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Habitat Variables Related to Juvenile Coho Salmon Abundance in Southeast Alaska

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Introduction: We examined a 10 year time series of biophysical conditions associated with juvenile salmon collected from the Southeast Coastal Monitoring Project between 1997 and 2006.
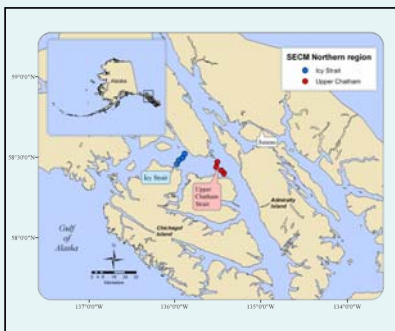
Methods: Sampled juvenile salmonids with a 20-m surface trawl; zooplankton with NORPAC and Bongo nets; and environmental conditions using a CTD.
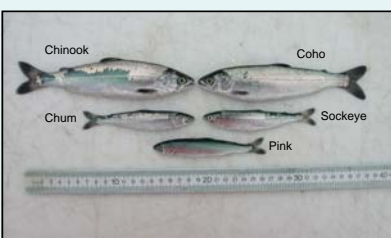
Objectives: To examine juvenile coho salmon abundance with associated biophysical parameters at 2 locations in strait habitats by month to determine which variables best predict abundance using logistic regression.

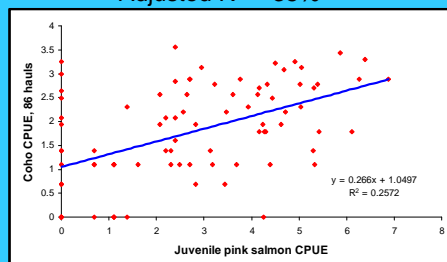**Results:** Monthly predictors of juvenile coho salmon catch per unit effort (CPUE) by location

Icy Strait

June
- Best predictor: Salinity 20-m
- Equation: coho = 9 - 0.32(Sal20) + 0.1(PCPUE) + 0.02(Zoop20)
  Adjusted R^2 = 22%

$y = -0.4978x + 16.338$
$R^2 = 0.1558$
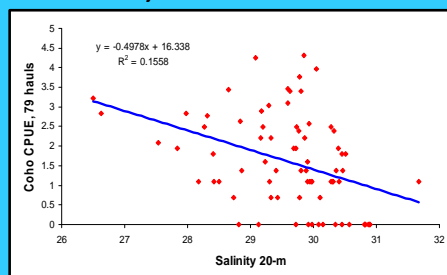
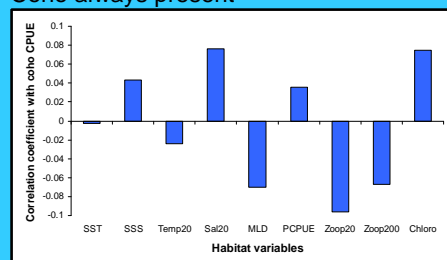**July**
- Best predictor: juvenile pink salmon CPUE
- Equation: coho = - 0.05 + 0.26(PCPUE) + 0.05(SSS) - 0.14(SST)
  Adjusted R^2 = 35%

$y = 0.266x + 1.0497$
$R^2 = 0.2572$

August
- No strong habitat predictors
- No variables entered regression model
- All correlations < 0.1
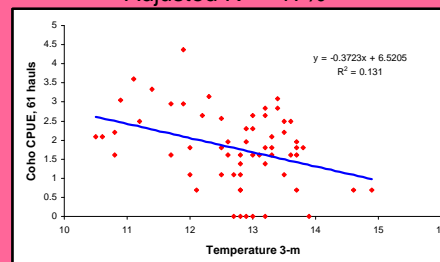- Coho always present

Upper Chatham Strait

June
- Best predictor: Zooplankton 20-m
- Equation: coho = 2 + 0.04(Zoop20) - 0.12(SSS)
  Adjusted R^2 = 29%

$y = 0.053x + 0.6425$
$R^2 = 0.2194$
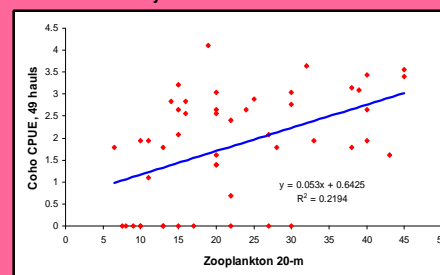
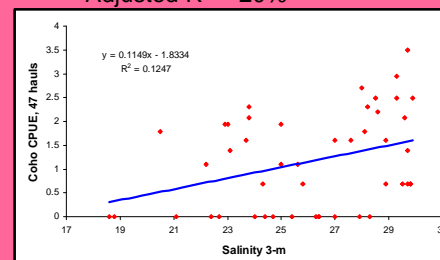**July**
- Best predictor: Sea surface temperature
- Equation: coho = 10 - 0.5(SST) - 0.14(Sal20) + 0.11(PCPUE)
  Adjusted R^2 = 17%

$y = -0.3723x + 6.5205$
$R^2 = 0.131$

August
- Best predictor: Sea surface salinity
- Equation: coho = 4 + 0.27(SSS) - 0.35(Sal20) - 0.14(MLD) + 0.12(Zoop20)
  Adjusted R^2 = 20%

$y = 0.1149x - 1.8334$
$R^2 = 0.1247$

Habitat variables:
1. Sea surface temperature (SST)
2. Sea surface salinity (SSS)
3. 20-m integrated SST (Temp20)
4. 20-m integrated SSS (Sal20)
5. Mixed layer depth (MLD)
6. Juvenile pink salmon abundance (PCPUE)
7. Zooplankton 20-m NORPAC (Zoop20)
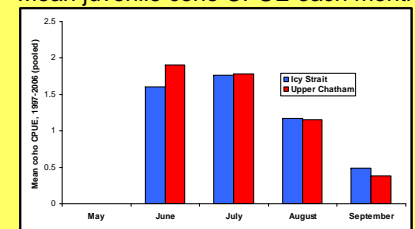8. Zooplankton $\leq$ 200-m Bongo (Zoop200)
9. Chlorophyll

Statistical analysis:
- Bivariate correlation with coho CPUE
- Forward-backward stepwise logistic regression to predict coho abundance

Surface trawl hauls taken each month
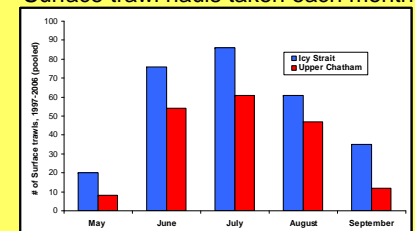
Mean juvenile coho CPUE each month

Conclusions:
1. The best predictors changed over time.
2. Important variables were consistent between locations.
3. Temp20, Zoop200, and Chlorophyll did not show significant predictive power.
4. In Icy Strait in August, coho were always present, but no variables were predictive.
5. Low power in July in Upper Chatham, and in August in Icy Strait, may reflect non-pulsed migration lagged in time and space.
6. Habitat variables generally had limited predictive power, suggesting that other factors are influential.