

## Projections and harvest decision table for 2024

- Project a constant TCEY for the next 3 years
- Calculate the probabilities of: stock decline, dropping below stock reference points, fishery decline, exceeding the reference $F_{43 \%}$ fishing intensity
- Include a range of mortality levels:
- No fishing
- Status quo +/- 5 and 10\%
- 1-year surplus production (<=50\% chance of dropping below current SB)
- 3-year surplus production
- $F_{43 \%}$ Reference
- $F_{40 \%}$ Maximum Economic Yield (MEY) proxy
- $F_{35 \%}$ Maximum Sustainable Yield (MSY) proxy


## Projections: no fishing mortality



## Projections: status quo (36.97 Mlb TCEY)



## Projections: 3-year surplus (39.1 MIb)



## Projections: $F_{43 \%}$ Reference (48.9 MIb)



## Projections: $F_{35 \%}$ MSY proxy (65.7 Mlb)



## Decision table

| 2024 Alternative |  |  | $\begin{gathered} \text { Status } \\ \text { quo -10\% } \end{gathered}$ | Status quo -5\% | Status quo | $\begin{gathered} \text { Status } \\ \text { quo }+5 \% \end{gathered}$ | 3-Year <br> Surplus | $\begin{gathered} \text { Status } \\ \text { quo +10\% } \end{gathered}$ |  | Reference $F_{43 \%}$ | $\begin{gathered} \text { MEY } \\ \text { proxy } \end{gathered}$ | $\begin{gathered} \text { MSY } \\ \text { proxy } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Total mortality (M Ib)TCEY (M Ib) | 0.0 | 21.6 | 34.9 | 36.7 | 38.6 | 40.4 | 40.7 | 42.3 | 46.6 | 50.5 | 56.1 | 67.3 |
|  | 0.0 | 20.0 | 33.3 | 35.1 | 37.0 | 38.8 | 39.1 | 40.7 | 45.0 | 48.9 | 54.5 | 65.7 |
| 2024 fishing intensity | $\mathrm{F}_{100 \%}$ | F68\% | $\mathrm{F}_{54 \%}$ | $\mathrm{F}_{52 \%}$ | $\mathrm{F}_{51 \%}$ | $\mathrm{F}_{50 \%}$ | $\mathrm{F}_{49 \%}$ | $\mathrm{F}_{48 \%}$ | $\mathrm{F}_{45 \%}$ | $\mathrm{F}_{43 \%}$ | $\mathrm{F}_{40 \%}$ | $\mathrm{F}_{35 \%}$ |
| Fishing intensity interval | -- | 46-79\% | 32-68\% | 31-67\% | 29-65\% | 28-64\% | 28-64\% | 27-63\% | 25-60\% | 23-58\% | 20-55\% | 17-50\% |

## Increasing mortality/fishing intensity $\rightarrow$ Increasing risk $\rightarrow$

## Decision table

|  | 2024 Alternative |  |  |  | $\begin{gathered} \text { Status } \\ \text { quo -10\% } \end{gathered}$ | Status quo -5\% | Status quo | $\begin{gathered} \text { Status } \\ \text { quo +5\% } \end{gathered}$ | 3-Year Surplus | $\begin{gathered} \text { Status } \\ \text { quo }+10 \% \end{gathered}$ |  | Reference $F_{43 \%}$ | $\begin{array}{\|c\|c\|} \text { MEY } \\ \text { proxy } \end{array}$ | $\begin{gathered} \text { Msy } \\ \text { proxy } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Total mortality (M Ib) TCEY (M Ib) <br> 2024 fishing intensity <br> Fishing intensity interval |  | 0.0 | 21.6 | 34.9 | 36.7 | 38.6 | 40.4 | 40.7 | 42.3 | 46.6 | 50.5 | 56.1 | 67.3 |
|  |  |  | 0.0 | 20.0 | 33.3 | 35.1 | 37.0 | 38.8 | 39.1 | 40.7 | 45.0 | 48.9 | 54.5 | 65.7 |
|  |  |  | $\mathrm{F}_{100 \%}$ | F68\% | $\mathrm{F}_{54 \%}$ | $\mathrm{F}_{52 \%}$ | $\mathrm{F}_{51 \%}$ | $\mathrm{F}_{50 \%}$ | $\mathrm{F}_{49 \%}$ | $\mathrm{F}_{48 \%}$ | $\mathrm{F}_{45 \%}$ | $\mathrm{F}_{43}$ \% | $\mathrm{F}_{40 \%}$ | $\mathrm{F}_{35 \%}$ |
|  |  |  | -- | 46-79\% | 32-68\% | 31-67\% | 29.65\% | 28-64\% | 28.64\% | 27-63\% | 25-60\% | 23-58\% | 20.55\% | 17.50\% |
| Stock Trend (spawning biomass) | in 2024 | is less than 2023 | $<1$ | 7 | 35 | 40 | 45 | 50 | 51 | 55 | 66 | 74 | 85 | 96 |
|  |  | is 5\% less than 2023 | $<1$ | $<1$ | 7 | 9 | 12 | 15 | 15 | 18 | 26 | 33 | 44 | 69 |
|  | in 2025 | is less than 2023 | $<1$ | 8 | 35 | 40 | 45 | 50 | 50 | 54 | 65 | 74 | 84 | 95 |
|  |  | is 5\% less than 2023 | $<1$ | 2 | 17 | 20 | 24 | 28 | 29 | 32 | 42 | 51 | 64 | 85 |
|  | in 2026 | is less than 2023 | $<1$ | 10 | 36 | 40 | 45 | 49 | 50 | 54 | 64 | 72 | 82 | 94 |
|  |  | is 5\% less than 2023 | $<1$ | 4 | 23 | 26 | 30 | 34 | 35 | 39 | 49 | 57 | 69 | 87 |

