NOAA FISHERIES

Black Sea Bass Projections

July 27 2023 SSC Meeting

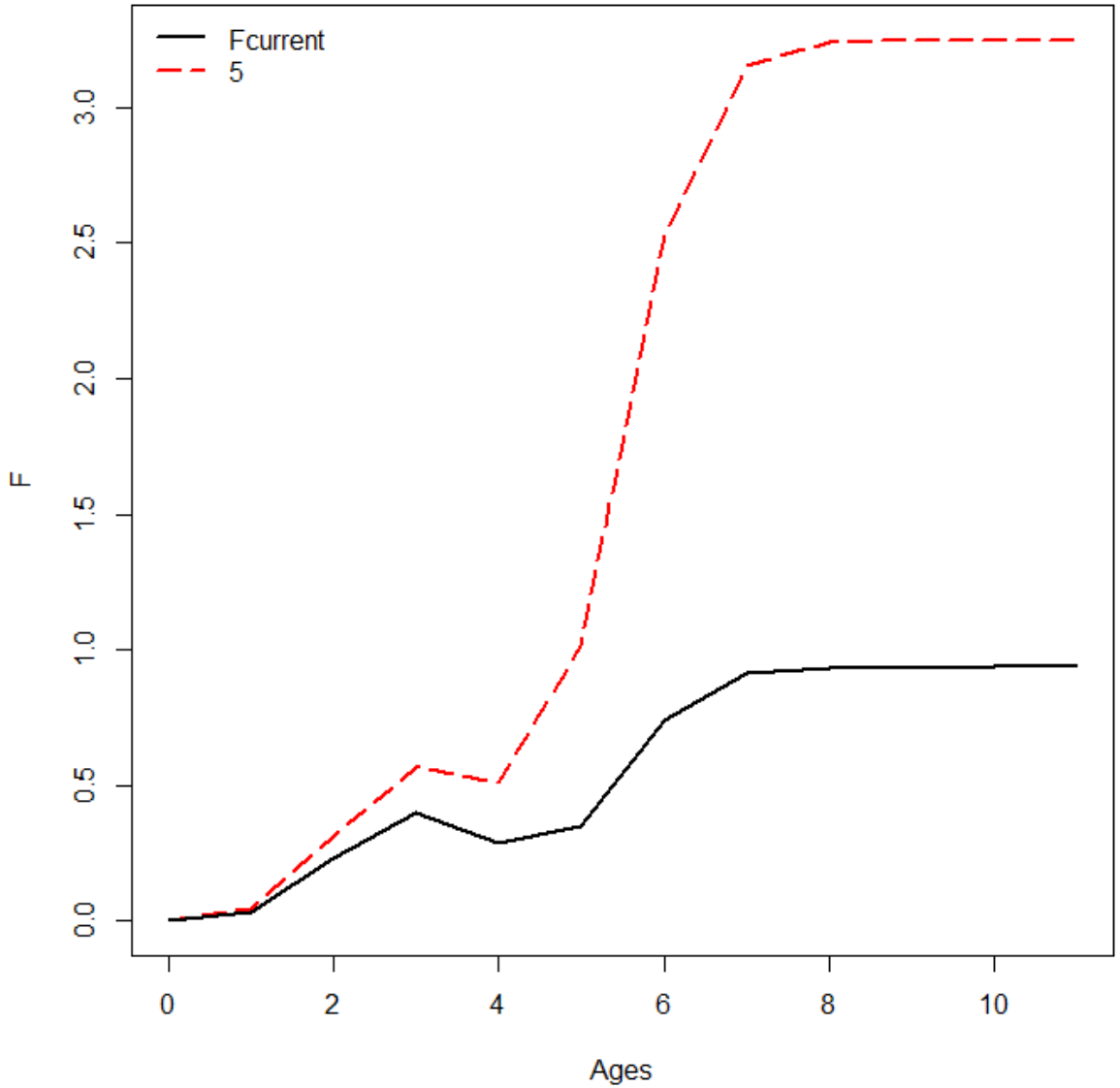
Projection requests

- Modeling specification
  - Fixed F for interim years, average last 3 years of time series
  - Projections using $F_{0.1}$ instead of F_{MAX}
  - Allow F from discard fleet to remain constant

- Projections
  - 75%$F_{0.1}$ using recent (2014-2019) average recruitment
  - 10 year rebuilding projection using long-term average recruitment and $F_{0.1}$

Fitting to Landings and Discards

- Multiple ways to fit to landings and/or discards
  - Fit Landings or discards with weighted selectivity
  - Fit both Landings and discards
  - Fit to each fishery separately
- Decision:
  - Use F estimated for each fishery using assessment selectivity



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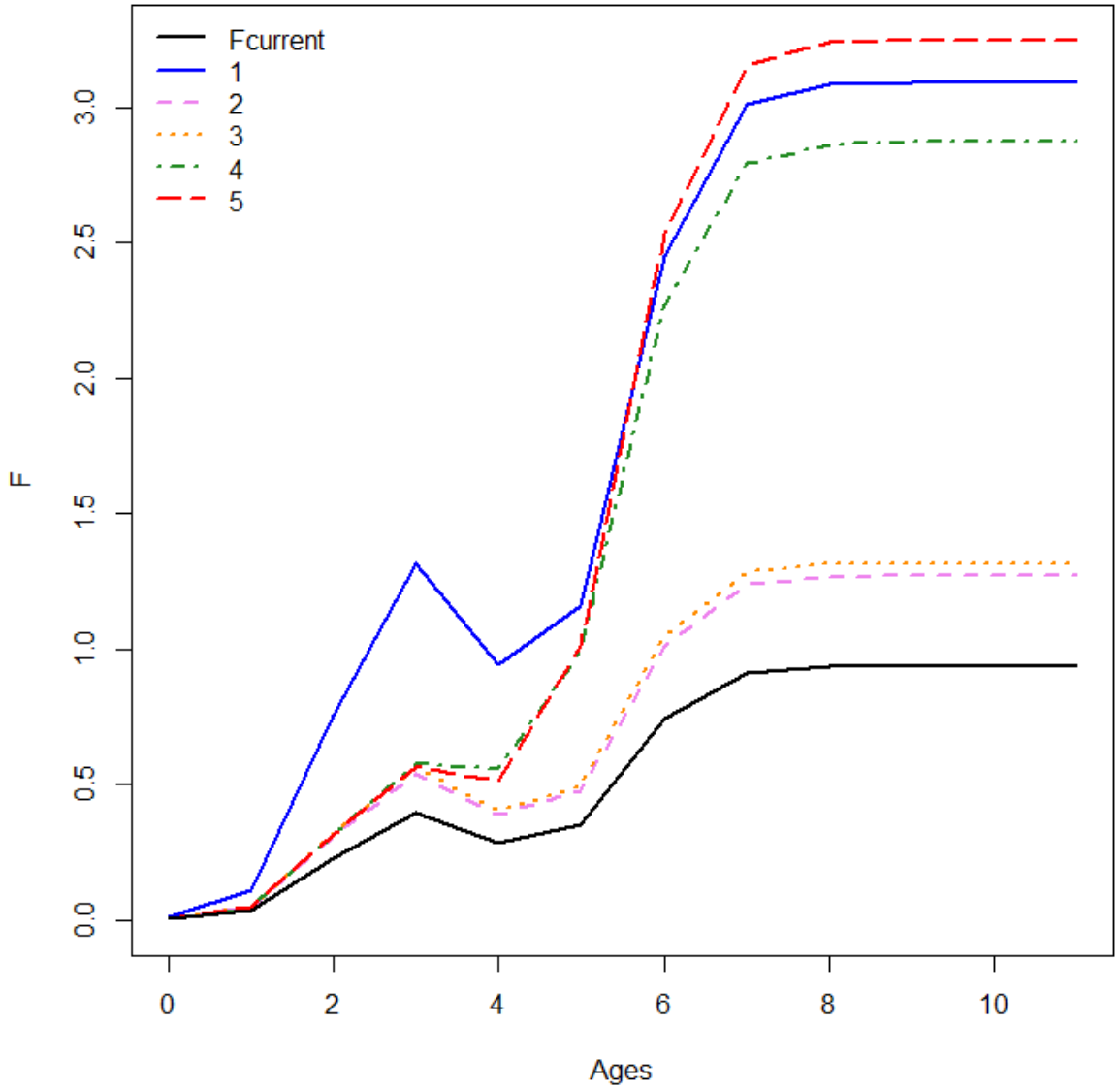
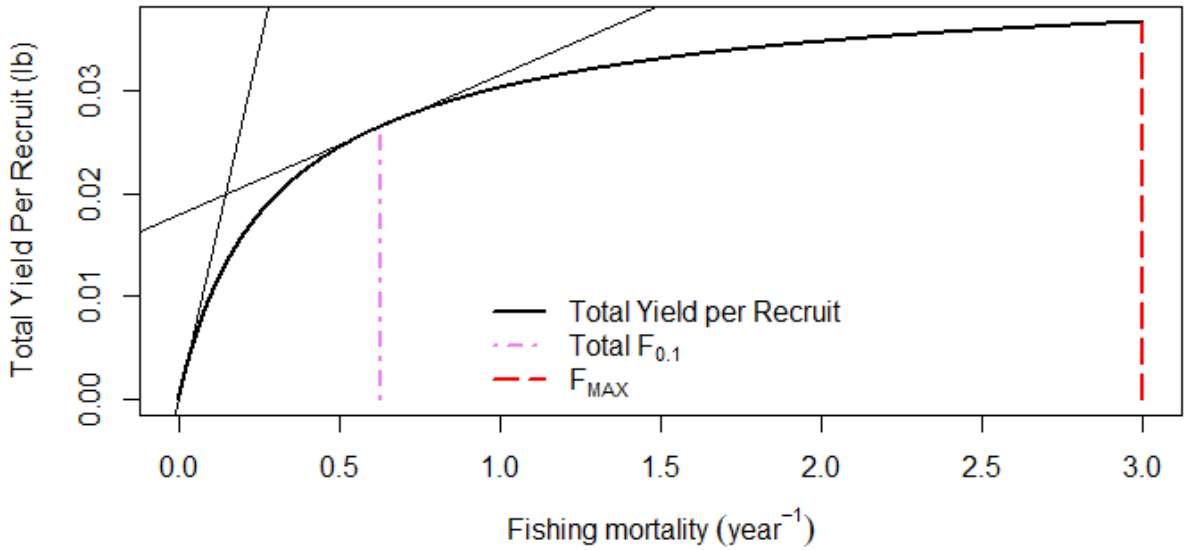


