



**NOAA
FISHERIES**

Overview: The Office of Science and Technology's Stock Assessment Program

Office of Science & Technology
Stock Assessment Science Program Review
September 9-12, 2014 – Silver Spring, MD

Stephen K. Brown, Ph.D., Division Chief
Kathleen Wynter, Stock Assessment Coordinator
Assessment and Monitoring Division (ST4)

Outline

- **Program Goal**
- **Stock Assessment Concepts**
- **How We Operate**
 - **Organization, reporting/communication**
- **Activities**
 - **Program development**
 - **Program implementation**
- **Staff**
- **Questionnaire: Feedback from Center Directors**

ST's Stock Assessment Program Goal

- To enhance the ability of the NMFS science centers to provide fishery managers with high quality, reliable, transparent, and timely stock assessments.
- This is accomplished by
 - Identifying and addressing national and regional assessment-related priorities through targeted projects and programs
 - Managing related budget lines
 - Facilitating reporting and communication

Stock Assessment Concepts

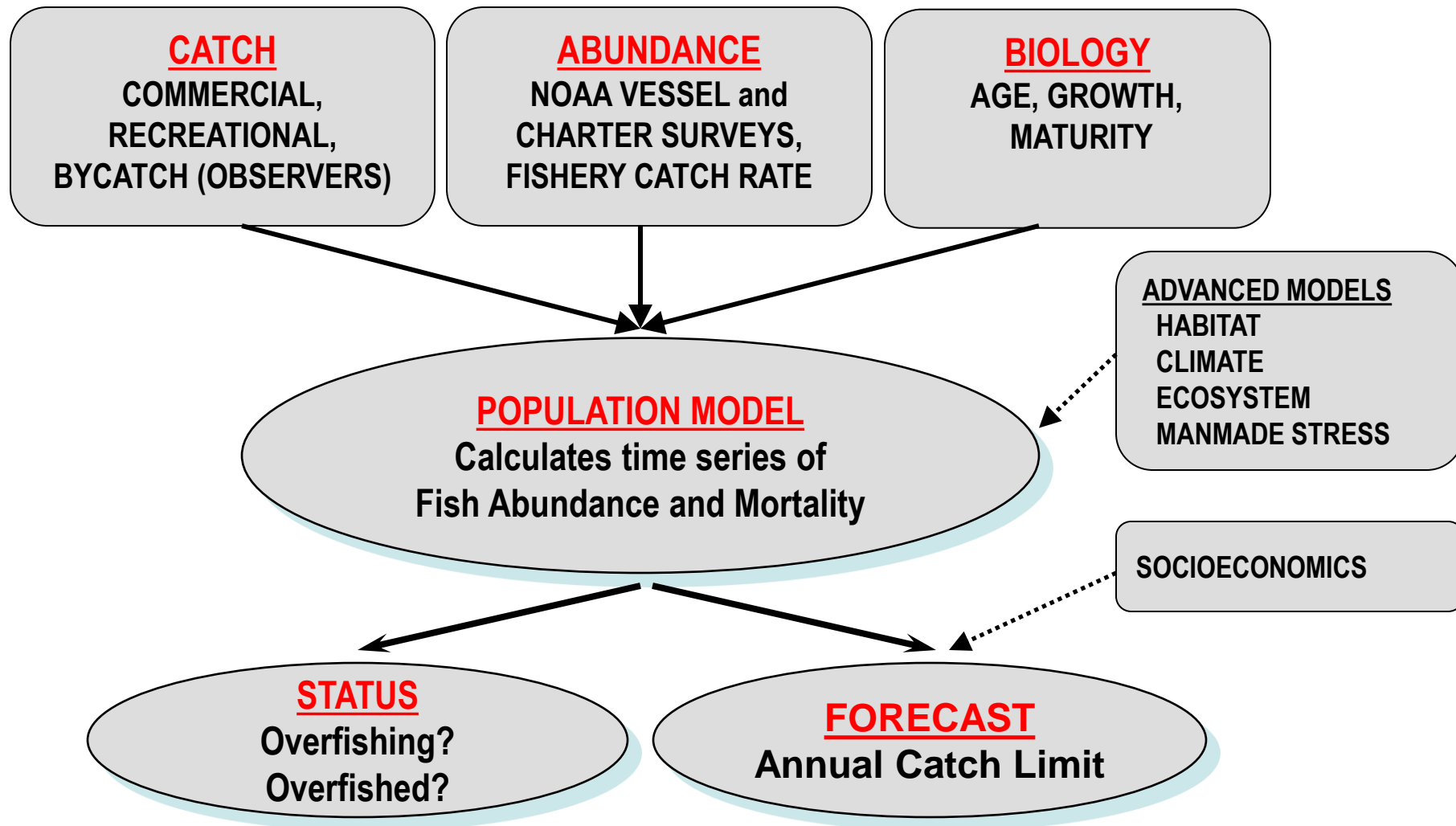
Stock Assessment Definition

- Collecting, analyzing, and reporting demographic information for the purpose of determining the effects of fishing on fish populations

