



**NOAA
FISHERIES**



On the Next Generation Stock Assessment Improvement Plan (SAIP)

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Outline

- SAIP – background
- Next Generation
- Science Innovations – data collection, models
- The four T's
- Stock Assessment Prioritization - status
- Questions and comments



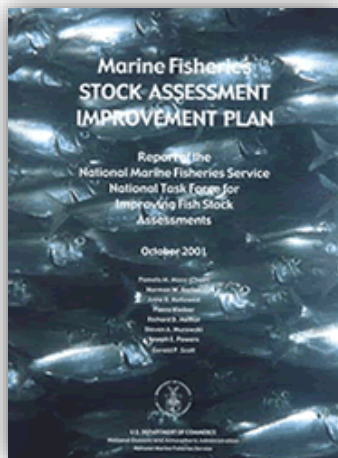
What is the SAIP?

Original SAIP

- Production models for core stocks
- Baseline monitoring for all stocks

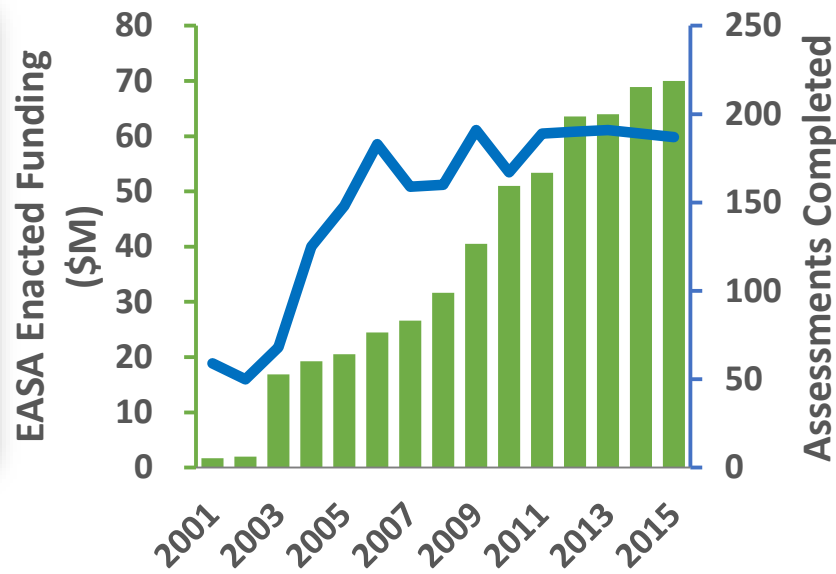
10 recommendations including

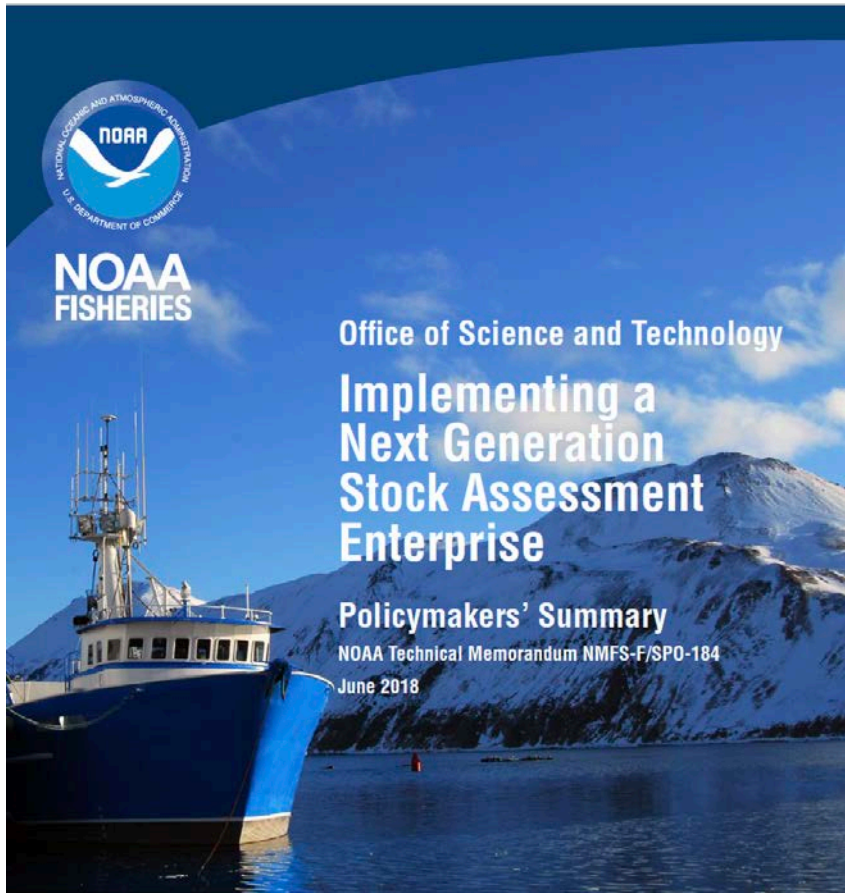
- Budget/staff increases
- More training, partnerships, research
- Increase awareness & credibility



(Mace et al. 2001)

