Striped Bass Cooperative Tagging Program

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Tagging Program Overview

- Tagging started in 1985 as part of Striped Bass management under the Atlantic Striped Bass Conservation Act in 1984
- USFWS maintains database, distributes tags, and receives all tag returns
- State agencies tag fish along the Atlantic Coast as part of routine monitoring (9 agency programs)
  - Producer area
    - Tag fish during spawning migrations in specific areas
  - Coastal area
    - Tag mixed stock fish during fall, winter, or early spring before migration

Tagging Program Overview

- Producer area tagging program
  - Hudson River: NYDEC
  - Delaware Bay: DNREC, PFBC, NJDEP
  - Chesapeake Bay: MDDNR, VA (VIMS), DC Fisheries
- Coastal tagging programs:
  - MADFW- Fall tagging off MA
  - NJDEP- Early spring tagging in lower DE Bay
  - NYDEC – Fall tagging off Long Island coast
  - NCCOOP- winter tagging offshore of Mid-Atlantic
    - Partnership between NCDMF, USFWS, MDDNR, NMFS, ASMFC

Tagging Program Overview

- All tagging programs through 2021
  - 558,593 fish tagged
  - 89,595 tag returns
  - 16% overall recapture rate (15.5% individual)

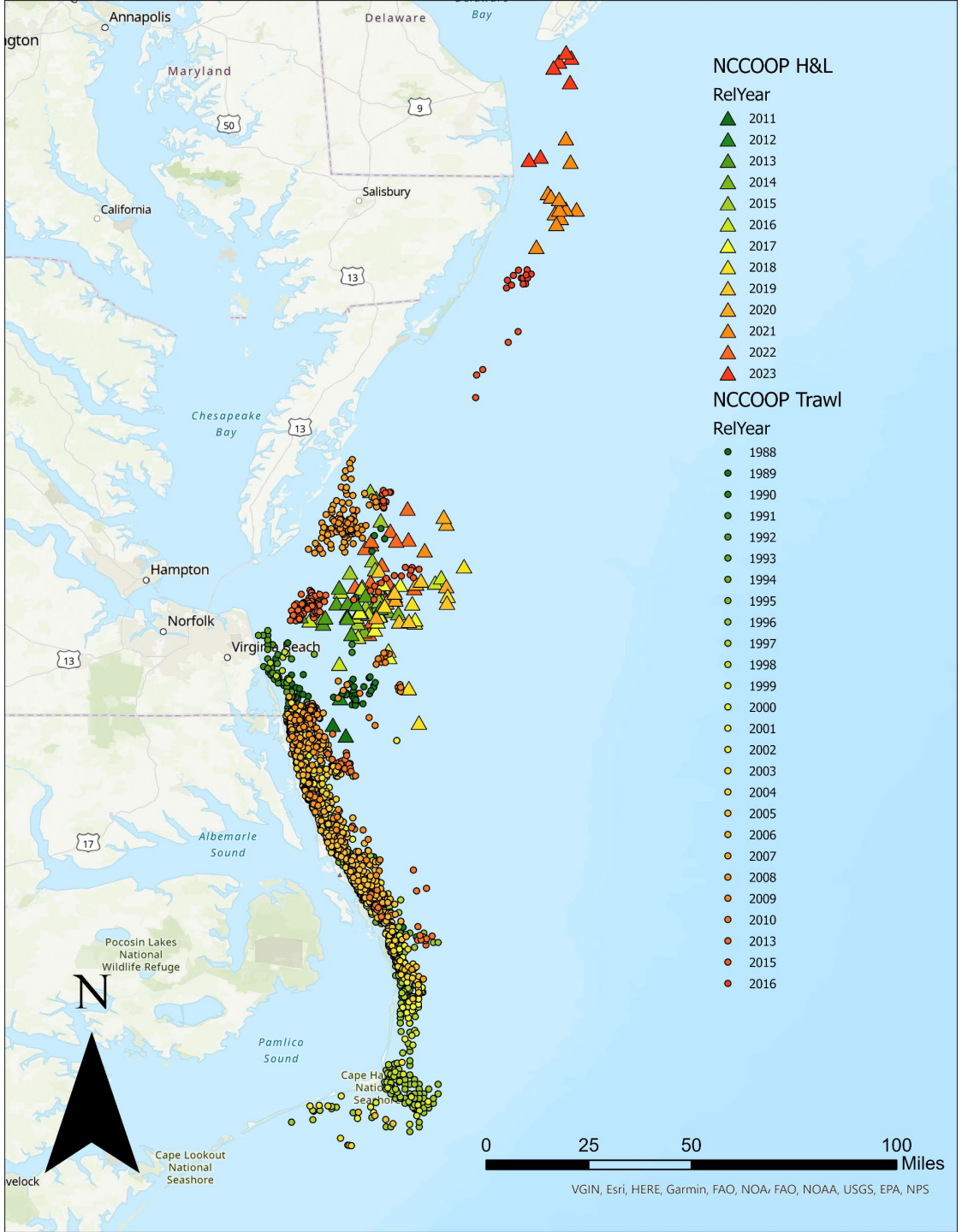
Tagging Program Overview

- Used in ASMFC stock assessments
  - Fishing and natural mortality estimates to ground-truth the statistical catch-at-age model

- Part of current efforts to develop a spatially explicit multi-stock assessment model
  - Relative stock composition (>28”(711mm))
  - Migration rates and residence time

NCCOOP History

- Cooperative tagging program designed to target overwintering Striped Bass offshore of NC
  - Trawl survey began in 1988 and continued through 2016 (no trawls in ‘11, ‘12 or ‘14)
  - Hook and line fishing sought as option beginning in 2011 due to lack of funding for trawl surveys
    - $100,000-$160,000 for trawl vessel use for 10 days
    - $20,000-$30,000 for 10+ hook and line charter trips