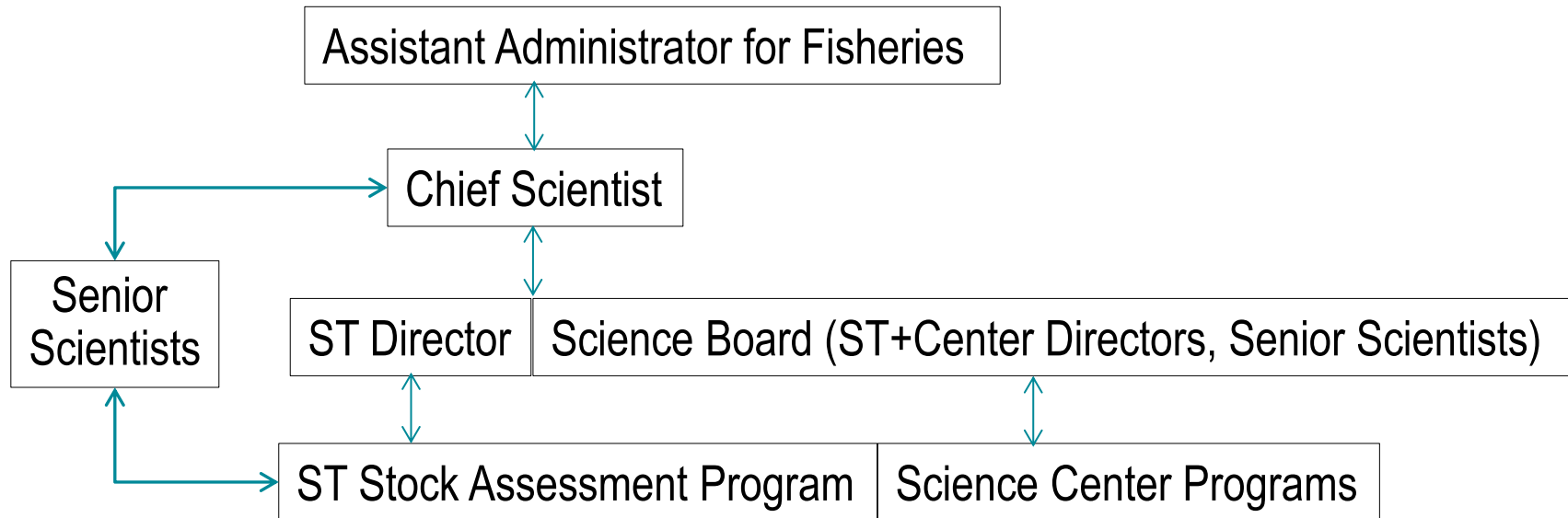
Magnuson-Stevens Act - National Standard 1

- “Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.”

Stock Assessment Components



How We Operate



- Science Board commissions a work group
 - Members & chair from ST and science centers
 - ST coordinates and funds the work group
 - ST coordinator/work group chair report back to Science Board
- Senior scientists oversee and advise programs and work groups
 - Senior scientist for stock assessments most active for stock assessment program

Identifying and Executing National Priorities

- Determine national capabilities, identify gaps and resource needs
- Advocate for assessment program at national level
 - Communicate needs to leadership and Congress via Federal budget process and briefings
- Execute ST's stock assessment program with a focus on national priorities
- Track performance at national level

