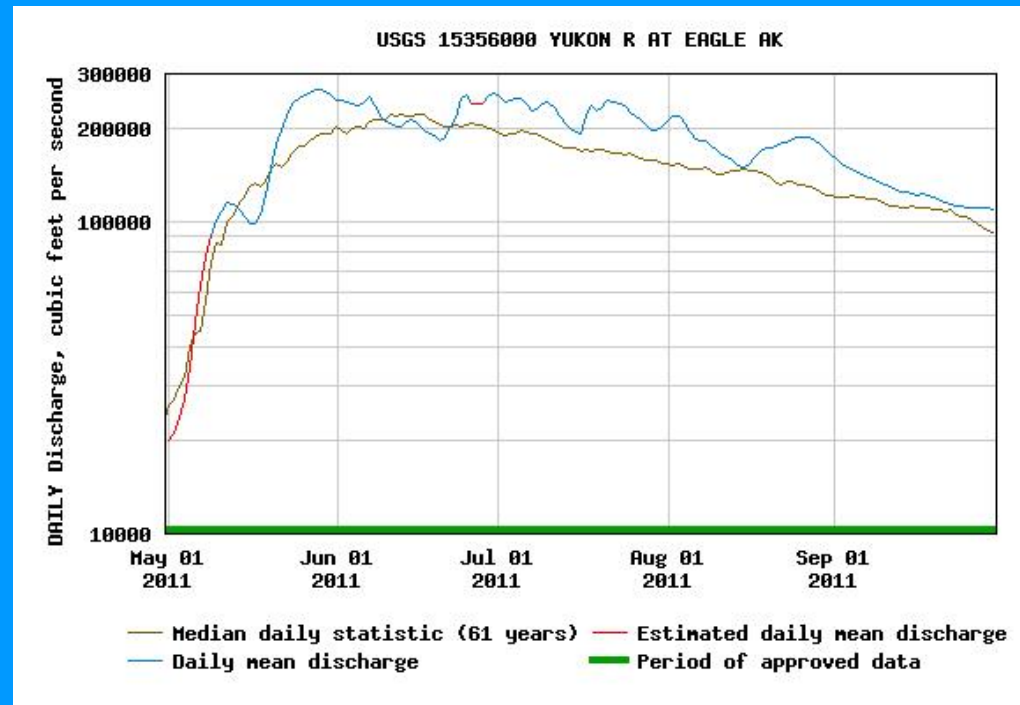
Big Creek near Minto, non glaciated reactive system



