D6 Small Sablefish Release

Presentation the SSC, February 2024

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SSC Actions:

1. Recommend a sablefish DMR or range of DMRs for analysis
2. Provide feedback on and endorse the proposed simulation study

NOAA FISHERIES

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

[Summary of findings on next slide]

Initial Review Analysis (Feb 2021): Methods and Summary of Findings

- Evaluated a range of retention selectivity scenarios; discard estimates are highly sensitive to these alternatives and DMRs
- Continued decline in market prices for smaller sablefish → poor economic conditions in fishery
- Stock related (spawning biomass) and economic (yield, ex-vessel value) impacts dependent upon size of fish discarded and DMR.
- Increasing harvest of large sablefish would put increasing pressure on spawning biomass.
- Voluntary discards would increase uncertainty in stock assessment, likely decrease in ABC
- Impacts vary based on management area based on differences in population size distribution

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Feb 2021

Council receives initial review analysis

- SSC recommends additional analyses before final action
  - Assess trade-off in lost yield of younger fish vs preserving spawning biomass and future value of catch
  - Impact of selectivity on reference points
  - SPR analysis
  - Differential impacts across communities or regions

SSC Recommendations (February 2021) (p4)

The SSC concluded that there are two unresolved questions that are central to understanding the effects of the proposed amendment:

1. What is the impact on the age structure and overall productivity of the stock under different rates of discard mortality and for different gear and discard selectivity profiles?

2. What is the impact on the uncertainties in the stock assessment, and the required buffers in setting ABC, arising from knowledge gaps introduced by not knowing gear selectivity or discard selectivity and mortality in a mostly unobserved fishery?

"The SSC recognizes that this analysis provides the basis for a time-sensitive action, but the SSC concluded that the analysis does not fully address these questions and recommends that the draft amendment is not ready for final action"

History of Action (cntd)

Oct 2021

- Council directs staff to prepare and schedule second initial review analysis when time and resources allow.

Apr-June 2022

- IFQ Committee and Council support scheduling next initial review as staff 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

[Summary on next slide]

June 2023 Update Paper

- Changes in Stock Status
- Fishery and Market Updates
- Comparison of Yield Per Recruit / Knuckey Analysis
- Monitoring Considerations for Estimating Discards
- Discard Mortality Rate (DMR) Considerations
- Stock Assessment Considerations and Effects on Uncertainty
- Tradeoffs and Workload Considerations / Next Steps

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June 2023

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

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

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)

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 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.

Alternatives

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SSC Action Items: (Circle back)

1. Provide range of DMRs to be included in analysis

2. Provide feedback on and endorse approach for proposed simulation study

DMR Considerations

Some of the Council alternatives (5, 12, 16, 20%) are proxy values assessed and described in previous discussion papers.

Some of these are used by other agencies or regions.

None account for post-release predation by whales

DMR for Alaska sablefish IFQ fishery would need to be determined by the SSC.

DMR Considerations: DMRs from Council motion

DMR value	Origin	Methods	Gear Type	Assumptions/ Caveats
5%	Halibut DMR for pots in GOA prior to 2020	Halibut DMR WG	Pot	Methods from Nov 2016 WG
11.7 (12) %	Stachura et al. (2012)	Tag recovery study	H &L	minor hooking injuries, 96.5% survival for halibut, survey platform
16%	ADFG	Proxy	H &L	same as halibut DMR in Gilroy and Stewart (2013)
20%	Somers et al. (2017)	West Coast Groundfish Mgmt Team	fixed gear	age 0 sablefish 100% mortality
25%	Discussions @ Council in June 2023	• n/a • (Note that ADFG sablefish DMR in halibut fishery is 25%)	Fixed gear	A DMR that accounts for post release predation may be higher

DMR Considerations: Addtl Information

DMR value	Origin	Methods	Gear Type	Assumptions
15%	DFO	Unknown	Pot	15% DMR assumed for sub-legals in stock assessment
30%	DFO	Unknown	H &L	30% DMR assumed for sub-legals in stock assessment
35%	NPFMC analysis (1987)	Unknown	Fixed gear	DMR assumed for 1987 NPFMC analysis pre-IFQ

DMR Considerations (cntd)

Sablefish DMR (pots, H&L) =

handling mortality/ post-release physiological effects + post-release predation

?