Overview of the Strategic Planning, Budgeting and Execution Process

Identify priorities, gaps/needs and make plans on how to address

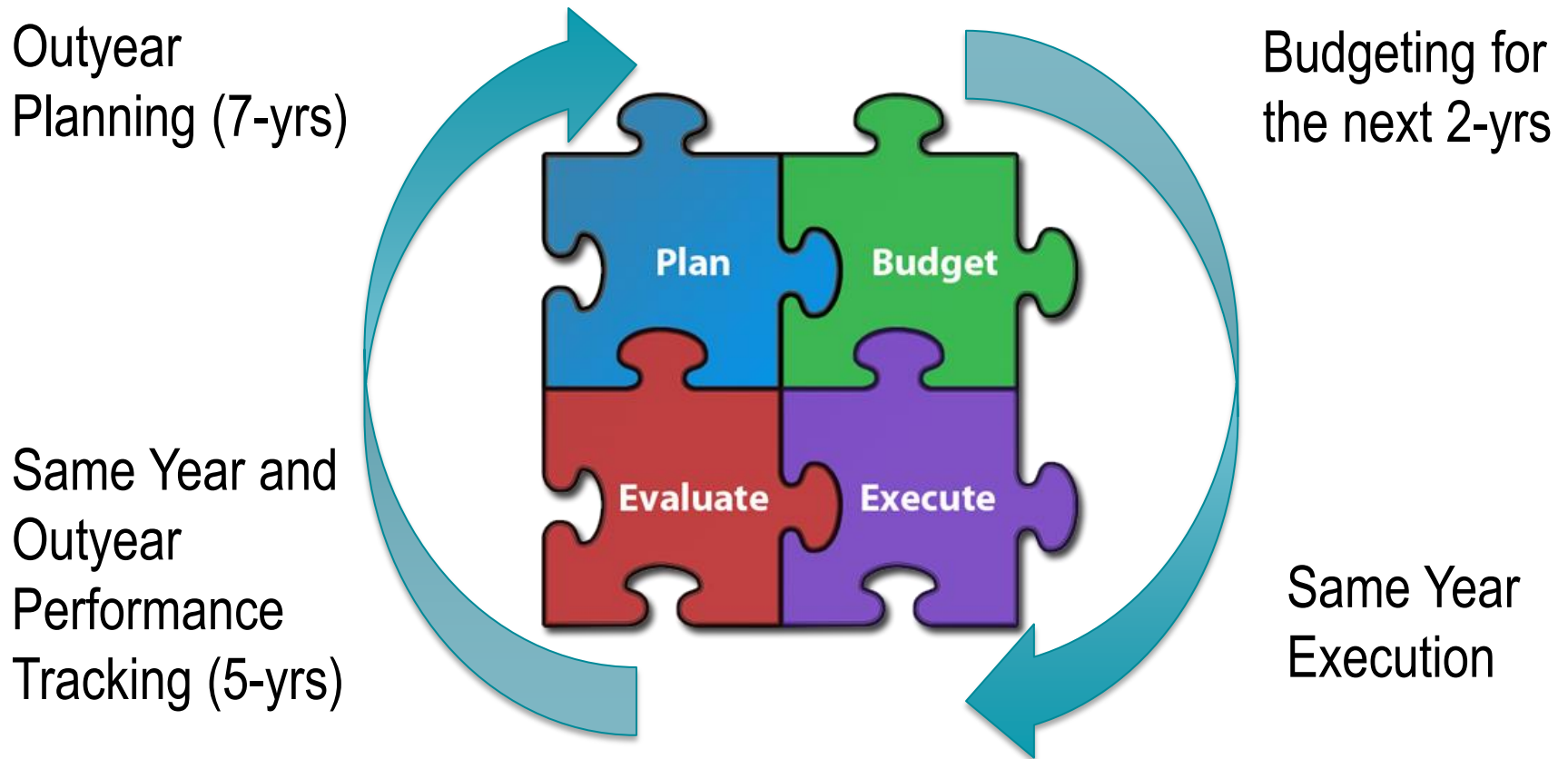


Communicate capabilities/gaps/needs through Federal Budget Process

Track performance

Execute priorities and track stock assessment budget

Overview of the Strategic Planning, Budgeting and Execution Process



Strategic Planning



Identify national priorities and advocate for the national stock assessment program

- Review planning documents and update with emerging issues
- Communicate throughout NMFS
 - Center planners and scientists, Science Board, Chief and Senior Scientists, ST Director...

Identify national gaps and resource needs

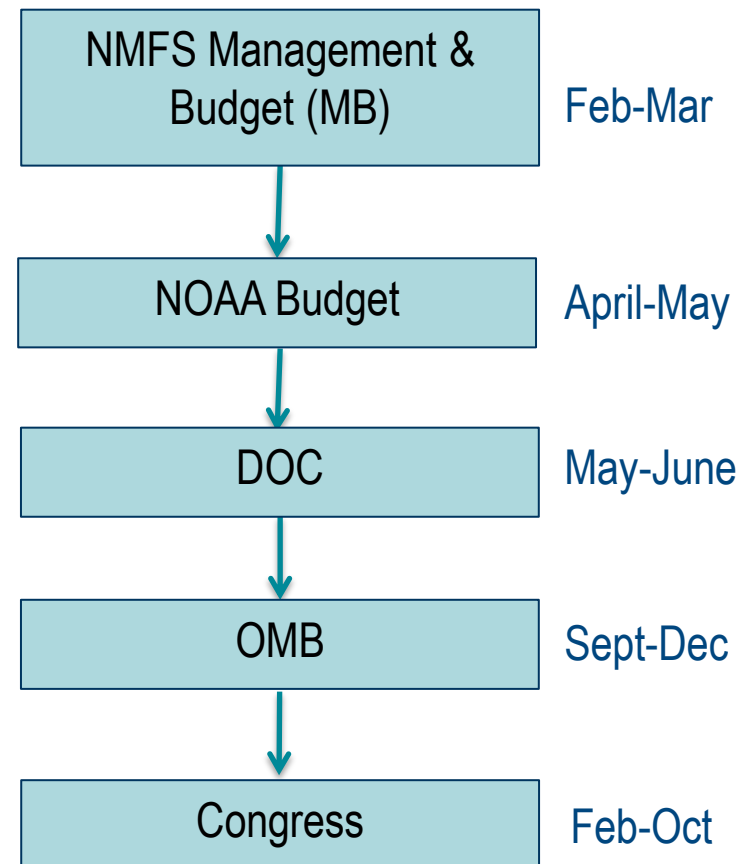
- Program reviews and communication within NMFS
- Strategic documents (e.g., SAIP)
- Track emerging programs of high importance

