

Evaluation of Rotational Management

New England Fishery Management Council

Review of DRAFT Report

December 9, 2021

Evaluation Contributors

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Evaluation Timeline – 2021 Council Priority

- Effort initiated with PDT sub-group in July
- October and December updates to Advisory Panel and Committee
- TODAY – review DRAFT report
- Final report submitted to Council January 19, 2022

Month	Outline, Work Plan, Data	PDT Meetings	AP/Cmt Meetings	Council Meeting	Report Writing	Draft Report	Final Report
Jul-21	X	X					
Aug-21	X	X					
Sep-21	X	X					
Oct-21		X	X		X		
Nov-21		X			X	X	
Dec-21			X	X	X		
Jan-22		X			X		X

Evaluation Goals and Objectives

- **Goals**

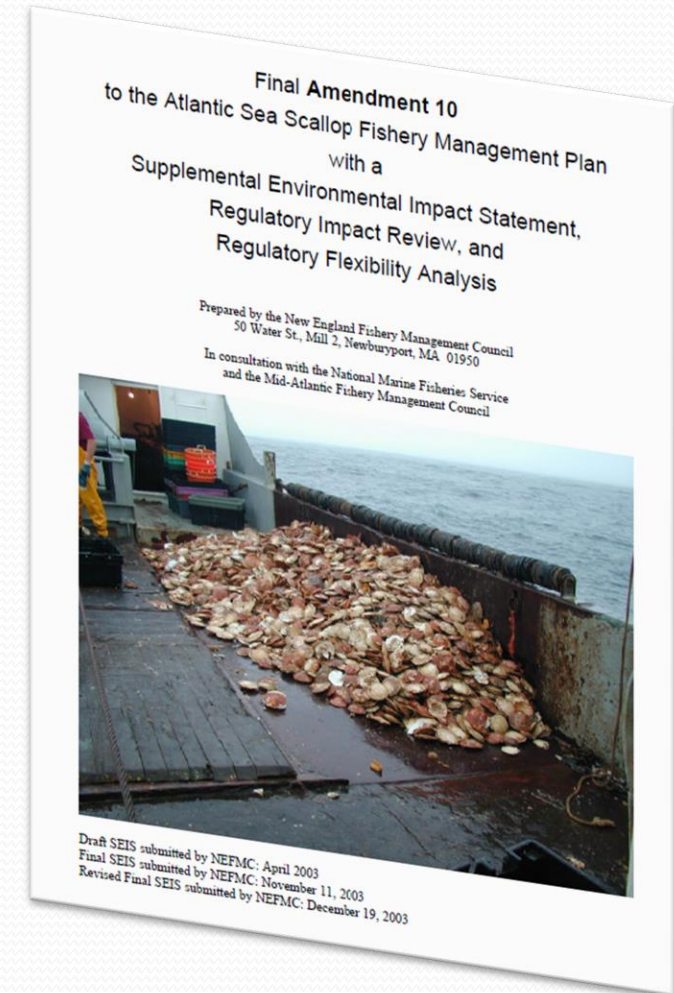
1. Evaluate how original objectives (A10) of the rotational program have been met;
2. Evaluate how current rotational management meets expected outcomes

- **Objectives**

1. Document the use of rotational management, specifically 2015-2021;
2. Assess performance relative to A10 objectives;
3. Describe current rotational program compared to original approach and describe outcomes and rationale for alternative approaches;
4. Document two-year specifications and evaluate outcomes and trade-offs;
5. Identify possible changes or areas for improvement of the rotational program

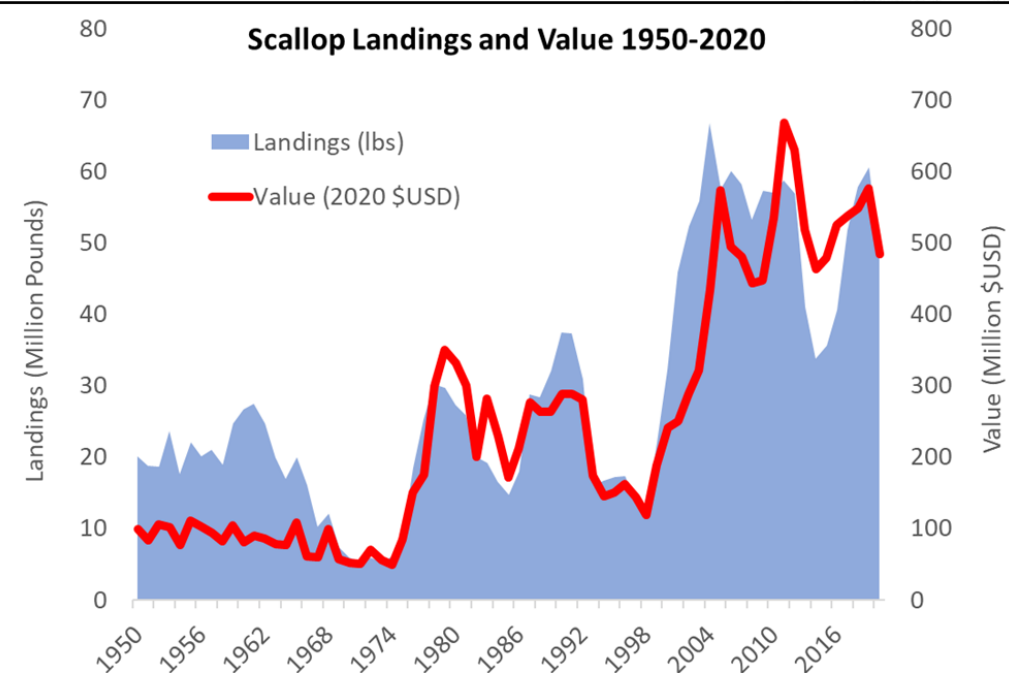
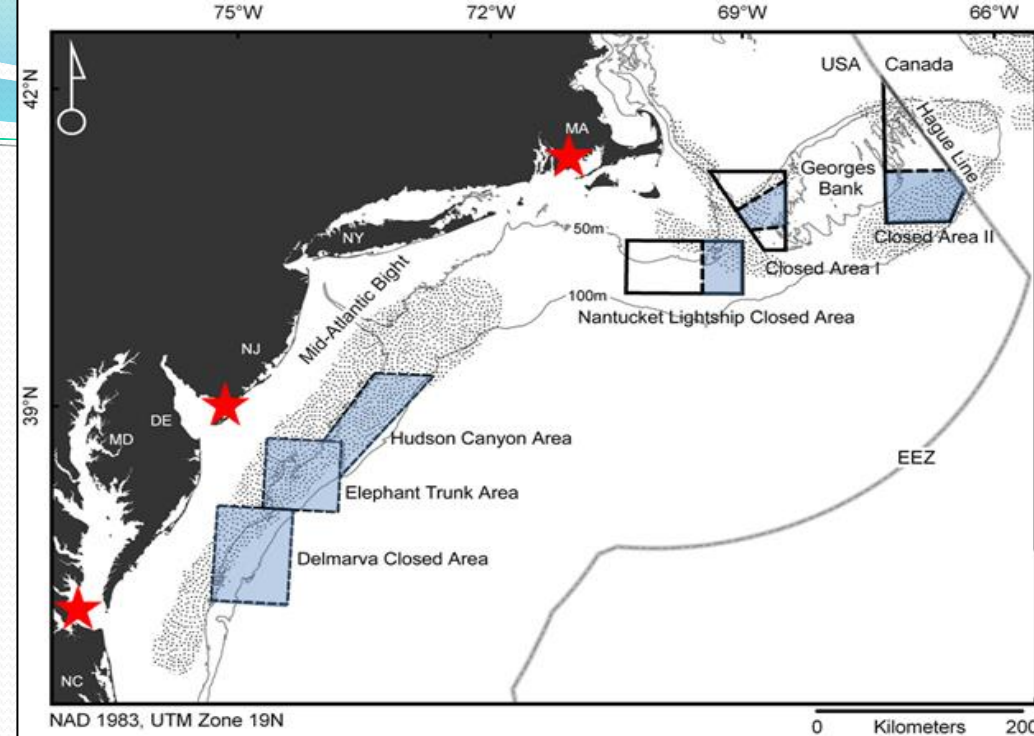
Obj. I – Document Rotational Management

- Document the use of rotational management, specifically 2015-2021
 - Brief history of Scallop FMP, rationale to develop A10
 - Define and describe Rotational Management
 - Management measures and results 2004-current
 - Focus on 2015-2021
 - Changes following A15 (OFL/ABC/ACL)
 - Changes following Mid-Atlantic access area configuration
 - Changes following OHA2 (Georges Bank access areas)



Scallop Management

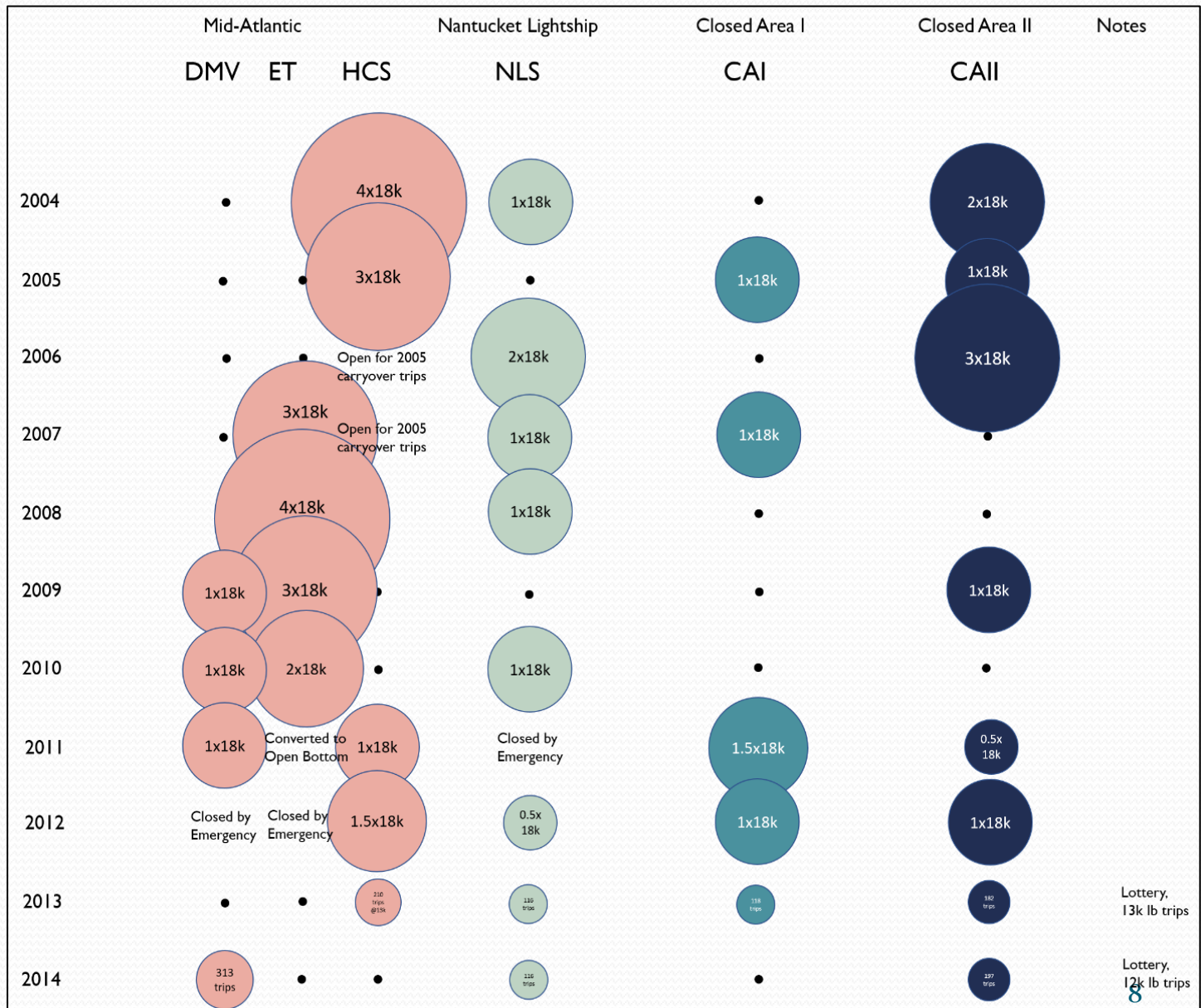
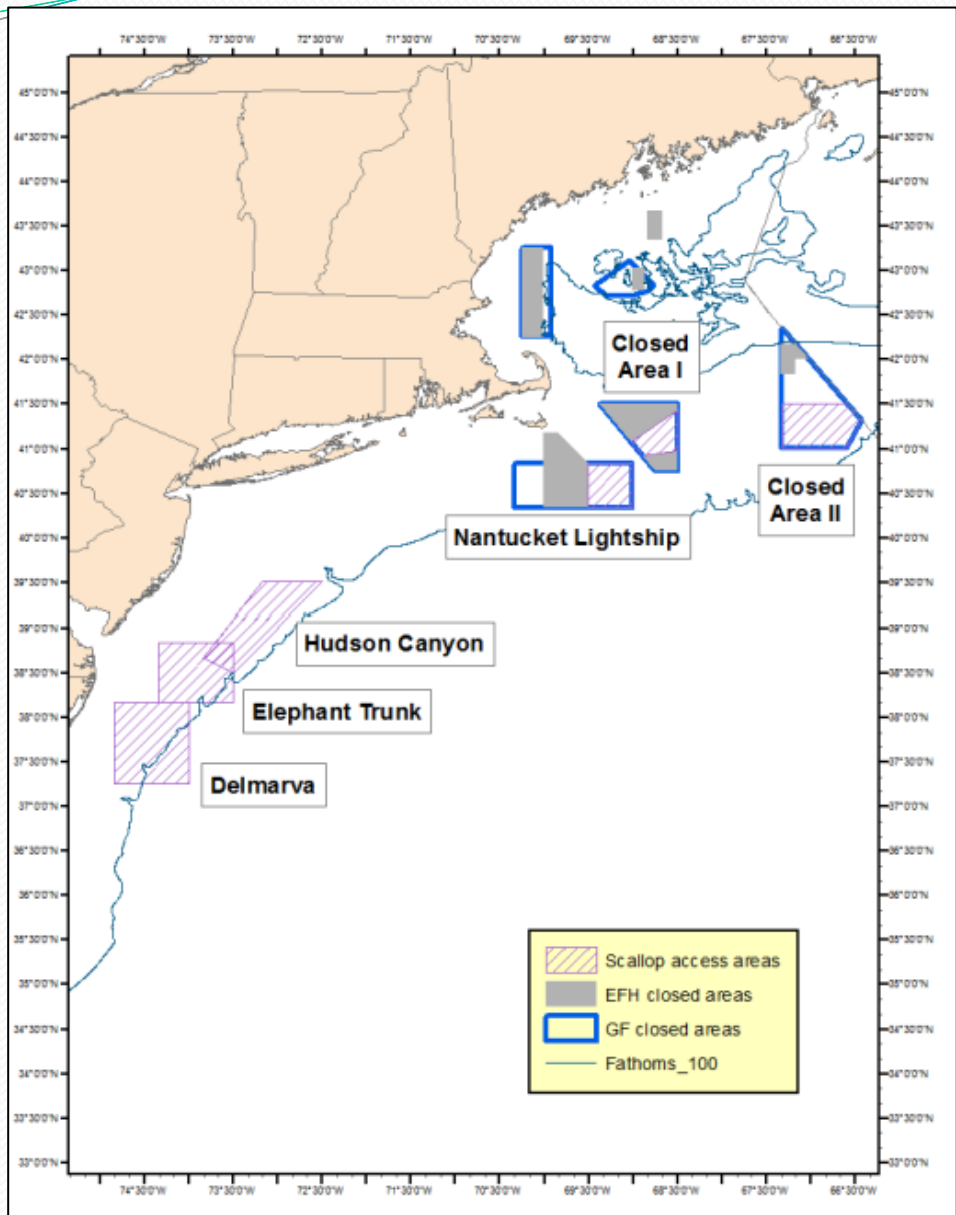
- Scallop FMP - 1982
 - Meat counts – fishing practice control
- Amendment 4 - 1993
 - Limited Access permit
 - Days-At-Sea – effort controls
- Georges Bank Groundfish Closures – 1994
 - Increased scallop effort in limited space
 - 1996 – overfished and overfishing
- First cooperative scallop survey - 1998
 - Increased scallop biomass in Closed Area II
 - Limited fishery in closed areas
 - Increased landings and revenue
 - Impetus for scallop closures in Mid-Atlantic
- Initial “rotational management” – 1998 -2003