Results of the 2001 SAIP





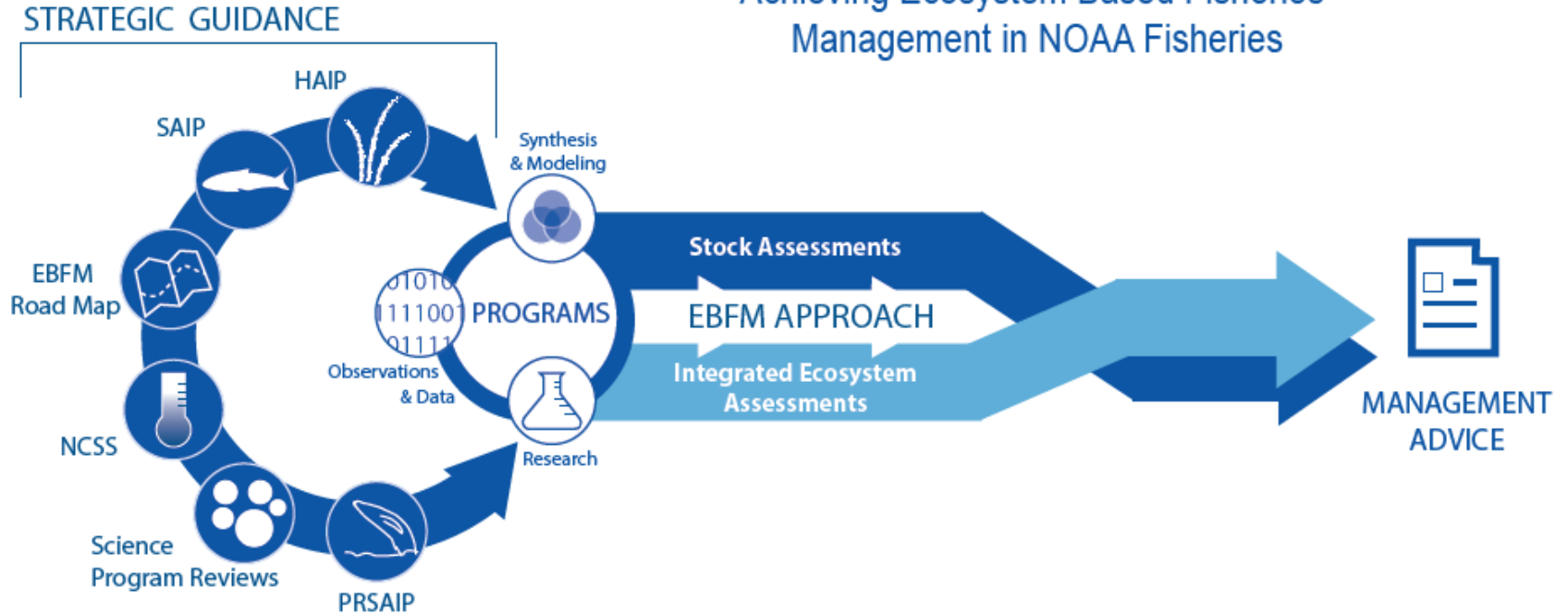
<https://spo.nmfs.noaa.gov/content/tech-memo/SAIP2018>

The Next Generation SAIP...

- provides national-scale strategic guidance and direction for the regional stock assessment programs
- is coordinated within the broader suite of strategic guidance driving NMFS programs that provide scientific advice to fishery managers

