

INTERNATIONAL PACIFIC



HALIBUT COMMISSION

Stock projections and harvest decision table for 2025-2027

Agenda item: 7.1
IPHC-2025-AM101-13 Rev_1
(I. Stewart & A. Hicks)



Projections and harvest decision table for 2024

- Project a constant TCEY for the next 3 years, over a range of mortality levels, including:
 - No fishing
 - *Status quo +/- 5, 10, 15, 25%*
 - *3-year surplus production*
 - $F_{43\%}$ Reference
 - $F_{40\%}$ Maximum Economic Yield (MEY) proxy
 - $F_{35\%}$ Maximum Sustainable Yield (MSY) proxy
- Calculate the probabilities of: stock decline, dropping below stock reference points, fishery decline (to get to $F_{43\%}$ in the future), exceeding the reference $F_{43\%}$ fishing intensity in 2025



Reading the decision table

2025 Alternative

Total mortality (M lb)

TCEY (M lb)

2025 fishing intensity

Fishing intensity interval

		Status quo -10%	Status quo -5%	Status quo	F _{46%}	3-Year Surplus	Status quo +10%	Reference F _{43%}	MEY proxy	MSY proxy
0.0	21.8	35.6	35.3	37.1	37.8	39.2	40.7	41.1	46.1	55.1
0.0	20.0	35.3	35.3	35.3	35.3	37.4	38.8	39.8	44.3	53.2
F _{100%}	F _{63%}	F _{50%}	F _{48%}	F _{46%}	F _{46%}	F _{45%}	F _{44%}	F _{43%}	F _{40%}	F _{35%}
--	41-75%	28-65%	27-63%	26-62%	25-61%	24-60%	23-59%	23-59%	21-56%	17-51%

Yields: low → high

Stock Trend (spawning biomass)	in 2026	is less than 2025	<1	4	30	36	41	43	48	53	56	69	87
		is 5% less than 2025	<1	<1	5	7	10	11	14	16	18	28	49
	in 2027	is less than 2025	<1	7	34	39	44	46	50	54	57	68	86
		is 5% less than 2025	<1	2	17	21	25	26	30	33	36	47	69
	in 2028	is less than 2025	<1	7	33	38	44	45	50	54	57	69	86
		is 5% less than 2025	<1	3	21	25	29	31	35	39	42	54	76
Stock Status (Spawning biomass)	in 2026	is less than 30%	26	27	27	28	28	28	28	28	28	28	29
		is less than 20%	2	6	10	11	12	12	13	14	14	16	19
	in 2027	is less than 30%	25	25	26	26	26	26	26	27	27	27	28
		is less than 20%	<1	2	8	9	10	10	11	12	13	16	21
	in 2028	is less than 30%	18	25	26	26	26	26	26	27	27	27	28
		is less than 20%	<1	1	7	8	9	10	11	12	13	16	22
Fishery Trend (TCEY)	in 2026	is less than 2025	0	7	31	34	38	40	43	47	49	60	81
		is 10% less than 2025	0	7	31	34	38	39	43	47	49	60	80
	in 2027	is less than 2025	0	6	30	33	37	39	42	46	49	61	82
		is 10% less than 2025	0	6	30	33	37	38	42	46	48	60	81
	in 2028	is less than 2025	0	6	29	33	37	38	42	46	49	61	82
		is 10% less than 2025	0	5	29	33	37	38	42	46	49	61	82
Fishery Status (Fishing intensity)	in 2025	is above F _{43%}	0	8	32	36	40	41	44	48	50	60	79

Risk metrics

Estimated risks



Reading the decision table

2025 Alternative

Total mortality (M lb)

TCEY (M lb)

2025 fishing intensity

Fishing intensity interval

		Status quo -10%	Status quo -5%	Status quo	$F_{46\%}$	3-Year Surplus	Status quo +10%	Reference $F_{43\%}$	MEY proxy	MSY proxy
0.0	21.8	34.6	35.1	37.1	37.8	39.2	40.7	41.1	46.1	55.1
0.0	20.0	33.1	33.6	35.3	35.9	37.4	38.8	39.3	44.3	53.2
$F_{100\%}$	$F_{63\%}$	$F_{50\%}$	$F_{48\%}$	$F_{46\%}$	$F_{46\%}$	$F_{45\%}$	$F_{44\%}$	$F_{43\%}$	$F_{40\%}$	$F_{35\%}$
-	41-75%	28-65%	27-63%	26-62%	25-61%	24-60%	23-59%	23-59%	21-56%	17-51%