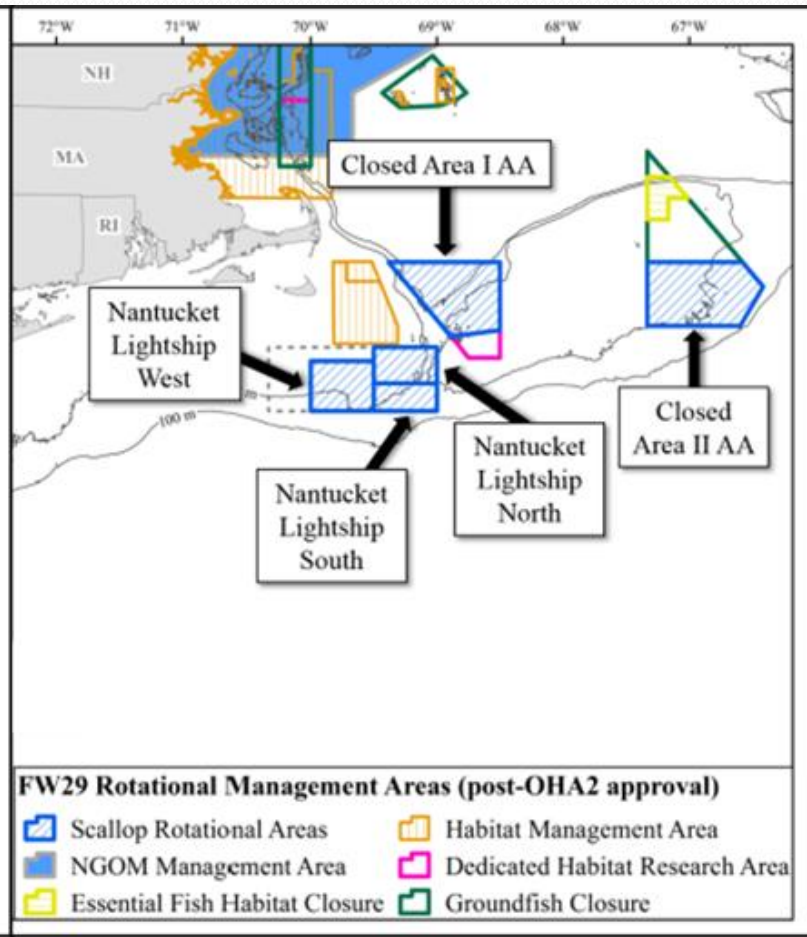
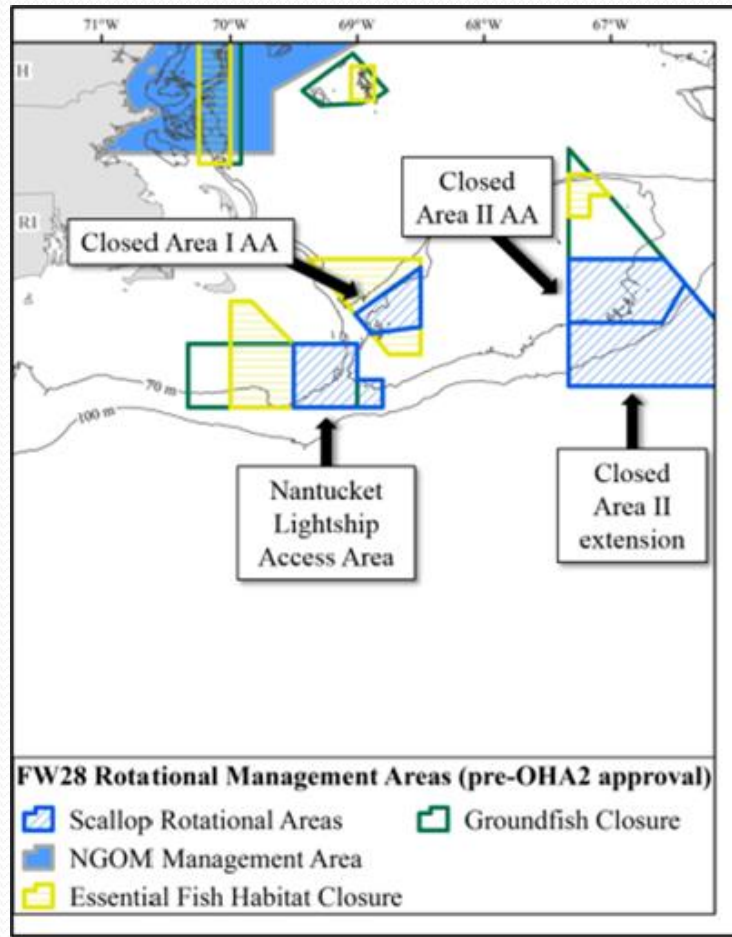
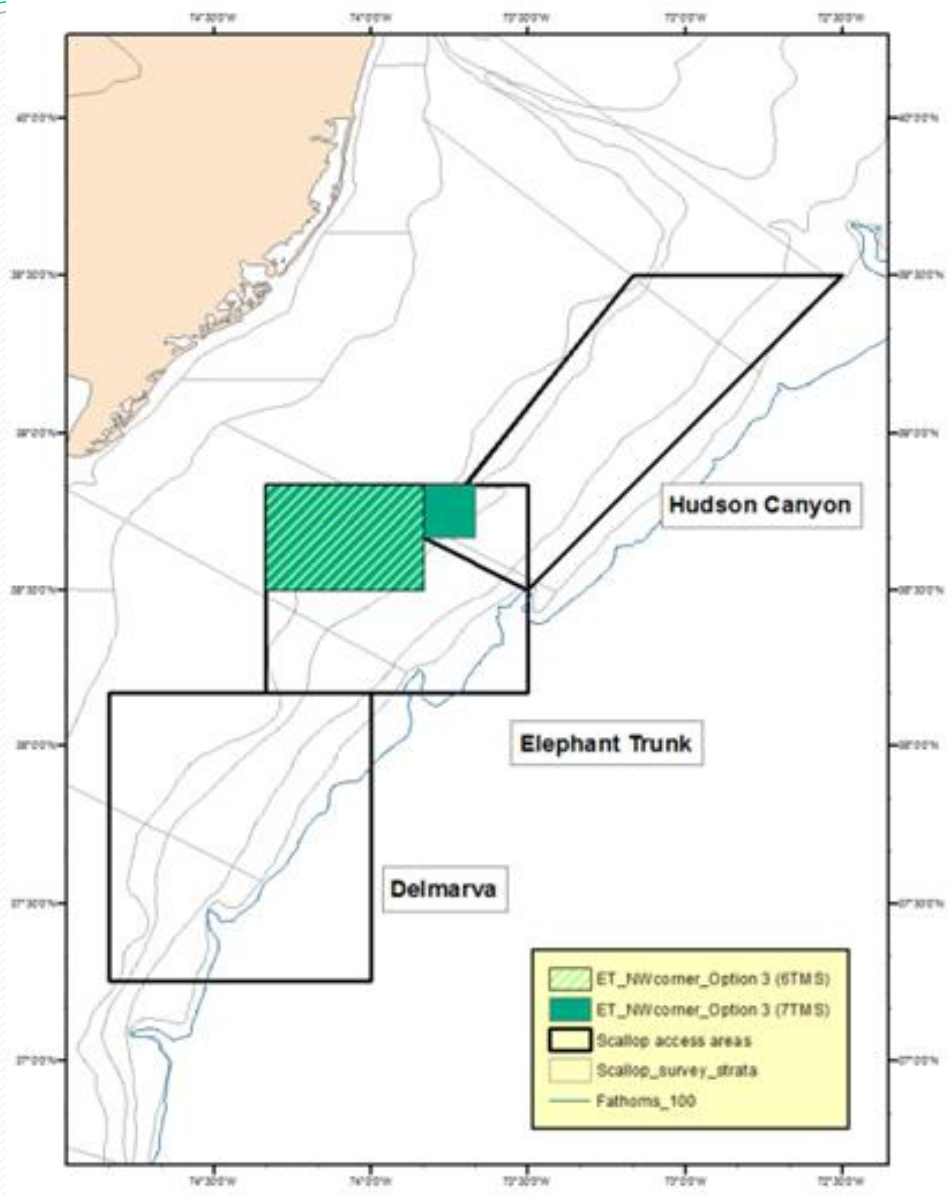
Defining Rotational Management – A10

- A10 (2004) introduced a formal adaptive rotation area management strategy
 - Use spatial management of scallops to improve yield and minimize impacts on bycatch and habitat
- Four types of areas
 - **“open areas”** using Days At Sea (DAS)
 - **“access areas”** open to fishing based on biomass and size structure
 - **“closed areas”** closed temporarily to allow growth and protect small scallops
 - Permanently closed areas (HAPC, EFH closures)
- Fully adaptive rotational approach that provides flexibility to define future rotational areas with no pre-defined conditions for closures and re-openings

