REPORT OF THE NOVEMBER 2023 BSAI GROUNDFISH PLAN TEAM MEETING

STEVE BARBEAUX (CO-CHAIR), KALEI SHOTWELL (CO-CHAIR), CINDY TRIBUZIO (VICE-CHAIR), DIANA STRAM (COORDINATOR)

DECEMBER 6, 2023
BSAI PLAN TEAM
MEETING OVERVIEW

- Dates: November 13-17
- Place: AFSC Seattle
- Leaders: Steve Barbeaux, Kalei Shotwell (co-chairs); Cindy Tribuzio (vice-chair); Diana Stram (coordinator)

Participation:

- Steven Whitney (NMFS AKRO)
- Allan Hicks (IPHC)
- Lisa Hillier (WDFW)
- Kirstin Holsman (AFSC REFM)
- Phil Joy (ADF&G)
- Andy Kingham (AFSC FMA)
- Beth Matta (AFSC REFM)
- Andy Seitz (UAF)
- Jane Sullivan (AFSC)
- Lucas De Filippo (AFSC ABL)
- AFSC and AKRO staff and members of the public
BERING SEA AND ALEUTIAN ISLANDS
BIG PICTURE

- Assessments of 26 stocks/complexes – (3 Full, 5 Update; 10 Harvest projection; 5 Catch report; 2 Ecosystem report; 1 “none”)

- Total of 23 models, including Tier 5/6 methods:
  - 8 base models/methods
  - 15 additional models/methods

- The Team agreed with authors’ recommendations regarding preferred models/methods and harvest specifications in all but one stock (AI Pacific cod)

- 2 new reductions from maximum permissible ABC recommended (5 total)

- Of the 15 stocks/complexes in Tiers 1 or 3, only 1 is in sub-tier “b”

- No stocks/complexes were subjected to overfishing in 2022, and no Tier 1 or 3 stocks/complexes are overfished/approaching as of 2023

- 19 Team recommendations
## Chapter 1

**Eastern Bering Sea pollock**
- **Author**: Ianelli
- **Tier**: 1a
- **Type**: Full
- **Risk**: 1,1,2,1
- **% Reduction**: 18%

**Aleutian Islands pollock**
- **Author**: Barbeaux
- **Tier**: 3a
- **Type**: H-Proj

**Bogoslof Island pollock**
- **Author**: Ianelli
- **Tier**: 5
- **Type**: C-Rep

**Eastern Bering Sea Pacific cod**
- **Author**: Barbeaux
- **Tier**: 3b
- **Type**: Full
- **Risk**: 1,1,1,1

**Aleutian Islands Pacific cod**
- **Author**: Spies
- **Tier**: 5
- **Type**: Full
- **Risk**: 1,2,2,1
- **% Reduction**: 8%

**Sablefish**
- **Author**: Goethel
- **Tier**: 3a
- **Type**: Update
- **Risk**: 1,1,1,1

**Yellowfin sole**
- **Author**: Spies/Bryan
- **Tier**: 1a
- **Type**: Update
- **Risk**: 1,2,2,1

**Greenland turbot**
- **Author**: Bryan
- **Tier**: 3a
- **Type**: H-Proj

**Arrowtooth flounder**
- **Author**: Shotwell
- **Tier**: 3a
- **Type**: H-Proj

**Kamchatka flounder**
- **Author**: Bryan
- **Tier**: 3a
- **Type**: H-Proj

**Northern rock sole**
- **Author**: McGilliard
- **Tier**: 1a
- **Type**: H-Proj
- **Risk**: 1,2,2,1
- **% Reduction**: 36%

**Flathead sole**
- **Author**: Kapur
- **Tier**: 3a
- **Type**: H-Proj

**Alaska plaice**
- **Author**: Cronin-Fine
- **Tier**: 3a
- **Type**: C-Rep

**Other flatfish**
- **Author**: Monnahan
- **Tier**: 5
- **Type**: H-Proj

**Pacific ocean perch**
- **Author**: Spencer
- **Tier**: 3a
- **Type**: H-Proj

**Northern rockfish**
- **Author**: Spencer
- **Tier**: 3a
- **Type**: Update
- **Risk**: 2,2,1,1
- **% Reduction**: 12%

**Rougheye & blackspotted rockfish**
- **Author**: Spencer
- **Tier**: 3a/5
- **Type**: H-Proj
- **Risk**: 2,2,1,1
- **% Reduction**: 12%

**Shortraker rockfish**
- **Author**: Shotwell
- **Tier**: 5
- **Type**: C-Rep

**Skates**
- **Author**: Tribuzio
- **Tier**: 3a/5
- **Type**: Update
- **Risk**: (2,1),1,1,1
- **% Reduction**: 13%

**Sharks**
- **Author**: Tribuzio
- **Tier**: 6
- **Type**: C-Rep
- **Risk**: 1,1,1,1

**Appendix 1**
- **Forage Species (including Squid)**
  - **Author**: Szulwaski
  - **Type**: E-Rep

**Appendix 2**
- **Sculpins**
  - **Author**: Spies
  - **Type**: E-Rep

*Assessment, Pop Dy., Environment, Fishery*
New three level rating system with no categories or stocks with extreme concern

Two of the five recommendations for reduction from maximum permissible ABC were from this year’s deliberations.