Risk of three-year SB decline

## Decision table

|  | 2024 Alternative |  |  |  | $\begin{gathered} \text { Status } \\ \text { quo -10\% } \end{gathered}$ | $\begin{gathered} \text { Status } \\ \text { quo -5\% } \end{gathered}$ | $\begin{aligned} & \text { Status } \\ & \text { quo } \end{aligned}$ | $\begin{gathered} \text { Status } \\ \text { quo +5\% } \end{gathered}$ | 3-Year Surplus | $\begin{gathered} \text { Status } \\ \text { quo }+10 \% \end{gathered}$ |  | Reference $\boldsymbol{F}_{43 \%}$ | $\begin{gathered} \text { MEY } \\ \text { proxy } \end{gathered}$ | $\begin{gathered} \text { MSY } \\ \text { proxy } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Total mortality (M Ib) <br> TCEY (M lb) <br> 2024 fishing intensity Fishing intensity interval |  | 0.0 | 21.6 | 34.9 | 36.7 | 38.6 | 40.4 | 40.7 | 42.3 | 46.6 | 50.5 | 56.1 | 67.3 |
|  |  |  | 0.0 | $20.0 \|$21.6 | 33.3 | 35.1 | 37.0 | 38.8 | 39.1 | 40.7 | 45.0 | 48.9 | 54.5 | 65.7 |
|  |  |  | $\mathrm{F}_{100 \%}$ | $\mathrm{F}_{68 \%}$ | $\mathrm{F}_{54 \%}$ | $\mathrm{F}_{52 \%}$ | $\mathrm{F}_{51 \%}$ | $\mathrm{F}_{50 \%}$ | $\mathrm{F}_{49 \%}$ | $\mathrm{F}_{48 \%}$ | $\mathrm{F}_{45 \%}$ | $\mathrm{F}_{43}$ | $\mathrm{F}_{40 \%}$ | $\mathrm{F}_{35 \%}$ |
|  |  |  | -- | 46-79\% | 32-68\% | 31-67\% | 29.65\% | 28.64\% | 28.64\% | 27-63\% | 25-60\% | 23-58\% | 20.55\% | 17.50\% |
| Stock Status (Spawning biomass) | in 2024 | is less than $\mathbf{3 0 \%}$ | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 26 | 26 | 26 | 26 |
|  |  | is less than $\mathbf{2 0 \%}$ | $<1$ | <1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 9 |
|  | in 2025 | is less than $\mathbf{3 0 \%}$ | 21 | 24 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 26 | 26 |
|  |  | is less than 20\% | $<1$ | $<1$ | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 7 | 9 | 16 |
|  | in 2026 | is less than $\mathbf{3 0 \%}$ | 8 | 21 | 24 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 26 | 26 |
|  |  | is less than 20\% | $<1$ | $<1$ | 2 | 2 | 3 | 3 | 3 | 4 | 6 | 8 | 12 | 19 |

