



**NOAA
FISHERIES**

National Perspectives on... Ecosystem-based Fishery Management

*New England Fishery Management Council
EBFM Committee*

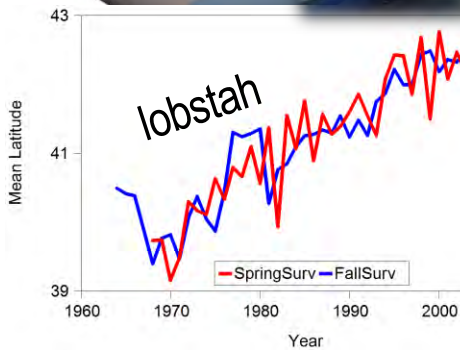
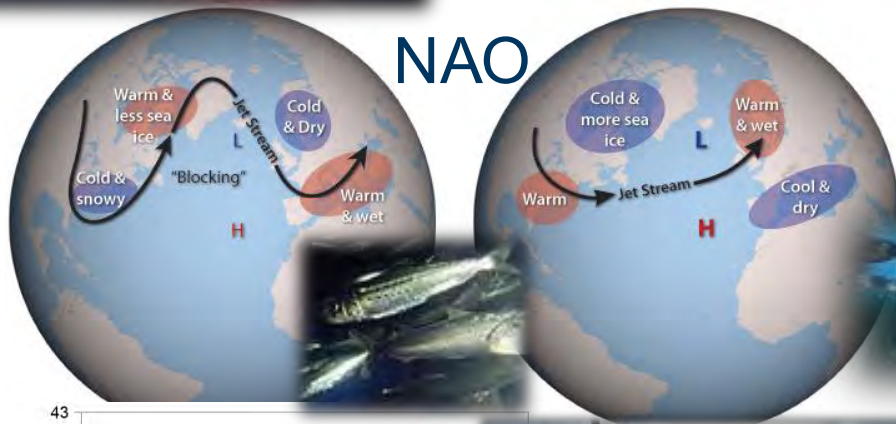
Jason Link, PhD
NOAA Fisheries Senior Scientist for Ecosystem Management

May 22, 2014

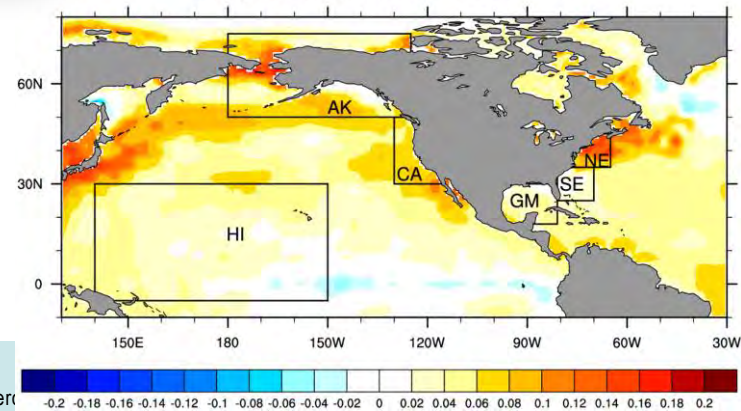
Take Aways

- We need to do, and are committed to doing, Ecosystem-based Fisheries Management
- Science-based Options exist to do EBFM, and can be inserted into LMR management, now
- The risks of not doing EBFM are not fading

Marine Ecosystems Face Many Pressures



Hadley SST Trend 1900-2011 (°C/decade)



3 Levels of Marine Ecosystem Management

(in relation to fisheries)

1. Ecosystem-Based Management (EBM)

– multiple ocean use sectors are discussed and strategic decisions made as to various tradeoffs among sectors

2. Ecosystem-Based Fisheries Management (EBFM)

– has facets of both strategic & tactical decisions solely within the fisheries sector

3. Ecosystem Approach to Fisheries (EAF)

– adds ecosystem factors into fisheries stock assessments for tactical management decisions



Based on: Ihde & Townsend. 2013. Interview with Jason Link. Fisheries 38(8) 363-369.

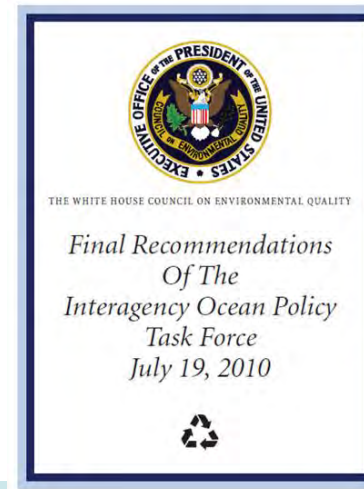
Some Benefits of EB(F)M

- More information to bear on management decisions, which should improve our ability to sustainably manage fisheries.
- We will have increased predictability of management actions.
- More stability of ecosystem levels measures,
 - translates into better regulatory stability and business plans
- Facilitates trade-offs, balancing social and ecological needs



Are We Allowed to Do Ecosystem Based Management?

- Numerous mandates drive how we manage Marine Fisheries & Ecosystems in the US.
- Able to do EB(F)M under/ within existing mandates.
- Need to do EBM to address all mandates



Magnuson-Stevens
Fishery Conservation and
Management Act



EBFM Options

Technical

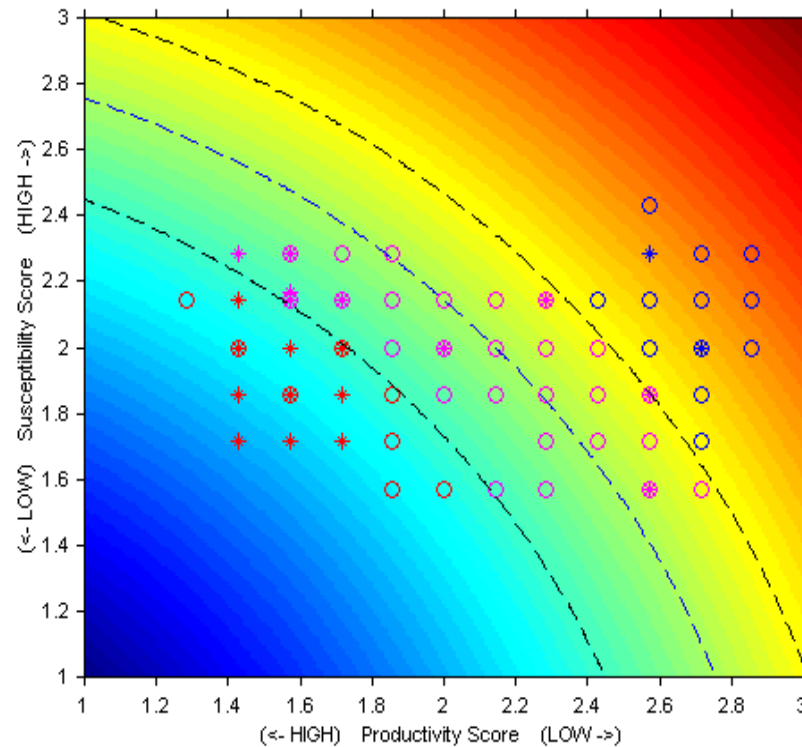
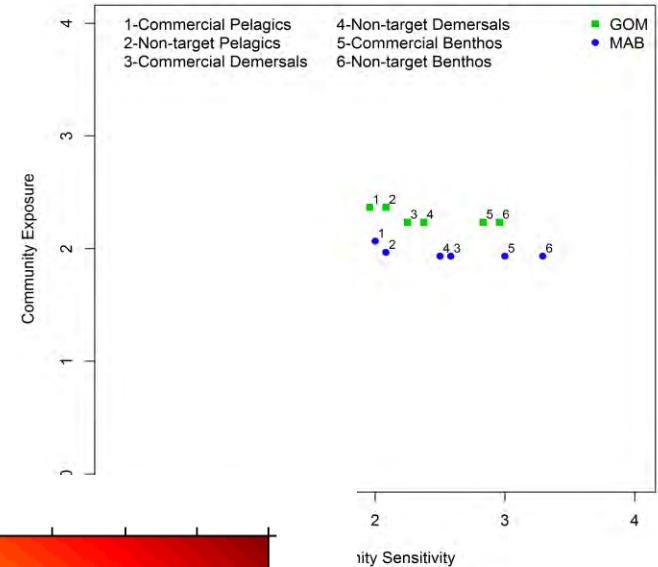
- Triage
- MRMs
- Indicators
- Constraints
- Scenario Testing