2004-2014 Rotational Measures



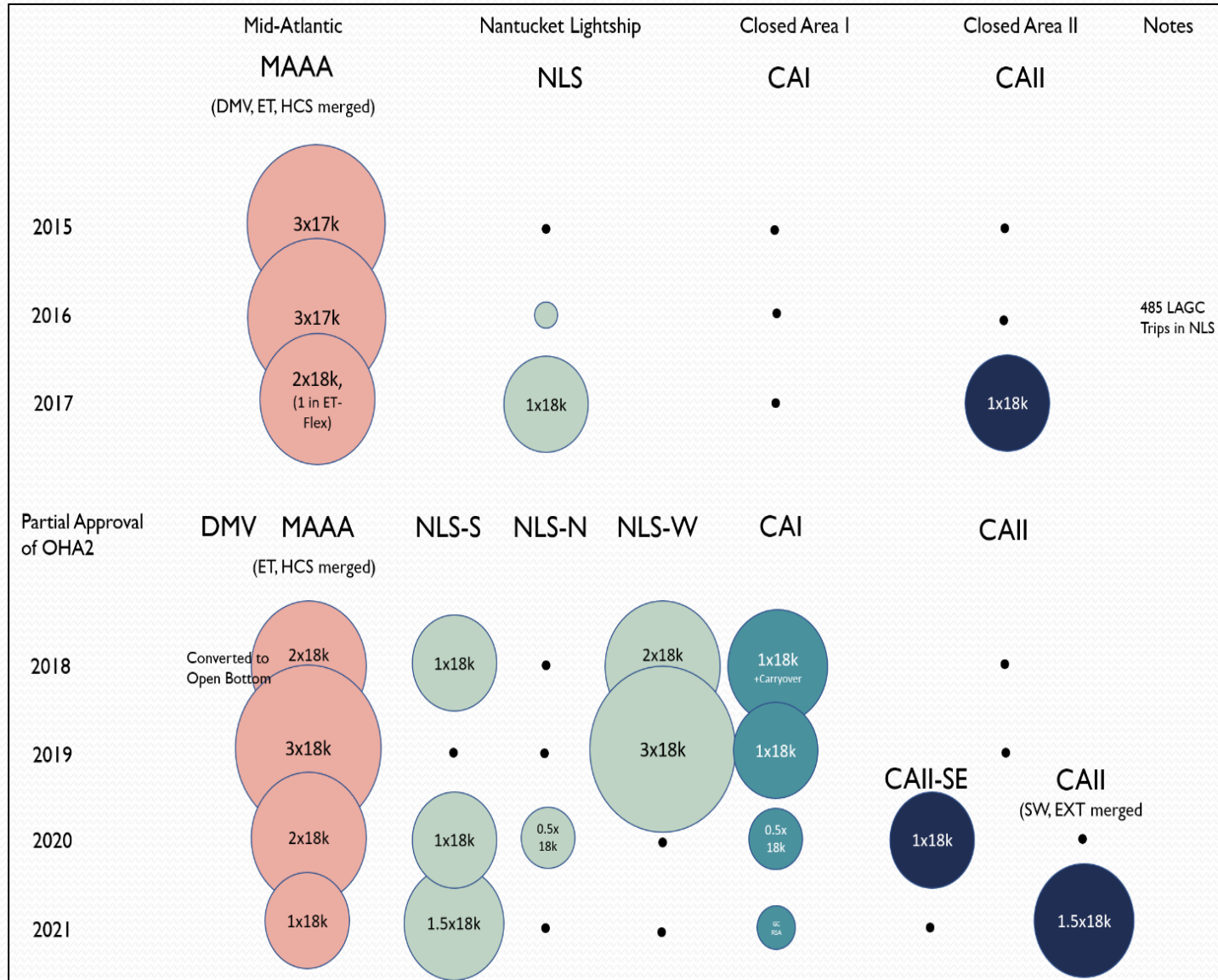
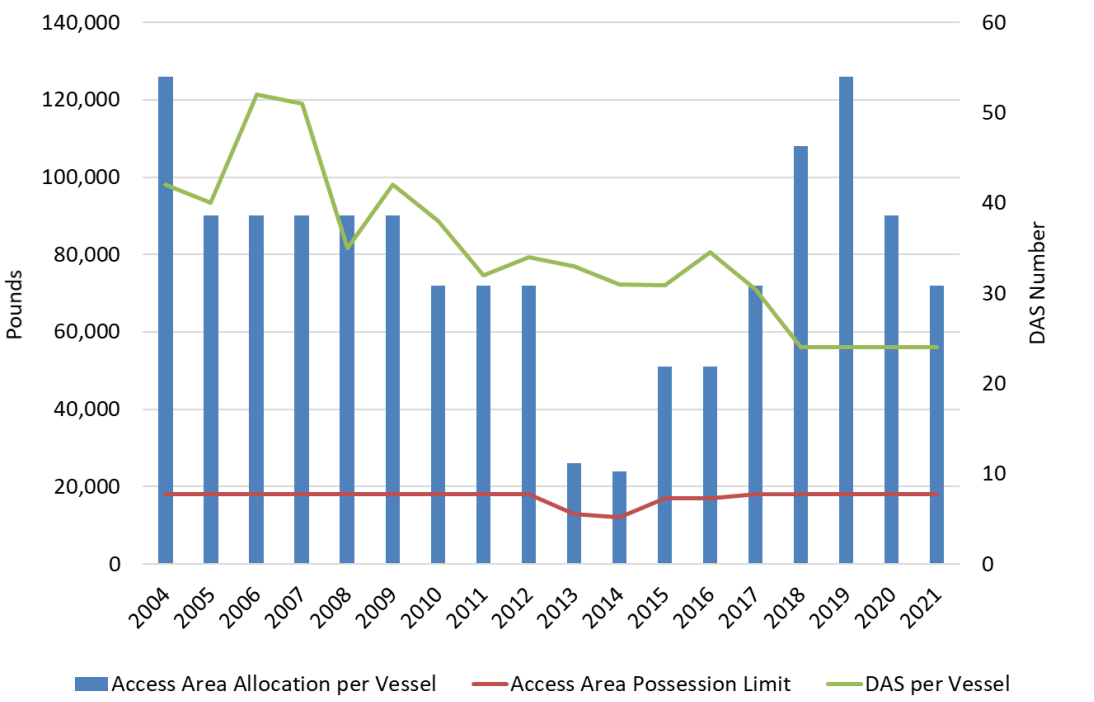
2015-2021 Rotational Measures



2015-2021 Allocations

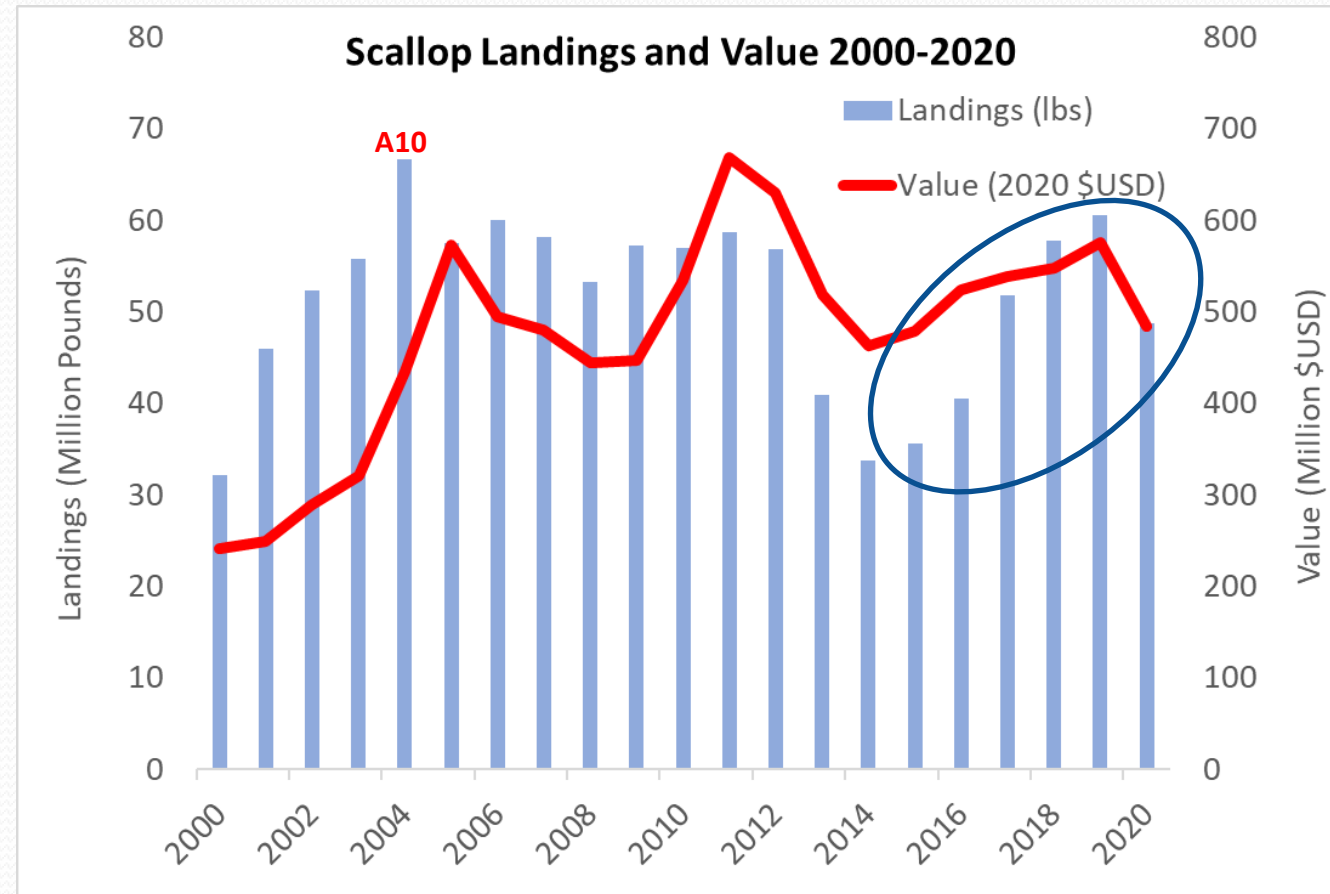
- Change in area configurations
 - MAAA – allowed additional harvest with widespread effort
 - GB – allowed harvest in previously closed areas

Allocations per FT-LA Vessel 2004-2021



2015-2021 Landings and Value

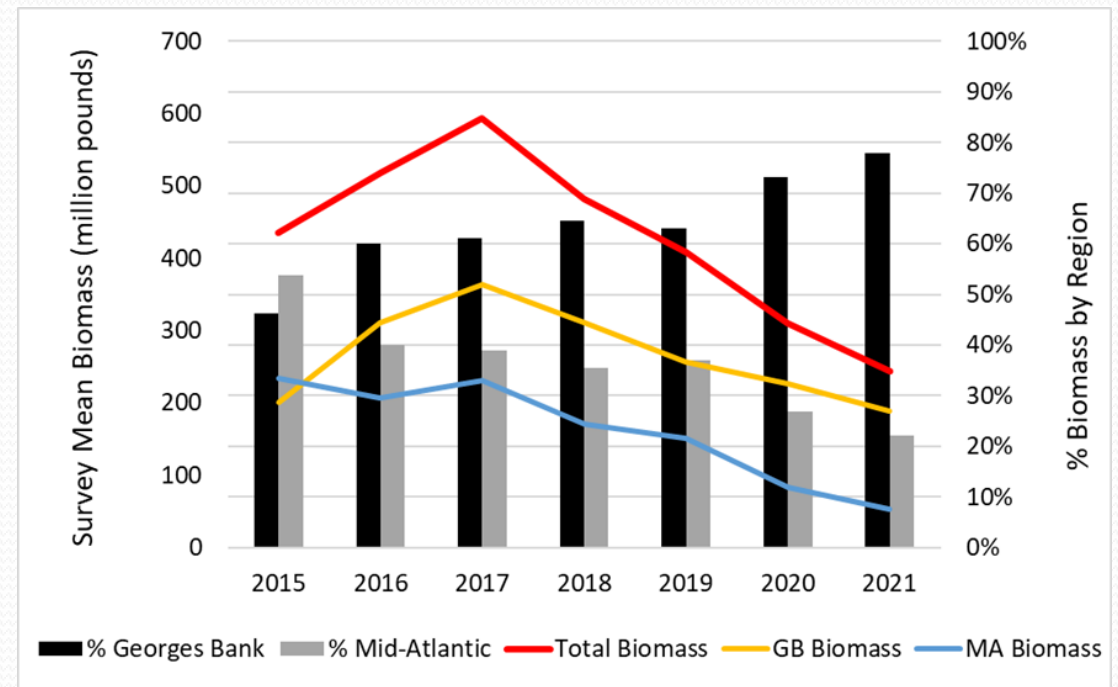
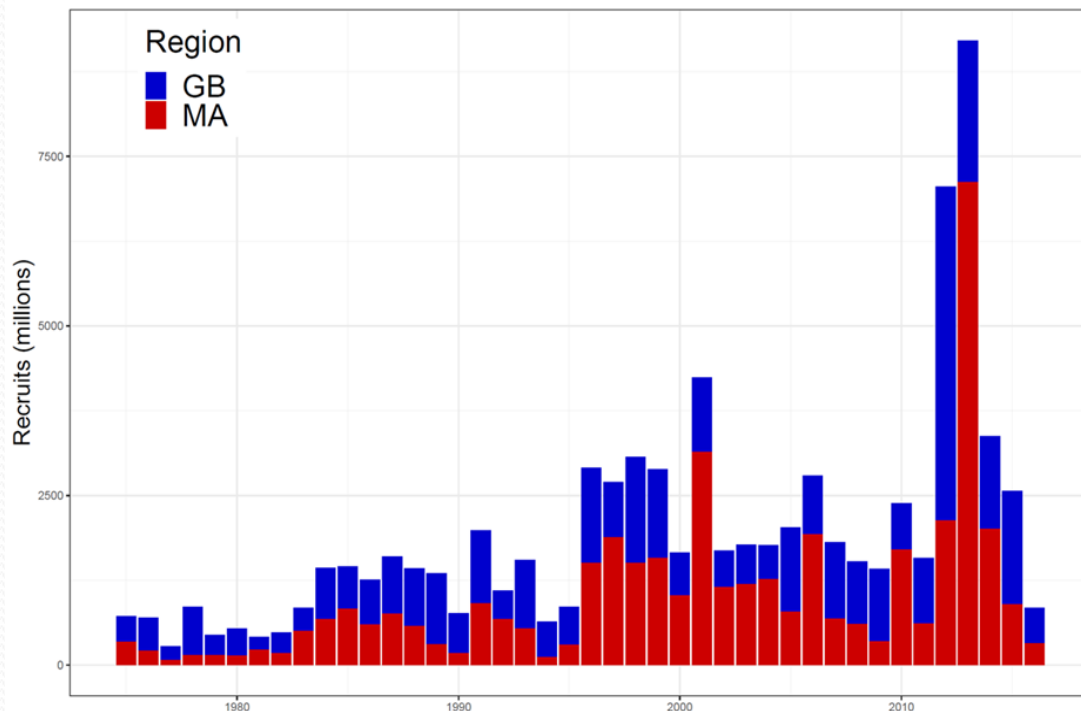
- Average landings
 - ~50 million pounds
- Average value
 - ~\$525 million
- Average price per pound
 - ~\$11.00/lb
- Average trip cost per day (FT-LA)
 - ~\$1,800/day



