MID-ATLANTIC
FISHERY MANAGEMENT COUNCIL

Atlantic Mackerel

August 2021

Agenda

- Review current management
- Review Advisory Panel Fishery Performance Report
- Review assessment
- Review SSC findings (Dr. Rago)

- Action: Emergency Action
- Action: Rebuilding Framework

Acronyms

- SSB = Spawning Stock Biomass
- MTA = Management Track Assessment
- MSY = Maximum Sustainable Yield
- F = Fishing Mortality
- SSC = Scientific and Statistical Committee
- ABC = Acceptable Biological Catch
- DAH = Domestic Annual Harvest (Quota)
- GARFO = Greater Atlantic Regional Fisheries Office

Review management

- Rebuilding plan implemented Nov 29, 2019
- Original projections indicated rebuilding by 2023 (now very unlikely)
- Minimal overlap of rebuilding plan and data in new MTA
- Realized catches have been below even most aggressive rebuilding plan

Review management

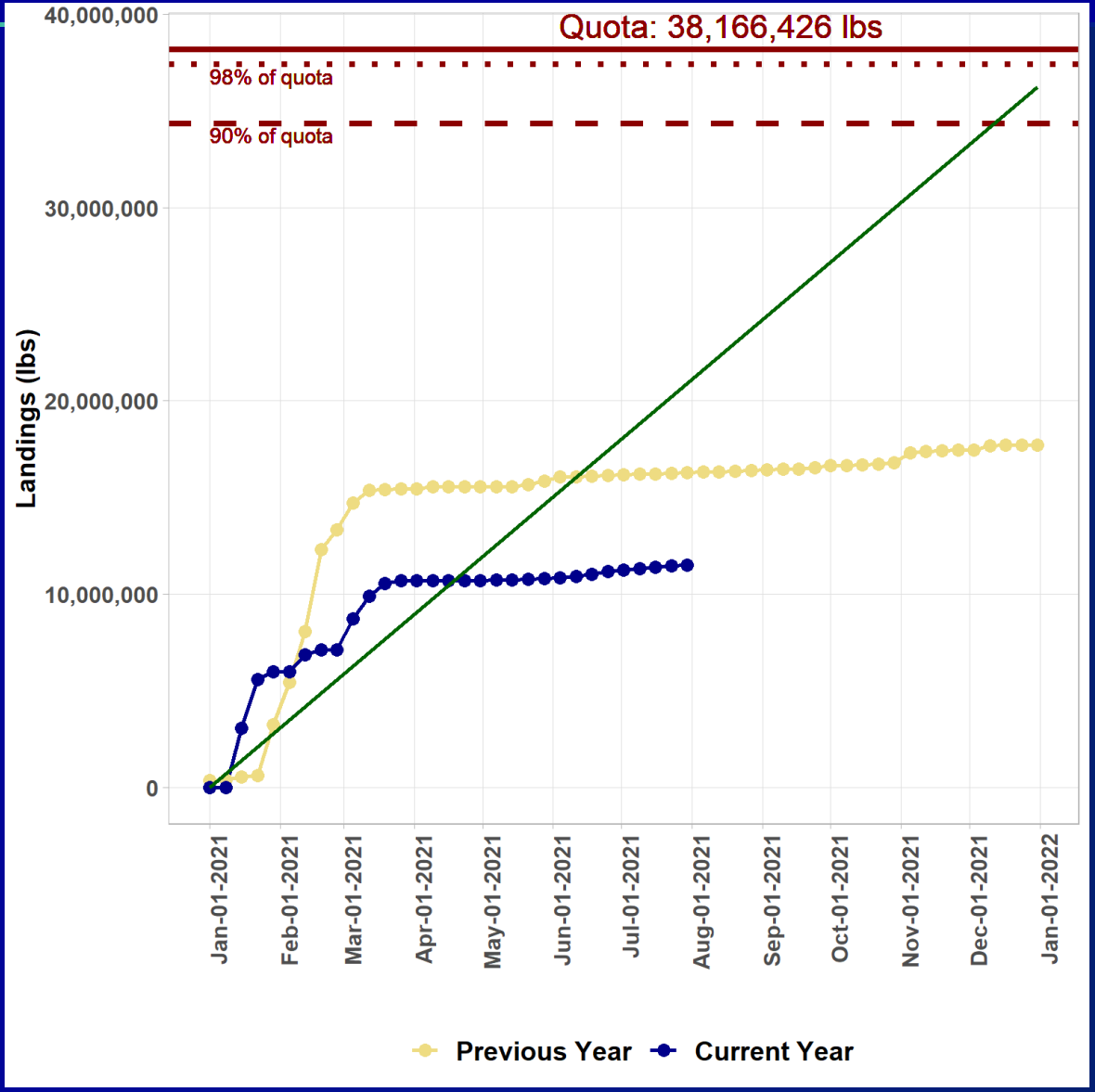
Specification	Mackerel 2021-2022 (MT)	Rationale Summary
(a) Overfishing Limit (OFL)	Not available	Assessment Delayed
(b) Acceptable Biological Catch (ABC)	29,184	from SSC
(c) Canadian Deduction (10,000 MT)	10,000	from recent observations
(d) U.S. ABC = ACL (Canadian catch deducted)	19,184	b-c
(e) Recreational Allocation	1,270	from recent observations
(f) Commercial Allocation (rest of ACL)	17,914	d-e
(g) Management Uncertainty Buffer = 3%	537	Closure system untested
(h) Commercial ACT (97% of allocation)	17,377	f-g
(i) DAH (0.37% set aside for discards)	17,312	from recent observations
(j) River Herring and Shad (RH/S) Cap	129	Incentive to avoid RH/S

Review management

- At 90% of the DAH, trip limits = 40,000 pounds (5,000 pounds for incidental/open access permits)

