Subyearling Chinook Survival in Lower Granite Dam to McNary Dam reach in 2006 compared to years 1998 to 2005

Preliminary Analysis

FPC

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2006 files/142-06
• Show 2006 survival estimates in relation to other recent years

• Compare Survival and Travel Time in the reach LGR to McNary in relation to environmental variables (Spill, WTT, Flow, Temp)

• Discuss appropriateness of CJS in reach survival estimation for subyearling chinook salmon in the Snake River
Survival Estimation methods

• Estimate Survival for various PIT-tagged subyearling chinook detected at LGR during four time periods
  5/20 to 6/2
  6/3 to 6/16
  6/17 to 6/30
  7/1 to 7/14

• Estimate Travel Time from LGR to McN and assign environmental variables (Avg Spill, Flow, WTT, Temp) based on passage timing through the reach for each group

• Remove ‘holdover’ detects from capture histories to remove potential source of bias in reach survival estimates
PIT-tag release groups used in analysis

• Production/Wild-(acclimation, hatchery and wild releases) includes release sites PLAP, CJRAP, BCCAP, NPTH, CEFLAF, Couse Creek and Snake River wild releases (WPC 15W)
• Not included--late season releases from BCCAP (Clearwater Surrogates), Clearwater wild marks, nor early season yearling fall chinook releases from acclimation facilities
• Analyzed and subsequently removed from multi-year analysis -- Hells Canyon Dam-PIT-tags released with Oxbow Hatchery release, Snake Surrogate – DMM SNAKE3 and SNAKE4
Avg Discharge LGS 1998 to 2006

Discharge (Kcfs)

5/1 5/8 5/15 5/22 5/29 6/5 6/12 6/19 6/26 7/3 7/10 7/17 7/24 7/31
Avg Spill Little Goose 1998 to 2006
Avg Temp Little Goose 1998 to 2006
Survival versus Avg Spill

\[ y = 0.32751 + 0.92651 \]

\[ \text{adj } R^2 = 0.58, \ p = 0.00000 \]
Survival versus Avg Total Discharge

\[ y = 0.21368 + 0.00352X \]
\[ \text{adj } R^2 = 0.59, \ p = 0.00000 \]
Survival versus WTT

$y = 0.80298 - 0.01647X$

$adj R^2 = 0.64$, $p = 0.00000$
Survival versus Avg Temp C

\[ y = 1.21499 - 0.03703X \]

\[ \text{adj } R^2 = 0.45, \ p = 0.00007 \]
Survival versus Travel Time

Survival LGR to MCN

Weighted Regression

$y = 0.72504 - 0.01209X$

$adj R^2 = 0.41, p = 0.00021$
Travel Time versus WTT

$y = 8.77911 + 0.67736X$

$adj \, R^2 = 0.30, \, p = 0.00037$
Travel Time versus spill

\[ y = 31.7 - 47.2X \]
adj \( R^2 = 0.41, p = 0.00021 \)
Is CJS appropriate for estimating Subyearning Chinook survival?

• Two basic model assumptions are violated when holdover fish are modeled with subyearlings
  – Equal probability of detection
  – And equal survival for group
• FPC analysis addresses these potential sources of bias by limiting scope of analysis
  – Survival groups represent active migrants since they are detected at LGR and…
  – Limit time period of estimation to minimize holdover proportions in group (last date at LGR 7/15)
  – Remove small proportion of holdover detections from detection history prior to estimating group survival
Proportion of Holdover Fish in FPC survival Groups

Percent of PIT-tag fish Passing JDA as HO

Year of subyearling migration

Conclusions

• Survival in 2006 was relatively high based on comparison with other recent years
• Survival and travel time showed significant relationship to all environmental parameters
• We identified production/wild group of tags as most appropriate for multiyear analysis
• CJS is appropriate model given the limited affect of holdover fish on the survival estimates used in this analysis