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SSC Action Items:

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Analyses: Yield-per-Recruit

- Implementation of minimum size limits for Alaskan sablefish have been considered for ~40 years.
- Bioeconomic yield-per-recruit (YPR) and spawner-per-recruit (SPR) have been utilized to assess impacts.
- Conclusions generally align:
  - **No strong biological benefits, but no net harm.**
  - **Landed value improved slightly.**
  - **Discard mortality strongly reduced benefits.**
    - **Most analyses assumed a 35% DMR.**
  - **Fishing mortality needed to maximize yield is higher (i.e., increased effort) with a MSL.**

STATUS OF THE GULF OF ALASKA SABLEFISH (Anoplopoma fimbria) RESOURCE IN 1983

By
Fritz Funk
and
Barry E. Bracken

Terry 5.22.1

2.0 Amendment Proposal 6: Minimum size limit for sablefish (GOA and BS/AI).

Fisheries Research, 11 (1991) 307–320
Elsevier Science Publishers B.V., Amsterdam

307

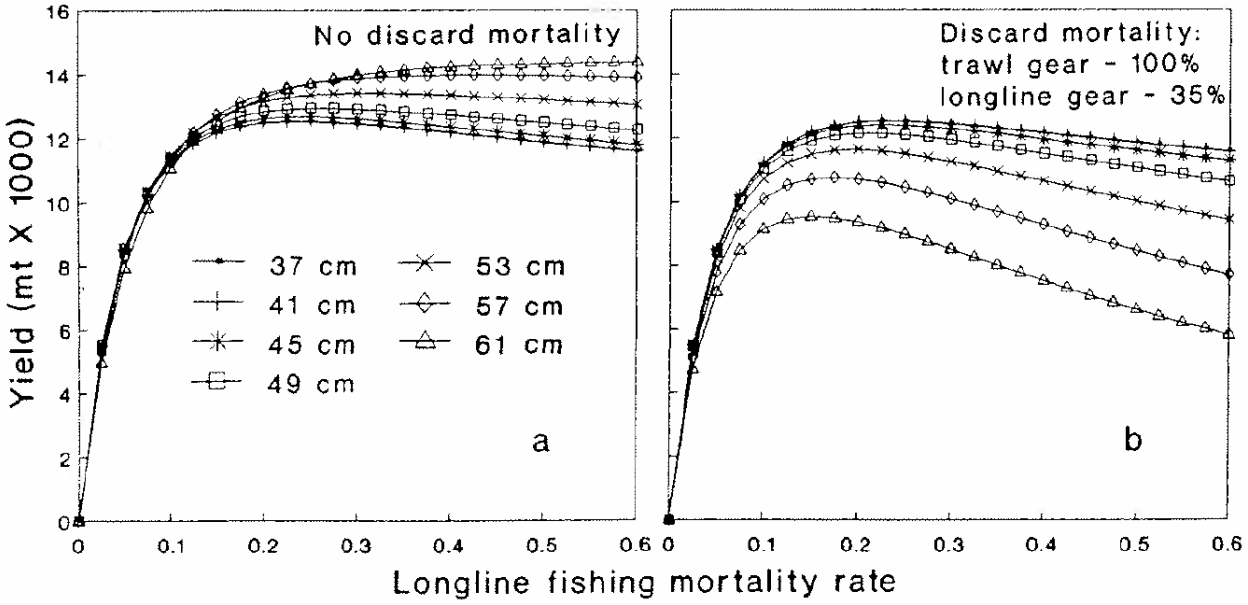
Bioeconomic analysis of a minimum size limit for Gulf of Alaska sablefish using a yield per recruit model

