

Science, Service, Stewardship



Implementing Ecosystem Based Fisheries Management (EBFM): a review of existing NMFS activities in the Regional Fisheries Management Councils.

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Ecosystem Based Management

"Ecosystem-based management looks at all the links among living and nonliving resources, rather than considering single issues in isolation. This system of management considers human activities, their benefits, and their potential impacts within the context of the broader biological and physical environment."

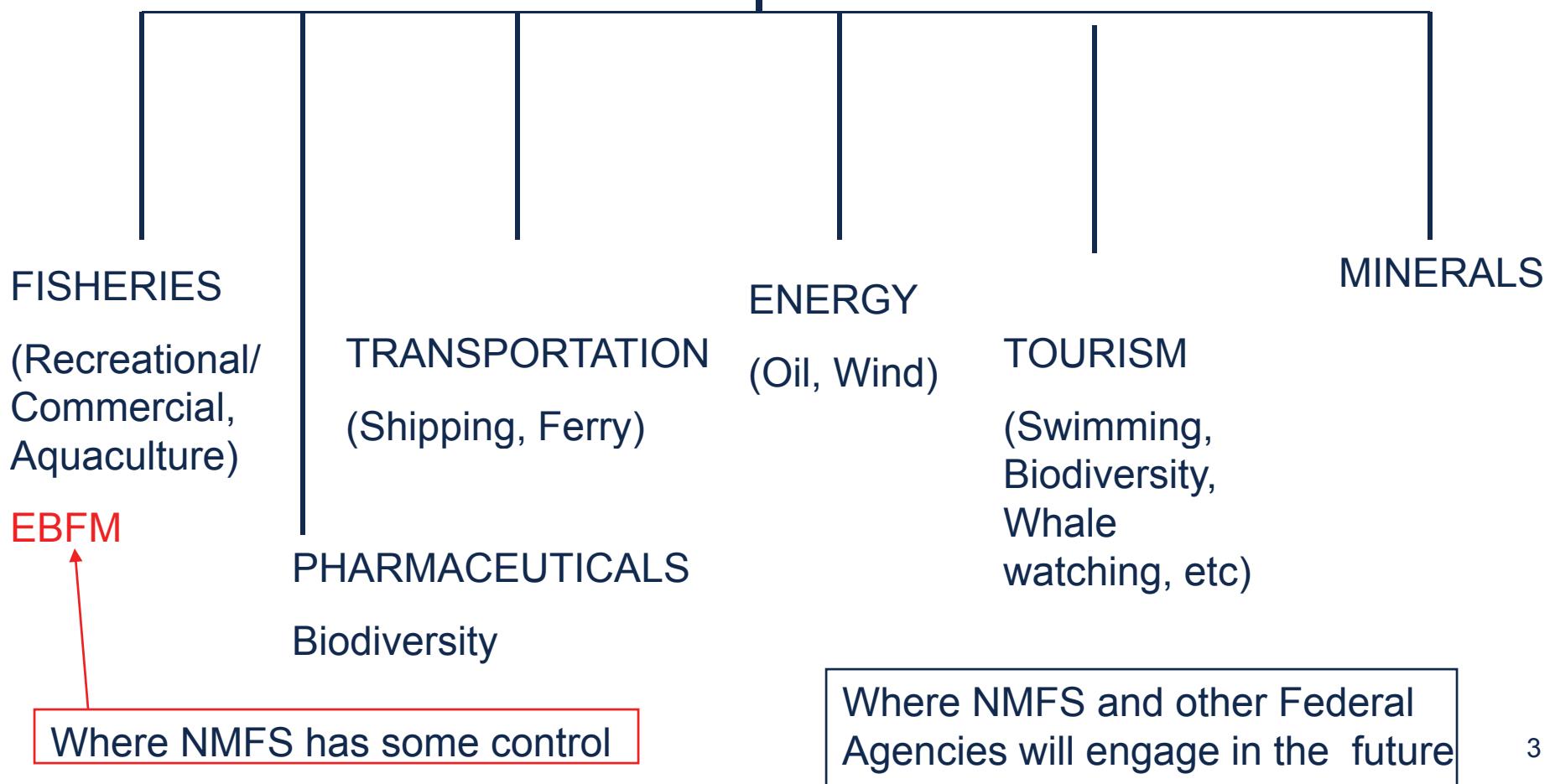
The U.S. Commission on Ocean Policy report (2004)

Ecosystem-based Management is an integrated approach to management that considers the entire ecosystem, including humans. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need...^{(I)t} considers cumulative impacts of different sectors.