Rearing: Basin Streamflow

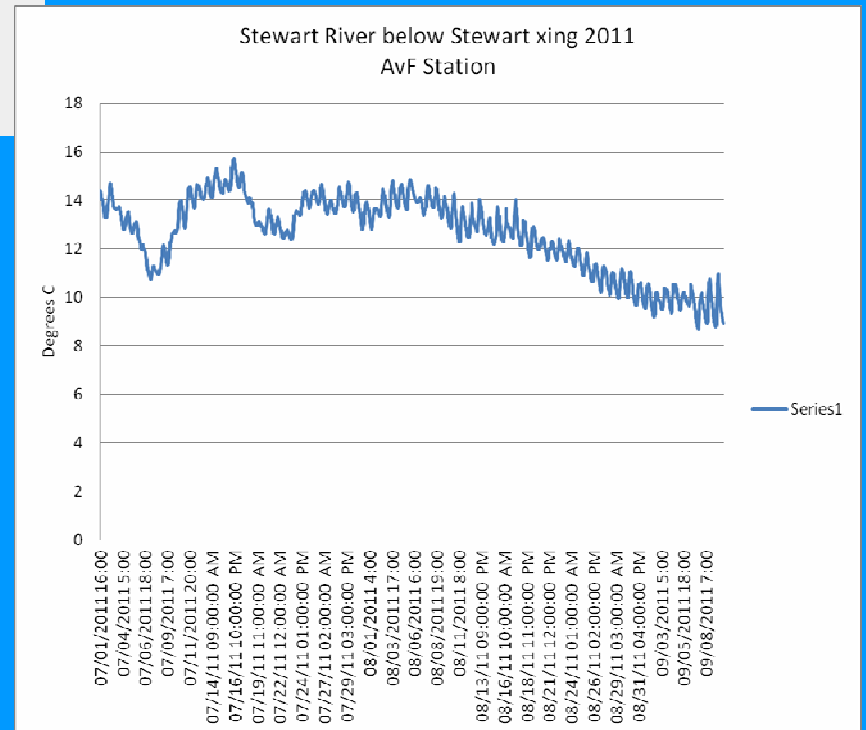
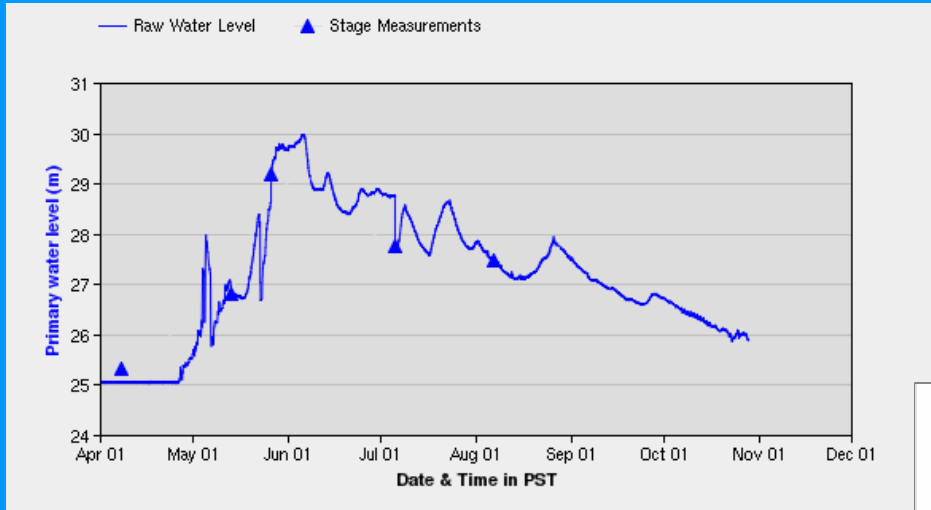
- Basin wide flows peaked by the first week of June and persisted at high flows for majority of summer, maintained further in late summer by consistent rainfall
- Graph at right show the 2011 flows recorded and the mean values for past 61 years