SAIP Overview

Achieving Ecosystem Based Fisheries Management in NOAA Fisheries



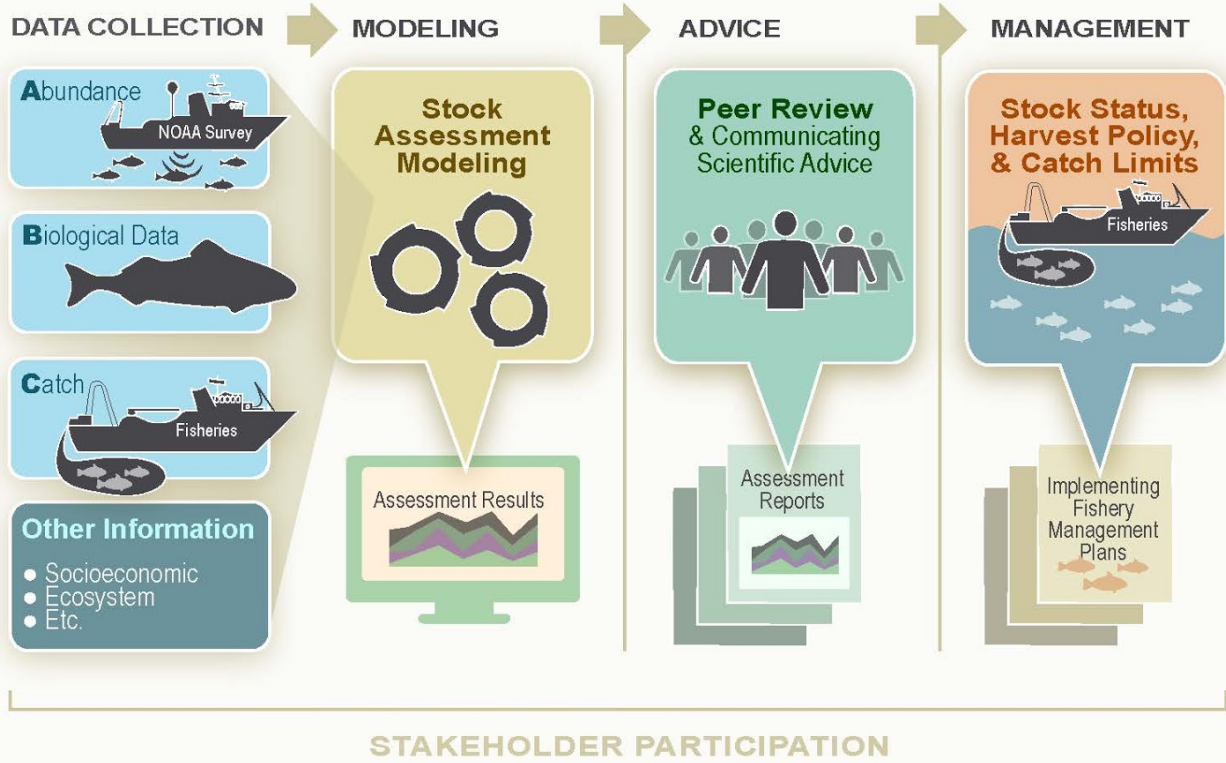
Assessment Process Overview

NOAA Fisheries Stock Assessment Process

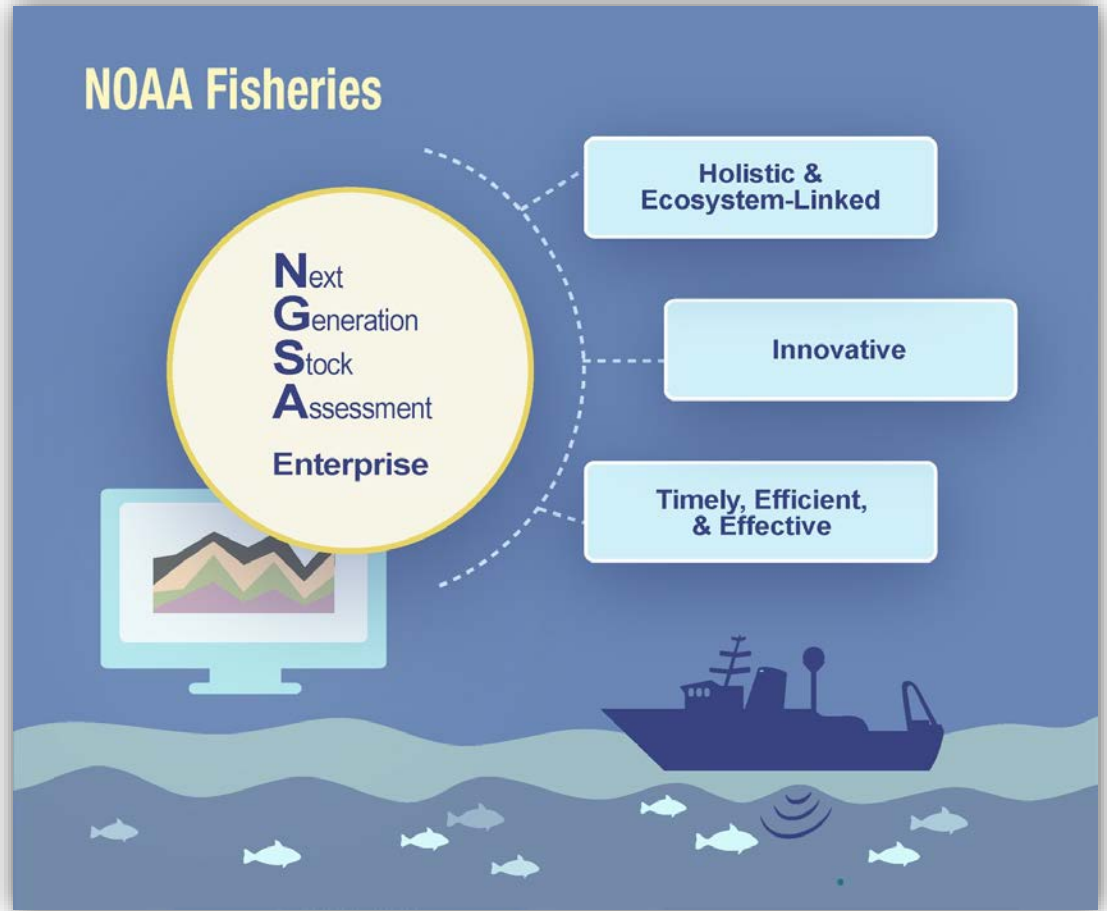
The Science Behind Sustainable Fisheries Management