Federal Budget Process



Budget Submissions - National

- Develop proposals for MB and build strong business cases for budget increases
- Respond to programmatic questions and defend requested increases as necessary
- Present impacts of varying budget scenarios and discuss trade-offs
- Conduct briefings NMFS/NOAA/DOC/OMB/Congress



National Stock Assessment Enterprise FY14 Allocations

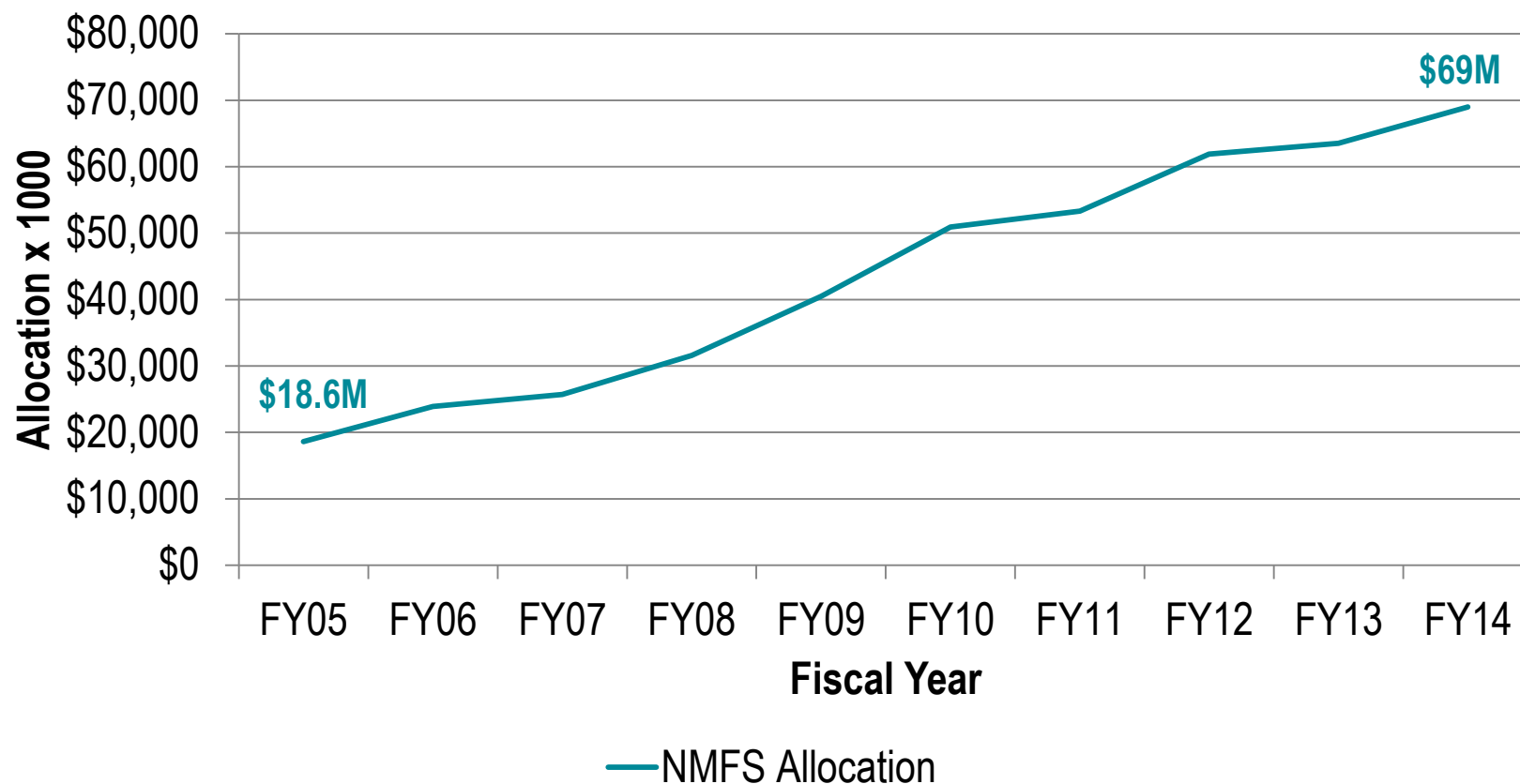


Budget Line	FY14 Allocation
Expand Annual Stock Assessments	\$69 million
Survey and Monitoring	\$24 million
Fisheries Research and Management Base	\$83 million
Fisheries Statistics	\$22 million
Fisheries Information Networks	\$22 million
Observers & Training	\$43 million
American Fisheries Act	\$4 million
Cooperative Research	\$12 million
Regional Studies – SEAMAP	\$5 million
Marine Resources Monitoring, Assessment & Prediction Program	\$0.8 million
TOTAL from NMFS Budget	\$285 million
TOTAL from OMAO Marine Operations Budget	\$16 million

