



NOAA
FISHERIES

Implementing a Next Generation Stock Assessment Enterprise

*An Update to NOAA Fisheries'
Stock Assessment Improvement Plan*

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Patrick Lynch, Ph.D.
National Stock Assessment Program Leader

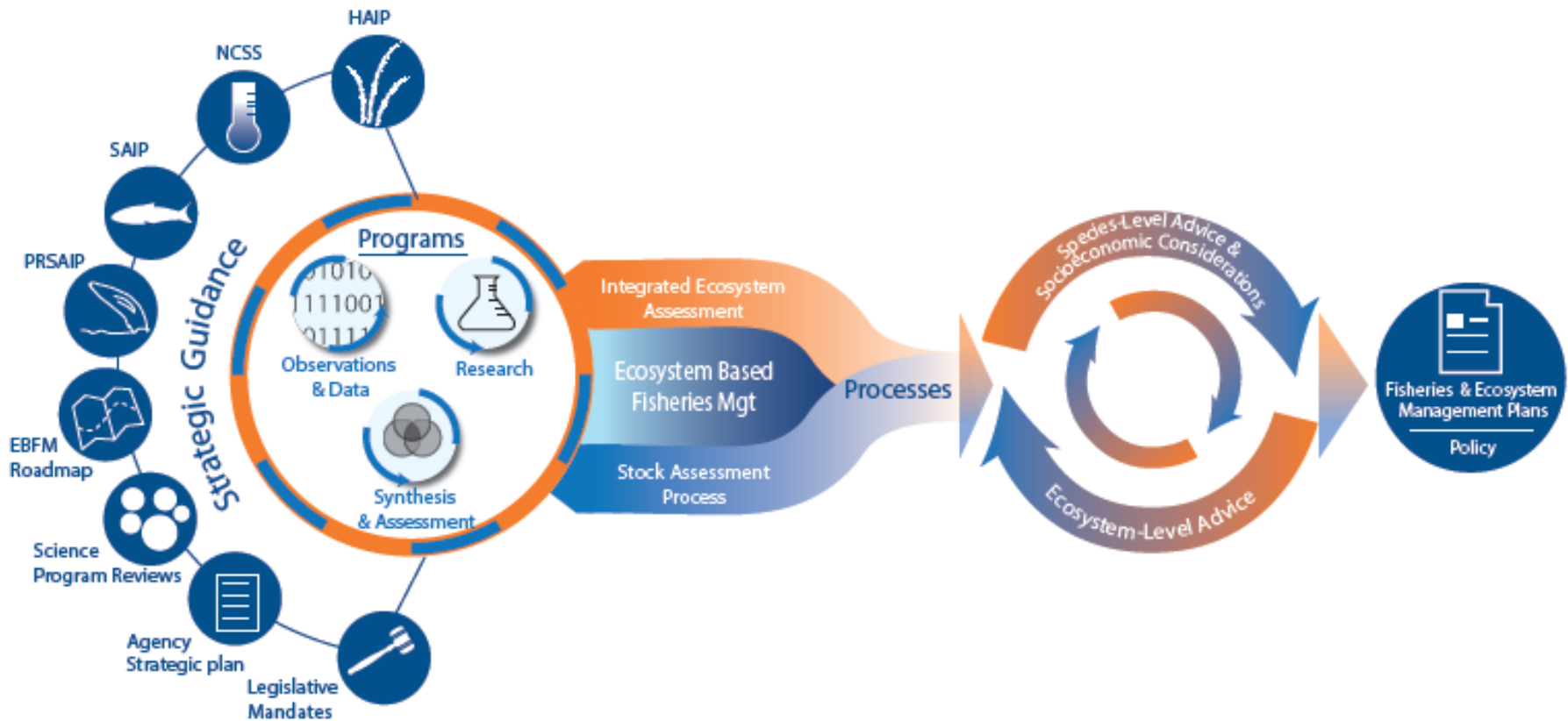
June 2017

Outline

- **What is the SAIP?**
- **Assessment program overview**
- **Next generation**
- **Request for review**

What is the SAIP?