Three of the five reductions were carried over from 2022 determinations.
BERING SEA AND ALEUTIAN ISLANDS
TOTAL BIOMASS (TIER 1, 3, AND 5)
BERING SEA AND ALEUTIAN ISLANDS SPAWNING BIOMASS (TIERS 1 AND 3)
BERING SEA AND ALEUTIAN ISLANDS SPAWNING BIOMASS (TIERS 1 AND 3)
BERING SEA AND ALEUTIAN ISLANDS ALLOWABLE BIOLOGICAL CATCH (ABC)

Total 2024 ABC = 3,434,567 t
+10% from 2023
BERING SEA AND ALEUTIAN ISLANDS
CHANGE IN 2023 ABC PROJECTION
Increase in value of BSAI harvested species from 2021 to 2022

Real ex-vessel value
# POLLOCK AND PACIFIC COD SUMMARY

<table>
<thead>
<tr>
<th>Stock</th>
<th>Tier</th>
<th>2024 ABC (t)</th>
<th>2024 OFL (t)</th>
<th>Change from 2023 ABC</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBS Pollock (Full)</td>
<td>1a</td>
<td>2,313,000*(18%)</td>
<td>3,162,000</td>
<td>21%</td>
</tr>
<tr>
<td>Al Pollock (H-Proj)</td>
<td>3a</td>
<td>42,654</td>
<td>51,516</td>
<td>-2%</td>
</tr>
<tr>
<td>Bogoslof Poll. (C-Rep)</td>
<td>5</td>
<td>86,360</td>
<td>115,146</td>
<td>0%</td>
</tr>
<tr>
<td>EBS Pacific cod (Full)</td>
<td>3b</td>
<td>167,952</td>
<td>200,995</td>
<td>16%</td>
</tr>
<tr>
<td>Al Pacific cod (Full)</td>
<td>5</td>
<td>12,732*(8%)</td>
<td>18,416</td>
<td>-8%</td>
</tr>
</tbody>
</table>

*xx% Reduced from maximum permissible ABC
CHAPTER 1
EBS WALLEYE POLLOCK

- Full Assessment; 1 new model presented; risk table (1,1,2,1)
CHAPTER 1
EBS WALLEYE POLLOCK
CHAPTER 1
EBS WALLEYE POLLOCK

Bottom trawl survey
Temperatures
CHAPTER 1
EBS WALLEYE POLLOCK

Bottom trawl survey abundance at age
CHAPTER 1
EBS WALLEYE POLLOCK

![Graph showing acoustic trawl survey biomass over years from 2000 to 2020. The graph displays fluctuations in biomass with error bars indicating variability. The x-axis represents years, and the y-axis represents acoustic trawl survey biomass.]
CHAPTER 1
EBS WALLEYE POLLOCK
CHAPTER 1
EBS WALLEYE POLLOCK

- Full Assessment; 1 new model presented; risk table (1,1,2,1)

- Team agreed with author’s recommendation on assessment model and reduction from maximum permissible ABC

- ABCs to be reduced by 18% from Tier 1 maximum permissible ABC based on risk table assessment
  - Multiple indicators of primary and secondary productivity show adverse signals borne out in continued declining trends in juvenile and adult fish condition.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Last asmt.</th>
<th>This asmt.</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>0.3</td>
<td>0.3</td>
<td>0%</td>
</tr>
<tr>
<td>2023 Tier</td>
<td>1a</td>
<td>1a</td>
<td></td>
</tr>
<tr>
<td>2024 Tier</td>
<td>1a</td>
<td>1a</td>
<td></td>
</tr>
<tr>
<td>2023 age+ biomass</td>
<td>12,389,000</td>
<td></td>
<td>-18%</td>
</tr>
<tr>
<td>2024 age+ biomass</td>
<td>11,445,000</td>
<td>10,184,000</td>
<td>-11%</td>
</tr>
<tr>
<td>2023 spawning biomass</td>
<td>4,171,000</td>
<td>11,445,000</td>
<td>-16%</td>
</tr>
<tr>
<td>2024 spawning biomass</td>
<td>3,944,000</td>
<td>3,518,000</td>
<td>-11%</td>
</tr>
<tr>
<td>B₀</td>
<td>6,653,000</td>
<td>6,728,000</td>
<td>1%</td>
</tr>
<tr>
<td>B_{msy}</td>
<td>2,674,000</td>
<td>2,689,000</td>
<td>1%</td>
</tr>
<tr>
<td>2024 F_{OFL}</td>
<td>0.491</td>
<td>0.422</td>
<td>-14%</td>
</tr>
<tr>
<td>2024 F_{ABC}</td>
<td>0.365</td>
<td>0.365</td>
<td>0%</td>
</tr>
<tr>
<td>2023 OFL</td>
<td>3,381,000</td>
<td></td>
<td>-6%</td>
</tr>
<tr>
<td>2024 OFL</td>
<td>4,639,000</td>
<td>3,162,000</td>
<td>-32%</td>
</tr>
<tr>
<td>2023 ABC</td>
<td>1,910,000</td>
<td></td>
<td>21%</td>
</tr>
<tr>
<td>2024 ABC</td>
<td>2,275,000</td>
<td>2,313,000</td>
<td>2%</td>
</tr>
</tbody>
</table>
Chapter 2: Assessment of the Pacific Cod Stock in the Eastern Bering Sea