Healthy Fish Stocks
= Sustainable Jobs,
Fisheries, and Food



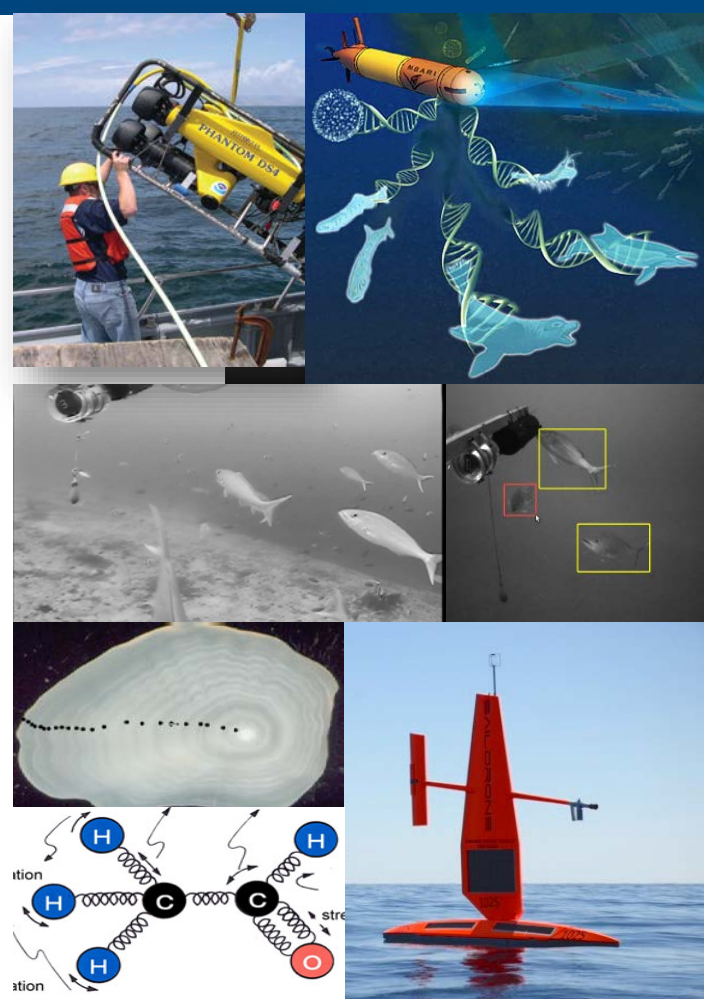
Next Generation



Next Generation: Innovative science recommendations

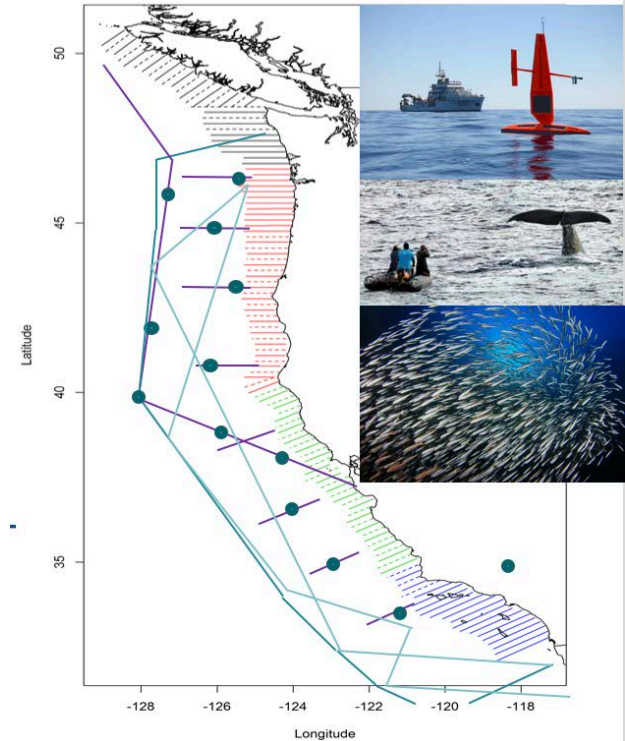
Data collection & processing

- National Working Group & data gap analysis
- Survey calibration – absolute abundance, shifting distributions
- Electronic & advanced tech – electronic monitoring & reporting, acoustics, optics, eDNA, unmanned, ...
- Expand industry partnerships
- Improve data management, access, standardization, automation



Brief digression: Next generation surveys

- Last Data Acquisition Plan (DAP) was in 1998
- Need to update survey strategies to consider:
 1. Status of NOAA fleet
 2. New technologies
 3. More holistic/ecosystem considerations in assessments
 4. Partners (industry, rec, etc.)
 5. Economic valuation of surveys
- Form a **National Survey Task Team (2019)** followed by **Regional Survey Task Teams (2020)** to develop the “next DAP”

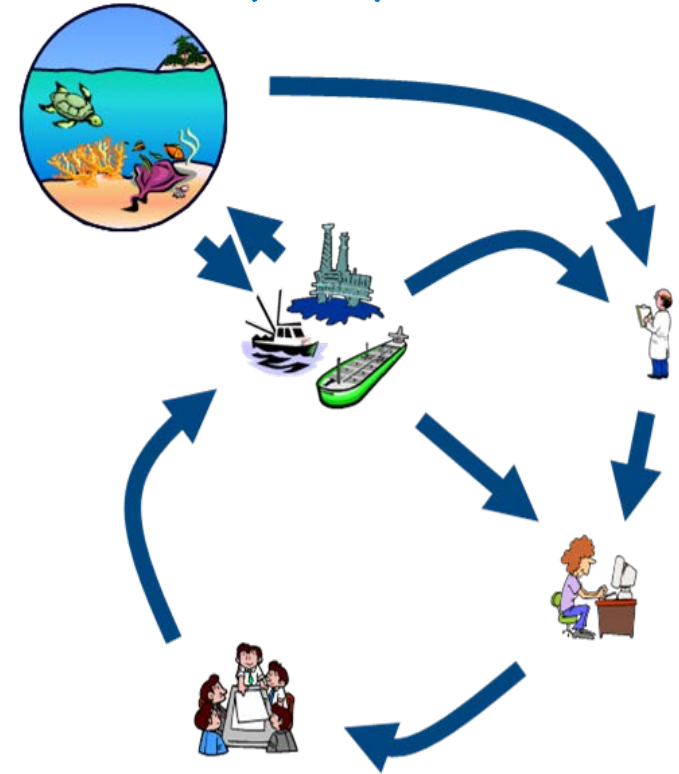


Next Generation: Innovative science recommendations

Assessment modeling

- Advanced techniques – state-space, geo-stats, sample weighting, auto-correlation
- Enhanced models – spatial, spp. interactions, environmental drivers
- More complete uncertainty – ensemble modeling, decision analysis tools
- Professional development – architecture, testing, documentation, community development
- Assessment priorities guide investments

