**Spawner to emigrant**

Multiple life histories with correlated multivariate normal error

To-do:

-multivariate normal errors

**Emigrant to spawner**

Survival from emigrant to spawner for each life history

To-do:

-extract chiwawa screw trap tag and subsequent detection data

-differentiate subyearlings and yearlings at tagging

-get detections at Tumwater Dam

-get array detections upstream of Tumwater Dam for adults (test whether these are reliable or if many are ghost tags)

-fit survival CJS ~tag DOY, Year,

-fit probability of age at return ~ tag DOY, year?

**Fit full population model**

Data

Spawner counts (wild & hatchery)

Wild broodstock removals

Emigrant abundance estimates by LH

Mark-recapture data

-detected as adult at Tumwater (Y/N)

-age at adult return

Age composition of carcasses

Process model

Emigrants = *f*(spawners) + *e*

*e ~ MVN*

spawners = emigrants \* s \*maturity

s ~ MVAR1

ALR(maturity) ~ MVN