Steven J. Barbeaux, Lewis Barnett, Madison Hall, Pete Hulson, Julie Nielsen, S. Kalei Shotwell, Elizabeth Siddon, Ingrid Spies, and James Thorson

December 6, 2023  Presentation to the NPFMC AP

https://afsc-assessments.github.io/EBS_PCOD/2023_ASSESSMENT/NOVEMBER_MODELS/
Fishery data

- 2023 ABC is 144,834 t and catch as of Dec. 5 = 139,528 t
- Longline is the highest proportion
- Continued southward shift in fishery
- Little observed fishing north of St. Matthew Island in 2023
CPUE indices

• VAST longline winter CPUE index
  • Downward trend overall with 16% drop from 2022

• All gear naïve CPUE index
  • Downward trend to near average since all-time high in 2020
Bottom trawl survey

- Increase in abundance (+12%)
- Small decline in biomass (-4%)
- Southeastern shift in distribution
Bottom trawl survey CAAL

- Demonstrates change in aging post-2007, and
- Increasing growth trend since 2008
• GHL = 12% of BSAI ABC, 98% harvested so far in 2023 (pot and jig)

• ADF&G port sampling provided data on length and weight of cod catch in Feb-Apr

• Higher proportion of smaller fish in Dutch Harbor Subdistrict (DHS)
Model 23.1.0.d Timeseries

- **SSB** - Similar trends to 2022 ensemble
  - Higher peaks and lower troughs
- **R** - Same peaks and valleys to 2022 ensemble
  - Strong 2018 year class with low surrounding year classes
- **F** - Similar to 2022 ensemble but some key differences
  - Lower F 2016-2021
CHAPTER 2
EBS PACIFIC COD

Total Catch

Total Biomass

Age 0 Recruitment

Spawning Biomass

| NOAA Fisheries quality guidelines. | mimation of policy. |
CHAPTER 2
EBS PACIFIC COD

- Full Assessment; 3 new models presented; risk table (1,1,1,1)
- Move from ensemble to single model approach
- Team agreed with author’s recommendation of using Model 23.1.0.d
- No reduction from maxABC

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Last asmt.</th>
<th>This asmt.</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M</strong></td>
<td>0.34</td>
<td>0.3866</td>
<td>14%</td>
</tr>
<tr>
<td>2023 Tier</td>
<td>3b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024 Tier</td>
<td>3b</td>
<td>3b</td>
<td></td>
</tr>
<tr>
<td>2023 age+ biomass</td>
<td>844,578</td>
<td></td>
<td>-4%</td>
</tr>
<tr>
<td>2024 age+ biomass</td>
<td>831,566</td>
<td>808,203</td>
<td>-3%</td>
</tr>
<tr>
<td>2023 spawning biomass</td>
<td>245,594</td>
<td></td>
<td>-9%</td>
</tr>
<tr>
<td>2024 spawning biomass</td>
<td>242,911</td>
<td>223,107</td>
<td>-8%</td>
</tr>
<tr>
<td>B₀</td>
<td>668,477</td>
<td>567,465</td>
<td>-15%</td>
</tr>
<tr>
<td>2024 F_{OFL}</td>
<td>0.35</td>
<td>0.46</td>
<td>31%</td>
</tr>
<tr>
<td>2024 F_{ABC}</td>
<td>0.29</td>
<td>0.37</td>
<td>28%</td>
</tr>
<tr>
<td>2023 OFL</td>
<td>172,495</td>
<td></td>
<td>17%</td>
</tr>
<tr>
<td>2024 OFL</td>
<td>166,814</td>
<td>200,995</td>
<td>20%</td>
</tr>
<tr>
<td>2023 ABC</td>
<td>144,834</td>
<td></td>
<td>16%</td>
</tr>
<tr>
<td>2024 ABC</td>
<td>140,159</td>
<td>167,952</td>
<td>20%</td>
</tr>
</tbody>
</table>
CHAPTER 2A
ALEUTIAN ISLANDS PACIFIC COD

- Full Assessment; 3 new models presented; risk table (1,2,2,1)
CHAPTER 2A
ALEUTIAN ISLANDS PACIFIC COD
CHAPTER 2A: AI PACIFIC COD