- At 98% of the DAH trip limit = 5,000 pounds for all permits

Review management



30%

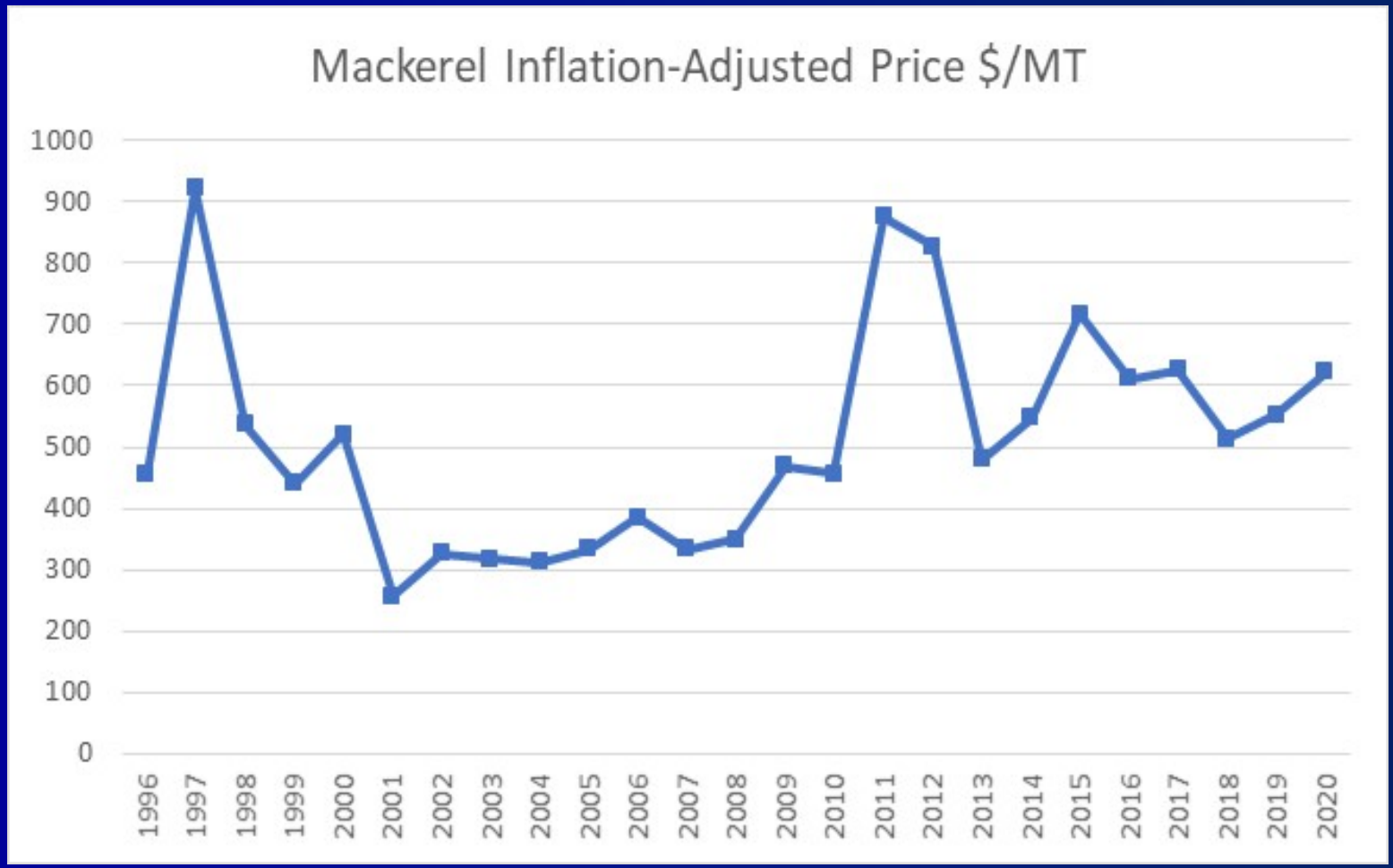
(8/5)

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

AP Fishery Performance Report

- Thermal/regime shifting
- Covid data gaps, fresh market impacts
- Trade issues – tariffs/container costs
- Herring RSA issue, New England's 12-mile line
- Mixed input on rebuilding approaches
- Concern over lack of ability to control recreational catch

