

**NOAA**  
**FISHERIES**

# Implementing a Next Generation Stock Assessment Enterprise

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

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*NOAA Fisheries' Scientific Programs and Chief Science Advisor*

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

June 2017

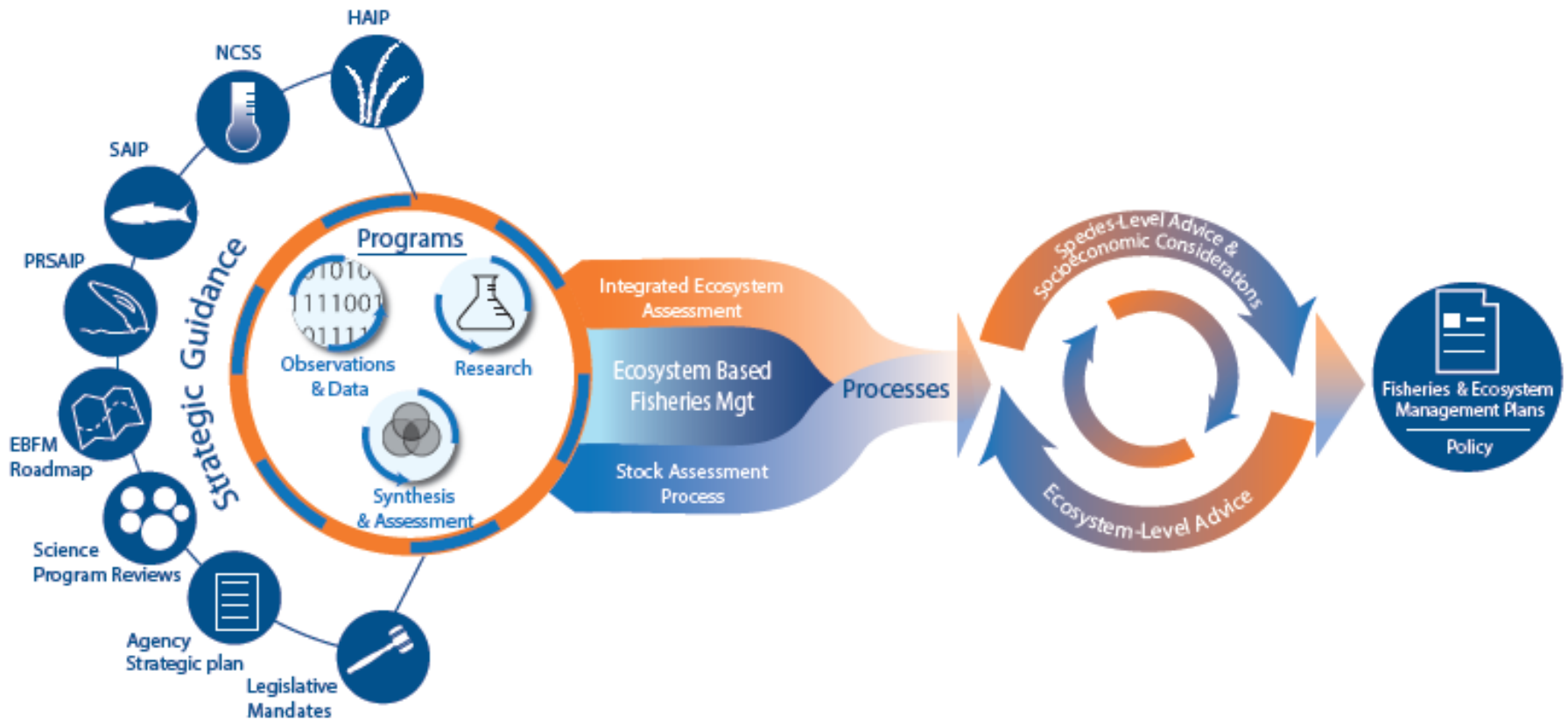