- Tier 5; Full Assessment, 3 new models; risk table (1,2,2,1)
- The Team did not recommend the author’s Tier 3 model, but recommended management continue under Tier 5 model.
- Due to risk table concerns the Team recommended an 8% reduction from maximum ABC.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Last asmt.</th>
<th>This asmt.</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>0.34</td>
<td>0.34</td>
<td>0</td>
</tr>
<tr>
<td>2023 tier</td>
<td>5</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>2024 tier</td>
<td>5</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Biomass</td>
<td>54,165</td>
<td>54,165</td>
<td>0%</td>
</tr>
<tr>
<td>2024 F_{OFL}</td>
<td>0.34</td>
<td>0.34</td>
<td>0%</td>
</tr>
<tr>
<td>2024 F_{ABC}</td>
<td>0.255</td>
<td>0.255</td>
<td>0%</td>
</tr>
<tr>
<td>2023 OFL</td>
<td>18,416</td>
<td>18,416</td>
<td>0%</td>
</tr>
<tr>
<td>2024 OFL</td>
<td>18,416</td>
<td>18,416</td>
<td>0%</td>
</tr>
<tr>
<td>2023 ABC</td>
<td>13,812</td>
<td>13,812</td>
<td>-8%</td>
</tr>
<tr>
<td>2024 ABC</td>
<td>13,812</td>
<td>12,732</td>
<td>-8%</td>
</tr>
</tbody>
</table>
## FLATFISH SUMMARY

<table>
<thead>
<tr>
<th>Stock</th>
<th>Tier</th>
<th>2024 ABC (t)</th>
<th>2024 OFL (t)</th>
<th>Change from 2023 ABC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellowfin sole (Update)</td>
<td>1a</td>
<td>265,913</td>
<td>305,298</td>
<td>-30%</td>
</tr>
<tr>
<td>Greenland turb. (H-Proj)*</td>
<td>3a</td>
<td>3,188</td>
<td>3,705</td>
<td>-19%</td>
</tr>
<tr>
<td>Arrowtooth fl (H-Proj)</td>
<td>3a</td>
<td>87,690</td>
<td>103,280</td>
<td>5%</td>
</tr>
<tr>
<td>Kamchatka fl. (H-Proj)</td>
<td>3a</td>
<td>7,498</td>
<td>8,850</td>
<td>-1%</td>
</tr>
<tr>
<td>Northern rsole (H-Proj)</td>
<td>1a</td>
<td>122,091*(36%)</td>
<td>197,828</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Flathead sole (H-Proj)</td>
<td>3a</td>
<td>67,289</td>
<td>81,605</td>
<td>3%</td>
</tr>
<tr>
<td>Alaska plaice (H-Proj)</td>
<td>3a</td>
<td>35,494</td>
<td>42,695</td>
<td>5%</td>
</tr>
<tr>
<td>Other flatfish (C-Rep)</td>
<td>5</td>
<td>17,189</td>
<td>22,919</td>
<td>0%</td>
</tr>
</tbody>
</table>

* Team recommendation made even though it was a harvest projection year
CHAPTER 4
YELLOWFIN SOLE

- Tier 1a; Update Assessment, 2 new models; risk table (1,2,2,1)
- Large decrease (-46%) in 2023 bottom trawl survey biomass estimate
CHAPTER 4
YELLOWFIN SOLE

- Tier 1a; Update Assessment, 2 new models; risk table (1,2,2,1)
- Substantial reduction in 2017 and surrounding year classed from previous assessment

Age 5 recruitment for Model 22.1 in 2022

2017 YC

Age 5 recruitment for Model 23.0 in 2023

2017 YC
Tier 1a; Update Assessment, 2 new models; risk table (1,2,2,1)

- Large reduction in total biomass (-62%) from 2022
- Similar female spawning biomass (-2%)
CHAPTER 4
YELLOWFIN SOLE

Total Catch

Year

Total Biomass

Year

Age 1 Recruitment

Year Class

Spawning Biomass

Year

Mean

$B_{MSY}$
CHAPTER 4
YELLOWFIN SOLE

- Tier 1a; Update Assessment, 2 new models; risk table (1,2,2,1)

- Fishery catches a large portion of younger/immature fish.

- Yellowfin sole females are 82% selected to the fishery by age 10 whereas they have been found to be only 40% mature at this age

