C4 Small Sablefish Release Initial Review

June 2024

Presenters:

Sara Cleaver, NPFMC

Jon McCracken, McCracken & Associates

Andrew Olson, NMFS Alaska Regional Office

Dr. Dan Goethel, Alaska Fisheries Science Center

NOAA FISHERIES

Presentation Outline

1. History of Action
2. Purpose and Need
3. Description of Alternatives (including management considerations)
4. Description of Fisheries
5. Potential Impacts
    - Sablefish simulation analysis
    - Social and economic impact analysis
6. Summary and Clarifications

History of Action

Apr 2018

- IFQ fishermen provide Council testimony regarding influx of small, low-value sablefish in catch.
- Council initiates a discussion paper on a **proposal to release small sablefish.**

Oct 2018-Dec 2019

- Council reviews 3 discussion papers on the small sablefish release issue.

Dec 2019

- Council adopts a purpose and need statement and develops alternatives to initiate analysis.

Alt 2: Allow Voluntary Release of Sablefish in the IFQ Fishery

Feb 2021

Council receives initial review analysis

- **SSC recommends additional analyses before final action**

History of Action (cntd)

Oct 2021-June 2022

- Council directs staff to prepare and schedule second initial review analysis when time and resources allow.
- Council noted that discussion about a minimum size limit (MSL) for sablefish retention should **not** be considered in the revised analysis.

June 2023

- Staff "update" document reviewed at Council
- **Council *revised alternatives***
  - **Included option for voluntary release <22 inches (retention required ≥22 inches)**

Feb 2024

- SSC reviews methods for proposed simulation analysis, selects DMRs for analysis.

Purpose and Need
(revised June 2023)

"Beginning with the 2014 age class, a continuing series of large year classes of sablefish are resulting in significant catches of small sablefish in the IFQ fixed gear fisheries and current regulations require IFQ holders to retain all sablefish. Small sablefish have low commercial value under current market conditions. Although no scientific studies are available to estimate survival rates for Alaska sablefish, information from other areas suggests that survival rates for carefully released sablefish may be high enough to warrant consideration of relaxing full retention requirements. Limited operational flexibility to carefully release sablefish may increase the value of the commercial harvest and allow small fish to contribute to the overall biomass."

Alternatives

Alternative 1, No Action (Status quo) – No discarding

Under the No Action alternative, all regulations and FMP language related to a prohibition on discarding sablefish would remain intact.

Alternative 2, Allow Release of Sablefish in the IFQ Fishery

Option 1: eliminate the regulatory restrictions that prohibit release of sablefish caught by sablefish IFQ vessels as well as the FMP provision prohibiting discarding.

Option 2: Require retention of sablefish 22 inches total body length or longer (provides for voluntary release of sablefish under 22 inches total body length)

Appendix 1: sablefish size and weight at age metrics

Courtesy of Jane Sullivan and Katy Echave

Under Alternative 2 Option 2, red is assumed discarded and black is retained

Sex	Age	Proportion Females Mature	Total length (in)	Round weight (lb)	Dressed weight (lb)
Male	1	--	18.3	1.5	1.0
Male	2	--	20.3	2.4	1.5
Male	3	--	21.9	3.2	2.0
Male	4	--	23.1	3.9	2.5
Male	5	--	24.1	4.6	2.9
Male	6	--	24.9	5.1	3.2
Male	7	--	25.5	5.5	3.5
Male	8	--	26.0	5.9	3.7
Male	9	--	26.4	6.2	3.9
Male	10	--	26.7	6.4	4.0
Male	11	--	27.0	6.5	4.1
Male	12	--	27.2	6.7	4.2
Male	13	--	27.3	6.8	4.3
Male	14	--	27.5	6.8	4.3
Male	15	--	27.6	6.9	4.4
Female	1	0.01	18.1	1.5	1.0
Female	2	0.02	20.4	2.4	1.5
Female	3	0.05	22.4	3.3	2.1
Female	4	0.10	24.0	4.3	2.7
Female	5	0.18	25.4	5.3	3.3
Female	6	0.32	26.6	6.2	3.9
Female	7	0.49	27.6	7.0	4.4
Female	8	0.67	28.5	7.8	4.9
Female	9	0.81	29.2	8.5	5.3
Female	10	0.90	29.8	9.1	5.7
Female	11	0.95	30.3	9.6	6.1
Female	12	0.97	30.7	10.1	6.4
Female	13	0.99	31.1	10.5	6.6
Female	14	0.99	31.4	10.9	6.9
Female	15	1.00	31.6	11.2	7.0

Elements of Alternative 2 (Analyzed in relation to Option 2)

Element 1: DMRs

Apply a DMR to discarded sablefish of:

1. 5%
2. 12%
3. 16%
4. 20%
5. 25%
6. SSC recommends the DMR through the stock assessment process

Sub-option: Select different DMRs for pot gear and hook and line gear

Element 2: Catch and Release Mortality Accounting

Sablefish catch and release mortality associated with the IFQ fishery will be accounted for in the stock assessment. The analysis should describe the potential implications of voluntary discards on the sablefish stock assessment, specifications process and catch accounting in the context of other uncertainties.

Element 3: Monitoring and Enforcement

The analysis should describe potential monitoring and enforcement provisions that could improve estimates of voluntary and regulatory discards.

Element 4: Review

Option 1: The ability to release sablefish will be reviewed in a) 3 years b) 5 years c) 7 years following implementation.

Option 2: The ability to release sablefish will sunset after 5 years following implementation.

The analysis should include a discussion of selectivity in sablefish pots and whether requiring escape mechanisms meet the objective of this action.

Element 1: Discard Mortality Rate (DMR)

Element 1: DMRs

Apply a DMR to discarded sablefish of:

1. 5%
2. 12%
3. 16%
4. 20%
5. 25%
6. SSC recommends the DMR through the stock assessment process

Sub-option: Select different DMRs for pot gear and hook and line gear

DMRs selected for analysis by SSC in February 2024: **12%, 20%, 35%**

Element 2: Catch and Release Mortality Accounting

The analysis should describe the potential implications of voluntary discards on the sablefish stock assessment, specifications process and catch accounting in the context of other uncertainties

- Majority of data come from observer data, which are limited in sablefish IFQ fishery.
  - Observers collect # and size of fish on total (unsorted) catch. Current protocols do not separate retained/discarded. Would require changes to protocols at the cost of other monitoring priorities, or changes in Catch Accounting protocols.
  - EM data could provide # of fish discarded, but not size.

- Current assumption used is that weight distribution of discards is similar to that of retained catch (due to full retention requirement).
  - Enables estimation of size distribution and amount of total fishery removals.
  - Voluntary discards even under a minimum retention size limit violates this assumption

Element 2: Catch and Release Mortality Accounting

- Overestimation risk by not adjusting total catch estimation methods for size-selective discards.
- Require implementing new total catch accounting method for IFQ and CDQ sablefish fisheries to estimate discards that inform the assessment and information necessary to manage the fishery (e.g. OFL, ABC, TAC, discard mortality rates (DMRs), and incidental catch allowances (ICAs)).
- New methods to account for voluntary discarding would be unique process for sablefish compared to other groundfish species and require substantial modification to catch accounting estimation processes.

Element 2: Catch and Release Mortality Accounting

- Sablefish IFQ program requires full retention and only retained fish count towards the annual amount of an individual's IFQ.
- Discard accounting in other catch-share programs requires data on discard amounts specific to the harvesting vessel, thus 100% monitoring
- Sablefish IFQ program partially observed and discard estimates based on mix of vessel activity.
- Vessels may behave differently when observers or EM are present or not influencing ability to estimate accurate discard estimate

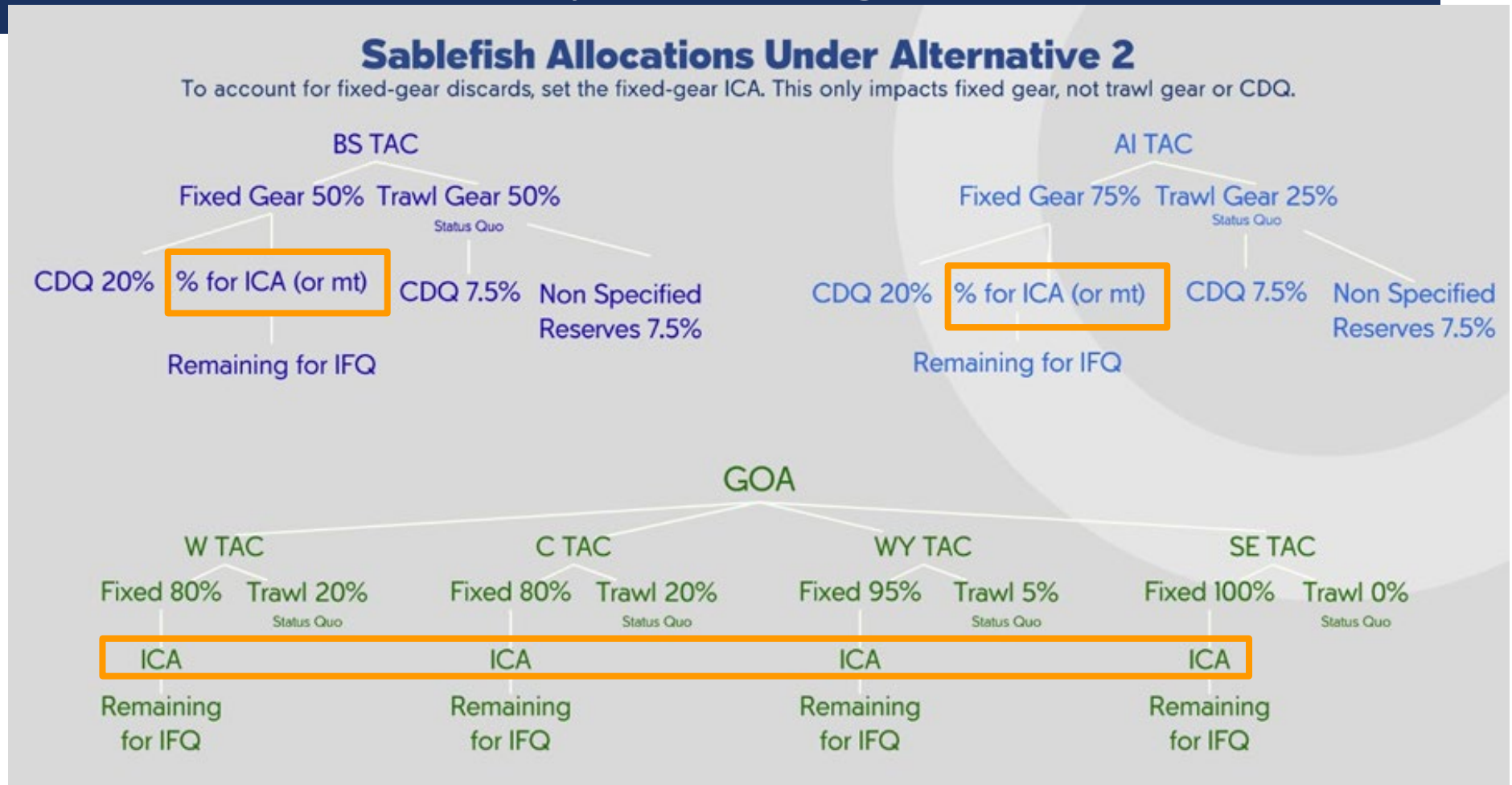
Table 1. Summary of selection rates and the number of trips expected to be monitored by observers and/or EM in each sampling stratum in 2024.

Component	Pool	Stratum	Selection Rate (%)	Number of Trips Expected to be Observed
Partial Coverage	Observer Trip Selection	Fixed-gear BSAI	44	123
		Fixed-gear GOA	13	264
		Trawl BSAI	72	22
		Trawl GOA	21	82
	Fixed-Gear EM trip selection	Fixed-gear EM GOA	24	232
		Fixed-gear EM BSAI	74	43
	Trawl EM EFP	Trawl EM GOA	33% shoreside monitoring (plus 100% EM coverage at-sea)	241
	No selection	Zero Coverage	0	0
Full Coverage	Observer Full Coverage	Observer	100	1,172
	Trawl EM EFP	Trawl EM BSAI	100% shoreside monitoring (plus 100% EM coverage at-sea)	1,661

Source: 2024 Annual Deployment Plan for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska

Element 2: Catch and Release Mortality Accounting

New **incidental catch allowance (ICA)** for fixed gear to account for sablefish discard mortality.