# Outline

- **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

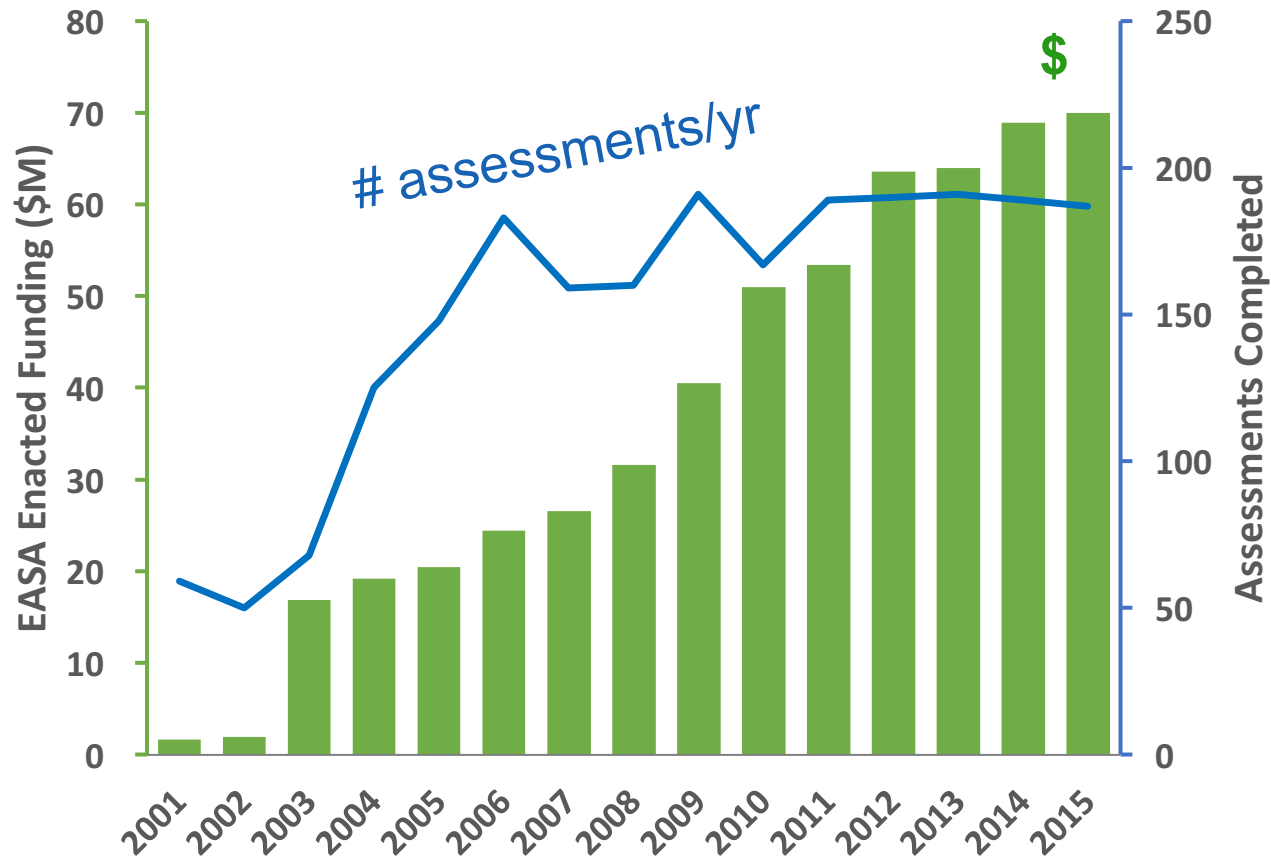
- “Tiers of Assessment Excellence”
  - Initial push for Tier 2
  - Production models for core stocks
  - Baseline monitoring for all stocks
- 10 recommendations
  - Budget/staff increases
  - More training, partnerships, research
  - Increase awareness & credibility





