

INTERNATIONAL PACIFIC



HALIBUT COMMISSION  
*Celebrating 100 Years*  
1924-2024

# Stock projections and the harvest decision table for 2024-2026

Agenda item 7.1

IPHC-2024-IM099-12 Rev\_1

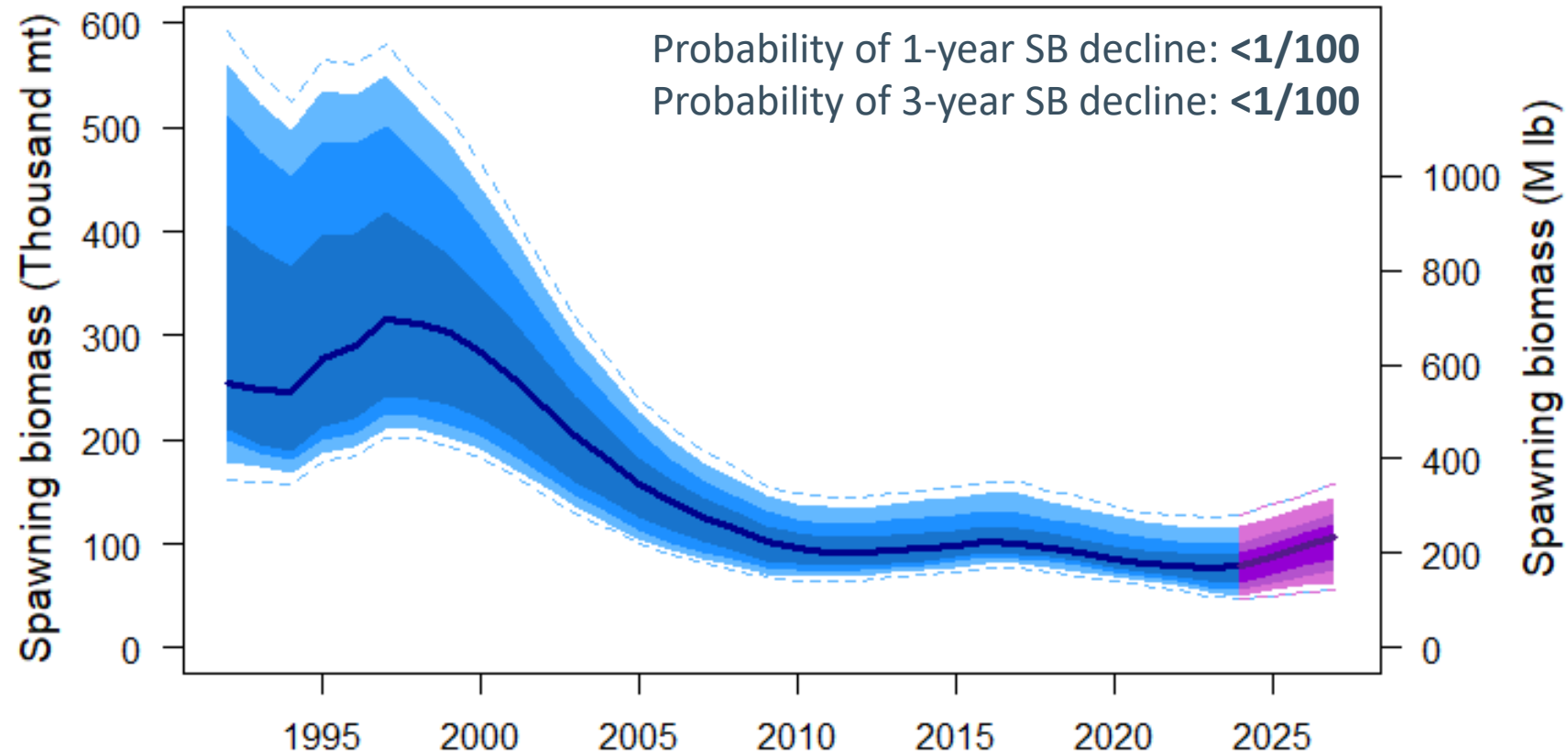
(I. Stewart, & A. Hicks)