Element 3: Monitoring and Enforcement

The analysis should describe potential monitoring and enforcement provisions that could improve estimates of voluntary and regulatory discards.

- Trade-offs to account for size-selective discards in at-sea observer sampling
  - Collection of length/age data on discarded sablefish could result in decreased biological sampling of other species (e.g. halibut, rockfish, crab, etc.)
  - Increase reliance on crew to collect samples (e.g. crew sorting retained sizes from discarded sizes)
- Changing observer sampling complex due to evaluating data needs of Council priorities, stock assessments, and other mandates.
- Voluntary discarding behavior can be impacted by observer or EM presence and bias data collection.
- ADP does not consider fishery or individual species and allocation of sampling resources would remain unchanged.

Section 2.2.3, page 26–27

Element 3: Monitoring and Enforcement

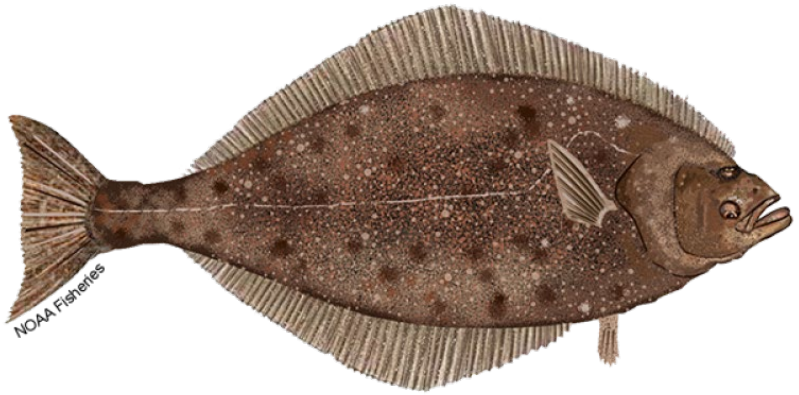
Enforcement

- To minimize sablefish discard mortality, Council may wish to recommend careful release handling requirements for longline and pot gear.

- Careful Release Provisions required for:
  - Prohibited Species Catch (PSC) Bycatch (50 CFR 679.21)
  - Halibut discard (50 CFR 679.102 and 679.7)

- Enforceability limitations with careful release and minimum retention size requirement (Alternative 2 Option 2).
  - Observers would have to witness and report the discard of legal sablefish (≥ 22 inches)

50 CFR 679.7 Prohibitions	(a)(13) **Halibut** caught with fixed gear: it is unlawful to: • Fail to release the halibut outboard a vessel's rails. ○ Release halibut caught with longline gear by any method other than— ▪ Cutting the gangion. ▪ Positioning the gaff on the hook and twisting the hook from the halibut. ▪ Straightening the hook by using the gaff to catch the bend of the hook and bracing the gaff against the vessel or any gear attached to the vessel. ○ Puncture the halibut with a gaff or other device. ○ Allow halibut caught with longline gear to contact the vessel, if such contact causes, or is capable of causing, the halibut to be stripped from the hook.



Section 2.2.3, page 27–30

Appendix 3: Escape Rings and Selectivity (page 155-160)

- Escape Ring Requirements (Appendix 4)
  - 3.5 in B.C., Canada
  - 3.75 in Southeast Alaska
  - No requirements for IFQ, but voluntarily used

- Escape ring requirements would prevent ability to close rings to aid in “topping-off” any remaining quota

- ADF&G (2019) and AFSC (2020) escape ring projects
  - Demonstrated use of escape rings decreased capture of small sablefish

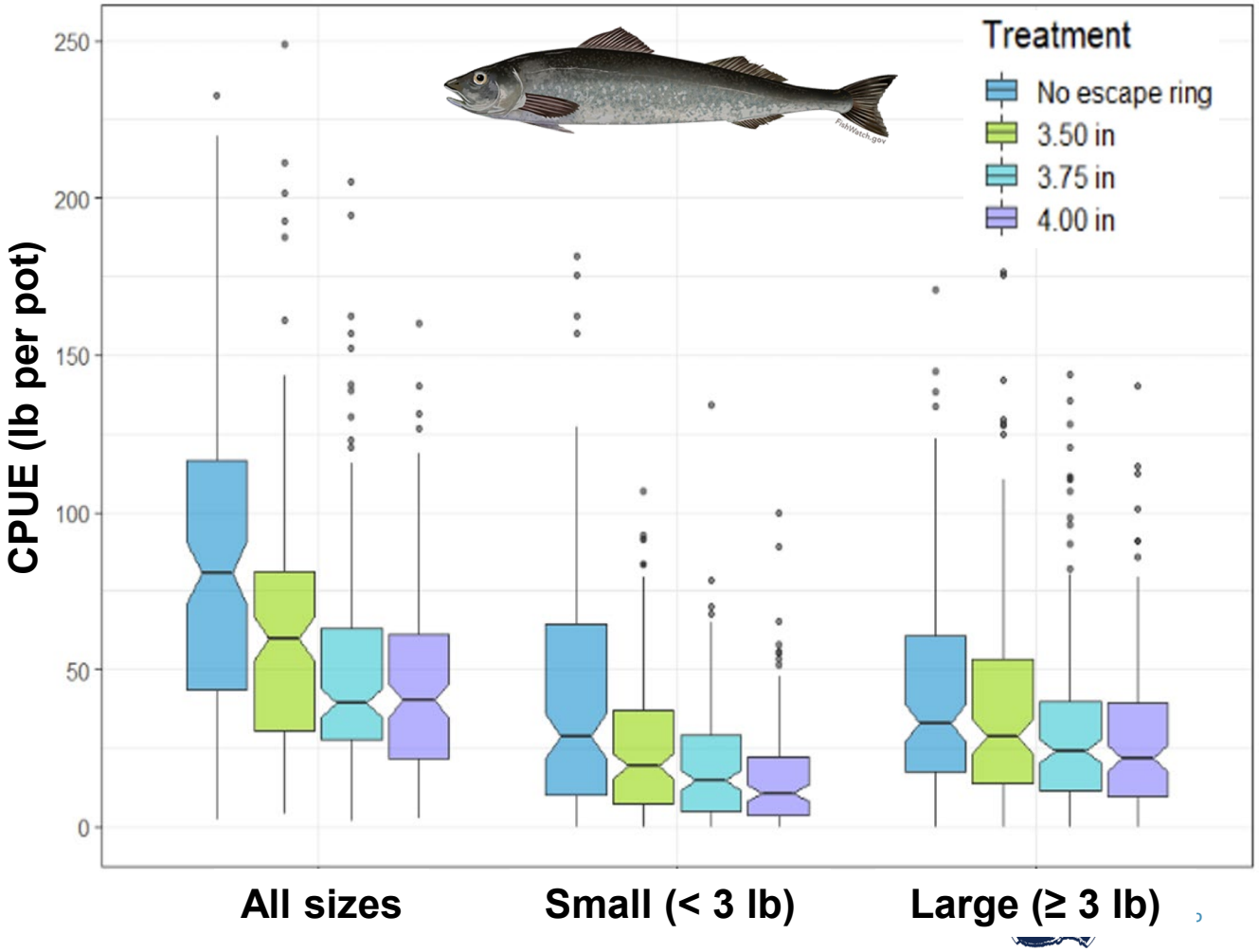


Figure A3 2: CPUE of sablefish by escape ring treatment in Chatham Strait, Alaska. Data courtesy of ADF&G.

Management and Enforcement Considerations

Release of sablefish by the IFQ target fisheries is currently prohibited by regulation 50 CFR 679.7

- Alternative 2 allows for discarding of sablefish of any size (Option 1) or below 22 inches total body length (Option 2).
- Concern to accurately estimate the annual variability in number, size, and composition of sablefish.
- Data collection biases
  - Voluntary discards can only be based on a portion of the IFQ sector but apply to whole IFQ program when determining ICAs and the resulting TAC.
  - Trade-offs in sampling priorities for other species.
  - Observer/EM effect of discards on observed vs unobserved vessels

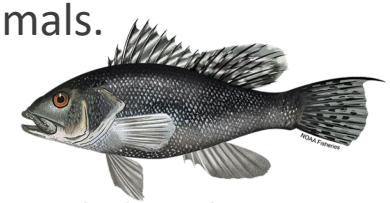
Section 6, page 136-139

Management and Enforcement Considerations

NMFS recommends the Council consider adding an Alternative for analysis that considers requiring gear modifications to improve size-selectivity of sablefish.

- Gear modification that improves size-selectivity of a target species and reduce bycatch such as, escape rings, vents, panels, stretch mesh, etc.
  - May reduce capture of small sablefish.
  - May reduce uncertainty associated with data collection, stock assessment impacts, discard mortality, and potential interactions with marine mammals.

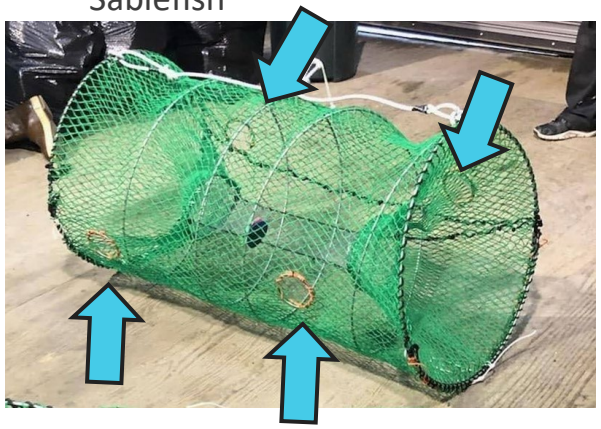
Sablefish



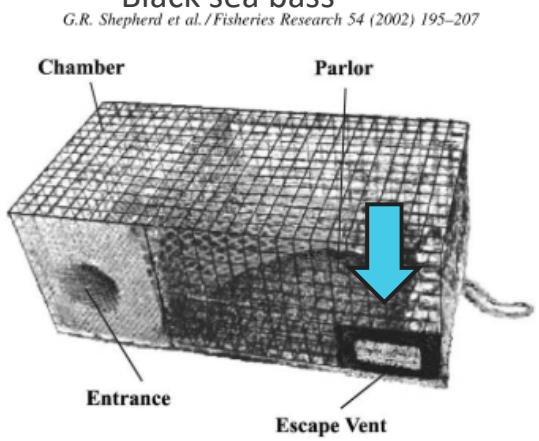
Black sea bass

American Lobster

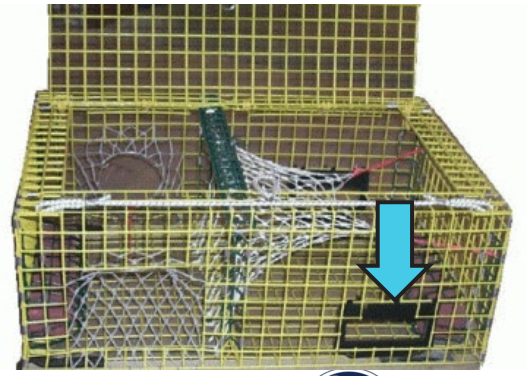
Source: Seattle Marine and Fishing Supply



Source: Fish Tech Inc.



