Implementation of
Ecosystem Based Management
in APNEP

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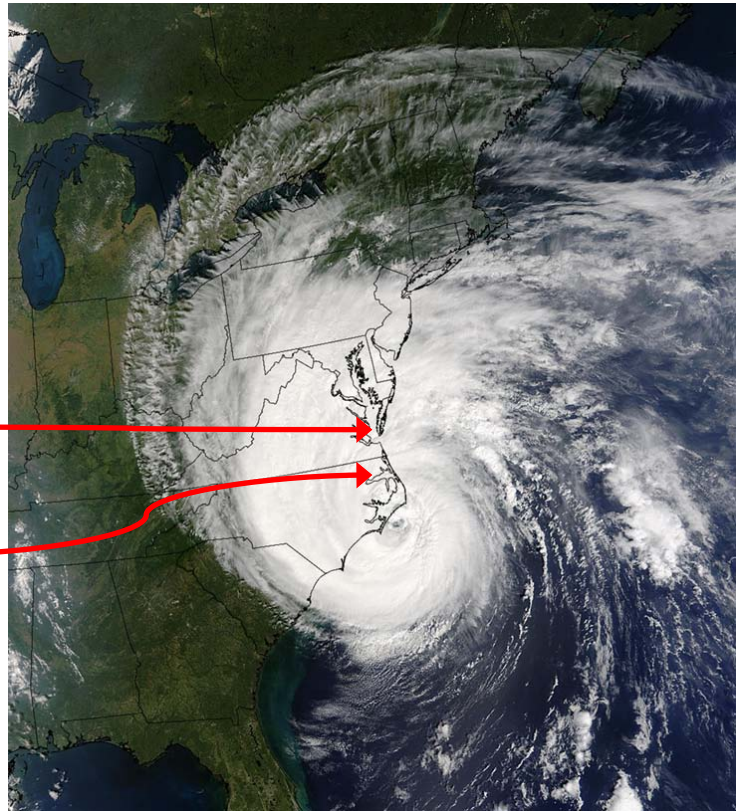
Albemarle-Pamlico National Estuary Program



Ecosystem Based Management

- place based
- focused on sustaining valued ecosystem services by protecting ecosystem structure and function,
- recognizes internal and external linkages of the whole system, and
- specifically considers economic, social and institutional aspects of the system

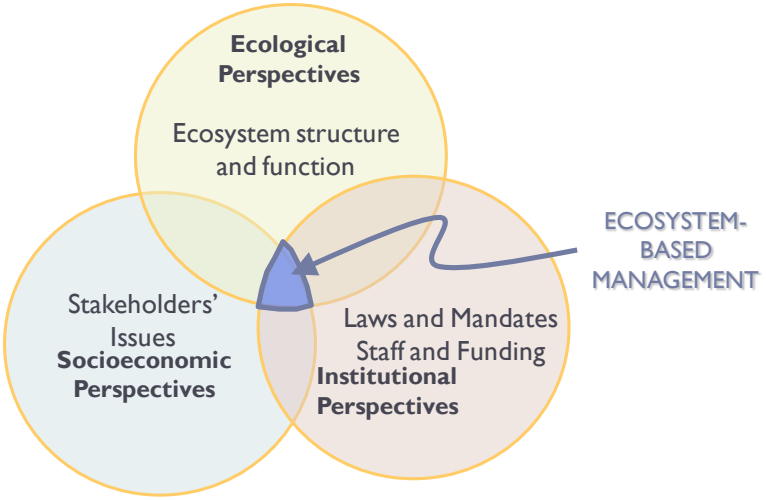
Essential conditions if an ecosystem-based initiative is to succeed

United Nations Environment Program. 2006. *Ecosystem-based management: Markers for assessing progress.* 58pp. unep/gpa, The Hague

