Baker Lake Sockeye 2020

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Baker Lake Sockeye History → Hatchery Production

Fisheries Management/Science
- Analyses – Preseason Forecasts

Future Plans

Summary of 2020 Season/Harvest sharing

Questions
• Record 10,781,926 fry released in 2020.
Pre-Season Management/Science

- Baker River sockeye experiencing multi-year decline
- Conservation-based approach to 2020 season
Pre-Season Management/Science

Baker River Forecast Model

- Evaluated run size relationship with climate-based predictors (i.e., North Pacific Gyre Oscillation)
- Identified February NPGO as strongest predictor of early marine survival
- Used sibling-based relationship model with NPGO to predict 2020 return
• Applying an NPGO based model resulted in a 15-30% decrease in performance error when hindcasted over the past 5 years
• 2020 Run Reconstructed run size: 19,157
In-Season Management/Science

Baker Trap Counts
• Flow Dependent
• ~10-day migration to Baker Trap

In-Season Update (ISU) Models
• Use trap counts to predict total run size
• Reliability of model prediction increases after 50% migration (avg timing 7/15)
• Migration time limits effectiveness of in-season actions
In-Season Management/Science

- Pattern recognition and historical correlation
- 2017 Trap Count: 16,704
- 2019 Trap Count: 15,890
- 2020 Trap Count: 15,607

https://wdfw.wa.gov/fishing/reports/counts/baker-river#returns
How does Baker compare to other stocks in 2020

<table>
<thead>
<tr>
<th>State/Province</th>
<th>Forecast Return</th>
<th>Estimated Return</th>
<th>Return Relative to Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baker River</td>
<td>13,242</td>
<td>19,157</td>
<td>+ 30%</td>
</tr>
<tr>
<td>Lake Washington</td>
<td>20,166</td>
<td>22,951</td>
<td>+ 12%</td>
</tr>
<tr>
<td>Columbia River</td>
<td>244,000</td>
<td>342,000</td>
<td>+ 28%</td>
</tr>
<tr>
<td>Bristol Bay</td>
<td>49,000,000</td>
<td>57,860,000</td>
<td>+ 15%</td>
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<tr>
<td>Nass</td>
<td>386,000</td>
<td>301,000</td>
<td>- 22%</td>
</tr>
<tr>
<td>Skeena</td>
<td>880,000</td>
<td>1,149,000</td>
<td>+ 23%</td>
</tr>
<tr>
<td>Sakinaw</td>
<td>75</td>
<td>85</td>
<td>+ 11%</td>
</tr>
<tr>
<td>Somass</td>
<td>169,000</td>
<td>304,000</td>
<td>+ 44%</td>
</tr>
<tr>
<td>Fraser River</td>
<td>941,000</td>
<td>293,000</td>
<td>- 69%</td>
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</table>
Forecasting Future: Exploring Other Factors

We will continue to look through the following factors when assessing forecast model performance now and in the future!

• Pink Competition – Density Dependent Effect (Connors et al., 2020)
• Stream flow and temperature
• Smolt density and size
• Time-varying relationships with climate (Malick, 2020)
Sockeye Salmon Scientific Literature


• Warming climate and competition both have a negative effect on southern sockeye population productivity

• Opposite effect for Northern populations

Connors et al. (2020)
Updated Harvest Sharing

Forecast performance is the greatest contributor to state/treaty harvest sharing

**Baker Sockeye Harvest 2010-2020**

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</thead>
<tbody>
<tr>
<td>State</td>
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<td></td>
<td></td>
<td></td>
<td>25,000</td>
<td>20,000</td>
<td>15,000</td>
<td>10,000</td>
<td>5,000</td>
<td>0</td>
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<tr>
<td>Treaty</td>
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<td></td>
<td></td>
<td></td>
<td>15,000</td>
<td>10,000</td>
<td>5,000</td>
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**Recent 10-year (2010-2020) Harvest/Share Equity**

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<thead>
<tr>
<th></th>
<th>State Share</th>
<th>Treaty Harvest</th>
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<tbody>
<tr>
<td>2020 Harvest</td>
<td>5,884</td>
<td>3,348</td>
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<tr>
<td>Total Harvest</td>
<td>118,958</td>
<td>137,383</td>
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*1: 2020 data is preliminary*
2020 Baker Lake Sockeye Fishery

2020 Baker Lake sockeye fishery highlights
• Anglers put in an estimated 41,233 hours of total fishing effort
  • 1,293 anglers were interviewed by WDFW creel staff and 6,742 angler hours were sampled
• Estimated 7,908 angler trips
• Estimated $458,652 economic impact (TCW Economics. 2008. aka Wegge. 2008)
Future Plans

• Prioritize Baker sockeye harvest equity in 2021 NOF season-setting process
• Continue to work with angler groups and tribes to improve connection
• Continue to update/evaluate technical tools used to manage fishery
• Hatchery improvements leading to more production/understanding.
Questions?