Source: New England Marine and Industrial

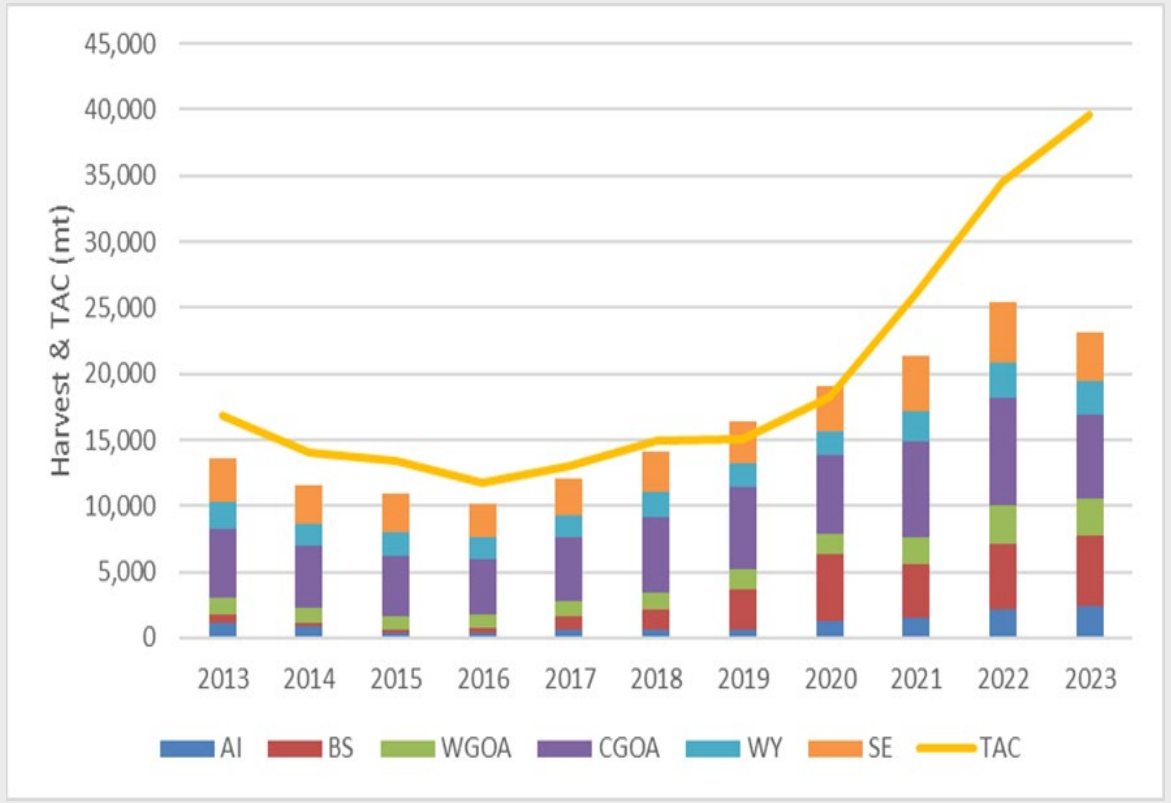


Chapter 3 - Description of Sablefish Fisheries

- Chapter 3 includes four sections
  - **Section 3.1 - Sablefish of IFQ Fishery, CDQ fixed-gear sablefish fishery, whale depredation in the sablefish IFQ fishery, non-target sablefish catch**
  - **Section 3.2 - Target products**
  - **Section 3.3 – Markets**
  - **Section 3.4 – Local knowledge, traditional knowledge, and subsistence**

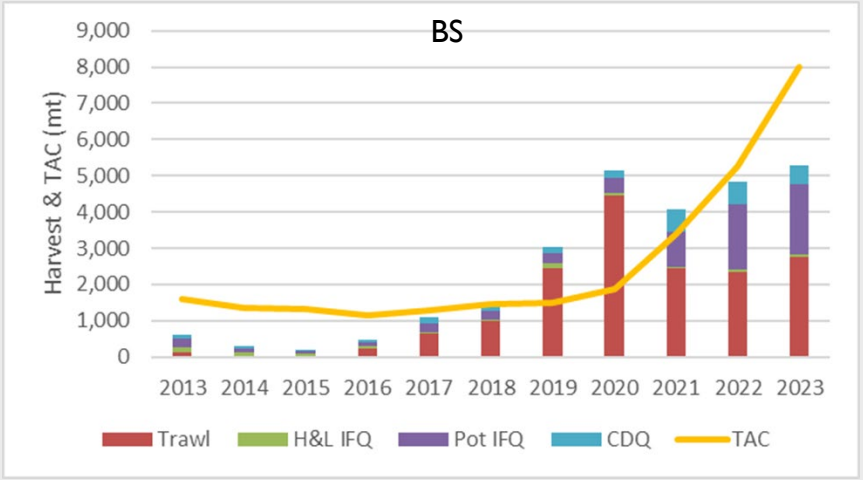
Chapter 3 - Description of Sablefish Fisheries (All sectors and gear types)

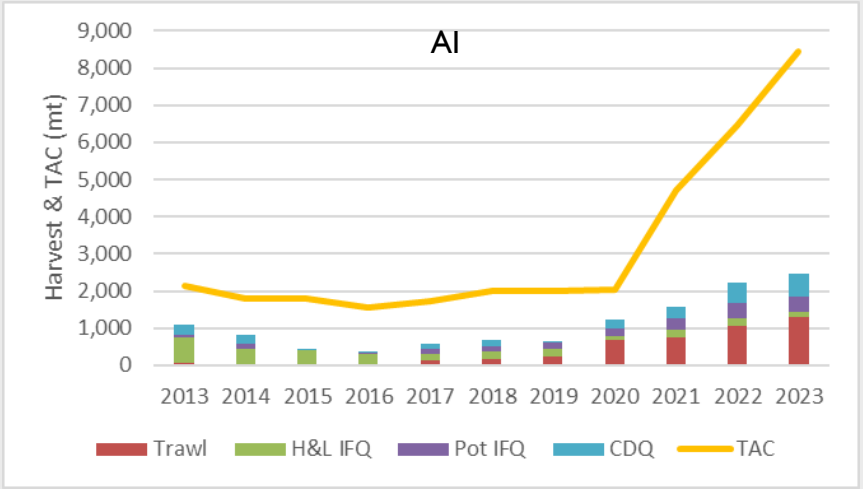
- Table 3-1 and Figure 3-1 on page 35 presents TAC (mt) and harvest of sablefish (mt) by FMP subarea, 2013-2023
- From 2013-2016, average harvest was 83% of TAC
- 2017 & 2018 average harvest was 93% & 94%
- 2019 & 2020 average harvest exceeded TAC
- 2021-2023 average harvest as percent of TAC declined sharply



Chapter 3 - Description of Sablefish Fisheries (All sectors and gear types)

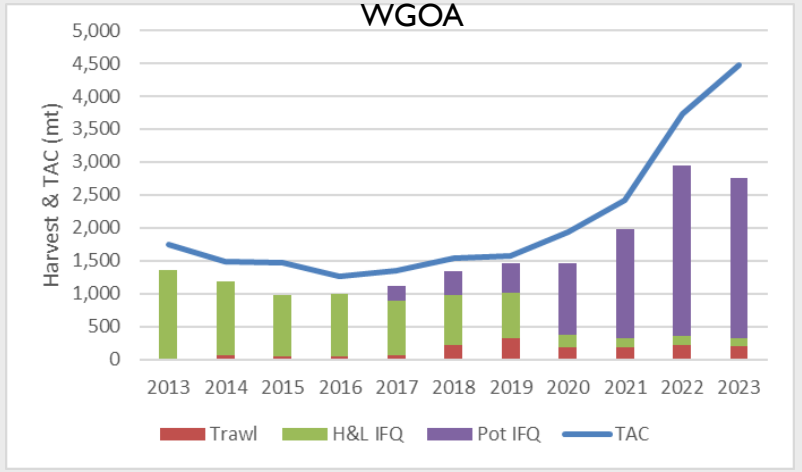
- Next series of tables and figures from page 36 – 41 present TAC (mt) and harvest of sablefish (mt) for each FMP subarea by sector from 2013-2023
- Presented in these figures are BS and AI TAC and sablefish harvest by sector from 2013 through 2023
- These figures illustrate the recent trend of TAC remaining unharvested
- The BS figure also illustrates the sharp increase in harvest of sablefish by the trawl sector

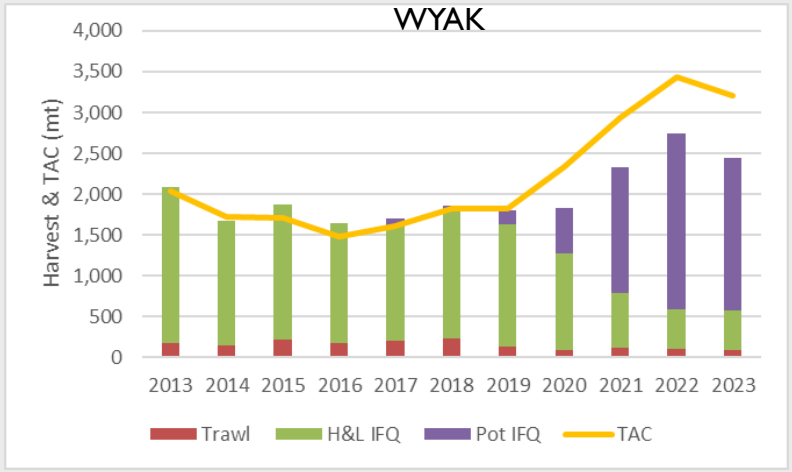


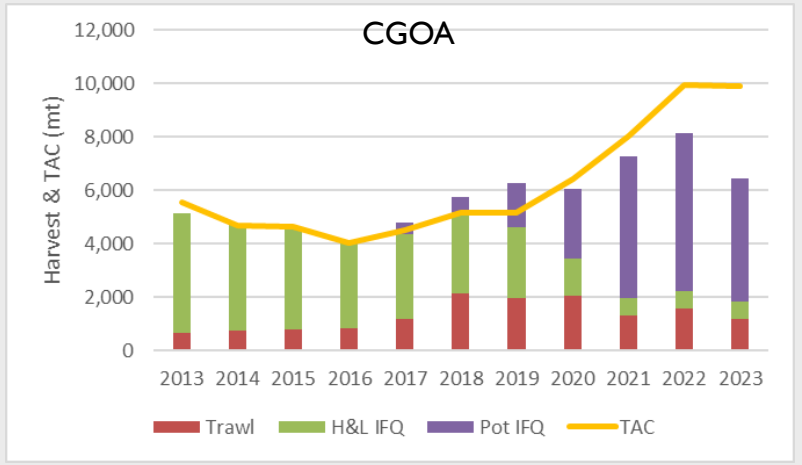


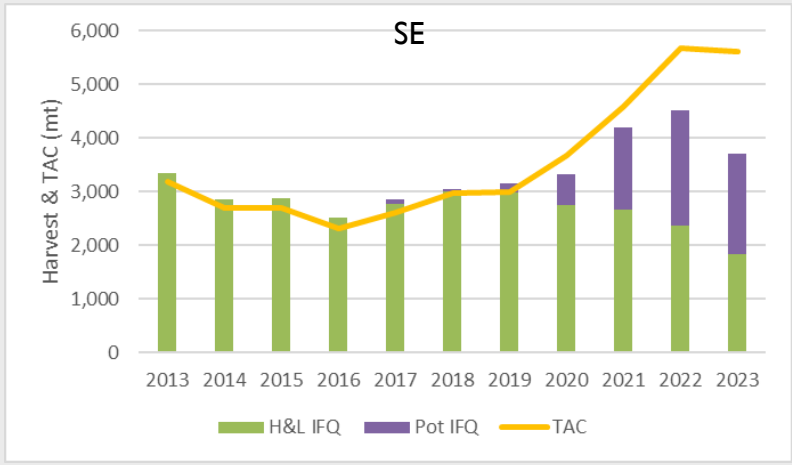
Chapter 3 - Description of Sablefish Fisheries (All sectors and gear types)

- Presented in these figures are GOA subareas TAC and sablefish harvest by sector from 2013 through 2023
- Again, these figures illustrate the recent trend of TAC remaining unharvested
- They also illustrate the growing utilization of pot gear to harvest IFQ sablefish
  - Starting in 2017, pot gear was authorized in the GOA sablefish IFQ fishery