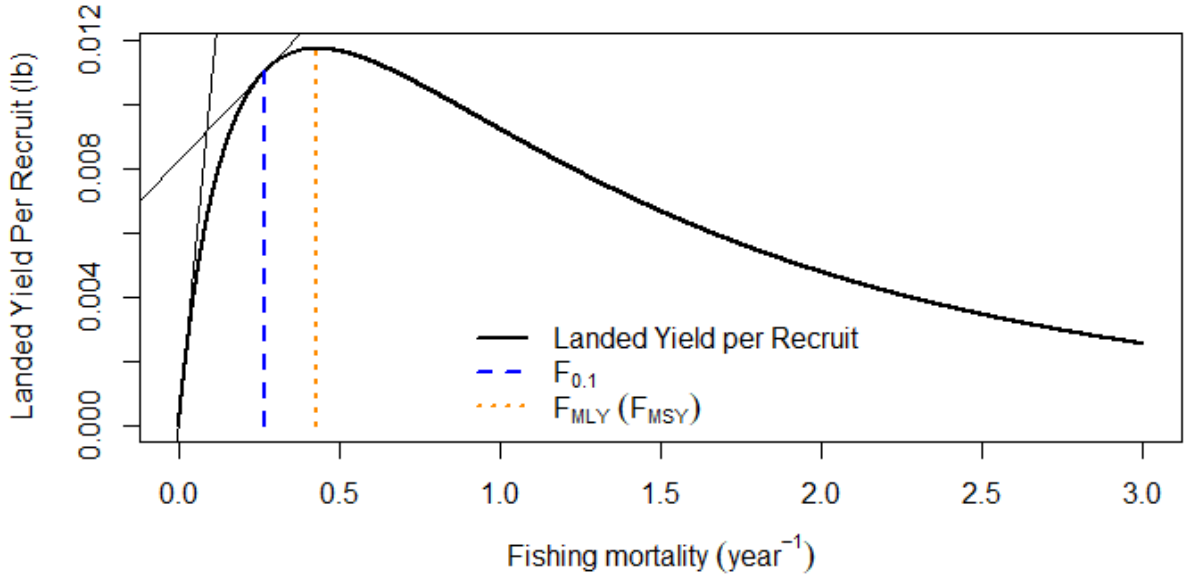
When fitting to 2022 landings and discards which last 3 years should be used for $F_{current}$?

- Options:
  1. Use average $F_{2019\text{-}2021}$ from assessment for $F_{2023\text{-}2024}$
  2. Recalculate $F_{current}$ from 2020-2022
     - Would require reweighting selectivities across gears
     - Reweighted selectivity would result in a change to $F_{0.1}$, F_{MAX} , and other reference points
- Decision
  - Use $F_{current}$ from assessment for 2023-2024 because changing it would have implications on stock status that were not estimated by the stock assessment
  - Use F_{2022} to calculate abundance in 2023 from which to do projections

F_{MSY}, F_{MAX}, or F_{MLY}

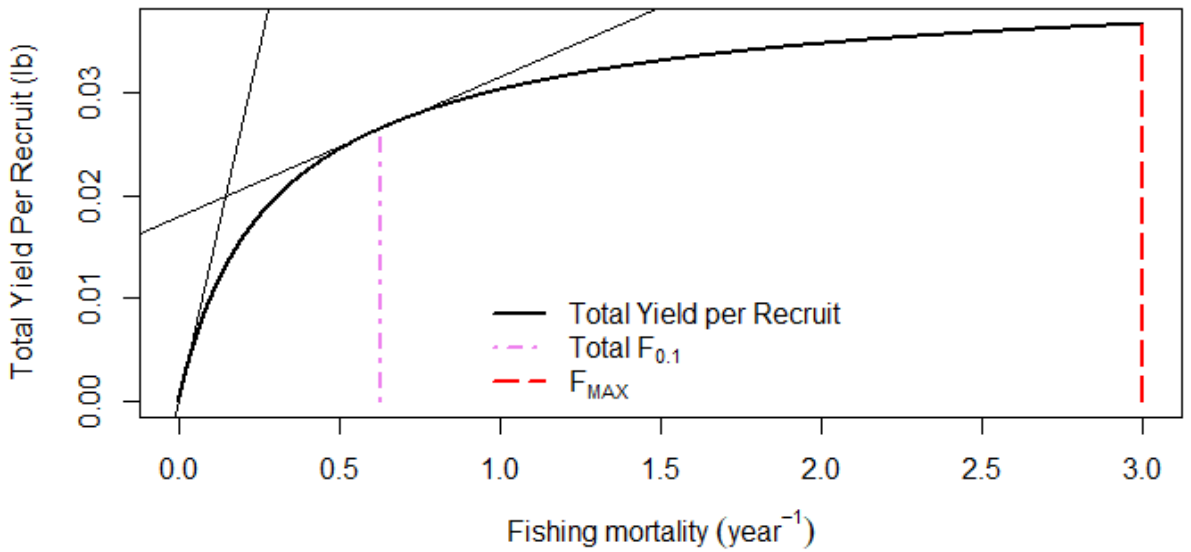
- Assessment used the term F_{MSY}
- With a mean recruitment model equilibrium calculations are the same as the yield per recruit
- F_{MAX} is the F that yields the maximum total yield (should include discards in calculations)
- Will use the term Maximum Landed Yield or F_{MLY}