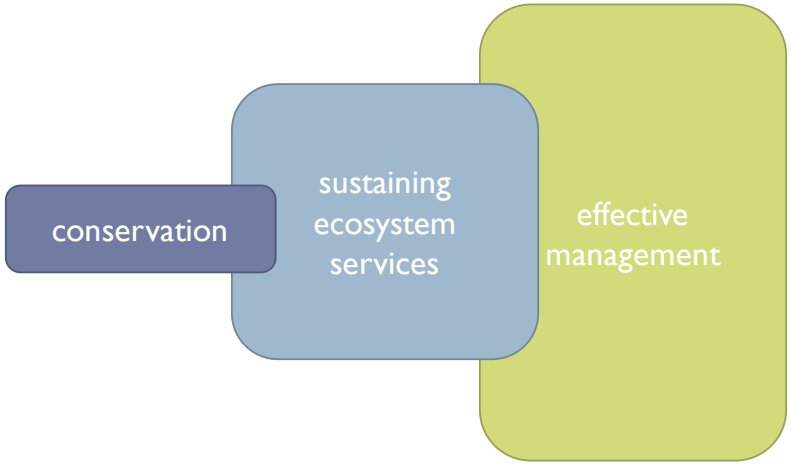
1. Unambiguous goals
2. Well-informed stakeholders
3. Delegation of authority and financial resources to sustain implementation
4. Capacity within implementing institutions

Change in the Concept of EBM

- NOAA Coastal Services Center (2007)



- Packard program evaluation team (2009)



essential elements of EBM

holistic vision / plan

comprehensive description of system, articulation of multiple management objectives

community

effective engagement of policy makers, managers, stakeholders, scientists

process

effective adaptive management

foundation

legal framework, management institutions, financial resources, effective communications

National Estuary Programs

- place-based
- protect and restore water quality and ecological integrity of estuaries of national significance
- targeted actions in estuarine watershed
  - water quality
  - habitat
  - living resources challenges
- diverse stakeholder involvement