McLeod et al. (2005)



Ecosystem Based Management (EBM) by Sectors





The Issue:

NOAA lists EBM as a major focus in the 2005-2010 Strategic Plan and the next Plan (2011-2015). (There is no breakout of EBFM).

So...

- 1) What are the legislative mandates to drive the agency and the RFMC's towards EBFM?
- 2) What has NMFS accomplished to date?
- 3) What's the strategy going forward?



A quick recap of EBFM history

- 1987 – NMFS Program Development Plan for Ecosystem Monitoring and Fisheries Management. (Died)
- 1999 – Ecosystem Principles Advisory Panel (EPAP) Report at the request of Congress recommending that regional fishery management councils develop a fisheries ecosystem plan (FEP) for every ecosystem under their jurisdiction.
- 2001 – The NOAA Marine Fisheries Advisory Panel considers EBM and recommends pilot projects to develop FEPs.
- 2004 – Congress appropriates \$2M for use by four Atlantic fisheries councils and commissions for EBM pilot workshops. (Summaries of each workshop available)
- 2004 – Pew Ocean Commission and President's Ocean Policy Task Force reports issued and EBM highlighted.
- 2005 – NMFS proposed MSA reauthorization language for development of FEPs.
- 2006 – Congress does not adopt specific EBFM provisions – NMFS focuses on ACL's.
- 2009-10 – With ACLs underway, NMFS Sustainable Fisheries is reviewing EBFM implementation again.



Legislative Mandates related to EBFM

Magnuson Stevens Fisheries Conservation
and Management Act (2006) (Specification
of OY and MSY (National Standard 1))

ESA and MMPA (Listed species or mammals
require ecosystem information).

NEPA (needs extensive ecosystem data)



Magnuson-Stevens Fishery Conservation and Management Act (MSA)

MSA mandatory provisions in fisheries management related to ecosystem considerations and EBFM.

- OY and MSY need to include environmental, social and economic factors (National Standard 1)
- Management actions should consider the needs of fishing communities (National Standard 8)
- Bycatch shall be minimized (National Standard 9)
- FMPs may “designate zones, and periods when, fishing shall be limited, or shall not be permitted...” (MSA 303(b)(2))



Magnuson-Stevens Fishery Conservation and Management Act (MSA)

MSA discretionary provisions related to ecosystem considerations into fisheries management:

- FMPs shall identify Essential Fish Habitat and minimize to the extent practicable adverse effects on such habitat (MSA 303(a)(7))

2006 addition of a discretionary provision:

- FMPs may “included management measure in the plan to conserve target and non-target species and habitats, considering the variety of ecological factors affecting fishery populations” (MSA 303(b)(12))



EBFM Principles from the 1999 EPAP Report.

- Allow fishing activity that can be reasonably expected to operate without unacceptable impacts
- Apply the precautionary approach
- Purchase “insurance” against unforeseen adverse ecosystem impacts. (e.g. MPA’s)
- Adaptive management- learn from actions and respond expeditiously with alternative management actions.
- Give incentives for protecting ecosystem (e.g. catch shares).
- Promote (stakeholder) participation as well as fairness and equity in policy and management to ensure acceptance.