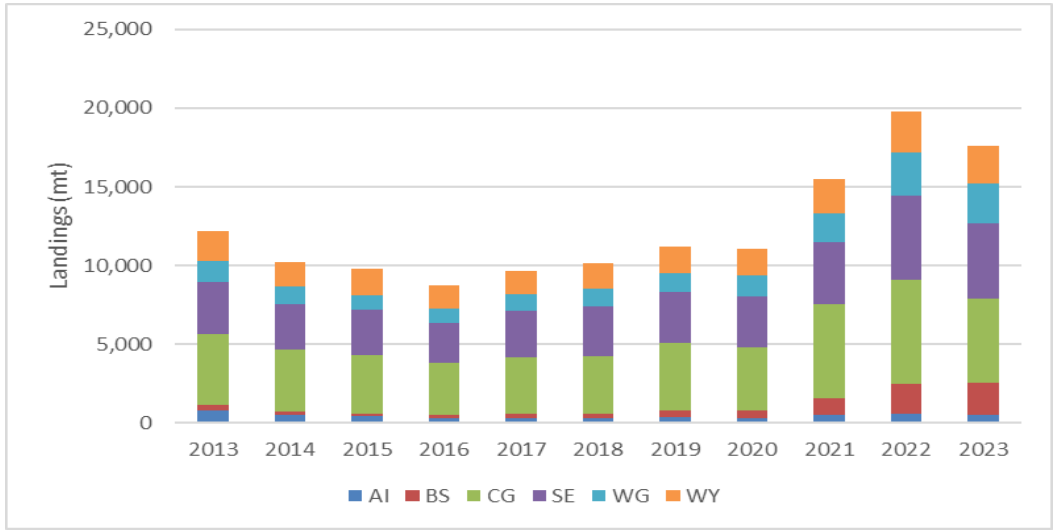


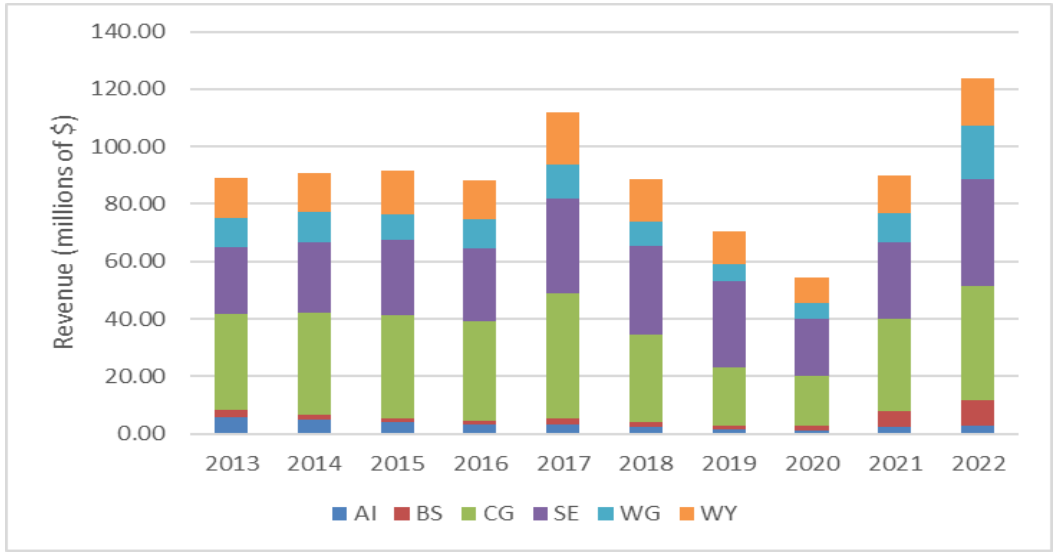
Chapter 3.1.1 – Sablefish IFQ Fishery

- Chapter 3.1.1 includes four sections
  - **Section 3.1.1.1 - sablefish IFQ gear types (pages 43-44)**
  - **Section 3.1.1.2 – sablefish IFQ/CDQ vessel count and vessel classes (pages 44-46)**
  - **Section 3.1.1.3 – sablefish IFQ revenue (pages 45-49)**
  - **Section 3.1.1.4 – sablefish IFQ processor grade prices and composition (pages 49-57)**

Chapter 3.1.1.3 – Sablefish IFQ Revenue

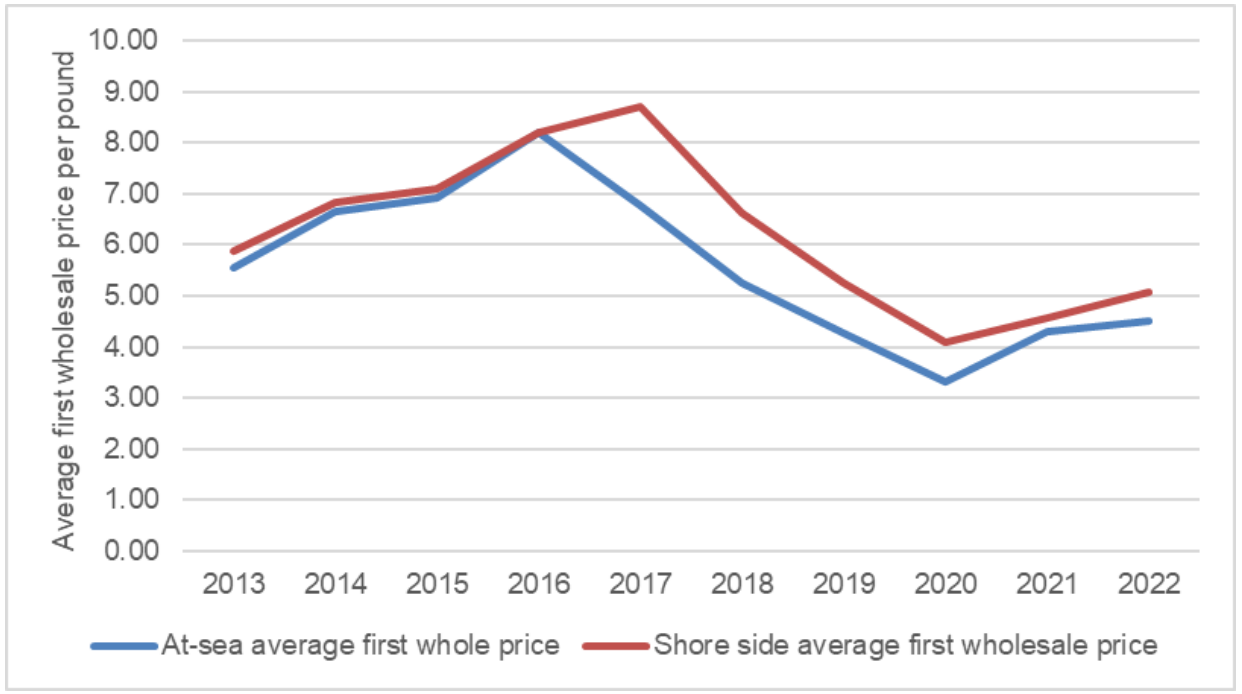
- Table 3-13 (page 48) provides sablefish IFQ allocations (mt), landings (mt), and ex-vessel revenue (millions of 2022 $) by subarea from 2013-2023
- Table 3-14 (page 48) provides sablefish IFQ ex-vessel revenue by area and gear from 2013-2023
- Although not official yet, estimated total ex-vessel revenue for 2023 is $51 million which is lower than 2020 ex-vessel revenue





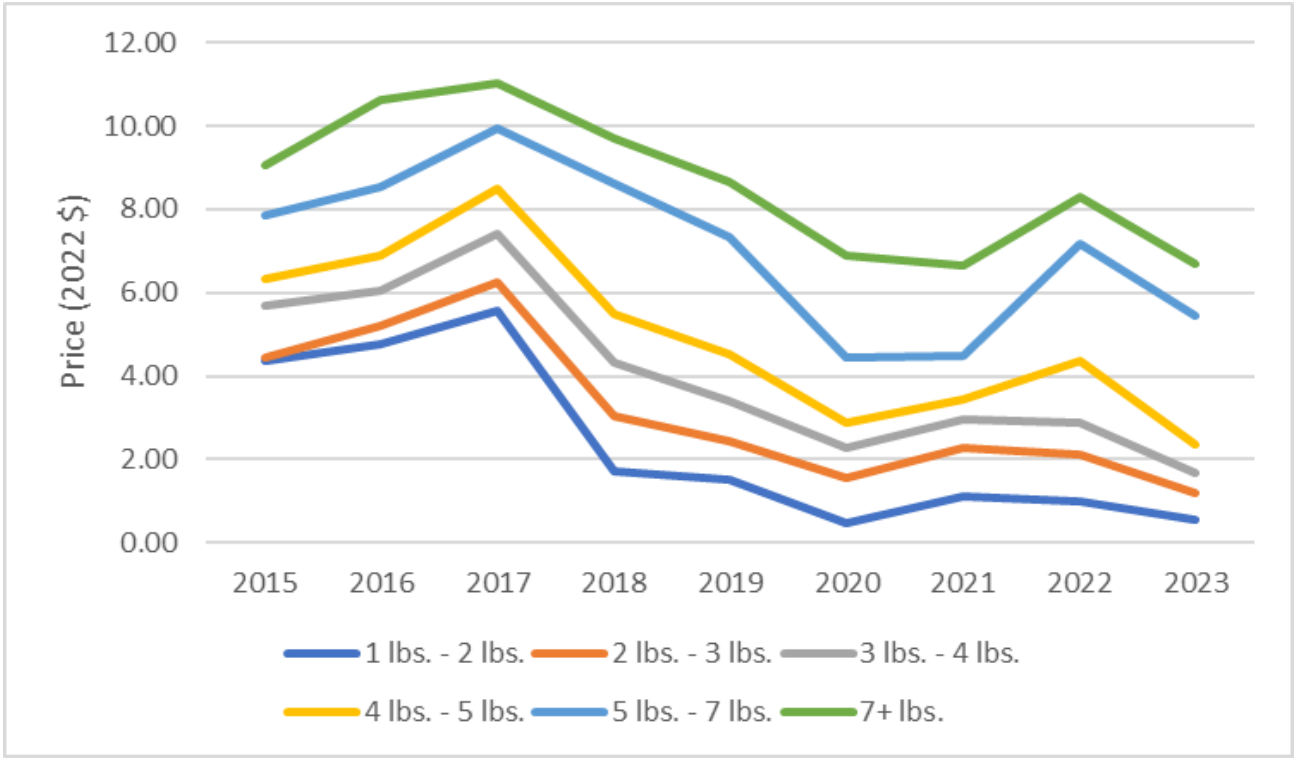
Chapter 3.1.1.3 – Sablefish IFQ Revenue

- Table 3-15 (page 49) provides average first wholesale revenue for at-sea processors and shoreside processors from 2013 through 2022
- Prices increase from 2013 through 2016/2017 but declined until 2020 followed by slight increase in 2021 and 2022



Chapter 3.1.1.4 – Sablefish IFQ Processor Grade Prices and Composition

- Table 3-16 (page 50) provides Alaska-wide average sablefish processor size grade prices in 2022 dollars from 2015-2023
- Table 3-17 (page 51) provides average sablefish processor grade prices by regulatory area
- Prices were uniform in movement with the except of 2022 when higher grades increased while lower grades declined
- 2023 saw the lowest prices for each grade since 2015



Chapter 3.1.1.4 – Sablefish IFQ Processor Grade Prices and Composition

Table 3-19 (page 53) provides percent of sablefish IFQ landings by grade for all regulatory areas combined, 2015-2023

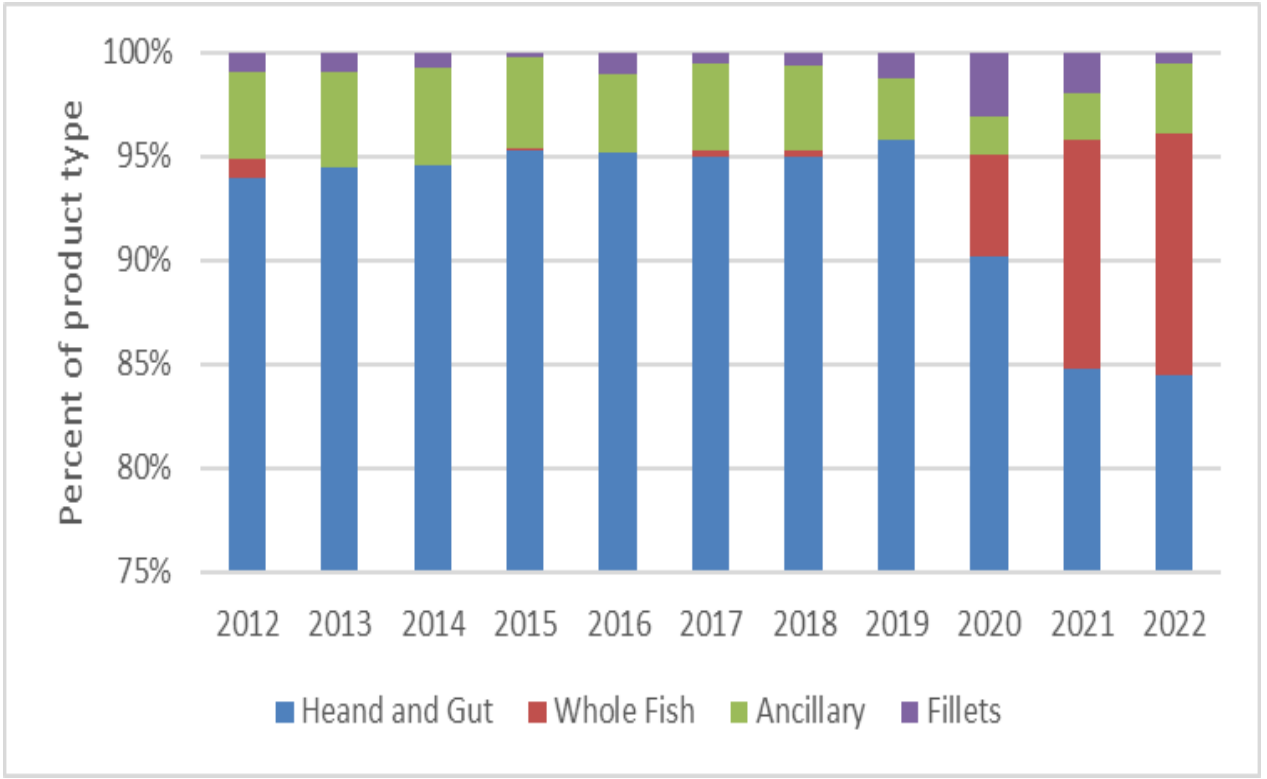
- Composition of sablefish IFQ landings is changing where premium grade landings are diminishing as a percent of total landings while smaller grades are increasing
- Figures 3-12 to 3-17 show the composition of landings for each subarea from 2015-2023
  - In general, 2 lbs. - 3 lbs. grade increased as a proportion to total landings and 7+ grade diminished
- Table 3-20 (page 56) provides percent of sablefish IFQ gross ex-vessel revenue by regulatory area and market grade