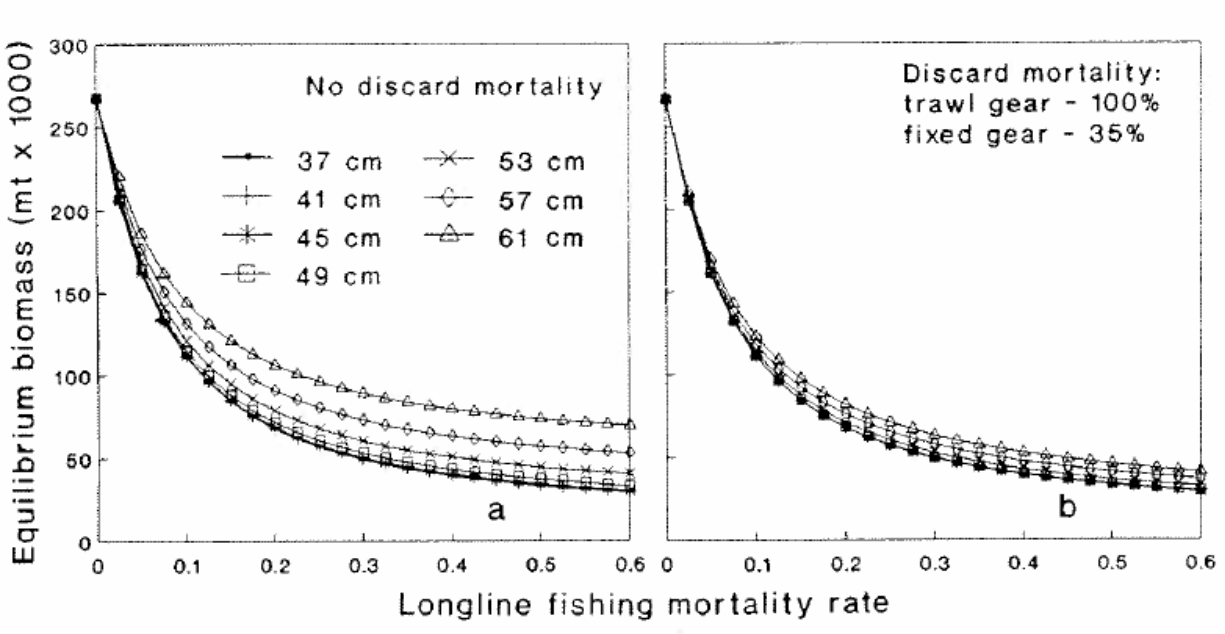
Sandra A. Lowe[a], Jeffrey T. Fujioka[b] and Joseph M. Terry[a]

Analyses: Yield-per-Recruit

Lowe et al., 1991

- To DMR or not to DMR: applying a DMR had larger influence than the MSL.
- With discarding, YPR maximized with 37cm size limit (effectively no MSL).
- No appreciative differences in SPR when DMR applied.





Analyses: Yield-per-Recruit

NPFMC 2021

Evaluated multiple retention scenarios:

- Full retention, knife-edged (minimum size limit at 59cm FL), logistic, exponential

DMRs between 5% and 100%

Koopman and Knuckey (2022)

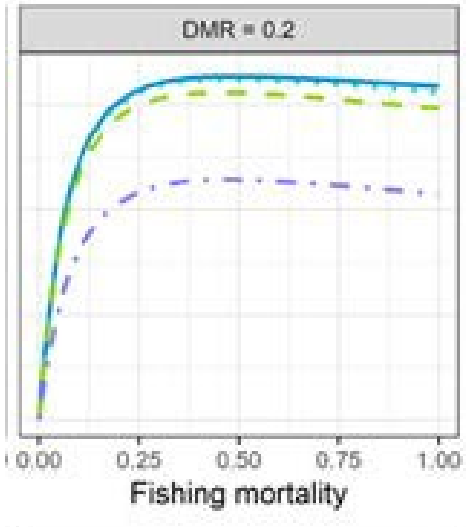
Minimum size limit (knife-edge)

- 5cm increments from 35cm to 65cm

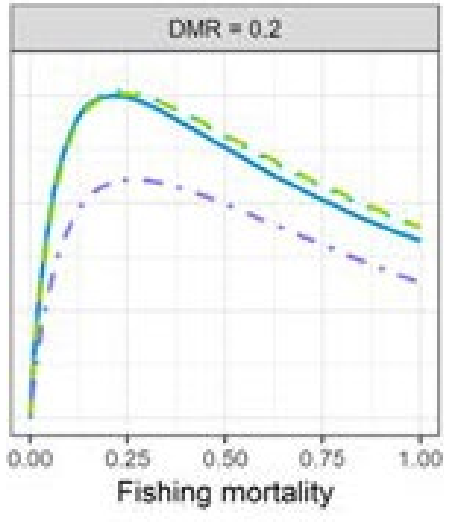
DMR of 11.7% (based on Stachura 2012)

Small increase in yield and fishery value under long-term average conditions.