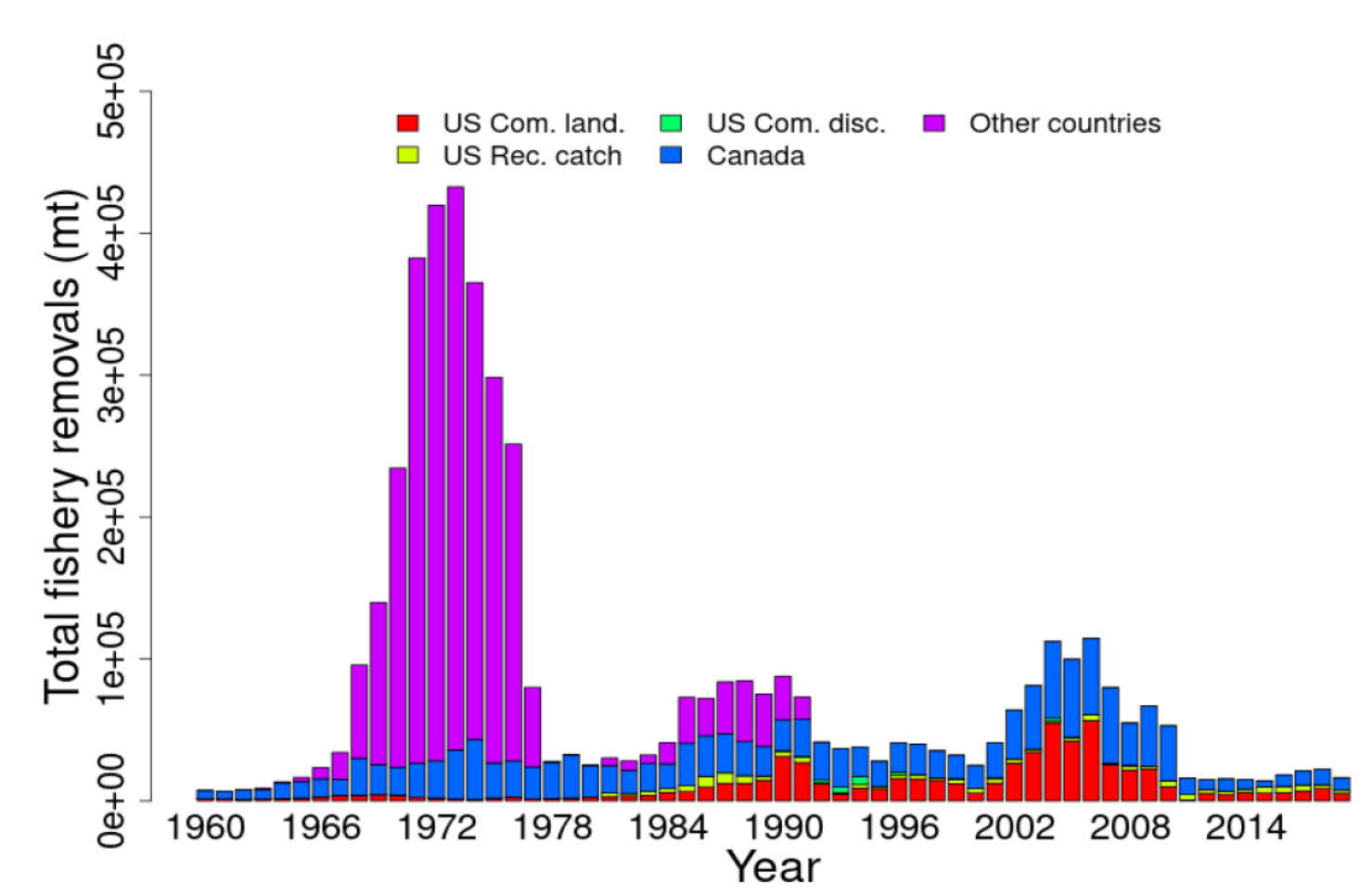
From Fishery Info Doc



Review assessment

- Previous ended in 2016, this one 2019
- SSB in 2016 (the terminal year from last assessment) revised downward by 29% in the new 2021 MTA
- Still about double overfishing in 2019