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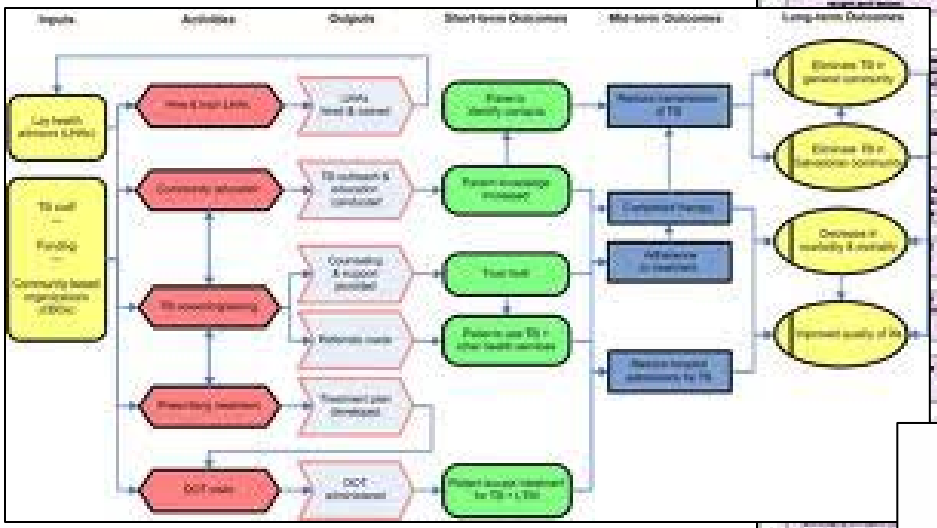
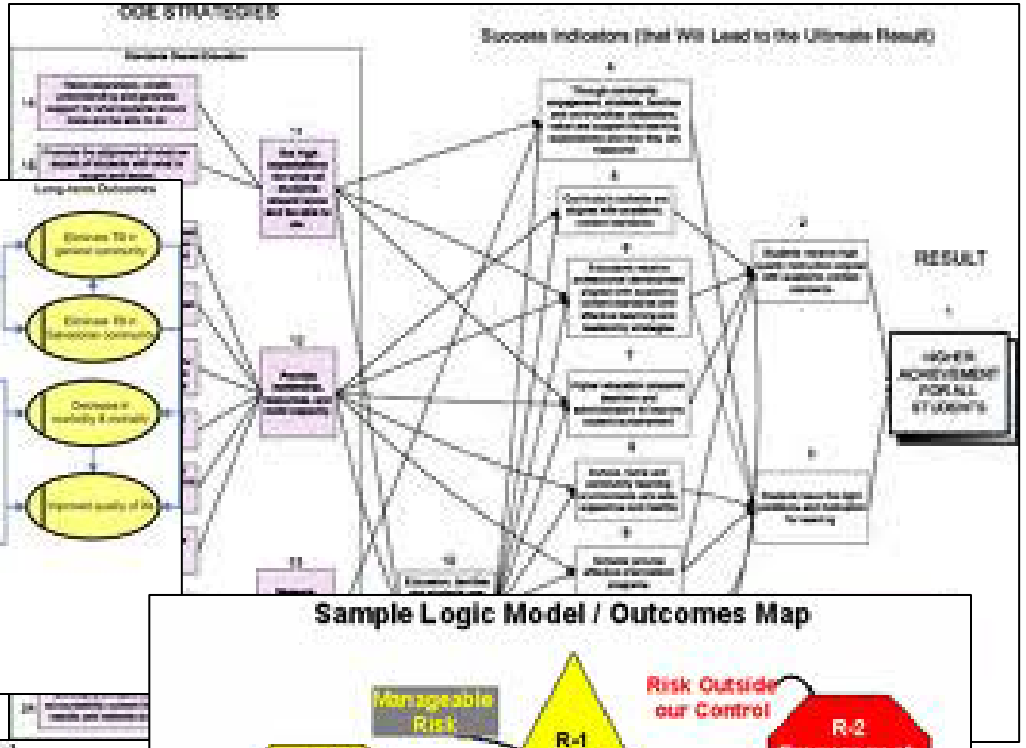
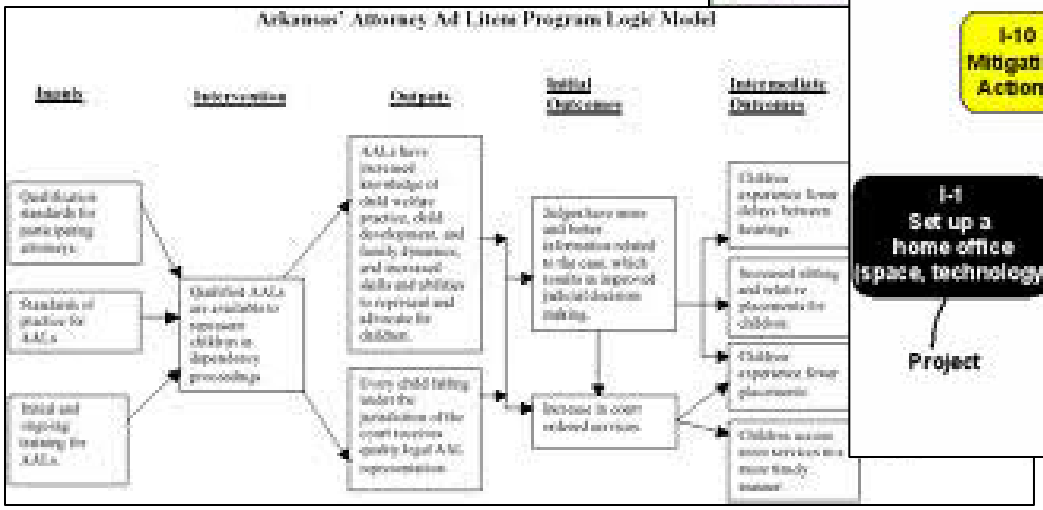
program framework