Governance

- Process
- FEPs
- Performance Evaluation

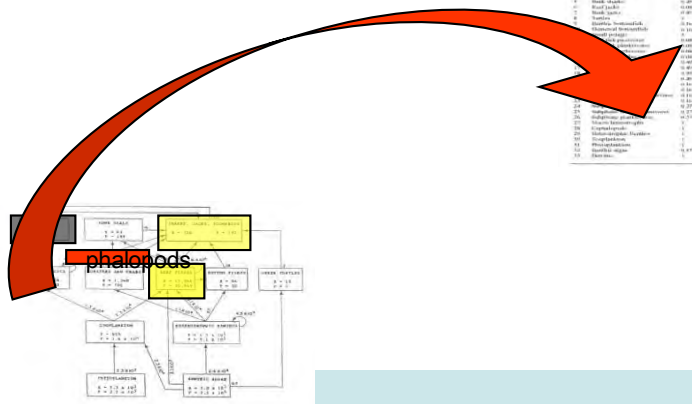
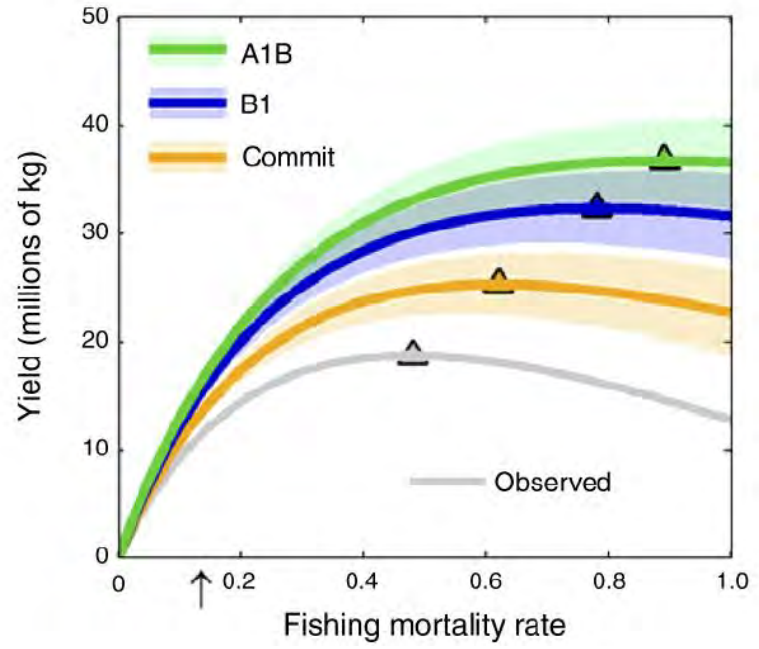
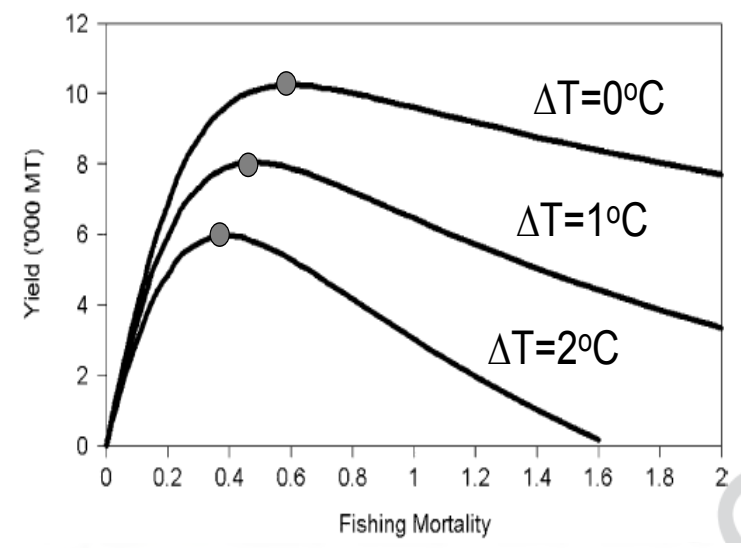
Technical Options- Triage

- RA
- Topical Workshops
- Data Input modifications



Technical Options- MRMs

- ESAMs
- MS Models



Technical Options- Indicators

- ESRs, Leading Indicators
- Tipping Points and Thresholds

NOAA FISHERIES
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Ecosystem Advisory
for the Northeast Shelf
Large Marine Ecosystem

Advisory 2013 - No. 2

Summary of Conditions

Data Sources

Sea Surface Temperature

Bloom Development

Bloom Start Day/Magnitude

Zooplankton Biomass

SST Distribution

Chlorophyll Distribution

Bloom Spatial Dynamics

Temperature from Survey

Satellite SST First Half Year

Extended SST First Half Year

Thermal Transition Date

Advisory Archives

Ecosystem Considerations

Contact Us

Summary of Conditions for the Northeast Shelf Ecosystem

- Sea surface temperature (SST) in the Northeast Shelf Large Marine Ecosystem during the first half of 2013 moderated compared to the record high temperatures that occurred in 2012; however, temperatures remain above the long-term mean based on both contemporary satellites remote sensing data and ship-board measurements.
- This moderating effect was not uniform over the ecosystem. The northern ecoregions of the Gulf of Maine and Georges Bank remained relatively warm whereas the Middle Atlantic Bight cooled to a greater extent.
- Spring survey hydrocast data shows that surface and bottom temperatures have moderated since 2012, but remain above average with bottom temperatures being influenced by water entering the ecosystem.
- In contrast to the 2012 Gulf of Maine spring bloom which was a long duration, intense bloom that started at the earliest recorded start date, the 2013 was the latest recorded bloom that was so poorly developed its extent was below detection limits. The bloom on Georges Bank was also relatively late and though it could be detected, it was a small bloom in terms of duration and intensity.
- Though not a regular feature in the Middle Atlantic Bight, a distinct spring bloom could be measured in 2013.
- An analysis of spring transition temperatures shows that there has been an abrupt shift in spring thermal phenology.
- 2013 spring zooplankton biomass on the Northeast Shelf was the lowest on record for the monitoring time series; the biomasses were lowest for the northern segments of the ecosystem and would appear to be related to the poorly developed spring bloom in the Gulf of Maine area
- The Northeast Shelf ecosystem continues to experience wide swings in physical conditions and biological responses that would appear to reflect great variation in the climate system impacting the ecosystem.