- SSB increased 39% from 2016 to 2019, at 24% of new target
- SSB increased 180% from 2014 (the time series minimum) to 2019
- New target & MSY both lower

Catches



(from MTA)

SSB

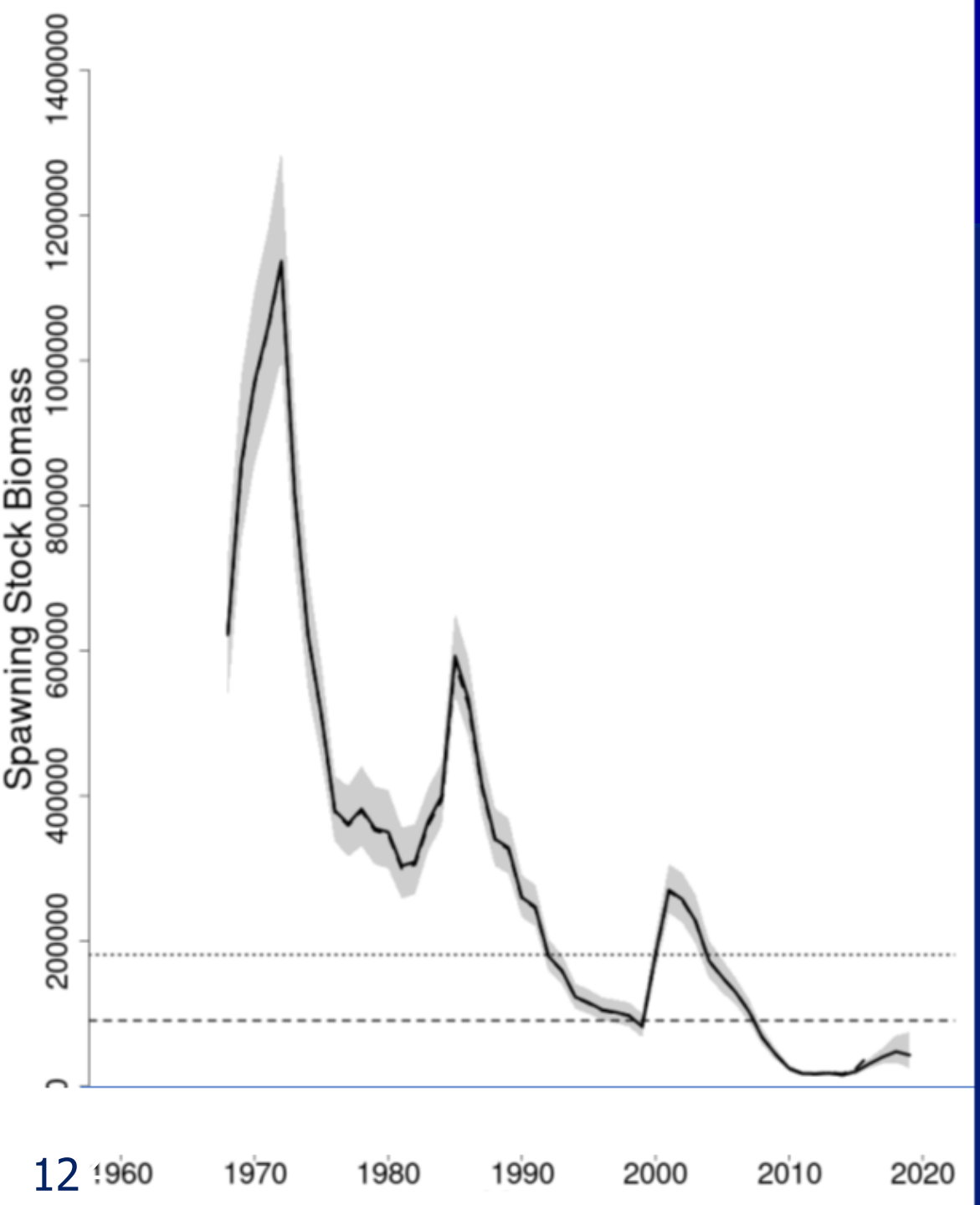
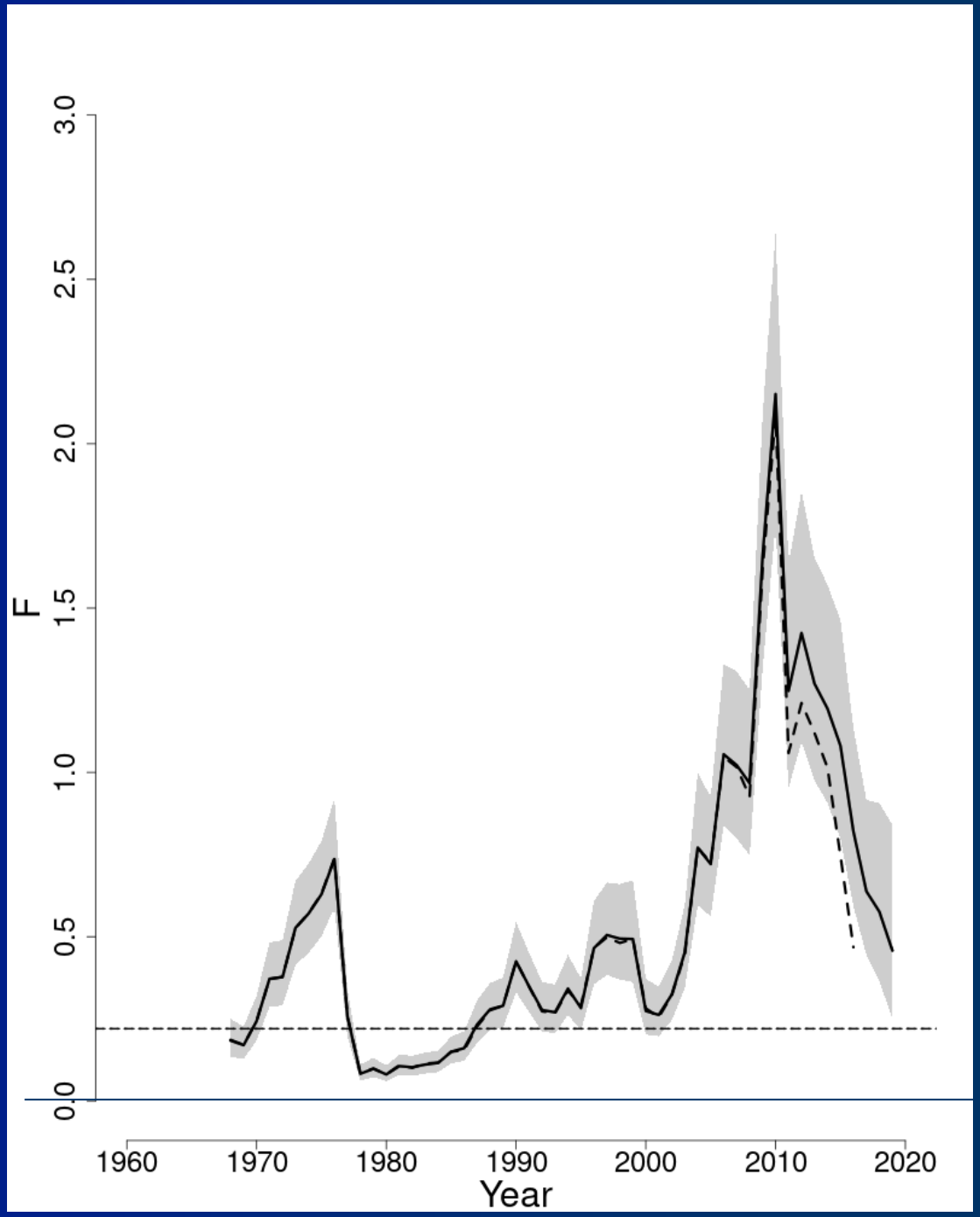


