Genetic information for management of Alaska Chinook salmon: Current capabilities and outlook

Gene Conservation Laboratory
Alaska Department of Fish and Game
Southeast Alaska Baseline
Southcentral Alaska Baseline

- 2011 coastwide baseline
- Recent additions
- Not ready
- Unsampled

Gulf of Alaska

Kilometers

0 30 60 120 180 240
Kenai River – 2 groups
Early/Late or Tributary/Mainstem

Deshka
Gulkana
Upper Copper
Lower Copper
Kasilof Mainstem
Susitna/Yentna/W Cook
NE Cook
S. Kenai Pen

Southcentral Alaska Baseline

- 2011 coastwide baseline
- Recent additions
- Not ready
- Unsampled

Gulf of Alaska
Southcentral Alaska Applications

Kenai River – 2 groups
Early/Late or Tributary/Mainstem

Kasilof Mainstem

2011 coastwide baseline
Recent additions
Not ready
Unsampled
Southwest Alaska Baseline

Coastal W. AK

Bristol Bay

N. AK Pen.

NW Gulf of AK

Gulf of Alaska

- **Black** circles: 2011 coastwide baseline
- **Red** circles: Recent additions
- **Orange** circles: Not ready
- **White** circles: Unsampled

Kilometers

160°W
Arctic-Yukon-Kuskokwim Baseline

- 2011 coastwide baseline
- Recent additions
- Not ready
- Unsampled
Looking for Genetic Markers

Ascertainment Populations

RAD sequenced 236 Chinook salmon

Courtesy of J. Seeb and L. Seeb, International Program for Salmon Ecological Genetics, University of Washington
Need to ensure observed differences are real rather than a product of sampling error

Courtesy of J. Seeb and L. Seeb, International Program for Salmon Ecological Genetics, University of Washington
Genotyped 24 populations (~2,000 individuals) at 287 SNPs

Courtesy of J. Seeb and L. Seeb, International Program for Salmon Ecological Genetics, University of Washington
Looking for Genetic Markers

Measures of Success

Courtesy of J. Seeb and L. Seeb, International Program for Salmon Ecological Genetics, University of Washington
Russia

Upper Yukon

British Columbia

West Coast U.S.

Copper

Coastal W. AK

N. AK Pen.

NW Gulf of AK

NE Gulf of AK

Coastal SEAK

Canadian Pen.

Coastwide Baseline

2011 coastwide baseline
Seasonal Migration Patterns of Chinook Salmon

Russian Stocks

(a) Spring-fall

(b) Winter

Western Alaska and Yukon River Stocks

(c) Spring-fall

(d) Winter
Conclusions

• Baseline representation
  – Adequate for most applications
  – Continuous improvement by adding populations & markers
  – Improved resolution needed: Coastal W. Alaska & W. Cook Inlet
  – Additional collections needed
    ✓ Alaska Peninsula/Kodiak
    ✓ Bristol Bay
    ✓ West Cook Inlet/Yentna River
    ✓ Chitina River
    ✓ Hatcheries and Transboundary Rivers

• Applications
  – Established in SE Alaska, Kenai River, Yukon River, and Bycatch
  – Potential in Copper River, Cook Inlet, Kodiak and Chignik
  – Marine life history studies
  – Mark recapture studies
Where did they go?