Management Strategy Evaluations (MSEs)



Next Generation: Timely, efficient, & effective

- Establish timely and efficient assessment processes by separating research-track from operational assessments
- Streamlining the operational process
- Maintain effective stock assessments with standardized approaches
- Balancing the “4Ts” of assessment **T**hroughput, **T**imeliness, **T**horoughness, and **T**ransparency



Next Generation

The 4Ts of Assessment Demands



Throughput

Expectation

Conduct a high number of assessments each year to support development of annual catch limits.

Reality

There are many more stocks under NOAA's purview than can be assessed in a year with current capacity.

Solution

Objective prioritization to determine the stocks most needing assessment; conduct more routine update assessments.



Timeliness

Expectation

Utilize current information and rapidly develop advice for management decisions.

Reality

Regional approaches to processing and assembling data, modeling, and reviewing assessments vary substantially.

Solution

Standardized and right-sized data delivery, modeling options, and peer review.



Thoroughness

Expectation

Assessments should be comprehensive investigations with fully-independent peer reviews.

Reality

Current data availability and assessment capacity do not facilitate comprehensive assessments for all stocks.

Solution

Objective prioritization to determine the stocks in need of comprehensive investigations.



Transparency

Expectation

Results should be fully documented, clearly communicated, and accessible for public understanding.

Reality

Assessments are complicated, produce numerous results, and a variety of communication formats are used.

Solution

Standardized and tiered reporting templates that summarize results at various levels of detail.

Next Generation: Timely, efficient, & effective

Determine needs

- Classify current assessments based on data inputs
- Use revised prioritization system to set target levels for input data
- Compare target/current levels to guide strategies & investments

Separate *Research* and *Operational* assessment tracks

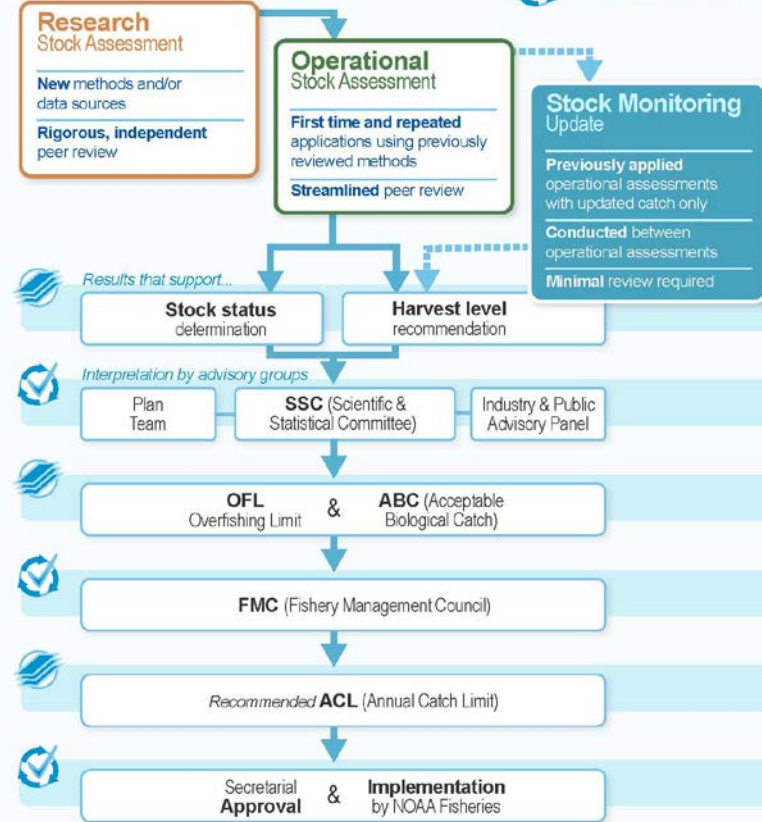
- Operational assessments use previously reviewed methods
 - More streamlined preparation, conduct, documentation and review — focused Terms of Reference
- Research assessments conducted as needed to improve assessments; respond to recommendations
 - More thorough documentation & review, not tied to management cycle
 - Once accepted, improvements transitioned to operations



Recommended changes (SA, GM & CA)*

1. Implement Research and Operational Assessments
 - increase quality and increase throughput by 10-20%
2. Conduct Interim (monitoring) Analyses that provide updated ABC advice based on regularly-updated indices of abundance and/or mortality
 - increase throughput 50-100% (depending on how often they are implemented)
3. Schedule assessments well in advance
 - increase throughput by 10-20%, and decrease the time to conduct each assessment by 10-20%
4. Consistently employ the Interdisciplinary Plan Team (IPT) style of decision assessments to decrease the duration of assessments 10-20% and reduce postponements in the assessment schedule
5. Research assessments for data-limited species are most efficient when methods are reviewed and vetted through previous processes, and then many (e.g., 15) species are addressed simultaneously at one workshop.