Three-year risks of dropping below $S B_{30 \%}$ and $S B_{20 \%}$

## Full decision table

2024 Alternative

|  | TCEY (M Ib) |  | 0.0 |
| :---: | :---: | :---: | :---: |
|  |  |  |  |
|  |  | 2024 fishing intensity | F100\% |
|  | Fishing intensity interval |  | -- |
| Stock Trend (spawning biomass) | in 2024 | is less than 2023 | $<1$ |
|  |  | is $5 \%$ less than 2023 | $<1$ |
|  | in 2025 | is less than 2023 | $<1$ |
|  |  | is $5 \%$ less than 2023 | $<1$ |
|  | in 2026 | is less than 2023 | $<1$ |
|  |  | is $5 \%$ less than 2023 | $<1$ |
| Stock Status (Spawning biomass) | in 2024 | is less than 30\% | 25 |
|  |  | is less than $\mathbf{2 0 \%}$ | $<1$ |
|  | in 2025 | is less than 30\% | 21 |
|  |  | is less than $\mathbf{2 0 \%}$ | $<1$ |
|  | in 2026 | is less than 30\% | 8 |
|  |  | is less than $\mathbf{2 0 \%}$ | $<1$ |
| Fishery Trend (TCEY) | in 2024 | is less than 2023 | 0 |
|  |  | is $\mathbf{1 0 \%}$ less than 2023 | 0 |
|  | in 2025 | is less than 2023 | 0 |
|  |  | is $\mathbf{1 0 \%}$ less than 2023 | 0 |
|  | in 2026 | is less than 2023 | 0 |
|  |  | is $\mathbf{1 0 \%}$ less than 2023 | 0 |
| Fishery Status (Fishing intensity) | in 2023 | is above $\boldsymbol{F}_{43 \%}$ | 0 |


| $\begin{aligned} & \text { Status } \\ & \text { quo-10\% } \end{aligned}$ | Status quo -5\% | Status quo | $\begin{gathered} \text { Status } \\ \text { quo +5\% } \end{gathered}$ | 3-Year <br> Surplus | $\begin{gathered} \text { Status } \\ \text { quo +10\% } \end{gathered}$ |  | Reference $F_{43 \%}$ | $\begin{array}{c\|} \text { MEY } \\ \text { proxy } \end{array}$ | $\begin{gathered} \text { Msy } \\ \text { proxy } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 34.9 | 36.7 | 38.6 | 40.4 | 40.7 | 42.3 | 46.6 | 50.5 | 56.1 | 67.3 |
| 33.3 | 35.1 | 37.0 | 38.8 | 39.1 | 40.7 | 45.0 | 48.9 | 54.5 | 65.7 |
| $\mathrm{F}_{54 \%}$ | F52\% | $\mathrm{F}_{51 \%}$ | $\mathrm{F}_{50 \%}$ | F49\% | F48\% | F45\% | F43\% | F40\% | F35\% |
| 32-68\% | 31-67\% | 29-65\% | 28-64\% | 28-64\% | 27-63\% | 25-60\% | 23-58\% | 20-55\% | 17-50\% |
| 35 | 40 | 45 | 50 | 51 | 55 | 66 | 74 | 85 | 96 |
| 7 | 9 | 12 | 15 | 15 | 18 | 26 | 33 | 44 | 69 |
| 35 | 40 | 45 | 50 | 50 | 54 | 65 | 74 | 84 | 95 |
| 17 | 20 | 24 | 28 | 29 | 32 | 42 | 51 | 64 | 85 |
| 36 | 40 | 45 | 49 | 50 | 54 | 64 | 72 | 82 | 94 |
| 23 | 26 | 30 | 34 | 35 | 39 | 49 | 57 | 69 | 87 |
| 25 | 25 | 25 | 25 | 25 | 25 | 26 | 26 | 26 | 26 |
| 1 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 5 | 9 |
| 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 26 | 26 |
| 2 | 2 | 2 | 3 | 3 | 3 | 5 | 7 | 9 | 16 |
| 24 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 26 | 26 |
| 2 | 2 | 3 | 3 | 3 | 4 | 6 | 8 | 12 | 19 |
| 25 | 27 | 28 | 30 | 31 | 33 | 41 | 50 | 63 | 85 |
| 23 | 25 | 26 | 27 | 27 | 29 | 34 | 41 | 52 | 75 |
| 25 | 26 | 28 | 30 | 31 | 33 | 42 | 51 | 65 | 87 |
| 22 | 24 | 26 | 27 | 27 | 29 | 35 | 42 | 55 | 78 |
| 24 | 26 | 28 | 30 | 31 | 33 | 42 | 52 | 67 | 88 |
| 21 | 23 | 25 | 27 | 27 | 29 | 35 | 43 | 57 | 81 |
| 26 | 27 | 29 | 31 | 32 | 34 | 42 | 50 | 62 | 82 |

## Risks not included in the decision table

- Stock is at the lowest absolute population level in the last 30+ years (actual number or biomass of fish in the water)
- Recent poor recruitment and low weight-at-age have resulted in low productivity relative to the long-term average
- Low catch-rates in the FISS and directed commercial fisheries
- Biological Region 3 is currently at the lowest observed proportion of the coastwide biomass since 1993 (the full historical range is unknown)
- Ecosystem/climate uncertainty remains high
- Unclear when/if we should expect to see long term average productivity levels