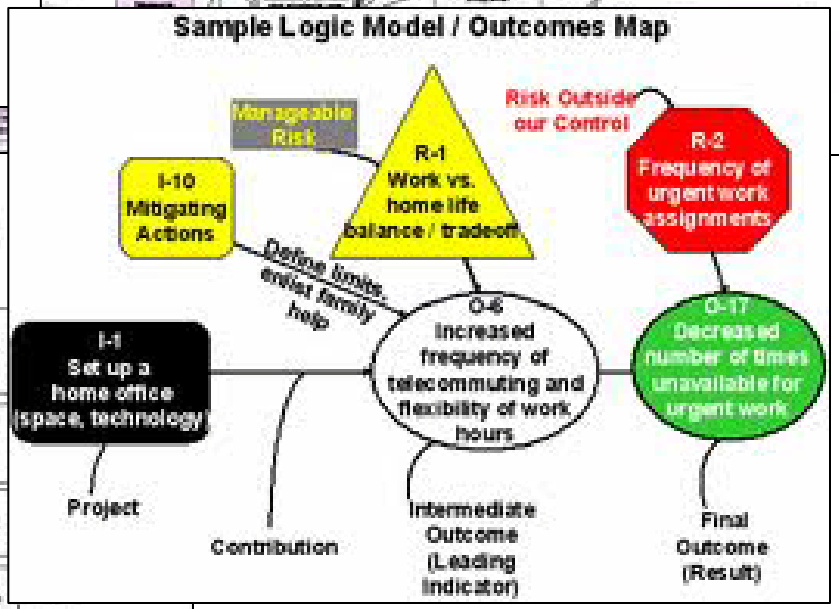
1. Articulate program goals
2. Develop system level model for goal attainment
3. Assess current management efforts – identify gaps
4. Develop management strategy
5. Develop monitoring program
6. Assess performance
7. Manage adaptively

Logic models









Goal modeling

identification of factors potentially affecting attainment

biological factors

- fauna
- flora
- Microorganisms

physical factors

- structure
- hydrology
- temperature

chemical factors

- salinity
- pH
- nutrients
- toxics

human factors

- use objectives
- modification of system
- knowledge

Protect and Restore Vital Aquatic Habitats - SAV			
		importance	manageable
biological factors			
fauna			
	predator prevalence	1	1
flora			
	physiological tolerance of plants	3	0
	propagation requirements	3	1
microorgs			
physical factors			
structure			
	bathymetry	3	0
	sediment type	2	0
hydrology			
	hydrodynamic conditions	3	0
temperature			
	maxima duration/frequency	3	0
chemical factors			
salinity			
	max-min duration/frequency	3	0
pH			
nutrients			
	N and P loads > eutrophication	3	2
toxics			
human factors			
use objectives			
	physical conflicts (competing uses)	2	3
modification of system			
	eutrophication	3	2
	suspended sediment loads	2	1
	altered bathymetry	1	3
	shading	1	3
knowledge			
	technical understanding of bed dynamics	1	2
	public understanding of protection efforts	3	3
	policy understanding of need for protection	3	3
	policy understanding of need for habitat restoration	3	2

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EBM - Stakeholder Collaboration

Optimistic model

- Trust transforms interests and leads to innovation
- Agreement on science basis leads to feasible, well-founded plan
- Involvement reduces challenges