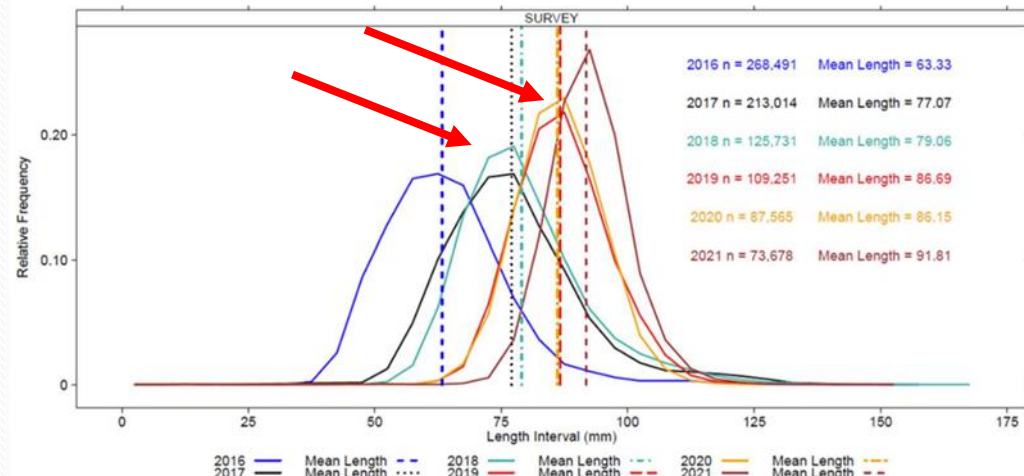
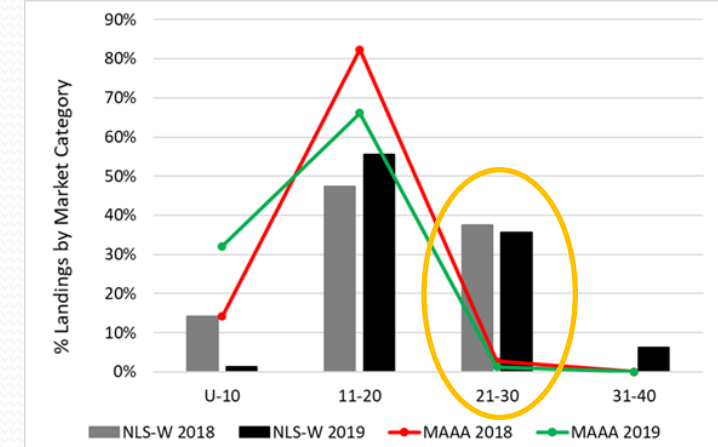
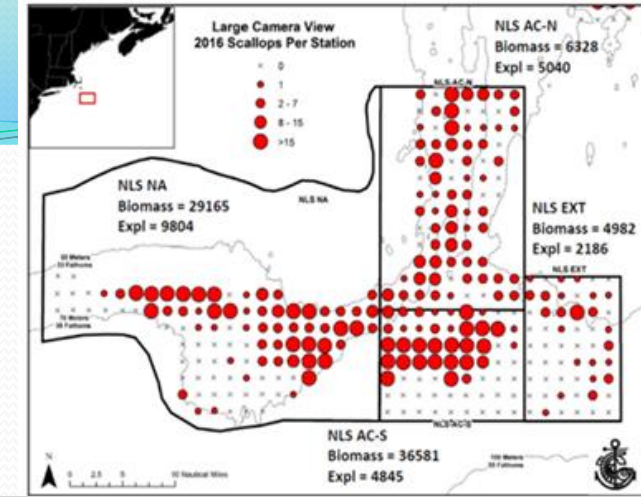
Year	Landings (lbs)	Value (2020 \$USD)	Average Price/Lb	Trip Cost per Day (FT-LA)
2015	35,545,382	\$478,495,131	\$13.46	\$1,889
2016	40,537,301	\$524,387,354	\$12.94	\$1,669
2017	51,737,962	\$538,080,071	\$10.40	\$1,774
2018	57,811,101	\$547,744,143	\$9.47	\$2,019
2019	60,520,858	\$575,596,700	\$9.51	\$1,925
2020	48,704,540	\$484,040,669	\$9.94	\$1,756 ¹¹

2015-2021 Recruitment and Biomass

- Very large year classes – 2012 and 2013 on Georges Bank and Mid-Atlantic
 - New opportunities and challenges
 - Increased allocations with high level of landings at high prices
 - High density aggregations, anomalous growth, increased mortality
- Average/below average recruitment in recent years
 - Biomass decline as large scallops are fished and no incoming year classes



Nantucket Lightship

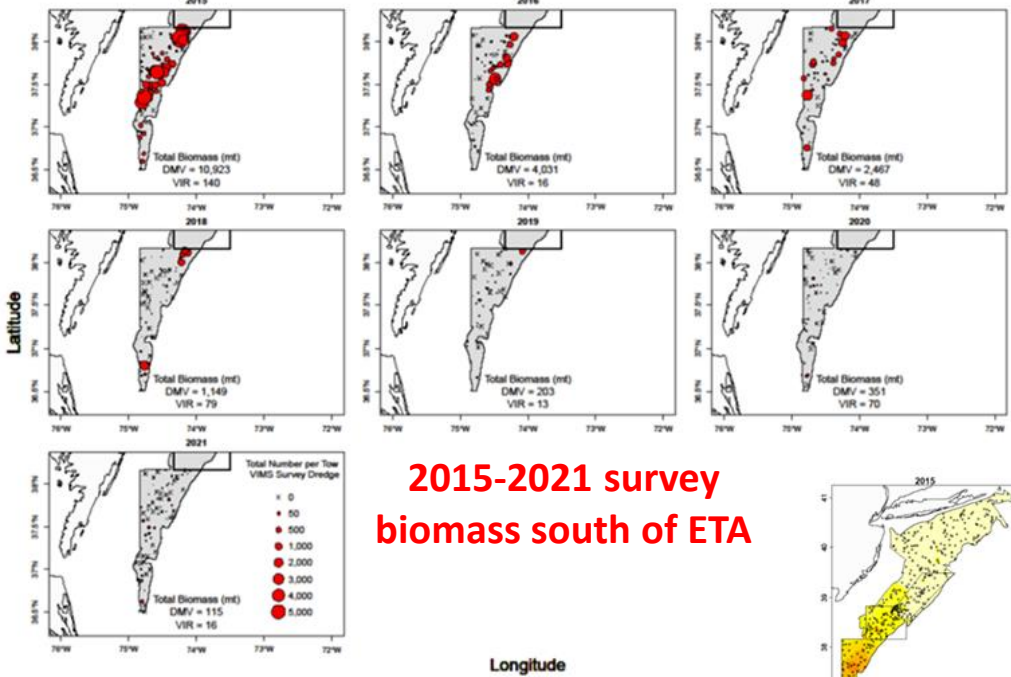


- Large recruitment observed in West and South areas
 - Cohort tracking observed slow growth (“Peter Pans”)
 - West region – ([PDT report to SSC in 2020, p.34](#))
 - Opened in 2018 – 2 trips (18,000lbs)
 - Smaller market category landings than other areas
 - Large decrease in biomass between 2018 and 2019
 - 2018 survey Biomass = ~106 million pounds
 - 2019 survey Biomass = ~26 million pounds
 - South region
 - Multiple years with no growth
 - Opened in 2019 – 1 trip (18,000 pounds)
 - Small market category landings (~70% 31-40 count)
 - 2021 – scallops are 10 years old
 - Average shell height = ~92mm (smaller than 4” ring)

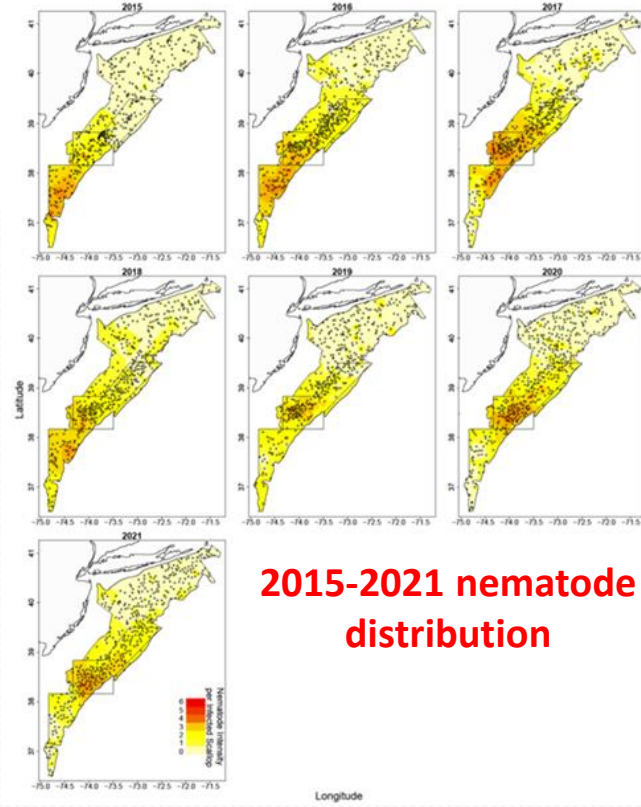
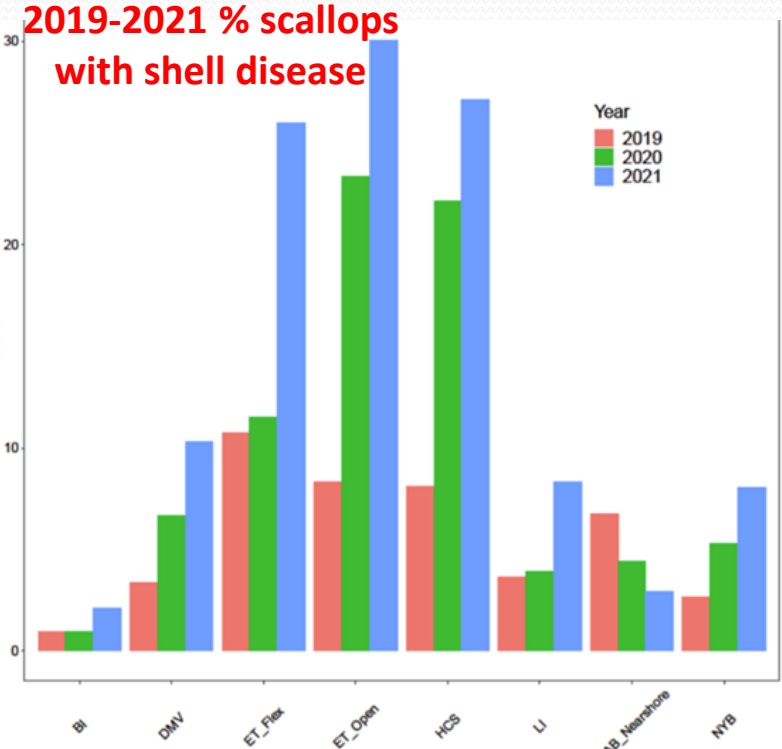
Mid-Atlantic

- Large recruitment – highest in time series
 - Access area open every year 2015-2021
 - Over 75 million pounds allocated since 2016

- Ecological changes
 - Truncation of southern distribution
 - Continuous decline south of ETA
 - Nematodes
 - Impacts to meat quality and fishing behavior
 - Shell blister disease
 - Impacts to meat yield