Annapolis
Maryland
Delaware
Bay
Salisbury
California
Chesapeake
Bay
Hampton
Norfolk
Virginia Beach
Albemarle
Sound
Pocosin Lakes
National
Wildlife Refuge
Pamlico
Sound
Cape Lookout
National
Seashore
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NCCOOP H&L
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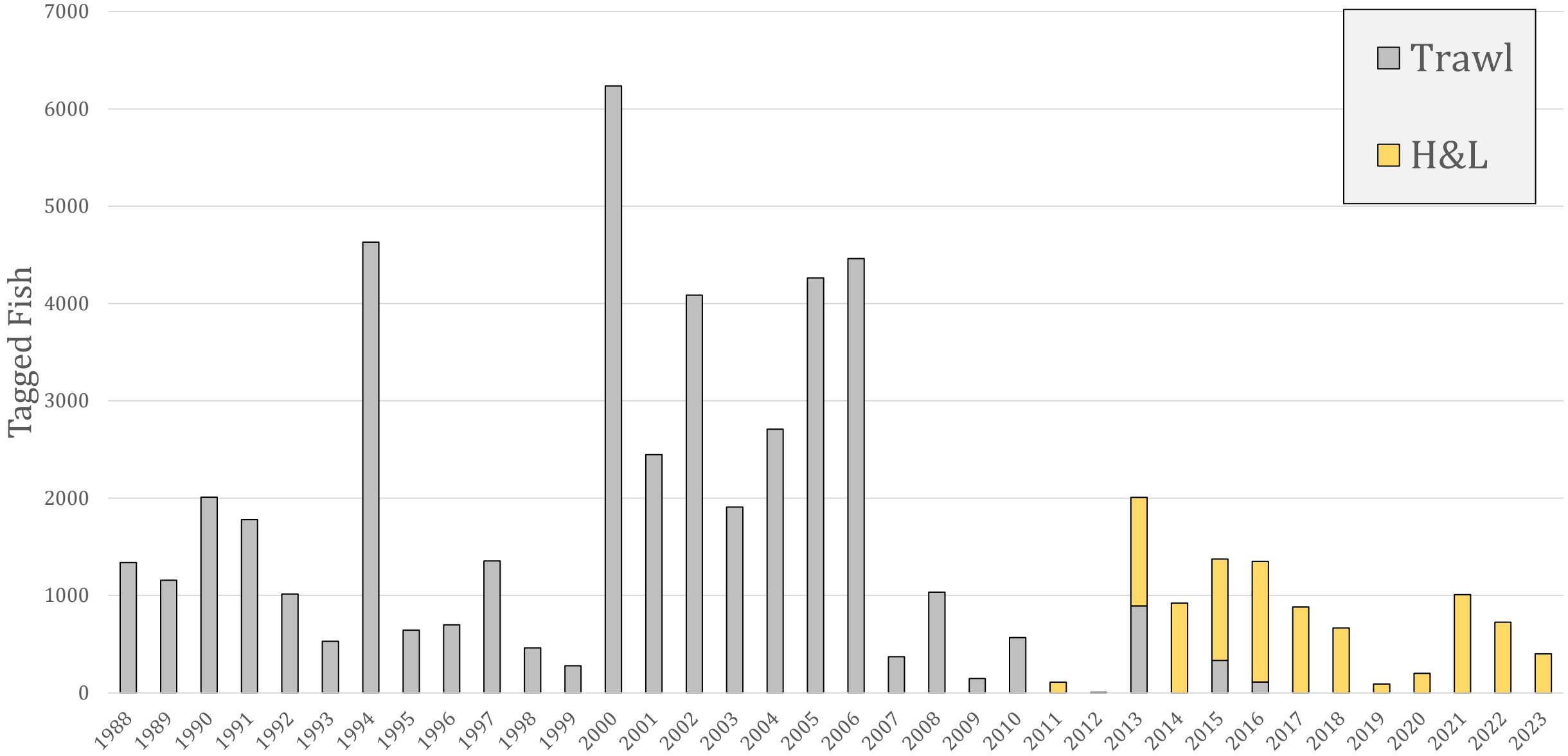
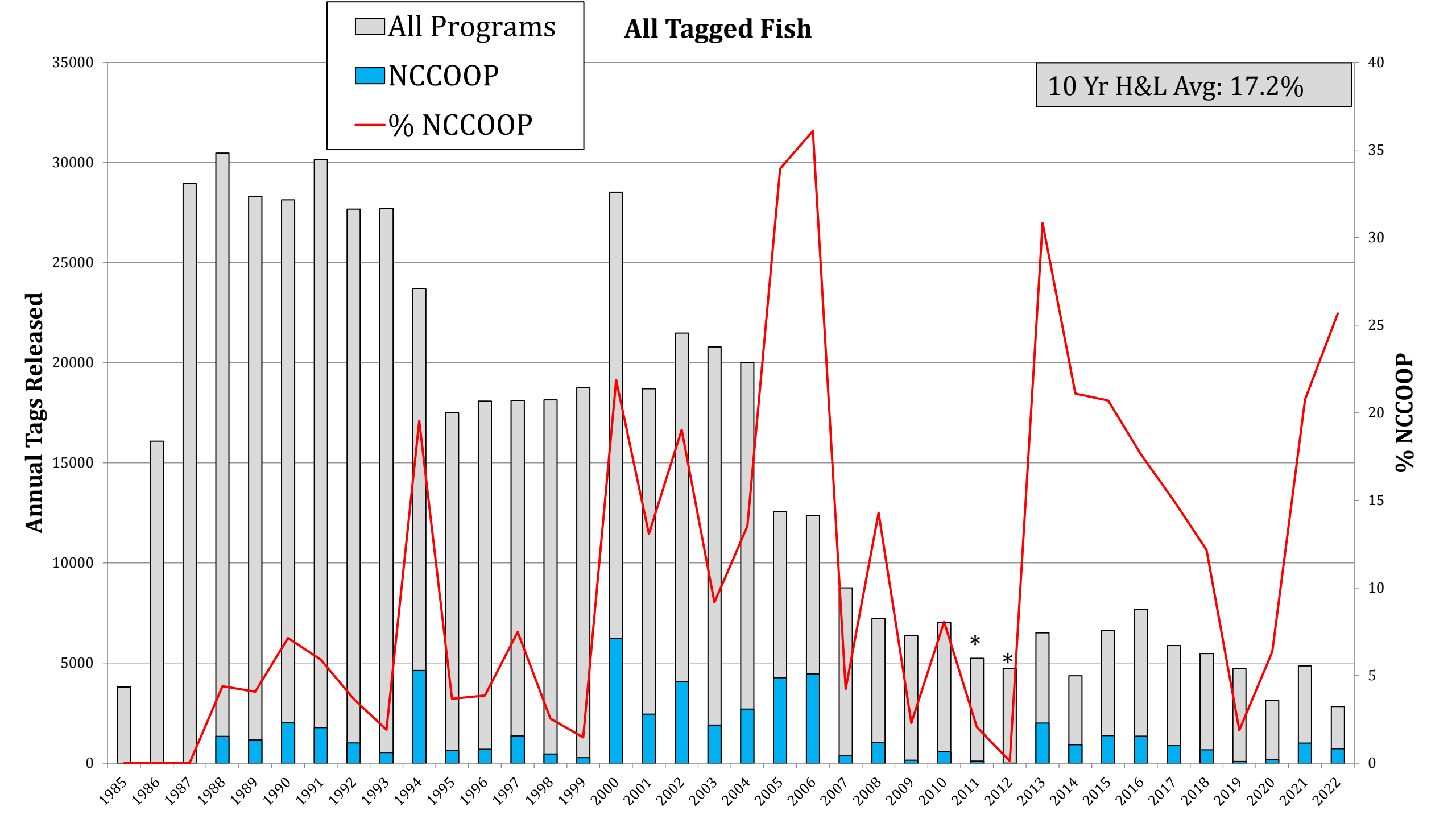
Miles
VGIN, Esri, HERE, Garmin, FAO, NOAA, FAO, NOAA, USGS, EPA, NPS

NCCOOP History- Trawl and Hook and Line (H&L)