- Large reduction in OFL and ABC, but still well above catch.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Last asmt.</th>
<th>This asmt.</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>0.12/0.125</td>
<td>0.12/0.137</td>
<td>-1%</td>
</tr>
<tr>
<td>2023 Tier 1a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024 Tier 1a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023 age 6+ biomass</td>
<td>3,321,640</td>
<td>2,512,810</td>
<td>-24%</td>
</tr>
<tr>
<td>2024 age 6+ biomass</td>
<td>4,062,230</td>
<td>2,512,810</td>
<td>-38%</td>
</tr>
<tr>
<td>2023 spawning biomass</td>
<td>885,444</td>
<td>881,640</td>
<td>0%</td>
</tr>
<tr>
<td>2024 spawning biomass</td>
<td>897,062</td>
<td>881,640</td>
<td>-2%</td>
</tr>
<tr>
<td>B&lt;sub&gt;0&lt;/sub&gt;</td>
<td>1,407,000</td>
<td>1,516,980</td>
<td>8%</td>
</tr>
<tr>
<td>B&lt;sub&gt;msy&lt;/sub&gt;</td>
<td>475,199</td>
<td>539,657</td>
<td>14%</td>
</tr>
<tr>
<td>2024 F&lt;sub&gt;OFL&lt;/sub&gt;</td>
<td>0.122</td>
<td>0.121</td>
<td>-1%</td>
</tr>
<tr>
<td>2024 F&lt;sub&gt;ABC&lt;/sub&gt;</td>
<td>0.114</td>
<td>0.106</td>
<td>-7%</td>
</tr>
<tr>
<td>2023 OFL</td>
<td>404,882</td>
<td>305,298</td>
<td>-38%</td>
</tr>
<tr>
<td>2024 OFL</td>
<td>495,155</td>
<td>305,298</td>
<td>-38%</td>
</tr>
<tr>
<td>2023 ABC</td>
<td>378,499</td>
<td>265,913</td>
<td>-43%</td>
</tr>
<tr>
<td>2024 ABC</td>
<td>462,890</td>
<td>265,913</td>
<td>-43%</td>
</tr>
</tbody>
</table>
## Rockfish Summary

<table>
<thead>
<tr>
<th>Stock</th>
<th>Tier</th>
<th>2024 ABC (t)</th>
<th>2024 OFL (t)</th>
<th>Change from 2023 ABC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific ocean perch (H-Proj)</td>
<td>3a</td>
<td>41,096</td>
<td>49,010</td>
<td>-2%</td>
</tr>
<tr>
<td>Northern rockfish (Update)</td>
<td>3a</td>
<td>19,274</td>
<td>23,556</td>
<td>3%</td>
</tr>
<tr>
<td>Blackspotted/rougheyse (H-Proj)</td>
<td>3b/5</td>
<td>511 *(12%)</td>
<td>684</td>
<td>9%</td>
</tr>
<tr>
<td>Shortraker rockfish (C-Rep)</td>
<td>5</td>
<td>530</td>
<td>706</td>
<td>0%</td>
</tr>
<tr>
<td>Other rockfish (C-Rep)</td>
<td>5</td>
<td>1,260</td>
<td>1,680</td>
<td>0%</td>
</tr>
</tbody>
</table>

*xx% Reduced from maximum permissible ABC
CHAPTER 13
NORTHERN ROCKFISH

- Tier 3a; Update Assessment; Risk (2,2,1,1)
  - Same model, data update
    - Negative retrospective pattern
      (Mohn’s rho = -0.16)
  - Fishery
    - Continued development of target fishery
    - Rapidly increasing catches
CHAPTER 13
NORTHERN ROCKFISH

- Tier 3a; Update Assessment; Risk (2,2,1,1)
- Same model, data update
  - Negative retrospective pattern
    (Mohn’s rho = -0.16)
- Fishery
  - Continued development of target fishery
  - Rapidly increasing catches
CHAPTER 13
NORTHERN ROCKFISH

- Tier 3a; Update Assessment; Risk (2,2,1,1)

- Stock Structure
  - Update of stock structure information requested by SSC
  - Spatial patterns in growth, and spatial genetic structure (Larson September PT presentation)

- Management
  - Mismatch between spatial scale of management and spatial population structure

- Risk table
  - Catch << ABC. Do not recommend reductions from maxABC, but monitor stock and fishery
Tier 3a; Update Assessment; Risk (2,2,1,1)

Team agreed with author’s recommendation and stayed with base model

No additional recommendations

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Last asmt.</th>
<th>This asmt.</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>0.054</td>
<td>0.052</td>
<td>-4%</td>
</tr>
<tr>
<td>2023 Tier 3a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024 Tier 3a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023 age+ biomass</td>
<td>277,133</td>
<td></td>
<td>7%</td>
</tr>
<tr>
<td>2024 age+ biomass</td>
<td>273,414</td>
<td>297,189</td>
<td>9%</td>
</tr>
<tr>
<td>2023 spawning biomass</td>
<td>118,251</td>
<td>115,209</td>
<td>11%</td>
</tr>
<tr>
<td>2024 spawning biomass</td>
<td>128,229</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B0</td>
<td>171,768</td>
<td>187,268</td>
<td>9%</td>
</tr>
<tr>
<td>2024 F_{OFL}</td>
<td>0.085</td>
<td>0.086</td>
<td>1%</td>
</tr>
<tr>
<td>2024 F_{ABC}</td>
<td>0.069</td>
<td>0.070</td>
<td>1%</td>
</tr>
<tr>
<td>2023 OFL</td>
<td>22,776</td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>2024 OFL</td>
<td>22,105</td>
<td>23,556</td>
<td>7%</td>
</tr>
<tr>
<td>2023 ABC</td>
<td>18,687</td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>2024 ABC</td>
<td>18,135</td>
<td>19,274</td>
<td>6%</td>
</tr>
</tbody>
</table>
### Stock Tier 2024 ABC