Grades	2015	2016	2017	2018	2019	2020	2021	2022	2023
7 UP	23%	20%	24%	22%	12%	7%	4%	3%	3%
5 to 7 Lbs	27%	26%	26%	23%	21%	19%	9%	10%	14%
4 to 5 Lbs	22%	24%	19%	21%	19%	22%	15%	17%	20%
3 to 4 Lbs	23%	20%	18%	18%	24%	25%	37%	32%	32%
2 to 3 Lbs	5%	7%	9%	13%	18%	21%	28%	31%	25%
1 to 2 Lbs	1%	3%	5%	4%	7%	5%	7%	7%	5%

Source: AKFIN; source file is sablefish_Grading_Area(4-30-24)

Chapter 3.2 – Target Products

- Table 3-26 (page 64) shows sablefish production (mt) by product form, 2012-2022
- The dominant sablefish wholesale product is H&G followed by whole fish as illustrated in Figure 3-21
- First wholesale volume of sablefish products averaged just under 8,000 mt annually
  - However, in 2021 and 2022 production has increased which has flooded the market which has results in lower prices
  - COVID-19 restrictions also likely contributed to the decline in prices



Chapter 3.3 – Sablefish Markets

- Japan is the primary market for Alaska's sablefish, generally > 70% of total export volume followed by China
- U.S. and Canada have accounted for nearly all global production of sablefish
  - Primary contributor is Alaska, contributes an annual average of 62% between 2016 and 2020
- As reported in Undercurrent News, Russia, which has been a relatively small contributor to world sablefish production, could play a more significant role as catch recommendations have increased dramatically
  - However, there is some uncertainty how and if Russian fishing fleet can capitalize on these high harvest recommendations
- Preliminary indications are that sablefish ex-vessel prices for 2024 are even lower than 2023 thus far
- Numerous geopolitical, trade inequities, and economic factors that are not directly controlled by seafood participants that are impacting Alaska's sablefish fishery
  - These include large harvests by overseas competitors with low currency valuations (Russia), trade conflicts with a major U.S. export receiver (China), higher operating costs due to domestic inflation, lingering COVID-19 logistical challenges associated with shipping, and high interest rates that have affected processors' ability to finance operations and needed investments to support vessel fleets and crew

C4 Small Sablefish Release

North Pacific Fisheries Management Council
Kodiak, AK
June 2024

Dan Goethel (AFSC), Sara Cleaver (NPFMC),
Chris Lunsford (AFSC), and Ben Williams (AFSC)

A Projection Analysis Quantifying the Implications of the Proposed Small Sablefish Release Action

NOAA FISHERIES

Outline for Projection Analysis Presentation

- Background on discard modeling
- Overview projection methods and input data
- Results, biological and fishery implications
- Associated uncertainty

Methods: Shiny App

- Ben Williams developed a user-friendly shiny app to illustrate impacts of retention and DMR options-- https://shinyfin.psmfc.org/small_sablefish/.
  - **Provides results in an interactive format to aid understanding and comparisons.**
- Includes full factorial combination of sensitivity runs and some alternate runs, which were not meant for review (provided to further aid understanding of model dynamics).
- Intended to enable interested parties to explore assumptions and consider impacts on their own and in a different format from a management document.

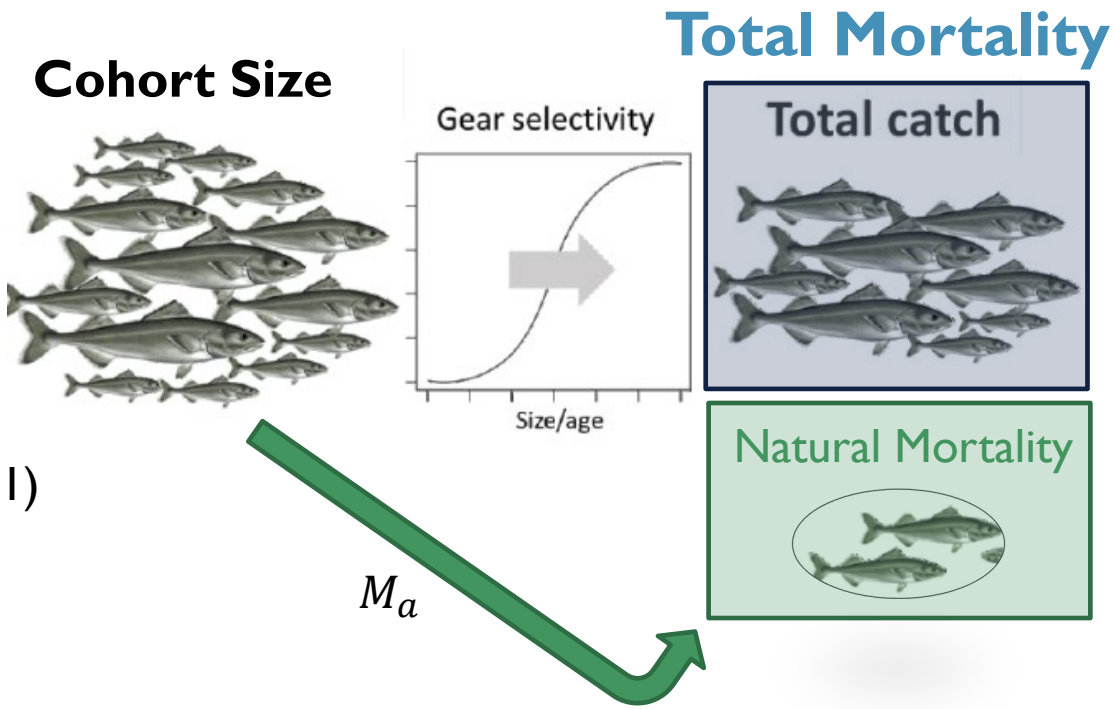
id	recruitment	dmr	retention_age
hist-0-1	historical	0	1
hist-12-3	historical	12	3
hist-20-3	historical	20	3
hist-35-3	historical	35	3

Understanding Discard Impacts *on a cohort (age/size class)*

Full Retention

Total Mortality = Retained Fishing Mortality + Natural Mortality

$$Z_a = F * Selectivity_a + M_a$$



NPFMC (2021)

Understanding Discard Impacts *on a cohort (age/size class)*

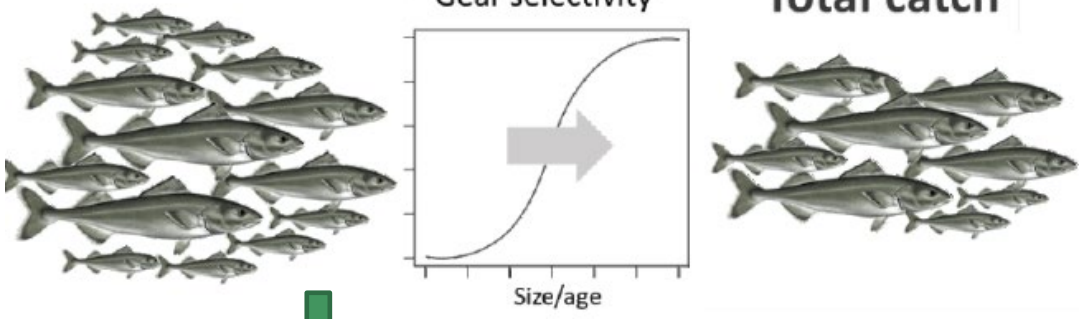
Discarding (Minimum Size Limit)

Total Mortality = Retained Fishing Mortality + Dead Discard Fishing Mortality + Natural Mortality

$$Z_a = F * Selectivity_a * Retention_a + F * Selectivity_a * (1 - Retention_a) * DMR + M_a$$

Total Mortality

Cohort Size



M_a

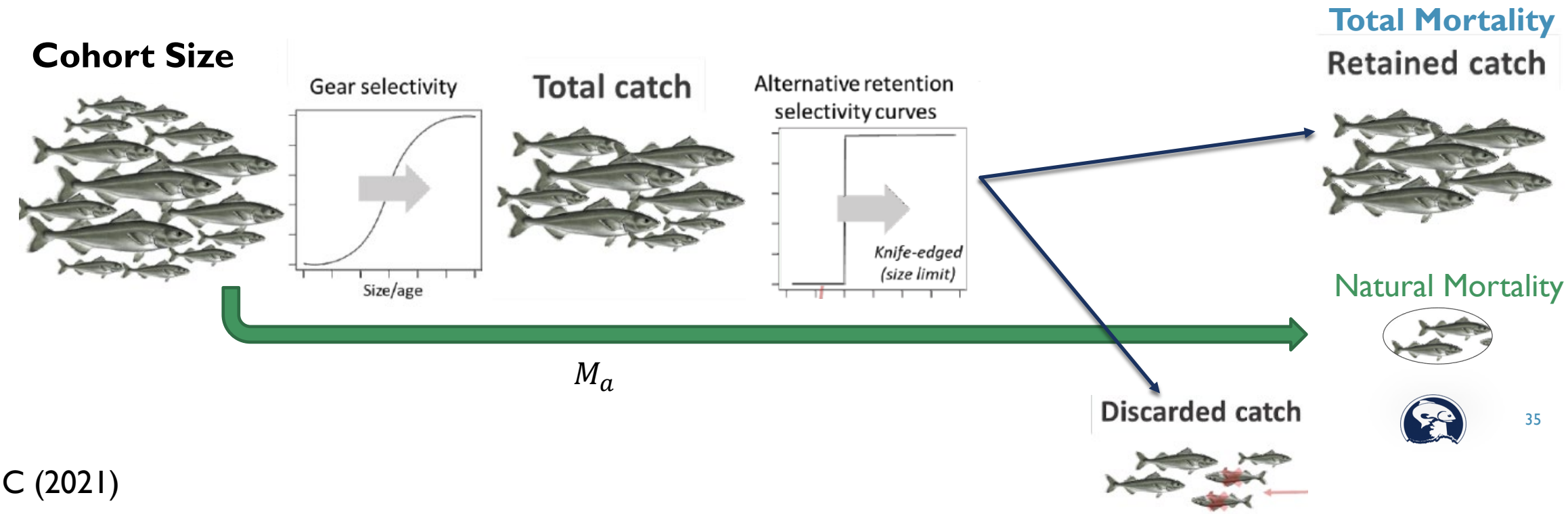
NPFMC (2021)

Understanding Discard Impacts *on a cohort (age/size class)*

Discarding (Minimum Size Limit)

Total Mortality = Retained Fishing Mortality + Dead Discard Fishing Mortality + Natural Mortality

$$Z_a = F * Selectivity_a * Retention_a + F * Selectivity_a * (1 - Retention_a) * DMR + M_a$$