All Programs
NCCOOP
% NCCOOP
All Tagged Fish
10 Yr H&L Avg: 17.2%
Annual Tags Released
% NCCOOP
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25000
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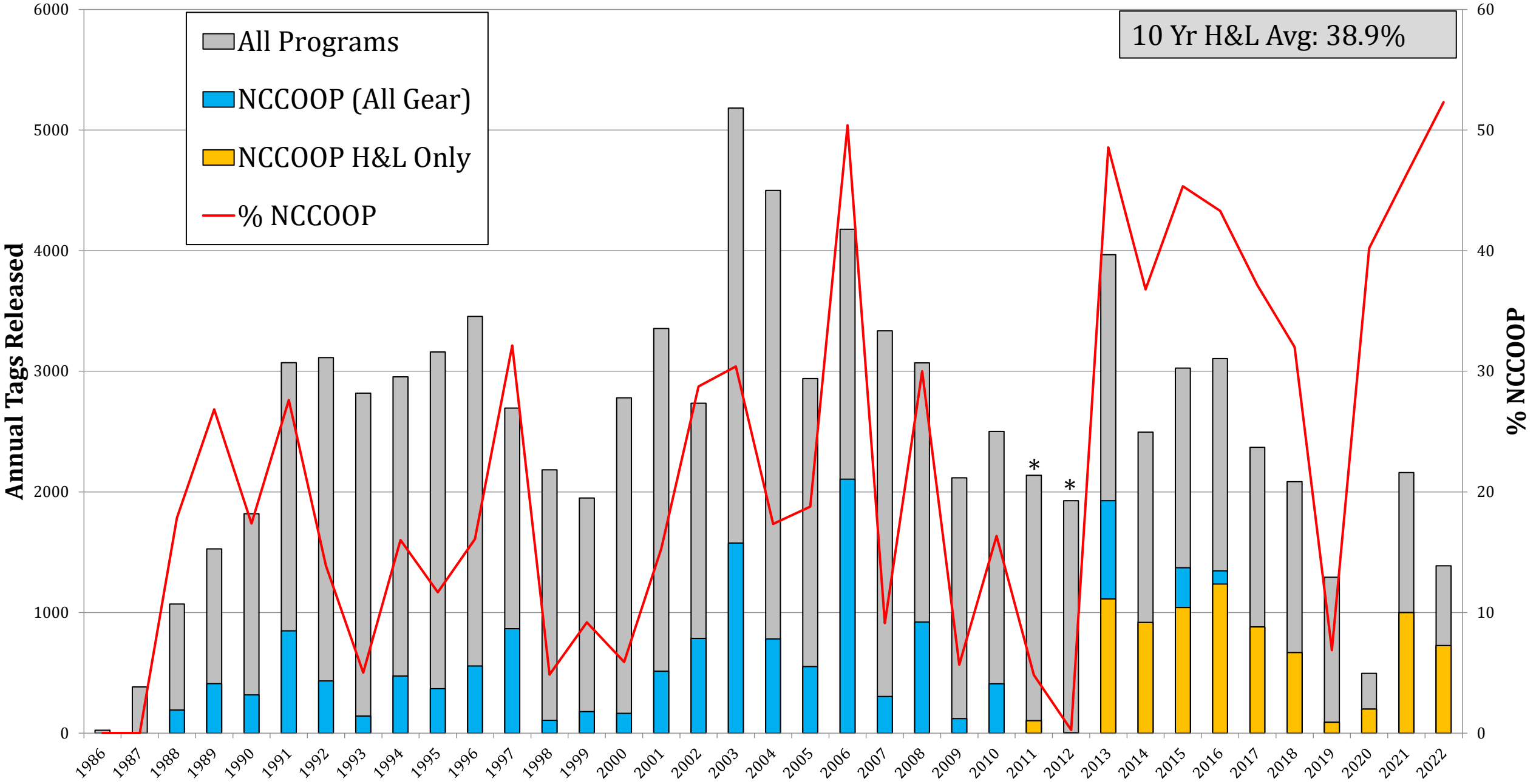
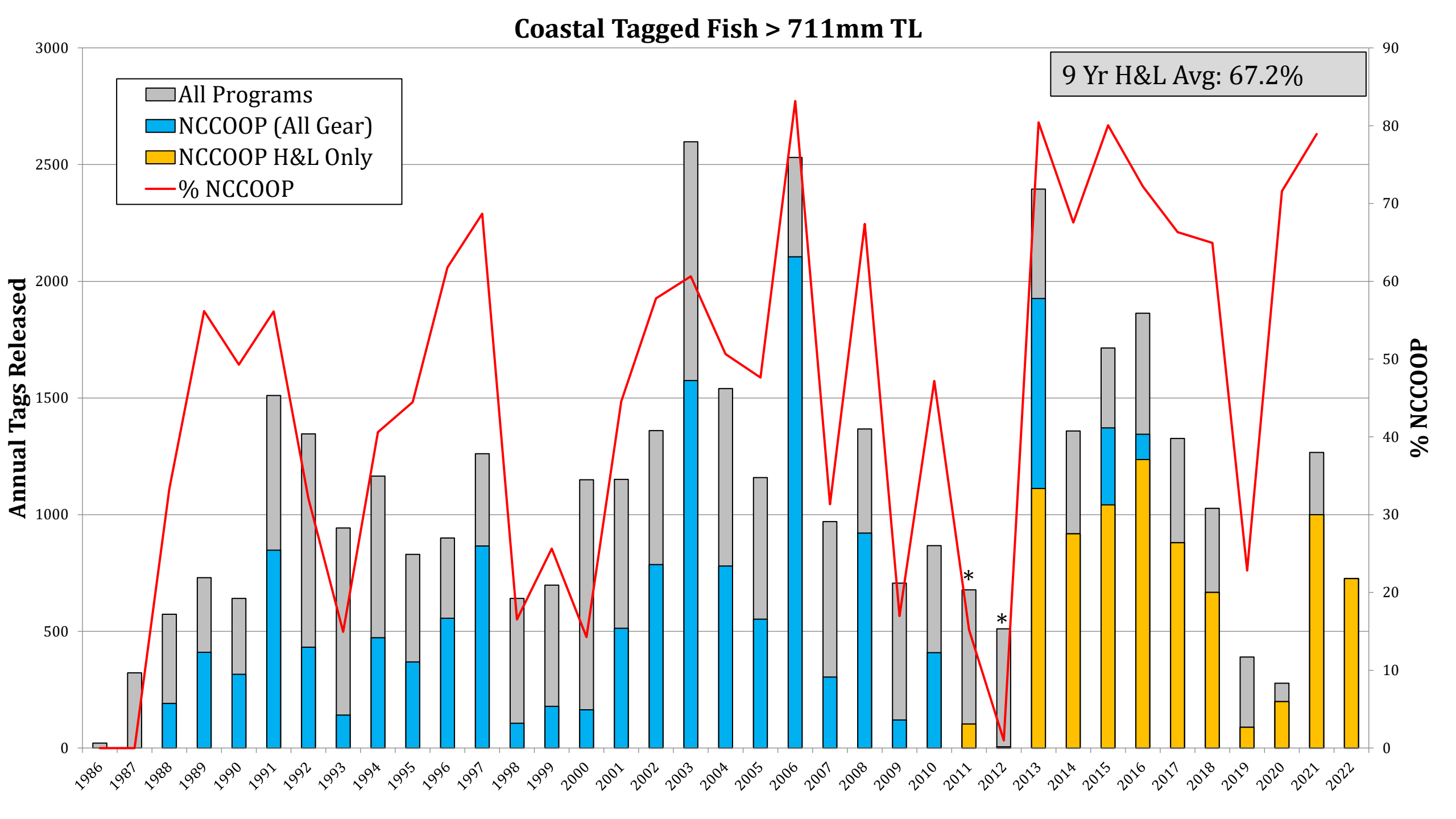
2022

All Tagged Fish > 711mm Total Length




Coastal Tagged Fish > 711mm TL
9 Yr H&L Avg: 67.2%
All Programs
NCCOOP (All Gear)
NCCOOP H&L Only
% NCCOOP
Annual Tags Released
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NCCOOP Hook and Line

Year	Trips	Number Caught	Number Tagged
2011	1	108	108
2012	1	6	6
2013	10	1,130	1,114
2014	10	925	921
2015	10	1,058	1,042
2016	10	1,273	1,240
2017	10	904	881
2018	10	695	667
2019	13	91	89
2020	13	202	199
2021	13	1,021	1,008
2022	12	742	726
2023	11	408	400
Totals	**113**	**8,153**	**8,001 (646 Avg/yr)**