Yield

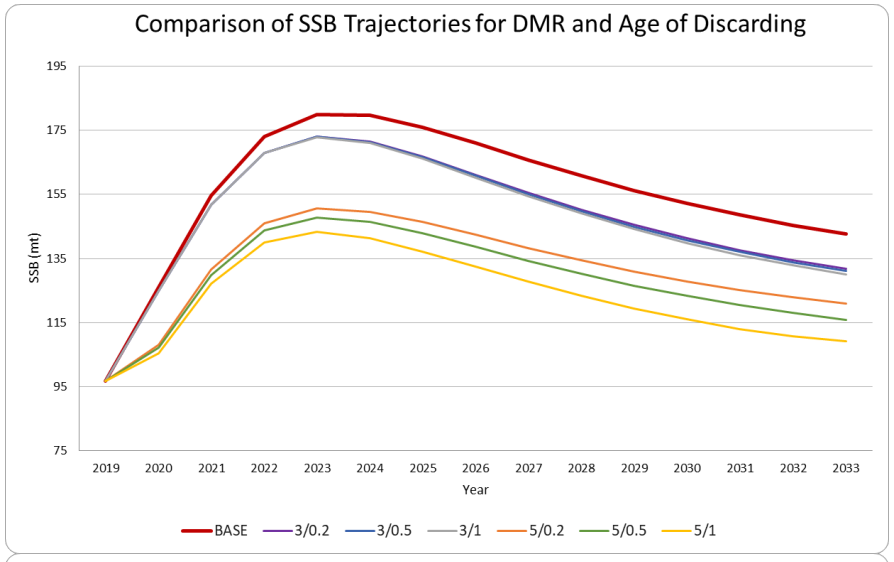


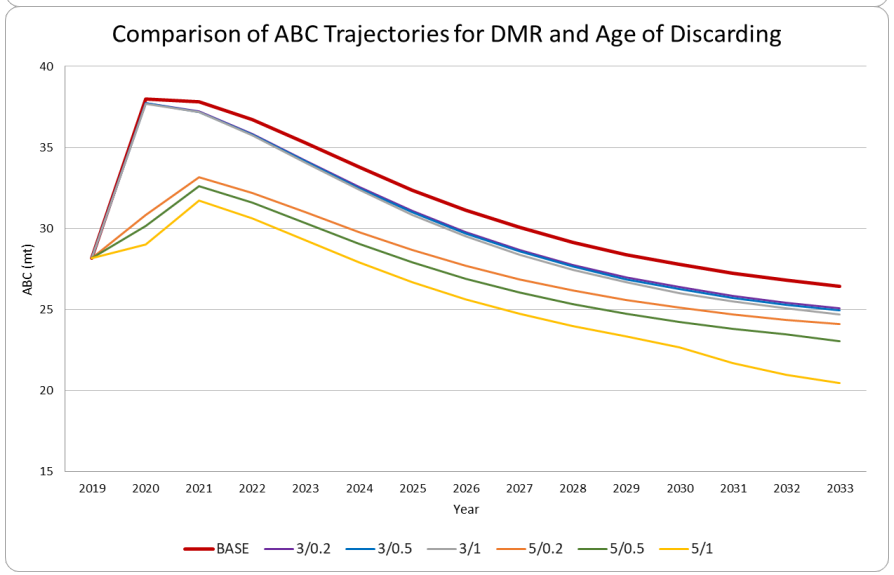
Net Ex-Vessel Value



Analyses: Non-YPR Approaches

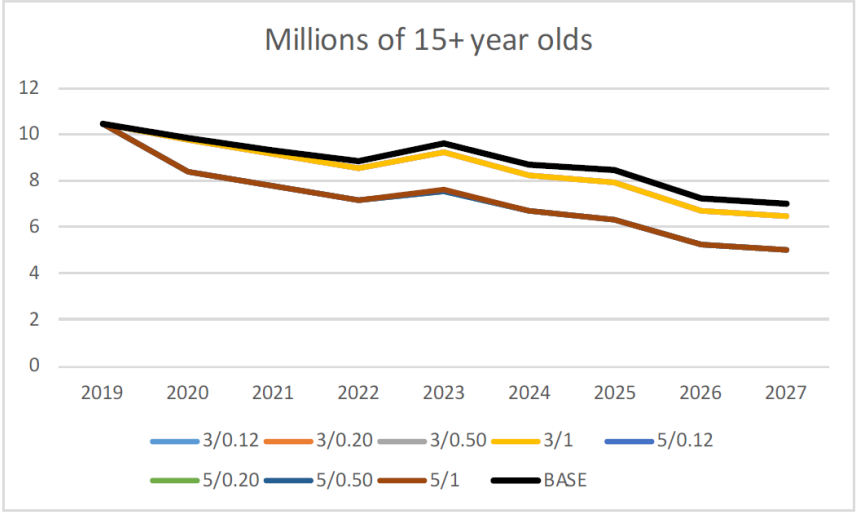
- Hanselman (NPFMC, 2019): used projections based on the 2019 AK sablefish assessment parameters, but dead discards did not count against the ABC (i.e., landings-based ABC accounting).
  - **Discarding reduced SSB and ABC, with larger declines with increased age of retention or higher DMR.**
- Cox et al. (2019, 2021): utilized management strategy evaluation (MSE) based on DFO BC sablefish stock.
  - **Full retention improved yield and biological metrics (i.e., ability to rebuild).**

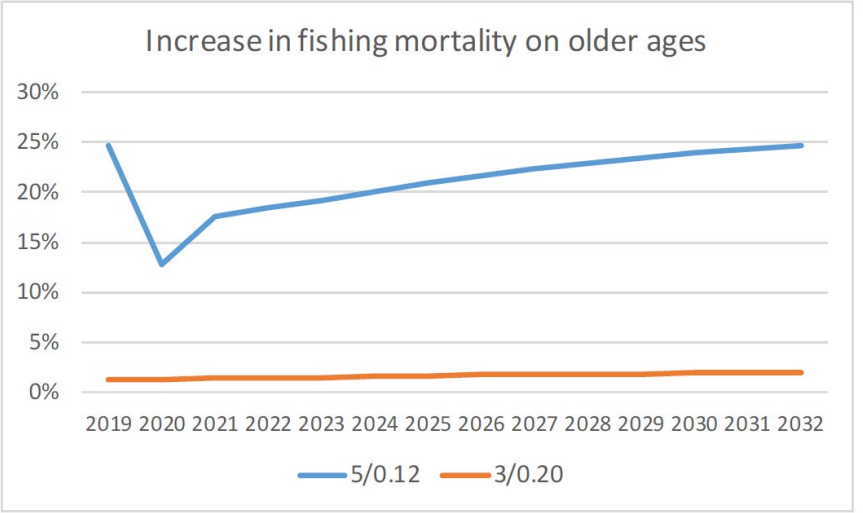




Analyses: Limitations

- Equilibrium YPR may not encapsulate complex interplay among spasmodic recruitment and discarding.
  - **No variability in recruitment.**
  - **Cannot effectively address differential impact of age-based mortality on *different sized* cohorts.**
- Hanselman (NPFMC, 2019) addressed these concerns using a B40% projection approach.
  - **"Shifting F from abundant age classes to older age classes has potentially negative implications for the productivity."**
  - **Current conditions (recruitment, skewed age distribution, market conditions) will impact results, but will always end up at B40% from this type of projection.**
- No approach can effectively predict future recruitment or economics.