Alaska Marine Ecosystem Considerations

This work is made possible through support from the Fisheries and the Environment (FATE) program

This report is produced annually to compile and summarize information about the Alaska Marine Ecosystem for the North Pacific Fisheries Management Council, the scientific community and the public. This report includes an ecosystem assessment, contributions with updated status and trend indices, and ecosystem based management indices and information for the Bering Sea (BS), Aleutian Islands (AI) and the Gulf of Alaska (GOA) ecosystems.

December 2013 Issues

- Download current report (PDF approx. 8.5 MB)
- Download Eastern Bering Sea Report Card (PDF approx. 500 KB)
- Download Aleutian Island Report Card (PDF approx. 700 KB)
- Guidelines for citing this document

Links

- 2012 Stock Assessments for 2013 Fishery Recommendations
- Data access for most contributions (Dec. 2013 Update)
- Data use is contingent upon compliance with the AESC Data Use Conditions
- A collection of links relevant to the report contents
- Contact Stephens Zacher (Editor) for further information

Archive

- Contribution archive
- Stock assessment archives

Ecosystem Considerations 2012

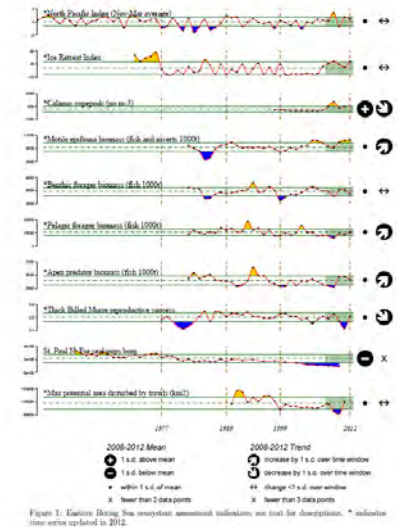
Edited by:
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With contributions from:
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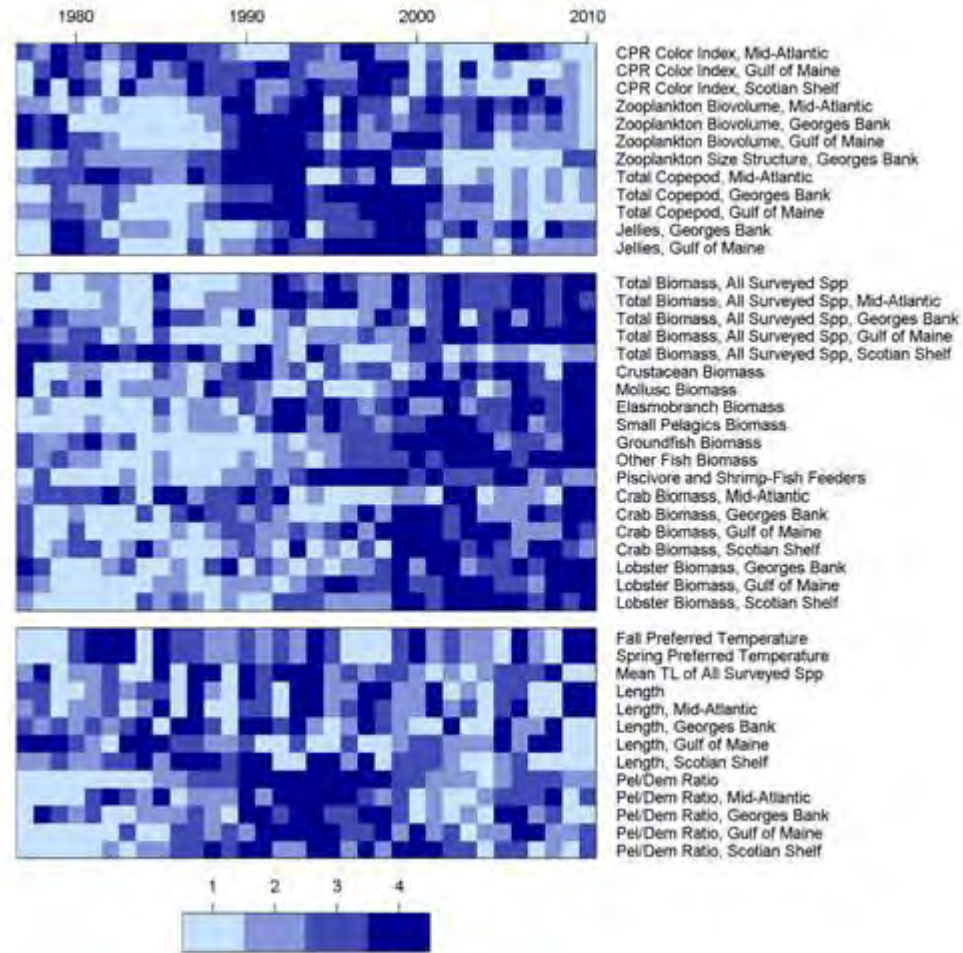
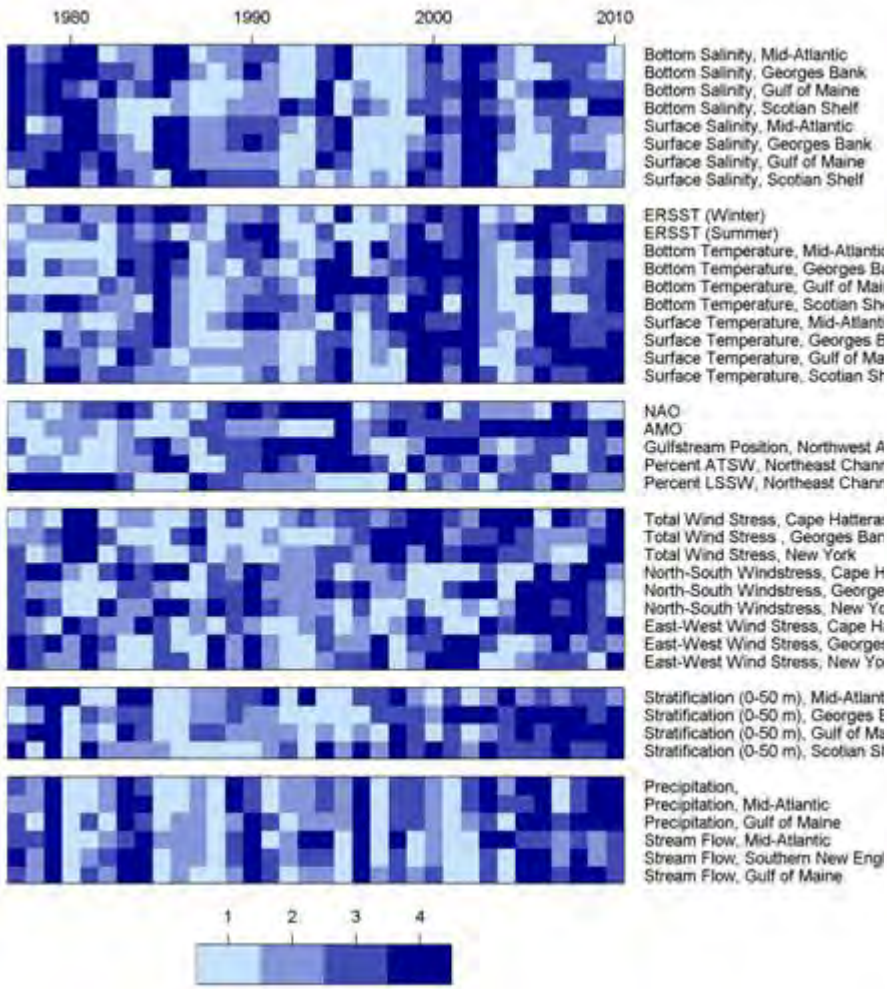
Reviewed by:
The Fleet Team for the Groundfish Fisheries of the Bering Sea, Aleutian Islands, and Gulf of Alaska