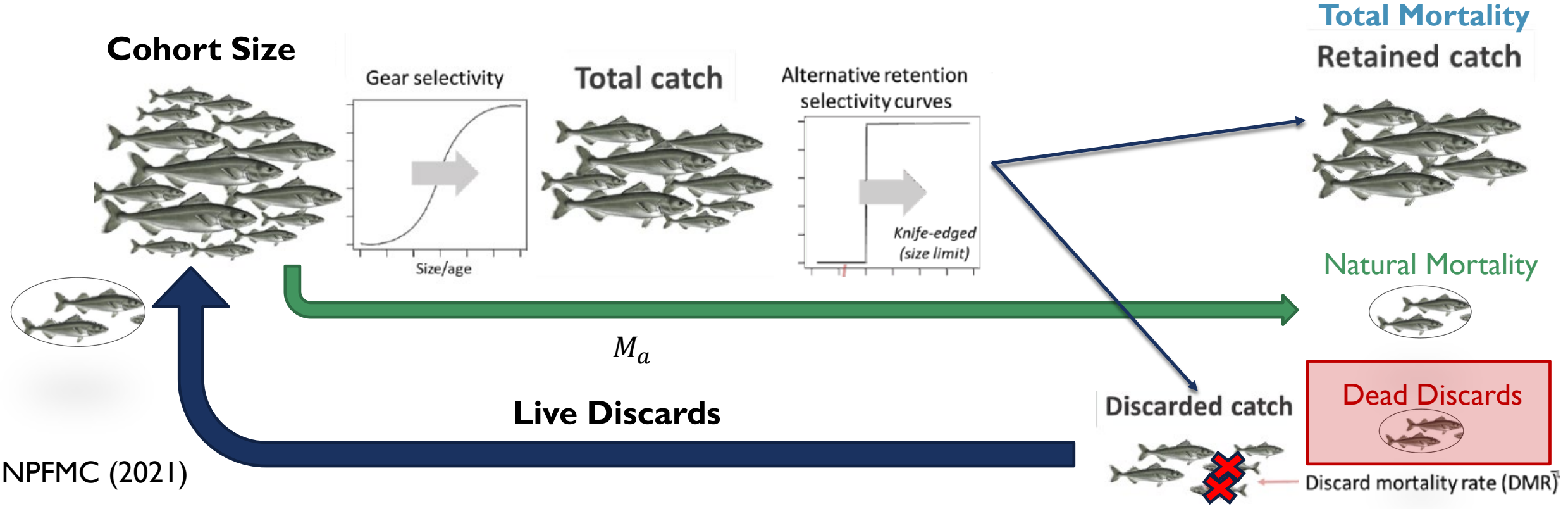
NPFMC (2021)

Understanding Discard Impacts *on a cohort (age/size class)*

Discarding (Minimum Size Limit)

Total Mortality = Retained Fishing Mortality + Dead Discard Fishing Mortality + Natural Mortality

$$Z_a = F * Selectivity_a * Retention_a + F * Selectivity_a * (1 - Retention_a) * DMR + M_a$$



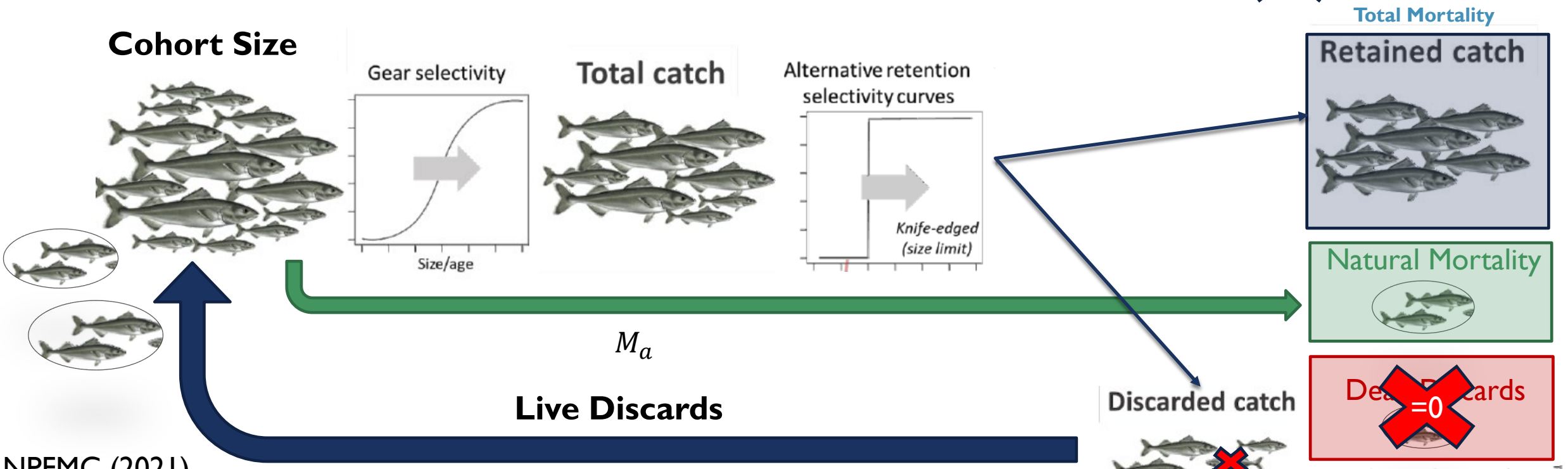
NPFMC (2021)

Understanding Discard Impacts *on a cohort (age/size class)*

Discarding (DMR= 0 (best case scenario, most survival)

Total Mortality = Retained Fishing Mortality + Dead Discard ~~Fishing~~ =0 Mortality + Natural Mortality

$$Z_a = F * Selectivity_a * Retention_a + F * Selectivity_a * (1 - Retention_a) * \text{=0} + M_a$$



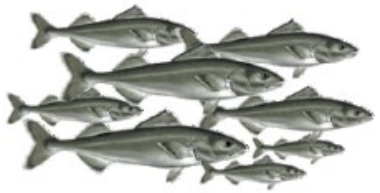
NPFMC (2021)

Understanding Discard Impacts *on a cohort (age/size class)*

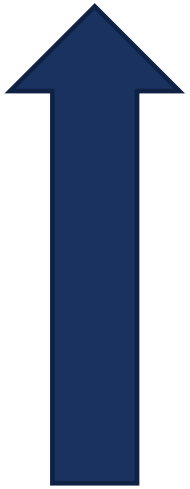
Impacts on a *Single Age Class*

For a Given F, Selectivity, and Retention

Cohort Size



Abundance

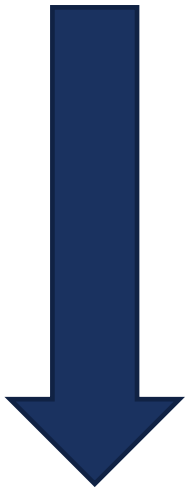


Discarding (DMR=0)

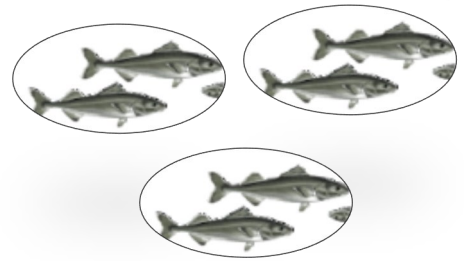
Discarding (DMR>0)

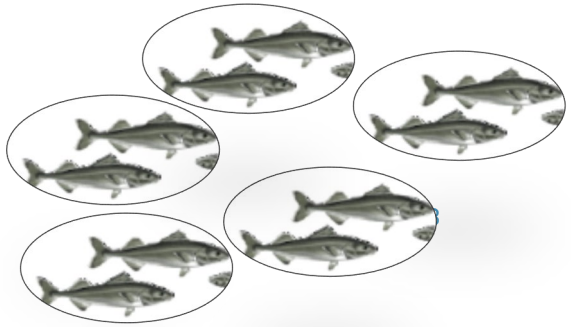
Full Retention

Retained Catch or Total Mortality



Retained catch





Understanding Discard Impacts *on the Population*

Impacts on the *Population*

Accounting for Biological (Weight, Maturity, and Natural Mortality) and Fishery (Selectivity and Retention) Processes Across All Ages

Minimum Size Limit (MSL) = Legal High-grading

Discard smaller, low value fish to enable retaining a larger, more valuable fish.

Pro: discarding small fish allows them to grow/mature, IF they survive (M, DMR).

Con: discarding allows high-grading to larger/mature fish (puts pressure on SSB) and increases effort.

Understanding Discard Impacts *on the Population*

Impacts on the *Population*

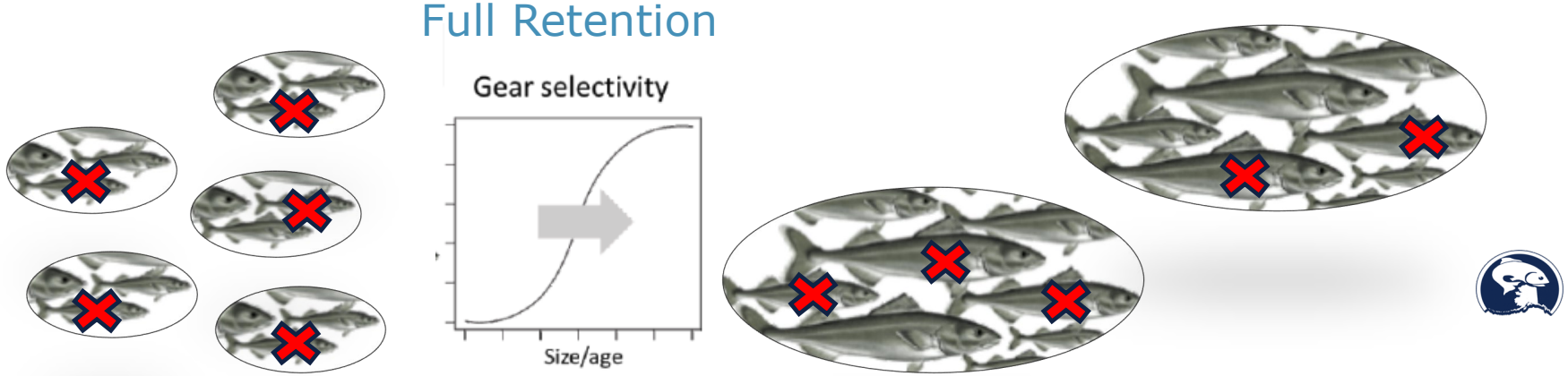
Accounting for Biological (Weight, Maturity, and Natural Mortality) and Fishery (Selectivity and Retention) Processes Across All Ages

Minimum Size Limit (MSL) = Legal High-grading

Discard smaller, low value fish to enable retaining a larger, more valuable fish.

Pro: discarding small fish allows them to grow/mature, IF they survive (M, DMR).

Con: discarding allows high-grading to larger/mature fish (puts pressure on SSB) and increases effort.



Understanding Discard Impacts *on the Population*

Impacts on the *Population*

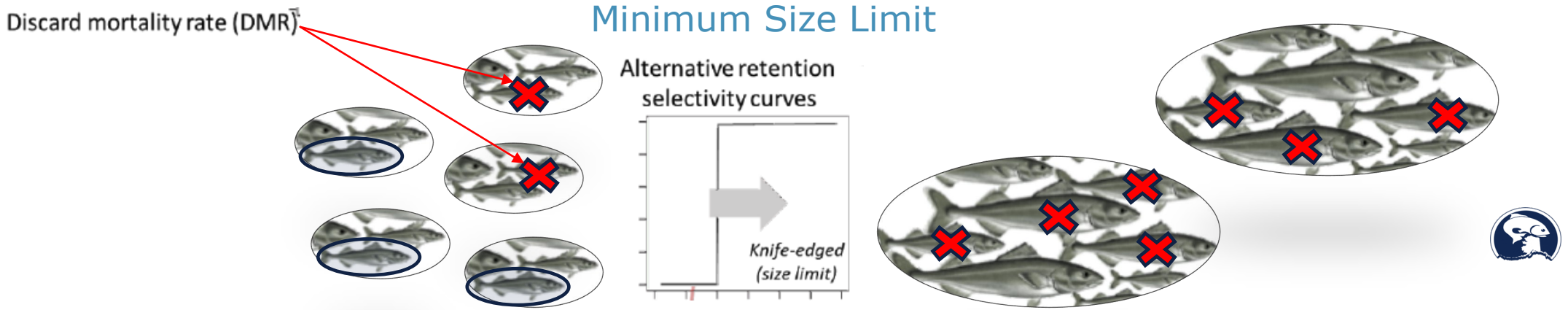
Accounting for Biological (Weight, Maturity, and Natural Mortality) and Fishery (Selectivity and Retention) Processes Across All Ages

Minimum Size Limit (MSL) = Legal High-grading

Discard smaller, low value fish to enable retaining a larger, more valuable fish.

Pro: discarding small fish allows them to grow/mature, IF they survive (M, DMR).

Con: discarding allows high-grading to larger/mature fish (puts pressure on SSB) and increases effort.