Yields: low → high

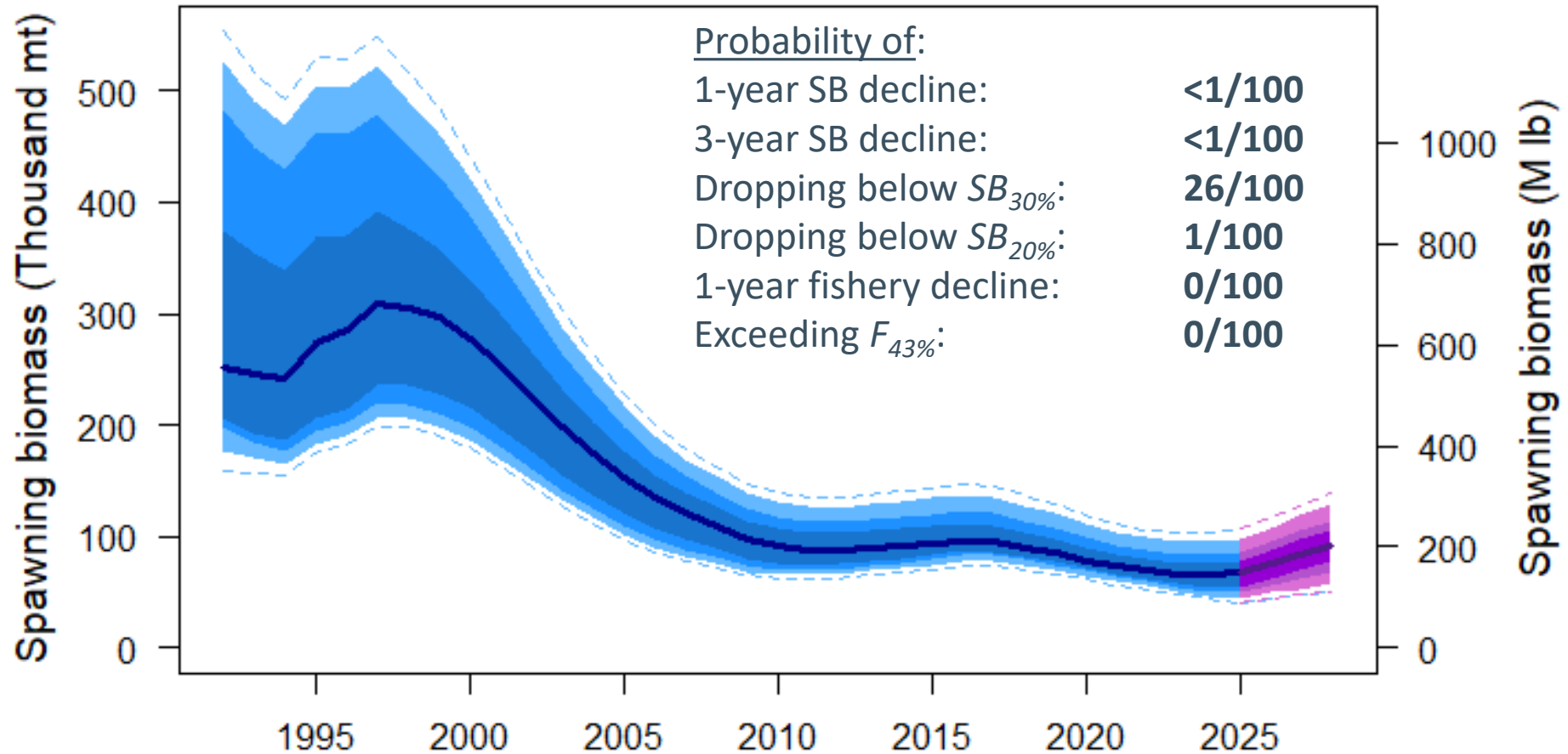
Stock Trend (spawning biomass)	in 2026	is less than 2025	<1	4	30	36	41	43	48	53	56	69	87	a
		is 5% less than 2025	<1	<1	5	7	10	11	14	16	18	28	49	b
	in 2027	is less than 2025	<1	7	34	39	44	46	50	54	57	68	86	c
		is 5% less than 2025	<1	2	17	21	25	26	30	33	36	47	69	d
	in 2028	is less than 2025	<1	7	33	38	44	45	50	54	57	69	86	e
		is 5% less than 2025	<1	3	21	25	29	31	35	39	42	54	76	f
Stock Status (Spawning biomass)	in 2026	is less than 30%	26	27	27	28	28	28	28	28	28	28	29	g
		is less than 20%	2	6	10	11	12	12	13	14	14	16	19	h
	in 2027	is less than 30%	25	25	26	26	26	26	26	27	27	27	28	i
		is less than 20%	<1	2	8	9	10	10	11	12	13	16	21	j
	in 2028	is less than 30%	18	25	26	26	26	26	26	27	27	27	28	k
		is less than 20%	<1	1	7	8	9	10	11	12	13	16	22	l
Fishery Trend (TCEY)	in 2026	is less than 2025	0	7	31	34	38	40	43	47	49	60	81	m
		is 10% less than 2025	0	7	31	34	38	39	43	47	49	60	80	n
	in 2027	is less than 2025	0	6	30	33	37	39	42	46	49	61	82	o
		is 10% less than 2025	0	6	30	33	37	38	42	46	48	60	81	p
	in 2028	is less than 2025	0	6	29	33	37	38	42	46	49	61	82	q
		is 10% less than 2025	0	5	29	33	37	38	42	46	49	61	82	r
Fishery Status (Fishing intensity)	in 2025	is above $F_{43\%}$	0	8	32	36	40	41	44	48	50	60	79	s