# 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



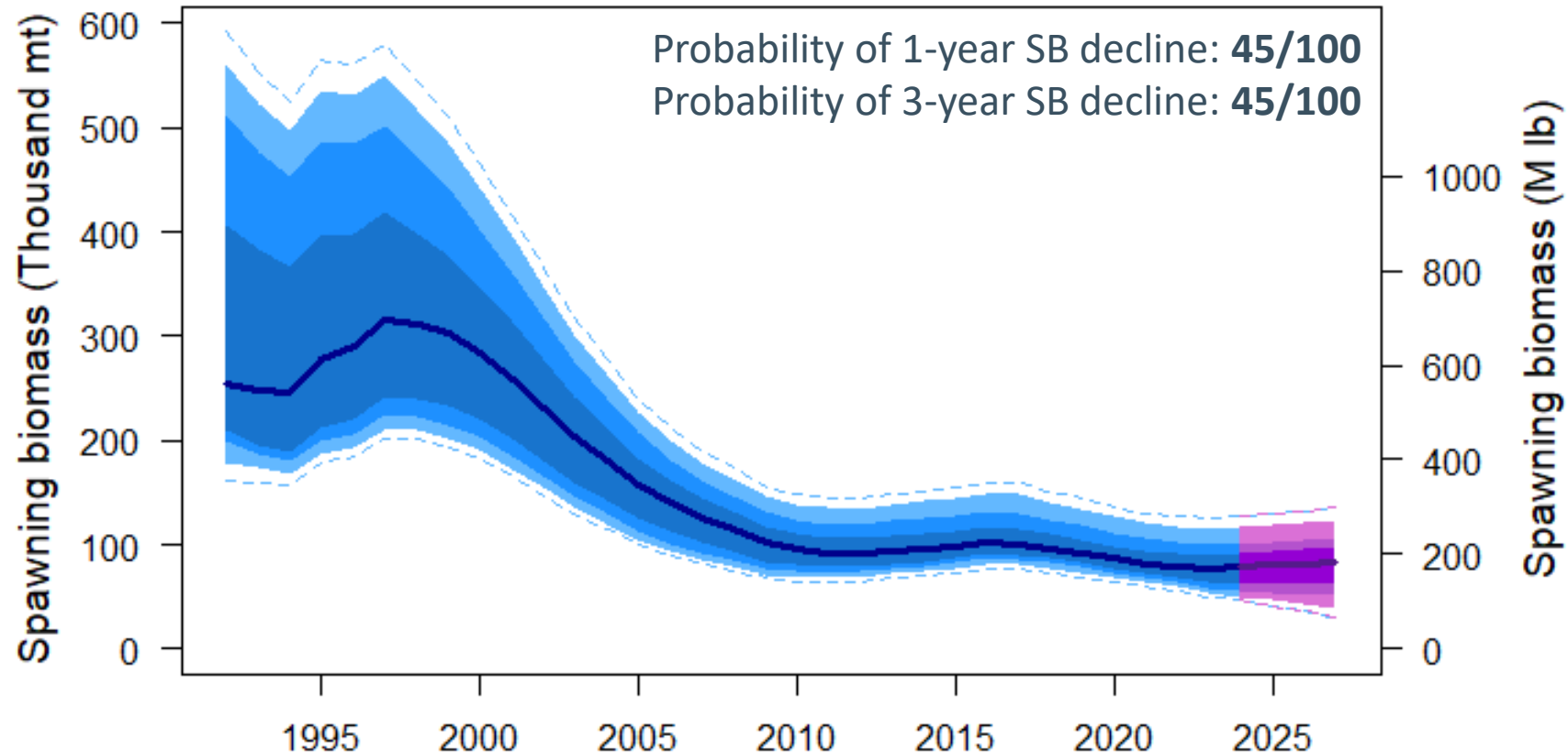
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1924