## Recent adopted TCEYs

|  | 2. | 23 | 2 C | 3 | 38 | 4A | 48 | 4CDI | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2013 | 1.11 | 7.78 | 5.02 | 17.07 | 5.87 | 2.43 | 1.93 | 4.28 | 45.48 |
| 2014 | 1.11 | 7.64 | 5.47 | 12.05 | 3.73 | 1.56 | 1.49 | 3.58 | 36.65 |
| 201 | 1.06 | 7.91 | 6.20 | 13.00 | 3.72 | 1.96 | 1.53 | 4.27 | 39.63 |
| 2016 | 1.26 | 8.24 | 6.54 | 12.75 | 3.41 | 1.95 | 1.37 | 4.07 | 39.59 |
| 20 | 1.47 | 8.32 | 7.04 | 12.96 | 3.98 | 1.80 | 1.34 | 3.84 | 40.74 |
| 201 | 1.32 | 7.10 | 6.34 | 12.54 | 3.27 | 1.74 | 1.28 | 3.62 | 37 |
| 201 | 1.65 | 6.83 | 6.34 | 13.50 | 2.90 | 1.94 | 1.45 | 4.00 | 38.6 |
| 2020 | 1.65 | 6.83 | 5.85 | 12.20 | 3.12 | 1.75 | 1.31 | 3.90 | 36.60 |
| 2021 | 1.65 | 7.00 | 5.80 | 14.0 | 3.1 | 2.05 | 1.40 | 3.98 | 39 |
| 202 | 1.65 | 7.56 | 5.91 | 14.55 | 3.90 | 2.10 | 1.45 | 4.10 | 41.22 |
| 2023 | 1.65 | 6.7 | 5. | 12.0 | 3. | 1.73 | . 36 | 3.8 | 36.97 |

## Recent adopted TCEYs

|  | 2 A | 28 | 2 C | 34 | 38 | 4 A | 48 | 4CDE | Total | Coastwide | "Blue line" |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2013 | 1.11 | 7.78 | 5.02 | 17.07 | 5.87 | 2.43 | 1.93 | 4.28 | 45.48 | 36.63 |  |
| 2014 | 1.11 | 7.64 | 5.47 | 12.05 | 3.73 | 1.56 | 1.49 | 3.58 | 36.65 | 33.48 |  |
| 2015 | 1.06 | 7.91 | 6.20 | 13.00 | 3.72 | 1.96 | 1.53 | 4.27 | 39.63 | 35.48 |  |
| 2016 | 1.26 | 8.24 | 6.54 | 12.75 | 3.41 | 1.95 | 1.37 | 4.07 | 39.59 | 36.31 | $F_{46 \%}$ |
| 2017 | 1.47 | 8.32 | 7.04 | 12.96 | 3.98 | 1.80 | 1.34 | 3.84 | 40.74 | 39.10 |  |
| 2018 | 1.32 | 7.10 | 6.34 | 12.54 | 3.27 | 1.74 | 1.28 | 3.62 | 37.21 | 31.00 |  |
| 2019 | 1.65 | 6.83 | 6.34 | 13.50 | 2.90 | 1.94 | 1.45 | 4.00 | 38.61 | 40.00 |  |
| 2020 | 1.65 | 6.83 | 5.85 | 12.20 | 3.12 | 1.75 | 1.31 | 3.90 | 36.60 | 31.90 |  |
| 2021 | 1.65 | 7.00 | 5.80 | 14.00 | 3.12 | 2.05 | 1.40 | 3.98 | 39.00 | 39.00 |  |
| 2022 | 1.65 | 7.56 | 5.91 | 14.55 | 3.90 | 2.10 | 1.45 | 4.10 | 41.22 | 41.22 |  |
| 2023 | 1.65 | 6.78 | 5.85 | 12.08 | 3.67 | 1.73 | 1.36 | 3.85 | 36.97 | 51.95 |  |
| 2024 |  |  |  |  |  |  |  |  |  | 48.88 |  |

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## Non-directed discard management in Alaska



Prohibited Species Catch (PSC) limits (MIb net)
BSAI:
Trawl LA=1.23,
Non-Trawl=1.17,
CDQ=0.52,
$\mathrm{A} 80=2.89 \rightarrow 2.31$

GOA:
Trawl (2.82), H\&L (0.44)

## Recommendations

## That the Commission:

1) NOTE paper IPHC-2023-IM099-12 Rev_1, which provides a summary of projections and the harvest decision table for 20242026.
2) REQUEST any additional harvest decision table alternatives for evaluation at AM100.
3) REQUEST any detailed mortality projections ${ }^{1}$ for 2024 (by IPHC Regulatory Area and fishery sector) for evaluation at AM100.
[^0]
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[^0]:    ${ }^{1}$ Detailed projections will include revised non-directed discard estimates through the end of 2023, available in early January.