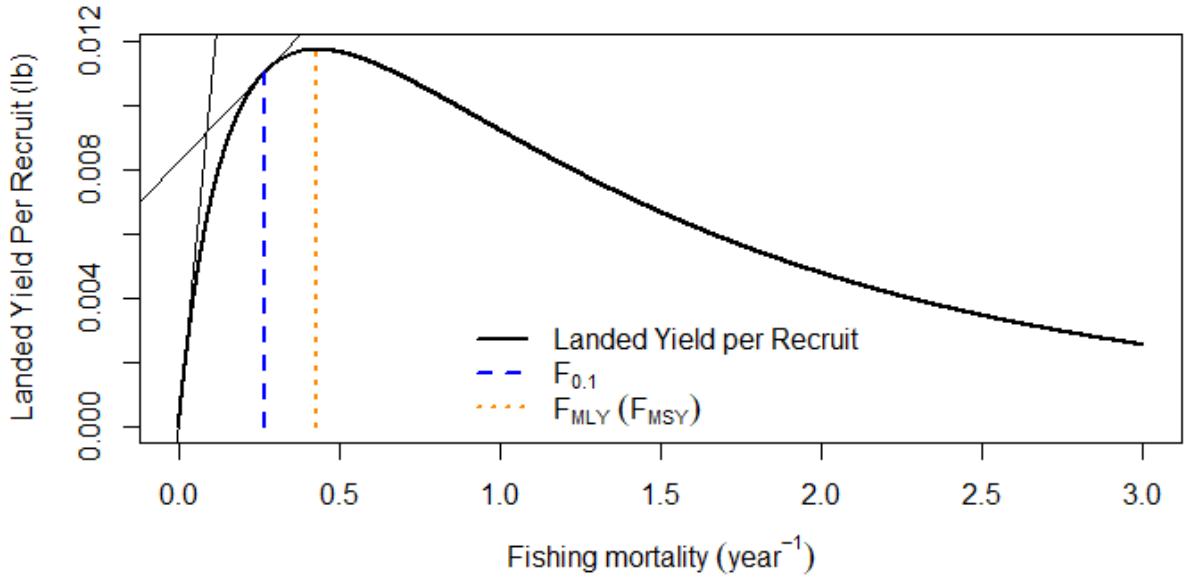




Ways to Calculate $F_{0.1}$

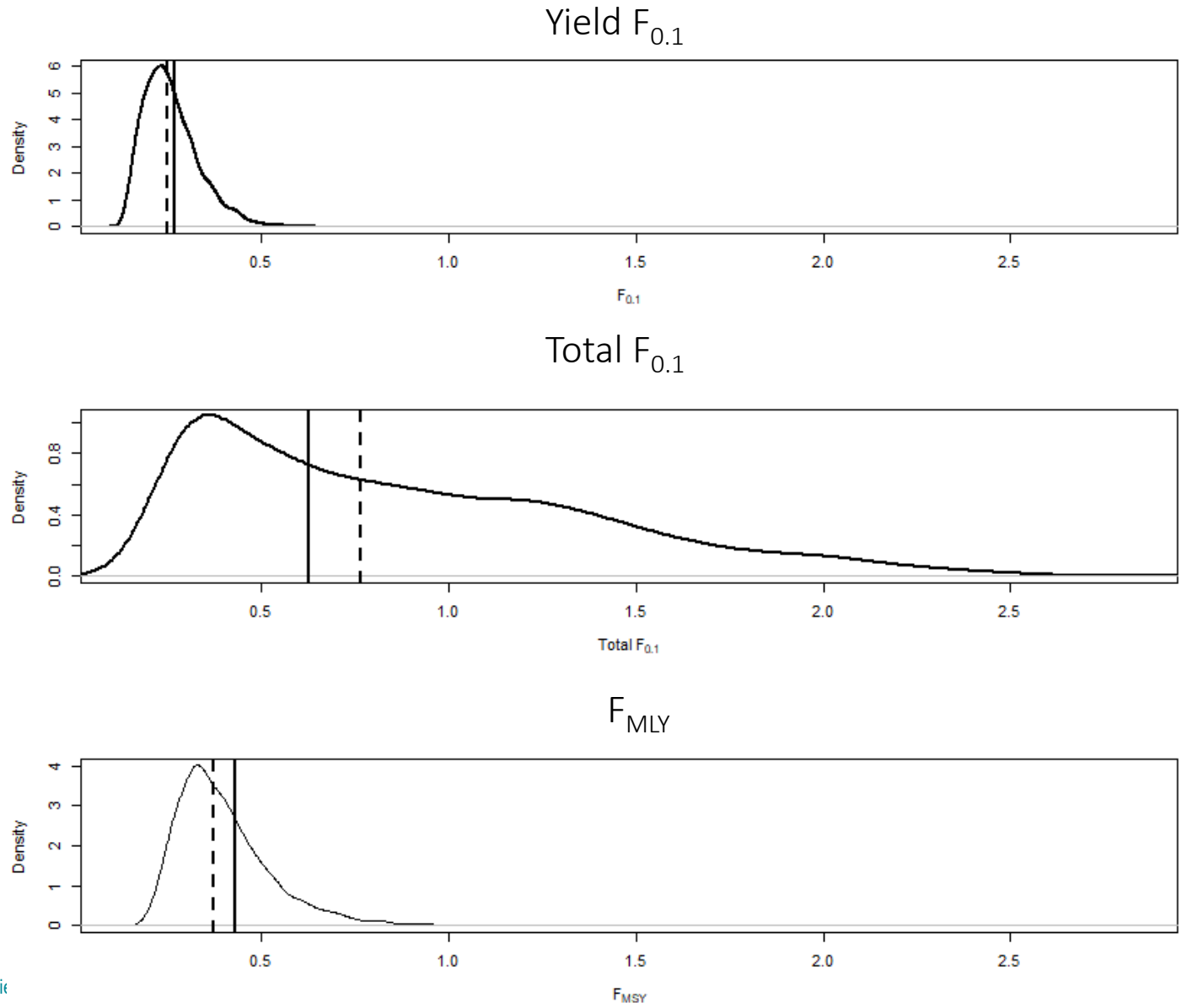
- $F_{0.1}$ is from 10% of the slope of yield per recruit at origin
  - Typically based on all removals
  - Can be calculated for only the yield of landed catch
- Terms Total $F_{0.1}$ and Yield $F_{0.1}$ used to distinguish options
- F_{MSY} from BAM determined by landed yield (i.e., no discards)