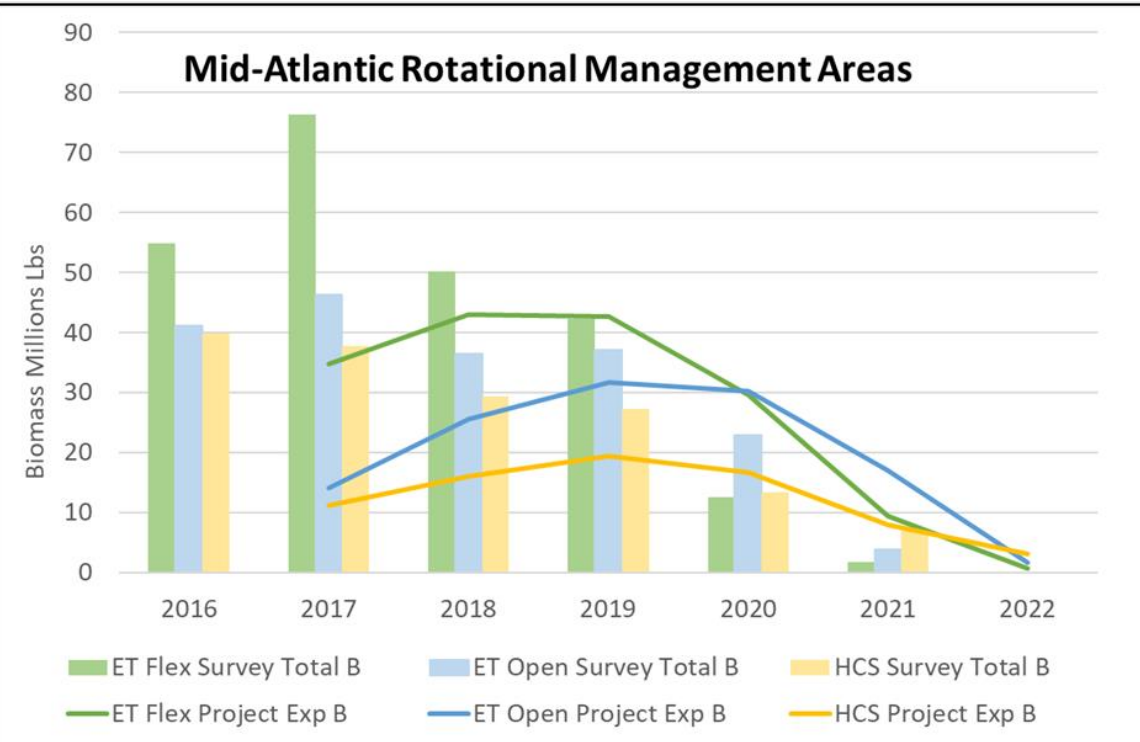
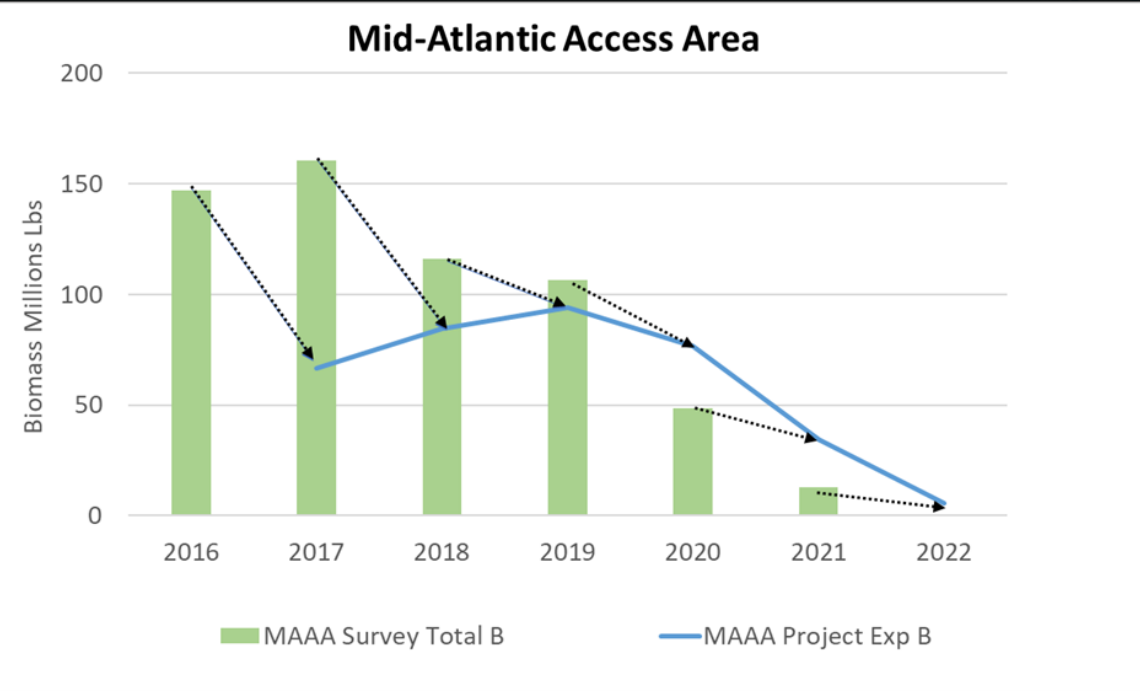


2015-2021 survey biomass south of ETA



Projections

- SAMS Model
 - Annual management is based on projections of exploitable biomass and fishing effort by area using observations from the annual surveys and fishery
- Recent challenges
 - Slow growth, increased mortality, changes in fishing behavior in high density areas
- Projection uncertainty has increased
 - MAAA example
 - Projected recruitment has not been observed
 - Increased mortality rates not projected
 - Rapid biomass decline not projected



Developing Rotational Measures

- Increasing complexity of management measures over time
 - Additional surveys: trade-off between more data and time to collect/process
 - Increased resource complexity: growth, mortality, fishing behavior
 - Additional alternatives: trade-off between time spent and return on outcomes
 - FW33: 9 alternatives, difference in Annual Projected Landings ~3%

FY-FW	Survey Data Year	Number of Surveys	Total Council Mtgs	# of Alternatives	*Total Months Development	Implementation Date
FY14 - FW25	2013	5	19	6	15	June 16, 2015
FY15 - FW26	2014	5	22	6	10	April 21, 2015
FY16 - FW27	2015	7	25	7	12	May 4, 2016
FY17 - FW28	2016	5	30	9	13	March 27, 2017
FY18 - FW29	2017	8	28	10	12	March 26, 2018**
FY19 - FW30	2018	10	28	5	13	March 27, 2019
FY20 - FW32	2019	9	25	5	10	March 31, 2020
FY21 - FW33	2020	9	30	9	11	May 5, 2021***

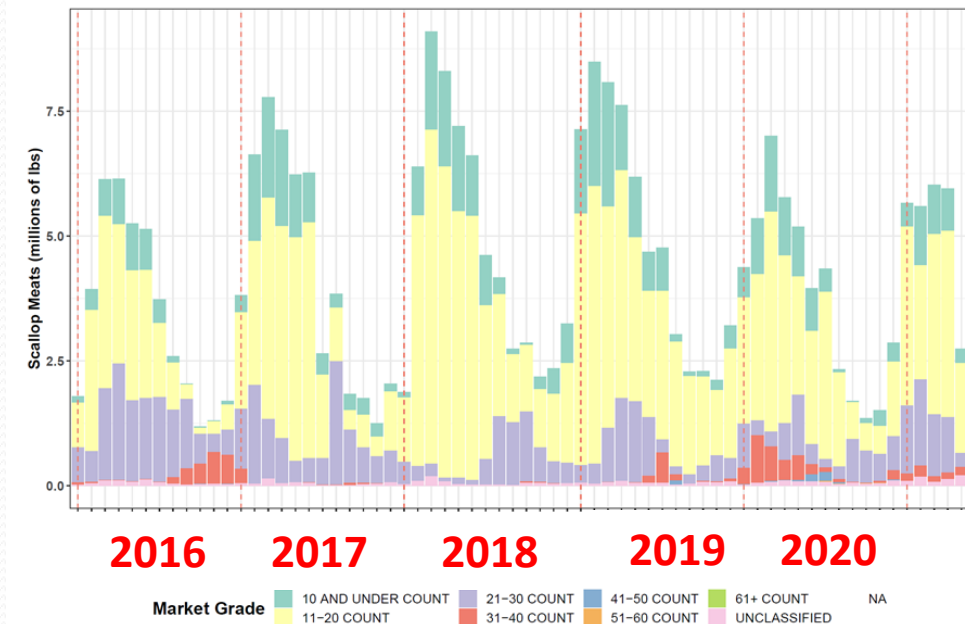
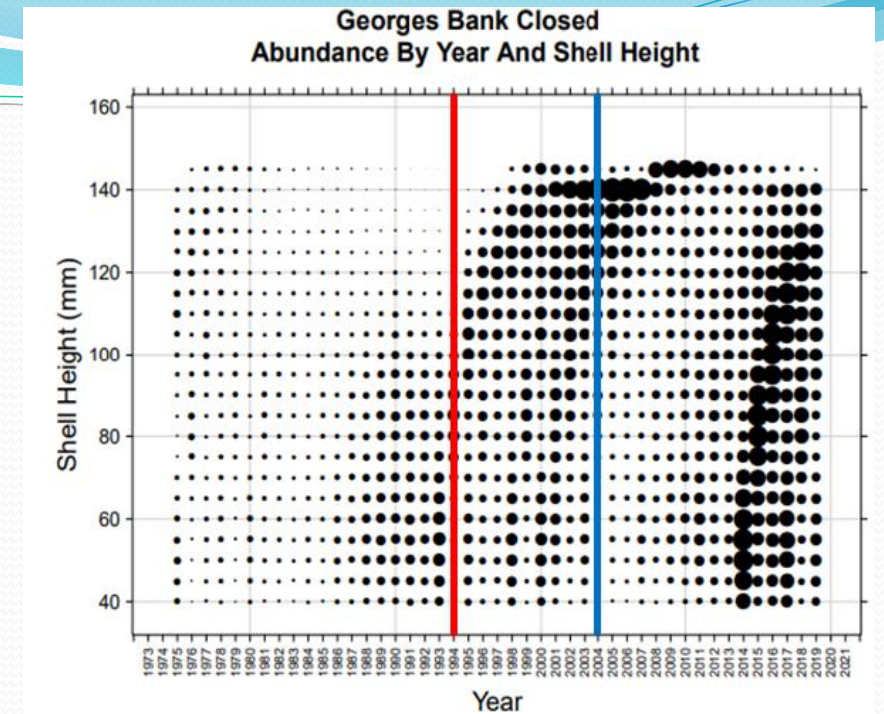
Obj. 2 – Assess Performance

- Assess performance relative to A10 objectives
- Primary Objectives
 - Improve yield and rebuilding potential by reducing mortality on small scallops
 - Reduce reliance on DAS allocations to control fishing mortality
 - Reduce and/or minimize bycatch mortality and habitat impacts
 - Continue controlled access to groundfish closed areas
- Secondary Objectives
 - Maximize industry flexibility to adjust to resource variation
 - Minimize regulatory complexity and costs
 - Minimize adverse impacts on communities, ensuring fair and equitable access to the resource



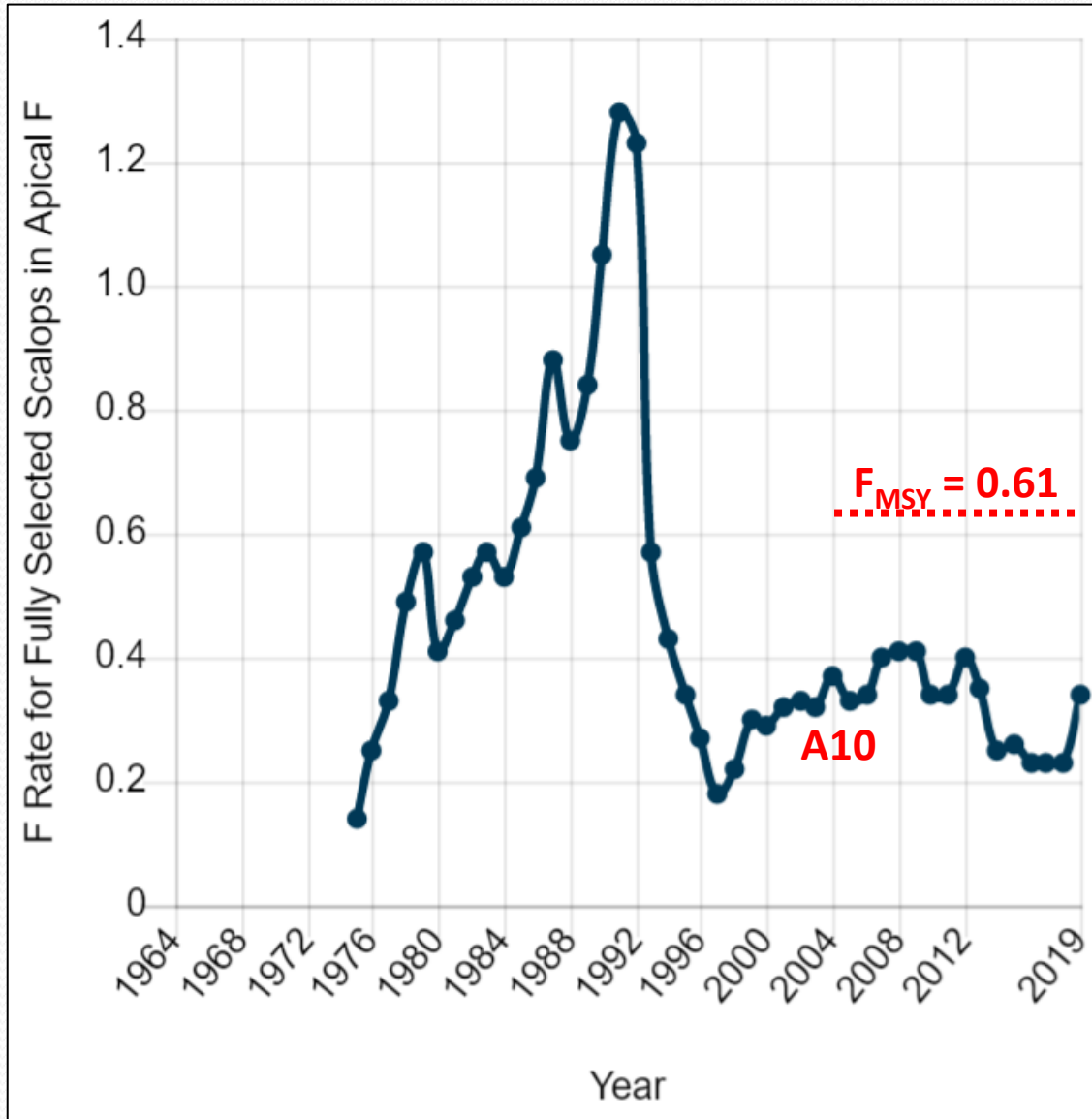
A10 Obj. 1 – Improve Yield

- Allow scallops to reach optimum size to maximize yield and reduce mortality on small scallops
- Increase in abundance at larger shell heights
 - Most notable in Georges Bank closed areas
 - Substantial increase following 1994 closures, continued after implementation of A10
- Increase in abundance across all shell heights
 - Reduced mortality for small scallops has increased over stock biomass
- Increase in abundance at smaller shell heights
 - Increase in recruitment after implementation of A10 with highest observations in the time series 2012-2013
- High proportion of large market category landings
 - U-10 and 11-21 count scallops