Yukon River at Eagle, Ak



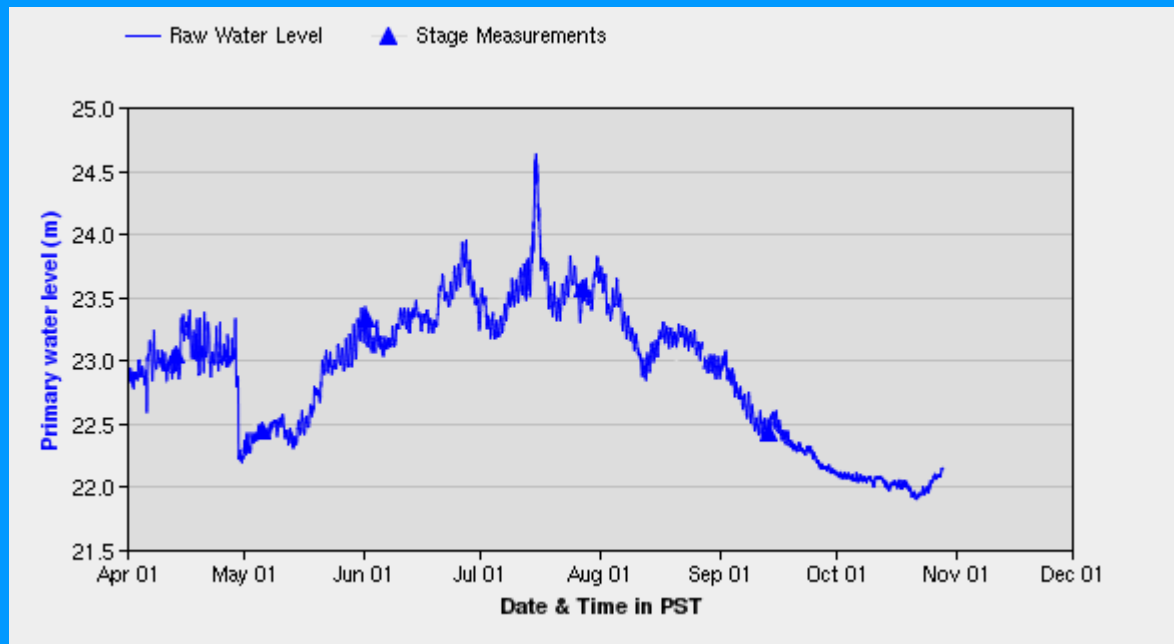
Credit: USGS Water Survey

Stewart River



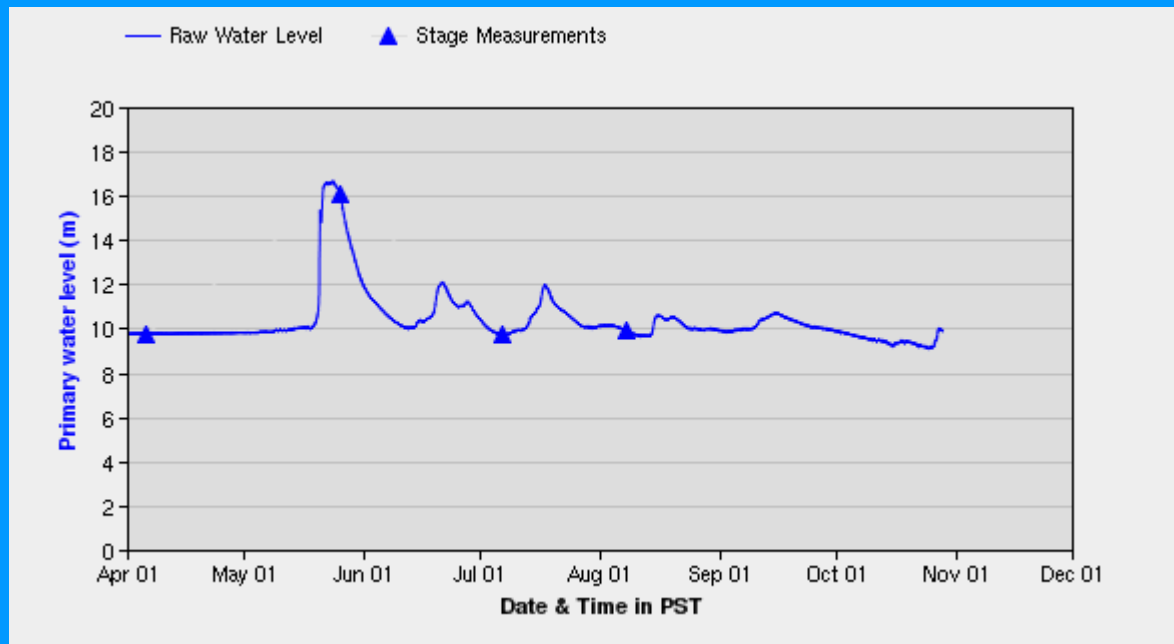
Credit: R&E URE 15-11, Environment Canada