Figure 1: Trends in spawning stock biomass (mt) of northwest Atlantic mackerel between 1968 and 2019; SSBThreshold (1/2 SSBMSY proxy; horizontal dashed line) as well as SSBTarget (SSBMSY proxy; horizontal dotted line)

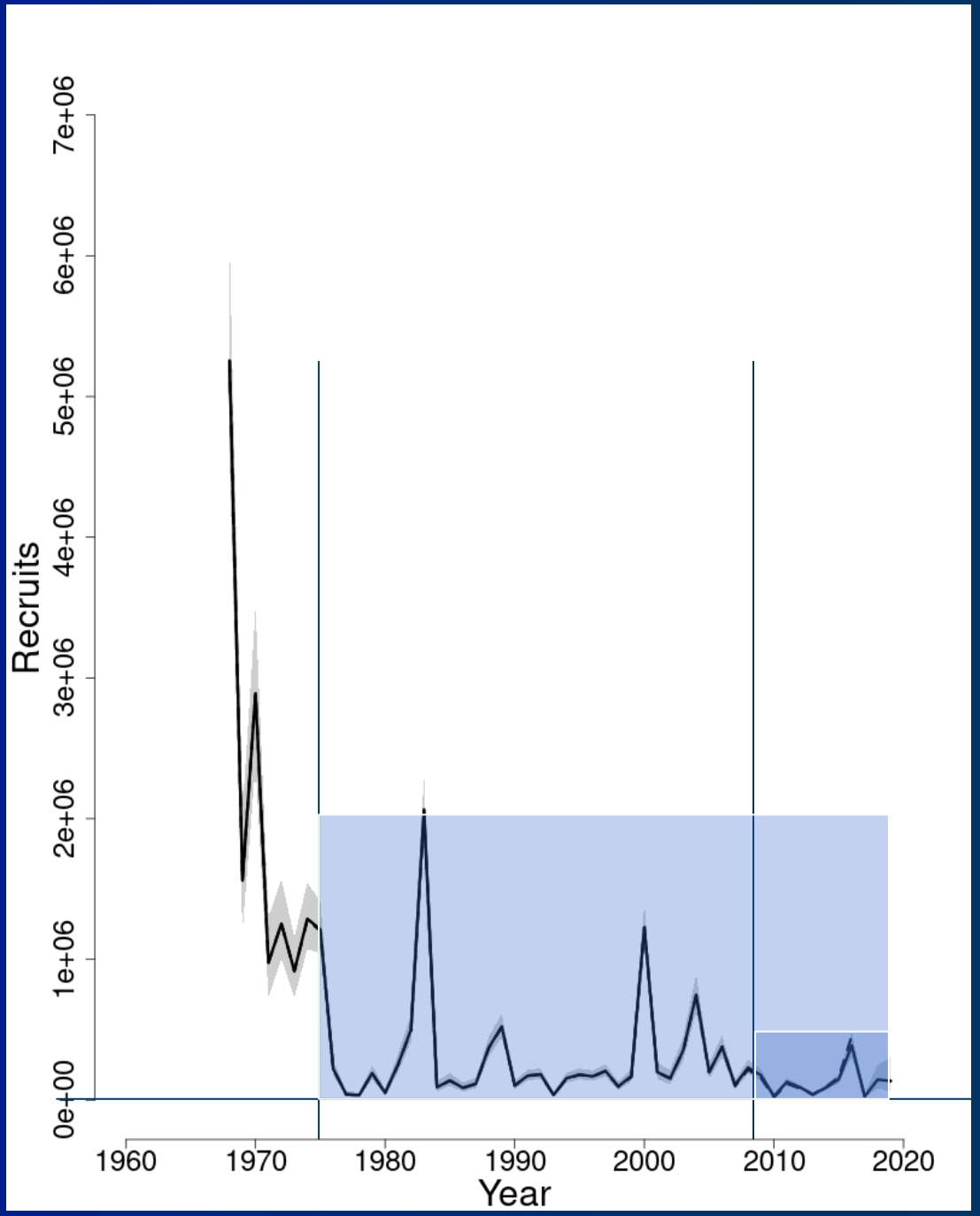
F

Figure 2: Trends in F current (solid line) and previous (dashed line) assessment and the corresponding $F_{Threshold}$ (F_{MSY} proxy=0.22; horizontal dashed line



Recruits

Figure 2: Trends in Recruits (age-1) (000s)



Mackerel Short Term Projections

Table 3: Short-term projections of total fishery catch and spawning stock biomass for northwest Atlantic mackerel based on a harvest scenario of fishing at F_{MSY} *proxy* between 2022 and 2023. The primary U.S. commercial mackerel fishery in 2020 occurred before the COVID pandemic began and discards represent a small proportion of total catch; therefore, the preliminary 2020 total catch estimate of 18,038 (mt) was used in projections.. Catch in 2021 is assumed as the sum of the U.S. ABC and the Candian quota (23,184 (mt)).

Year	Catch (mt)	SSB (mt)	F
2020	18038	62039 (27791 - 120790)	0.366

Year	Catch (mt)	SSB (mt)	F
2021	23184	70137 (29523 - 140000)	0.412

SSC Summary (Dr. Rago)

Atlantic Mackerel—SSC Comments (1)

- **Assessment Issues:**
  - Age structured model (ASAP) uses fishery-independent surveys to estimate SSB, notably an egg survey in Canada (northern contingent) and a long-term NMFS ecosystem monitoring survey. Very strong year classes in 1982 and 1989 but recruitment since 2008 has been below median. 2015 OK but 2016 lowest ever.
  - MRIP-adjusted catches increased the overall scale of the population but recreational catches are relatively small percent of overall removals in the US. Commercial discards, and recreational and bait catches in Canada are not estimated.
  - Natural mortality is estimated as 0.2, but analyses suggest higher M~0.26.
  - Retrospective patterns in SSB and R have increased since 2017. Retro for R is especially problematic since rebuilding depends strongly on the realization of average recruitment.

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Atlantic Mackerel—SSC Comments (2)

- Compared to the previous Benchmark Assessment, the perception of stock status has been revised substantially downward in the new Management Track Assessment (MTA). Key differences include:
  - SSB in 2016 (terminal year of benchmark) was revised down by 29%;
  - The estimated proxy for Maximum Sustainable Yield declined by 17%;
  - Projected biomass in 2020 (first projection year from new MTA) is just one third (about 60,000 MT) that predicted for 2020 in projections that were used to develop initial rebuilding after the Benchmark Assessment (about 177,000 mt).

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Atlantic Mackerel—SSC Comments (3)

- **<u>Rebuilding Issues</u>—A primary concern**
  - Projections from the 2017 benchmark suggested that rebuilding was possible by 2023, even with modest increases in catches.
  - Updated projections from the 2021 MTA suggest that rebuilding could not occur even if fishing mortality was zero. No single factor responsible
    - The downward adjustment of the 2015 year class was only -15%, but the very low 2016 and subsequent year classes are important.
    - Median age at maturity increased, and weights-at-age declined.
  - Given the revised assessment basis, a new rebuilding schedule can be implemented in 2022.
  - Many options and absence of essential management guidance precluded specific options for 2021

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Atlantic Mackerel—Terms of Reference (1)

SSC recommends separate actions for 2021 and 2022:

- For 2021, the stock is almost certain to be subject to overfishing given the current catch trajectory relative to the estimated OFL of 11,622 mt. Therefore, SSC recommends that measures be taken to eliminate or minimize additional catch during the current year.

- For 2022, SSC recommends that $F_{msy} = 0.22$ be utilized with a P* of 0.4, resulting in an ABC of 8,760 mt.
  - Assumes 2021 catch equals 23,184 mt = U.S. ABC (19,184 mt) plus 4,000 MT 2021 Canadian quota.
  - The static P* = 0.4 (OFL CV=100%, low recruitment scenario) is used as an interim measure to account for some scientific uncertainty while rebuilding is re-considered given stock size is certainly well below B_{msy}.
  - By comparison standard application of the Council's P* risk policy under the low recruitment scenario results recommendation of 3,931 MT with an 11% tolerated risk of overfishing.

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Atlantic Mackerel—Terms of Reference (2)

Why Reduce?