<table>
<thead>
<tr>
<th>Stock</th>
<th>Tier</th>
<th>2024 ABC (t)</th>
<th>2024 OFL (t)</th>
<th>Change from 2023 ABC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atka mackerel (H-Rep)</td>
<td>3a</td>
<td>95,358</td>
<td>111,684</td>
<td>-3%</td>
</tr>
<tr>
<td>Skates (Update)</td>
<td>3a/5</td>
<td>37,808</td>
<td>45,574</td>
<td>-2%</td>
</tr>
<tr>
<td>Sharks (C-Rep)</td>
<td>6</td>
<td>450*(13%)</td>
<td>689</td>
<td>0%</td>
</tr>
<tr>
<td>Octopus (Update)</td>
<td>6</td>
<td>4,560</td>
<td>6,080</td>
<td>28%</td>
</tr>
</tbody>
</table>

*xx% Reduced from maximum permissible ABC*
SKATES

Tier 3a and 5; Update Assessment, risk table ((2,1),1,1,1)

Alaska Skate Tier 3a

- Update to catch and survey data
- Migration from older version of stock synthesis

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Last asmt.</th>
<th>This asmt.</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>0.13</td>
<td>0.13</td>
<td>0%</td>
</tr>
<tr>
<td>2023 Tier 3a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024 Tier 3a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023 age+ biomass</td>
<td>473,527</td>
<td></td>
<td>-4%</td>
</tr>
<tr>
<td>2024 age+ biomass</td>
<td>450,679</td>
<td>455,367</td>
<td>1%</td>
</tr>
<tr>
<td>2023 spawning biomass</td>
<td>114,804</td>
<td></td>
<td>-7%</td>
</tr>
<tr>
<td>2024 spawning biomass</td>
<td>105,595</td>
<td>107,197</td>
<td>2%</td>
</tr>
<tr>
<td>B₀</td>
<td>178,425</td>
<td>172,881</td>
<td>-3%</td>
</tr>
<tr>
<td>2024 F_OFL</td>
<td>0.092</td>
<td>0.093</td>
<td>1%</td>
</tr>
<tr>
<td>2024 F_ABC</td>
<td>0.079</td>
<td>0.080</td>
<td>1%</td>
</tr>
<tr>
<td>2023 OFL</td>
<td>35,503</td>
<td></td>
<td>-9%</td>
</tr>
<tr>
<td>2024 OFL</td>
<td>33,451</td>
<td>32,429</td>
<td>-3%</td>
</tr>
<tr>
<td>2023 ABC</td>
<td>30,567</td>
<td></td>
<td>-9%</td>
</tr>
<tr>
<td>2024 ABC</td>
<td>28,799</td>
<td>27,950</td>
<td>-3%</td>
</tr>
</tbody>
</table>
CHAPTER 18
SKATES

Total Catch

Year

Total Biomass

Year

Age 1 Recruitment

Year Class

Spawning Biomass

Year
CHAPTER 18
SKATES

- Tier 3a and 5; Update Assessment, risk table ((2,1),1,1,1)
- Other Skates Tier 5
  - Update to survey biomass estimates
  - New REMA model run

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Last asmt.</th>
<th>This asmt.</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>0.1</td>
<td>0.1</td>
<td>0%</td>
</tr>
<tr>
<td>2023 Tier</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024 Tier</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2023 age+ biomass</td>
<td>107,174</td>
<td>107,174</td>
<td>23%</td>
</tr>
<tr>
<td>2024 age+ biomass</td>
<td>107,174</td>
<td>131,446</td>
<td>23%</td>
</tr>
<tr>
<td>2024 F_{OFL}</td>
<td>0.1</td>
<td>0.1</td>
<td>0%</td>
</tr>
<tr>
<td>2024 F_{ABC}</td>
<td>0.075</td>
<td>0.075</td>
<td>0%</td>
</tr>
<tr>
<td>2023 OFL</td>
<td>10,717</td>
<td>10,717</td>
<td>23%</td>
</tr>
<tr>
<td>2024 OFL</td>
<td>10,717</td>
<td>13,145</td>
<td>23%</td>
</tr>
<tr>
<td>2023 ABC</td>
<td>8,038</td>
<td>8,038</td>
<td>23%</td>
</tr>
<tr>
<td>2024 ABC</td>
<td>8,038</td>
<td>9,858</td>
<td>23%</td>
</tr>
</tbody>
</table>
Tier 6; Update assessment; risk table (1,1,1,1)

Tier 6 based on Consumption model

- Updated Pacific cod stomach samples
- No model changes

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Last asmt.</th>
<th>This asmt.</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023 Tier</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2024 Tier</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2023 OFL</td>
<td>4,769</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024 OFL</td>
<td>4,769</td>
<td>6,080</td>
<td>27%</td>
</tr>
<tr>
<td>2023 ABC</td>
<td>3,576</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024 ABC</td>
<td>3,576</td>
<td>4,560</td>
<td>28%</td>
</tr>
</tbody>
</table>
APPENDIX 1
FORAGE FISH

Bottom trawl survey
- Capelin and eulachon down.
- Herring and shrimp up.
- BASIS survey down.