Strategic guidance for stock assessment programs



What is the SAIP?

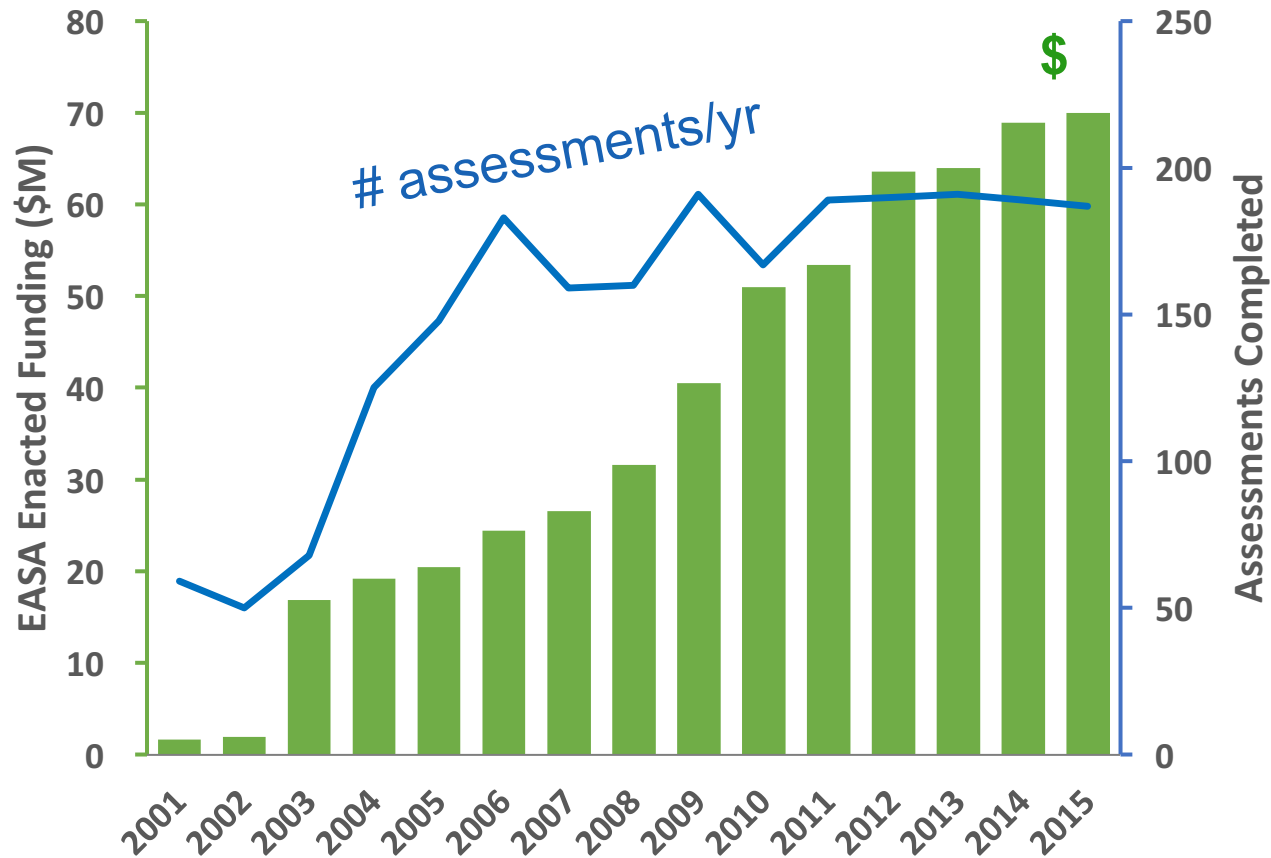
Original SAIP – Mace et al. 2001

- “Tiers of Assessment Excellence”
 - Initial push for Tier 2
 - Production models for core stocks
 - Baseline monitoring for all stocks
- 10 recommendations
 - Budget/staff increases
 - More training, partnerships, research
 - Increase awareness & credibility