Risk metrics

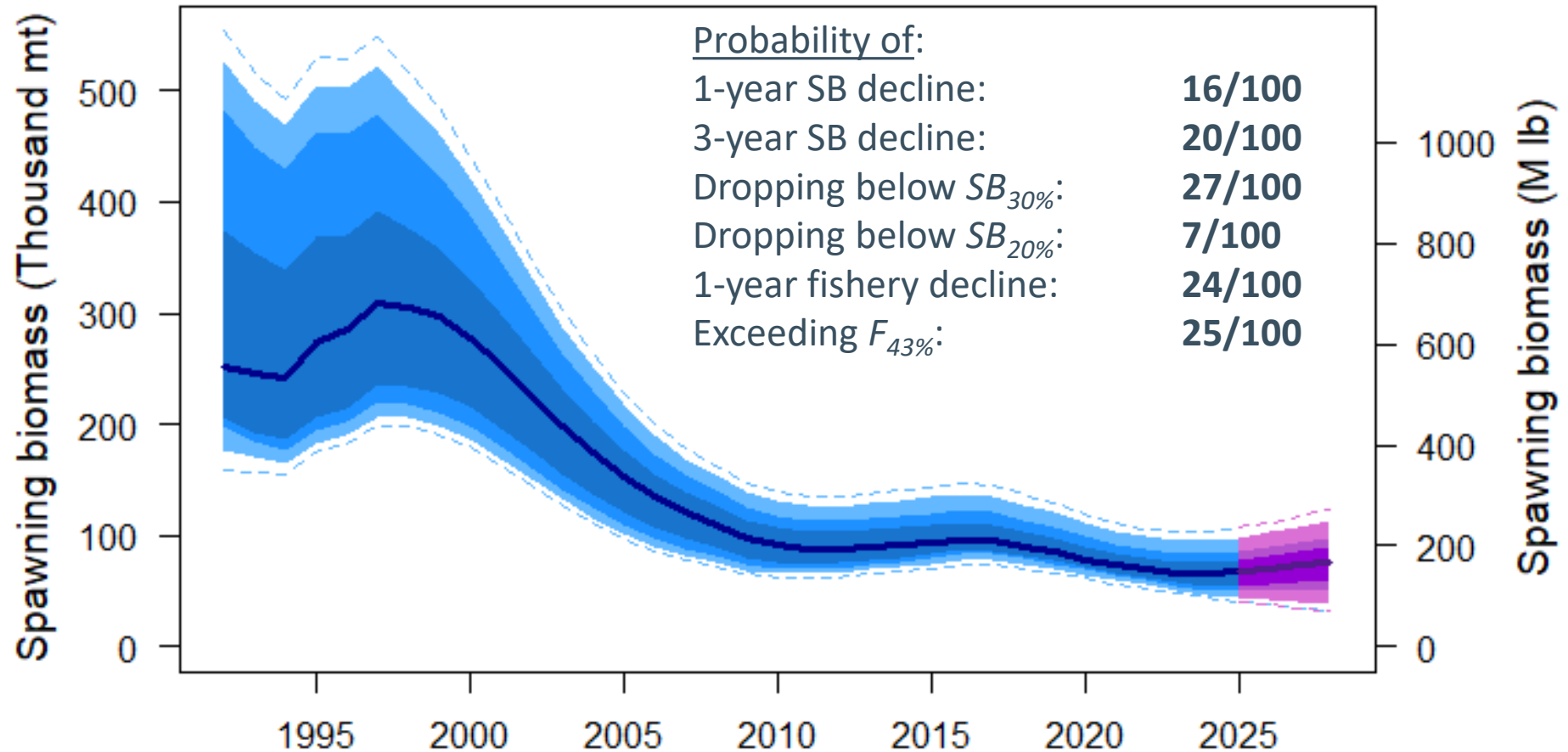
Estimated risks



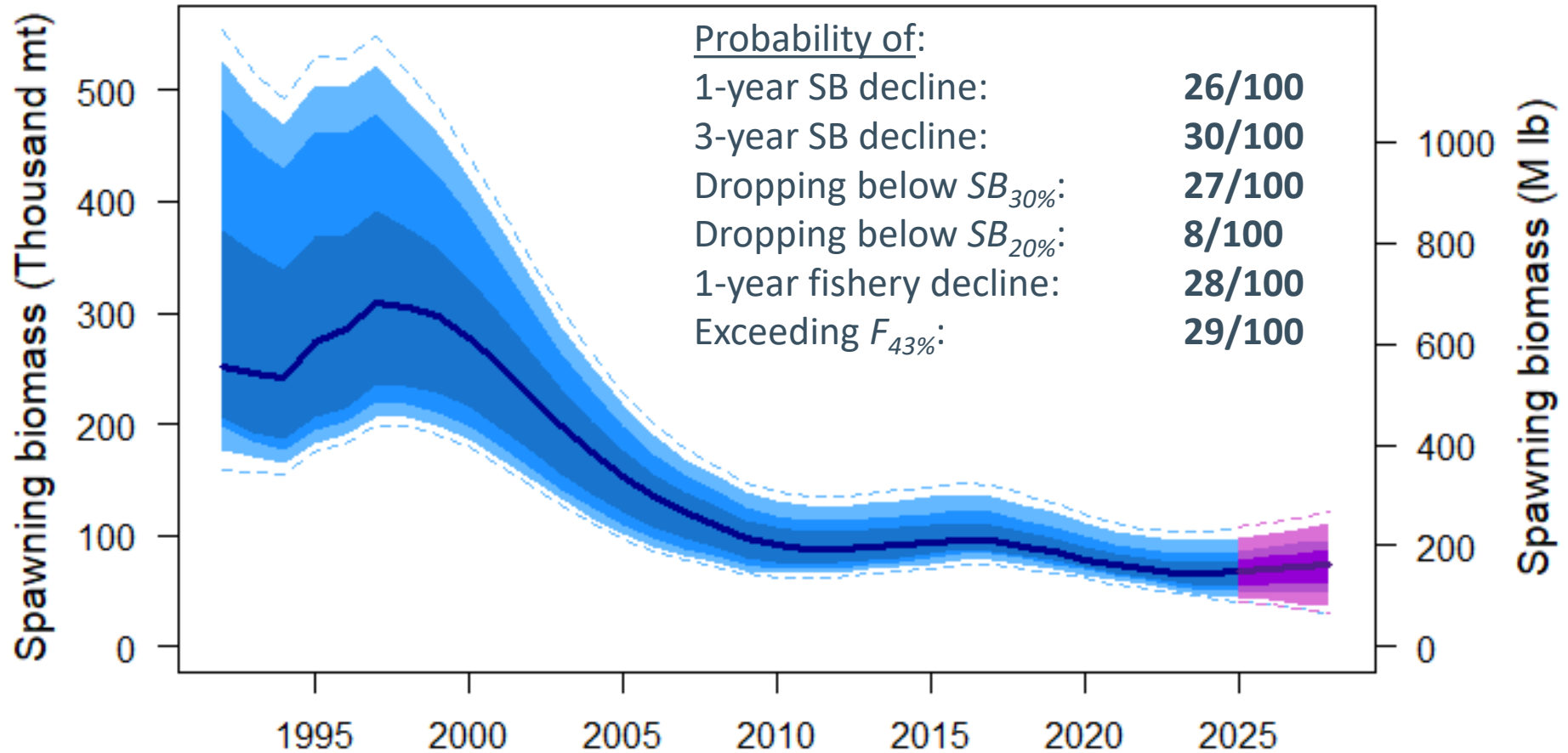
Projections: no fishing mortality (TCEY = 0; SPR = 100%)