Fisheries
- Squid and herring catches up.
- All other catches down.

Future
- Spatiotemporal models + environmental linkages
- Synthetic indices of forage
# Harvest Projection Summary

<table>
<thead>
<tr>
<th>Stock</th>
<th>Tier</th>
<th>2024 ABC (t)</th>
<th>2024 OFL (t)</th>
<th>Change from 2023 ABC</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI pollock (H-Proj)</td>
<td>3a</td>
<td>42,654</td>
<td>51,516</td>
<td>-2%</td>
</tr>
<tr>
<td>Greenland turb. (H-Proj)*</td>
<td>3a</td>
<td>3,188</td>
<td>3,705</td>
<td>-19%</td>
</tr>
<tr>
<td>Arrowtooth fl (H-Proj)</td>
<td>3a</td>
<td>87,690</td>
<td>103,280</td>
<td>5%</td>
</tr>
<tr>
<td>Kamchatka fl. (H-Proj)</td>
<td>3a</td>
<td>7,498</td>
<td>8,850</td>
<td>-1%</td>
</tr>
<tr>
<td>Northern rsole (H-Proj)</td>
<td>1a</td>
<td>122,091*(36%)</td>
<td>197,828</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Flathead sole (H-Proj)</td>
<td>3a</td>
<td>67,289</td>
<td>81,605</td>
<td>3%</td>
</tr>
<tr>
<td>Alaska plaice (H-Proj)</td>
<td>3a</td>
<td>35,494</td>
<td>42,695</td>
<td>5%</td>
</tr>
<tr>
<td>Pacific ocean perch (H-Proj)</td>
<td>3a</td>
<td>41,096</td>
<td>49,010</td>
<td>-2%</td>
</tr>
<tr>
<td>Blackspotted/rougheye (H-Proj)</td>
<td>3b/5</td>
<td>511*(12%)</td>
<td>684</td>
<td>9%</td>
</tr>
<tr>
<td>Atka mackerel (H-Proj)</td>
<td>3a</td>
<td>95,358</td>
<td>111,684</td>
<td>-3%</td>
</tr>
</tbody>
</table>

* Team recommendation made even though it was a harvest projection year.
CHAPTER 4
GREENLAND TURBOT RECOMMENDATIONS

- Greenland Turbot (Harvest Projection)
  - The Team was concerned about the status of Greenland turbot and recommended an operational full assessment due to concerns with continued long term declines in survey indices as well as the inability of the model to fit the indices.
### CATCH REPORT SUMMARY

<table>
<thead>
<tr>
<th>Stock</th>
<th>Tier</th>
<th>2024 ABC (t)</th>
<th>2024 OFL (t)</th>
<th>Change from 2023 ABC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bogoslof poll. (C-Rep)</td>
<td>5</td>
<td>86,360</td>
<td>115,1460</td>
<td>0%</td>
</tr>
<tr>
<td>Other flatfish (C-Rep)</td>
<td>5</td>
<td>17,189</td>
<td>22,919</td>
<td>0%</td>
</tr>
<tr>
<td>Shortraker rockfish (C-Rep)</td>
<td>5</td>
<td>530</td>
<td>706</td>
<td>0%</td>
</tr>
<tr>
<td>Other rockfish (C-Rep)</td>
<td>5</td>
<td>1,260</td>
<td>1,680</td>
<td>0%</td>
</tr>
<tr>
<td>Sharks (C-Rep)</td>
<td>6</td>
<td>450 *(13%)</td>
<td>689</td>
<td>0%</td>
</tr>
</tbody>
</table>

*xx% Reduced from maximum permissible ABC
THANK YOU
The Team recommended that a bullet point be added in harvest projection presentations to explain reductions or changes in max ABC when it occurs.

The Team recommended that as a best practice that appendices be linked in the front of the document (as with the sablefish assessment) to allow for an easier review of the appendices.
BSAI TEAM
POLLOCK RECOMMENDATIONS

- **EBS Pollock**
  - The Team recommended continuing to evaluate projection bias due to selectivity assumptions, and the examination of new methods that may reduce that bias.
  - The Team recommended that the authors clearly state where MLE estimates are being used and where MCMC estimates are being used.
  - The Team recommended using posterior distributions from the MCMC to determine probabilities in the risk table and expanding the risk table to at least include the recommended ABC.

- **EBS Multi-species Model**
  - Kirstin intends to communicate with authors earlier in next year’s assessment cycle to help facilitate risk assessment, which is further recommended by the Team.
BSAI TEAM
PACIFIC COD RECOMMENDATIONS

- **Pacific cod - EBS**
  - The Team recommended expanding the discussion of uncertainty around M in the risk table. For example, the interplay between M and q, and what may elevate the risk to a level 2 categorization.