Expand Annual Stock Assessments - National Historical Trends



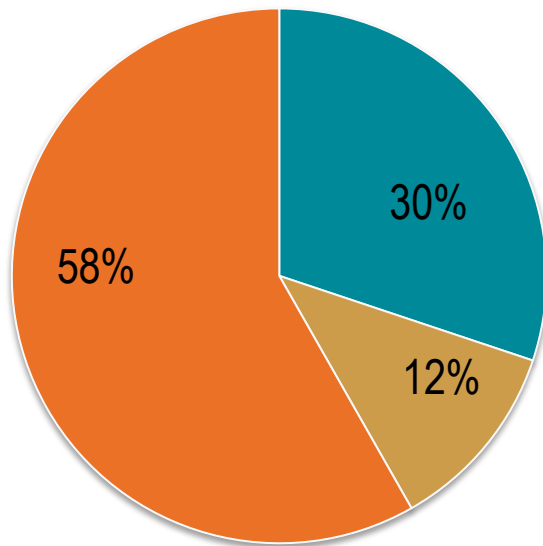
Expand Annual Stock Assessments



Expand Annual Stock Assessments FY14 Allocations



National Expand Annual Stock Assessments - FY14 \$69M



■ ST-Transfers ■ ST - Executed ■ Other

ST received 42% of EASA

- 30% transferred to address national stock assessment priorities in the regions
- 12% held in ST (but work not necessarily conducted by ST, eg. west coast charters)

ST's Role in Making Funding Decisions



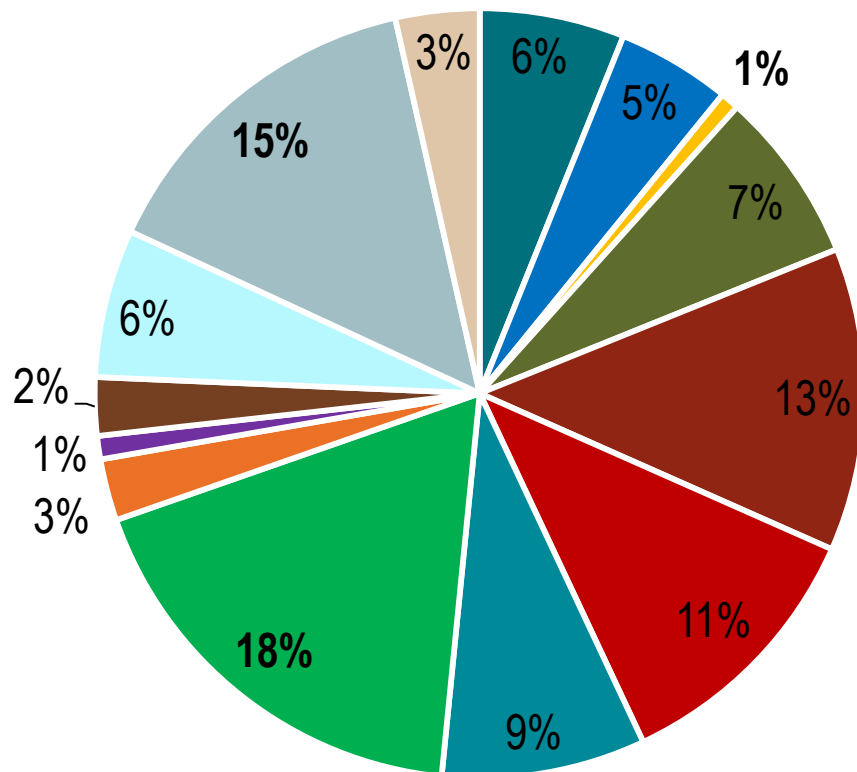
Develop ST spend plan – internal & regional needs

- Internal
 - Fund long standing priorities (e.g., RFPs)
 - Internal staff (salaries, fellows, workshop travel, etc)
- Regional
 - Address priorities identified by Leadership (Science Board, Chief Scientist, Senior Science Advisors, etc.)
 - Address priorities identified by program reviews
 - Bail outs due to unforeseen circumstances (ship breakdowns; buyback of days-at-sea)

Expand Annual Stock Assessments ST Activities



FY14 EASA – Activities Supported by ST
(Transfers and Internal)



- Academic Support
- Climate Sciences
- Economics and Social Science
- Fish Assessments
- **Fishery-Independent Surveys**
- **Advanced Sampling Technology**
- Fisheries Oceanography / Ecosystems
- **Fishery-Dependent Data Collection**
- Habitat Assessments
- International Science
- Protected Species / Environmental Compliance
- ST Internal
- **Base Increases - Permanent BOPs**
- Territorial Initiative

Tracking Expand Annual Stock Assessments



Budget Tracking Database

- Develop annual spend plans
- Track actual expenditures by program and/or purpose
- Able to query useful information to respond to budget related inquiries

Sample Question :How much did ST spend on RFPs from Expand Annual Stock Assessments in FY14?