November 16, 2012
North Pacific Fishery Management Council
601 W. 4th Avenue, Suite 306
Anchorage, AK 99501

NOAA Ecosystem Considerations



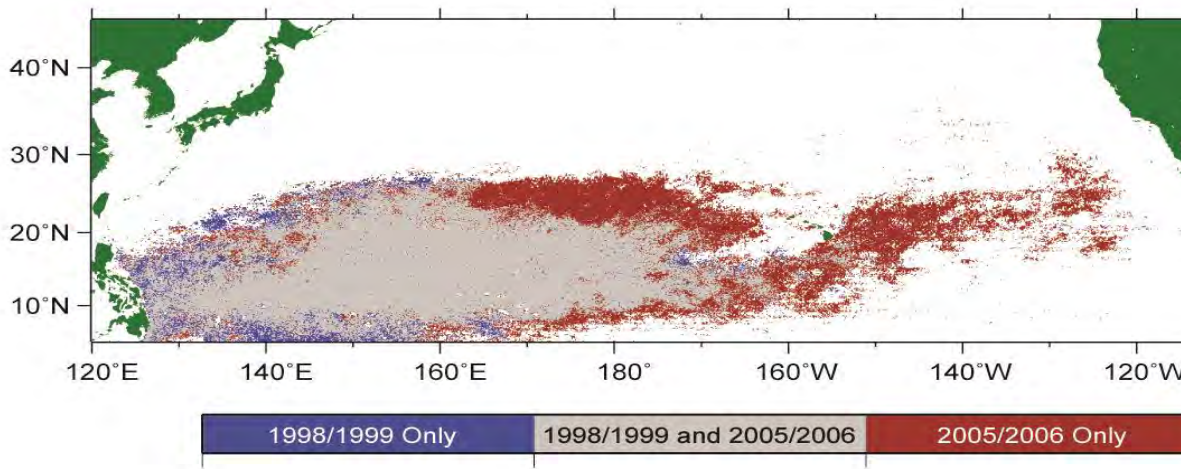
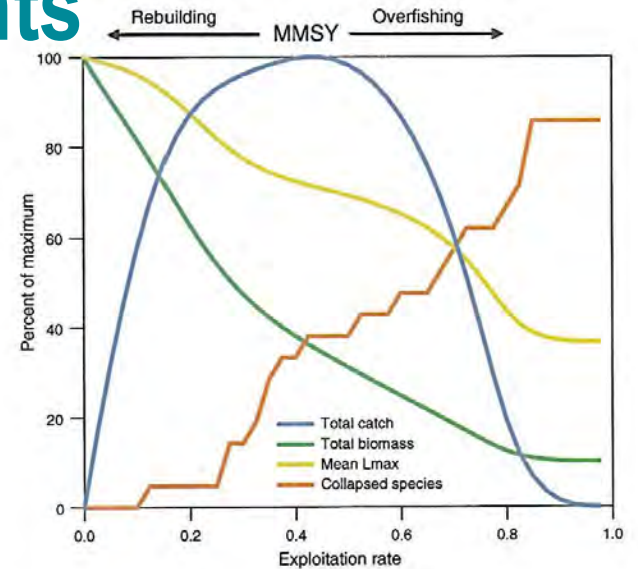
Leading Indicators



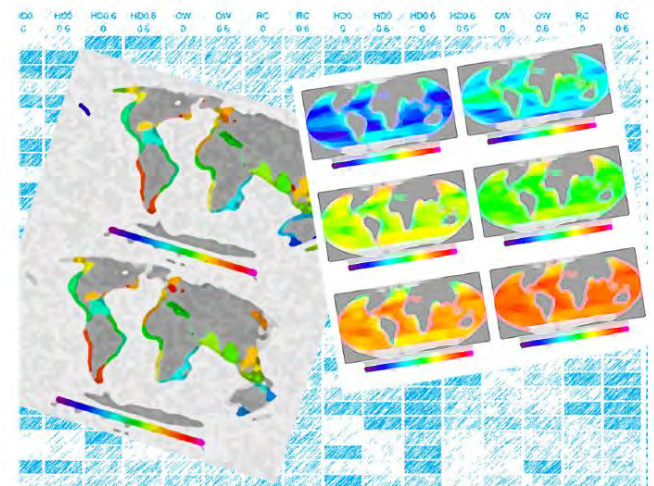
NEFSC ESR 2011

Technical Options- Constraints

- Aggregate Production Models
- System Production Caps

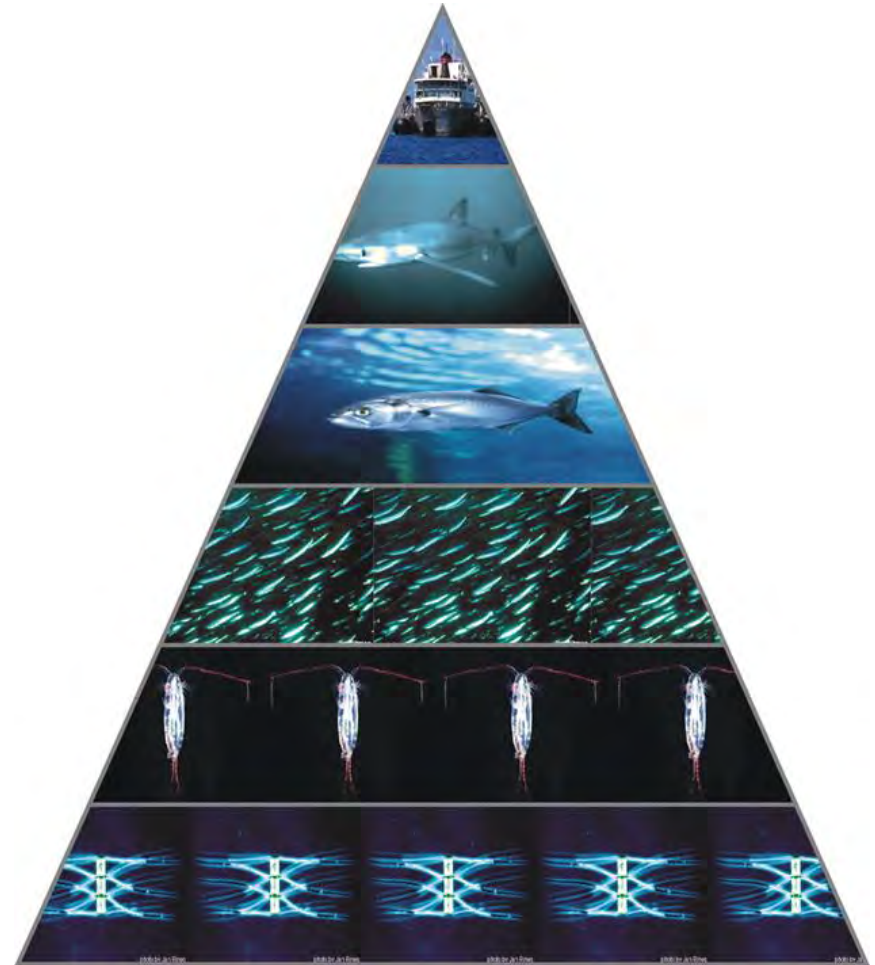
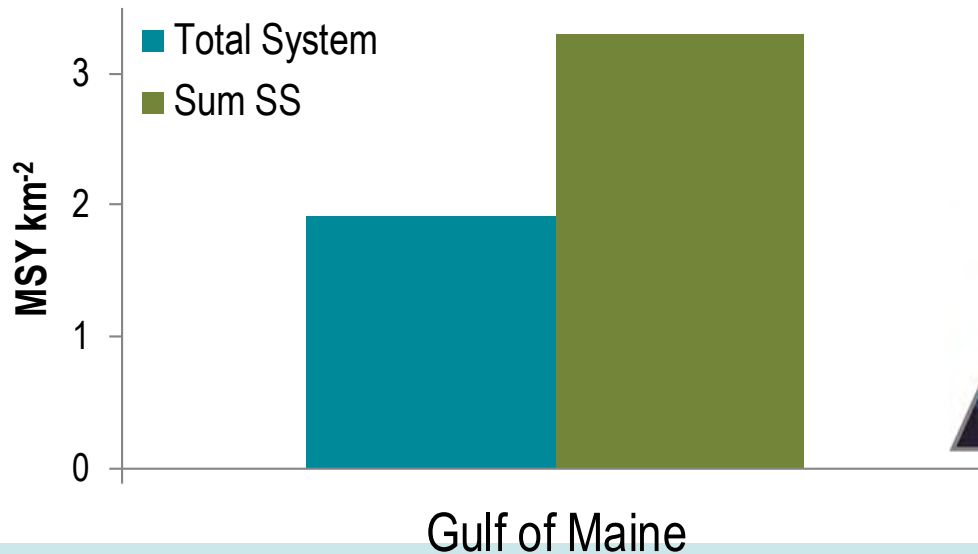