- Current rebuilding plan —will fail to meet the 2023 target.
- Long-term rebuilding period likely.
- Continued stock depletion —The perception of the stock has been revised substantially downward.
  - SSB in 2016 (terminal year of benchmark) was revised down by 29%;
  - Historically low recruitment since 2015;
  - Estimated proxy for Maximum Sustainable Yield declined by 17%;
  - Projected biomass in 2020 (first projection year from new MTA) is just 1/3 (about 60,000 mt) of what was predicted for 2020 in projections used to develop initial rebuilding after the Benchmark Assessment (about 177,000 mt).
- DFO 2021 Quota — Canada DFO has reduced quota by half to 4,000 mt to allow for immediate rebuilding.
- Current landings information — Most US landings occur within the first quarter (Jan-Mar) curtailing the effectiveness of a 2021 emergency action. Combined harvests and bycatch may be around 13,500 mt in 2021 based on fishery performance so far, a historical low in the series

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Atlantic Mackerel—Rebuilding Considerations (3)

General Rebuilding Considerations:

- Components of a rebuilding plan — Key variables in rebuilding include,
  - T-min: The minimum amount of time a stock rebuilds at F=0.
  - T-max: The maximum time allowed for a stock to rebuild, which is typically 10 years but can exceed 10 years when T-min>10 in which case T-max=10 + mean generation time.
  - T-target: The target number of years for rebuilding; lies between T-min and T-max.
  - P_R-max: The probability of rebuilding by T-max.
  - P_R-target: The probability of rebuilding by T-target
- Science-determined —T-min and T-max are scientifically derived values estimated from projections.
- Council-determined —The Council sets T-target, P_R-max, and P_R-target based on risk policy, feasibility, and catch-rebuilding trade-offs.
- Feasibility — Potentially limited due to harvests outside Council control.
- Risk and long rebuilding

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Atlantic Mackerel—Rebuilding Issues (4)

Specific Atlantic Mackerel Rebuilding Issues:

- Risk
- Feasibility
- Catch data streams —Harvest controls during rebuilding could result in very low commercial catches affecting metrics important in evaluating stock status and rebuilding.
- Recruitment assumptions —will be a critical aspect of rebuilding scenarios
- Biological Reference Points — what recruitment period (1975-present) is relevant?
- Risk of overfishing — P* (probability of overfishing) does not have explicit rebuilding time built in, but application of the P* control rule may lead to rebuilding within a certain period.
- Adaptation during rebuilding
- Forage Species — Under the MAFMC EAFM Guidance Document, forage species may require more risk-averse harvest control rule.

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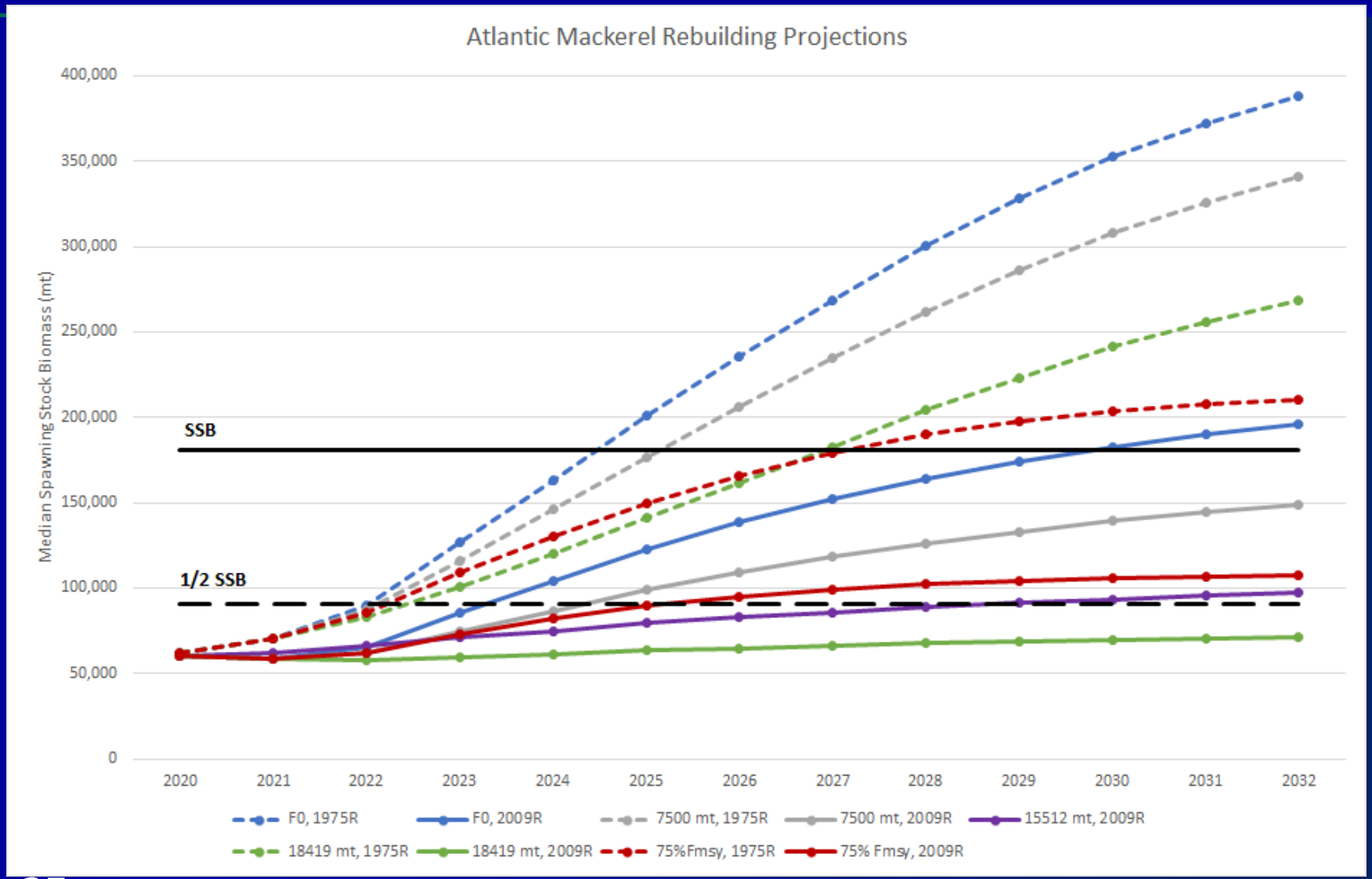
Staff General Thoughts

- There is a key tension in rebuilding to a target stock size that assumes higher recruitment, and then you assume lower recruitment when trying to get there…
- If you update reference points with low recruitment, easier rebuilding, but will get a very low MSY as well…
- Assume higher recruitment…underperform.