White River



Credit: Environment Canada

Porcupine River



Credit: Environment Canada

Rearing: Season Temperatures

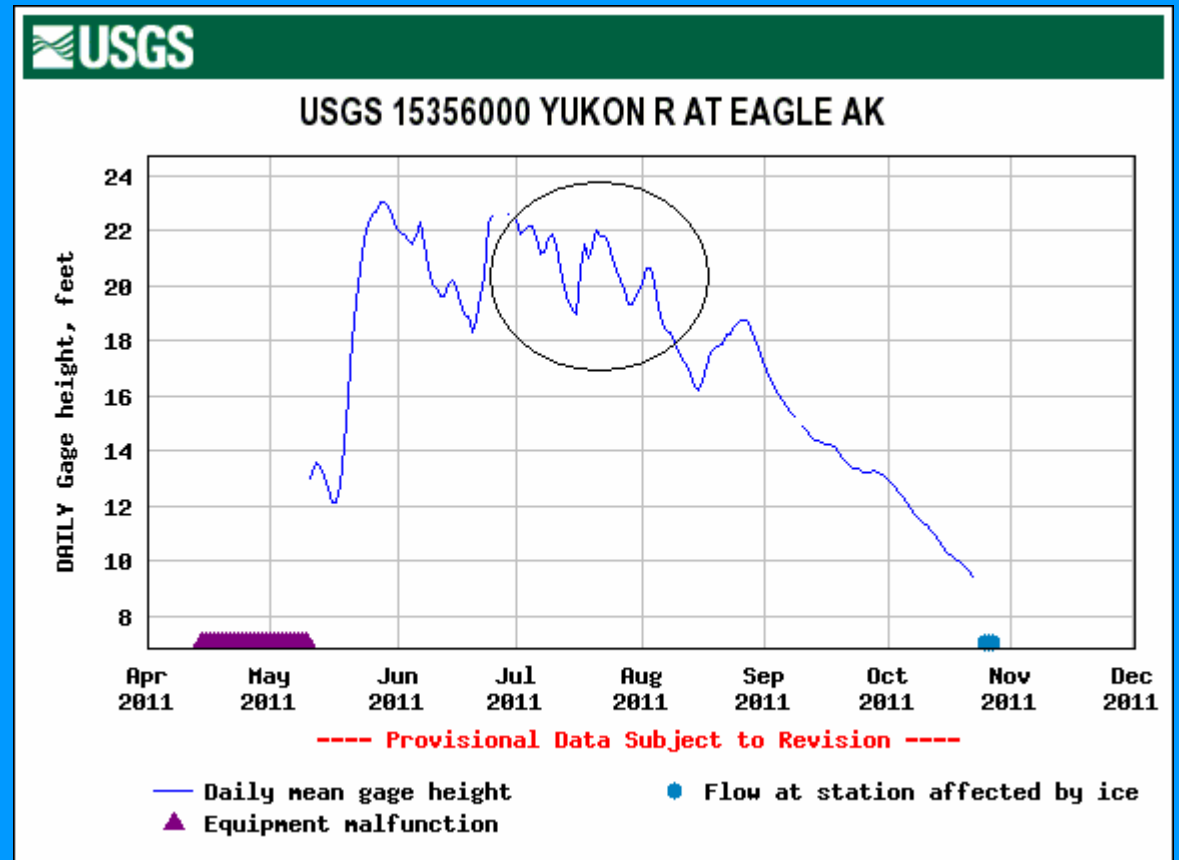
- Summer temperature for the Yukon Territory was slightly higher than normal (0.2C higher than 1948- present dataset)
- 2010 was 8th warmest on record (+0.9C)
- Stream temperatures likely lower than normal throughout the Yukon following elevated flows and particularly in August during consistent rain (21 of 31 days rained) 52 of 91 summer days rained (Whitehorse)

Migration, Spawning and Flows

- Migration was not observed to have been delayed or otherwise impacted due to conditions, White R spike may have delayed/compromised migration for a short period
- Spawning was likely overall not impacted negatively as observed stream conditions were relatively stable at elevated flows, however Nordenskiöld R was very high during spawning (possibly damaging), and sedimentation was noted during aerial assessment (L Salmon, Nisutlin R)
- 2011 Winter flows, incubation conditions, are likely to be beneficial as substantial precipitation inputs and a mild fall should charge aquifers well

Migration Cont'd

- Yukon River levels relatively consistent at border passage location, decreasing as migration completed
- Salmon observed at Whitehorse Rapids Fishway appeared healthy and strong, minimal marks or stress



Credit: USGS Water Survey

Comments/Summary

- Cold consistent 2010/2011 winter. Aside from warming period in November 2010 in the Stewart River area incubation and hatching should have occurred well for 2010 Brood.
- 2011 is *wettest* summer on record. Strong freshets, elevated summer streamflows, and inferred decrease in stream temperatures likely led to limited rearing options until later in the rearing season year when flows of rearing tribs subsided periodically and juveniles had grown to adequate migratory size
- Fish passage to rearing and spawning habitat may be improved for subsequent years by consistent high water observed, beaver dam, log jam failures
- Below average return for 2010 Brood combined with these conditions may be negative, difficult to say as juvenile sampling success was limited, likely due to low numbers and/or combined with stream conditions observed
- Consistent wet conditions into the Fall should charge aquifers well for 2011 Brood incubation. Good snowfall and freeze up conditions