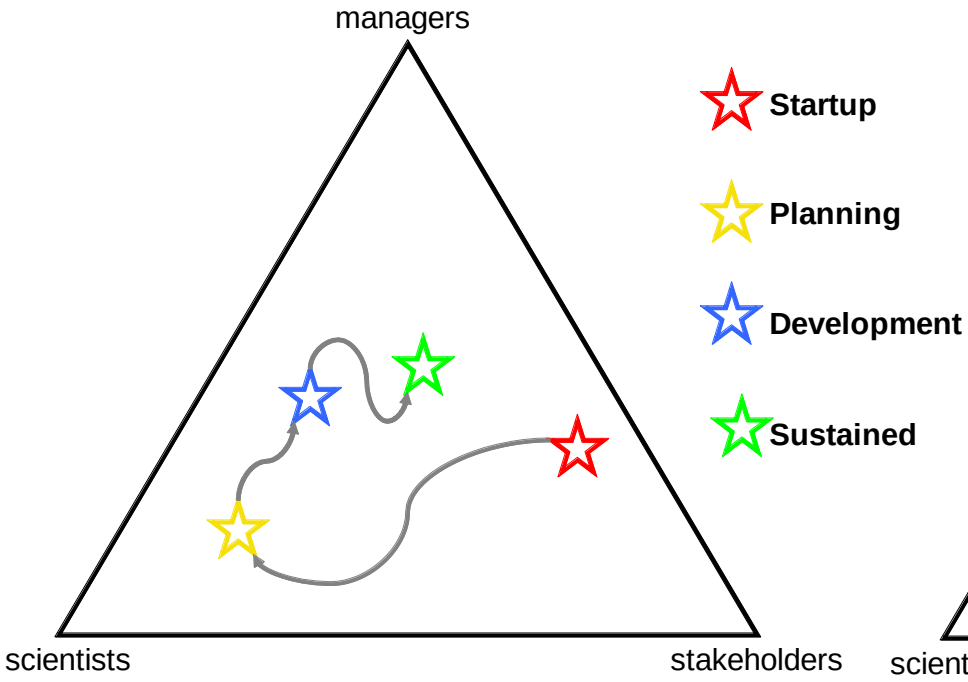
Pessimistic model

- Consensus seeking leads to lowest common denominator
- Socio-economic interests dilute precaution
- Special interests resurface impeding implementation

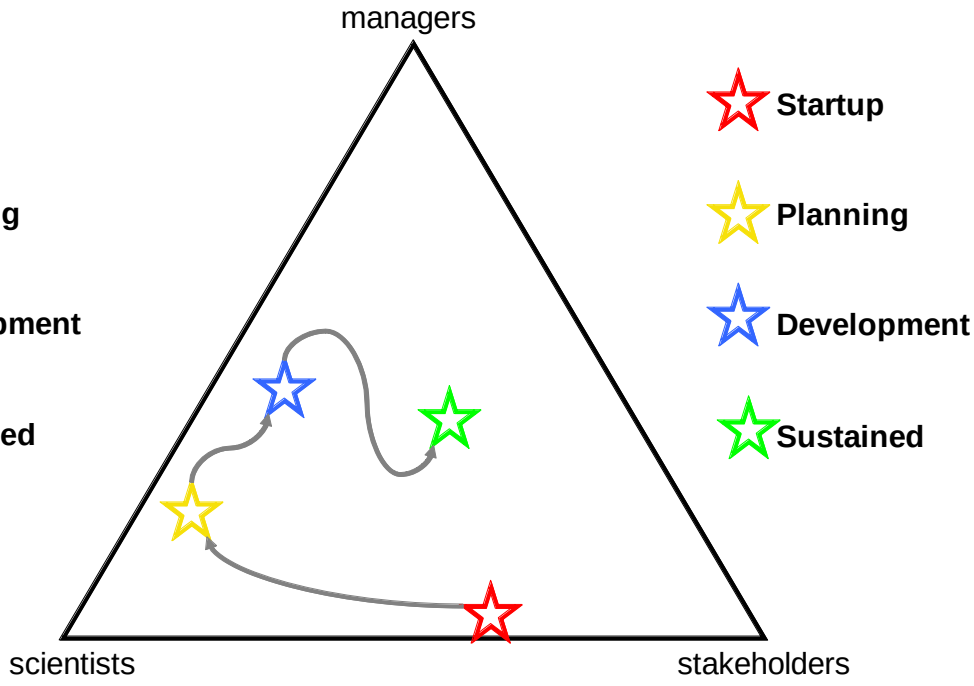
Adapted from: Judith Layzer. 2008. Natural Experiments: Ecosystem-based management and the environment. The MIT Press. Cambridge, MA.