100 years

2024

# Projections: *status quo* (36.97 Mlb TCEY)



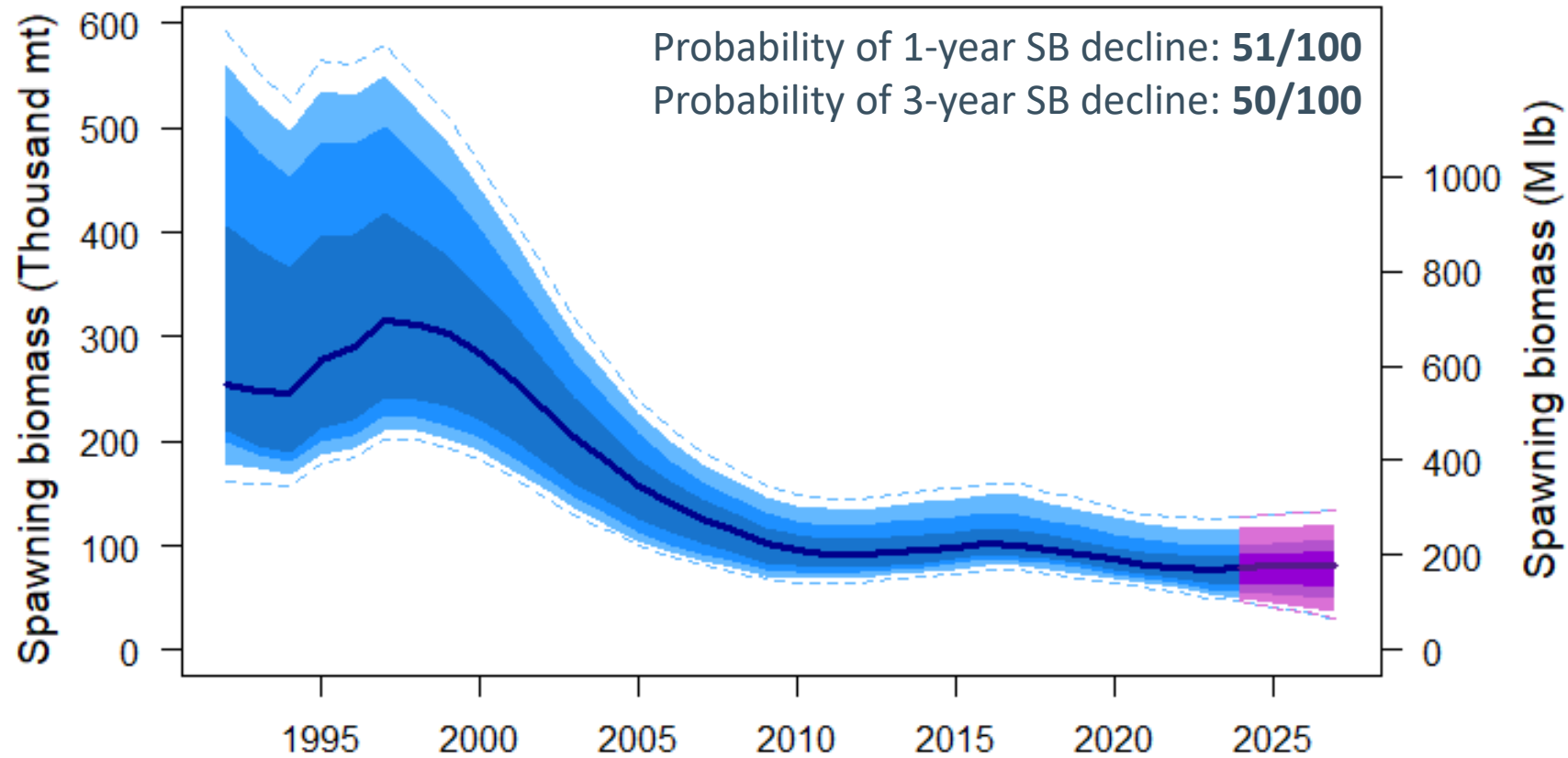
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1924

100 years

2024

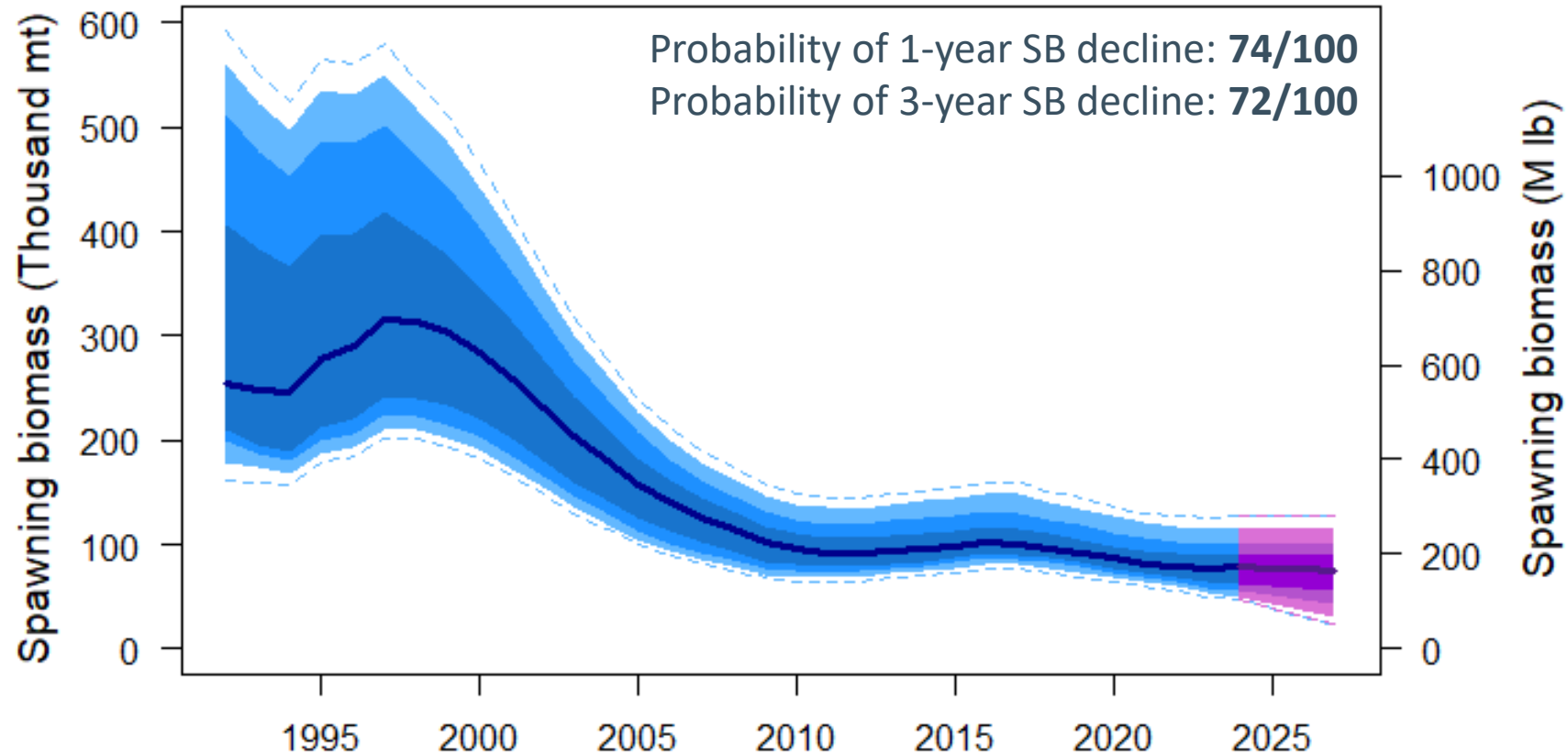
# Projections: 3-year surplus (39.1 Mlb)