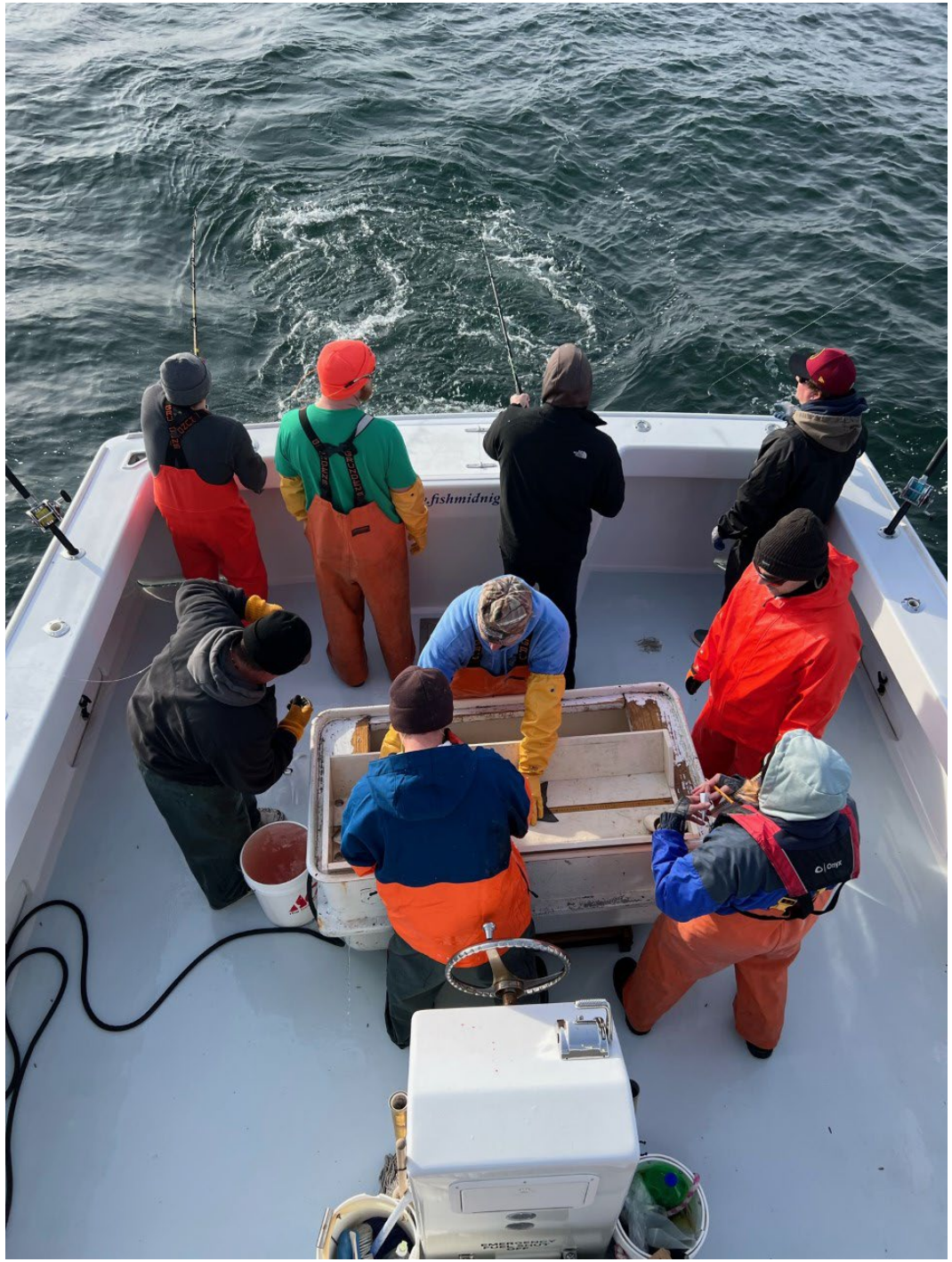
751 avg excluding first 2 years

NCCOOP Hook and Line Summary

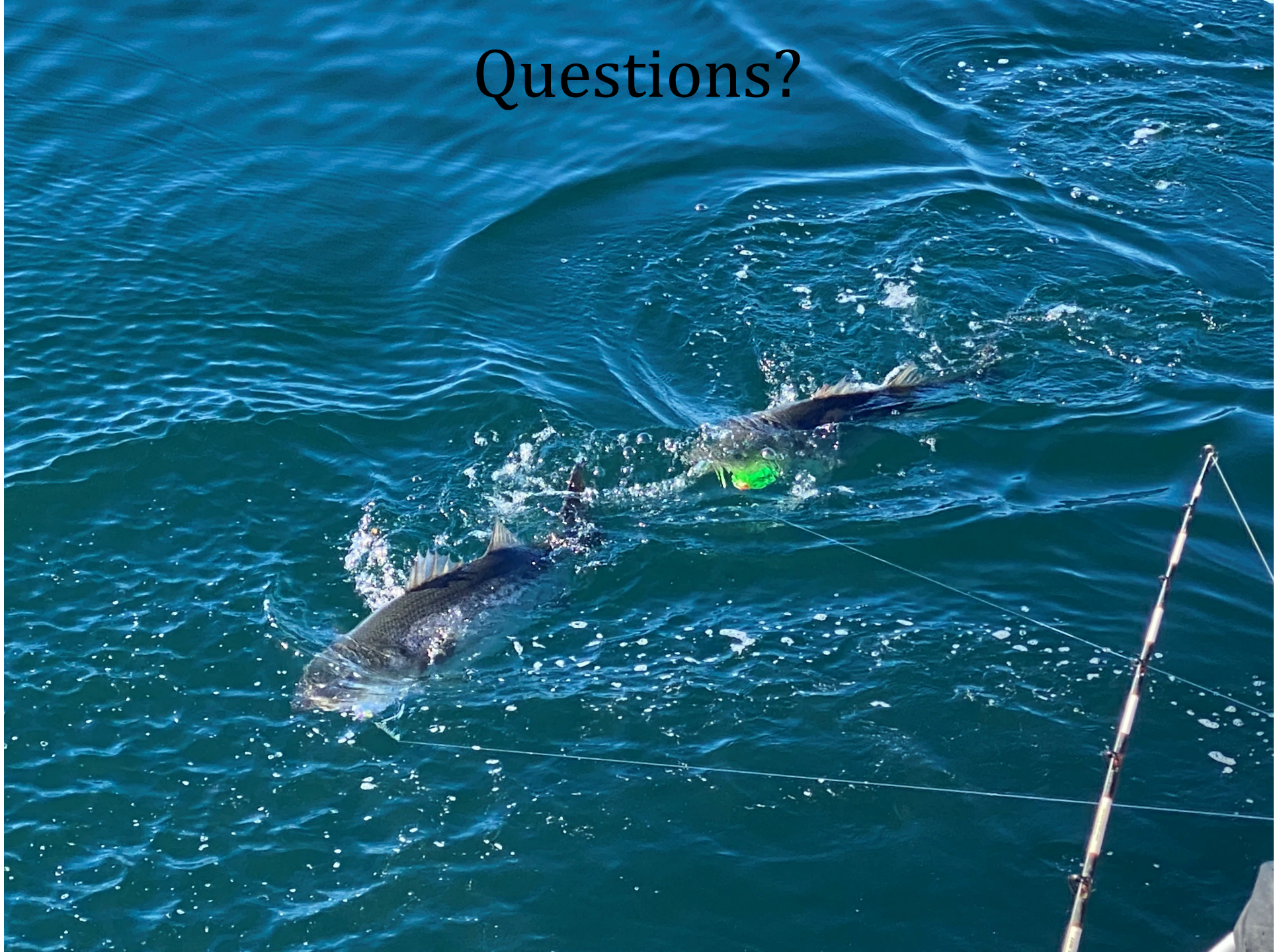
- Hook and line has been a viable, cheaper option than trawl survey
- Provides a majority of tagging data on coastal fish, especially large migratory fish
- Sampling challenges:
  - Fish availability/location
- Future funding challenges
  - No long-term funding source
  - Funding in recent years has been either ASMFC/USFWS
  - Currently no secured funding to conduct sampling in 2024

Acknowledgements

- F/V Midnight Sun, Capt. Ryan Rogers and crew
- 100’s (1,000’s?) of volunteer anglers over the years
- Agency personnel for staff time



Questions?



Striped Bass Rebuilding Projections: 2022 Preliminary Data and Ocean Commercial Quota Utilization

Striped Bass TC-SAS Report

May 2, 2023

M. Celestino (SAS Chair)

Overview

- Striped Bass TC-SAS met in March 2023
  - Review correction to rebuilding probabilities in 2022 Stock Assessment Update Report
  - Develop updated stock rebuilding projections as tasked by the Management Board

Correction to 2022 Assessment Update

- 2022 Assessment Update includes short-term projections with probability of female SSB reaching SSB threshold and target under constant *F* scenarios
- Standard error was inadvertently used in error calculations
  - Resulted in larger error than should have been shown around SSB projections
- Projections were corrected to use CV in error calculation
  - Results in smaller error and updated probabilities
  - Median SSB projections not affected
- TC-SAS reviewed the correction and the 2022 Assessment Update Report will be updated to reflect the correction