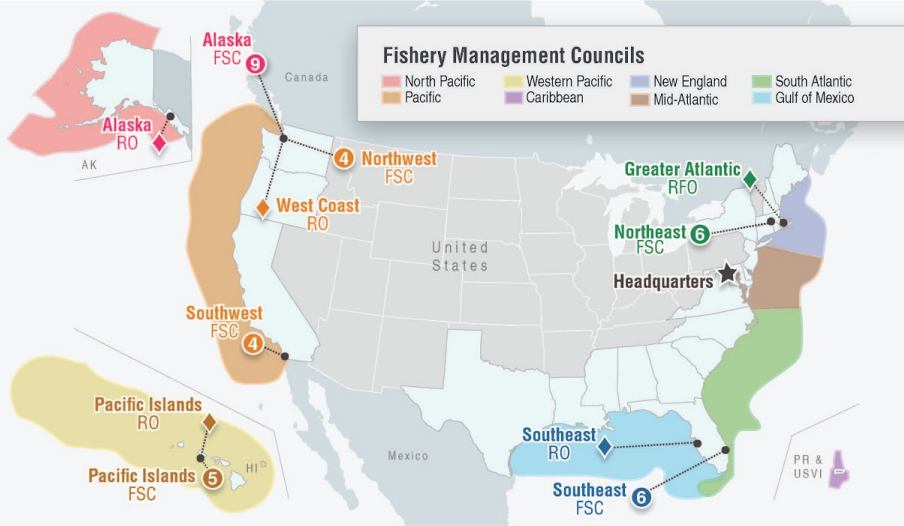
What is the SAIP?

Results of the 2001 SAIP



Assessment Program Overview

NOAA Fisheries Science to Support Fisheries Management



□ The Western Pacific FMC manages additional regions not depicted here.

NOAA Fisheries Organization

Regions	Regional Offices (RO)	Fishery Science Centers (FSC)	Labs / Field Stations / Facilities
		# Number of Fishery Management and/or Advisory Organizations supported by Science Center	
Alaska	Alaska RO Juneau, AK	9 Alaska FSC Seattle, WA	AK Anchorage • Baranof Island • Kodiak • Dutch Harbor • Juneau • Kodiak • Pribilof Islands WA Seattle OR Newport
West Coast	West Coast RO Seattle, WA	5 Northwest FSC Seattle, WA	WA Manchester • Pasco • Seattle • Mukitoo
		4 Southwest FSC La Jolla, CA	CA Arcata • Granite Canyon • La Jolla • Pacific Grove • Piedras • Santa Cruz Antarctica • King George Isl. • Livingston
Pacific Islands	Pacific Islands RO Honolulu, HI	5 Pacific Islands FSC Honolulu, HI	HI Honolulu U.S. Territories • American Samoa • Guam • Northern Mariana Islands
Greater Atlantic	Greater Atlantic RFO* Gloucester, MA	6 Northeast FSC Woods Hole, MA	ME Orono RI Narragansett NJ Highlands
			MA Woods Hole CT Milford
Southeast	Southeast RO St. Petersburg, FL	6 Southeast FSC Miami, FL	NC Beaufort MS Pascagoula • Stennis TX Galveston
			FL Panama City • Miami LA Lafayette

* Regional Fisheries Office

Fishery Management & Advisory Organizations

▲ Advisory (not management) organization.