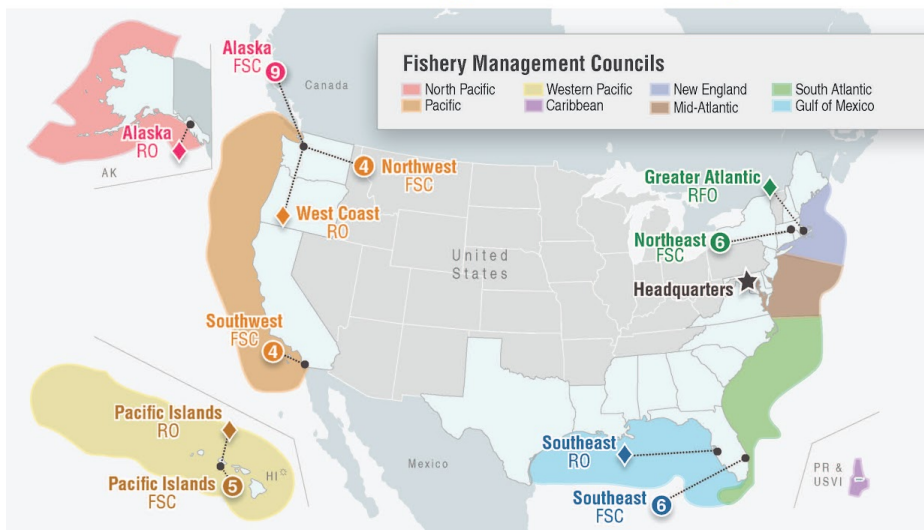
# What is the SAIP?

## 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) # Number of Fishery Management and/or Advisory Organizations supported by Science Center	Labs / Field Stations / Facilities
Alaska	<b>Alaska RO</b> Juneau, AK	<b>9 Alaska FSC</b> Seattle, WA	AK   Anchorage • Baranof Island • Kodiak • Dutch Harbor • Juneau • Kodiak • Pribilof Islands WA   Seattle OR   Newport
West Coast	<b>West Coast RO</b> Seattle, WA	<b>5 Northwest FSC</b> Seattle, WA <b>4 Southwest FSC</b> La Jolla, CA	WA   Manchester • Pasco • Seattle • Mukilteo CA   Arcata • Granite Canyon • La Jolla • Pacific Grove • Piedras • Santa Cruz Antarctica   • King George Isl. • Livingston
Pacific Islands	<b>Pacific Islands RO</b> Honolulu, HI	<b>5 Pacific Islands FSC</b> Honolulu, HI	HI   Honolulu U.S. Territories   • American Samoa • Guam • Northern Mariana Islands
Greater Atlantic	<b>Greater Atlantic RFO*</b> Gloucester, MA	<b>6 Northeast FSC</b> Woods Hole, MA	ME   Orono RI   Narragansett NJ   Highlands MA   Woods Hole CT   Milford
Southeast	<b>Southeast RO</b> St. Petersburg, FL	<b>6 Southeast FSC</b> 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
ISCCTS*	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
WCFC	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
GOMFC	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. Guidance Committee (NE)	Northeast U.S. Continental Shelf (Georges Bank) - Temperate Climate	Georges Bank groundfish stocks shared by U.S. & Canada

### Science Centers

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

### Geography

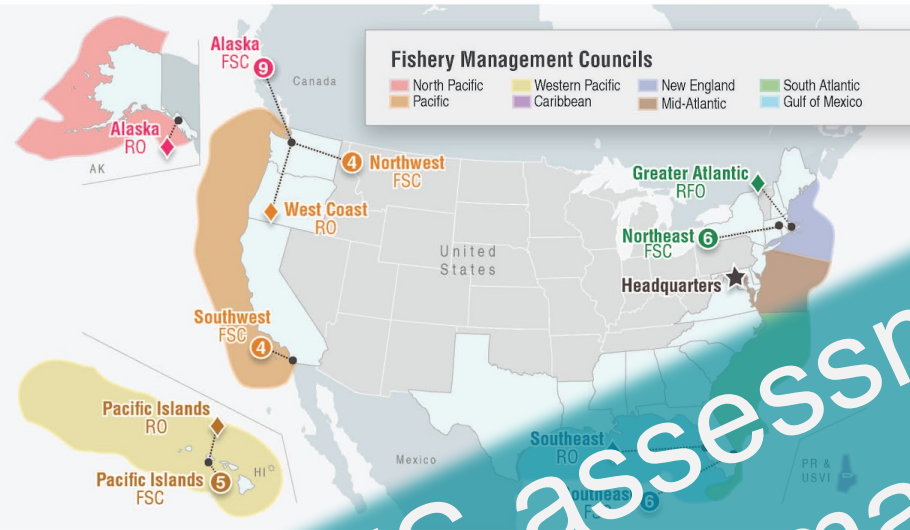
AK - Alaska | CA - California | CT - Connecticut  
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OR - Oregon | PR - Puerto Rico | RI - Rhode Island  
TX - Texas | U.S. - United States  
USVI - U.S. Virgin Islands | WA - Washington