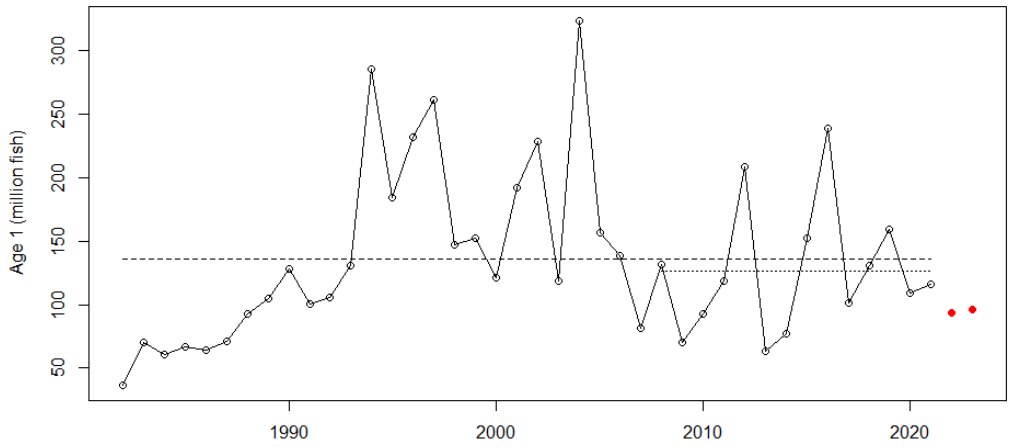
New Rebuilding Projections

- Task 1 from Board: Evaluate whether 2022 removals remained at a level associated with the 2021 fishing mortality rate
- Task 2 from Board: Conduct stock projections to determine how ocean commercial quota utilization scenarios would impact the stock and rebuilding timeline

- Board requested projections for May 2023 meeting, and requested inclusion of 2022 preliminary removals data
- TC-SAS developed projections to address both tasks

Projection Data Inputs

- Projections use 2022 assessment model configuration, including low recruitment assumption
- Age-1 recruitment estimated using Maryland YOY index
  - 2021 Maryland YOY to predict 2022 recruitment for all scenarios
  - 2022 Maryland YOY to predict 2023 recruitment for quota utilization scenarios



Projection Data Inputs

- **All scenarios include preliminary 2022 removals in number of fish**
  - Preliminary 2022 commercial landings from each state
  - Estimated 2022 commercial discards using 2021 discard-to-landings ratios
  - Preliminary 2022 MRIP estimates for recreational harvest and recreational release mortality (9% of live releases)
- 2022 preliminary MRIP estimates indicate 40% increase in recreational removals relative to 2021
  - 91% increase in recreational harvest
  - 3% increase in recreational live releases
- Across both sectors, preliminary estimated 33% increase in total removals in 2022

Projection Data Inputs

- Note: Final MRIP data released April 26, 2023
  - Very minor difference from preliminary striped bass catch estimate
  - Final total recreational removals estimate 1% lower than preliminary estimate

Projection Data Inputs

- **For ocean quota utilization scenarios, assume there would be additional harvest starting in 2023 to reflect using all (or most of) ocean quota [Board task scenarios]**

- Full Ocean Quota Used starting in 2023: unused 2022 ocean quota converted from pounds to number of fish and added to total removals
  - Active comm. fisheries: state-specific avg. weight
  - Inactive comm. fisheries: coastwide ocean avg. weight

- Full Ocean Quota Used Except NJ starting in 2023: NJ's quota subtracted from that additional harvest
  - NJ's commercial quota is unavailable for quota transfers because it has been re-allocated to the recreational fishery

Projection Scenarios

- Three scenarios assuming constant, 3-year average fishing mortality through 2029
  - 3-year average *F* acknowledges that catch and *F* vary from year-to-year, even under same regulations
  - 3-year average *F* was very similar to *F*2022; projections using *F*2022 instead of average were explored as sensitivity run with similar results

- Scenario 1 based on preliminary 2022 removals only
  - Assumes constant *F*; uses average *F* 2019-2021-2022

- Scenarios 2 and 3 apply ocean commercial quota scenario starting in 2023
  - Different assumption: Assumes constant removals between 2022-2023, then constant *F* from 2023-2029;
  - Uses average *F* 2019-2021-2023

Note: F2020 excluded due to COVID-19 uncertainty.

Projection Scenarios

- **Scenario 1**: uses preliminary 2022 removals to estimate *F*2022. For 2023-2029, *F*2022 is averaged with *F*2019 and *F*2021.

- **Scenario 2**: Starting in 2023, *F* accounts for harvesting the full ocean quota each year. *F*2023+full quota assumes preliminary 2022 removals plus additional commercial harvest from 2023 population. For 2023-2029, *F*2023+fullquota is averaged with *F*2019 and *F*2021.

  **Note: Landed NJ commercial quota is counted both in the "full commercial quota" and in the re-allocation of the commercial quota to the recreational fishery (MRIP); those fish are double-counted here.*

- **Scenario 3**: Starting in 2023, *F* accounts for harvesting the full ocean quota each year except for New Jersey's quota. *F*2023+fullquotaminusNJ assumes preliminary 2022 removals plus additional commercial harvest from the 2023 population. For 2023-2029, *F*2023+fullquotaminusNJ is averaged with *F*2019 and *F*2021.

Projection Results

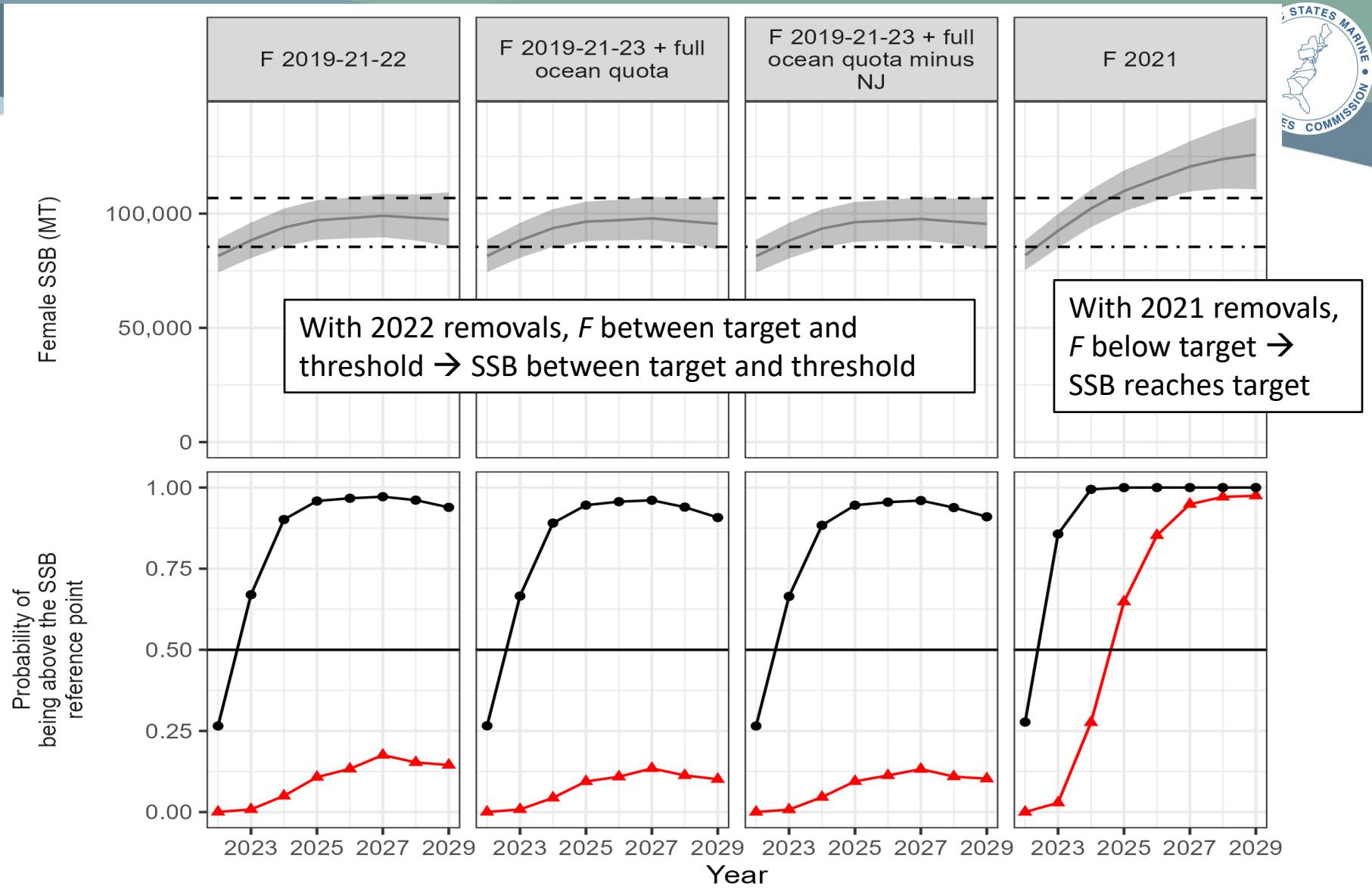
- For all scenarios, projected *F* rates were between the current *F* target of 0.17 and *F* threshold of 0.20.
- These projected *F* rates are higher than *F*2021 (0.14)
- If *F* stays between the target and the threshold from 2023-2029, the probability of rebuilding the stock to SSB target by 2029 decreases substantially compared to the rebuilding probability associated with *F*2021.