Organization	Supported by NOAA Fisheries Science Center(s)	Managed Ecosystem	Managed Stocks
ADFG	Alaska Dept. of Fish & Game (AK)	Gulf of Alaska & Bering Sea - Sub-Arctic	Numerous Alaska coast stocks
CCAMLR	Commission for the Conservation of Antarctic Living Marine Resources (SW)	Antarctic	Toothfishes, Icefish, & Krill
CCSBT	Commission for the Conservation of Southern Bluefin Tuna (AK)	Southern Hemisphere Oceans	Southern bluefin tuna
IATTC	Inter-American Tropical Tuna Commission (SW, PI)	Eastern Pacific Ocean - Sub-Arctic to Tropical	Tunas, Billfish, Sharks
IPHC	Int'l Pacific Halibut Commission (AK)	Pacific Coast - Temperate to Sub-Arctic	Pacific halibut
ISCTTS*	Int'l Scientific Committee for Tuna & Tuna-Like Species in the Northern Pacific Ocean (PI)	Northern Pacific Ocean	Tunas, Billfish, Sharks
NPFC	Northern Pacific FC (AK)	Northern Pacific Ocean - Sub-Arctic to Sub-Tropical	Numerous groundfish, Pelagics, Invertebrates
NPFMC	Northern Pacific FMC (AK)	Gulf of Alaska & Bering Sea - Sub-Arctic	Groundfish, Salmon, Crab, Scallops
PFMC	Pacific FMC (AK, NW, SW)	California Current	Salmon, Groundfish, pelagics, HMS
PSC*	Pacific Salmon Commission (AK, NW, SW)	Pacific Coast, Bays, Rivers, & Estuaries	Pacific salmon stocks
PSMFC*	Pacific States Marine FC (AK, NW, SW)	Pacific Coast, Bays, Rivers, & Estuaries	Numerous Pacific coast stocks
PWS	Pacific Whiting Treaty (W)	California Current - Temperate	Pacific whiting (Pacific hake)
SPRFMO	Southern Pacific Regional FMO (AK, PI)	Southern Pacific Ocean	Jack mackerel, Chub mackerel, Squids
WCPCF	Western & Central Pacific FC (PI)	Western & Central Pacific Ocean	Tunas, Billfish, Sharks
WPFMC	Western Pacific FMC (PI)	Insular Pacific Hawaii - Tropical	Bottomfish, Reef fishes, HMS, Invertebrates
ASMFC	Atlantic States Marine FC (NE, SE)	U.S. East Coast, Bays, & Estuaries	Coastal groundfish, Pelagics, Invertebrates, Anadromous fishes
CFMC	Caribbean FMC (SE)	Caribbean Sea - Tropical	Reef fishes, Invertebrates, Migratory pelagics
GOMFMC	Gulf of Mexico FMC (SE)	Gulf of Mexico - Tropical/Subtropical	Reef fishes, Invertebrates, Migratory pelagics
GSMFC	Gulf States Marine FC (SE)	Coastal Gulf of Mexico - Tropical/Subtropical	Gulf menhaden, Blue crab, Many commercial/rec. stocks
ICCAT	Int'l Commission for the Conservation of Atlantic Tunas (SE)	Atlantic Ocean - Sub-Arctic to Tropical	Tunas, Billfish, Sharks
MAFMC	Mid-Atlantic FMC (NE)	Northeast U.S. Continental Shelf (Mid-Atlantic Bight)	Groundfish, Clams & quahogs, Pelagic fishes & squids
NAFO	Northeast Atlantic FO (NE)	Northeast Atlantic Ocean	Groundfish, Squid, Shrimp
NASCO	North Atlantic Salmon Conservation Org. (NE)	Northeast U.S. Continental Shelf (Georges Bank) - Temperate Climate	Georges Bank groundfish stocks shared by U.S. & Canada
NEFMC	New England FMC (NE)	Northeast U.S. Continental Shelf (New England)	New England groundfish, Sea scallops, Red crab, Atlantic herring, Atlantic salmon
SAFMC	South Atlantic FMC (SE)	Southeast U.S. Continental Shelf	Reef fishes, Invertebrates, Migratory pelagics
TMGC	Transboundary Mgmt. Ordinance Committee (NE)	Northeast U.S. Continental Shelf (Georges Bank) - Temperate Climate	Georges Bank groundfish stocks shared by U.S. & Canada

Science Centers

- AK Alaska
- NW Northwest
- SW Southwest
- NE Northeast
- SE Southeast
- PI Pacific Islands