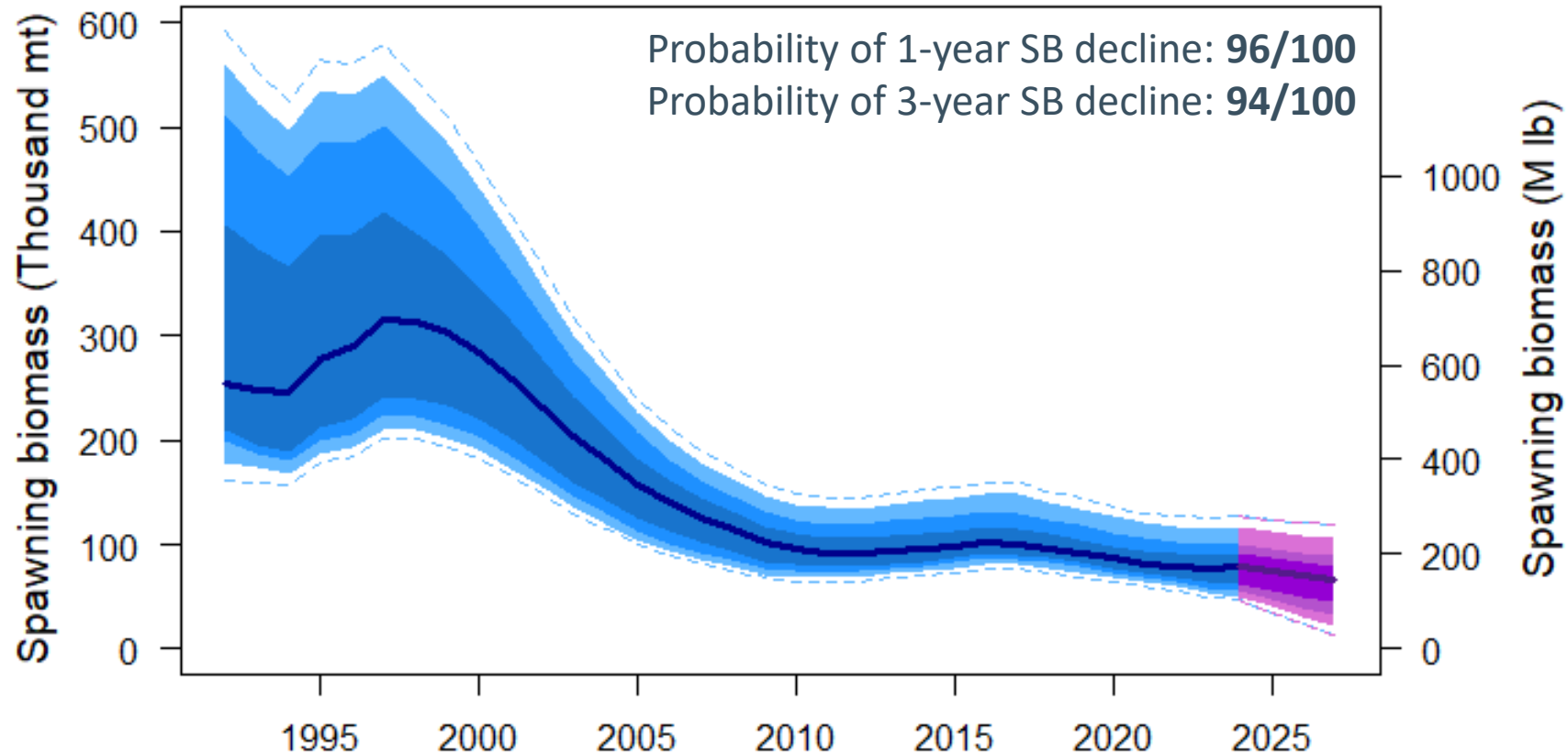
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1924 100 years 2024