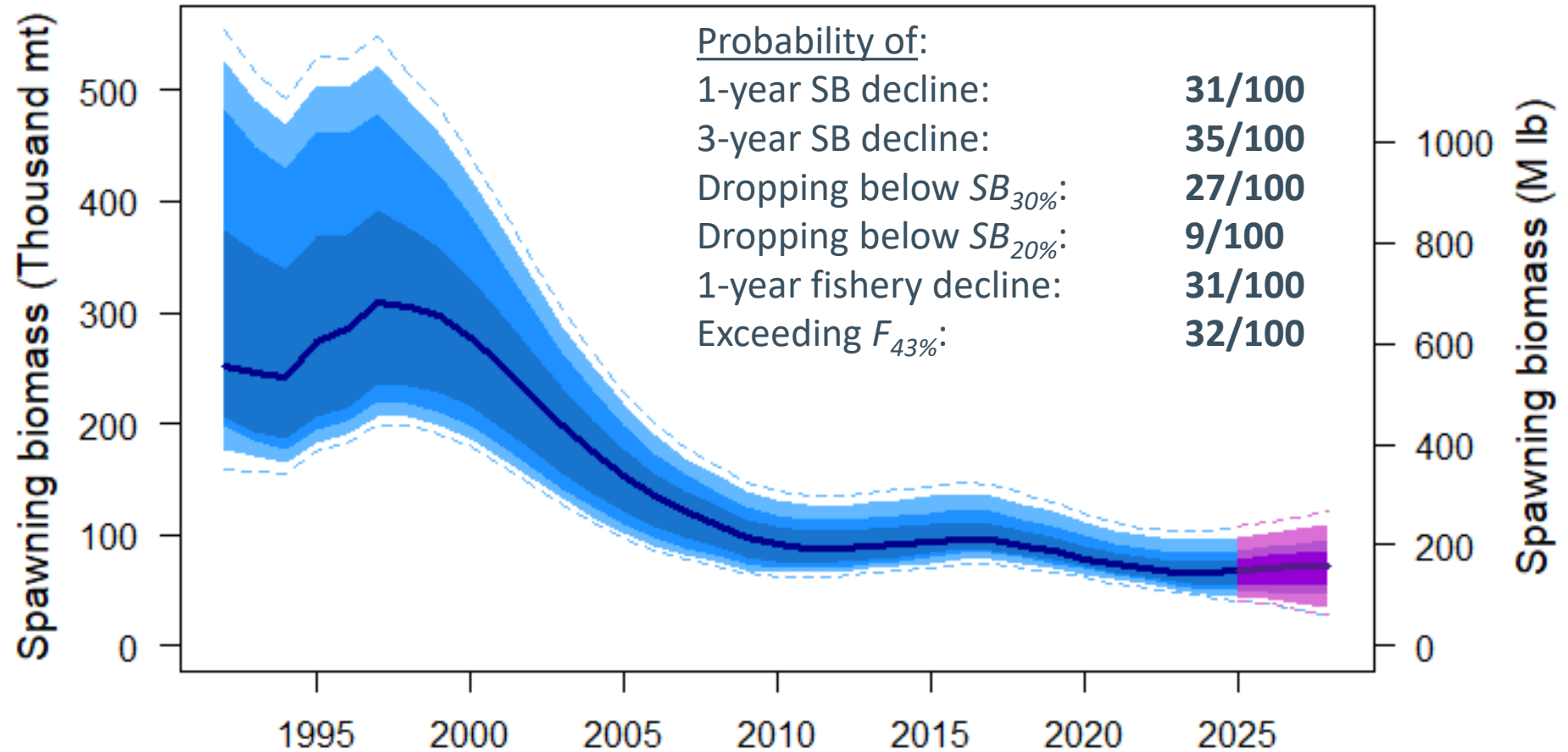
Projections: status quo -25% (TCEY = 26.46 Mlb; SPR = 55%)



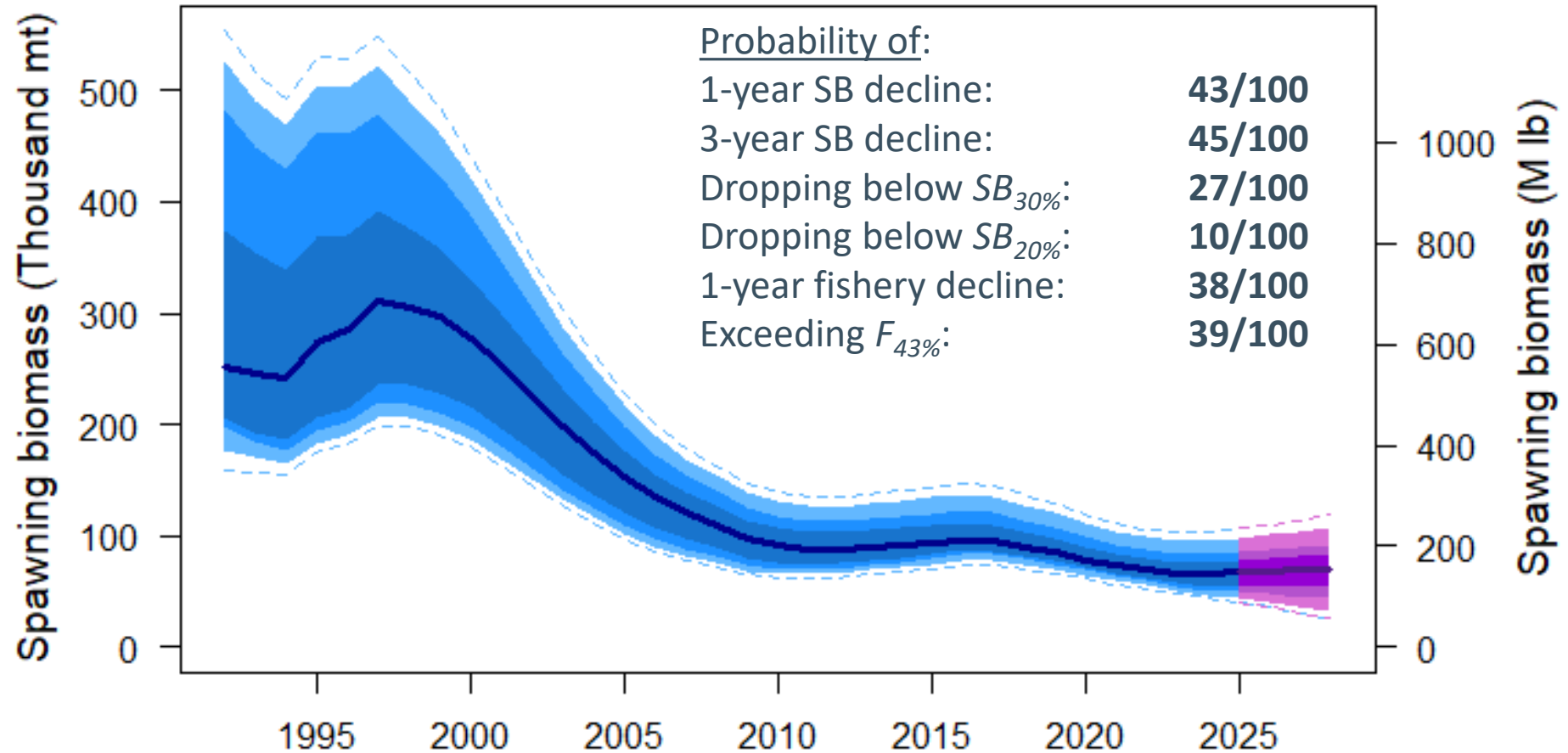
Projections: status quo -15% (TCEY = 29.99 Mlb; SPR = 51%)