RFP	FY14 Amount
Advanced Sampling Technology Working Group	\$841,000
Fish Assessments (methods & improvements)	\$1,057,178
Habitat Assessments	\$706,535
Ecosystems	\$1,000,000
International	\$250,000
Protected Resources (supplements Sea Turtle RFP)	\$35,647
TOTAL	\$3,890,360

Tracking Stock Assessment Performance



Government Performance and Results Modernization Act (GPRA-MA) 2010

- Long-term priority goals (4yrs)
- Performance plans (2yrs)
 - Annual goals and performance targets
 - Quarterly performance targets and milestones
- Quarterly priority progress reviews
- Performance reports

**Increased accountability and
transparency for
government programs**

**Useful tool for
responding to
stakeholder inquiries**

Tracking Stock Assessment Performance



Milestones & Anticipated Accomplishments (Quarterly/Annual)

- ST program specific
- National level

Stock assessment performance metrics (National)

- Develop performance measures and targets (quarterly/annual)
- Track and communicate progress (quarterly/annual)
 - Species Information System (SIS)
 - Stock assessment quarterly reports

<https://www.st.nmfs.noaa.gov/stock-assessment/FishStockReports/index>

Tracking Stock Assessment Performance



Species Information System (<https://www.st.nmfs.noaa.gov/sisPortal/>)

- Intranet site and public portal with up-to-date information on stock status and stock assessment results
 - Report on individual stocks
 - Mapping tool
 - Quarterly reports posted on ST website
 - Performance measurement and reporting (GPRA)
- Plans to develop and implement assessment prioritization software

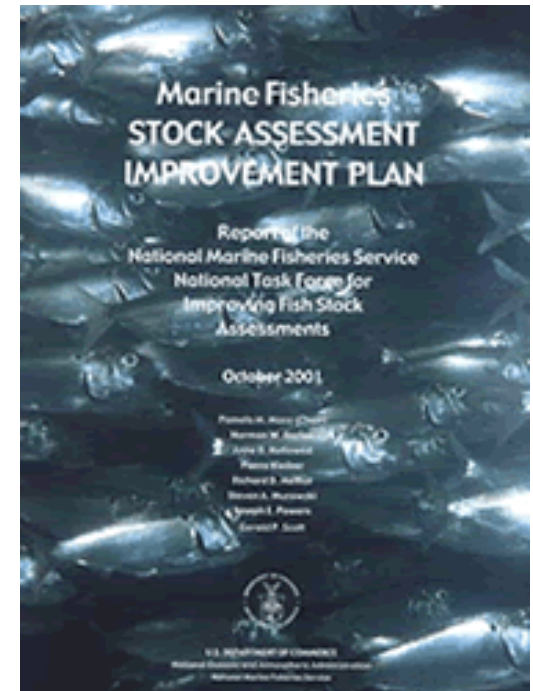
ST's Stock Assessment Activities

- Program Development
 - Stock Assessment Improvement Plan
 - Capacity Building
 - Technical Development
- Program Implementation

Stock Assessment Improvement Plan

SAIP published in 2001

- Developed by ST-led work group
- Established system for recording assessment quality & frequency
- Defined Tiers of Excellence
- Estimated resource needs
- Led to “Adequate Assessment” performance measure for FSSI stocks
- Provided basis for annual budget requests
 - \$69M appropriated in FY14



A New Stock Assessment Improvement Plan

Necessary to improve strategic planning

- Need for prioritization rather than moving toward % adequate (Tier 3)
- % adequate has plateaued

Approach

- Led by Senior Scientists (Methot and Link)
- Large WG: 28 scientists across science centers, and Offices of ST and Sustainable Fisheries

Capacity Building

Quantitative Ecology and Socioeconomics Training (QUEST) Program

- Five permanent university faculty positions & two rotating research faculty to educate and train the next generation of scientists

NMFS/Sea Grant graduate fellowships

- Provide graduate fellowships in population dynamics and natural resource economics

Related (non-ST) Efforts

- Living Marine Resource Cooperative Science Center
- Recruiting-Training-Research Program
- Regional programs

Working Groups and RFPs – Structure and Function

Standing working groups commissioned by Science Board to address topics of national importance

- Science center representatives and chair
- ST coordinates and funds
- Typical activities
 - Conduct annual internal RFP
 - R&D focus; ~1-2 year projects; Max funding ~\$100K/year
 - Serve as conduit between HQ and science centers
 - Develop materials as needed (Q&A's, white papers, etc.)