Geography

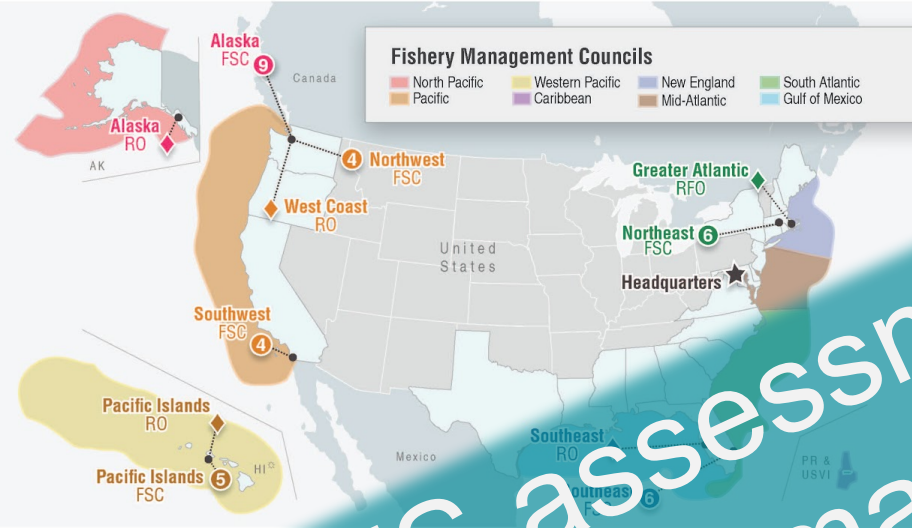
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- TX - Texas | U.S. - United States
- USVI - U.S. Virgin Islands | WA - Washington

Shorthand / Acronyms

- Dept. Department
- FC Fisheries Commission
- FMC Fisheries Management Council
- FMO Fisheries Management Organization
- FO Fisheries Organization
- HMS Highly Migratory Species
- Int'l International
- Isl. Islands
- Mgmt. Management
- Org. Organizational
- Rec. Recreational (fisheries)

Assessment Program Overview

NOAA Fisheries Science to Support Fisheries Management



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ISCCTS	International Commission for the Scientific Study of Tuna & Tuna-Like Species in the North Pacific Ocean	Northern Pacific Ocean	Tunas, Billfish, Sharks
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- Int'l - International
- Isl. - Islands
- Mgmt. - Management
- Org. - Organization
- Rec. - Recreational (fisheries)

NMFS assessments support and numerous management and advisory organizations

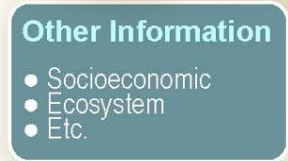
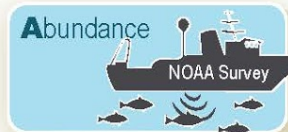
Assessment Program Overview

NOAA Fisheries Stock Assessment Process The Science Behind Sustainable Fisheries Management