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



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



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1924

100 years

2024

# Decision table

2024 Alternative			<i>Status quo -10%</i>	<i>Status quo -5%</i>	<i>Status quo</i>	<i>Status quo +5%</i>	3-Year Surplus	<i>Status quo +10%</i>		<i>Reference F<sub>43%</sub></i>	<i>MEY proxy</i>	<i>MSY proxy</i>
<b>Total mortality (M lb)</b>	<b>0.0</b>	<b>21.6</b>	<b>34.9</b>	<b>36.7</b>	<b>38.6</b>	<b>40.4</b>	<b>40.7</b>	<b>42.3</b>	<b>46.6</b>	<b>50.5</b>	<b>56.1</b>	<b>67.3</b>
<b>TCEY (M lb)</b>	<b>0.0</b>	<b>20.0</b>	<b>33.3</b>	<b>35.1</b>	<b>37.0</b>	<b>38.8</b>	<b>39.1</b>	<b>40.7</b>	<b>45.0</b>	<b>48.9</b>	<b>54.5</b>	<b>65.7</b>
<b>2024 fishing intensity</b>	<b>F<sub>100%</sub></b>	<b>F<sub>68%</sub></b>	<b>F<sub>54%</sub></b>	<b>F<sub>52%</sub></b>	<b>F<sub>51%</sub></b>	<b>F<sub>50%</sub></b>	<b>F<sub>49%</sub></b>	<b>F<sub>48%</sub></b>	<b>F<sub>45%</sub></b>	<b>F<sub>43%</sub></b>	<b>F<sub>40%</sub></b>	<b>F<sub>35%</sub></b>
<b>Fishing intensity interval</b>	--	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 →  
Increasing risk →





# Decision table

2024 Alternative			<i>Status quo -10%</i>	<i>Status quo -5%</i>	<i>Status quo</i>	<i>Status quo +5%</i>	3-Year Surplus	<i>Status quo +10%</i>		<i>Reference F<sub>43%</sub></i>	<i>MEY proxy</i>	<i>MSY proxy</i>
Total mortality (M lb)	0.0	21.6	34.9	36.7	38.6	40.4	40.7	42.3	46.6	50.5	56.1	67.3
TCEY (M lb)	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	F <sub>100%</sub>	F <sub>68%</sub>	F <sub>54%</sub>	F <sub>52%</sub>	F <sub>51%</sub>	F <sub>50%</sub>	F <sub>49%</sub>	F <sub>48%</sub>	F <sub>45%</sub>	F <sub>43%</sub>	F <sub>40%</sub>	F <sub>35%</sub>
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%

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			<i>Status quo -10%</i>	<i>Status quo -5%</i>	<i>Status quo</i>	<i>Status quo +5%</i>	3-Year Surplus	<i>Status quo +10%</i>		<i>Reference F<sub>43%</sub></i>	<i>MEY proxy</i>	<i>MSY proxy</i>
Total mortality (M lb)	0.0	21.6	34.9	36.7	38.6	40.4	40.7	42.3	46.6	50.5	56.1	67.3
TCEY (M lb)	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	F <sub>100%</sub>	F <sub>68%</sub>	F <sub>54%</sub>	F <sub>52%</sub>	F <sub>51%</sub>	F <sub>50%</sub>	F <sub>49%</sub>	F <sub>48%</sub>	F <sub>45%</sub>	F <sub>43%</sub>	F <sub>40%</sub>	F <sub>35%</sub>
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%

Stock Status (Spawning biomass)	in 2024	is less than 30%	25	25	25	25	25	25	25	26	26	26	26	
		is less than 20%	<1	<1	1	2	2	2	2	2	3	4	5	9
	in 2025	is less than 30%	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 30%	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  $SB_{30\%}$  and  $SB_{20\%}$



# Full decision table

## 2024 Alternative

Total mortality (M lb)

0.0	21.6
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TCEY (M lb)

0.0	20.0
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2024 fishing intensity

F <sub>100%</sub>	F <sub>68%</sub>
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Fishing Intensity Interval

