



NOAA's Integrated Ecosystem Assessment (IEA) Program

**Ecosystems 2010
Global Progress on Ecosystem-based Fisheries Management
October 2010**

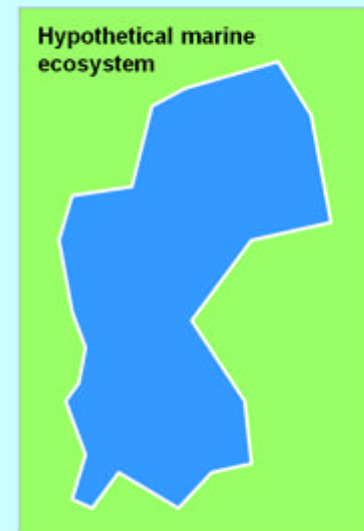
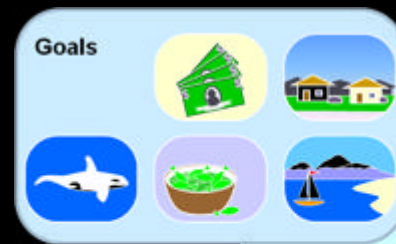
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Integrated Ecosystem Assessment Outline

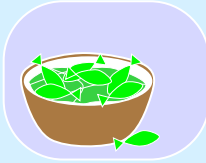
- **NOAA IEA Approach:**
 - **Objective and Process**
- **National Programming**
 - **Regional Implementation**
- **Alaska Region – IEA efforts**

Ecosystem-Based Management Challenge

- Ecosystems provide a large number of goods and services
- These services interact, often in ways we don't understand
- People place different values on different services

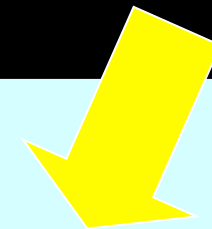
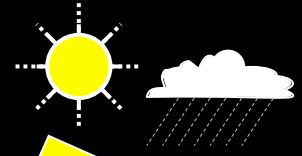


Goals

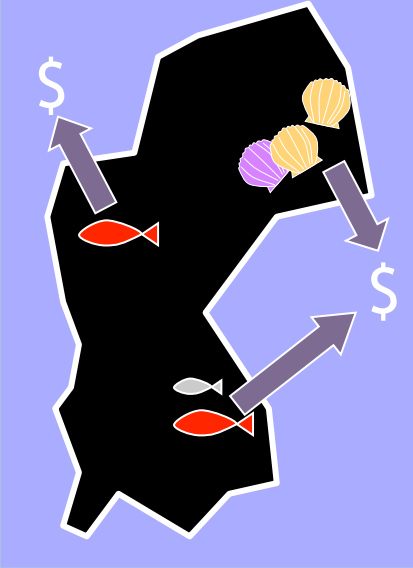


Ecosystem-based management

External drivers

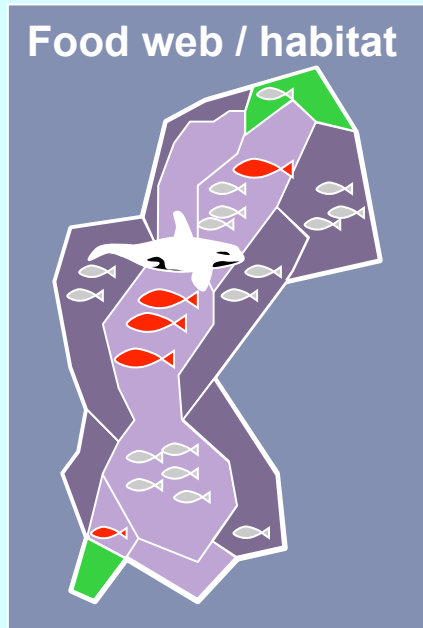


Resource use

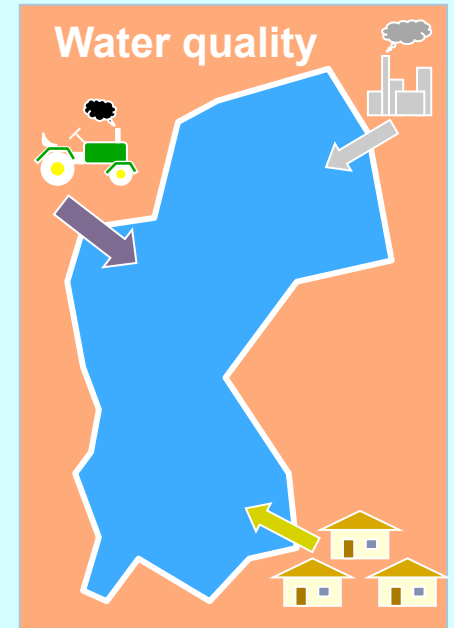


tradeoffs?