NOAA Fisheries Next Generation Stock Assessment to Management Process



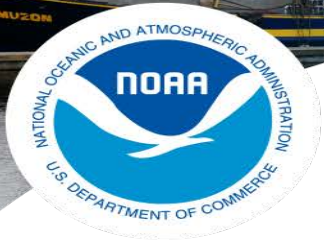
Hypothetical schedule with stock prioritization

Research (RT), Operational (O), and Interim (I) Assessments

Stock	Prioritization Score	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Red Snapper	6.6	RT + I	O	I	O	I	O
Greater Amberjack	6.4	I	RT + I	O	I	I	O
Gray Triggerfish	6.1	O	I	I	RT + I	O	I
Gray Snapper	3.7	O	I	I	I	O	I
Scamp	2.8	I	I	O	I	I	I
Red Grouper	2.5	O	I	RT + I	O	I	I
Gag Grouper	2.5	I	I	I	RT + I	O	I
King Mackerel	2.4	I	O	I	I	RT + I	O
Cobia	2.3	I	I	O	I	I	RT + I
Vermilion Snapper	2.2	I	O	I	I	RT + I	O
Spanish Mackerel	2.1	I	I	O	I	I	I
Yellowedge Grouper	1.5	RT + I	O	I	I	I	O
GULF DLM		DLM	I	I	I	I	I
Caribbean		I	I	I	DLM	I	I

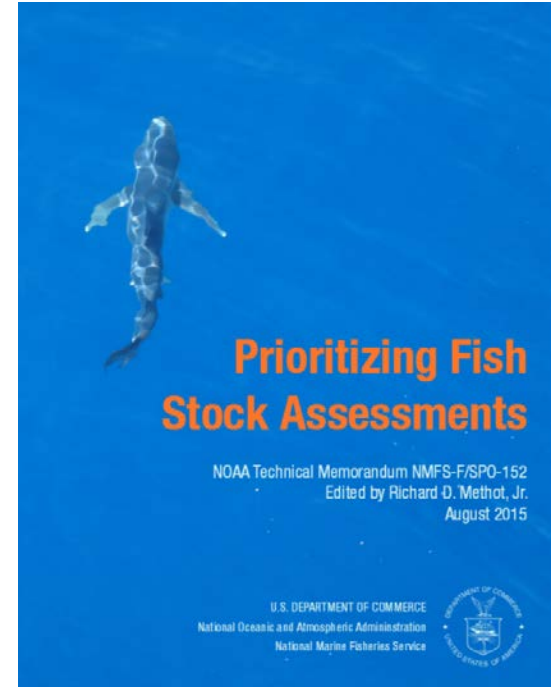
SAMPLE

Update on Implementation of Stock Assessment Prioritization

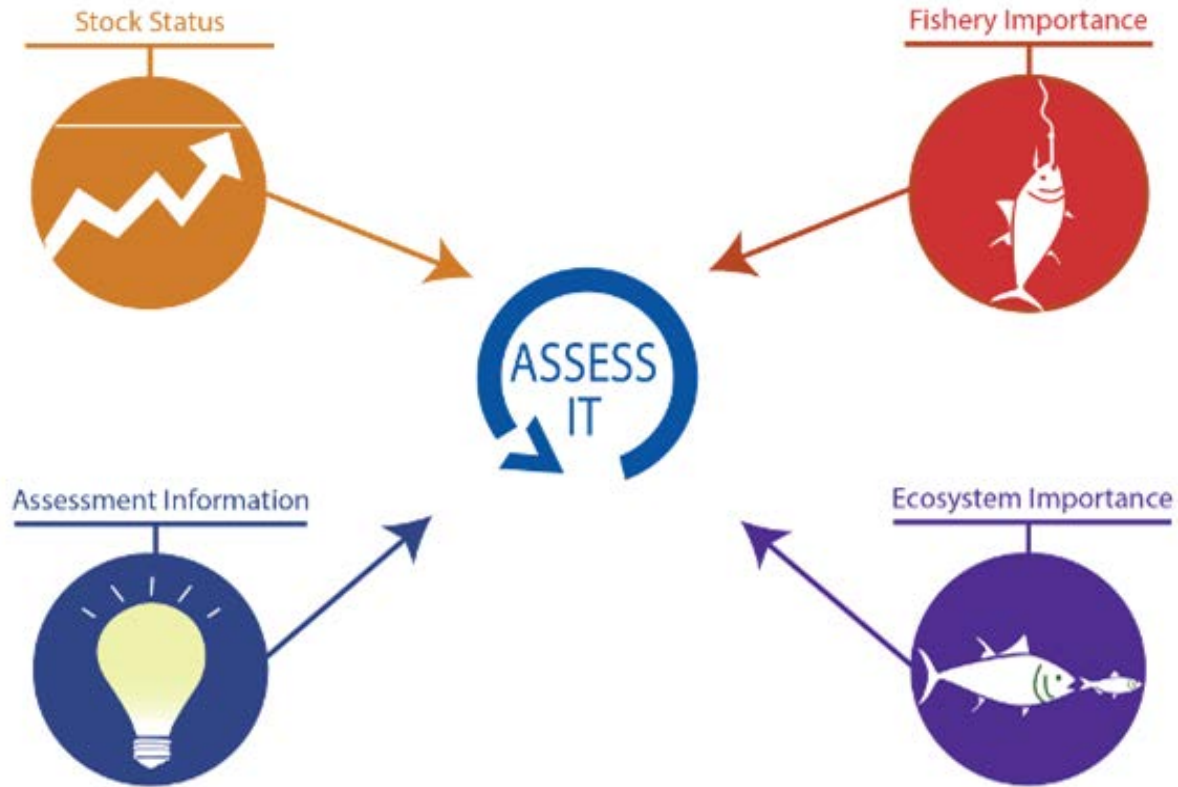


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- Response to (2011) budget inquiries
- Goal: Support sustainable fisheries
- Implemented on a regional basis
- Ranks provide objective advice



Which Stocks Need Assessments?