Projection Results

Description	Scenario	Year	Projected *F*	Pr SSB > target in 2029	Pr SSB > thresh-old in 2029
*F*2021 from 2022 Stock Assessment Update	-	2022-2029	F in 2021	**97.5 %**	99.9 %
2022 Preliminary Removals	1	2022	F in 2022	**15 %**	94 %
		2023-2029	Average F (2019,2021, 2022)		
2022 Preliminary Removals + Full Ocean Quota in 2023	2	2022	F in 2022	**11 %**	91 %
		2023-2029	Average F (2019,2021, 2023+fullquota)		
2022 Preliminary Removals + Full Ocean Quota minus NJ in 2023	3	2022	F in 2022	**11 %**	91 %
		2023-2029	Average F (2019,2021, 2023+fullquota minusNJ)		

Discussion: 2022 Removals

- **Increased recreational removals in 2022 are driving the increased *F* rates and lower rebuilding probabilities in all scenarios**
- Projections indicate SSB will increase over time before stalling between the target and threshold; aligns with estimated *F* rates being between the F target and threshold
- *F* reference points calculated to achieve the SSB reference points in the long-term → to rebuild to SSB target by 2029 (short-term), *F* would need to be below its target
- While higher *F* rates result in low probability of rebuilding to target, the probability of reaching the SSB threshold in 2029 (no longer overfished) is still above 90% for all scenarios

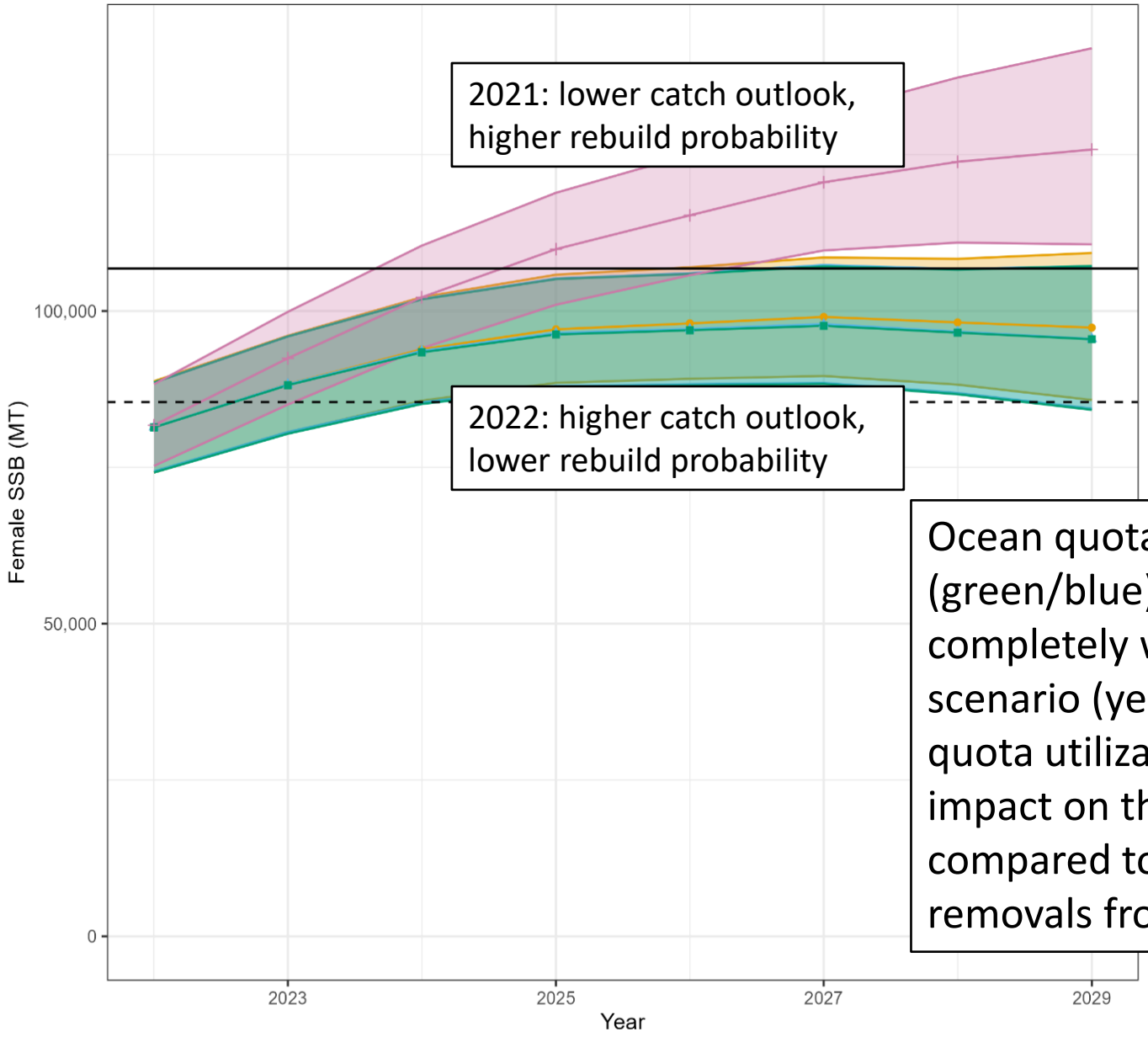

F 2019-21-22
F 2019-21-23 + full ocean quota
F 2019-21-23 + full ocean quota minus NJ
F 2021
Female SSB (MT)
100,000
50,000
0
With 2022 removals, F between target and threshold → SSB between target and threshold
With 2021 removals, F below target → SSB reaches target
Probability of being above the SSB reference point
1.00
0.75
0.50
0.25
0.00
2023 2025 2027 2029
Year
Reference Point
50% Probability
SSB Target
SSB Threshold
Probabilities
p(SSB > SSB Threshold)
p(SSB > SSB Target)

Discussion: 2022 Removals

- Angler effort/behavior is important and source of uncertainty
- As the stock recovers and strong year classes become available, effort may increase, contributing to increased harvest and live releases
- Projections assuming a constant *F* or constant catch are not necessarily representative of future years since striped bass catch and *F* vary from year-to-year.
- New projections based on 2022 removals represent a higher catch outlook; projections based on 2021 removals represent a lower catch outlook
  - If future catch and *F* are somewhere in the middle, the rebuilding probability may also fall between the low 15% based on 2022 and the high 97% based on 2021

Discussion: Quota Utilization

- **Projections indicate the impact of additional quota utilization on *F* and rebuilding probability is negligible**
- Projected *F* for ocean quota utilization scenarios 2-3 is worst-case scenario; only 2% higher than *F* for 2022 removals scenario 1
- Slightly lower (-4%) rebuilding probability; however, this results from projection assumptions more than additional quota use
  - In scenario 1, average F (2019,2021,2022) was applied
  - In scenarios 2-3, average F (2019,2021,2023) was applied, so population dynamics between 2022 and 2023 contribute to the difference
- The maximum quota utilization scenario 2 only adds 41,500 extra fish to removals (<1% total removals)
- Scale of tens of thousands of fish relative to the total removals scale of several million has negligible impacts



Ocean quota utilization scenarios (green/blue) overlap almost completely with 2022 removals scenario (yellow) → additional quota utilization has minimal impact on the projections compared to the increase in total removals from 2021 to 2022