Pathway to sustained EBM

PANGAS



SLOSEA



Source: PANGAS and SLOSEA Pis

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Develop monitoring program

- reflect management priorities
- designed to reduce uncertainty in system model
- link condition and management efforts
- data is appropriate to decision thresholds for adaptive management

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EBM - Adaptive Management

Optimistic model

- Emphasis on flexibility promotes ‘better-than-minimum’ performance
- Monitoring informs practice ensuring use of best available understanding

Pessimistic model

- Flexibility facilitates evasion by laggards
- Managers resist adjustments and development interests prevail

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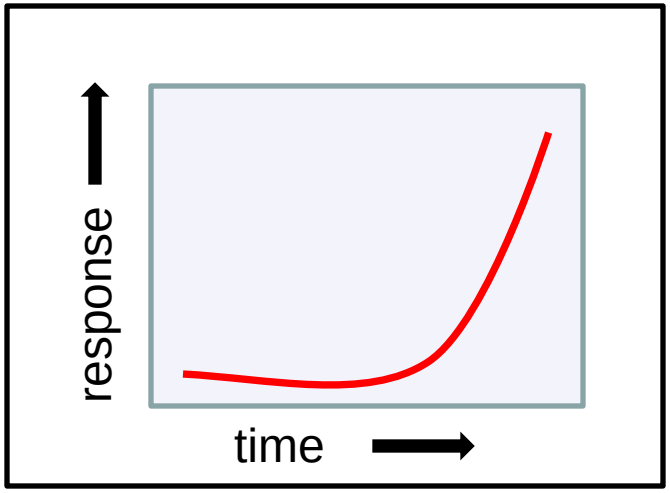
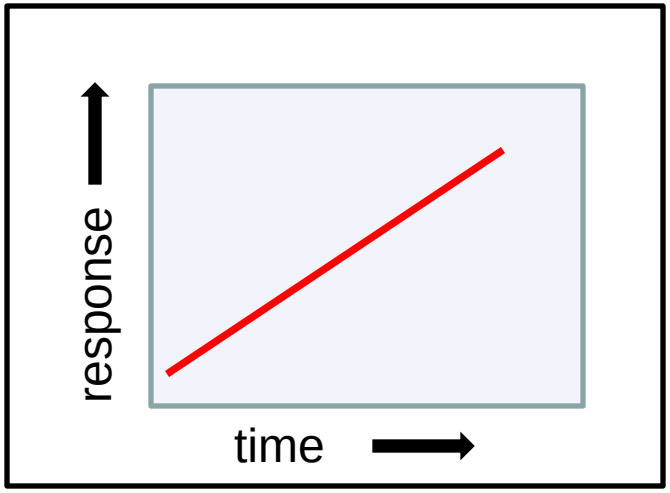
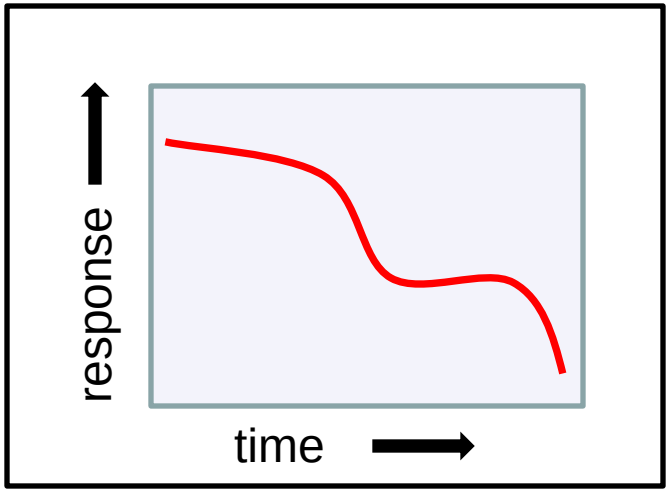
Establishing performance expectations