Regional Prioritization Implementation

Organize stocks

Identify assessment targets

Develop factor scores

Assign factor weights

Rank weighted scores

Prioritization Scoring Factors

Category	Factor	Raw Scores
Fishery Importance	Commercial Fishery Importance	0-5
	Recreational Fishery Importance	0-5
	Importance to Subsistence	0-5
	Non-Catch Value	0-5
	Constituent Demand	0-5
	Rebuilding Status	0-1
Stock Status	Relative Stock Abundance	1-5
	Relative Fishing Mortality	1-5
Ecosystem	Key Role in Ecosystem	1-5
Assessment Information	Unexpected Changes in Stock Indicators	0-5
	Relevant New Type of Information Available	0-5
	Years Assessment Overdue Relative to Target Frequency	0-10

Assessment schedule

Completed Assessments in FY2019

Research & Operational

- *Blue marlin - Atlantic (International HMS)*
- *Bigeye tuna - Atlantic (International HMS)*

Operational Assessment

- Blacktip shark - Gulf of Mexico
- Brown shrimp - Gulf of Mexico
- Pink shrimp - Gulf of Mexico
- Royal red shrimp - Gulf of Mexico
- White shrimp - Gulf of Mexico
- Brown rock shrimp - Southern Atlantic Coast
- Brown shrimp - Southern Atlantic Coast
- Pink shrimp - Southern Atlantic Coast
- White shrimp - Southern Atlantic Coast

Note: assessments have not yet been separated by tracks (e.g., Research vs. Operational) as recommended in the SAIP.

Research and Operational Assessments planned for FY2019:

Caribbean spiny lobster - Puerto Rico
Caribbean spiny lobster - St. Croix
Caribbean spiny lobster - St. Thomas / St. John
White marlin - Atlantic (International HMS)
Skipjack tuna - Western Atlantic (International HMS) or
Yellowfin tuna - Atlantic (International HMS)

Research & Operational Assessments delayed to FY2020 by Government Shutdown:

Red porgy - Southern Atlantic Coast
Greater Amberjack - Southern Atlantic Coast
Gray Triggerfish - Gulf of Mexico
Red grouper - Gulf of Mexico

Research & Operational Assessments planned for the near future:

Cobia - Southern Atlantic Coast
Cobia - Gulf of Mexico

Prioritization Implementation Status



FMC	FMP(s)	Comments
CFMC	ALL	Currently under initial development by HQ and SEFSC staff; investigating some alternative approaches to accommodate scoring for data-poor stocks; seeking Council engagement for further development and review
GMFMC	ALL	Draft scores developed by staff at SEFSC and under ongoing review by Council
HMS	Tunas/Billfish	For discussion with regional experts – proceed with gap analysis, but does scheduling component make sense for RFMO-managed stocks?
	Sharks	Draft scores developed, needs further review by HMS staff and others
NEFMC/ MAFMC	ALL	NEFSC staff worked with NRCC to develop a comprehensive assessment scheduling process for Northeast stocks – just completed
NPFMC	Crabs	Prioritization process used to review assessment frequency with Crab Plan Team
	Groundfish	Prioritization process used to review and provisionally revise assessment frequency for groundfish stocks; new schedule will be revisited again after several cycles to review frequencies and check progress
	Arctic	Process not applicable at this time for Arctic resources
	Salmon	Process not applicable – salmon assessments led by State of Alaska
	Scallop	Process not applicable – single species contained in FMU

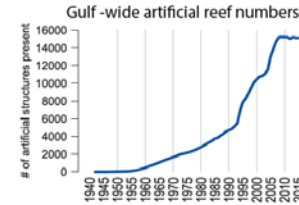
Prioritization Implementation Status

FMC	FMP(s)	Comments
PFMC	Groundfish	Initially implemented in 2016 by NWFSC/SWFSC staff with heavy engagement and review by SSC and Council plan teams; results have been used to develop recommendations for scheduling assessments for the 2017 & 2019 assessment cycles
	CPS	Limited utility – only four stocks contained in the FMU – perhaps use to review assessment frequency?
	Salmon	Process not applicable at this time
PFMC/ WPFMC	HMS	For discussion with regional experts – proceed with gap analysis, but does scheduling component make sense for RFMO-managed stocks?
SAFMC	ALL	Developed by SEFSC staff and reviewed by SAFMC; stock assessment schedule developed under SEDAR developed taking into account the recommendations from prioritization
WPFMC	ALL	Planned for 2019 after new FMU lists are finalized/approved by Council



Some benefits so far...