Healthy Fish Stocks
= Sustainable Jobs,
Fisheries, and Food

DATA COLLECTION



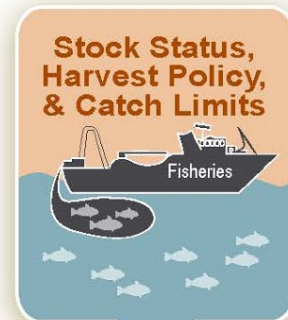
MODELING



ADVICE



MANAGEMENT

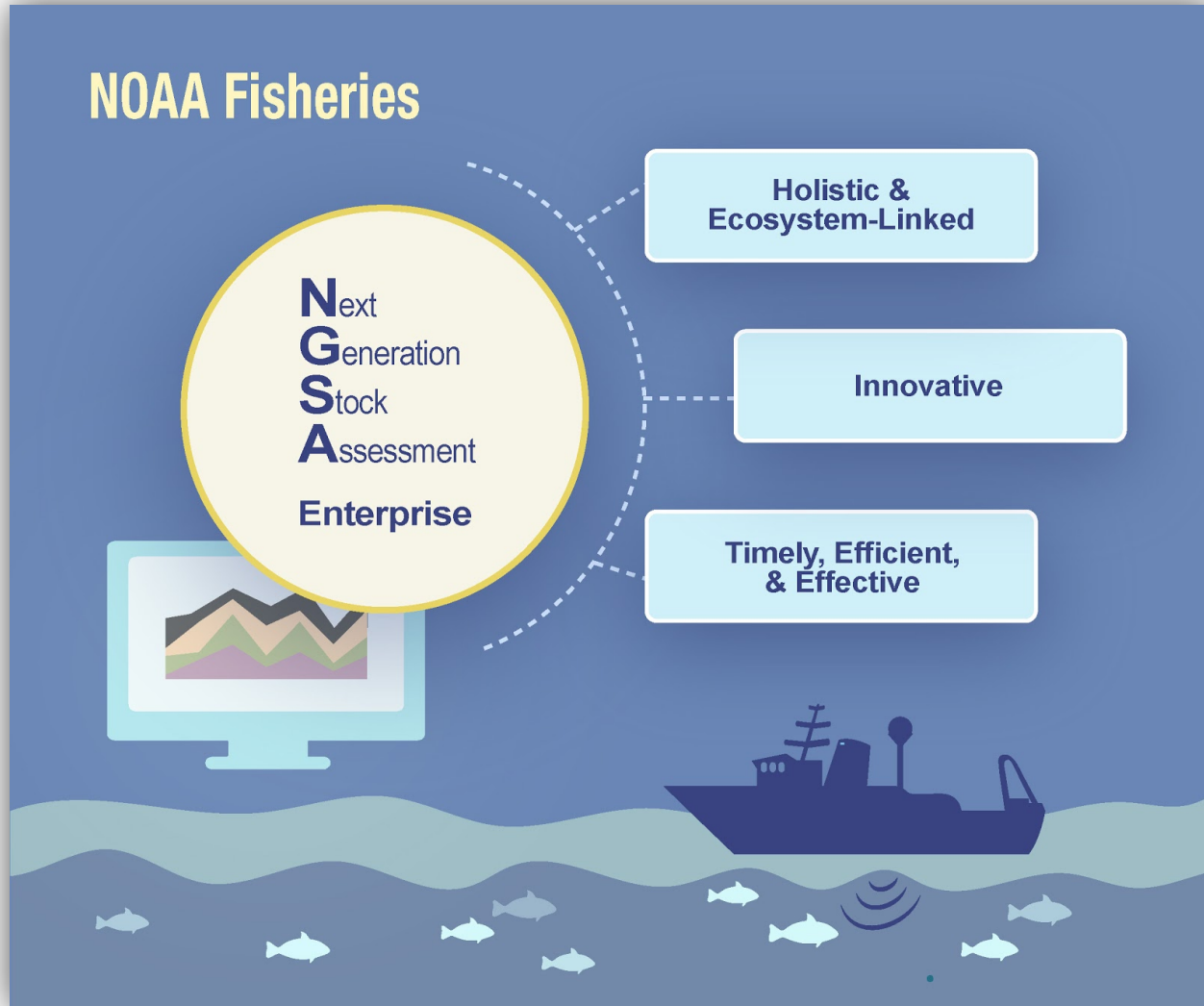


STAKEHOLDER PARTICIPATION

Assessment Program Overview

	Current Regional Peer Review Processes**				
	SEDAR	SAW/SARC	STAR	WPSAR	North Pacific Plan Teams
Year initiated	2002	1985	1998	2010	1989
Region(s) covered	Southeast coast, Gulf of Mexico, Caribbean	Northeast coast	West coast	Pacific Islands	Gulf of Alaska, Bering Sea, Aleutian Islands
Council(s) supported	SAFMC, GMFMC, CFMC	NEFMC, MAFMC	PFMC	WPFMC	NPFMC
Other entities supported	ASMFC, GSMFC, HMS Sharks	ASMFC	-	-	-
Science center(s) participating	SEFSC	NEFSC	NWFSC, SWFSC	PIFSC	AFSC
Typical review panel	CIE and SSC	CIE and SSC	SSC, CIE, and other	SSC, PIFSC, CIE, and other	SSC, CIE (roughly every 5 years per stock)
	**Is this info correct?				