Strategic Initiatives have expanded scope for high-priority topics

- Goal is operational capability
- 3-5 year duration, then project and work group sunset
- Funding \$600K/year

FY14 Working Group/RFP Overview

Name	\$K/year	# Funded projects/yr
Stock Assessment Analytical Methods	\$532	7
Improve a Stock Assessment	\$526	10
Fisheries And The Environment	\$1,359	10
Habitat Assessment	\$707	8
Cooperative Research	\$1,500	7
International Science	\$250	10+1 partial
Advanced Sampling Technologies	\$841	9
Electronic Monitoring - National Observer Program	\$900	5
Fisheries Information System	\$2,000	13
Marine Recreational Information Program	\$2,600	14
Sea Turtle Assessment	\$500	7
National Standard 8	\$390	7+2 partial
Recreational Fisheries Economics	\$500	4+2 partial
Economics	\$1,100	21+9 partial
Ocean Acoustics	\$300	7+2 partial
Totals:	\$14,005	139+16 partial

Methods Workshops

ST Organized and Supported

- National Stock Assessment Workshops (NSAWs): 11 (1991-2010)
- Assessment Methods Working Group: Natural Mortality (2009)
- Advanced Sampling Technology Workshops

ST Participated and Supported

- RFP funded (e.g., CAPAM selectivity workshop in 2013)
- Professional Societies
 - World Conference on Stock Assessment Methods (2013)
 - Conference Symposia (e.g., AFS, ICES, GCFI, MONF, ...)
- Regional and RFMO working groups
- National Science and Statistical Committee (SSC) Workshops
 - 4 workshops (2008-2011), stock assessment-focused

Program Implementation

Fishery independent survey support

- Vessel and survey prioritization and funding
- Data management

Fishery dependent support

Science Quality

- National Standard 2 - best scientific information available guidelines
- Center for Independent Experts - peer review program

Assessment Methods and Tools

- Stock Synthesis and AD Model Builder support
- NOAA Fisheries Toolbox - web interface to access standardized tools

Fishery-Independent Survey Support

NMFS receives ~42% of NOAA-funded sea days on NOAA fleet

- OMAO funded 1273 DAS costing \$15.9M in FY14

ST supports NMFS on NOAA Fleet Council and Fleet WG

- Prioritization, Allocation, and Scheduling System (PASS)
- 1-n prioritized list of NMFS surveys
- Fishery Independent Survey System (FINSS)

ST funds additional sea days

- On NOAA ships, up to 453 DAS costing \$5.4M; only 15 DAS costing \$225K in FY14
- On chartered ships (1791 DAS costing \$16.8M [\$11M from ST for charters and charter survey costs] in FY12)

Fishery Dependent Support

NMFS regional observer programs

- Catch & bycatch data from US commercial fishing and processing vessels
- 47 fisheries monitored, >77,000 observer days at sea
- ST's National Observer Program coordinates regional programs
 - National Bycatch Report, observer safety, electronic monitoring

Catch Data

- Recreational surveys to estimate effort and catch rates
 - EASA provided \$3M out of \$22M budget
- Biological sampling of landed commercial catch
 - EASA provided \$2M

Science Quality

National Standard 2 – under MSA to improve scientific integrity of information used for the conservation and management of living marine resources

- Best scientific information available
- Scientific peer review standards
- Role of Scientific and Statistical Committees (Council process)
- Purpose, content, availability of Stock Assessment and Fishery Evaluation reports

Center for Independent Experts – Gold standard for independent peer review of NMFS science products

- 237 reviews, 639 peer review reports since 1999*
- ~2/3 on stock assessments
- Most reviewers are from overseas
- High quality and detailed, but expensive and time consuming

*As of 22 July

Stock Assessment Tools

Stock Synthesis - statistical age-structured population modeling framework

- 64 U.S. assessments now use SS, dozens more internationally
- Dr. Rick Methot awarded DOC Gold Medal for SS2 in 2008
- ST supporting continued development of SS3 (\$200K in FY14)

Automatic Differentiation Model Builder (ADMB)

- Key software component of most assessment models
- ST and Moore Foundation support ADMB Foundation – software in public domain (\$250K from ST in FY14)

Stock Assessment Toolbox

- Intranet site with tested assessment software, documentation, test data sets (ST support has been \$90K/year)