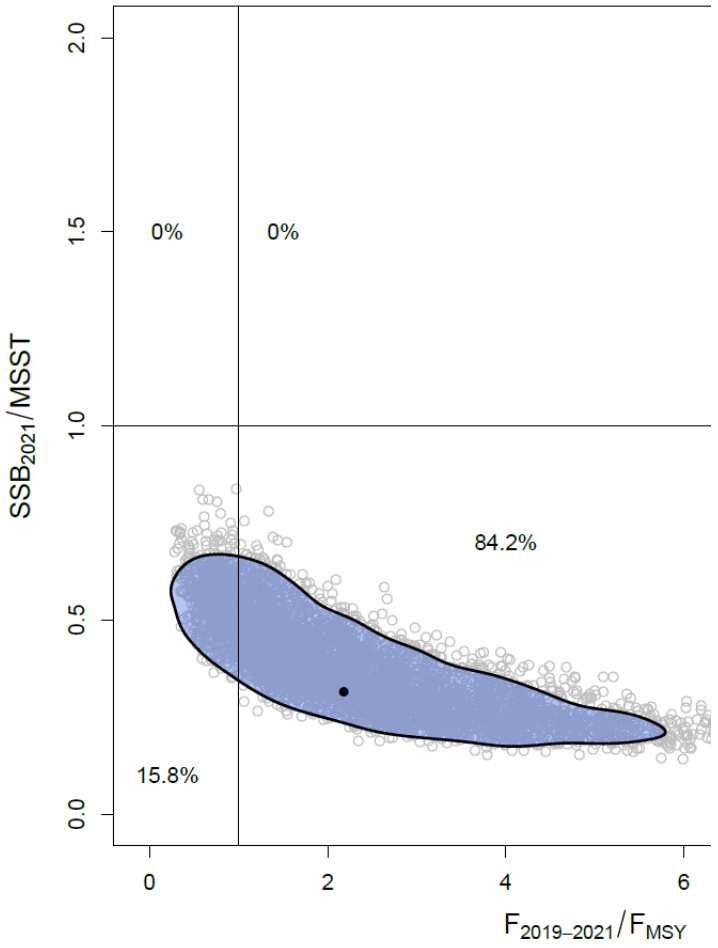


F_{MSY} Proxy Options

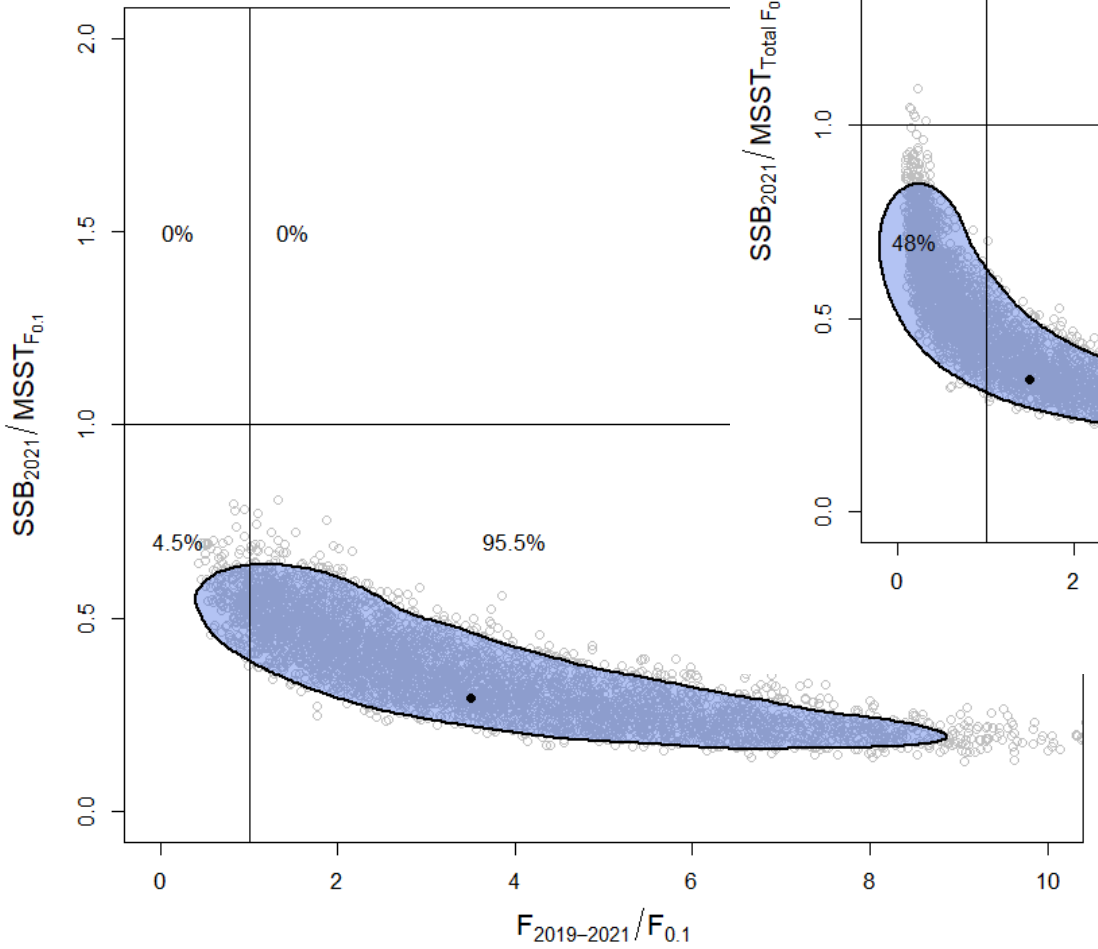
- "F_{MSY}" presented in assessment was rejected because it was called F_{MAX} and $F_{0.1}$ was suggested as an alternative
- Total $F_{0.1}$ results in less landed yield and more discards than F_{MLY}
- Is F_{MLY} is appropriate proxy?
  - If not, which $F_{0.1}$?