### Shorthand / Acronyms

Dept. - Department  
FMO - Fisheries Management Organization  
FMC - Fisheries Management Council  
FSC - Fisheries Science Center  
HMS - Highly Migratory Species  
Int'l - International  
Is. - Islands  
Mgmt. - Management  
Org. - Organization  
Rec. - Recreational (fisheries)

# Assessment Program Overview

## NOAA Fisheries Science to Support Fisheries Management



## NOAA Fisheries Organization

Regions	Regional Office (RFO)	Fishery Science Centers (FSC)	Labs / Field Station	Facilities
Alaska	Alaska RFO Juneau, AK	Alaska FSC 9	Anchorage Sitka Kodiak Dutch Harbor	WA   Seattle OR   Newport
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Pacific Islands	Pacific Islands RFO Honolulu, HI	Pacific Islands FSC 5	La Jolla, CA Hawaii U.S. Territories American Samoa Guam Northern Mariana Islands	CA   San Diego HI   Honolulu PR   San Juan VI   St. Thomas
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CCSBT	Commission for the Conservation of Southern Bluefin Tuna	Southern Hemisphere Oceans	Southern Bluefin Tuna
IATTC	Inter-American Tropical Tuna Commission	Eastern Pacific Ocean - Sub-Arctic to Tropical	Bluefin Tuna, Yellowfin Tuna
IPHC	Int'l Pacific Halibut Commission	Pacific Coast - Temperate Sub-Arctic	Pacific Halibut
ISCCTS	International Commission for the Scientific Study of Tuna & Tuna-Like Species in the North Pacific Ocean	North Pacific Ocean	Tunas, Billfish, Sharks
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### Science Centers

AK	Alaska	NE	Northeast
W	West Coast	SE	Southeast
SW	Southwest	PI	Pacific Islands

### Geography

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		Rec.	Recreational (fisheries)