Analyses: Proposed Projection Framework

- Essentially same as Hanselman (NPFMC, 2019) B40% projections:
  - **Implement 50 year projections based on inputs from the 2023 AK sablefish SAFE and using the NPFMC B40% HCR.**
  - **Assume a dead removals-based ABC accounting (as opposed to landings only as in NPFMC, 2019).**
- Inputs from 2023 SAFE:
  - **Biology (i.e., weight-at-age and natural mortality).**
  - **Fishery selectivity (i.e., for the fixed gear and trawl fleets).**
  - **Recent fishing mortality ratio among fleets.**
  - **Terminal year abundance-at-age.**
- Sensitivities:
  - **Recruitment (i.e., mean from different time periods, low and high).**
  - **DMR (i.e., low, high, and expert judgement).**
  - **MSL (assuming knife-edge retention at age-3 corresponding to a 22in MSL).**
  - **Price (input by size categories and converted to age-based metrics).**

Analyses: Proposed Projection Framework

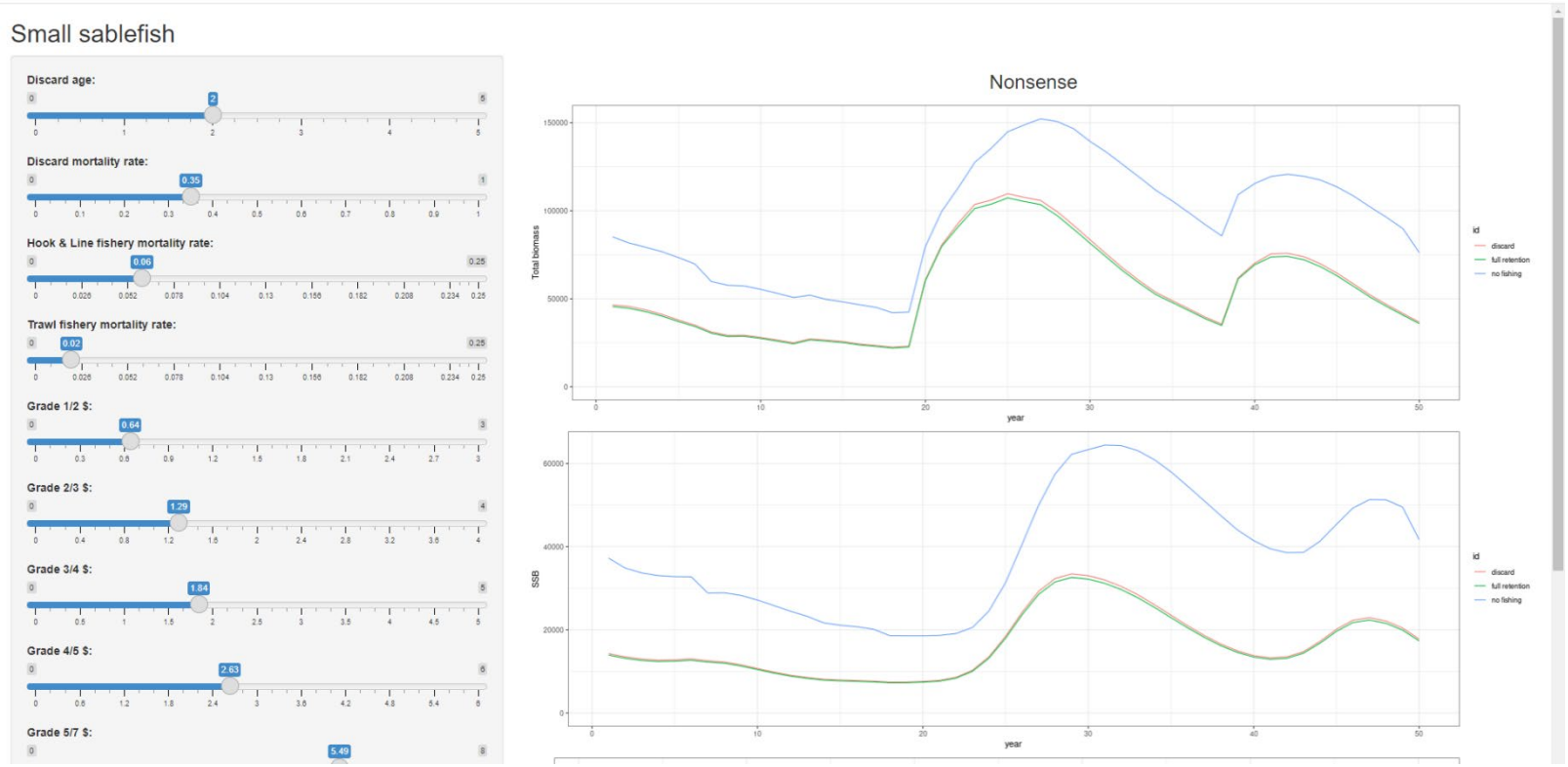
- Outputs:
  - **Trajectory of population and fishery (biomass, SSB, catch, discards) over the time series**
  - **Summary of mean values for first 10 and last 10 years:**
    - **Biological metrics: biomass, SSB, abundance-at-age, % SSB > age-10, % biomass > age-10**
    - **Fishery: ABC, catch, dead discards, landed value, % catch > age-5**
- Comparisons:
  - **What is the impact of moving from full retention to a MSL under differing DMRs?**
  - **How does future recruitment impact interpretation of results?**