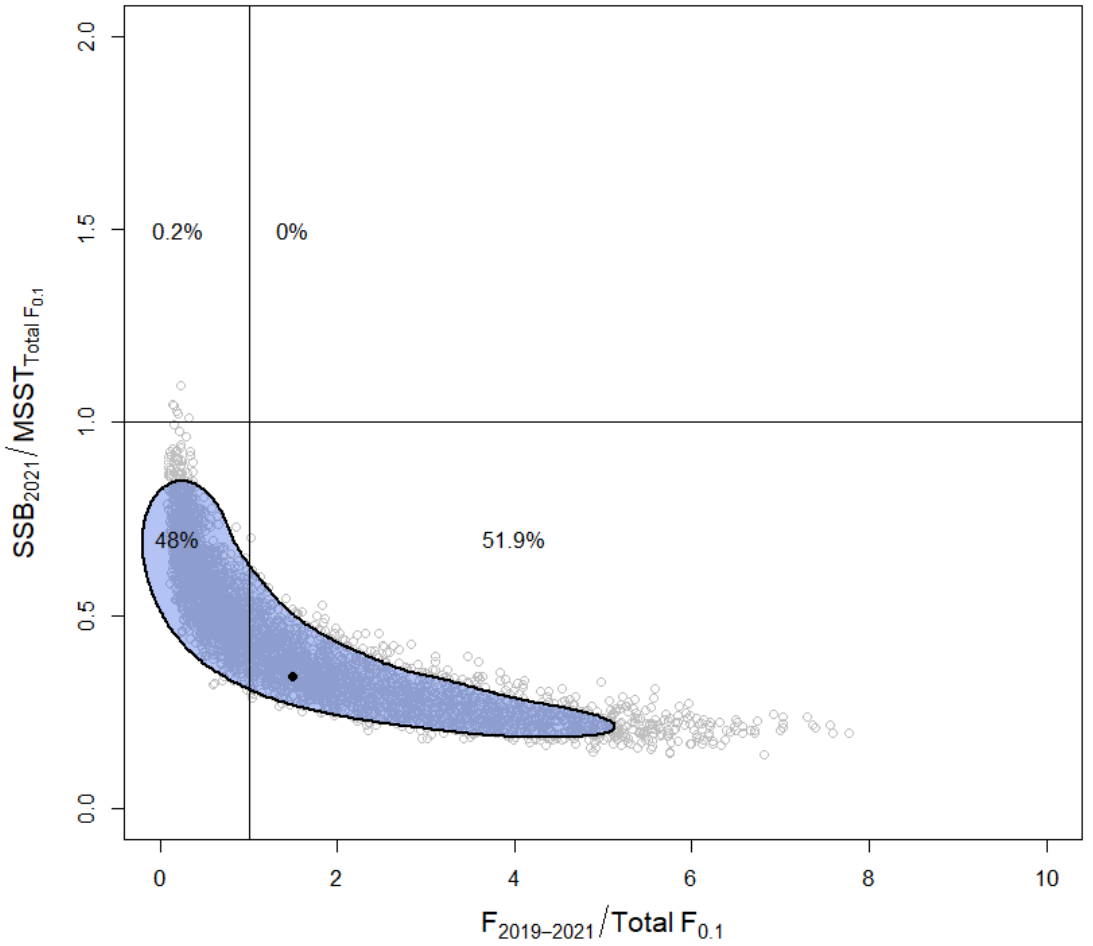
F_{MLY}



Yield $F_{0.1}$

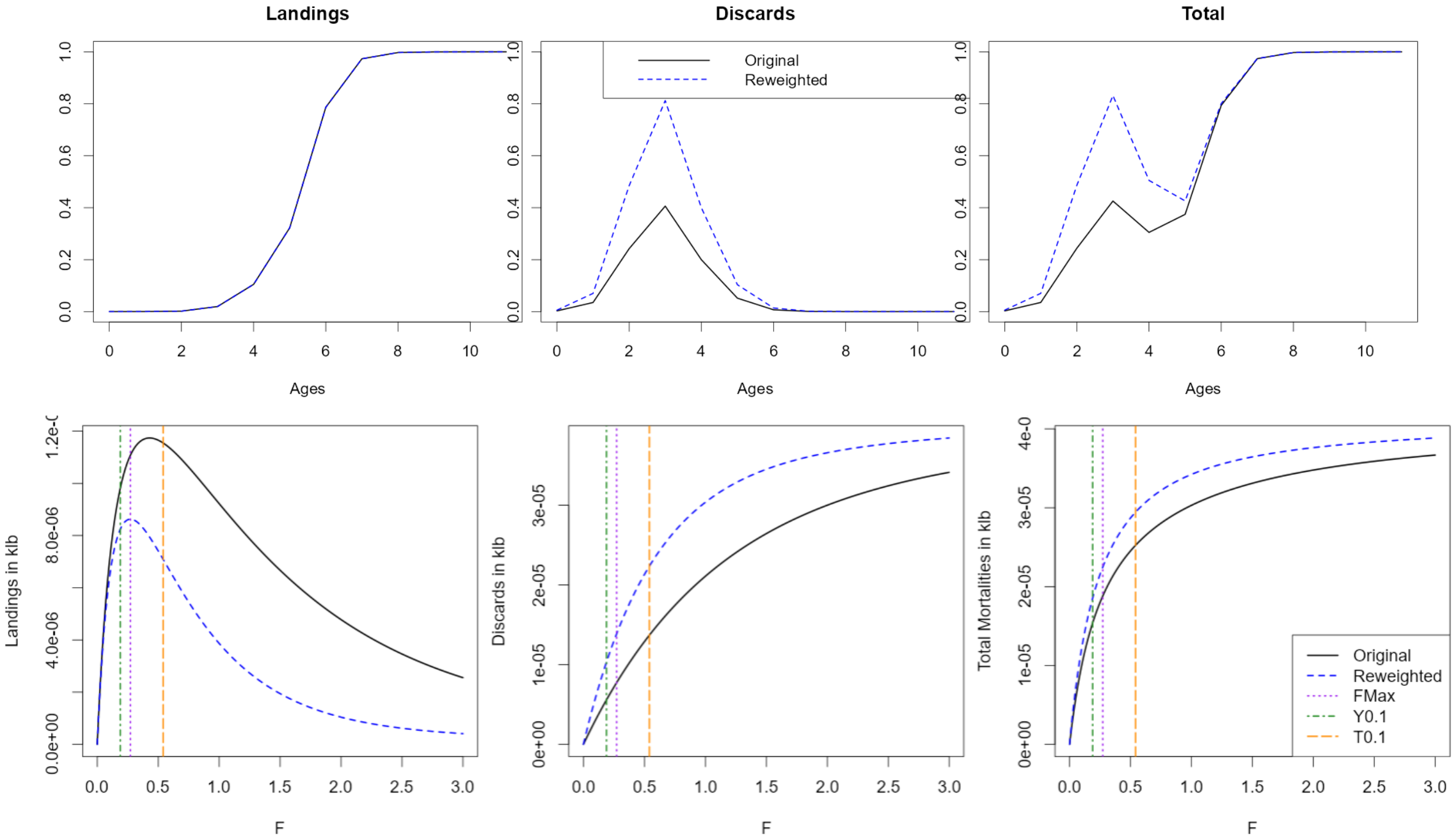


Total $F_{0.1}$



Allow F from discard fleet to remain constant

- The F used in projections and equilibrium calculations (e.g., $F_{0.1}$) is a single F using a selectivity combined across fleets
  - Separating landed F and discard F would require separate selectivities
  - If the proportion of landings to discards changes then the combined selectivity would change, and thus the reference point would change
  - Changes in the reference point could have stock status implications on the estimates from the assessment
- Shiny app shows how changing the relative amount of landings to discards will change selectivity and then reference points
  - https://matthew-vincent-noaa.shinyapps.io/msynypr/


Landings
Discards
Total
Original
Reweighted
Ages
Ages
Ages
Landings in klb
Discards in klb
Total Mortalities in klb
F
F
F
Original
Reweighted
FMax
Y0.1
T0.1

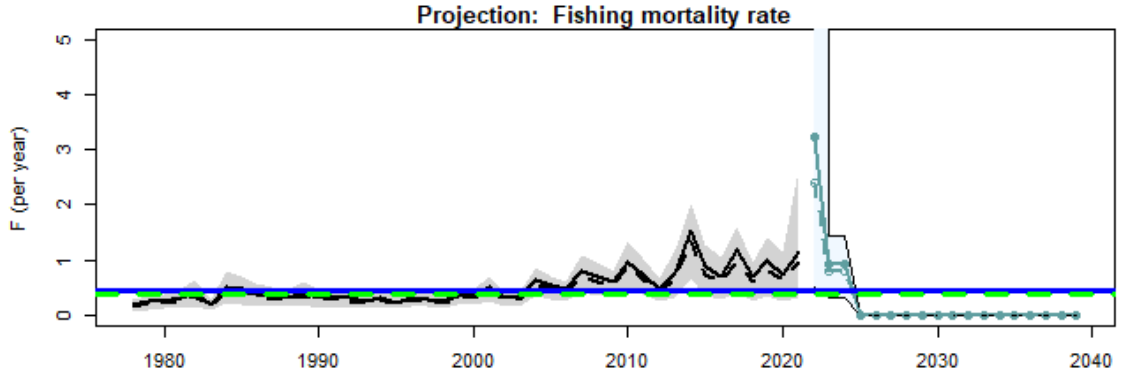
Reference point	Landings *0	Landings *0.25	Landings *0.5	Landings*2	Landings
F_{MLY}	0	0.28	0.27	0.67	0.43
Yield F_{MLY}	0	478.79	705.68	1218.99	960.05
Discards F_{MLY}	0	1333.61	1132.78	749.73	931.41
SSB F_{MLY}	510.65	386.29	398.27	412.49	407.61
Yield $F_{0.1}$	0	0.2	0.19	0.35	0.27
Yield $F_{0.1}$ Yield	0	461.85	674.35	1116.34	902.74
Yield $F_{0.1}$ Discards	0	1057.5	843.4	426.09	624.26
SSB Yield $F_{0.1}$	510.65	412.13	425.97	449.23	438.81
Total $F_{0.1}$	1.14	0.65	0.54	0.65	0.63
Total $F_{0.1}$ Yield	0	327.47	579.42	1218.72	915.86
Total $F_{0.1}$ Discards	2812.16	2255.12	1828.44	729.72	1260.09
SSB Total $F_{0.1}$	237.36	296.1	332.21	414.62	375.85

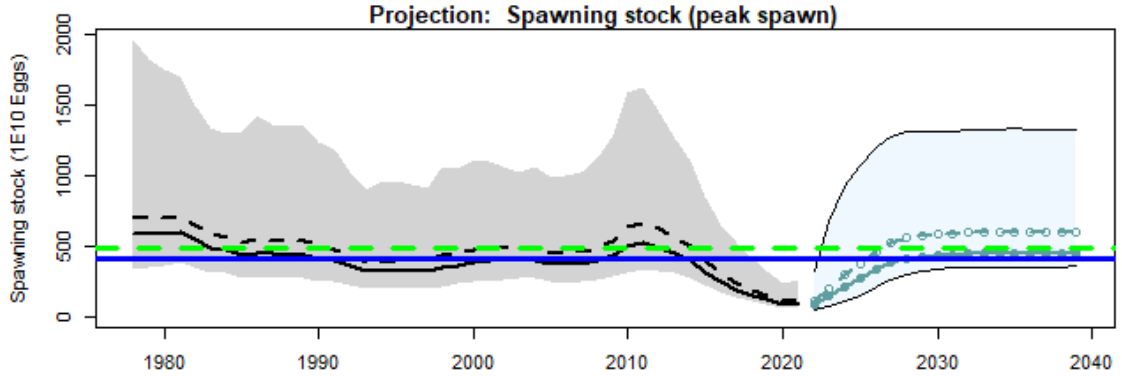
Current Projection Scenario Specifications

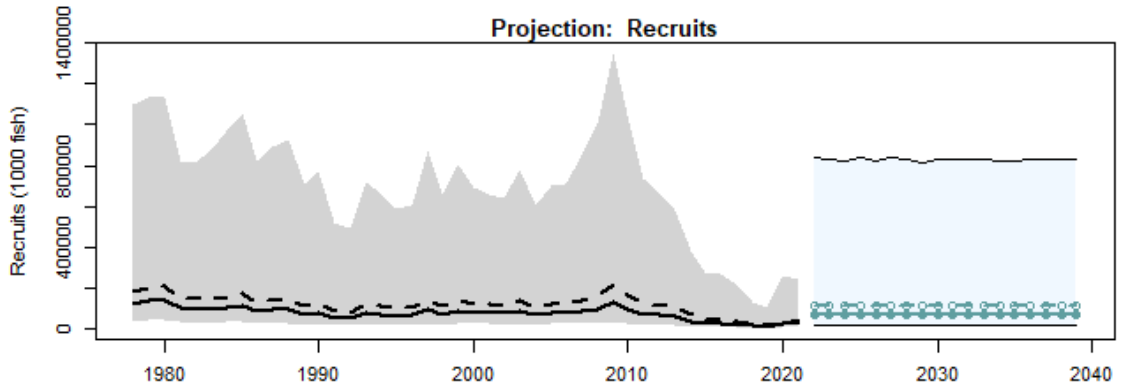
- F_{2022} calculated from fit to landings/discards and abundance
- $F_{2023\text{-}2024}$ set to $F_{current}$ (i.e. average 2019-2021) from assessment
- Used weighted selectivity from assessment (i.e., discards change proportional to landings based on F)