DEVELOPING NEW APPROACHES TO GLOBAL STOCK STATUS ASSESSMENT AND FISHERY PRODUCTION POTENTIAL OF THE SEAS



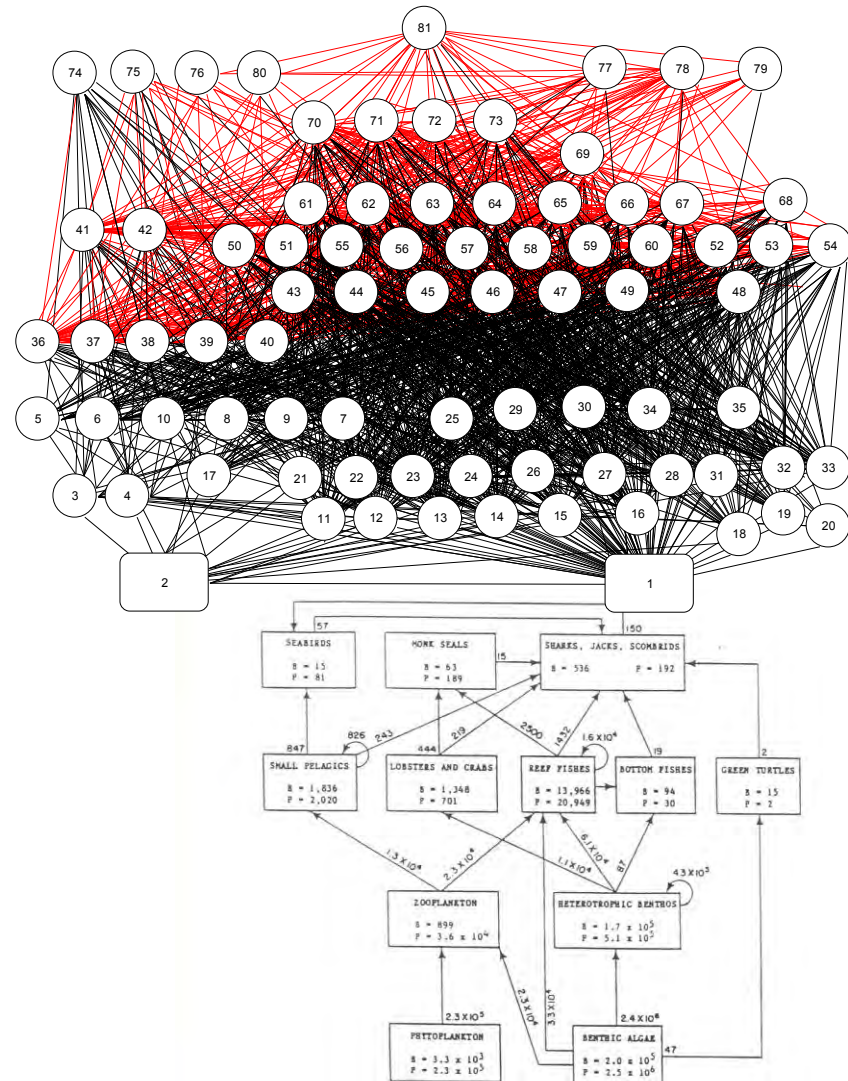
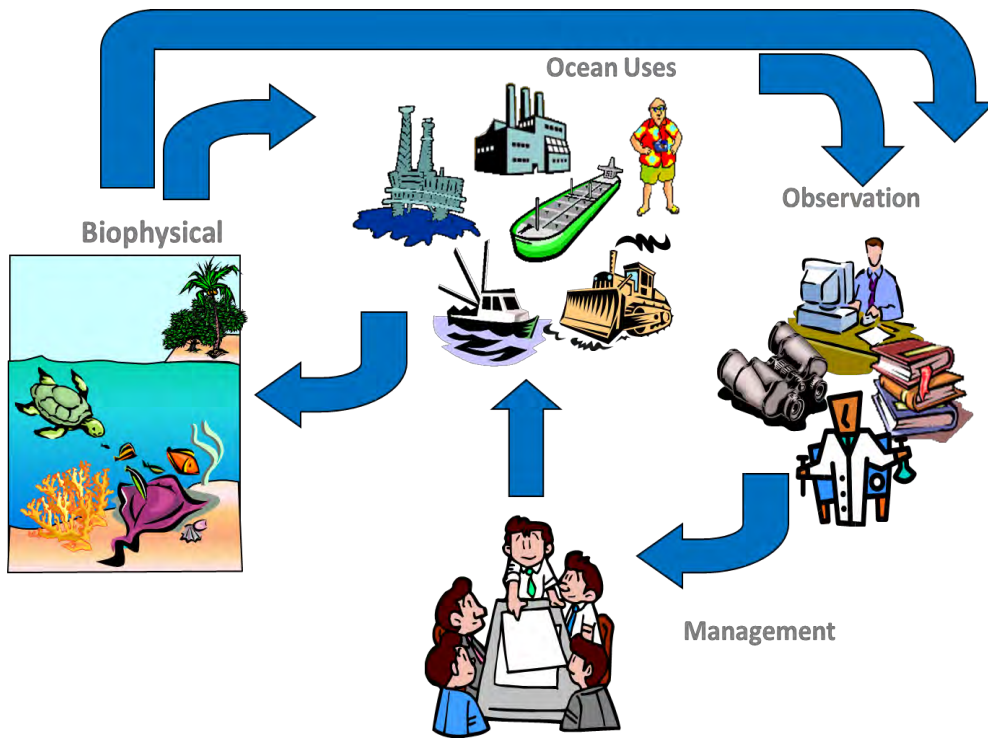
Understanding System Production Limits Is Critical