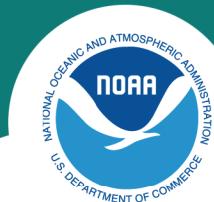
EBFM “Criterion” to assess existing Council activities (EPAP 1999)

- Are ecosystem boundaries identified to specify resource management units? **(Yes- LME regions are defined)**
- Is scientific uncertainty in stock assessments and knowledge about marine ecosystems considered in FMPs? (And precautionary approach applied?) **(Yes- NPFMC only)**
- Is there routine monitoring of ecosystems and are the results used to support management? **(Yes on monitoring; no on implementation)**
- Have food webs of targeted species been used in FMP's? (e.g. forage fish set aside) **(Yes-NPFMC, PFMC)**
- Are total removals, including discards, included in stock assessments? **(Yes when data is available)**
- Have effects of fishing on the ecosystem been studied? **(Yes but not implemented in management)**
- Has an FEP (or equivalent) been developed and used to support management? **Yes for several fisheries- Aleutian Islands, Southeast, Western Pacific)**



Four (4) ecosystem consideration tools are being implemented by the Councils into management

- Marine Spatial Planning
- “Set Asides”
- Ecosystem Assessments
- Enhanced Stock Assessments



EBFM Scientific and Management Tools to date- mostly qualitative.

- Marine Spatial Planning (Temporary Closures, MPA's)
- “Set asides”
 - Forage fish
 - Catch shares
- Assessments
 - Ecosystem chapters for an existing FMP
 - Fisheries Ecosystem Plan (FEP)
 - Integrated Ecosystem Assessment (starting 2011)
- Models
 - Enhanced Stock Assessments (quantitative)
 - Ecosystem Models (Fishery Production Potential (quantitative),
(Foodweb, Bioenergetics, Predator-Prey))



Example of EBFM 1: Ecosystem Based Management in the Southeast Region:

- 1) Marine Protected Areas**
- 2) Fisheries Ecosystem Plan**

Karla Gore, Southeast Regional Office





Marine Protected Area as a Fishery Management Tool

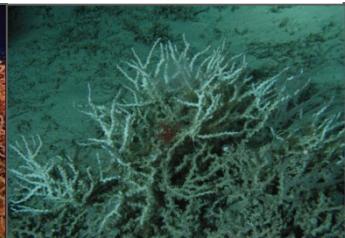
- In 1990, the SE Council Snapper Grouper Plan Development Team offered an MPA amendment.
- Amendment 14 submitted in 2007, approved and implemented in 2009.