Analyses: Proposed Scenarios

Abbreviation	Recruitment	Retention	DMR	Rational
Base_Mean-Recr	Mean (1978+)	Full	None	Current biological and fishery dynamics, which match the 2023 SAFE ABC projections.
Base_High-Recr	Hi (Mean 2014+)	Full	None	Current dynamics, but assuming a recruitment regime shift.
Ret_Age-3_DMR-Low_Mean-Recr	Mean (1978+)	Age-3 (Knife-edge)	Lower Bound	Discarding action using the lower bound on DMR to address uncertainty.
Ret_Age-3_DMR-Low_High-Recr	Hi (Mean 2014+)	Age-3 (Knife-edge)	Lower Bound	Discarding action using the lower bound on DMR to address uncertainty and assuming a recruitment regime shift.
Ret_Age-3_DMR-Exp_Mean-Recr	Mean (1978+)	Age-3 (Knife-edge)	Expert Judgment	Best approximation of discarding action using expert judgment for the DMR.
Ret_Age-3_DMR-Exp_High-Recr	Hi (Mean 2014+)	Age-3 (Knife-edge)	Expert Judgment	Discarding action using expert judgment for the DMR and assuming a recruitment regime shift
Ret_Age-3_DMR-High_Mean-Recr	Mean (1978+)	Age-3 (Knife-edge)	Upper Bound	Discarding action using the upper bound on DMR to address uncertainty concerns (e.g., an increase in DMR to address whale predation).
Ret_Age-3_DMR-High_High-Recr	Hi (Mean 2014+)	Age-3 (Knife-edge)	Upper Bound	Discarding action using the upper bound on DMR to address uncertainty concerns (e.g., an increase in DMR to address whale predation) and assuming a recruitment regime shift.

Analyses: Shiny App In Development

- Ben Williams is developing a user-friendly shiny app to illustrate impacts of MSL and DMR options on SSB, ABC, and landed value.
  - **Intended to enable interested parties to choose assumptions and consider impacts on their own.**



SSC ACTION ITEMS

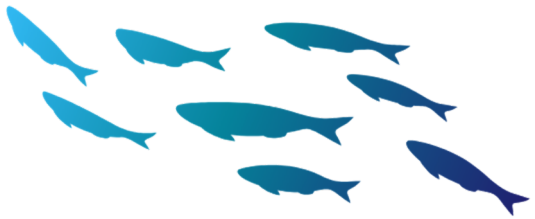
1. Provide range of DMRs to be included in analysis
2. Provide feedback on analytical approach

STATUS OF SABLEFISH EFFORTS

- **Management strategy evaluation (MSE)** to explore ability of NPFMC harvest control rule (HCR) (B40%) to achieve biological and yield-based metrics for long-lived species with dynamic recruitment
  - AFSC/UAF project
  - Started January 2024
  - MSE framework generalizable to other species
- **NPFMC analysis of small sablefish release**
  - Council & AFSC staff
  - Initial review scheduled June 2024
- **Sablefish MEY analysis**
  - April 2024 SSC discussion?
- Other **ongoing research efforts** related to sablefish assessment, fleet, and spatial structure:
  - Analysis of electronic tags
  - Spatial assessment model nearly complete
  - Fleet disaggregated model comparison (M. Cheng, UAF)

Addressing complex fleet structure in fishery stock assessment models: Accounting for a rapidly developing pot fishery for Alaska sablefish (*Anoplopoma fimbria*)

Matthew L.H. Cheng [a,*], Daniel R. Goethel [b], Curry J. Cunningham [a]



Questions?