- There are limits to how much fish any ecosystem can produce
- The challenge of energy flow



Technical Options- Scenario Testing

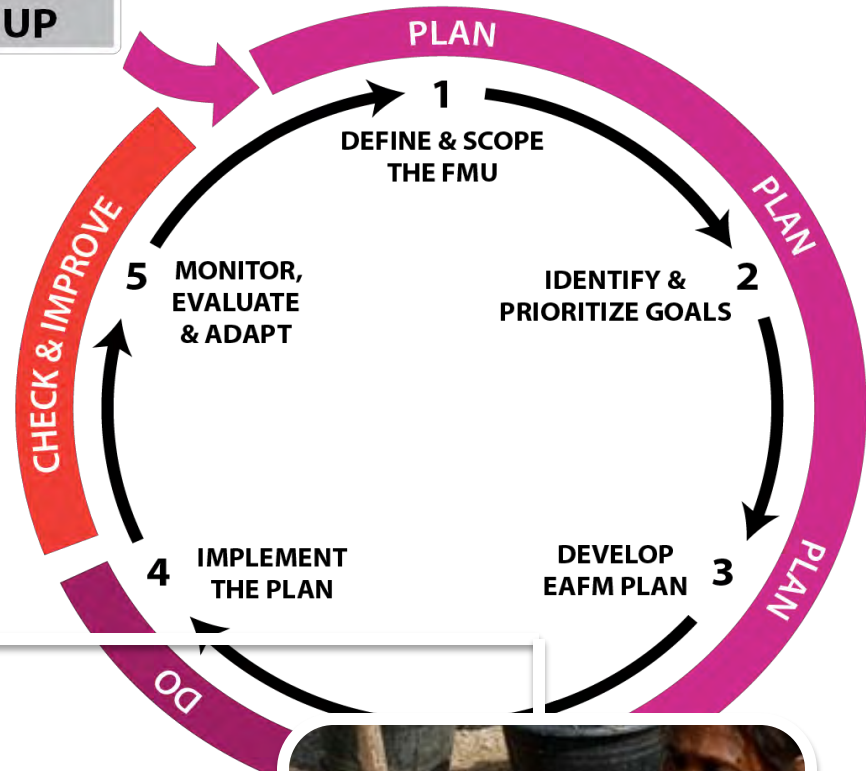
- System MSEs



Governance Options- Process

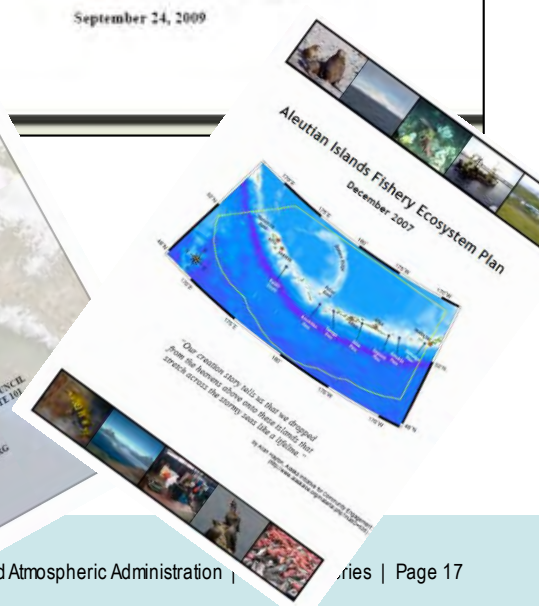
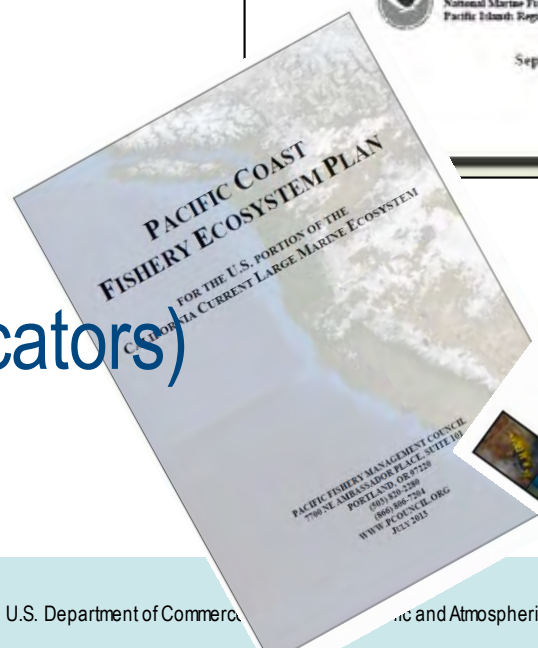
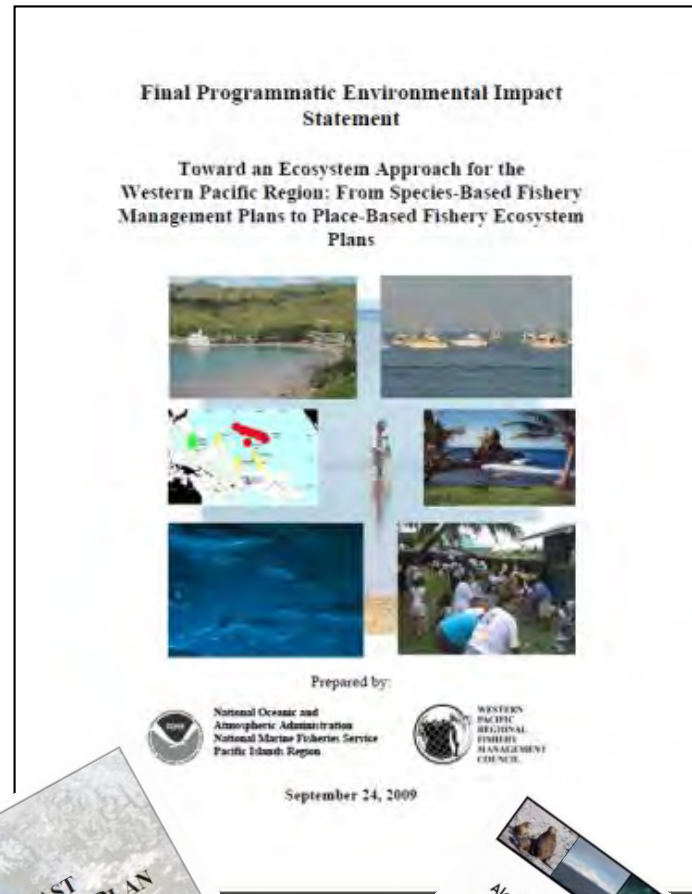
- Change standing TORs for SARC, SRG, SSC etc.
- Change risk tolerances
- Adopt adaptive mgt cycles