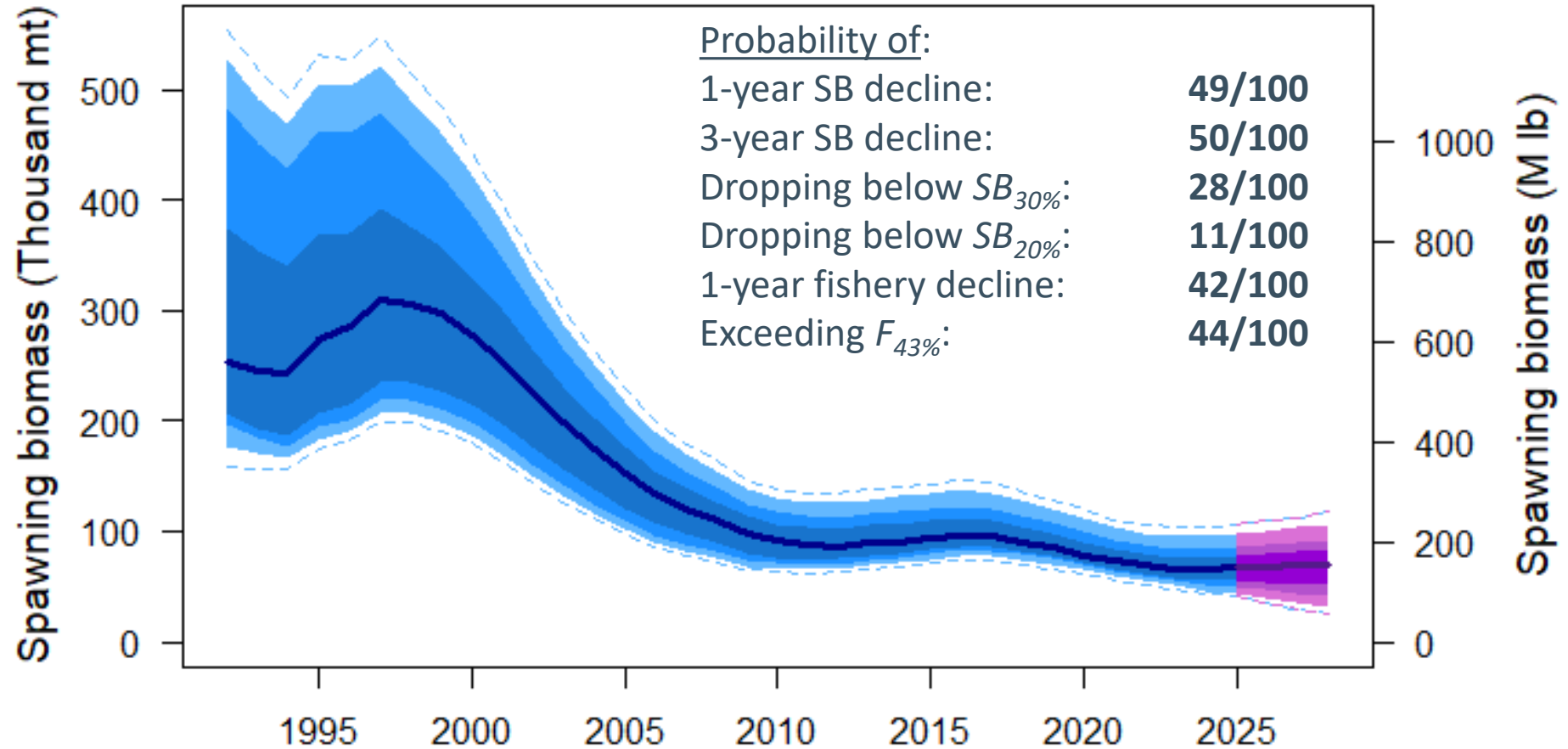
Projections: status quo -10% (TCEY = 31.76 Mlb; SPR = 50%)



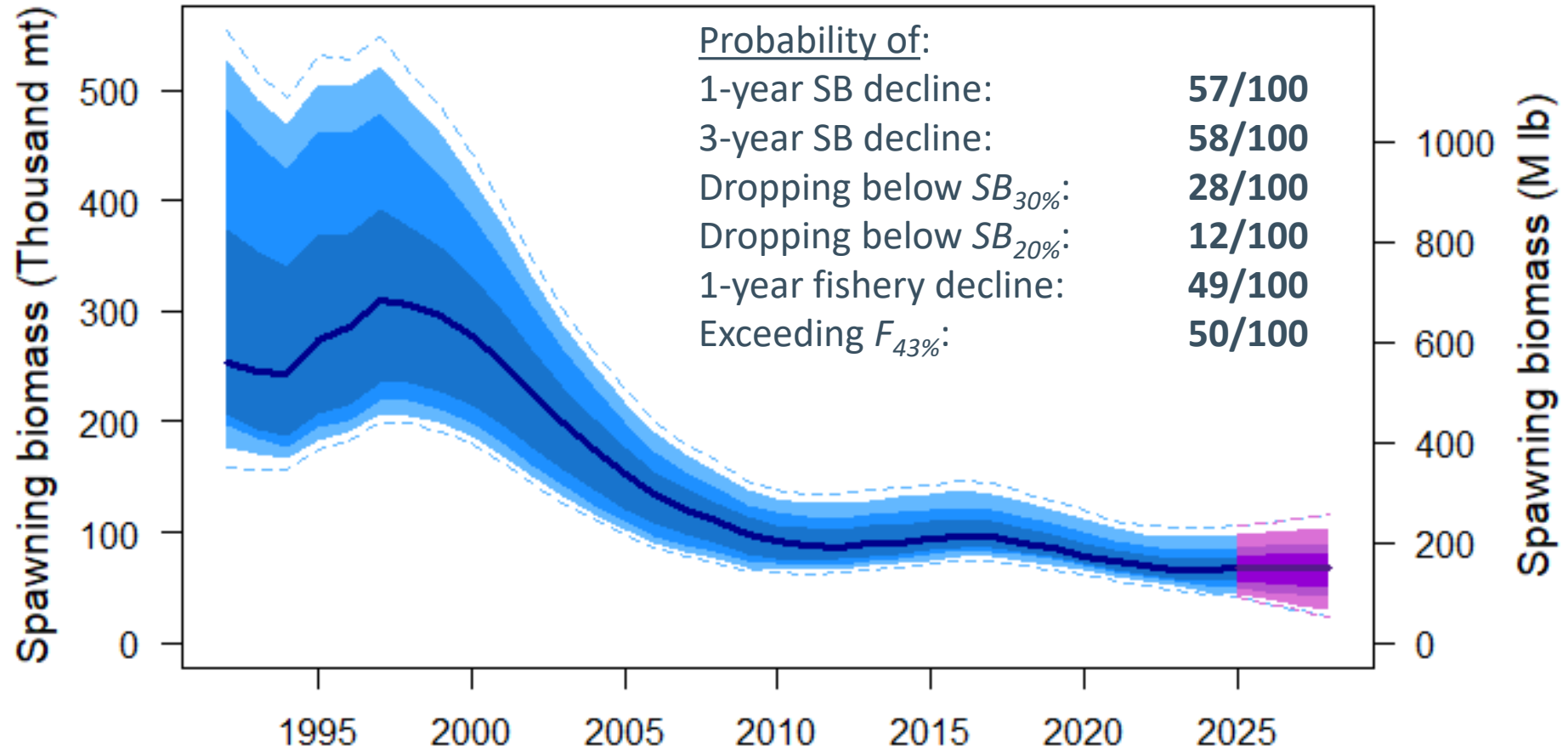
Projections: status quo (TCEY = 35.28 Mlb; SPR = 47%)