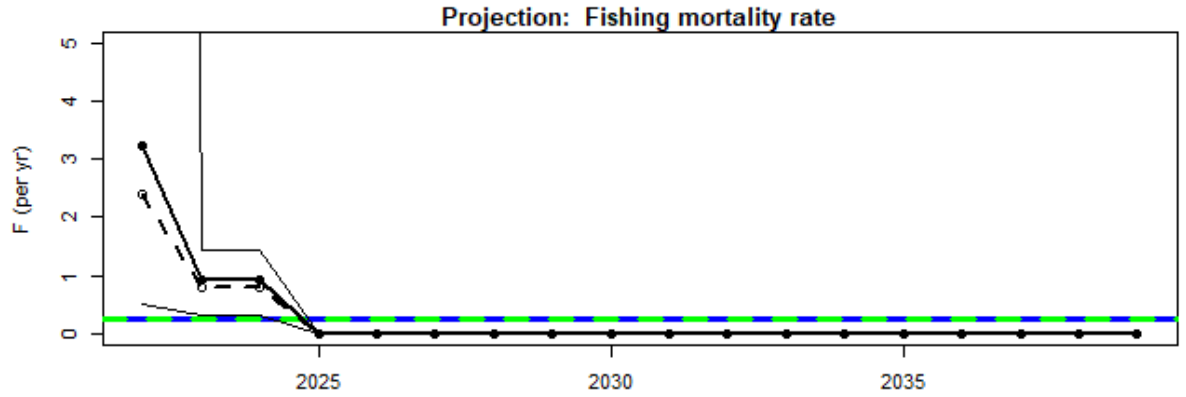
- In the following slides, the horizontal lines for F varies by title, but SSB, Removals, and Discards are all based on MLY (MSY)
  - These could be changed to be consistent with the F reference point