Atlantic Mackerel Rebuilding Projections
Median Spawning Stock Biomass (mt)
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
SSB
1/2 SSB
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
F0, 1975R
F0, 2009R
7500 mt, 1975R
7500 mt, 2009R
15512 mt, 2009R
18419 mt, 1975R
18419 mt, 2009R
75%Fmsy, 1975R
75% Fmsy, 2009R

?s

Emergency Action

- Have SSC recommendations
- Not as binding w/emergency action
- Need to reduce overfishing, allow stock to increase, mitigate economic effects
- Be based on best available science
- Last EA did include a lower option…

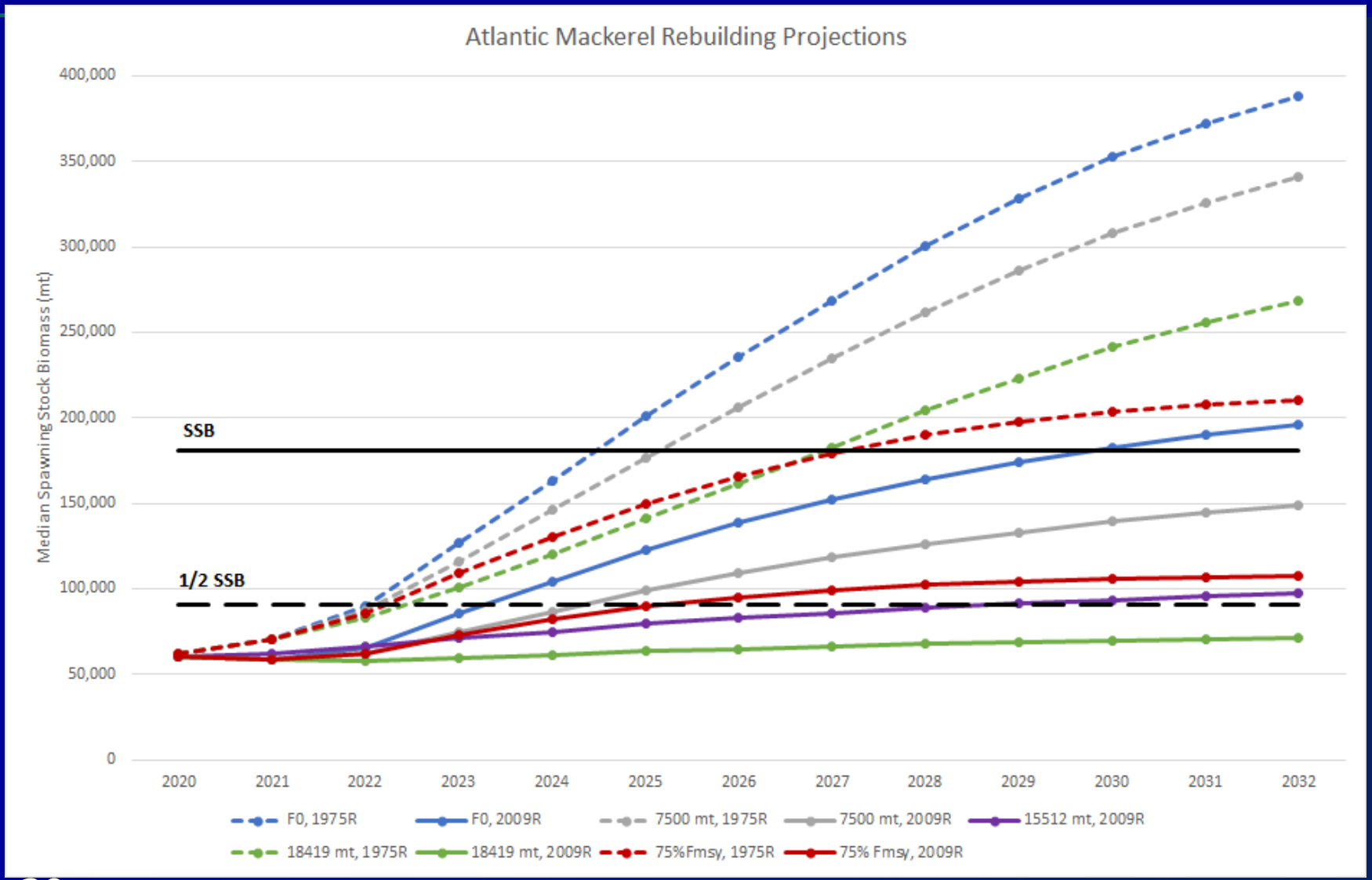
Emergency Action – for 2021/start 2022

Specification	Current	Option 1 (SSC)	Option 2 (Like EA)
(a) Overfishing Limit (OFL)	NA		
(b) Acceptable Biological Catch (ABC)	29,184	8,760	
(c) Canadian Deduction (10,000 MT)	10,000	4,000	4,000
(d) U.S. ABC = ACL (Canadian catch deducted)	19,184	4,760	11,512
(e) Recreational Allocation	1,270	3,503	3,503
(f) Commercial Allocation (rest of ACL)	17,914	1,257	8,009
(g) Management Uncertainty Buffer	537	38	na
(h) Commercial ACT	17,377	1,219	8,009
(i) DAH (set aside for discards)	17,312	1,121	7,911

Emergency Action

- 4,000+3,503+7,911+98 = 15,512 MT
- This would lead to less overfishing based on the projection methods recommended by the SSC using the lower recruitment scenario compared to the current specifications.
- Also predicted to lead to slight biomass increases.
- Would allow Council and industry some time

Emergency Action



Emergency Action

- Committee Motion:

- …that the Council move forward with Option 2 for Atlantic Mackerel emergency action as presented.

- COM: (7-0-1)

Emergency Action

- Key Points:
- Rationale: mackerel fishery is under stress (but was also concern that this action will delay the *Illex* Amendment)
- With low herring quotas/research set aside, unlikely that a relatively substantial fall mackerel fishery occurs

Emergency Action

- GARFO encouraged Council to focus on what is best for the fishery
- GARFO votes no on any emergency action to preserve Secretary's flexibility.
- Adding recreational measures into an emergency action would delay implementation since recreational measures have not been previously contemplated.

Emergency Action

- AP input supported Option 2 as providing something for participants but concern about slowing down progress on the *Illex* permit action.
- A public comment supported Option 2 given the dominant impact of recruitment.