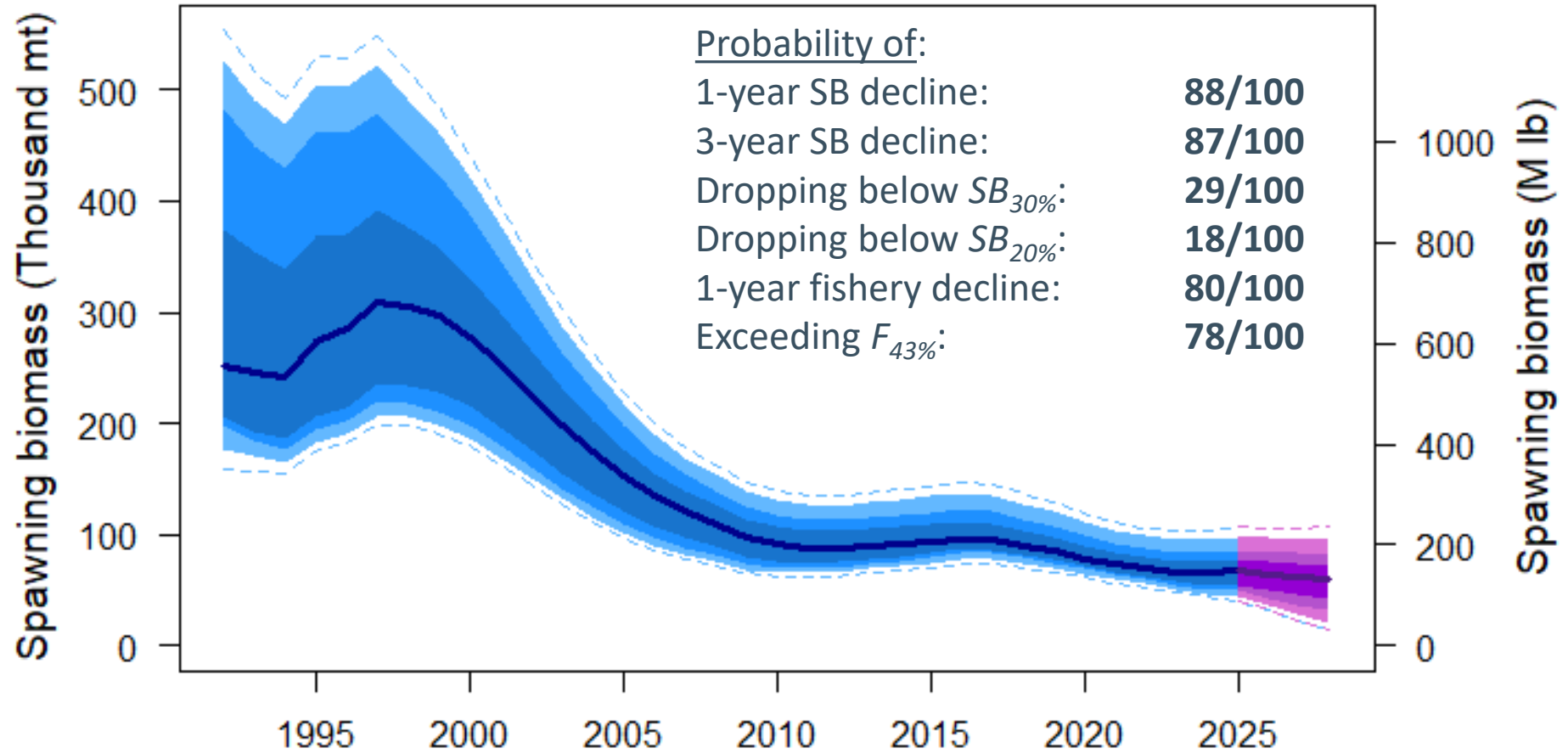
Projections: 3-year surplus (TCEY = 37.20 Mlb; SPR = 45%)



Projections: Reference (TCEY = 39.83 Mlb; SPR = 43%)



Projections: MSY proxy (TCEY = 53.22 Mlb; SPR = 35%)



General summary of risks

- Risk of spawning biomass decrease this year is similar to last year's estimate at the status quo
- Across all yields there is a higher risk of dropping below $SB_{20\%}$ than estimated last year:
 - 10% at the status quo vs. 2% last year
- TCEY corresponding to the reference SPR = 43% is much lower than last year:
 - 39.83 Mlb this year vs 48.88 Mlb last year