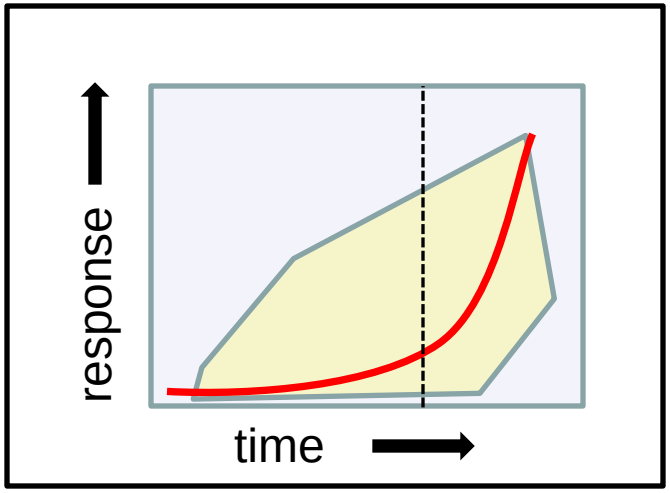


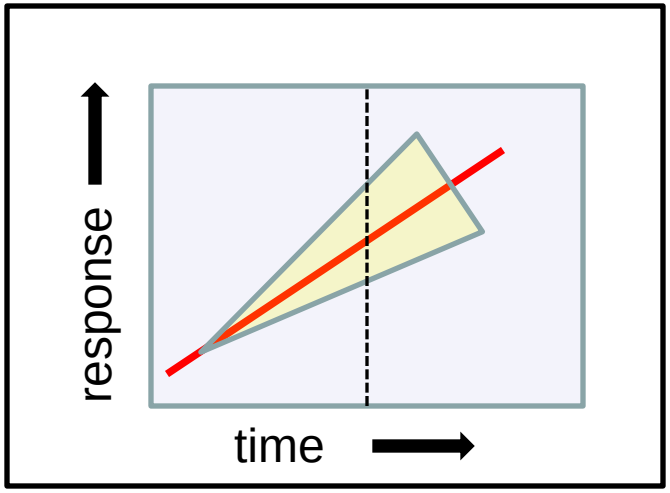


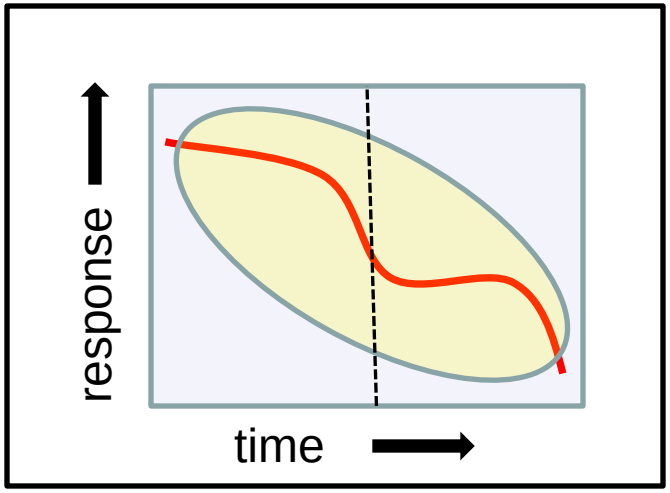


Establishing performance expectations

Identifying uncertainty







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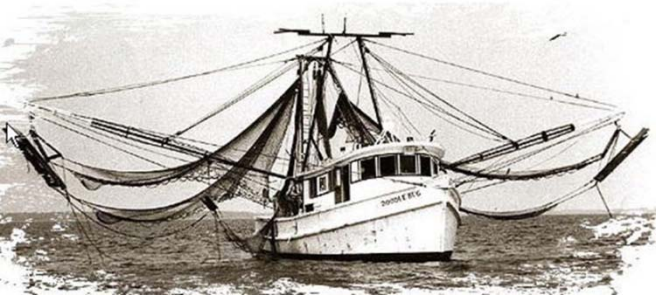

EBM advantages

- Goals clear and well understood
- Full ecosystem considerations
  - Human and natural system components
- Goal practicality vetted
- Coordination of existing programs
- Monitoring clearly linked to program goals
- Decision thresholds identified
- Iterative reductions in uncertainty

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