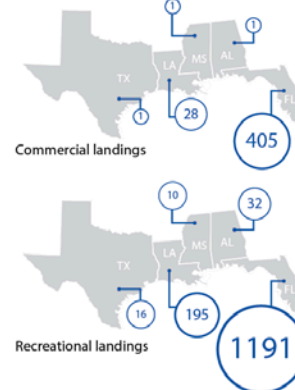
- Operational assessment implementation increasing
- Efforts to “improve SEDAR” largely based on SAIP concepts
- Prioritization has affected several regional assessment schedules already
- Several efforts underway to explore technologies and ensemble modeling approaches
- National modeling team in Office of ST formalizing approach to developing & onboarding operational tools
- Streamlined reporting (e.g., see gray snapper eco-infographic)



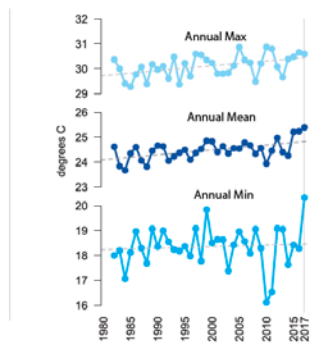
Juvenile and subadult gray snapper require seagrass habitats for nurseries and protection before transitioning into adults
Trends in seagrass cover from 1980 - 2014



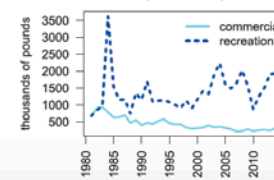
Average annual landings by state (1981-2015) in 1000s of lbs



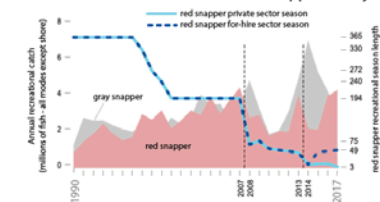
Sea surface temperatures in the adult range (Northern Gulf of Mexico)



Gulf-wide annual landings (1981-2015)



Potential influence of red snapper fishery



Sudden decreases in access to red snapper (such as the reductions in season length from 2007 to 2008 and 2013 to 2014) may cause short-term increases in targeting of other snapper species, such as gray snapper.

Prioritization Activities in FY19

FY19 Milestone: “Expand the stock assessment prioritization process to more regions and initiate the data target setting and gap analysis process defined in the next generation SAIP”

1. Continue work on prioritization for CFMC stocks
2. Work with AFSC to initiate gap analysis for NPFMC groundfish, using already available information from completed prioritization
3. Initiate prioritization with PIFSC once WPFMC’s revised FMU lists are finalized

Next Steps

1. Continue to evolve the prioritization process/guidance as needed based on lessons learned
2. Consider whether/how process should be applied for remaining stocks
3. Test the gap analysis calculations developed in the SAIP
4. Coordinate with new survey working group on stock assessment data gaps and priorities



Thank you

Questions?

Background Material

Definitions 1: Research Assessments

... allow for innovation and new ideas to be built into the assessment models. Such assessments would occur as needed to provide a first assessment of a stock or to improve existing Operational Assessments, or to establish a data source or procedure that can be implemented in many assessments .

Research Assessments are vetted through fully independent review (e.g., CIE), and if the innovations are found to be acceptable, the new methodology would be used subsequently in Operational Assessments.

Definitions 2: Operational Assessments

- ... **provide management advice.** They are designed to be timely and efficient, and address the deficiencies of the current SEDAR process. The Operational Assessment schedules put key stocks into a regular assessment cycle⁽¹⁾. These key stocks include those that have already been through a Benchmark or Research Assessment, and for which the Councils desire regular and timely ABC advice.
- Operational Assessments are similar in scope to the current SEDAR Update Assessments, taking a previous Benchmark or Research Assessment and updating all relevant data, but making no or minimal change to methodology.

⁽¹⁾ The frequency of that advice will depend on the number of stock assessment analysts and the number of key stocks, and could also reflect expected annual rates of changes in abundance (e.g., a short-lived species like black sea bass could be assessed more frequently than a long-lived species like tilefish).

Definitions 3: Interim Analyses

- ... adjust ABCs between Operational Assessments.
- This innovation is expected to as much as double throughput by allowing annual or biennial updates of ABC advice using the most recent data available instead of relying on assumptions about fishing practices and recruitment for several years into the future (as with current projection approaches).
- More frequent Interim Analyses would also permit a wider interval between Research and Operational Assessments. Interim Analyses are not full assessments in the sense of revising model structure or re-estimating all model parameters, but instead provide updated ABCs based on current trends in critical data sources, such as landings, fishery independent indices of abundance, or age/length data.
- Interim Analyses offer the biggest “bang-for-the-buck” in terms of providing timely management advice with the largest savings in cost.

Illustrative example of **Research Track**, **Operational Assessments** and **Interim Analyses**. In this example using three assessment analysts, management advice (ABCs) is updated every year for one species (Red Snapper), every other year for seven other stocks, and Research Assessments are completed for two new stocks. Note that once a Research Assessment is completed for the unassessed species, then they enter into the Operational-Interim cycle.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Red Snapper	Operate	Interim	Interim	Interim	Operate	Interim
Black Sea Bass		Operate		Interim		Operate
Red Porgy	Interim		Operate		Interim	
Gag Grouper		Interim		Operate		Interim
Vermilion Snapper	Operate		Interim		Operate	
Snowy Grouper		Operate		Interim		Operate
Tilefish	Interim		Operate		Interim	
Red Grouper		Interim		Operate		Interim
Scamp	Research	Operate		Interim		Operate
Gray Triggerfish			Research	Operate		Interim
Greater Amberjack			Interim		Operate	

Analyst 1
Analyst 2
Analyst 3