START UP



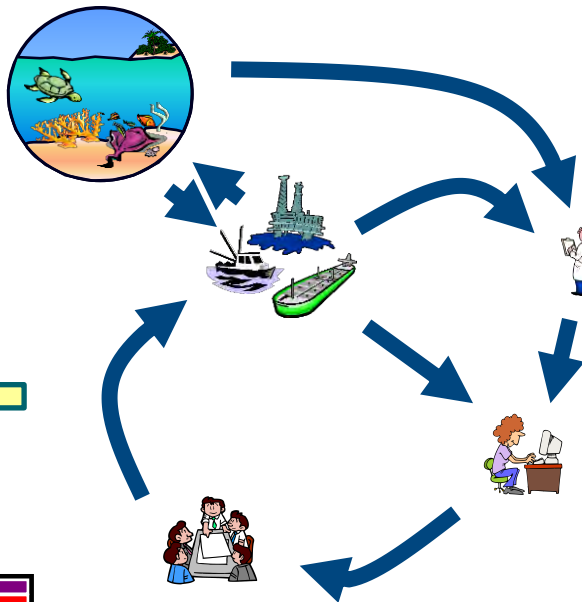
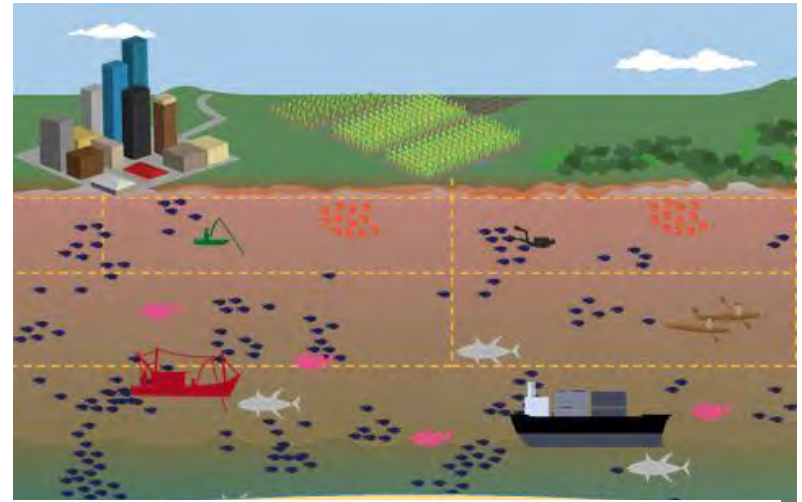
Governance Options- FEPs

- Explore Portfolio Analyses
- Develop mechanism for new situations (e.g. shifting spp)
- Standardized & Key “issues” checklist for TOC
- Track overall Ecosystem Productivity
- Ask for other BRPs (indicators)

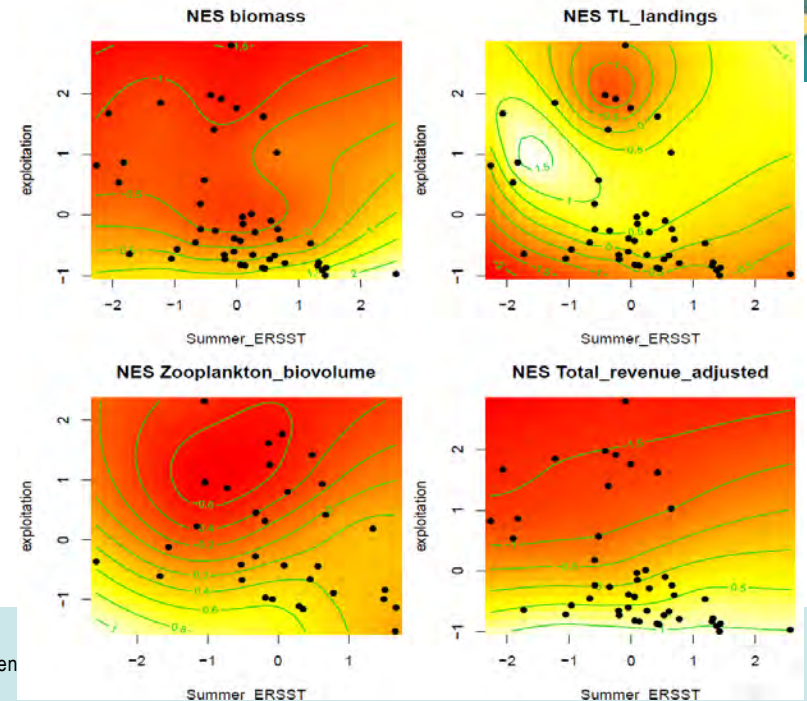


Governance Options- Evaluation

- Track (system) Performance metrics,
- Track bycatch, fleet, etc.
- Ensure robust HSEs met

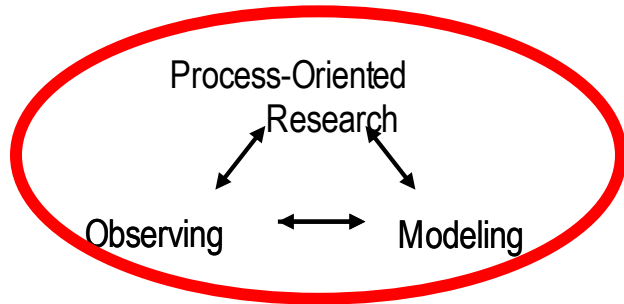


Performance measures

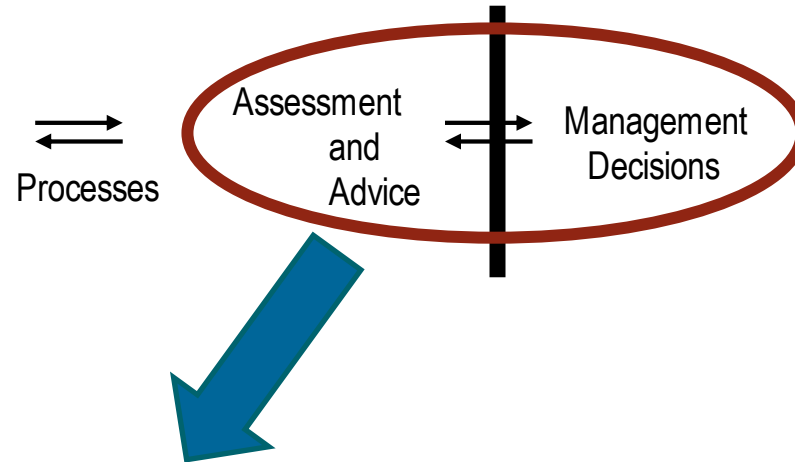


Generic LMR Mgt Process

Science & Research



Assessment & Advice



Data

Population/
Ecosystem
Modeling

Review

BRPs, Status
Determination

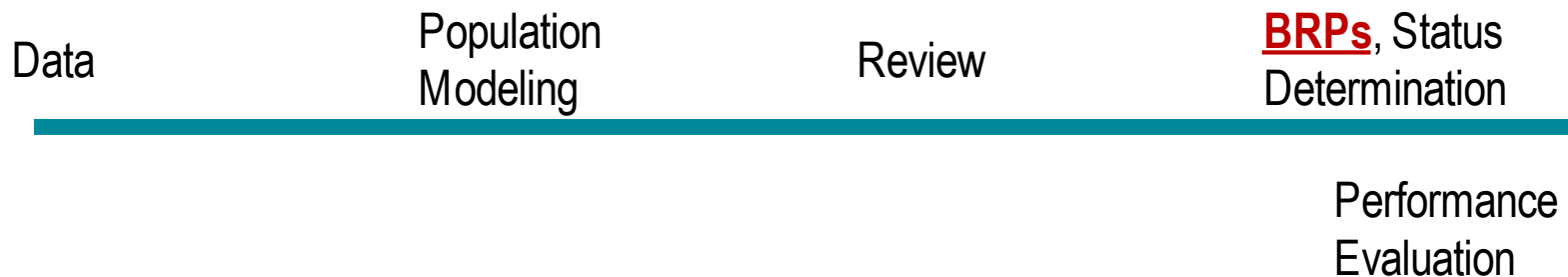
Performance
Evaluation



Ecosystem-Savvy LMR Mgt Process

A priori and ASAP:
Vulnerability and Risk Assessment,
Track leading indicators

Revisit:
Cumulative Effects
Coordinate and evaluate tradeoffs
System views



Ecosystem-Savvy LMR Mgt Process

Data:
Workshops for cross-cutting issues
Δ Data Inputs for distribution, Δ Stock ID, Δ stock unit area, track fleet dynamics, Δ vital rate estimates, Δ to adaptive Monitoring programs

