LRP Project – South Coast Chum Case Study

Working Notes

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**General questions for Kendra:**

1. Is MU necessary?

2. Check that Year is actually brood year in the infilling code

3. Check that Escape column is spawners (as opposed to the Return column)

4. FLAG: Should probably limit stock-recruit data to year > 1959/1960 to allow for full brood year returns up to age 6. This may be done automatically, see retroFunctions.r line 20

**Notes on data:**

Why remove summer run? They fill in some gaps in Upper Knight and Bute Inlet CUs

Check in report, if not, follow up with Pieter Van Will.

Why remove Qualicum River, Little Qualicum River, Puntledge River?

Source variable: what is difference between RACK, Enhanced, and Brood?

**Chum Data infilling**

Luke’s notes on infilling:

* Data filtering step
  + remove summer run
  + remove Qualicum River, Little Qualicum River, Puntledge River
  + remove non-wild fish
* Get geometric mean of spawners across all years
* Get sum of geometric means across CUs
* Get proportion

**Observations related to infilling**:

* There are a lot of by-stream infilling.
* Sensitive to high-abundance streams, especially in years with few monitored streams
* Are the stock-recruit relationships (recruits?) based on infilled escapement data?
* IF so, this could partially explain the very large residuals from mean Ricker.
* Could there be a better way of doing it (e.g., percentile, but select the highest observed spawning escapement for each stream, add, to get a kind of max observed aggregate abundance? Then get 25% of that?)
* This infilling assumes that escapement between streams within a CU is correlated. When you actually look at whether observed escapements, for some CUs, they are as likely to be correlated as not.

(from:

Adapting benchmarks of biological status for persistent changes in productivity and

variability in exploitation history with a focus on data-limited populations (Conservation

Units) of chum salmon in southern BC

Carrie Holt, Brooke Davis, Lyse Godbout, Pieter Van Will, and Wilf Luedke

<https://www.psc.org/download/466/information/8412/s15-i13-adapting-benchmarks-of-biological-status-for-persistent-changes-in-productivity-and-variability-in-exploitation-history-with-a-focus-on-data-limited-populations-of-chum-salmon-in-southern-bc.pdf> )

Stream-specific escapement for inner south coast chum were aggregated to the CU level, and

identified as either wild, or enhanced (hatchery-origin fish, or those fish used for hatchery brood

stock). Wild escapement were infilled at the stream level and then again at the CU level when

there were no escapement estimates for a site within a given CU or a CU within the inner south

coast region. Infilling assumed that sites within CUs, and CUs within the region contributed their

geometric average proportion of overall escapement in years when data were missing. Infilling

occurred at the CU level for two out of seven CUs: Upper Knight (1979, 1980, 1982, 1984, 1989,

1991, 1996, 2004-1013) and Bute Inlet (2005, 2006, 2008-2013). CU-specific returns were

estimated for all fish using backwards catch reconstructions with variable vulnerability levels for

each CU to each fishery (Van Will 2014). To estimate wild returns, we applied the same

proportion of wild fish in escapement to catches, i.e., we assumed that enhanced and wild fish

were equally vulnerable to the fishery. Brood year returns were calculated assuming annual

estimates of age-at-maturity from the mixed-stock fishery in Johnstone Strait (Van Will 2014).