--	46-79%
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Status quo -10%	Status quo -5%	Status quo	Status quo +5%	3-Year Surplus	Status quo +10%		Reference F <sub>43%</sub>	MEY proxy	MSY proxy
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
F <sub>54%</sub>	F <sub>52%</sub>	F <sub>51%</sub>	F <sub>50%</sub>	F <sub>49%</sub>	F <sub>48%</sub>	F <sub>45%</sub>	F <sub>43%</sub>	F <sub>40%</sub>	F <sub>35%</sub>
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	
Stock Status (Spawning biomass)	In 2024	Is less than 30%	25	25	25	25	25	25	25	26	26	26	26	
		Is less than 20%	<1	<1	1	2	2	2	2	3	4	5	9	
	In 2025	Is less than 30%	21	24	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 30%	8	21	24	25	25	25	25	25	25	26	26	
		Is less than 20%	<1	<1	2	2	3	3	3	4	6	8	12	19
Fishery Trend (TCEY)	In 2024	Is less than 2023	0	<1	25	27	28	30	31	33	41	50	63	85
		Is 10% less than 2023	0	<1	23	25	26	27	27	29	34	41	52	75
	In 2025	Is less than 2023	0	1	25	26	28	30	31	33	42	51	65	87
		Is 10% less than 2023	0	<1	22	24	26	27	27	29	35	42	55	78
	In 2026	Is less than 2023	0	1	24	26	28	30	31	33	42	52	67	88
		Is 10% less than 2023	0	<1	21	23	25	27	27	29	35	43	57	81
Fishery Status (Fishing Intensity)	In 2023	Is above F <sub>43%</sub>	0	<1	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

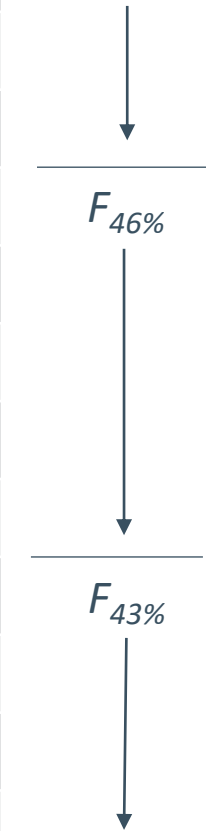
# Recent adopted TCEYs

	<b>2A</b>	<b>2B</b>	<b>2C</b>	<b>3A</b>	<b>3B</b>	<b>4A</b>	<b>4B</b>	<b>4CDE</b>	<b>Total</b>
<b>2013</b>	<b>1.11</b>	<b>7.78</b>	<b>5.02</b>	<b>17.07</b>	<b>5.87</b>	<b>2.43</b>	<b>1.93</b>	<b>4.28</b>	<b>45.48</b>
<b>2014</b>	<b>1.11</b>	<b>7.64</b>	<b>5.47</b>	<b>12.05</b>	<b>3.73</b>	<b>1.56</b>	<b>1.49</b>	<b>3.58</b>	<b>36.65</b>
<b>2015</b>	<b>1.06</b>	<b>7.91</b>	<b>6.20</b>	<b>13.00</b>	<b>3.72</b>	<b>1.96</b>	<b>1.53</b>	<b>4.27</b>	<b>39.63</b>
<b>2016</b>	<b>1.26</b>	<b>8.24</b>	<b>6.54</b>	<b>12.75</b>	<b>3.41</b>	<b>1.95</b>	<b>1.37</b>	<b>4.07</b>	<b>39.59</b>
<b>2017</b>	<b>1.47</b>	<b>8.32</b>	<b>7.04</b>	<b>12.96</b>	<b>3.98</b>	<b>1.80</b>	<b>1.34</b>	<b>3.84</b>	<b>40.74</b>
<b>2018</b>	<b>1.32</b>	<b>7.10</b>	<b>6.34</b>	<b>12.54</b>	<b>3.27</b>	<b>1.74</b>	<b>1.28</b>	<b>3.62</b>	<b>37.21</b>
<b>2019</b>	<b>1.65</b>	<b>6.83</b>	<b>6.34</b>	<b>13.50</b>	<b>2.90</b>	<b>1.94</b>	<b>1.45</b>	<b>4.00</b>	<b>38.61</b>
<b>2020</b>	<b>1.65</b>	<b>6.83</b>	<b>5.85</b>	<b>12.20</b>	<b>3.12</b>	<b>1.75</b>	<b>1.31</b>	<b>3.90</b>	<b>36.60</b>
<b>2021</b>	<b>1.65</b>	<b>7.00</b>	<b>5.80</b>	<b>14.00</b>	<b>3.12</b>	<b>2.05</b>	<b>1.40</b>	<b>3.98</b>	<b>39.00</b>
<b>2022</b>	<b>1.65</b>	<b>7.56</b>	<b>5.91</b>	<b>14.55</b>	<b>3.90</b>	<b>2.10</b>	<b>1.45</b>	<b>4.10</b>	<b>41.22</b>
<b>2023</b>	<b>1.65</b>	<b>6.78</b>	<b>5.85</b>	<b>12.08</b>	<b>3.67</b>	<b>1.73</b>	<b>1.36</b>	<b>3.85</b>	<b>36.97</b>