Next Generation



Next Generation Holistic and ecosystem-linked

Potential Linkages Between Ecosystem/Socioeconomic Drivers and Fish/Fisheries

Drivers

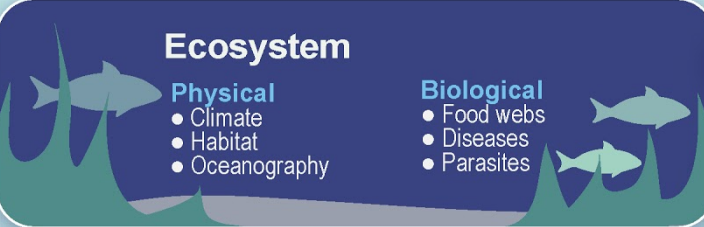
Ecosystem

Physical

- Climate
- Habitat
- Oceanography

Biological

- Food webs
- Diseases
- Parasites



Socioeconomic

Human Behavior

- Incentives
- Risks & uncertainties
- Demographics

Human Organization

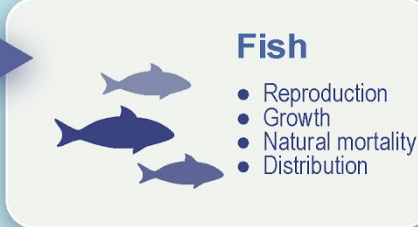
- Market dynamics
- Institutions
- Infrastructure



Potential Effects

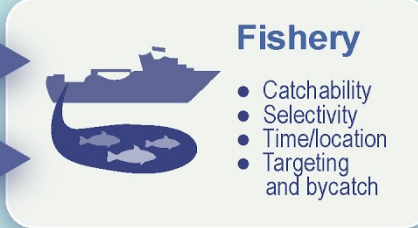
Fish

- Reproduction
- Growth
- Natural mortality
- Distribution



Fishery

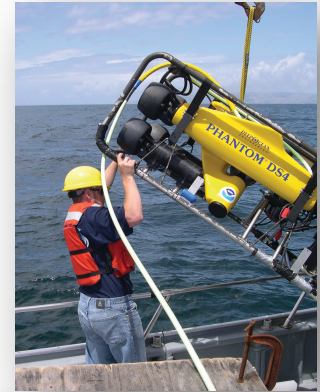
- Catchability
- Selectivity
- Time/location
- Targeting and bycatch



Next Generation

Innovative science recommendations

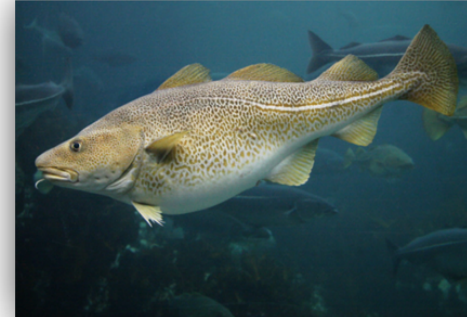
- Data collection & processing
 - National WG & data gap analysis
 - Survey calibration – absolute abundance, shifting distributions
 - Electronic & advanced tech – electronic monitoring & reporting, acoustics, optics, eDNA, unmanned, ...
 - Expand industry partnerships
 - Improve data management, access,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



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



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



Next Generation

Timely, efficient, & effective

- Separate research/operational assessment tracks
 - Operational assessments use previously reviewed methods
 - More streamlined preparation, conduct, documentation, & review — focused terms of reference
 - Research assessments conducted as needed to improve assessments; respond to recommendations
 - More thorough documentation & review, not tied to mgmt. cycle
 - Once accepted, improvements transitioned to operations

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.

Request for Review

Proposed deadline: Mid-June, 2017

- Each Council – single consolidated document of comments (with line number references)

NMFS steps following Council comment:

- Layout/design
- Final NMFS clearance
- **Release: Sept. 2017**



Thank You!