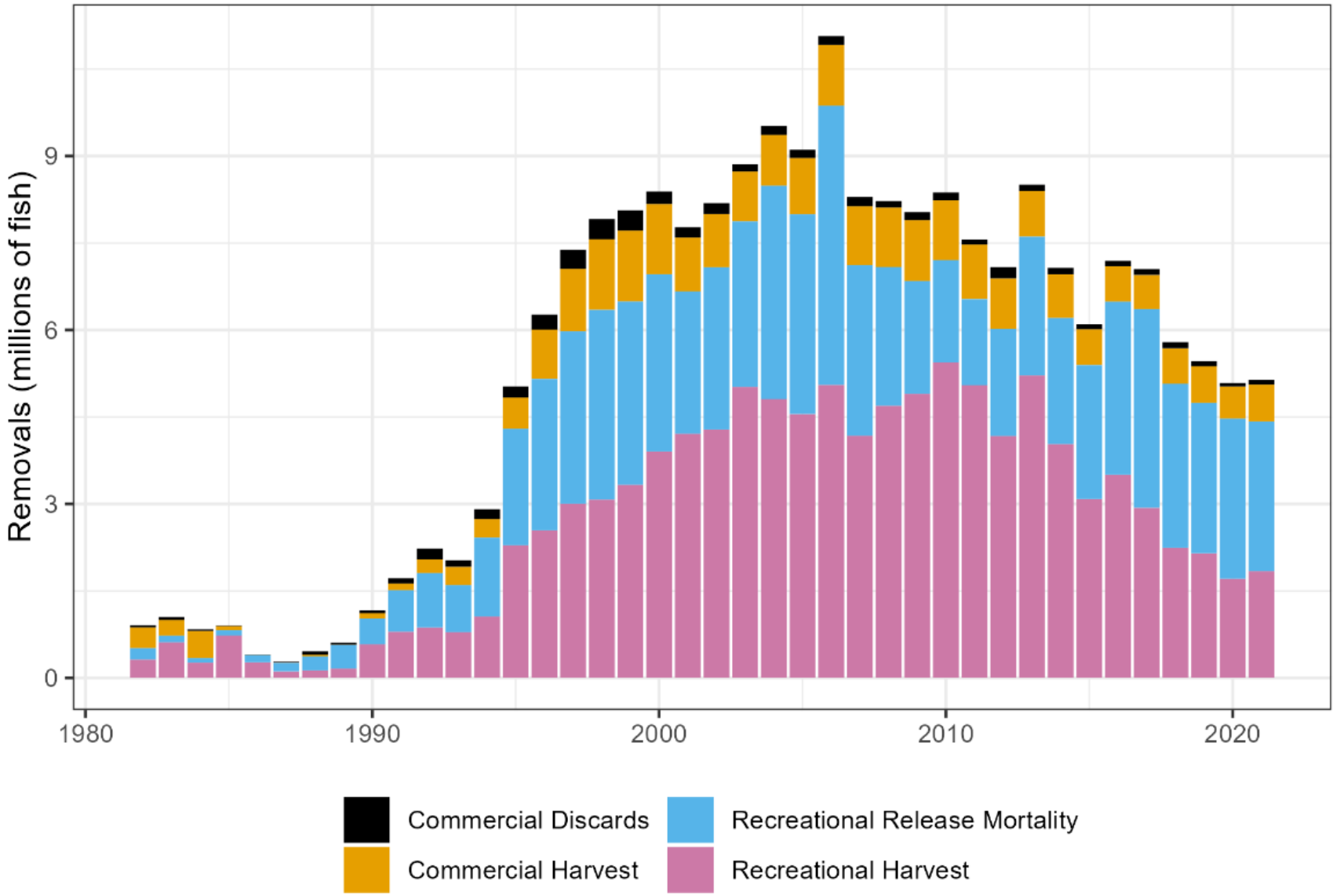
Discussion: Interim Projections

- TC-SAS discussed benefits and challenges of conducting stock projections between stock assessments
- In this case, interim projections are a timely update:
  - Significant increase in 2022 recreational catch following two low catch years, which also included COVID-19 uncertainty
  - Emergence of the strong 2015-year class in the ocean fishery likely contributed to the 2022 increase
- Interim projections are not the same as a full stock assessment update where the model would be re-run to include the catch-at-age and index data and produce *F*/SSB estimates for stock status
- Annual projections would not be particularly useful given interannual variability in removals and striped bass life history
- Potential benefits of aligning projections and assessments with management changes

Questions?

TC-SAS Extra Slides

Figure 2 from update assessment



Atlantic Striped Bass
Draft Addendum I to Amendment 7
Public Comment and AP Report

Commercial Quota Transfers in the Ocean Region

Striped Bass Management Board

May 2, 2023

Outline

- Draft Addendum I
  - Statement of the Problem
  - Timeline
  - Proposed Management Options
- Public Comment Summary
- Advisory Panel Report
- TC-SAS Report recap

Board action for consideration: Select management option and consider final approval of Addendum I.

Statement of the Problem

- Questions/concerns raised about striped bass commercial quota system
  - E.g., concern about the use of 1970s reference period as basis for quotas
- Concerns included in scoping for Draft Amendment 7, but commercial quota issue was not selected for further development
- Some support for addressing commercial quota issues separately from Amendment 7

Statement of the Problem

- In August 2021, the Board initiated this **draft addendum** to consider allowing for the voluntary transfer of commercial quota in the ocean region
- Management option that could provide some, more immediate relief for states seeking a change to their quota
- Other Commission-managed species allow for the voluntary transfer of quota between states, which can address issues like shifting stocks, quota overages, etc.

Timeline

Date	Action
August 2021	Board initiated Draft Addendum
Aug-Oct 2021	PDT developed Draft Addendum document
October 2021	Board deferred consideration until May 2022, later postponed until August 2022
August 2022	Board provided guidance to PDT for further development
November 2022	Board approved Draft Addendum I for public comment
Nov 2022-Jan 2023	Public comment period; deadline January 13
January 31, 2023	Board postponed final action until May 2023 and tasked the TC with developing projections for quota utilization scenarios
May 2, 2023	**Board considers selecting measures and final approval of Addendum I**

Proposed Management Options

Proposed Options

- Options consider allowing for the **voluntary transfer** of striped bass commercial quota in the **ocean region** between states that have ocean quota
- Options do not address Chesapeake Bay quota
- Options do not consider transfers between the Chesapeake Bay and the ocean (or vice versa)
- Commercial quota that has been reallocated to a state's recreational fishery (i.e., recreational bonus program) is not eligible to be used for quota transfers

Proposed Options

- If transfers are permitted, quota would be transferred **pound-for-pound**
- Uncertainty associated with transfers between states that catch different size striped bass
  - States catch different size striped bass due to variability in size distribution along the coast, different size limits, gears, seasons, etc.
  - Through CE, states have adjusted their commercial size limits from the historical standard, resulting in changes to their quota over time
  - A pound of striped bass quota is not equal across states
  - Some proposed options incorporate a provision to address this discrepancy

Proposed Options

Option A Status Quo. Transfers not permitted.

The following options would allow voluntary transfers of ocean commercial quota.

Proposed Options

Option A Status Quo. Transfers not permitted.

The following options would allow voluntary transfers of ocean commercial quota.

Option B. Transfers permitted (with overfished conservation tax).

Option C. Transfers permitted except no transfers if stock is overfished.

Option D. Board discretion/set criteria on transfers (with overfished conservation tax).

Option E. Board discretion/set criteria on transfers except no transfers if stock is overfished.

Least restrictive

Most restrictive

Option B

<u>Option B</u>. General transfer provision: Voluntary transfers would be permitted (with overfished conservation tax).

- No limit on how much quota can be transferred
- When the stock is overfished, a 5% conservation tax would apply to transfers to address the issue that a pound of quota is not equal across states

Example: If State A transfers 10,000 pounds to State B when the stock is overfished, State B would receive 9,500 pounds and the other 500 pounds is the conservation tax no longer available for harvest that year.

Option C

<u>Option C</u>. Limited transfers based on stock status: Voluntary transfers would be permitted, except no transfers when the stock is overfished.

- No limit on how much quota can be transferred
- When stock is overfished, no transfers permitted

Note: Given the current overfished status of the stock, this option would <u>not</u> provide near-term relief to states seeking additional quota.

Option D

<u>Option D</u>. Board discretion: Board would decide whether voluntary transfers are permitted/set criteria every 1-2 years (with overfished conservation tax).