Harvest decision table

2025 Alternative				<i>Status quo -25%</i>	<i>Status quo -15%</i>	<i>Status quo -10%</i>	<i>Status quo -5%</i>	<i>Status quo</i>	<i>F_{46%}</i>	3-Year Surplus	<i>Status quo +10%</i>	Reference <i>F_{43%}</i>	MEY proxy	MSY proxy	
Total mortality (M lb)		0.0	21.8	28.3	31.8	33.6	35.4	37.1	37.8	39.0	40.7	41.7	46.1	55.1	
TCEY (M lb)		0.0	20.0	26.5	30.0	31.8	33.5	35.3	35.9	37.2	38.8	39.8	44.3	53.2	
2025 fishing intensity		F _{100%}	F _{63%}	F _{55%}	F _{51%}	F _{50%}	F _{48%}	F _{47%}	F _{46%}	F _{45%}	F _{44%}	F _{43%}	F _{40%}	F _{35%}	
Fishing intensity interval		--	41-75%	33-69%	30-66%	28-65%	27-63%	26-62%	25-62%	25-61%	24-60%	23-59%	21-56%	17-51%	
Stock Trend (spawning biomass)	in 2026	is less than 2025	<1	5	16	26	31	37	43	45	49	54	57	70	88
		is 5% less than 2025	<1	<1	2	4	6	8	11	12	14	17	19	29	50
	in 2027	is less than 2025	<1	7	21	30	35	40	45	47	50	55	58	69	86
		is 5% less than 2025	<1	2	8	14	18	22	26	27	30	34	37	48	70
	in 2028	is less than 2025	<1	8	20	30	35	40	45	47	50	55	58	70	87
		is 5% less than 2025	<1	3	11	18	22	26	30	32	36	40	43	55	77
Stock Status (Spawning biomass)	in 2026	is less than 30%	26	26	27	27	27	27	27	28	28	28	28	29	
		is less than 20%	1	5	7	8	9	10	10	11	11	12	12	14	18
	in 2027	is less than 30%	25	25	26	26	26	26	26	26	26	26	26	27	28
		is less than 20%	<1	2	4	6	7	8	9	9	10	11	12	15	20
	in 2028	is less than 30%	17	25	25	25	26	26	26	26	26	26	26	27	28
		is less than 20%	<1	1	3	5	6	7	8	9	10	11	12	16	21
Fishery Trend (TCEY)	in 2026	is less than 2025	0	7	24	28	31	34	38	39	42	46	49	60	80
		is 10% less than 2025	0	4	22	26	27	29	32	33	35	38	39	48	67
	in 2027	is less than 2025	0	6	23	27	30	33	37	38	41	46	48	60	81
		is 10% less than 2025	0	4	20	25	27	29	31	32	34	37	39	49	69
	in 2028	is less than 2025	0	5	21	26	29	33	37	38	41	46	49	61	82
		is 10% less than 2025	0	3	18	23	26	28	31	32	34	37	40	50	71
Fishery Status (Fishing intensity)	in 2025	is above <i>F_{43%}</i>	0	7	25	29	32	35	39	44	47	50	59	78	



Projection summary

- Poor recruitment continues and is likely to limit short-term yields even if strong year-classes emerge in the future
- These projections already rely on the still uncertain 2016 year-class
- *Additional risks not included in the decision table:*
 - An additional decline of 5% in the 2024 commercial fishery CPUE (when updated next year) would increase the fishing intensity at the status quo TCEY from $F_{47\%}$ to $F_{46\%}$
 - Potential for bias in estimated FISS trends due to reduced recent designs
 - Stock remains at historical low spawning biomass and low productivity
 - Low catch rates in the FISS and directed commercial fishery
 - Recruitment regime uncertainty remains high



Additional information

- Recent adopted TCEYs
- Mortality projection tool
- Stock distribution uncertainty
- Requested mortality projection tables



Recent adopted TCEYs

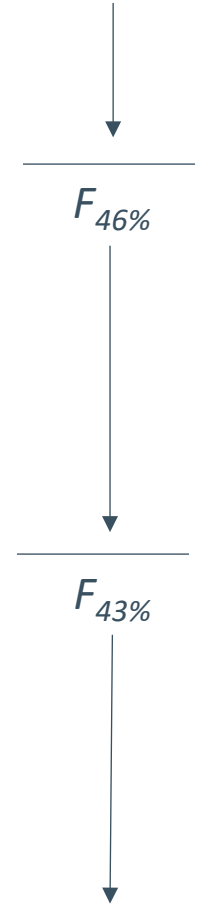
	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
2013	1.11	7.78	5.02	17.07	5.87	2.43	1.93	4.28	45.48
2014	1.11	7.64	5.47	12.05	3.73	1.56	1.49	3.58	36.65
2015	1.06	7.91	6.20	13.00	3.72	1.96	1.53	4.27	39.63
2016	1.26	8.24	6.54	12.75	3.41	1.95	1.37	4.07	39.59
2017	1.47	8.32	7.04	12.96	3.98	1.80	1.34	3.84	40.74
2018	1.32	7.10	6.34	12.54	3.27	1.74	1.28	3.62	37.21
2019	1.65	6.83	6.34	13.50	2.90	1.94	1.45	4.00	38.61
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	14.00	3.12	2.05	1.40	3.98	39.00
2022	1.65	7.56	5.91	14.55	3.90	2.10	1.45	4.10	41.22
2023	1.65	6.78	5.85	12.08	3.67	1.73	1.36	3.85	36.97
2024	1.65	6.47	5.79	11.36	3.45	1.61	1.25	3.70	35.28



Recent adopted TCEYs

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total	'Reference' TCEY Coastwide
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
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	1.65	6.47	5.79	11.36	3.45	1.61	1.25	3.70	35.28	48.88
2025										39.83

"Blue line"



2025 Mortality projection tool

- Enter a coastwide TCEY
- Enter a distribution (%) for each IPHC Regulatory Area
- Select 'Drop-down' alternatives for non-directed discards and units

- Results provide detailed mortality tables by IPHC Regulatory Area and fishery sector including all domestic catch sharing plans/agreements

- Link on the AM101 meeting page
- See [IPHC-2025-AM101-INF02](#) for more information



Request from IM100: Mortality tables

- Detailed mortality tables for:
 - 1) Status quo coastwide TCEY (35.28 Mlb)
 - 2) Status quo -15% (29.99 Mlb)
 - 3) Status quo -25% (26.46 Mlb)

- Distribute each according to:
 - Estimated O32 stock distribution from the 2024 FISS
 - Relative harvest rates (1.0 for 2A-3A, 0.75 for 3B-4CDE)



Request from IM100: Mortality tables

- Status quo coastwide TCEY (35.28 Mlb)

	<u>2A</u>	<u>2B</u>	<u>2C</u>	<u>3A</u>	<u>3B</u>	<u>4A</u>	<u>4B</u>	<u>4CDE</u>	<u>Total</u>
2024 O32 Stock distribution	3.3%	13.6%	16.4%	22.6%	15.4%	7.4%	9.8%	11.4%	100%
Relative harvest rate	1.0	1.0	1.0	1.0	0.75	0.75	0.75	0.75	NA
TCEY distribution	3.8%	15.3%	18.4%	25.4%	13.0%	6.3%	8.3%	9.6%	100%
TCEY	1.33	5.39	6.50	8.95	4.59	2.21	2.92	3.40	35.28