SEFMC Fishery Ecosystem Plan

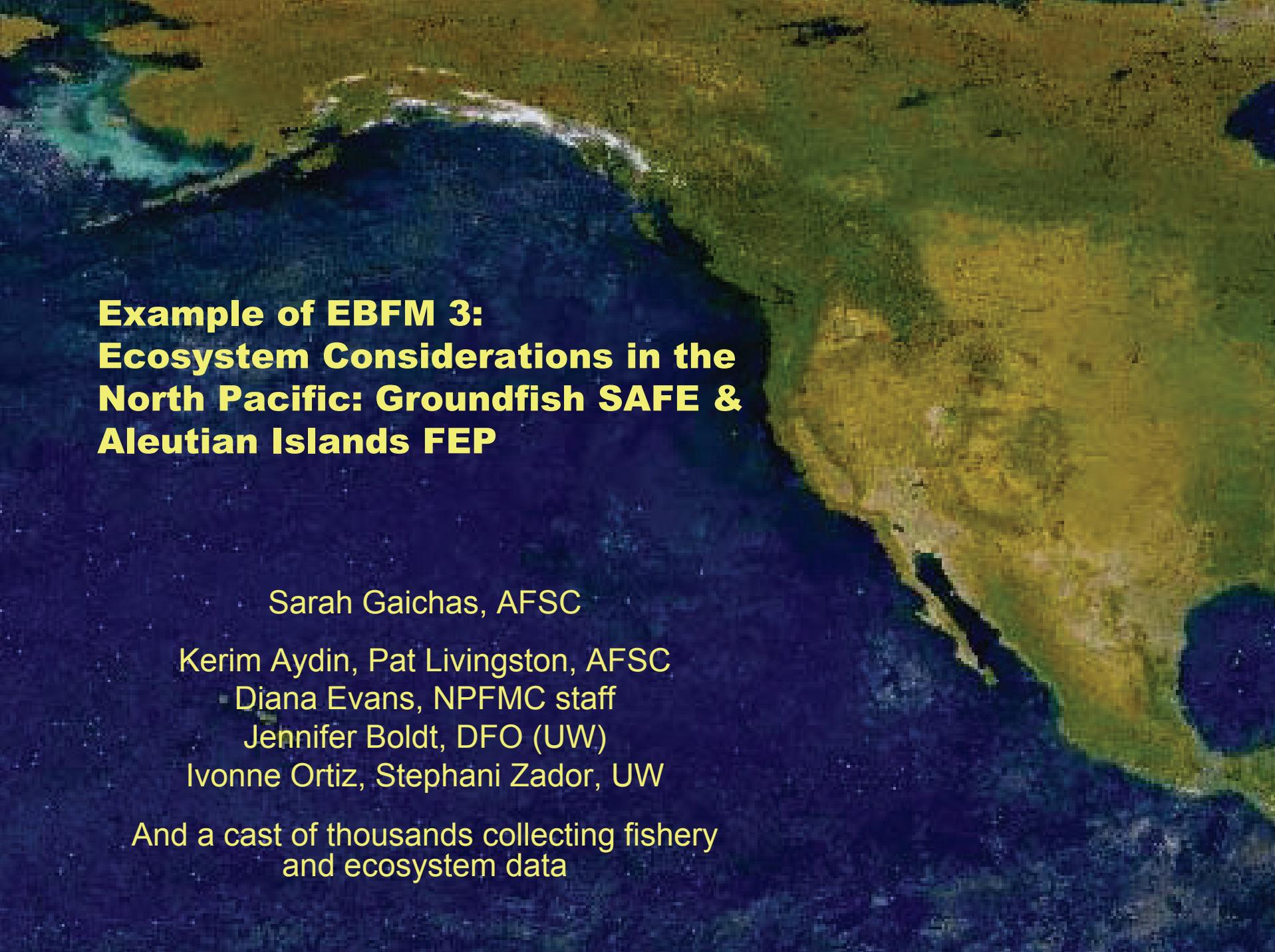
- Developed by Council Staff from 2002 to 2009.
- Submitted to NMFS as a supporting document to an amendment and not as a stand alone document.
- Six Volumes and over 2,500 pages
- Plan to update every five years— one Council staff person full time job.





EBFM Example 2: “Set Asides”

- Catch Shares (LAPP, ITQ, IFQ, Sectors) (allocate fish quota to certain individuals/Sectors based on catch history.
 - 14 in operation
 - Earliest Atlantic Quahog and Surfclam (1990)
 - Smallest GofMx Wreckfish (1992) (25 total; 2 fishing)
 - Northeast Multispecies Sectors (2009) (17 Sectors; 50% of permits; 98% of catch)
 - Pacific Trawl Fishery (2010)
 - Additional 25 proposed.
- Forage Fish set asides (Sardines in the North Pacific)

The background image shows a satellite or aerial view of the Aleutian Islands chain in the North Pacific. The islands are rugged and mostly covered in green vegetation. The surrounding ocean water is a deep blue, transitioning to lighter shades where the islands are located. The overall scene is a mix of natural land and sea.

Example of EBFM 3: Ecosystem Considerations in the North Pacific: Groundfish SAFE & Aleutian Islands FEP

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Ivonne Ortiz, Stephani Zador, UW

And a cast of thousands collecting fishery
and ecosystem data

Overview of the Aleutian Islands Fishery Ecosystem Plan

North Pacific Fishery Management Council

Ecosystem based fishery management



Aleutian Islands FEP

Arctic FMP

Ecosystems Considerations Chapter for Groundfish SAFE

http://www.fakr.noaa.gov/npfmc/current_issues/ecosystem/AIFEP12_07.pdf

http://www.fakr.noaa.gov/npfmc/current_issues/Arctic/arctic.htm

ftp://ftp.afsc.noaa.gov/afsc/public/Plan_Team/ecosvstem.pdf

November 2009 Council Draft

Ecosystem Considerations

APPENDIX C

Ecosystem Considerations for 2010

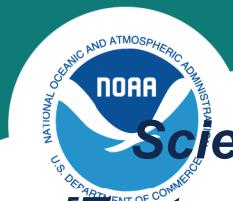
Reviewed by
The Plan Teams for the Groundfish Fisheries
of the Bering Sea, Aleutian Islands, and Gulf of Alaska

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A single-species assessment with additional ecosystem information.