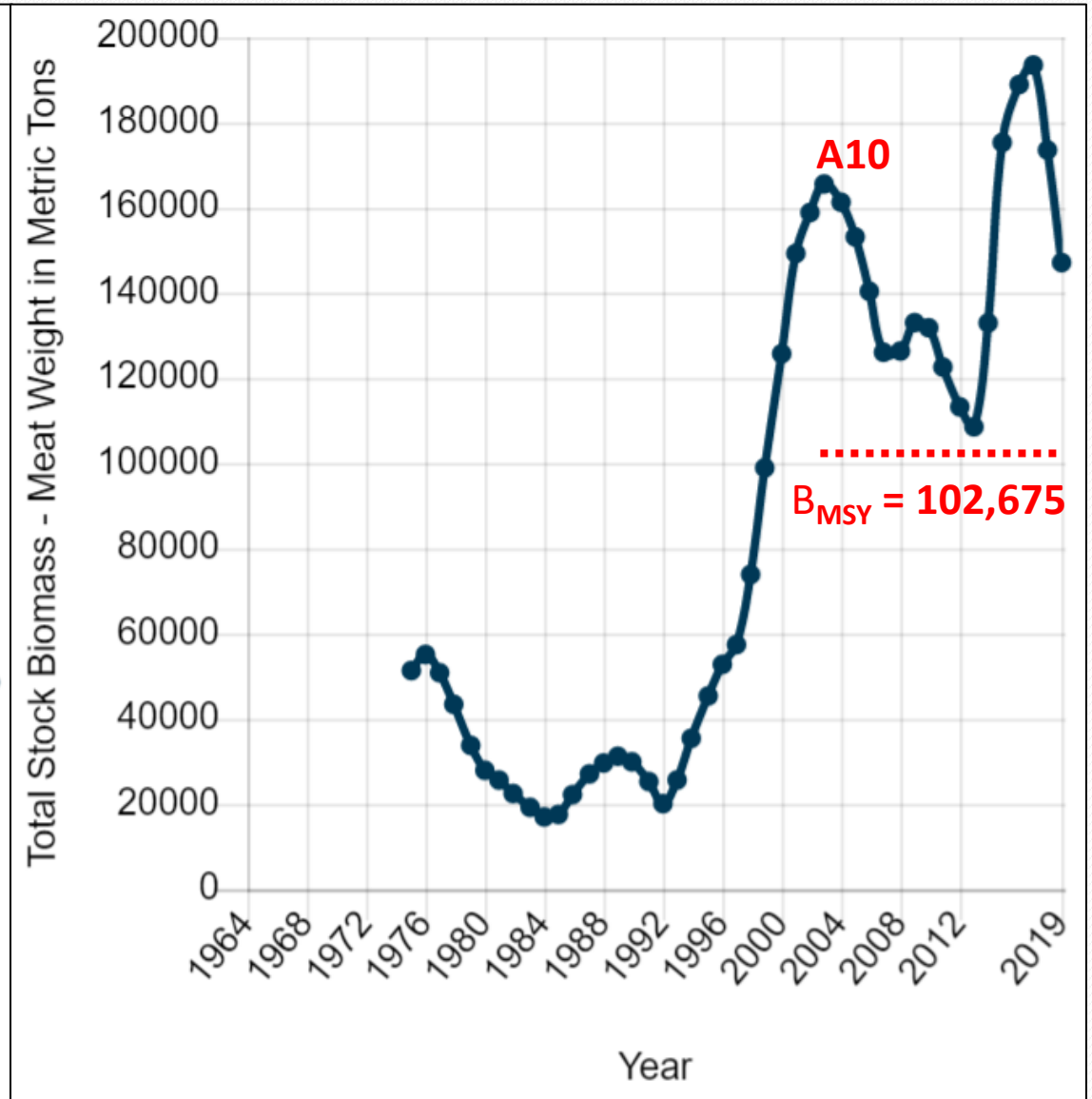


A10 Obj. 1 - Scallop Stock Status

Fishing Mortality (2020)

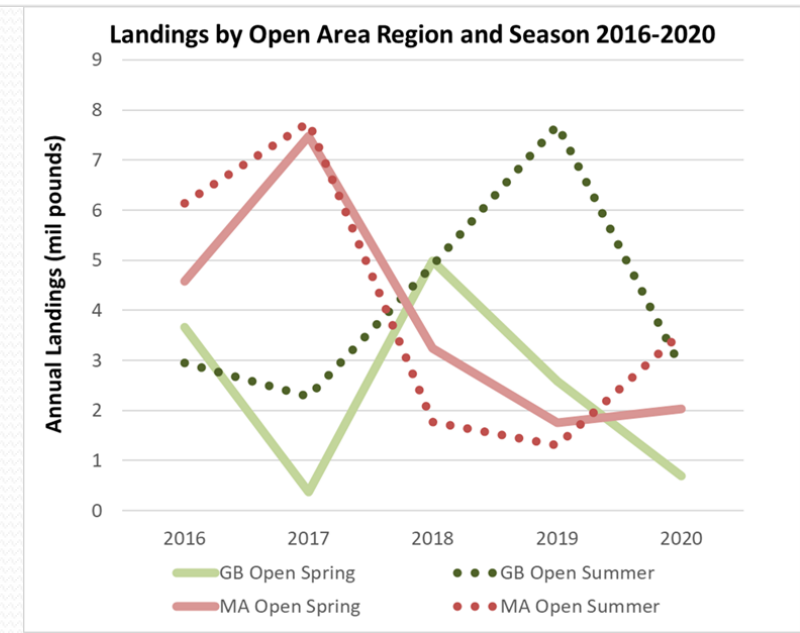
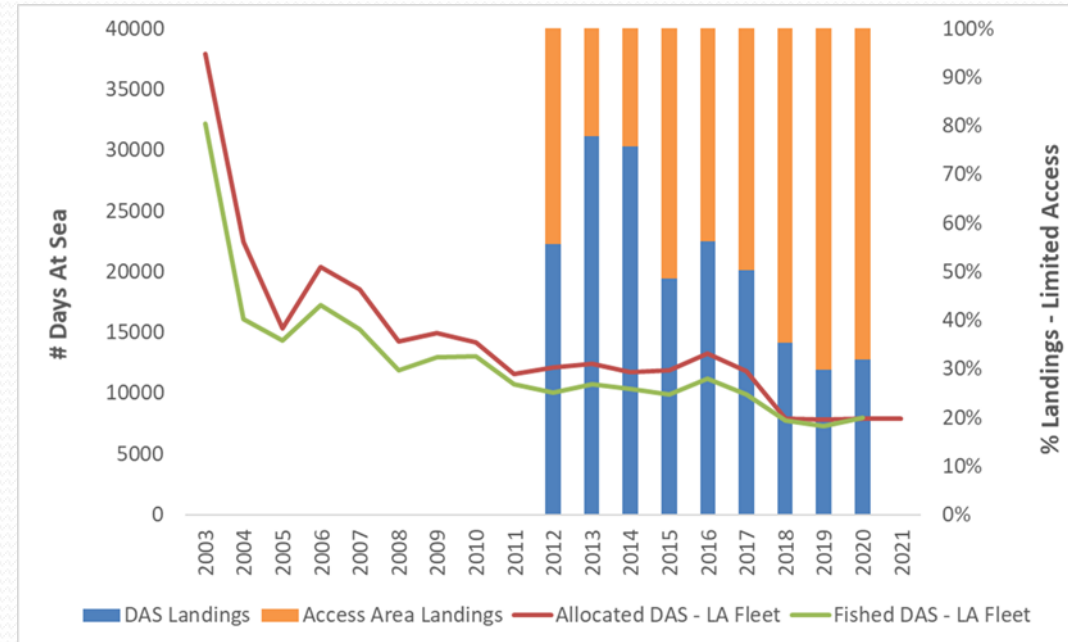


Stock Abundance(2020)



A10 Obj. 2 – Reduce Reliance on DAS

- A10 separated open and access area allocations
 - Immediate decline in DAS allocation and effort
- Continued decline in DAS allocation since 2004
 - 24 DAS in last four fishing years
- Reduced reliance on DAS landings with sustained high overall landings
 - ~30% landings from DAS in last three years
- Shift in effort by open area and season
 - Mid-Atlantic spring shift to Georges Bank summer
 - Meat yield, bycatch considerations



AI0 Obj. 2 – DAS Reliance by Region

- Open area landings dependence by region (New England and Mid-Atlantic)
 - More open area landings in NE than MID
 - Higher LPUE in northern fishing areas
 - Great South Channel and Georges Bank
 - Vessels landing in northern ports (New Bedford)
- Open area landings dependence by port (top 12 ports)
 - Higher percentage of open area landings in northern ports
 - Some exceptions (Point Pleasant, Chatham) related to General Category IFQ vessels
- Possible changes if MAAA reverts to open bottom



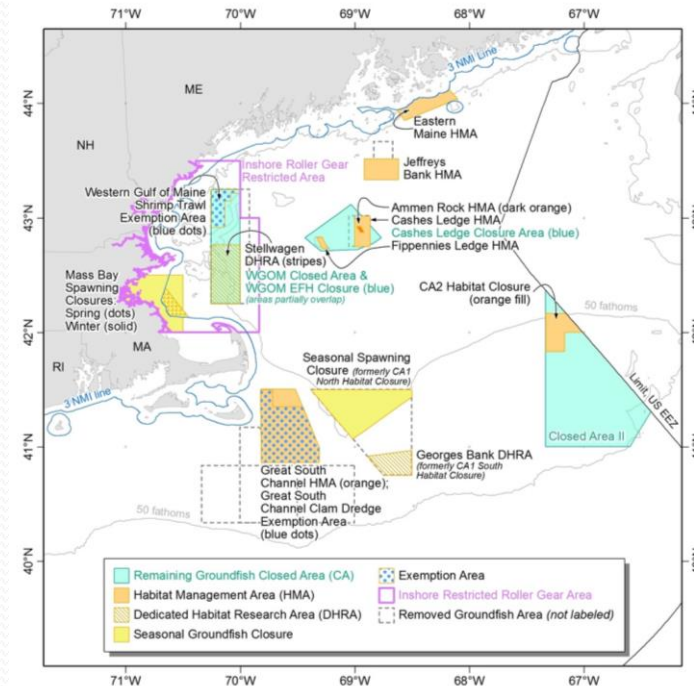
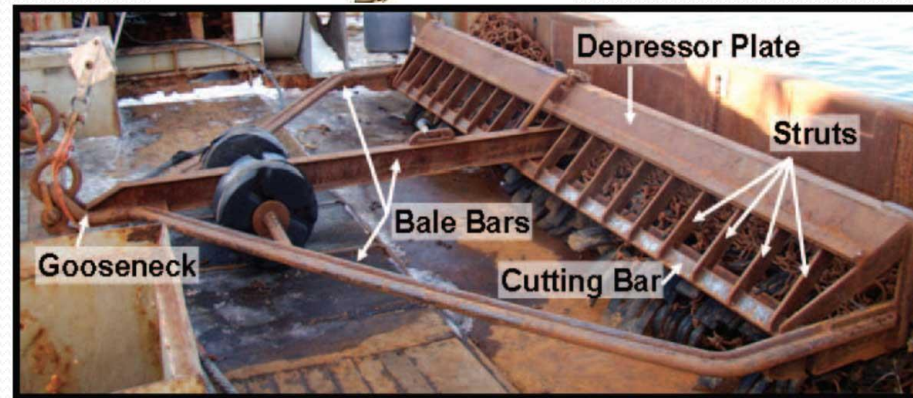
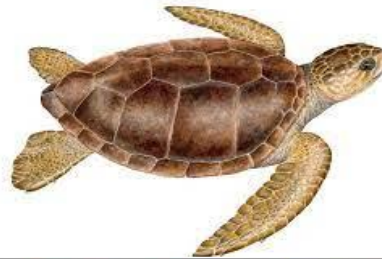
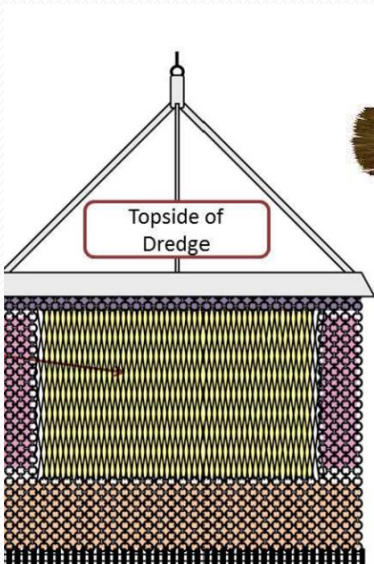
AI0 Obj. 4 and 7 - Bycatch and Habitat