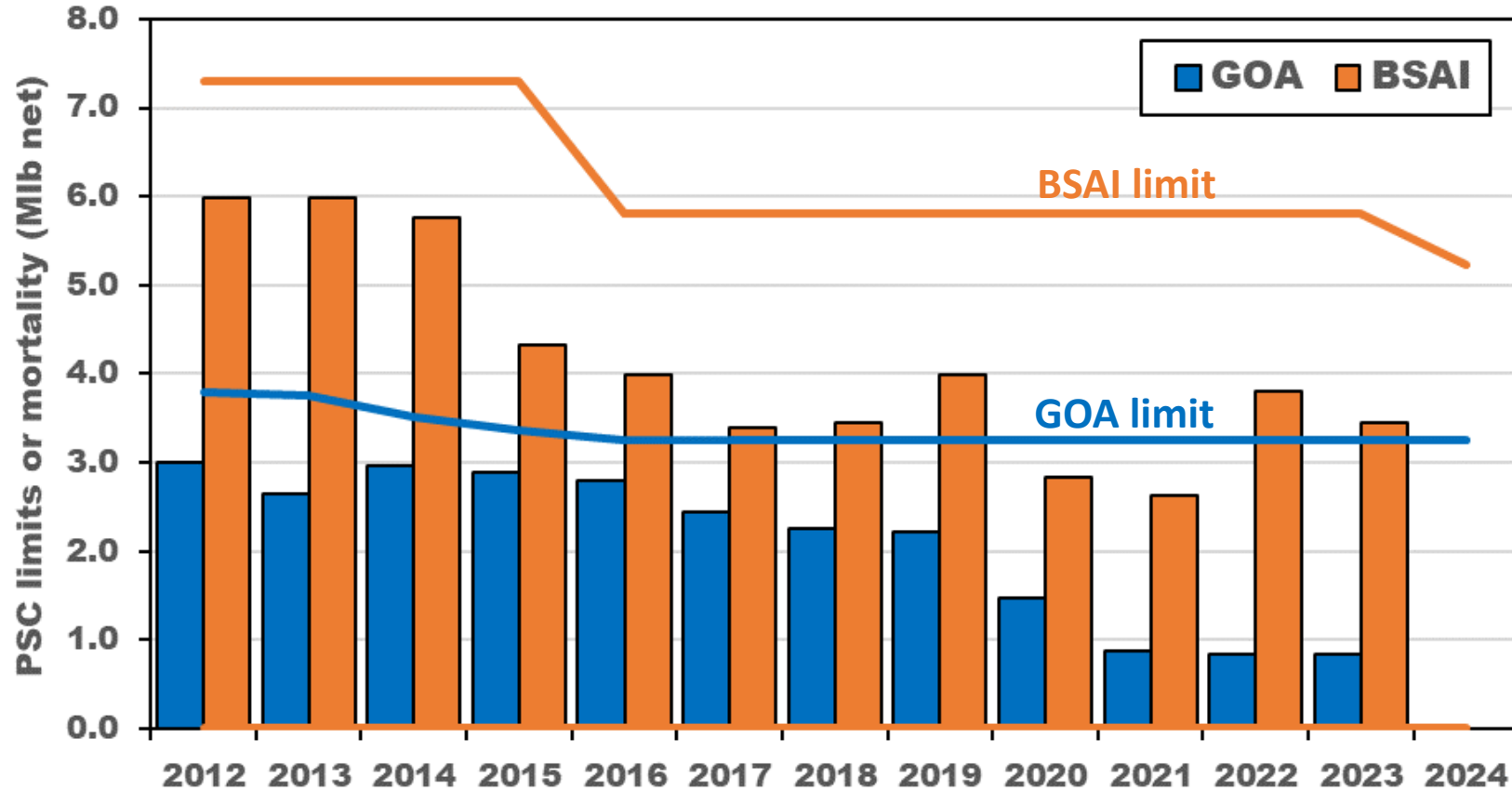
# Recent adopted TCEYs

	<b>2A</b>	<b>2B</b>	<b>2C</b>	<b>3A</b>	<b>3B</b>	<b>4A</b>	<b>4B</b>	<b>4CDE</b>	<b>Total</b>	'Reference' TCEY <b>Coastwide</b>
<b>2013</b>	<b>1.11</b>	<b>7.78</b>	<b>5.02</b>	<b>17.07</b>	<b>5.87</b>	<b>2.43</b>	<b>1.93</b>	<b>4.28</b>	<b>45.48</b>	<b>36.63</b>
<b>2014</b>	<b>1.11</b>	<b>7.64</b>	<b>5.47</b>	<b>12.05</b>	<b>3.73</b>	<b>1.56</b>	<b>1.49</b>	<b>3.58</b>	<b>36.65</b>	<b>33.48</b>
<b>2015</b>	<b>1.06</b>	<b>7.91</b>	<b>6.20</b>	<b>13.00</b>	<b>3.72</b>	<b>1.96</b>	<b>1.53</b>	<b>4.27</b>	<b>39.63</b>	<b>35.48</b>
<b>2016</b>	<b>1.26</b>	<b>8.24</b>	<b>6.54</b>	<b>12.75</b>	<b>3.41</b>	<b>1.95</b>	<b>1.37</b>	<b>4.07</b>	<b>39.59</b>	<b>36.31</b>
<b>2017</b>	<b>1.47</b>	<b>8.32</b>	<b>7.04</b>	<b>12.96</b>	<b>3.98</b>	<b>1.80</b>	<b>1.34</b>	<b>3.84</b>	<b>40.74</b>	<b>39.10</b>
<b>2018</b>	<b>1.32</b>	<b>7.10</b>	<b>6.34</b>	<b>12.54</b>	<b>3.27</b>	<b>1.74</b>	<b>1.28</b>	<b>3.62</b>	<b>37.21</b>	<b>31.00</b>
<b>2019</b>	<b>1.65</b>	<b>6.83</b>	<b>6.34</b>	<b>13.50</b>	<b>2.90</b>	<b>1.94</b>	<b>1.45</b>	<b>4.00</b>	<b>38.61</b>	<b>40.00</b>
<b>2020</b>	<b>1.65</b>	<b>6.83</b>	<b>5.85</b>	<b>12.20</b>	<b>3.12</b>	<b>1.75</b>	<b>1.31</b>	<b>3.90</b>	<b>36.60</b>	<b>31.90</b>