Population Modeling

Review

BRPs, Status Determination

Performance Evaluation

Ecosystem-Savvy LMR Mgt Process

Data

Modeling:
Δ model parameters,
Better link to climate
features and physical
predictions,
Better consideration of MS
issues,
Include covariates,
Explore simulations and
MSEs,
Explore funct. forms,
Link-in spp & habitat intxns

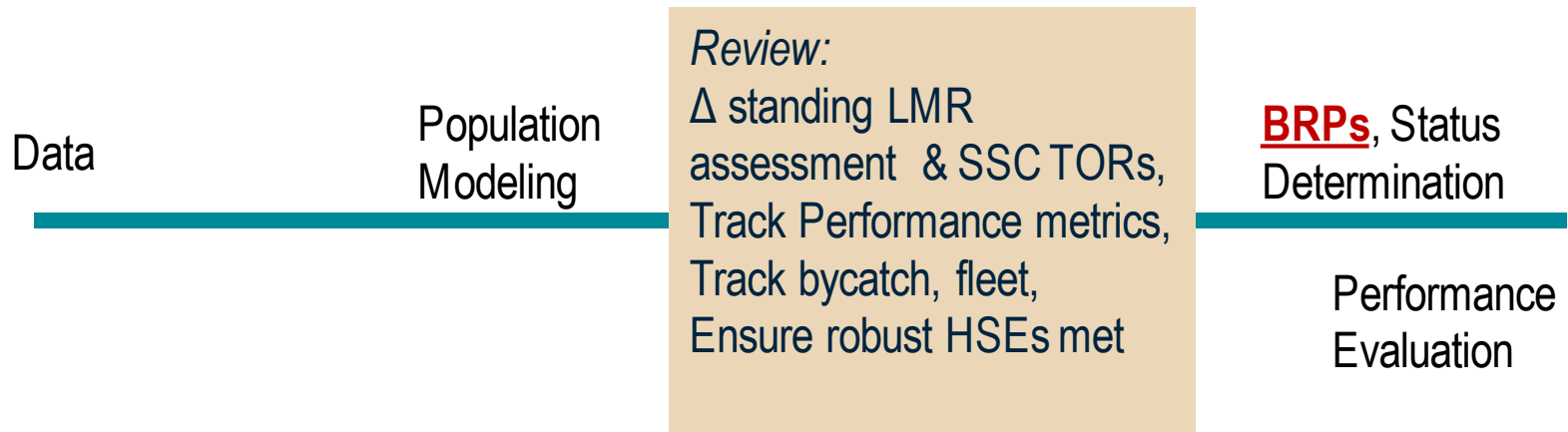
Review

BRPs, Status
Determination

Performance
Evaluation



Ecosystem-Savvy LMR Mgt Process



Ecosystem-Savvy LMR Mgt Process

Data

Population
Modeling

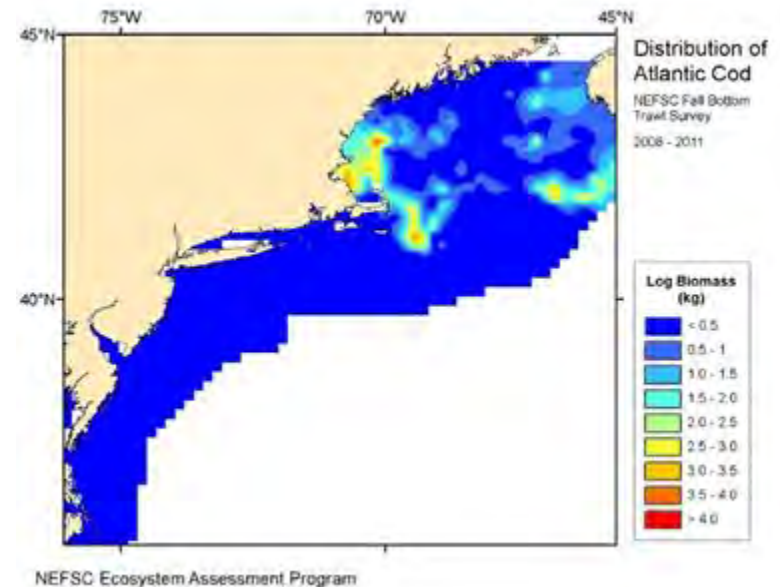
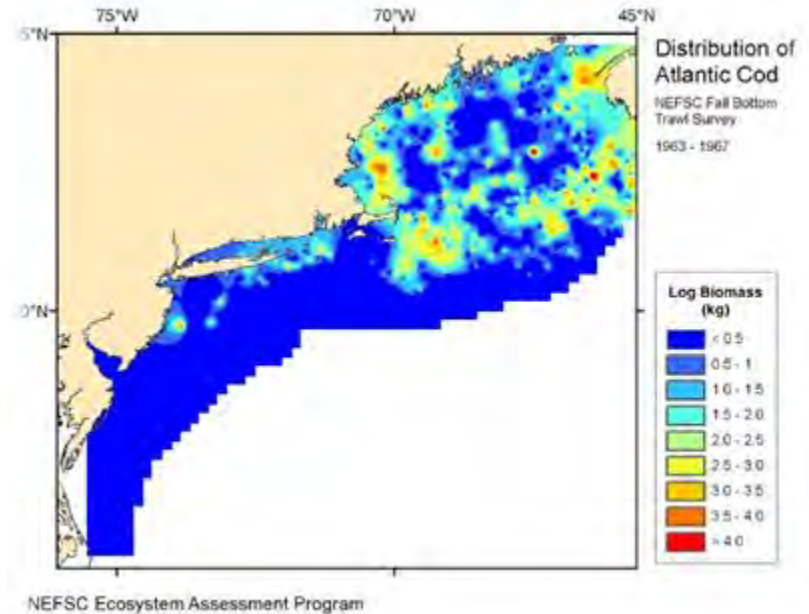
Review

Mgt Advice:
Track overall Ecosystem
Productivity,
Explore Portfolio
Approaches,
 Δ risk tolerances
Emerging-exiting spp &
FMPs



Moving Forward

- Ecosystem-Based Fisheries Management is feasible now
- Ecosystem-Based Fisheries Management requires that we directly confront tradeoffs



Hot Topics

- CC and OA
- Habitat
- Forage
- Technical and Spp Interactions
- Bycatch
- Cumulative impacts
- Cumulative removals
- Cumulative production
- MCDA & Triage
- Re-MSA



Questions / Discussion