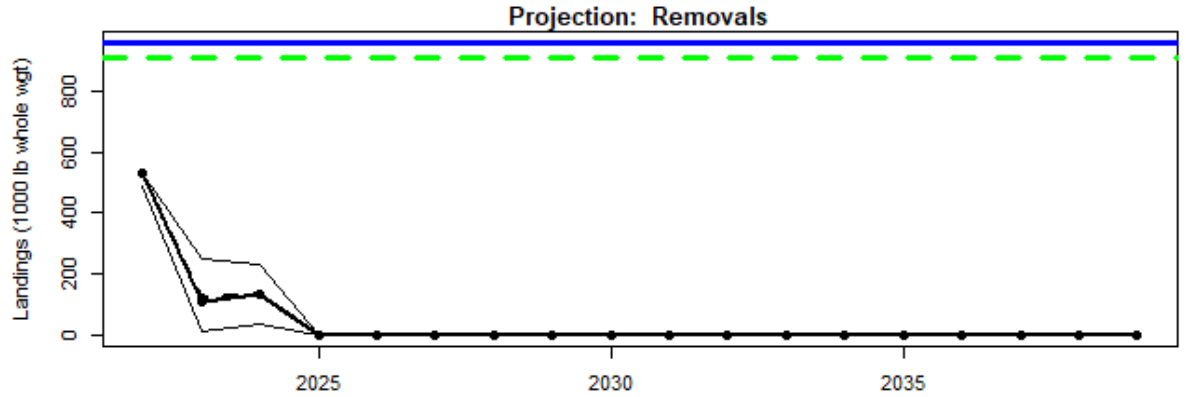
F=0 Long-term recruitment

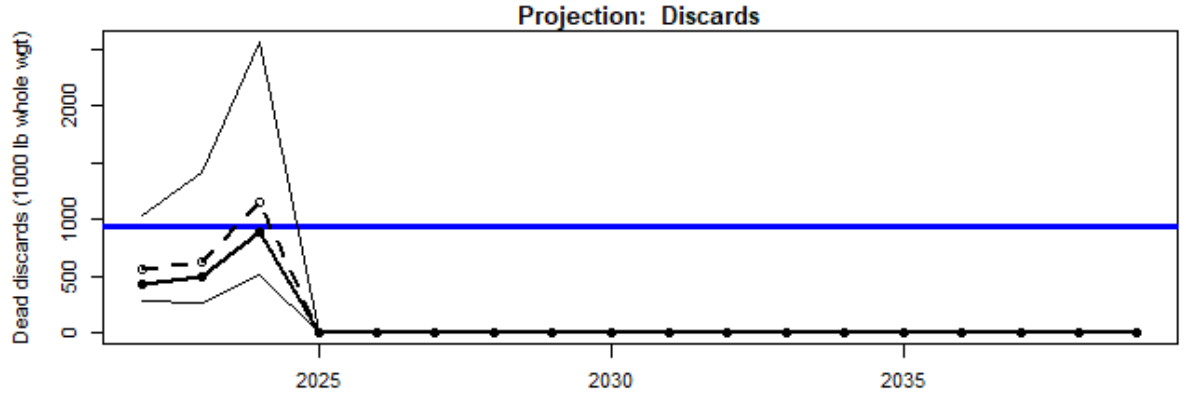




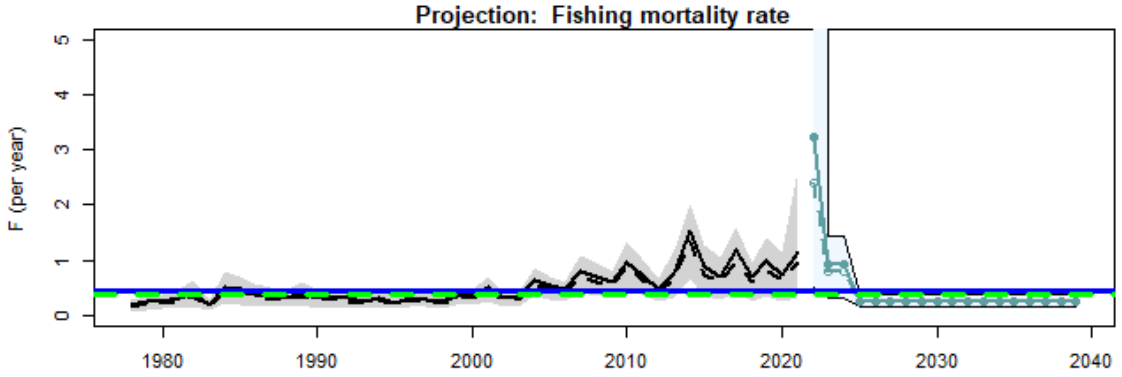


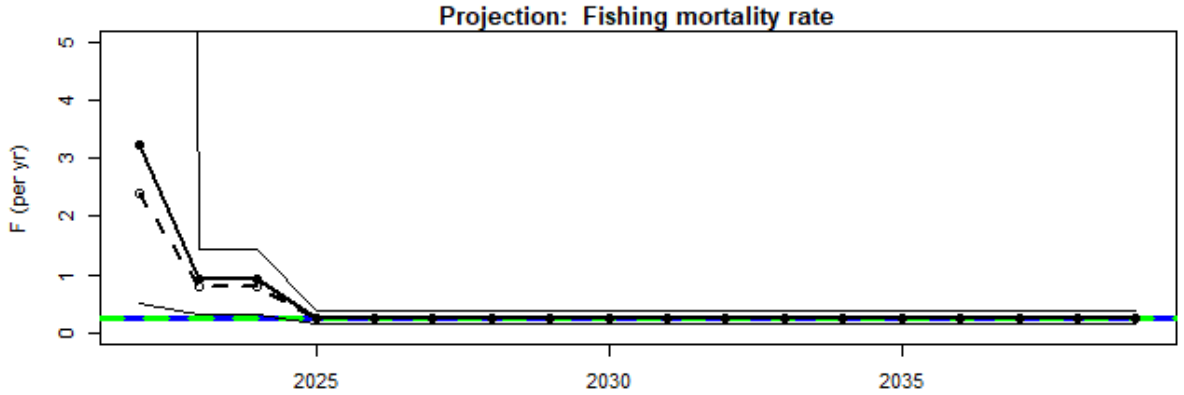


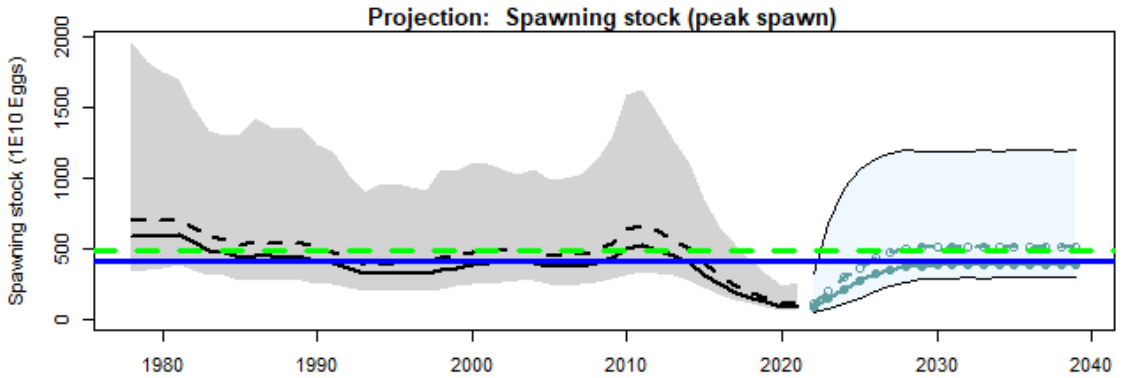


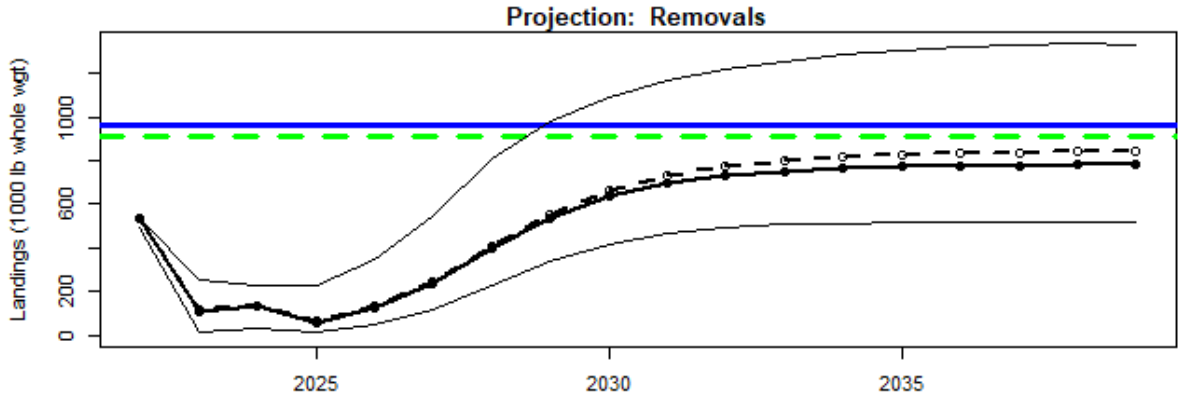


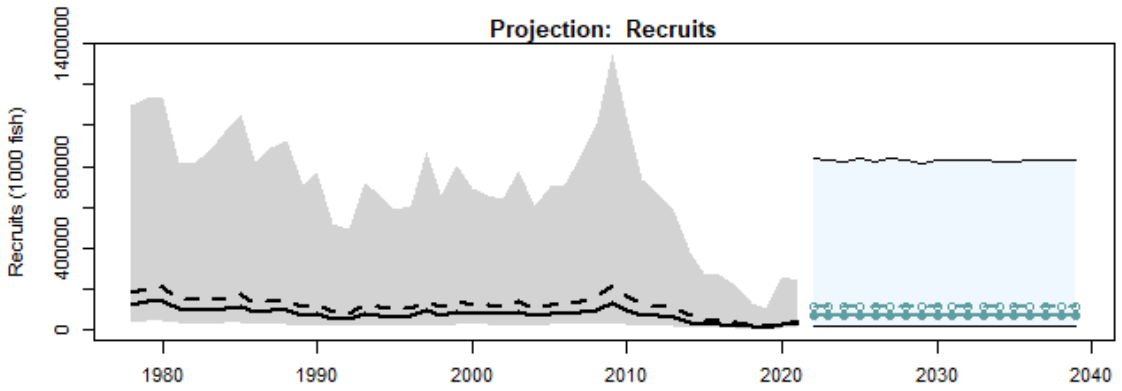
$F_{0.1}$ Long-term recruitment

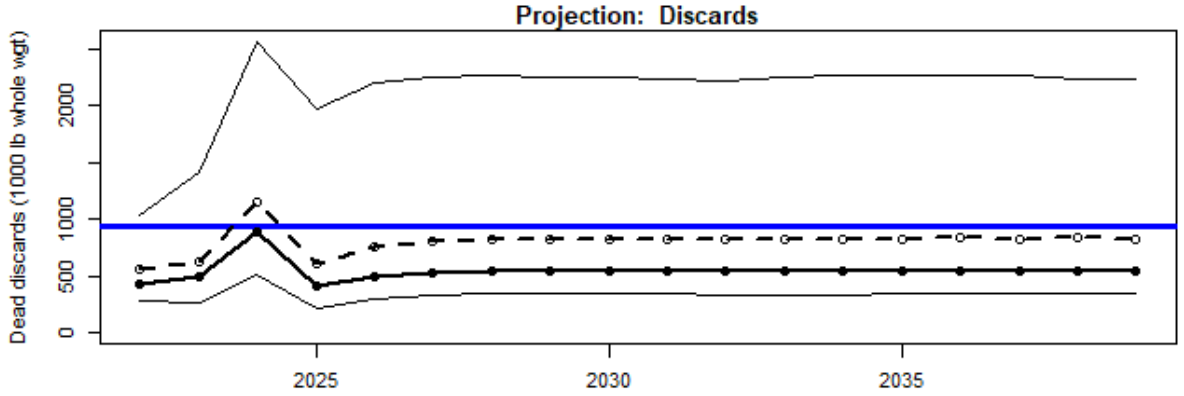




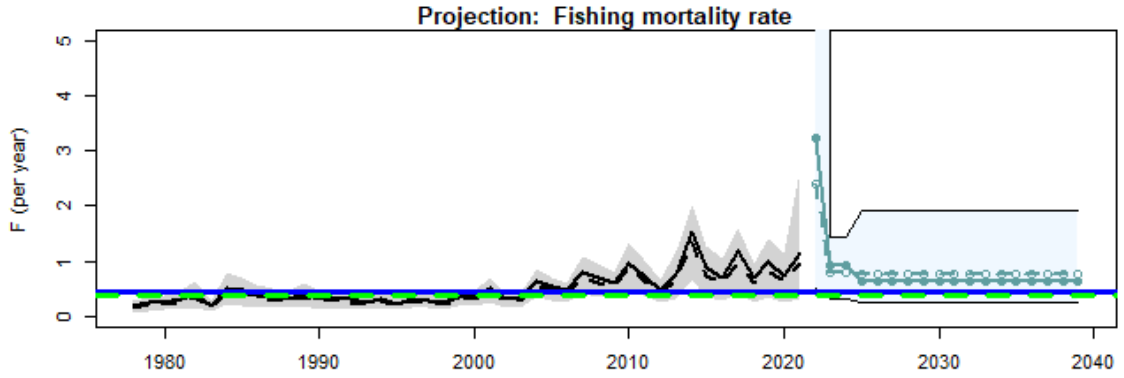


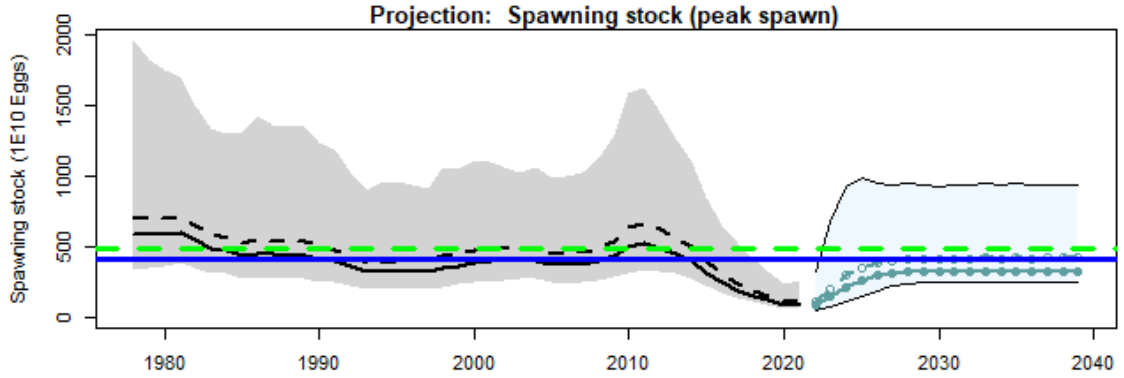


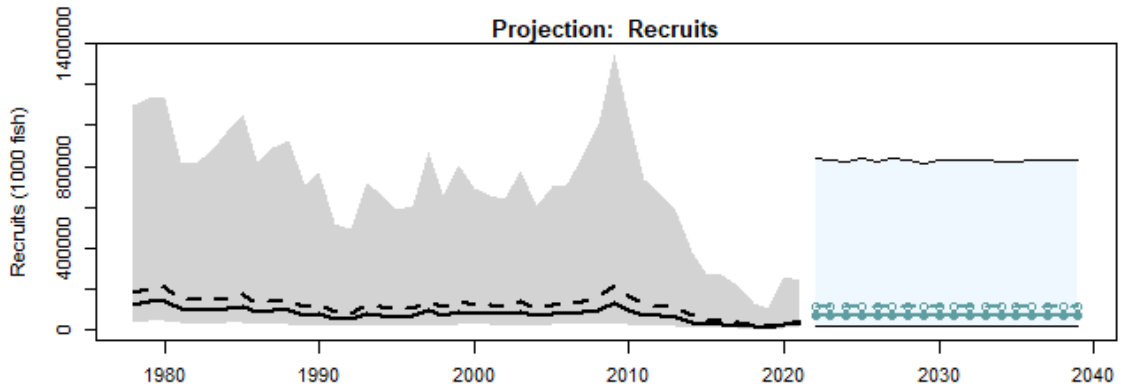


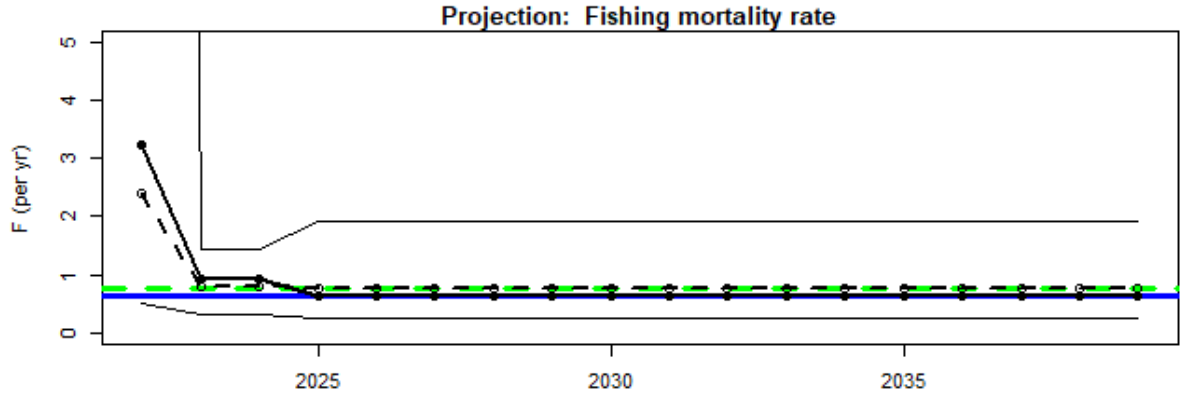


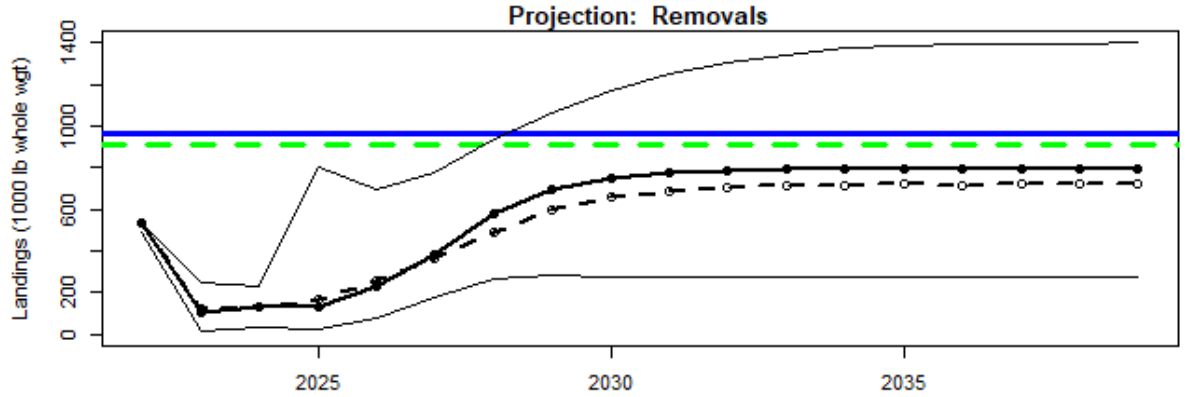
Total $F_{0.1}$ long-term recruits

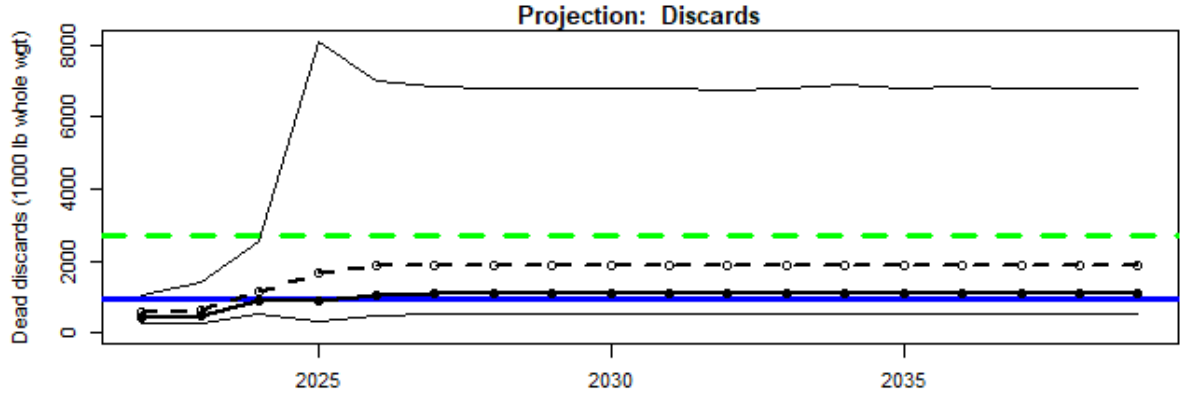












How to Proceed?

1. Are the methods for fitting to 2022 landings/discards and choice of $F_{current}$ for 2023-2024 appropriate ?
2. Is Maximum Landed Yield an acceptable proxy for MSY in this scenario or is $F_{0.1}$ or Total $F_{0.1}$ (and the associated SSB) more suitable?
3. The proposed 75%$F_{0.1}$ is not consistent with the ABC control rule. What is the P* that should be used for BSB?
4. What should the F for the landings be set at if separating discards from landings in the projections?
   - Would a scenario with landings=0 and discards at recent average level, ignoring the change in reference point be sufficient?
5. How should the issue of changing reference points be dealt with if we attempt to separate landings and discards?

Discussion