Understanding Discard Impacts *on the Population*

Impacts on the *Population*

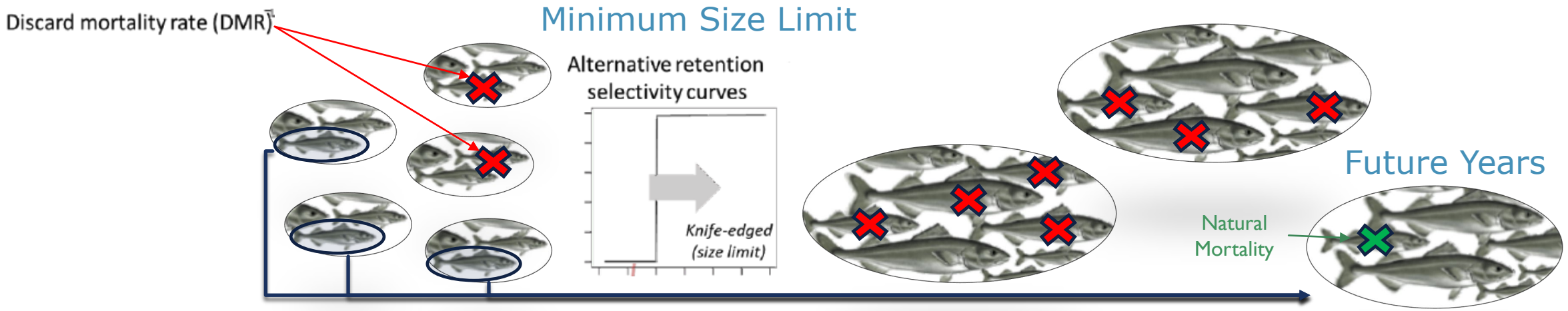
Accounting for Biological (Weight, Maturity, and Natural Mortality) and Fishery (Selectivity and Retention) Processes Across All Ages

Minimum Size Limit (MSL) = Legal High-grading

Discard smaller, low value fish to enable retaining a larger, more valuable fish.

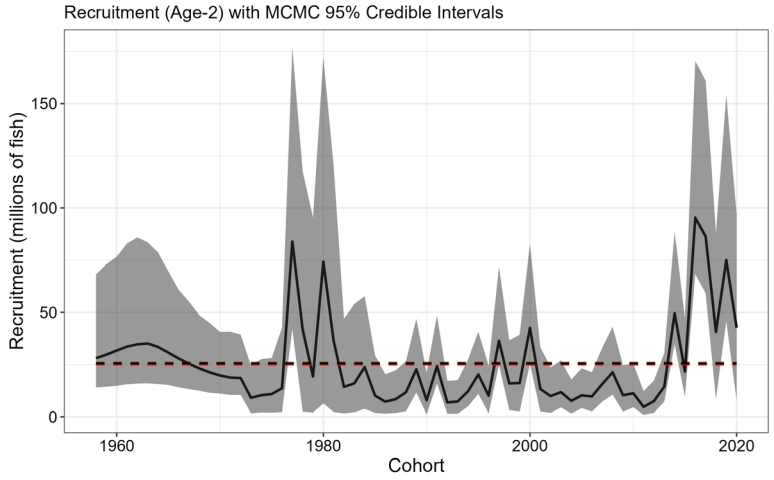
Pro: discarding small fish allows them to grow/mature, IF they survive (M, DMR).

Con: discarding allows high-grading to larger/mature fish (puts pressure on SSB) and increases effort.



Methods: Simulation Projection Framework

- Adapt the NPFMC ABC catch projection model to allow for discarding.
- Model structure:
  - **Age- and sex-structured forward simulation for 50 years.**
  - **Catch projected using the NPFMC $F_{40\%}$ harvest control rule.**
  - **Parameters taken from 2023 SAFE:**
    - **Biological inputs, fishery selectivity (fixed gear and trawl), etc.**
    - **Recruitment sampled with replacement from the SAFE time series.**
  - ***No economic or fishery behavior integrated.***
    - **Gross revenue calculated based on price.**
    - **Price grades assigned to age based on weight.**
    - **Assumed time-invariant 2023 prices for all years.**



	Price Grade					
Year	1/2	2/3	3/4	4/5	5/7	7+
2015	$4.22	$4.27	$5.19	$6.09	$7.55	$8.94
2016	$4.85	$5.05	$5.78	$6.63	$8.16	$10.04
2017	**$5.70**	**$6.05**	**$7.16**	**$8.25**	**$9.34**	**$10.70**
2018	$1.63	$2.89	$4.13	$5.28	$8.27	$9.14
2019	$1.49	$2.06	$2.71	$3.56	$5.88	$6.69
2020	$0.45	$1.19	$1.74	$2.17	$3.33	$4.97
2021	$0.96	$1.91	$2.46	$2.84	$3.78	$5.60
2022	$0.84	$1.75	$2.40	$3.57	$5.97	$6.94
2023	**$0.43**	**$0.95**	**$1.34**	**$1.88**	**$4.33**	**$5.35**
Mean	**$2.29**	**$2.90**	**$3.66**	**$4.47**	**$6.29**	**$7.60**

Methods: Assumptions

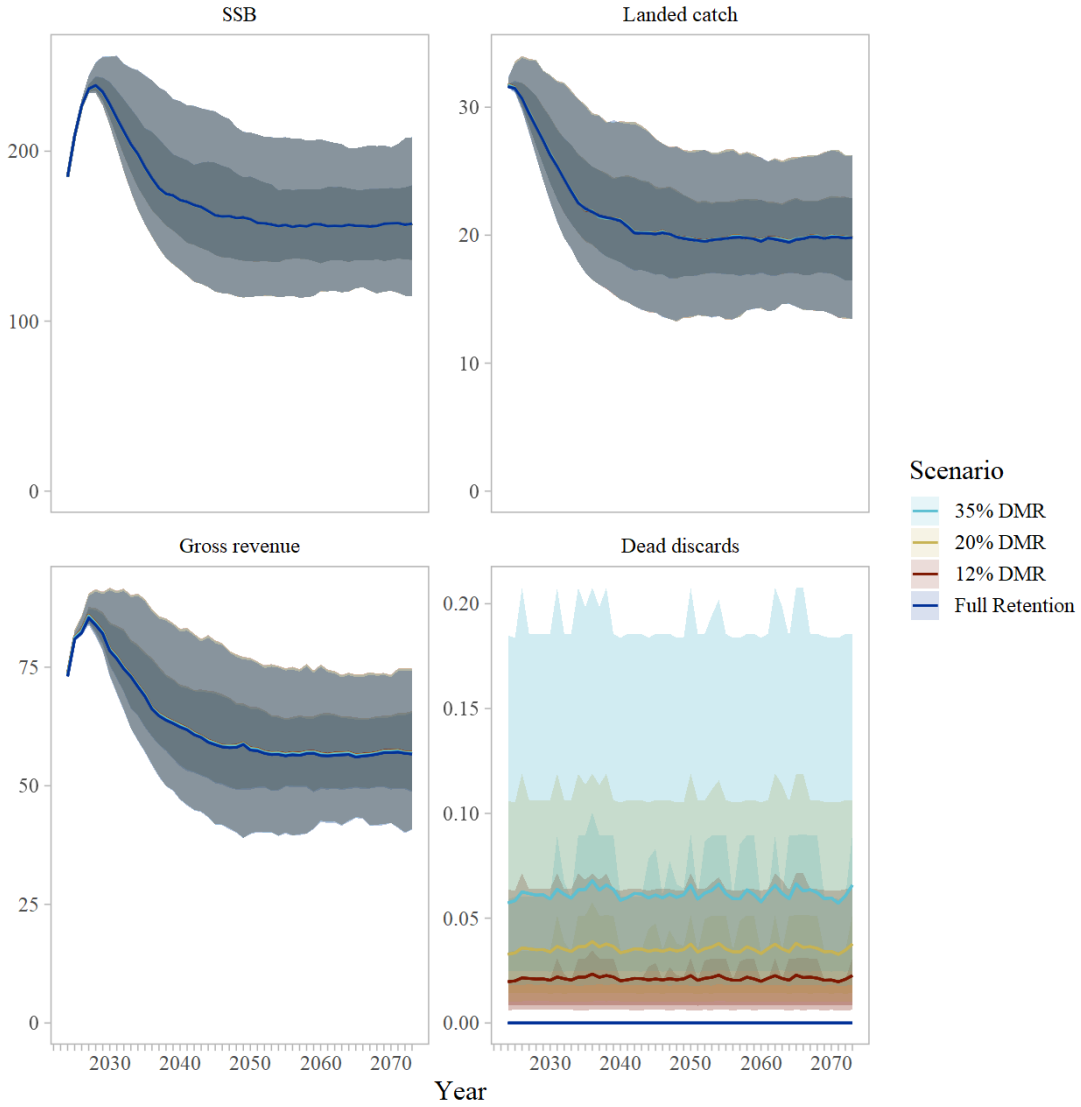
- Primary Uncertainties and Comparison Axes:
  - **Retention:**
    - **Full retention in IFQ fishery (status quo).**
    - **Trawl fleet full retained or 100% DMR**
    - **Minimum Size Limit (MSL) .**
      - **22in total length (= 56cm TL or 52-53cm FL) MSL.**
      - **Assume knife-edge retention at age-3.**
        - **Cannot effectively model 'voluntary' release, so this represents the maximum discarding (i.e., a minimum size limit with full compliance).**
        - **All fish < age-2 are discarded, all fish age-3 or older are retained.**
  - **Discard mortality rate (DMR):**
    - **12%, 20%, and 35%.**
    - **Values specified by SSC in Feb. 2024.**

	Fork Length (cm)		Round Weight (kg)	
Age	Male	Female	Male	Female
2	47.9	48.0	1.1	1.1
3	52.0	53.2	1.4	1.6
4	55.3	57.6	1.8	2.0
5	57.9	61.3	2.1	2.5
6	60.0	64.4	2.3	2.9
7	61.6	67.0	2.5	3.3
8	62.9	69.2	2.7	3.6
9	64.0	71.1	2.8	3.9
10	64.8	72.7	2.9	4.2

Abbreviation	Retention	DMR	Price
Full_Retention	Full	None	2023 (Fixed)
Hist_Recr_DMR_12%	Age-3 (Knife-edge)	12%	2023 (Fixed)
Hist_Recr_DMR_20%	Age-3 (Knife-edge)	20%	2023 (Fixed)
Hist_Recr_DMR_35%	Age-3 (Knife-edge)	35%	2023 (Fixed)

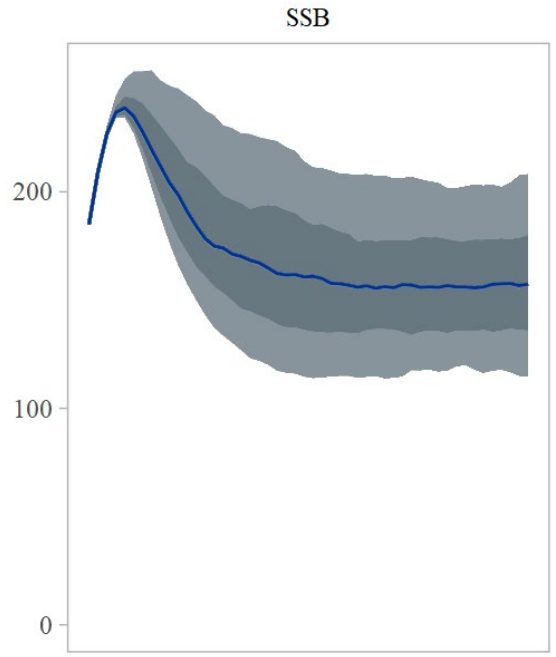
Results: Historical Recruitment

- Dead discards are minimal under all discarding scenarios.
- Allowing discarding has extremely limited impact on most metrics.
  - **Slight improvement in gross revenue.**
- **SSB and revenue maximized when older individuals are present.**
- Probability of entering an overfished state is independent of discarding assumption.
  - **< 7% of all years across all iterations were in an overfished state for a given retention and DMR.**



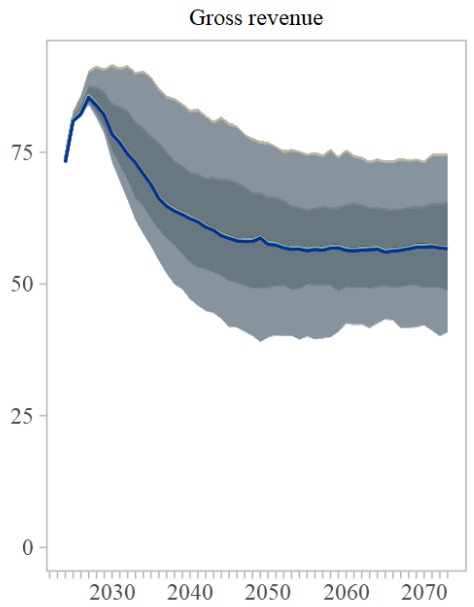
Implications: Biological

- No conservation benefit, but no negative consequences from a simulation standpoint.
- Generally low probability of entering an overfished state.
  - **Independent of whether discarding is allowed or not.**
- Why does discarding not have more of an impact?
  - **Low selectivity at age-2, so very few fish being released.**
  - **Low fishing mortality, so limited harvest at age-2.**
  - **Comparatively high natural mortality (10%), which negates benefits of release.**
- Discarding with lowest DMR (12%) reduces age-2 mortality by 1%.
  - **Declines from 12% (full retention) to 11% (discarding with 12% DMR).**
- Released fish in first projection year add ~0.5kt to SSB over the lifespan of the cohort (~0.3% increase in SSB).