- Board would decide by their final meeting of the year whether to allow transfers for the next 1-2 years, based on stock status and fisheries performance information
- When the stock is overfished, a 5% conservation tax would apply to transfers to address the issue that a pound of quota is not equal across states

Option D

<u>Option D</u>. Board discretion: Board would decide whether voluntary transfers are permitted/set criteria every 1-2 years (with overfished conservation tax).

- Board may choose to specify one or more <u>criteria</u>:
  - A limit on the transferable amount of quota (e.g., set poundage or percent of the quota that could be transferred in a year);
  - A seasonal limitation on transferability (e.g., no more than 50% of the transferable quota amount transferred before July 1);
  - Eligibility of a state to receive a transfer based on percentage of that state's quota landed (e.g., state may not request quota until it has landed 90% of its annual quota).

Option D

<u>Option D</u>. Board discretion: Board would decide whether voluntary transfers are permitted/set criteria every 1-2 years (with overfished conservation tax).

- If the Board selects this option and Addendum I is approved in 2023, the Board could decide whether to allow 2023 transfers
- Then the Board would start the regular process of deciding about transfers before the next year begins (e.g., make decision for 2024 by Fall 2023)

Option E

<u>Option E</u>. Limited transfers based on stock status and Board discretion: Board would decide whether voluntary transfers are permitted/set criteria every 1-2 years, except no transfers when the stock is overfished.

- Board would decide by their final meeting of the year whether to allow transfers/set criteria for the next 1-2 years, based on stock status and fisheries performance information
- When the stock is overfished, no transfers permitted

Note: Given the current overfished status of the stock, this option would <u>not</u> provide near-term relief to states seeking additional quota.

Voluntary Transfer Process

- If transfers are permitted (Options B – E), follow voluntary transfer process:
  - Require a donor state and a receiving state
  - May occur any time during the year, and up to 45 days after the calendar year ends (Board may specify any number from 0 up to 45 days)
  - States must submit a signed letter to the Commission
  - Transfer is final when states receive written confirmation letter from Commission staff
  - Transfers do not permanently impact state quota shares
  - States are still responsible for quota overages of transferred quota

Compliance Schedule

- Measures approved through this Addendum would be effective immediately on the date of approval.

- If commercial quota transfers are permitted, states must account for any additional quota potentially received via transfers when determining the number of commercial tags required for the upcoming season.

Note: If the Board selects status quo Option A, there would be no change to current management; so there would be no final Addendum I document. A note would be added to the FMP Review acknowledging the Draft Addendum I process.

Public Comment Summary

Comment Count

	Option A. No transfers	Option B. Transfers allowed, with overfished tax	Option C. Transfers allowed, except no transfers when overfished	Option D. Board discretion transfers, with overfished tax	Option E. Board discretion transfers, except no transfers when overfished
Written Total	1,950	9	0	0	2
Hearing Total	155	16	4	3	8

- Vast majority favored status quo Option A
- Of those who favored the alternatives, Option B had the most support

Option A Support

Option A Support (status quo no transfers)

- Concern about expanding harvest and increasing mortality when the stock is rebuilding, overfished, and experiencing low recruitment
- Focus should be rebuilding the stock, not maximizing harvest
- Concern transfers would jeopardize stock rebuilding
- Board has rejected quota transfers in the past
- Allowing transfers conflicts with stakeholder input supporting conservation during Am7
- If states are not harvesting full quota, stock is not doing well and extra quota should not be transferred/harvested elsewhere

Options B – E Support

Option B Support (transfers permitted with overfished tax)

- Commenters noted they are commercial fishermen
- Transfers allow for efficient use of quota
- Small impact of commercial fishery overall
- Commercial fishery has accountability in place with payback for any overages
- Transfers would help avoid regulatory discards after states fill quota
- Benefits of transfers for other species

Options B – E Support

Option D Support (Board discretion with overfished tax)

- Some Board discretion would be beneficial
- Caution against too much oversight and setting overly restrictive transfer criteria

Option E Support (Board discretion except no transfers when overfished)

- Provide maximum oversight by the Board and support caution when rebuilding
- Still benefit states seeking transfers after filling quota early

Advisory Panel Report

AP: Option A Support

14 AP members support Option A (status quo no transfers)

- Transfers not appropriate while the stock is overfished and rebuilding; not allow increase in either sector's harvest while overfished.
- Public comments overwhelmingly support Option A.
- Transfers would not benefit the stock, especially when overfished.
- Concern for potential behind-the-scenes, non-transparent 'horse-trading'.
- Need buffer of not harvesting the NC quota while stock is overfished.
- If quota is transferred north, large breeding females would be harvested; concern about moving quota from harvesting smaller fish to harvesting larger fish (lose more spawning potential).
- Moving quota disrupts rebuilding analysis and assumed size of catch.
- Chesapeake Bay recruitment failure calls for caution and conservation.

AP: Option B Support

4 AP members support Option B (transfers permitted with overfished tax)

- Science would not set total quotas that would jeopardize the stock.
- Commercial fishery already is already constrained and closely monitored with payback and accountability provisions in place.
- Striped bass fishery is primarily recreational, and the commercial fishery is only 10% of total removals with low, relatively stable landings; allowing transfers would not have a significant, if any, impact on stock status with the commercial fishery at such low levels.

AP: Additional Recommendations

Recommendations for the quota transfer process:

- If transfers are permitted:
  - 3 AP members recommend eliminating the 45-day provision allowing transfers up to 45 days after the calendar year ends; could lead to states being less careful about exceeding their quota.
  - 3 AP members recommend transfers be permitted only for states that allow commercial fishing; states that prohibit commercial fishing (ME,NH,CT,NJ) should not be able to transfer their quota.

- 1 AP member recommends revising the quota utilization calculation to exclude states that don't have commercial fisheries. Calculating the percent utilization incorporating those states (e.g., Maine landed 0% of their quota) seems wrong since those states have chosen not to allow commercial fishing.

AP: Additional Recommendations

If the Board does not allow transfers at this time, AP is split on <u>whether to consider transfers again in the future:</u>

- Some AP members support revisiting transfers after the stock is rebuilt, as that would be more appropriate timing.

- Some AP members don't support revisiting the transfer issue in the future (i.e., transfers should not be allowed in any case) because transfers are not an appropriate tool for the striped bass fishery.

- Some AP members noted uncertainty about whether transfers should be considered in the future.
  - When the stock is rebuilt, transfers could be a tool to respond to climate change and shifting stocks, but only if controlled and regulated properly.

AP: Additional Recommendations

Recommendations on <u>commercial quota system generally</u>:

- 3 AP members recommend the Board re-examine the overall commercial quota system since it is based on outdated data from the 1970s; science has advanced since that time.

- 1 AP member recommends the Board take a broader perspective and re-examine the contribution/value of each sector (commercial and recreational) to the striped bass fishery overall.

TC-SAS Report recap

January 2023 Board Motion

Move to postpone action on Addendum I and task the TC with running two population projections:

- One which assumes harvest of the entire ocean commercial quota from all states
- One which assumes harvest of the ocean commercial quota from all states except New Jersey (since their quota is reallocated out of the commercial fishery)

The TC may use their expert judgement on other needed assumptions for the projections (i.e. selectivity) to produce the most realistic output for consideration by the Board.

- *Board requested projections for May 2023 meeting, and requested inclusion of 2022 preliminary removals data*
- *TC-SAS Report earlier during this May 2023 meeting*

TC-SAS Discussion: Quota Utilization

- **Projections indicate the impact of additional quota utilization on *F* and rebuilding probability is negligible**
- Projected *F* for ocean quota utilization scenarios 2-3 is worst-case scenario; only 2% higher than *F* for 2022 removals scenario 1
- Slightly lower (-4%) rebuilding probability; however, this results from projection assumptions more than additional quota use
  - In scenario 1, average F (2019,2021,2022) was applied
  - In scenarios 2-3, average F (2019,2021,2023) was applied, so population dynamics between 2022 and 2023 contribute to the difference
- The maximum quota utilization scenario 2 only adds 41,500 extra fish to removals (<1% total removals)
- Scale of tens of thousands of fish relative to the total removals scale of several million has negligible impacts

Questions?

Board action for consideration: Select management option and consider final approval of Addendum I.