Emergency Action Com. Motion

- Committee Motion:

- …that the Council move forward with Option 2 for Atlantic Mackerel emergency action as presented.

- COM: (7-0-1)

Rebuilding v2

- SSC indicated long term endeavor, 50% risky
- Staff: Focus on 10-year rebuilding
- 50%, 60%, 75% probabilities

- Request that the SSC provide a recommendation on assumed recruitment used in rebuilding projections in order to most closely achieve the targeted rebuilding probabilities. Also request that the SSC provide a recommendation on how long a change in recruitment should persist before a regime change is apparent (i.e. when reference points should be updated).

Rebuilding v2

- What is Council's risk preference in terms of assumed 2021 catch?
- Assuming can only affect recreational catch in federal waters, direct staff to develop some recreational measures (moratorium in federal waters, trip limit in federal waters)
- Include RH/S cap options…

Rebuilding v2 – Com. Motions

- 1: …that the Council request analysis/alternatives for 50%/60%/75% rebuilding probabilities associated with a 10-year rebuilding timeline.

- COM: By consent

Rebuilding v2 – Com. Motions

- Key Points:

- Rationale: some options above the standard median 50% probability appear warranted.

  [Given results so far]

- P* Calculations will still be done and still an option… (anything involving higher catches must include a risk policy adjustment)

Rebuilding v2 – Com. Motions

- 1: …that the Council request analysis/alternatives for 50%/60%/75% rebuilding probabilities associated with a 10-year rebuilding timeline.

- COM: By consent

Rebuilding v2 – Com. Motions

- 2: …that the Council request the SSC perform additional analyses regarding recruitment assumptions and reference points to inform rebuilding decisions.

- COM: By consent

Rebuilding v2 – Com. Motions

- Key Points:

- Interpretation: the SSC would be asked whether the best available science supports a particular recruitment assumption as most probable over the course of rebuilding, if not, provide information on the relative risk of using different recruitment assumptions.

Rebuilding v2 – Com. Motions

- Key Points:

- Interpretation: In terms of reference points, the question would be at what point would a regime change be apparent to trigger a revision of reference points.

Rebuilding v2 – Com. Motions

- 2: …that the Council request the SSC perform additional analyses regarding recruitment assumptions and reference points to inform rebuilding decisions.

- COM: By consent

Rebuilding v2 – Com. Motions

- 3: …that the Council consider and analyze an alternative that would mimic the butterfish regulations for the mackerel fishery (3-inch + minimum mesh required to retain more than 5,000 pounds).

- COM:(6-0-0)

Rebuilding v2 – Com. Motions

- Key Points:
- Rationale: Allow some smaller fish to escape to build mackerel recruit numbers over time.
- Staff would add typical specification measures that apply to quotas based on standard practices.

Rebuilding v2 – Com. Motions

- 3: …that the Council consider and analyze an alternative that would mimic the butterfish regulations for the mackerel fishery (3-inch + minimum mesh required to retain more than 5,000 pounds).

- COM:(6-0-0)

Rebuilding v2 – Com. Motions

- 4: …that the Council include an alternative and analysis of a 10-inch Atlantic mackerel minimum size limit for the recreational fishery (in addition to measures described in staff memo).

- COM: passes by consent

Rebuilding v2 – Com. Motions

- Key Points:
- Rationale: Similar to Canada's 26.8 cm limit, based on maturity data.
- Would be in addition to potential federal waters closure.

Rebuilding v2 – Com. Motions

- Key Points:
- Could same be done with chub mackerel given similar appearance?
- ME, NH, MA (the majority of Atl. mackerel catch) indicated they could theoretically do measures in ~3-4 months depending on other scheduling AND requested being included in any relevant discussions.

Rebuilding v2 – Com. Motions

- 4: …that the Council include an alternative and analysis of a 10-inch Atlantic mackerel minimum size limit for the recreational fishery (in addition to measures described in staff memo).

- COM: passes by consent

Rebuilding v2 – Com. Motions

- 5: …that the Council include an alternative and analysis of using no less than 129 MT for the RH/S cap throughout the rebuilding timeline.

- COM: 7-0-0

Rebuilding v2 – Com. Motions

- Key Points:
- Rationale was that at cap amounts lower than 129 MT, the cap would be unrealistic, unmonitorable, and ineffective.
- Current scaling process (up or down) would also be included as an option.

Rebuilding v2 – Com. Motions

- AP members noted:
- the likely lower scale of RH/S catches at lower mackerel/herring quotas;
- the New England Council maintained RH/S caps when herring quotas were reduced;
- the Mid Atlantic's cap has been designed as an incentive to avoid RH/S at any mackerel quota level.

Rebuilding v2 – Com. Motions

- 5: …that the Council include an alternative and analysis of using no less than 129 MT for the RH/S cap throughout the rebuilding timeline.

- COM: 7-0-0

Rebuilding v2 – One more thing…

- 2021 catch assumption for rebuilding projections…
  - Related to risk…
  - 23,184 MT?
  - 15,512 MT?
  - Other?

Flexibility?

Anything Else?

Extra Slides

SSC Findings

- Updated projections from the 2021 MTA suggest that rebuilding can not occur by 2023 even with zero fishing
- Low recruitment, median age at maturity increased, and weights-at-age declined
- Retrospective trends

SSC Findings

- 2021 overfishing nearly certain (OFL =11,622 MT)
  - 4,000 Canada + 3,500 US Rec + 5,200 US Com = 12,700 MT

- For 2022 to end overfishing, starting with Fmsy = 0.22 (10,817 MT) and a P* of 0.4, ABC = 8,760 MT
  - 8,760 – 4,000 – 3,500 = 1,260 MT US Com
  - Uses 23,184 MT for 2021

SSC Findings

- Low recruitment = slow rebuilding
  - recruitment assumptions require additional science deliberation
- A 50% chance of rebuilding is risk-prone, SSC recommends higher rebuilding chance
  - (Lower catches at least initially)
- EAFM Guidance Document – "the Council could adopt biological reference points for forage stocks that are more conservative…"

SSC Findings

- Keep current reference points
- Shorter recruitment time series will likely provide greater certainty against underperforming short-term forecasts
  - Assume lower, if get assumed lower will still be on projected track
- Modifications will likely be needed

?s