Distribution of Chinook Fry and Parr Rearing in Willamette Project Reservoirs

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Objectives

- Determine Chinook Fry Distribution in Reservoirs
  - Longitudinal (along shoreline length)

- Determine Parr Distribution in Reservoirs
  - Longitudinal
  - Vertical (summer to fall)
Study Area

**Reservoir Lengths**

**Detroit**
- 14 km long
- 31 km max shoreline

**Cougar**
- 7.5 km
- 16 km max shoreline

**Lookout Point**
- 17 km
- 25 km max shoreline
Methods

Nearshore Fry Traps

- Traps set 5 m from shore
- Catch by shoreline distance
- June

Trap locations in June

Cougar Reservoir
Methods
Oneida Traps - Parr

- 34 m from shore
- Fished upper 3m of water column
- Catch by section
Methods
Gill Nets – Parr Vertical Distribution

- Ingram and Korn (1969)
- Set at specific depth intervals (every 15 ft)
- Assessed changes through time (Aug-Nov)
- Detroit and Lookout Point only
Results

- Fry distribution
  - skewed towards head of reservoir
  - ~15km max dispersion
Fry Distribution - Nearshore Traps

Fry Catch in Relation to Shoreline Distance

Shoreline distance from HOR (km)

June

Fry catch

Detroit Dam

Detroit

Head of Res
Fry Distribution - Nearshore Traps

Fry Catch in Relation to Shoreline Distance

Fry Catch

Shoreline distance from HOR (km)

0 5 10 15 20 25 30 35

0 20 40 60 100

Cougar Dam

Detroit Dam

Head of res

June

Cougar

Detroit
Fry Distribution - Nearshore Traps

Fry Catch in Relation to Shoreline Distance

Shoreline distance from HOR (km)

Fry catch

June

Cougar Dam

Lookout Pt. Dam

Cougar
Detroit
Lookout Pt.
Fry Distribution - Nearshore Traps

Fry Size in Relation to Shoreline Distance

Cougar

Size at entrance

P < 0.001
Results

- **Fry distribution**
  - skewed towards head of reservoir
  - \(~15\text{km}\) max dispersion

- **Parr distribution**
  - skewed towards upper reservoir
  - descend into deeper water in late summer
Parr Distribution

Oneida Trap Catch by Reservoir Section

- Detroit
- Cougar
- Lookout Pt.

Reservoir section

Lower Middle Upper

Oneida trap locations

Natural Hatchery

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5

0 2 4 6 8 10 12 14 16 18

a ab b
Oneida Trap Catch by Date – Natural Origin

Detroit

Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Mean weekly catch

Cougar

Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Mean weekly catch

Lookout Pt.

Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov
Mean weekly catch

>20 C
18 C
>20 C
>20 C
Parr Vertical Distribution
Cougar Reservoir
Ingram & Korn data 1966-1967

- May
- June
- July
- Aug
- Sep
- Nov

Catch/set

Net depth (ft)
Parr Vertical Distribution

Detroit Gill Nets

August

<table>
<thead>
<tr>
<th>Net depth (ft)</th>
<th>Mean catch/net</th>
</tr>
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<tbody>
<tr>
<td>0-15</td>
<td>18°</td>
</tr>
<tr>
<td>15-30</td>
<td>17°</td>
</tr>
<tr>
<td>30-45</td>
<td>15°</td>
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<tr>
<td>45-60</td>
<td>13°</td>
</tr>
<tr>
<td>60-75</td>
<td>n/a</td>
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<tr>
<td>75-90</td>
<td>n/a</td>
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September

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<th>Mean catch/net</th>
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<td>12°</td>
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<tr>
<td>75-90</td>
<td>11°</td>
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October

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November

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Parr Vertical Distribution

Lookout Point Gill Nets

July

- Mean catch/set
- Net depth (ft)
- 0-15: 18°
- 15-30: 16°
- 30-45: 13°
- 45-60: 12°
- 60-75: n/a
- 75-90: n/a

August

- Mean fish/sq ft of net (x100)
- Net depth (ft)
- 0-15: 21°
- 15-30: 19°
- 30-45: 16°
- 45-60: 14°
- 60-75: n/a
- 75-90: n/a

October

- Mean fish/sq ft of net (x100)
- Net depth (ft)
- 0-15: 17°
- 15-30: 17°
- 30-45: 16°
- 45-60: 15°
- 60-75: 15°
- 75-90: 12°

November

- Mean fish/sq ft of net (x100)
- Net depth (ft)
- 0-15: 13°
- 15-30: 13°
- 30-45: 13°
- 45-60: 12°
- 60-75: 12°
- 75-90: 12°
In Conclusion

• Fry concentrated in upper end of reservoir
  – Travel \( \sim 15 \) km along shore
  – Delayed re-fill may improve fry dispersion (?)

• Parr distributed in upper end of reservoir in summer

• Parr descend to cooler water in summer
  – Detroit and LOP parr remain below 45 ft (13.7 m) until November.
Recommended Future Studies

- Expand fry nearshore sampling from April through July
  - Movement patterns
  - Effects of delayed refill

- Increase sampling effort to assess parr vertical distribution
Acknowledgments

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Kris Clemons
Shelly Goff
Greg Gilham
Mario Minder
The End
Fry Distribution - Nearshore Traps

**Cougars**

- Fry catch vs. distance from HOR (km)
- Dates from May to September

**Detroit**

- Fry catch vs. distance from HOR (km)
- Dates from May to September