Measures implemented in Scallop FMP:

- Flatfish bycatch
 - Gear modifications and seasonal closures
- Turtle mortality
 - Deflector dredge
- Habitat impacts
 - Rotational management

Measures implemented in other actions:

- Flatfish bycatch
 - Sub-ACLs
- Turtle mortality
 - Estimated dredge hours, research priorities
- Habitat impacts
 - OHA2

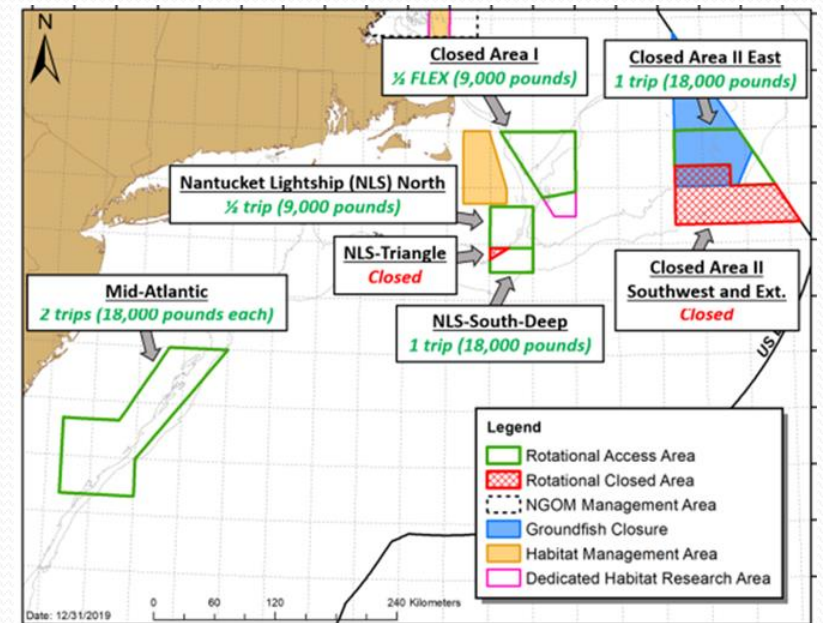
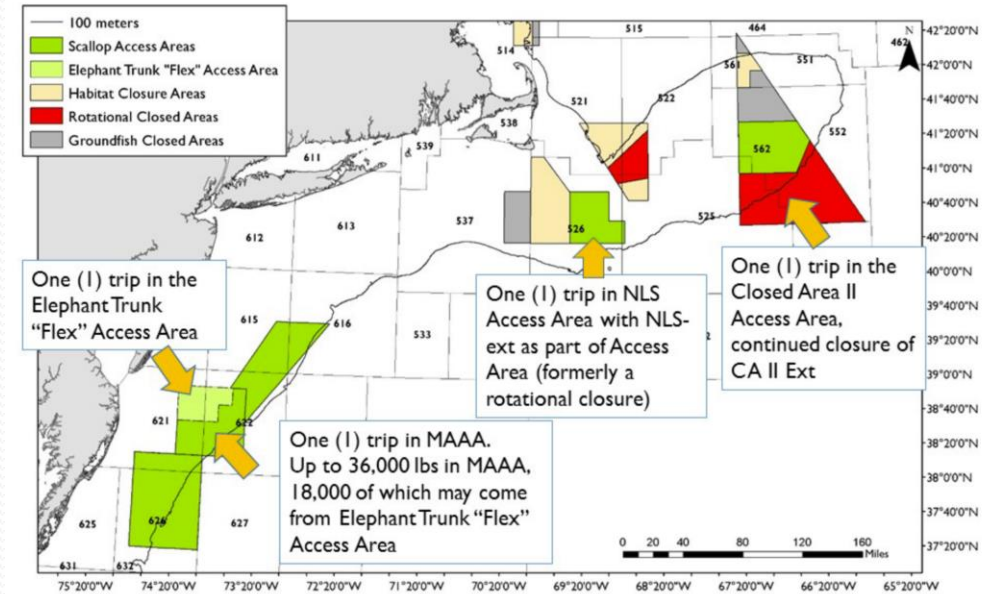


Obj. 3 – Original vs. Current Rotation

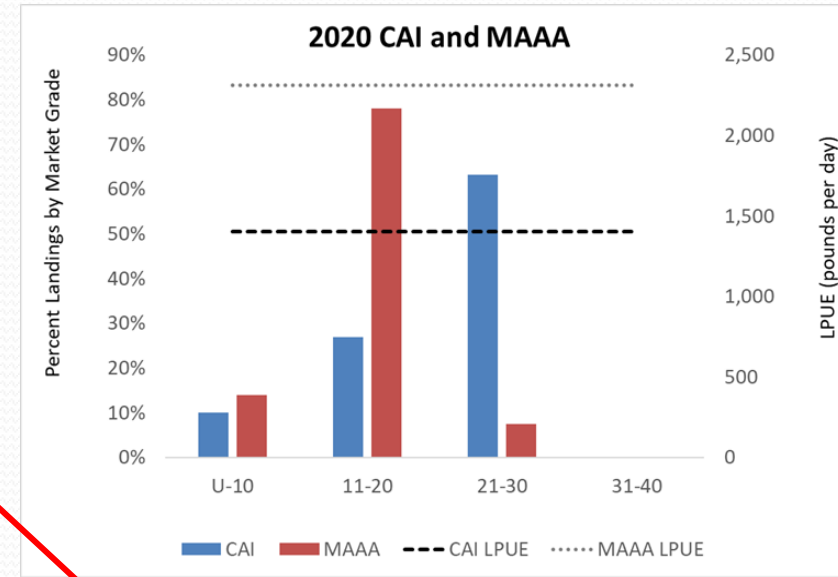
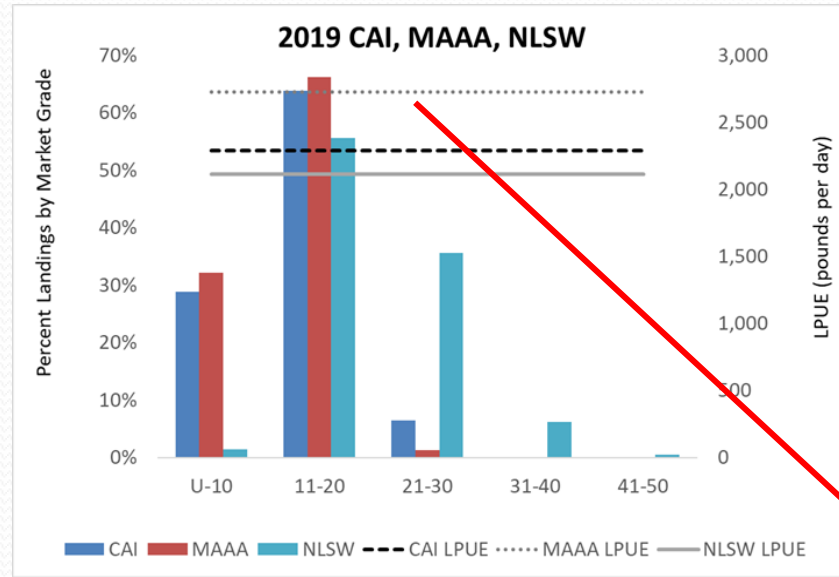
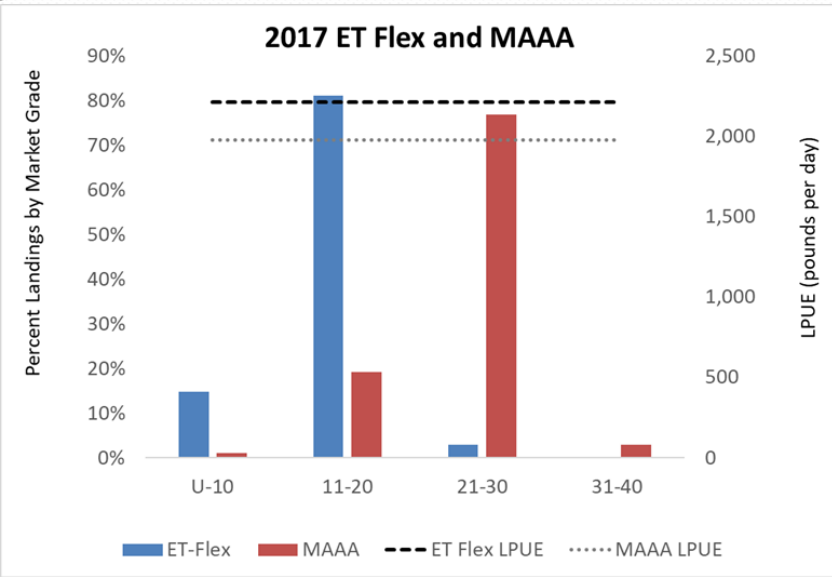
- Describe current rotational program compared to original approach and describe outcomes and rationale for alternative approaches
- Fully adaptive area rotation scheme – includes guidelines, but no binding requirements
 - **Growth thresholds**
 - Close areas when growth projected to be $\geq 30\%$
 - Open areas when growth projected to be $\leq 15\%$
 - **Boundaries and distribution of rotational closures**
 - No more than one regional closure
 - Minimum 6 or 9 contiguous 10-minute squares
 - All closures combined not to exceed 25% of total exploitable biomass
 - Straight line boundaries and internal angles ≤ 180 degrees
 - **Area re-opening**
 - NMFS calculates “annual potential increase”
 - Percent increase in total or relative biomass that would occur during a one-year interval if $F=0$
 - **Fishing mortality in access areas**
 - Hybrid F definition, ramped fishing mortality targets

Flexibility Measures - Flex Trips

- How has the Flex Trip option affected performance of the rotational program?
- FW28 – 2017: Designed to maximize yield from areas:
 - Containing small scallops
 - Not expected to support full trip
- Pounds could be used in “allocated” area or “flexed” to a different area
 - 2017 – Elephant Trunk Flex or MAAA
 - 2019 – CAI, MAAA, NLS-West
 - 2020 – CAI or MAAA
- Factors in decision of where to fish
 - LPUE
 - Market category
 - Price