Implications: Fishery

- Gross revenue increases slightly.
- Effort increases under discarding, likely with associated costs.
- Given tradeoff in size/weight of fish between age-2 and larger ages, likely to be limited opportunity to high-grade.
  - **For example, one grade 3/4 fish can be kept for every 3 age-2 fish released.**



	Price Grade					
Year	1/2	2/3	3/4	4/5	5/7	7+
2015	$4.22	$4.27	$5.19	$6.09	$7.55	$8.94
2016	$4.85	$5.05	$5.78	$6.63	$8.16	$10.04
2017	**$5.70**	**$6.05**	**$7.16**	**$8.25**	**$9.34**	**$10.70**
2018	$1.63	$2.89	$4.13	$5.28	$8.27	$9.14
2019	$1.49	$2.06	$2.71	$3.56	$5.88	$6.69
2020	$0.45	$1.19	$1.74	$2.17	$3.33	$4.97
2021	$0.96	$1.91	$2.46	$2.84	$3.78	$5.60
2022	$0.84	$1.75	$2.40	$3.57	$5.97	$6.94
2023	**$0.43**	**$0.95**	**$1.34**	**$1.88**	**$4.33**	**$5.35**
Mean	**$2.29**	**$2.90**	**$3.66**	**$4.47**	**$6.29**	**$7.60**

Scientific Uncertainty- Impacts to Assessment

- Increases in scientific uncertainty under this motion due to:
  - **Loss of data on age-2 recruitment (fewer age/length samples).**
  - **Limited data on discarding.**
    - **Need data on:**
      - **Magnitude of discards.**
      - **Size/age composition of discards.**
      - **Discard mortality rate.**
    - **Availability and precision of each data type will impact assessment uncertainty.**
- If data limited, would need to fix discard parameters (DMR, retention) or start the model at age-3 (since no data on age-2 dynamics).
- Likely to be author proposed risk table reductions from max ABC to address increased assessment uncertainty.

Increasing stock assessment uncertainty

Scenarios	Data used in stock assessment	Ability to estimate:			Example
		Gear selectivity	*Retention selectivity*	*Discard mortality rate (DMR)*	
Mandatory retention with at-sea observers	Age or length compositions from the total catch	Yes	*Not needed*	*Not needed*	Status quo
Voluntary discarding with at-sea observers paired with shoreside sampling	Age or length compositions from the retained catch *and* the total catch (retained + discarded)	Yes	Yes	No	BSAI king, snow, and tanner crabs
Minimum size limit with at-sea observers	Age or length compositions from the total catch (retained + discarded)	Yes	Assume full retention at minimum size limit	No	--
Voluntary discards with at-sea observers only	Age or length compositions from the total catch (retained and discarded)	Yes (but may increase uncertainty)	No	No	--
Voluntary discards with shoreside sampling only	Age or length compositions from the retained catch	No	No	No	Chatham Strait sablefish

NPFMC (2021)

Conclusions of Simulation Study

- Given the proposed ‘optional release’ size, corresponding essentially to an average age-2 fish, the simulation does not indicate negative consequences of allowing discarding.
- However, no biological benefits for enacting a minimum size limit for Alaska sablefish.
- Likely to be some economic benefits, but costs associated with increased effort also likely to increase.
- More extreme impacts were not observed due to the limited selectivity of age-2 fish and the comparatively high natural mortality compared to fishing mortality at this age.
- Scientific uncertainty associated with the stock assessment and resulting ABC projections will likely increase due to limited data available to model the discarding process.
- Interactive app available to further explore results of this work: https://shinyfin.psmfc.org/small_sablefish/.

Social Impact Assessment- Status Quo
Harvesters

- Section 5.2 Social Impact Assessment (pages 109-124)
  - Sablefish IFQ vessel ownership for CVs is concentrated in Alaska, specifically Homer, Seward, Kodiak, Juneau, Petersburg, and Sitka, which accounts for 55% of CVs
  - For CPs, ownership is also concentrated in Alaska at 70%, with Sitka having the highest percentage of ownership address at 33%
  - From the perspective of sablefish IFQ gross ex-vessel revenue by ownership address, Petersburg at 19% and Sitka at 14% had the largest revenue
  - Sablefish IFQ vessels with a highest degree of dependency on the sablefish fishery by historic ownership address include Petersburg at 58%, Cordova & Sitka at 41%, and Seward at 33%
  - For sablefish IFQ vessels, the sablefish and halibut IFQ fisheries are the primary source of ex-vessel revenue, while salmon and Pacific cod are less important
  - Several Alaska communities are dependent on the sablefish IFQ fishery: Sitka at 23%, Seward at 22%, and Petersburg at 12%.

Social Impact Assessment – Status Quo
Crew and Quota Share Holders

Crew

- Crew numbers have declined over the years, but in 2021 and 2022 crew numbers increased
- Crew numbers for the less than 40’ and the greater than 60’ have shown the greatest loss in crew numbers since 2013

Quota Share Owners

- Sitka has the largest number of quota share holders at annual average of 123 owners
- Other communities with high numbers of QS holders are Kodiak (68), Petersburg (59), Seward (57)
- The region with highest concentration of sablefish QS is SE at 106 million shares which accounts for 31% of the total sablefish quota shares
  - Of the Southeast communities, Petersburg ~53 million shares (15% of total shares) and Sitka ~ 31 million shares (9% of total), had the largest number of shares

Social Impact Assessment
Shore Processors

- Annual average number of processors accepting sablefish IFQ deliveries from 2013-2023 was 34
- Sitka, Seward, Kodiak, and Petersburg combined to accounted for approximately 67% of the average annual first wholesale gross revenue from the sablefish IFQ fishery from 2013 through 2023
- Processors in Sitka at 36%, Seward at 25%, and Juneau at 14% were highly dependent on the sablefish fishery
- Seward at 24% and Sitka at 17% were the two communities with highest dependency on the sablefish IFQ fishery
  - Other communities with dependency greater than 5% included Petersburg and Juneau at 7%, and Kodiak at 5%.

Economic and Social Impacts

Alternative 1, No Action

- Selecting Alt 1 leaves in place the existing regulatory restrictions prohibiting release of any sablefish caught by sablefish IFQ vessels either when directing on sablefish or when unused IFQ is onboard.
- Under Alt 1, harvest participation and fishing behavior are likely to be similar to current participation and fishing practices which include:
    - Not harvesting all their allocations (Table 5-15 and Figure 5-1 on page 125 shows annual percent of allocations harvested by regulatory area)
    - Reduced number of vessels active in the fishery (Figure 5-2 on page 126 shows declining number of active vessels)
    - Reduced fishing days (Figure 5-3 on page 126), especially for vessels fishing less than 24 days a year (Table 5-16 and Figure 5-4 on page 127)
    - More dependent on the sablefish fishery in more recent years (Table 5-6 on page 117 & Figure 5-5 on page 128)
    - Little ability to improve ex-vessel revenue with higher encounter rates of smaller sablefish and continued very low prices for smaller sablefish due to world market for sablefish

Economic and Social Impacts

Alternative 1, No Action

- Processors that receive deliveries of sablefish IFQ/CDQ would experience similar processing activity and would also be negatively impacted under Alt 1 relative to Alt 2
  - As noted earlier, Table 5-13 (page 123) provides dependency information for those shore processors that accept sablefish IFQ/CDQ deliveries
  - These processors that are dependent on the sablefish fishery are in Sitka, Seward, and Juneau
- Communities that are directly engaged and dependent on the sablefish fishery would likely see similar expenditure patterns associated with the sablefish fishery under Alt 1
  - Communities impacted the greatest under Alt 1 include Sitka, Seward, Petersburg, Juneau, Kodiak, and Homer
  - The communities would likely experience reduced direct, indirect, and induced expenditures under Alt 1 relative to Alt 2 from reduced harvesting and processing of sablefish

Economic and Social Impacts

Alternative 2: Allow Release of Sablefish in the IFQ Fishery

- Simulation results show only slight improvements in total revenue from allowing highgrading of sablefish <22” with sablefish ≥ 22”
  - One of the primary reasons is due to the encounter rates of smaller, less valuable, sablefish relative to larger, more valuable sablefish
  - These encounter rates are an impediment to the economic success of highgrading smaller sablefish for larger sablefish
- Simulation results do not account for the complexity and variation of key economic inputs at the harvester level that when factored could result in different gross ex-vessel revenue results
  - For example, there are likely many different levels of fishing effort across the many harvesters, there are likely changes in ex-vessel prices over time and between harvesters, changes in sablefish market conditions due to overseas competitors sablefish production, conflicts with major exporters, higher operating costs, and continued logistical challenges
  - Factoring in some of these and other economic inputs across the fleet of sablefish IFQ harvesters, the resulting gross ex-vessel revenue could be different from estimates depicted in the simulations

Economic and Social Impacts

Alternative 2: Allow Release of Sablefish in the IFQ Fishery

- Discarding small sablefish would enhance harvester flexibility to improve gross ex-vessel revenue and to reduce harvest of sablefish of no economic value
    - Harvester participation and fishing behavior would likely change when there is perceived benefit from discarding
        - Not all harvesters would change their fishing behavior, case in point H&L CPs in the BS
- Factors influencing sablefish IFQ harvesters to discard small sablefish include:
    - Continued population trends in sablefish stocks resulting in high proportion of small sablefish relative to large sablefish
    - Increased fishing effort by existing harvesters to highgrade which could increase costs of fishing (higher fuel costs, bait costs, observer costs, vessel maintenance costs and higher crew costs)
    - Continued low prices for smaller sablefish due to seafood world market conditions
    - The relative percentage of sablefish IFQ that can be highgraded under Alt 2
    - The use of an ICA to account for discards

Collectively these factors could make it difficult for some harvesters to increase ex-vessel revenue from highgrading small sablefish, but there is potential for some harvesters to increase their ex-vessel revenue

Economic and Social Impacts

Alternative 2: Allow Release of Sablefish in the IFQ Fishery

- Processors that receive deliveries of sablefish IFQ/CDQ would likely face challenges in benefiting from Alt 2 for many of the same reasons that could impact harvesters
    - Continued downward pressure on sablefish prices for all grades of sablefish combined with the relatively small percentage of sablefish that can be highgraded could result in less than expected gross first wholesale revenue

- Communities that are directly engaged and dependent on the sablefish fishery would depend on the success of harvesters and processors utilizing Alt 2 highgrading to improve ex-vessel and first wholesale revenue which would likely increase expenditures in the communities
    - Communities impacted the greatest under Alt 2 include Sitka, Seward, Petersburg, Juneau, Kodiak, and Homer

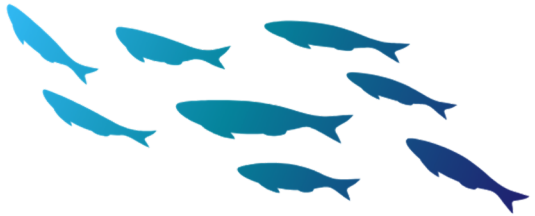
Summary Points

- DMR will be chosen as part of the annual harvest specifications process
- Trade-offs in sampling priorities for other species
- Discards estimated based on fish tickets and observer data
- Potential for observer bias
- Voluntary discards can only be based on a portion of the IFQ sector (observed sector) but apply to whole IFQ program when determining new ICAs for fixed gear fishery and the resulting TAC.
- Limited enforceability
- Negligible impacts on sablefish stock
- Increased flexibility, potential slight improvements in revenue for sablefish IFQ harvesters
- Potential reductions from maxABC due to increased uncertainty

Clarifications from and action for the Council

- May select a PPA at this time
- If Alt 2 option 1 is no longer feasible, could be removed and no further analysis of that option needed
- Inclusion of CDQ in any further motion
- Consider Council decision points in motion
- Careful release requirements?
- Escape mechanism requirement?

SUMMARY AND COUNCIL CLARIFICATIONS



Questions?