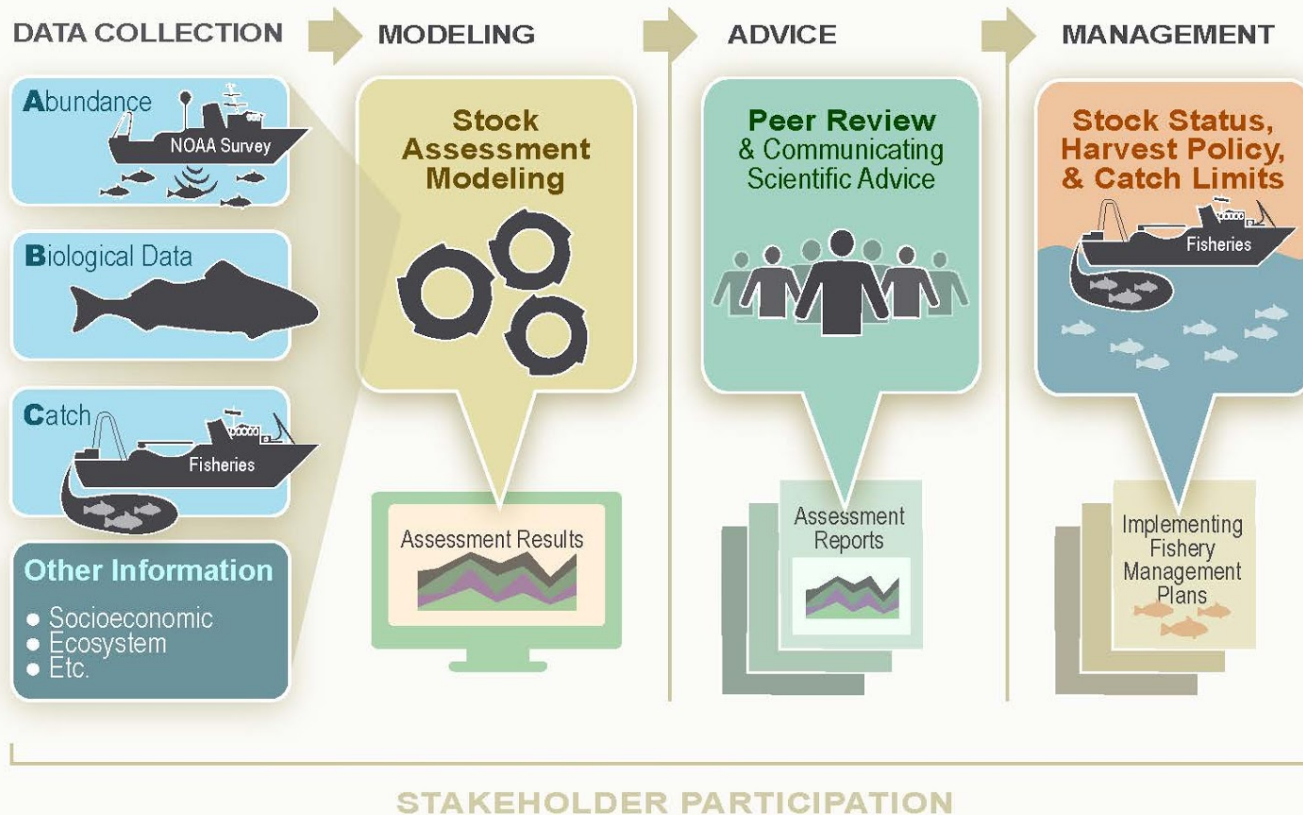


# Assessment Program Overview

## NOAA Fisheries Stock Assessment Process The Science Behind Sustainable Fisheries Management



**Healthy Fish Stocks**  
= Sustainable Jobs,  
Fisheries, and Food

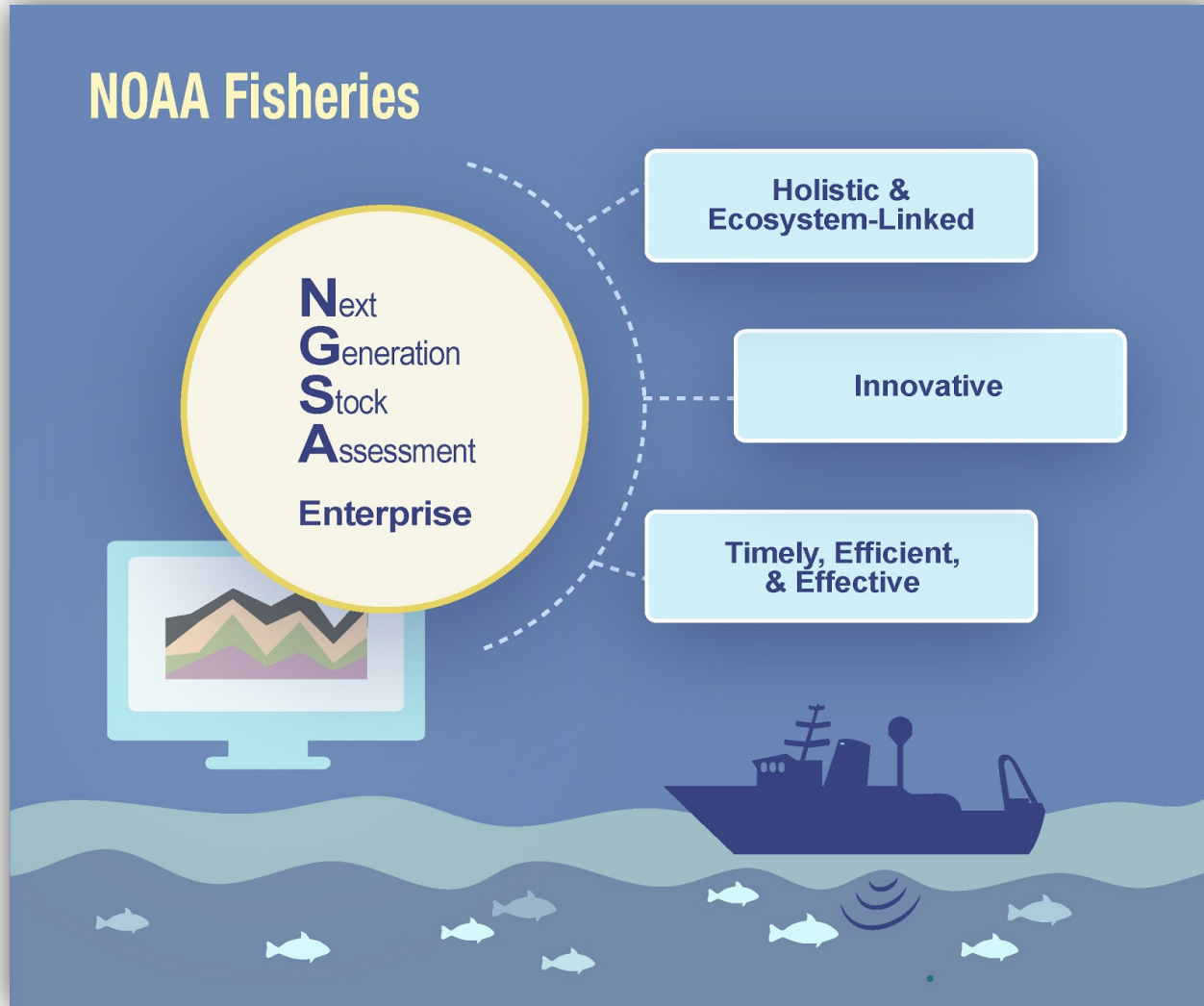


# Assessment Program Overview

	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?				



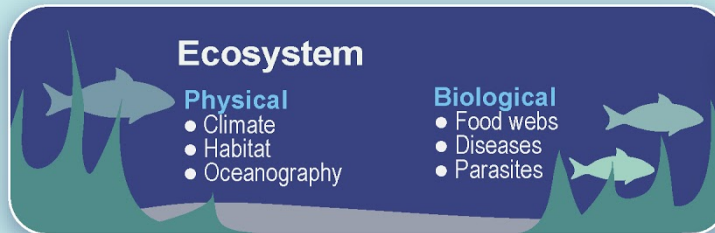
# Next Generation



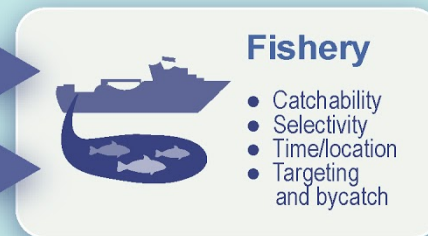
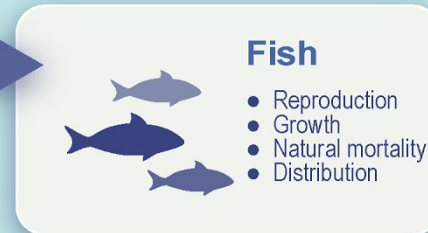
# Next Generation Holistic and ecosystem-linked

## Potential Linkages Between Ecosystem/Socioeconomic Drivers and Fish/Fisheries

### Drivers



### Potential Effects





# Next Generation

## Innovative science recommendations

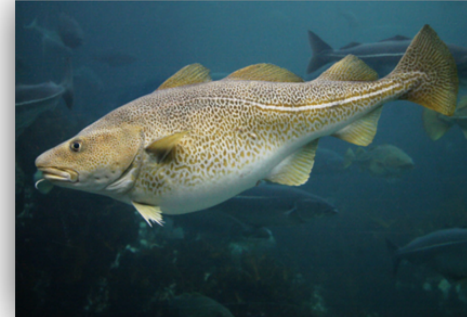
- Data collection & processing
  - National WG & data gap analysis
  - Survey calibration – absolute abundance, shifting distributions
  - Electronic & advanced tech – electronic monitoring & reporting, acoustics, optics, eDNA, unmanned, ...
  - Expand industry partnerships
  - Improve data management,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