- **Pacific cod - Aleutian Islands**
  - The Team recommended that authors refrain from reusing model names previously reviewed and provide unique model names for any new model configurations up for review by the Team.
  - The Team recommended that the authors investigate length-weight data and look for changes over time.
  - The Team also recommended that a sensitivity analysis on M similar to what was provided in the eastern Bering sea Pacific cod assessment be presented given the high uncertainty in that value.
  - The Team recommended that the authors conduct a sensitivity analysis and provide the probability of being under B_{20%} given the three projection scenarios similar to what was provided in the Bering Sea Pacific cod stock assessment.
Yellowfin sole

The Team recommended that the author conduct a model sensitivity analysis to evaluate the current approach used for natural mortality and the effect it has on model performance and results, including estimating female natural mortality of the current approach to using natural mortality that is estimated for males and fixed for females.

Greenland Turbot

The Team was concerned about the status of Greenland turbot and recommended an operational full assessment due to concerns with continued long term declines in survey indices as well as the inability of the model to fit the indices.
BSAI TEAM
OTHER FISHES RECOMMENDATIONS

- **Skates**
  - The Team recommends the authors examine using a catchability that is tuned to temperature.
  - The Team applauded the authors’ approach to not change the methodology for this first assessment cycle after the change in authorship, and gave the authors leeway to explore the data and assessment methodology in more detail to come up with the improvements that should be incorporated into the model for the next assessment cycle. The Team recommended this approach be used as the model for how authorship transfers be conducted going forward.

- **Octopus**
  - The Team recommends that the next assessment contain a link to the original consumption methodology employed in the 2012 analysis.
Forage Species

The Team recommended providing some indication on future plots of reference levels across years to show consistent comparative information across years and trends.

The Team recommended working in collaboration with the ESR team and to consider how to contribute forage information to other initiatives such as ESP and ESR as time allows including the consideration of what is the best index of forage and how and where it can be reported on an annual basis.
Aleutian Islands pollock

- **Total Catch**
  - Graph showing total catch (kilograms) from 1978 to 2020 with peaks in the early 1990s.

- **Total Biomass**
  - Graph showing total biomass (kilograms) with a mean line and fluctuations from 1978 to 2020.

- **Age 1 Recruitment**
  - Graph showing recruitment (millions) by year class from 1977 to 2019 with a peak in 1987.

- **Spawning Biomass**
  - Graph showing spawning biomass (kilograms) with a line indicating MSY (B_{MSY}) from 1978 to 2020.
Blackspotted/Rougheye Rockfish

**Total Catch**

- Year: 1977 to 2019
- Scale: 0 to 3 kilotons

**Total Biomass**

- Year: 1977 to 2019
- Scale: 0 to 20 kilotons
- Mean line

**Age 3 Recruitment**

- Year Class: 1974 to 2016
- Scale: 0 to 20 millions

**Spawning Biomass**

- Year: 1977 to 2019
- Scale: 0 to 5 kilotons
- $B_{MSY}$ line
Pacific ocean perch
Alaska Plaice

Total Catch

Year Class

Total Biomass

Year

Age 3 Recruitment

Year Class

Spawning Biomass

Year
Arrowtooth Flounder

**Total Catch**

Year: 1976 to 2018

**Total Biomass**

Year: 1976 to 2018

**Age 1 Recruitment**

Year Class: 1975 to 2017

**Spawning Biomass**

Year: 1976 to 2018
Flathead sole

**Total Catch**

- Total Catch (kilotons)

**Total Biomass**

- Total Biomass (kilotons)
- Mean

**Age 3 Recruitment**

- Recruitment (millions)

**Spawning Biomass**

- Spawning Biomass (kilotons)
- $B_{MSY}$
Kamchatka flounder

Total Catch

Total Biomass

Age 2 Recruitment

Spawning Biomass
Northern rocksole

- **Total Catch**
  - Graph showing the total catch over the years from 1975 to 2023.
  - The x-axis represents the years, and the y-axis represents the total catch in kilotons.

- **Total Biomass**
  - Graph showing the total biomass over the years from 1975 to 2023.
  - The x-axis represents the years, and the y-axis represents the total biomass in kilotons.
  - A green dashed line indicates the mean biomass.

- **Age 0 Recruitment**
  - Graph showing the age 0 recruitment over the years from 1975 to 2023.
  - The x-axis represents the year classes, and the y-axis represents the recruitment in millions.

- **Spawning Biomass**
  - Graph showing the spawning biomass over the years from 1975 to 2023.
  - The x-axis represents the years, and the y-axis represents the spawning biomass in kilotons.
  - A red dashed line indicates the spawning biomass at MSY ($B_{MSY}$).
Greenland Turbot

Total Catch

Total Biomass

Age 0 Recruitment

Spawning Biomass
Atka Mackerel

**Total Catch**

**Total Biomass**

**Age 1 Recruitment**

**Spawning Biomass**