<b>2021</b>	<b>1.65</b>	<b>7.00</b>	<b>5.80</b>	<b>14.00</b>	<b>3.12</b>	<b>2.05</b>	<b>1.40</b>	<b>3.98</b>	<b>39.00</b>	<b>39.00</b>
<b>2022</b>	<b>1.65</b>	<b>7.56</b>	<b>5.91</b>	<b>14.55</b>	<b>3.90</b>	<b>2.10</b>	<b>1.45</b>	<b>4.10</b>	<b>41.22</b>	<b>41.22</b>
<b>2023</b>	<b>1.65</b>	<b>6.78</b>	<b>5.85</b>	<b>12.08</b>	<b>3.67</b>	<b>1.73</b>	<b>1.36</b>	<b>3.85</b>	<b>36.97</b>	<b>51.95</b>
<b>2024</b>										<b>48.88</b>

“Blue line”



# Non-directed discard management in Alaska



Prohibited Species Catch (PSC) limits (Mlb net)

BSAI:

Trawl LA=1.23,

Non-Trawl=1.17,

CDQ=0.52,

A80= 2.89 → 2.31

GOA:

Trawl (2.82),

H&L (0.44)



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1924 100 years 2024

# Recommendations

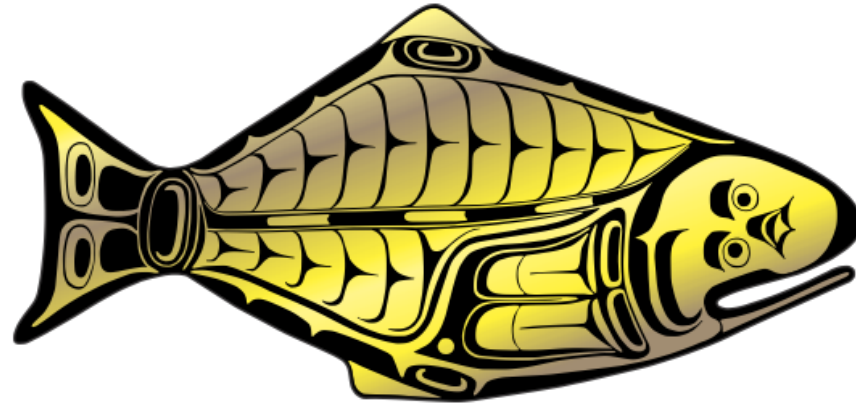
*That the Commission:*

- 1) **NOTE** paper IPHC-2023-IM099-12 Rev\_1, which provides a summary of projections and the harvest decision table for 2024-2026.
- 2) **REQUEST** any additional harvest decision table alternatives for evaluation at AM100.
- 3) **REQUEST** any detailed mortality projections<sup>1</sup> for 2024 (by IPHC Regulatory Area and fishery sector) for evaluation at AM100.

<sup>1</sup>Detailed projections will include revised non-directed discard estimates through the end of 2023, available in early January.



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