HQ Stock Assessment Staff

Position	Federal	Contractor
NOAA Senior Scientist for Stock Assessments	1.0	
Chief, Assessment and Monitoring Division (ST4)	0.1	
Assessment Coordinator/Scientist (ST4)	1.0	
Assessment Coordinator/Manager-Budget (ST4)	1.0	
SIS Coordinator (ST4)	1.0 ←	0.5
Advanced Sampling Technology Coordinator (ST4)	0.6	
Science Quality Assurance (ST4)	0.5 (+0.4)	
Vessel Coordinators (ST4)	1.0+0.5	
Cooperative Research Coordinator (ST4)	0.5	
National Observer Program (ST4)	3.0	0.3
Fishery Independent Survey System Coordinator (ST4)		0.5
Application Developers (ST6)	Variable	Variable
Other RFP Managers (ST7)	2 x 0.2	

Questionnaire: Responses from Center Directors

Question	St Ag	Ag	+/-	Dis	St Dis	??
ST's stock assessment activities contribute to NMFS' national stock assessment enterprise	4	1				1
ST's stock assessment activities help the stock assessment program at my center	2	4				
ST's stock assessment-related RFPs advance overall NMFS stock assessment science	2	2	2			
ST's training & capacity building help develop future stock assessment scientists	2	2		1	1	
ST's reporting & communication accurately represents NMFS enterprise & needs internally & to key stakeholders	2		2	1	1	
ST should pursue new/expanded activities to improve national stock assessment program	1	3	2			
ST should reduce/discontinue certain activities in the national stock assessment program	1	1	2		1	
ST's staff and resources are appropriate for current stock assessment activities	1	2				2
ST's responsiveness helps address my center's emerging stock assessment needs	1	3	1	1		

Q1&2: ST Contributes to S.A. Nationally/At My Center

Nationally

- All positive comments, highlighting national coordination, support for Science Board & Chief Scientist, ship funding, RFPs.

At My Center

- There are trade-offs between flexibility of funding and need for permanent funding; ST needs to maintain large block of temporary funds to respond to evolving needs.
- Consider setting aside block of funding at ST to support rotating NRC post-doctoral fellowships at centers.
- Assessment Methods Working Group could be more active in support of a national program of methods development linking efforts in each region.

Q6&7: ST Should Expand/Reduce S.A. Activities

Expand

- Changes in scope must result from Science Board discussion.
- Improved coordination and management would be appreciated.
- Not at the expense of pushing funds out into the field; need a better understanding of roles and responsibilities of ST staff.
- Continue to bolster the S.A. Methods Working Group.

Reduce

- Can't think of an activity we should abandon.
- Consolidation of the RFPs and better coordination.
- ST stock assessment activities should be reviewed by the Science Board annually.

Q9&10: ST Resources Appropriate/Responsiveness Helped My Center

ST Staff & Resources

- Any changes should be result of deliberations by Science Board.
- Don't decrease, but consider realignment.
- Uncertain; need ST review documents to understand details.

ST Responsiveness Helped My Center

- This is a work in progress, which enables an adaptive approach to getting it right.
- More reliance on center experts on how to improve the stock assessment program.
- Regional differences in approaches cause large differences in the number of assessments per year. S&T should address this issue vigorously.
- Consider 'tiger teams' of best & brightest to take on more contentious stocks.
- CAPAM is good example of this where **FSC identified a gap in stock assessment method development and ST moved to fund it.

Questionnaire: Strengths, Challenges, Solutions

- ST's strength is to provide a hub to support the Chief Scientist.
- ST coordinates across NMFS, follows through with Science Board and Chief Scientist...
- BUT better coordination needed among RFPs, and field personnel need clearer understanding of ST.
- ST works to increase resources for stock assessments...
- BUT imposes many efforts with little return to the centers.
- ST and some centers appear over-staffed, while other centers downsize to preserve survey and process studies.
- Strength and challenge is to advocate for consistency at national level without being constraining...
- BUT need to bridge gap between fish and protected resources assessments.
- A challenge is for ST to understand unique stock assessment processes for highly migratory species managed by Regional Fisheries Management Organizations.



Program Strengths

- Dedicated and hard-working staff
- Mission generally recognized as being important to NOAA and the Nation
 - Therefore, relatively well resourced
- Good communication vertically and laterally
- Strong working relationships
- Well-defined responsibilities within ST
- Continued accrual of new responsibilities

Program Challenges

- High work load
- Limited redundancy among staff
- Unpredictability of needs, fast turn-arounds
 - Mostly represent others who do the work and implement the programs
 - Responses often require information held by and the responsibility of others
- Need to coordinate at many different levels
- Constant need to educate and inform at all levels (internally and externally)
- Complex administrative environment (e.g., personnel)
- Resources are never enough, so need to prioritize (Next Gen SAIP)
- Hard for staff to keep current with the science or to continue doing science

Solutions

- Adapt to challenges (unpredictability, fast turn-arounds)
- Improve access to relevant information (performance, budget, previous responses, etc.)
- Delegate some administrative activities (e.g., personnel)
- Add staff as new responsibilities accrue
 - Increase staff redundancy/back-ups
- Provide staff with more opportunities to participate in science projects
- Rotate ST staff to field and vice versa



Thank You!