From North Pacific Fisheries Management Council's Scientific and Statistical Committee minutes, December 2006:

"The [Eastern Bering Sea walleye pollock] stock remains above the MSY level, having declined ... at a rate of about 19% per year....A series of 4 below-average recruitments has contributed to the decline...."

Results from a single species assessment

"Other issues raised in the stock assessment suggest a need for further caution."

— a northward shift ... with some portion of the population into Russian waters.

Results from an assessment and ecosystem indicators

— a large decline in zooplankton, which is important in providing forage for juvenile pollock. **...and ecosystem indicators**

— increasing predation by arrowtooth flounder on juvenile pollock, contributes to declines in adult pollock biomass. **...and a multispecies model**

"Consequently, the SSC agrees with the Plan Team that a reduction in Allowable Biological Catch from the maximum permissible is justified."

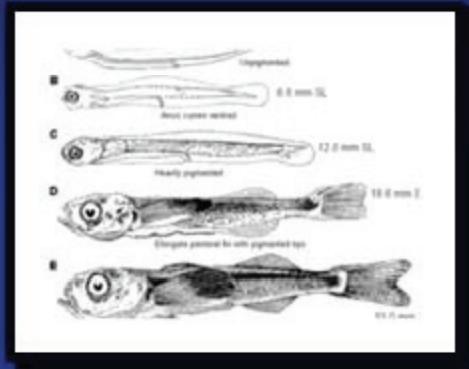


Example of EBFM 4: Addition of an Environmental Variable to the stock recruitment equation in the PFMC. Addition of sea surface height as an indicator of upwelling and ecosystem productivity.

**Michael Schrippo, NWFSC and now
at the SEFSC.**



Sablefish Recruitment: The Conceptual/Mathematical Model



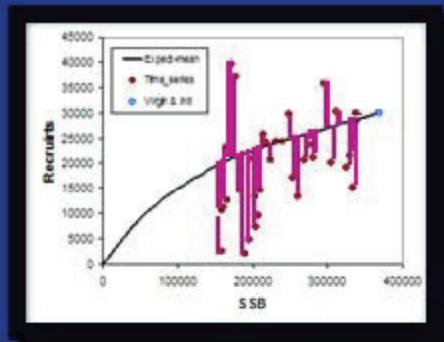
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$$\hat{R}_y = \left(\frac{4hR_0S_y}{S_0(1-h) + S_y(5h-1)} \right) e^{\varepsilon} * e^{\beta E_y}$$





Summary of the existing state of EBFM with the Councils:

- RFMC's have the legal mandates to implement EBFM into management and many have the desire to do so.
- Ecosystem information is considered discretionary now but the RFMC's would have to respond to any information presented.
- The policy and the desire is running ahead of the science and management tools.



Impediments for RFMC to move towards EBFM

- Lack of management objectives for the fishery and ecosystem to guide the science.
- Management uncertainty of how to do so.
- Scientific tools are still in infancy (e.g. Integrated Ecosystem Assessments, modeling)
- No perceived incentive
 - No outside pressure to do so- e.g. lawsuit, NMFS
 - It's a long term goal versus a short term management crisis
- Economic and social benefits are not well known.



Recommended Strategy for NMFS Sustainable Fisheries on EBFM implementation.

- Fund Strategic Planning in 3-5 years (bottom up):** Councils are often focused on short term issues (ex: setting quotas for next year) and EBFM is about identifying long term goals and objectives.
- Technical Memo (top down):** Update the EPAP 1999 report on how to incorporate ecosystem science into assessments based on one or more National Workshops.
- Develop EBFM criterion** and give the Councils credit where its being done.
- Raise stature of EBFM:** through a NMFS website, presentation and meetings with stakeholders include the tools available, as well as the economic and social costs.
- More ecosystem, social and economic research and tool development**of course.
- Develop patience within NMFS.** NPFMC and SEFMC both took 7+ years to implement selective EAFM principles into management.

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Thank You.