Flexibility Measures - Flex Trips

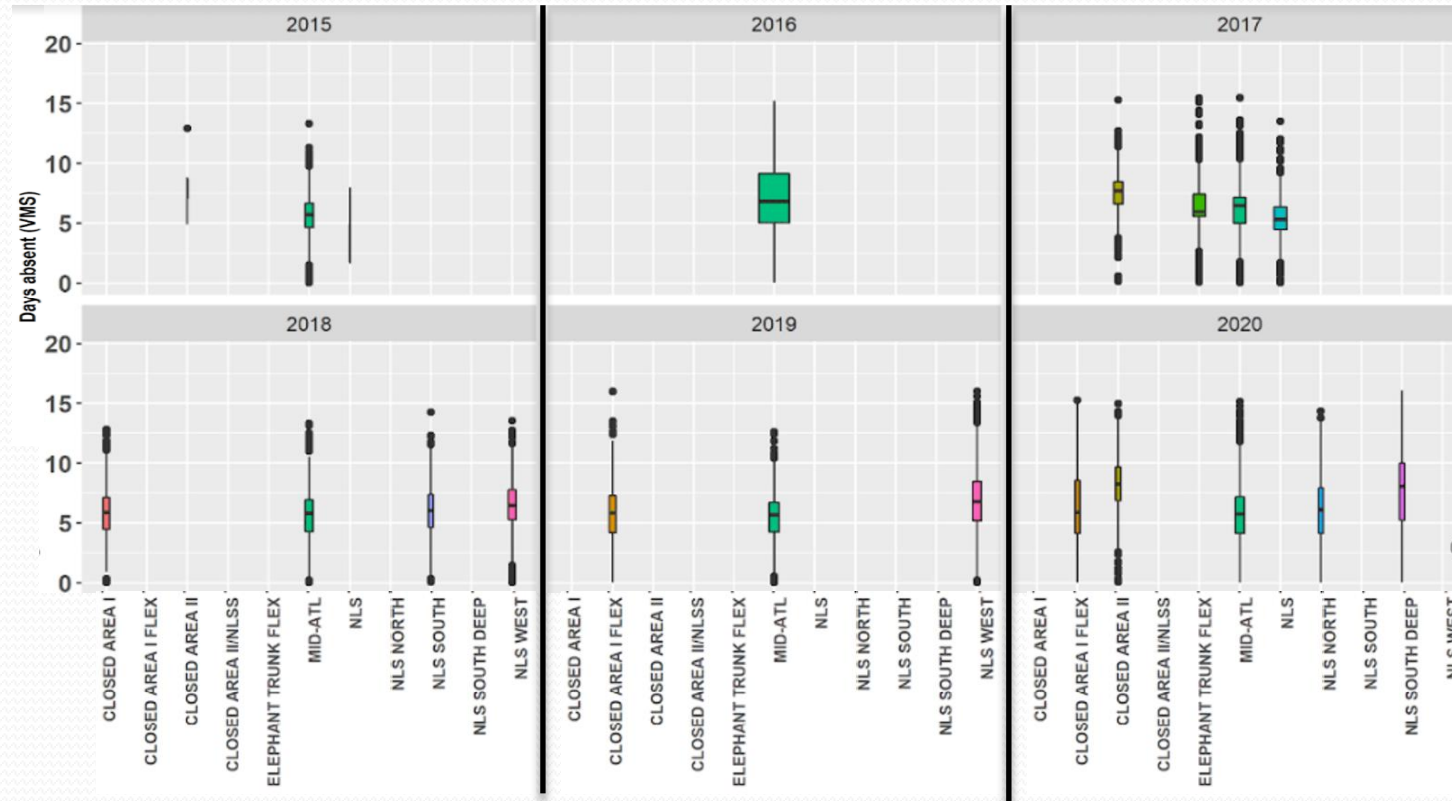


Fishing Year	Flex Option	ET-Flex	MAAA	CAI	NLS-W
2017	landings (lbs)	4,546,117	1,189,306		
	landings (%)	79%	21%		
	number of vessels	228	214		
2019	landings (lbs)		1,294,709	4,726,158	65,465
	landings (%)		21%	78%	1%
	number of vessels		192	231	29
2020	landings (lbs)		2,398,523	147,977	
	landings (%)		94%	6%	
	number of vessels		221	18	

Fishing Year 2019			
Market Grade	CAI	MAAA	NLSW
U-10	\$12.44	\$9.43	\$9.95
11-20	\$10.13	\$9.01	\$8.54
21-30	\$9.78	\$9.00	\$8.49
31-40			\$8.15
41-50			\$6.57
UNCLASSIFIED	\$12.06	\$9.15	\$8.72

Flexibility Measures - Allocation of Pounds

- How has the accounting change affected performance of rotational management?
- FW26 – 2015: Change in accounting from trips to pounds
 - Removed broken trip requirements
 - Vessels may take as many trips as needed to harvest allocation
- No major changes in number of trips or trip duration
- Provides near real time information to owners for allocation balance
- Complexity of accounting system



Flexibility Measures – 60-Day Extension

- How has the 60-day access area extension affected performance of rotational management?
- FW18 – 2006: Relaxed broken trip measures
 - Allowance to harvest access area allocation in first 60 days of following year
- Majority of harvest occurs within Fishing Year
 - Small percent of landings from carryover suggests this is a useful provision for vessel flexibility
 - Some years with >10% harvest during 60-day extension
 - Potential to reduce mortality by harvesting when yield is higher – areas with anomalous growth and low LPUE
 - Flex Trip allocations – CAI 2020
- Increased safety at sea
 - Avoid fishing in winter weather conditions without penalty

FY	Area	Allocation (lbs)	% Harvest Month 1-12	% Harvest Month 13-14
2017	CAII	6,246,000	99%	1%
2017	ET-Flex	6,246,000	93%	7%
2017	MAAA	6,246,000	93%	7%
2017	NLS-North	6,246,000	97%	3%
2018	CAII	7,884,604	97%	3%
2018	MAAA	12,492,000	96%	4%
2018	NLS-South	6,246,000	91%	9%
2018	NLS-West	12,492,000	89%	11%
2019	CAI-Flex	6,246,000	93%	7%
2019	MAAA	18,738,000	95%	5%
2019	NLS-West	18,738,000	95%	5%
2020	CAI-Flex	3,123,000	84%	16%
2020	CAII	6,246,000	91%	9%
2020	MAAA	12,492,000	96%	4%
2020	NLS-North	3,123,000	96%	4%
2020	NLS-South	6,246,000	84%	16%

Flexibility Measures – Trip Trading Increment

- How has the trip trading provision affected performance of rotational management?
- FW32 – 2020: Change in measures to allow access area pound trading
 - Ability to exchange in 9,000 lbs increments
- Additional flexibility between regions and ports
- No impact to resource



Fishing Year 2021
 (April 1, 2021 – March 31, 2022)
Sea Scallop Access Area Allocation Exchange Application
Full-Time

Instructions: This form must be used to request a Sea Scallop Access Area allocation exchange. One form must be used for each exchange. Vessel operators may not start an Access Area trip requiring the allocation requested below until vessel owners receive written notice that the request has been approved. Written approval or disapproval of the request will be provided within 15 days of receipt of this form. Please read the 'Scallop Access Area Allocation Exchange Program Requirements and Restrictions' included with this form for more information.

Full-time vessels: Access area allocation may only be exchanged in the amount of a full trip limit or half trip limit. Trip trading will be allowed between full-time vessels in 9,000 pounds increments. Full-time vessel can only trade with other full-time vessels (categories: 2, 5 and 7). Full-time vessels can exchange no more than 18,000 pounds or no less than 9,000 pounds of unharvested scallops, from one access area for another 18,000 pounds or 9,000 pounds of unharvested scallops allocated to another vessel from another access area

<p>Full Time Vessel A's Permit Information</p> <p>Name: _____</p> <p>Business Name: _____</p> <p>F/V: _____</p> <p>Permit Number: _____</p>	<p>Full Time Vessel B's Permit Information</p> <p>Name: _____</p> <p>Business Name: _____</p> <p>F/V: _____</p> <p>Permit Number: _____</p>
<p>Vessel A will give one access area allocation below to Vessel B (Check only one)</p> <p><input type="checkbox"/> MAA /9000 lb</p> <p><input type="checkbox"/> MAA / 18,000 lb</p> <p><input type="checkbox"/> CAII / 9,000 lb</p> <p><input type="checkbox"/> CAII / 18,000 lb</p> <p><input type="checkbox"/> NLS-S / 9,000 lb</p> <p><input type="checkbox"/> NLS-S / 18,000 lb</p>	<p>Vessel B will give one access area allocation below to vessel A (Check only one)</p> <p><input type="checkbox"/> MAA /9000 lb</p> <p><input type="checkbox"/> MAA / 18,000 lb</p> <p><input type="checkbox"/> CAII / 9,000 lb</p> <p><input type="checkbox"/> CAII / 18,000 lb</p> <p><input type="checkbox"/> NLS-S / 9,000 lb</p> <p><input type="checkbox"/> NLS-S / 18,000 lb</p>

Flexibility Measures – Performance

- Generally, flexibility measures implemented since A10 have matched original intent and objectives and met expected management and fishery outcomes
- Flex Trips
 - Equitable opportunities for fleet
 - Mechanism to harvest scallops in areas that cannot support full fleet allocation
 - Need to consider factors that influence fishing decisions (grade, LPUE, price)
- Allocation of Pounds
 - Streamlined reporting and increased availability of information to owners/captains
 - Increased complexity in accounting system
- 60-Day Extension
 - Potential to reduce mortality from higher yields in spring
 - Increased safety at sea
 - Increased uncertainty in projections if spatial/temporal overlap with surveys

Obj. 4 – Two-Year Specifications



- Describe two-year specification actions and evaluate outcomes

Frameworks

- 16/39 – FY 2004 and 2005
- 18 – FY 2006 and 2007
- 19 – FY 2008 and 2009
- 22 – FY 2011 and 2012

Evaluated FW 18, 19, 22

- Management measures
- Complexity
- Performance



DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 648

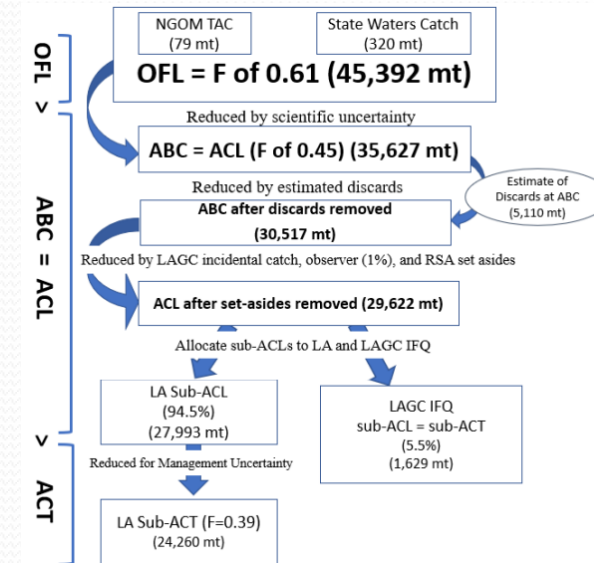
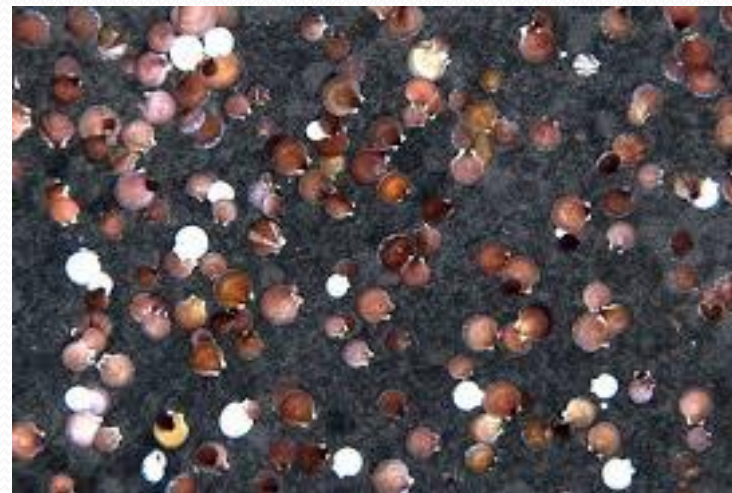
[Docket No. 120330235–2014–01]

RIN 0648–BC04

Fisheries of the Northeastern United States; Atlantic Sea Scallop Fishery; Closure of the Delmarva Access Area

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Temporary rule; emergency action.



Obj. 4 – Two-Year Specifications

- Generally, two-year specification actions resulted in required interventions to adjust second year measures.
- Evaluation suggests that there is value in adjusting specifications on an annual basis
- Performance Challenges
 - Delayed implementation
 - Complexity of actions required long development timeframe with delayed implementation in Year 1
 - Emergency Actions
 - Uncertainty in projections required NMFS Emergency Actions to close areas, reallocate trips
 - Carry Over
 - Unharvested allocations carried forward several years
- Substantial resources and increasing complexity, consider options to streamline process
 - Specifications-only (Amendment 19)
 - Supplemental Information Report (SIR)
 - Expand use of Default Measures

Obj. 5 – Possible Improvements

- **Identify possible changes or areas for improvement of the rotational program**
 - Recommendations to be developed based on findings of the evaluation – final report
 - Ideas for improvements
 - Evaluate projection uncertainty
 - SAMS model review and GeoSAMS model development
 - “Life cycle” of a rotational management area
 - Consider performance of flexibility measures for future actions
 - Factors that influence fishing behavior
 - Accounting system
 - Evaluate DAS carry over provisions
 - Evaluate spatial scale
 - Optimal size for rotational management areas
 - Streamline Council process for updating specifications
 - Specifications outside of the FW process
 - Maintain annual specifications, reduce number of alternatives that require NEPA analysis
 - Coordinate survey system – Scallop Survey Working Group

Preliminary Conclusions of the Evaluation

- Program has substantially evolved since 2004 implementation of A10
- Goal 1:
 - **Evaluate how original objectives (A10) of the rotational program have been met:**
 - The rotational management program has achieved many of the primary and secondary objectives of the program.
- Goal 2:
 - **Evaluate how current rotational management meets expected outcomes:**
 - New approaches used since the creation of the MAAA and the partial approval of OHA2
 - Exceptional year classes introduced new challenges for management
 - Projection uncertainty
 - Increased flexibility for vessels – Flex Trips, Allocation in Pounds, Carry Over, Trip Trading
 - Issues with higher than predicted mortality in key areas (NLS-W, MAAA)
 - Increased complexity for annual management measures

Next Steps

- **Timeline**

- Final report due to Council January 19, 2022

- **Process**

- 2021 Priority – scope to be completed by January 2022 – “Phase 1”

- Additional evaluation considerations:

- What other properties of rotational management or scallop management are useful to evaluate?
- What other evaluation information would be useful to advance the Scallop FMP?
- How would additional evaluation of rotational program inform Council decisions?

- Additional evaluation topics:

- Performance of rotational management for high density aggregations
- How to optimize yield from large recruitment events
- How to address resource anomalies (e.g., growth, mortality)

Thank You! & Questions?

