Readme

**Scripts**

1. CWT Spawning Data Prep.R – Preparing coded-wire tag recovery data from spawning grounds and hatchery for hatchery-origin cohort reconstruction

2. CWT Harvest Data Prep.R – Preparing coded-wire tag recovery data from ocean and in-river harvest. Calculating the age-aggregated encounter rate.

3. Hatchery Cohort Reconstruction.R – Cohort reconstruction code for hatchery cohorts from CWT data. Calculates hatchery-origin maturation and impact rates.

**1. CWT Spawning Data Prep.R**

**Data input**

**CWTReleased.csv** – coded wire batch data for winter-run Chinook salmon for brood year from 2000-2017. Obtained from RMIS database.

**CWTRecoveries.csv** – all recoveries of winter-run Chinook salmon for brood year from 1999-2018. Obtained from RMIS database.

**Escapement to Hatchery All.csv** – total number of fish (hatchery and natural-origin) recovered at the hatchery each year. Obtained from SacPas.

**CWT Recoveries SG.csv** –recoveries of winter-run Chinook salmon from spawning ground surveys for brood year from 1998-2017. Missing data in RMIS database filled in by USFWS from Mike O’Farrell.

**Total to Hatchery All.csv –** Hatchery and natural-origin fish taken to the hatchery and used as broodstock

**Data output**

**Escapement to Hatchery.csv** – CWT recovered at hatcheries and expanded. Grouped by brood year so each line is the age distribution each brood comes back as. Used in *Hatchery Cohort Reconstruction.R*

**Hatchery Release.csv –** Number of hatchery fish released for every brood year. Created from CWTReleased.csv data. Used to calculate survival before age-2 (not necessary for this analysis) in *Hatchery Cohort Reconstruction.R.*

**Natural Escapement to Hatchery.csv** – Male and female natural-origin fish collected for broodstock at the hatchery. Used in the *Natural Cohort Reconstruction Prep.R*

**HatcheryRunSizeCWT.csv –** Total estimate of hatchery fish on the spawning grounds every run year. From *CWT Spawning Data Prep.R*

**CWTBootstraps.Rds –** Age Specific escapement by brood year. A list with 1000 items, each representing a bootstrapped sample. Used in *Hatchery Cohort reconstruction. R*

**2. CWT Harvest Data Prep.R**

**Data input**

**CWTReleased.csv** – coded wire batch data for winter-run Chinook salmon for brood year from 2000-2017. Obtained from RMIS database.

**CWTRecoveries.csv** – all recoveries of winter-run Chinook salmon for brood year from 1999-2018. Obtained from RMIS database.

**sitearea.modified.csv** – file with the region each sampling site is located within

**Size\_limits.csv** –file with the size limit (inches) associated with each fishery type, location, and time.

**release.mort.rate.csv** – file with the release mortality rate associated with each fishery type, location, and time.

**length.at.age.csv** – length of age of winter-run Chinook salmon in the ocean. From O’Farrell et al. 2012 Appendix A

**years with values.csv –** Supporting file with months and years where fishing occurred. Use as a placeholder (for when there is no fishing data for a cohort in a period where there is fishing.

**Data output**

**River Harvest.csv –** Age-3 and Age-4 in-river harvest by brood year. Used in Hatchery Cohort Reconstruction.R

**Catch Bootstrap.Rds** – Ocean fishery encounters (n) by brood year and month. Unrecovered tags in harvested fish was resampled 1000 to generate 1000 estimates of harvest, which was then divided by the proportion that was of legal size to estimate number encountered.. Used in *Hatchery Cohort Reconstruction.R*

**Impact Bootstrap.Rds –** Ocean fishery impact (n) by brood year and month. Unrecovered tags in harvested fish was resampled 1000 to generate 1000 estimates of fishery impact (including drop-off mortality and release mortality). *Used in Hatchery Cohort Reconstruction.R*

**3. Hatchery Cohort Reconstruction.R**

**Data input**

**CWTBootstraps.Rds –** Age Specific escapement by brood year. A list with 1000 items, each representing a bootstrapped sample. Created in *CWT Spawning Data Prep.R*

**Escapement to Hatchery.csv** – CWT recovered at hatcheries and expanded. Grouped by brood year so each line is the age distribution each brood comes back as. Created in *CWT Spawning Data Prep.R*

**River Harvest.csv –** Age-3 and Age-4 in-river harvest by brood year. Created in *CWT Harvest Data Prep.R.*

**Hatchery Release.csv –** Number of hatchery fish released for every brood year. Created from CWTReleased.csv data. Used to calculate survival before age-2 (not necessary for this analysis).

**Catch Bootstrap.Rds** – Ocean fishery encounters (n) by brood year and month. Unrecovered tags in harvested fish was resampled 1000 to generate 1000 estimates of harvest, which was then divided by the proportion that was of legal size to estimate number encountered. From *CWT Harvest Data Prep.R.*

**Impact Bootsrap.Rds –** Ocean fishery impact (n) by brood year and month. Unrecovered tags in harvested fish was resampled 1000 to generate 1000 estimates of fishery impact (including drop-off mortality and release mortality). From *CWT Harvest Data Prep.R.*

**Data output**

**CWT Cohort Reconstruction.Rds –** Hatchery cohort reconstruction full results, bootstraps.

**Maturation\_Uncertainty\_CWT.csv –** Age 2, 3, and 4 maturation rates and their 95% confidence intervals.

**Impact\_Uncertainty\_CWT.csv –** Age 3 and 4 ocean fishery impact and their 95% confidence intervals.