Kuskokwim Project Notes

**Scenarios**

* Dropped age-length trend simulations from analysis. Trends modeled now are: 1) no trends, 2) age-sex-length trends, 3) continuing trends.
* Keep three models for stock assessment (Ricker, DLM, yield per recruit)
* Model only unselective fishery

**Ricker parameters**

Update Ricker parameters (alpha, beta, SD) to those estimated for the Kusko presented in *Incorporating demographic information into spawner-recruit analyses alters biological reference points for a western Alaska salmon population* by authors B. Staton, M. Catalano, S. Fleischman, and J. Ohlberger (published in the *Canadian Journal of Fisheries and Aquatic Sciences*).

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| Ohlbereger et al. parameter name | Ohlbereger et al. parameter description | Ohlbereger et al. parameter value | Staton et al. parameter name | Staton et al. parameter description | Staton et al. parameter value (median) |
| alpha\_mean | mean productivity at low abundance | 5 | alpha | Ricker productivity | 6.463 |
| beta\_mean | mean density effect | 5e-5 | beta\_e5 | Ricker capacity | 1.039 X 105 |
| rho | recruitment autocorrelation | 0.4 | phi | lag-1 autoregressive coefficient | 0.593 |
| procerr | recruitment process error | 0.35 | sigma\_R | white noise recruitment process error | 0.380 |
|  |  |  | sigma\_R0 |  | 0.510 |
| sr\_corr | strength of alpha-beta correlation | 0.0 | mean\_R0 |  | 228941.331 |
| sr\_parms\_sd | stochastic variation SR parameters | 0.2 |  |  |  |

Changes made to parameters.R file

procerr=0.35 ---> procerr=0.38

rho=0.4 ---> rho=0.593

alpha\_mean=5 ---> alpha\_mean=6.463

beta\_mean=5e-5 ---> beta\_mean=1.039e-5

sr\_corr=0.0 (no change)

sr\_parms\_sd=0.2 (no change)

\*\*Note: these changes increased the run time by >5X\*\*

**Updated age-sex-length (ASL) parameters**

* meanageini=5.5 (Confirmed as 5.5 based on Staton, et al. 2021, Supplemental Material, EM-ASL scenario, section 6, Fig. 7a. Calculated as the weighted average of ages in 1970s as weighted average across year classes and sexes.)
* agetrend=-0.4\*scen$ageT[j] (This is based on an observed decline in average age of population presented in Staton, et al. 2021, Supplemental Material, EM-ASL scenario, section 6, Fig. 7a. Calculated as difference in weighted average of ages in 1970 and 2015.)
* sdage=0.6 (no change)
* vonB\_Linf=1200 (No change but need to reconsider)
* vonB\_k=0.325 (No change but need to reconsider)
* ocean0s=100 ( Originally 150 in model. Decreased to 100 assuming that Kusko Chinook are smaller than average at all age classes. This is a guess. Need to find smolt data)
* sdSaA=0.01 (no change)
* sizetrends=c(0,0,0,0,10,-40,rep(-100,3))\*scen$sizeT[j] (Based on visually estimated change 1970-2015 shown in Olhberger et al. 2020, Fig 5d. No data for ages 1-3, so set to 0. Age 4 shows no change, age 5 shows increase of ~10 mm, age 6 shows decline of ~40 mm, and age 7 shows decline of ~100 mm, which is assumed the same for ages 8 and 9 (no data)).
* propF=0.41 (Set to 0.41 based on Fig 5e in Ohlberger et al. 2020. Also estimated at 0.41 in Staton et al. 2021, Supplemental Material, EM-ASL scenario, section 6, Fig. 7b.)
* propFtrend=-0.275\*scen$sexT[j] (This is based on an observed decline in proportion female in Staton, et al. 2021, Supplemental Material, EM-ASL scenario, section 6, Fig. 7b. Visually estimated to change from 0.41 to 0.3 between 1970 and 2015 (~27.5% decline). This is a more conservative change than suggested in Fig 5e in Ohlberger et al. 2020 which suggests 25% female in 2015.)
* No changes in agediff, allometry, and alt\_sr\_param.