Request from IM100: Mortality tables

- Uncertainty due to stock distribution

	<u>2A</u>	<u>2B</u>	<u>2C</u>	<u>3A</u>	<u>3B</u>	<u>4A</u>	<u>4B</u>	<u>4CDE</u>	<u>Total</u>
Low 95% CI	2.1%	11.2%	13.8%	18.3%	11.5%	4.6%	5.4%	9.3%	
O32 Stock distribution	3.3%	13.6%	16.4%	22.6%	15.4%	7.4%	9.8%	11.4%	100%
High 95% CI	5.1%	16.4%	19.2%	27.1%	19.9%	11.2%	16.3%	13.9%	
Low 95% CI	0.81	4.43	5.47	7.27	3.42	1.37	1.59	2.76	
TCEY	1.33	5.39	6.50	8.95	4.59	2.21	2.92	3.40	35.28
High 95% CI	2.04	6.50	7.60	10.75	5.91	3.35	4.86	4.14	



Request from IM100: Mortality tables

- Status quo coastwide TCEY (35.28 Mlb)

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Commercial discards	0.05	0.15	NA	NA	0.33	0.08	0.02	0.05	0.68
O26 Non-directed discards	0.06	0.31	0.05	0.26	0.17	0.29	0.13	1.41	2.69
Recreational	NA	0.03	1.01	0.88	0.00	0.01	0.00	0.00	1.93
Subsistence	NA	0.41	0.25	0.12	0.01	0.00	0.00	0.01	0.81
Total non-FCEY	0.11	0.90	1.31	1.26	0.52	0.38	0.16	1.47	6.11
Commercial discards	NA	NA	0.16	0.44	NA	NA	NA	NA	0.60
Recreational	0.50	0.67	0.92	1.45	NA	NA	NA	NA	3.54
Subsistence	0.02	NA	NA	NA	NA	NA	NA	NA	0.02
Commercial landings	0.70	3.82	4.11	5.79	4.07	1.83	2.77	1.93	25.01
Total FCEY	1.21	4.50	5.18	7.69	4.07	1.83	2.77	1.93	29.18
							4C FCEY	0.86	
							4D FCEY	0.86	
							4E FCEY	0.21	
TCEY	1.33	5.39	6.50	8.95	4.59	2.21	2.92	3.40	35.28
U26 Non-directed discards	0.01	0.04	0.00	0.25	0.11	0.13	0.01	1.35	1.90
Total	1.33	5.44	6.50	9.20	4.69	2.33	2.94	4.75	37.18



Request from IM100: Mortality tables

- Status quo -15% (29.99 Mlb)

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Commercial discards	0.04	0.12	NA	NA	0.28	0.07	0.02	0.04	0.56
O26 Non-directed discards	0.06	0.31	0.05	0.26	0.17	0.29	0.13	1.41	2.69
Recreational	NA	0.02	1.01	0.88	0.00	0.01	0.00	0.00	1.92
Subsistence	NA	0.41	0.25	0.12	0.01	0.00	0.00	0.01	0.81
Total non-FCEY	0.10	0.87	1.31	1.26	0.46	0.36	0.15	1.46	5.99
Commercial discards	NA	NA	0.13	0.37	NA	NA	NA	NA	0.49
Recreational	0.41	0.56	0.77	1.20	NA	NA	NA	NA	2.94
Subsistence	0.02	NA	NA	NA	NA	NA	NA	NA	0.02
Commercial landings	0.59	3.16	3.31	4.78	3.43	1.51	2.33	1.43	20.55
Total FCEY	1.02	3.72	4.21	6.34	3.43	1.51	2.33	1.43	24.01
							4C FCEY	0.67	
							4D FCEY	0.67	
							4E FCEY	0.10	
TCEY	1.13	4.58	5.52	7.61	3.90	1.88	2.48	2.89	29.99
U26 Non-directed discards	0.01	0.04	0.00	0.25	0.11	0.13	0.01	1.35	1.90
Total	1.13	4.63	5.52	7.86	4.01	2.00	2.50	4.24	31.89



Request from IM100: Mortality tables

- Status quo -25% (26.46 Mlb)

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Commercial discards	0.04	0.11	NA	NA	0.24	0.06	0.02	0.03	0.49
O26 Non-directed discards	0.06	0.31	0.05	0.26	0.17	0.29	0.13	1.41	2.69
Recreational	NA	0.02	1.01	0.88	0.00	0.01	0.00	0.00	1.92
Subsistence	NA	0.41	0.25	0.12	0.01	0.00	0.00	0.01	0.81
Total non-FCEY	0.10	0.85	1.31	1.26	0.43	0.35	0.15	1.45	5.91
Commercial discards	NA	NA	0.11	0.31	NA	NA	NA	NA	0.42
Recreational	0.35	0.48	0.65	1.03	NA	NA	NA	NA	2.51
Subsistence	0.02	NA	NA	NA	NA	NA	NA	NA	0.02
Commercial landings	0.52	2.72	2.80	4.10	3.01	1.30	2.04	1.10	17.60
Total FCEY	0.90	3.20	3.56	5.45	3.01	1.30	2.04	1.10	20.56
							4C FCEY	0.51	
							4D FCEY	0.51	
							4E FCEY	0.08	
TCEY	0.99	4.04	4.87	6.71	3.44	1.65	2.19	2.55	26.46
U26 Non-directed discards	0.01	0.04	0.00	0.25	0.11	0.13	0.01	1.35	1.90
Total	1.00	4.09	4.87	6.96	3.55	1.78	2.21	3.90	28.36



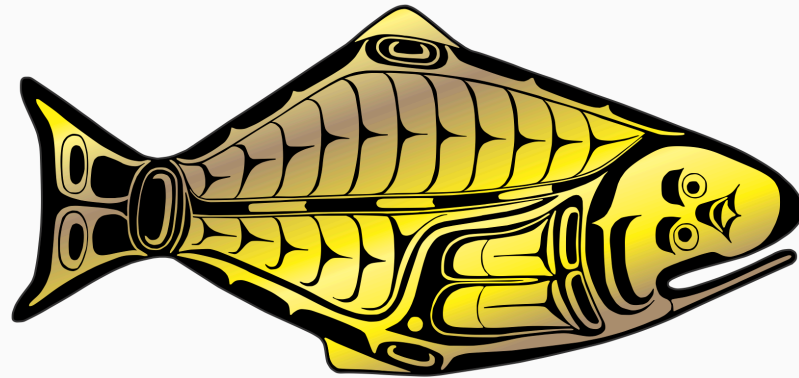
Recommendations

That the Commission:

- 1) **NOTE** paper IPHC-2025-AM101-13 Rev_1, which provides a summary of projections and the harvest decision table for 2025-2027.
- 2) **REQUEST** any additional harvest decision table alternatives for evaluation during AM101.
- 3) **REQUEST** any detailed mortality projections for 2025 (by IPHC Regulatory Area and fishery sector) for evaluation during AM101.



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