Escapement Goals for Kenai River King Salmon 75 cm and Longer

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Escapement Goals for Kenai River King Salmon 75 cm and Longer

1) Why size-based goals?
2) How did we choose the goals?
3) How will size-based goals affect management?
Kenai King Salmon Sonar in Transition

- 2010 DIDSON fully installed at RM 9
- 2011-12 nearshore kings discovered
- 2013 goals based on expanded RM-9 counts
- 2013 installed ARIS at RM 14
- 2015-16 manage with RM-14 ARIS
- 2017 manage based on kings 75 cm and longer
Why 75 cm?

- Nearly all sockeye salmon are less than 75 cm long as measured by the ARIS.
- Nearly all fish measured 75 cm or longer by the ARIS are king salmon.
- 75 cm ARIS length = 75 cm METF = 33.3 in total length
Why size-based goals?

1) King salmon 75+ cm can be counted directly from sonar images

2) King salmon 75+ cm include the vast majority of females
Late Run King Salmon Length by Age, Sex
Estimates of Small King Salmon

- Sonar and netting data required
- Subject to improvement
- Poorly suited for inseason management


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Escapement Goals for Kenai River King Salmon 75 cm and Longer

1) Why size-based goals?

2) How did we choose the goals?
   - Analysis
   - Goal selection

3) How will size-based goals affect management?
Improved Analysis

- **Methods – unchanged from 2013**
  - Use all data; best data receive more weight
  - Uncertainty assessed
  - Extensively reviewed

- **Data - improved**
  - 2013-2015 data most precise yet
  - Large fish data are more accurate
  - Paired abundance estimates agree very well
Late Run Abundance (75+ cm)
LR Escapement, Recruitment (75+ cm)
LR Spawner-Recruit Analysis (75+ cm)
LR Spawners providing MSY (75+ cm)

$S_{MSY}$ 18,477
LR Optimal Yield Profiles (75+ cm)

\[ S_{MSY} = 18,477 \]
2013 Late Run OYPs (all sizes)

![Graph showing probability distributions for different MSY levels, with SMSY at 20,260 spawners.](image)

- 70% MSY
- 80% MSY
- 90% MSY

- 74% of SMSY
- 148% of SMSY
Alaska King Salmon Goals

| Situk | Unuk | Anchor | Karluk | Keta | Nelson | Kenai Late Run | Deshka | Taku | Andrew | Alsek | Ayakulik | Chignik | Blossom | Chena | Chilkat | Chickamin | Stikine | Goodnews | Kenai Early Run | Salcha | Kuskokwim |

of $S_{MSY}$
Alaska King Salmon Goals

Smsy: 18,477

multiplied by

74% – 148%

rounds to

13,500 – 27,000
### Another Example

<table>
<thead>
<tr>
<th></th>
<th>Kenai Late Run</th>
<th>Ayakulik</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Smsy</td>
<td>20,260</td>
<td>5,165</td>
</tr>
<tr>
<td>Original Goal</td>
<td>15,000 – 30,000</td>
<td>4,000 – 7,000</td>
</tr>
<tr>
<td>% of Smsy</td>
<td>74% - 148%</td>
<td>77% - 136%</td>
</tr>
<tr>
<td>What Changed?</td>
<td>More and better data, different currency</td>
<td>More data, improved analysis</td>
</tr>
<tr>
<td>New Smsy</td>
<td>18,477</td>
<td>6,213</td>
</tr>
<tr>
<td>New Goal</td>
<td>13,500 – 27,000</td>
<td>4,800 – 8,400</td>
</tr>
</tbody>
</table>

Original criteria applied to updated information
2013 Late Run Goal

OLD

NEW

Probability

% MSY
- 70
- 80
- 90

Spawners

0 10,000 20,000 30,000 40,000

92%
68%
87%
65%
Early Run Abundance (75+ cm)
Early Run SRA (75+ cm)
Early Run $S_{MSY}$ (75+ cm)

$S_{MSY}$

3,283
Early Run Goal in Context

3,800 – 8,500
\textit{divided by}\nSmsy = 4,434
\textit{equals}\n86% – 192% of Smsy

Smsy: 3,283
\textit{equals}\n2,800 – 6,300
2,800 – 5,600
Early Run OYPs

![Graph showing probability distribution for Early Run OYPs with OLD and NEW categories. The graph compares the probability of spawners across different MSY percentages: 70, 80, and 90%. The graph highlights the difference in distribution between OLD and NEW categories, with OLD showing a higher probability at lower spawner counts and NEW showing a higher probability at higher spawner counts.](image-url)
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Effects on Management I

If future runs continue to be small in number and in size, fishing opportunities may be reduced compared to the status quo.

- New LR goal is 90% of old goal
- 2014-2016 estimates of kings 75+ cm were only 61-77% of all-size king estimates
Effects on Management II

Daily inseason estimates for kings 75+ cm
- Postseason estimates for kings of all sizes

Revisions to inseason estimates less likely
- Estimates based on sonar alone
- Methods more straightforward and settled
Effects on Management III

Small fish will no longer have the potential to influence management

Less risk of putting very few females on the spawning beds
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