Food web / habitat



Water quality



tradeoffs?

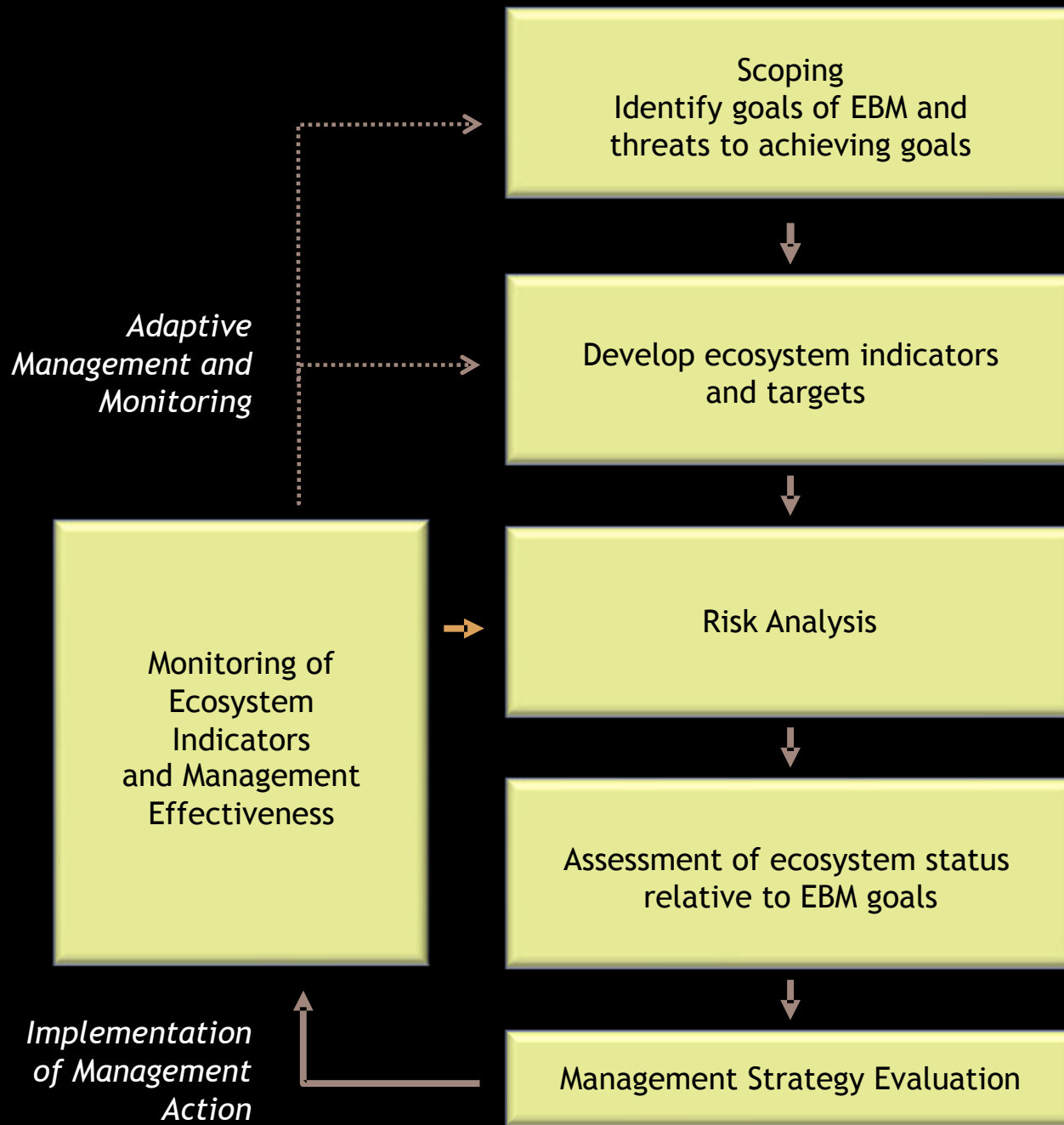
Integrated Ecosystem Assessments

“A synthesis and quantitative analysis of information on relevant physical, chemical, ecological and human processes *in relation to specified ecosystem management objectives*”.

- A framework for organizing and synthesizing science to inform multi-scale, multi-sector EBM
- Objective: to provide evaluation of management strategies and advice, through:
 - comprehensive integration of diverse ecosystem information and best-available science
 - incorporating economic and social science data
 - Evaluating benefits and risks to social and ecological sectors posed by management actions
 - continuous performance evaluation and review

The IEA loop

(Levin et al. 2008, 2009)



Scoping

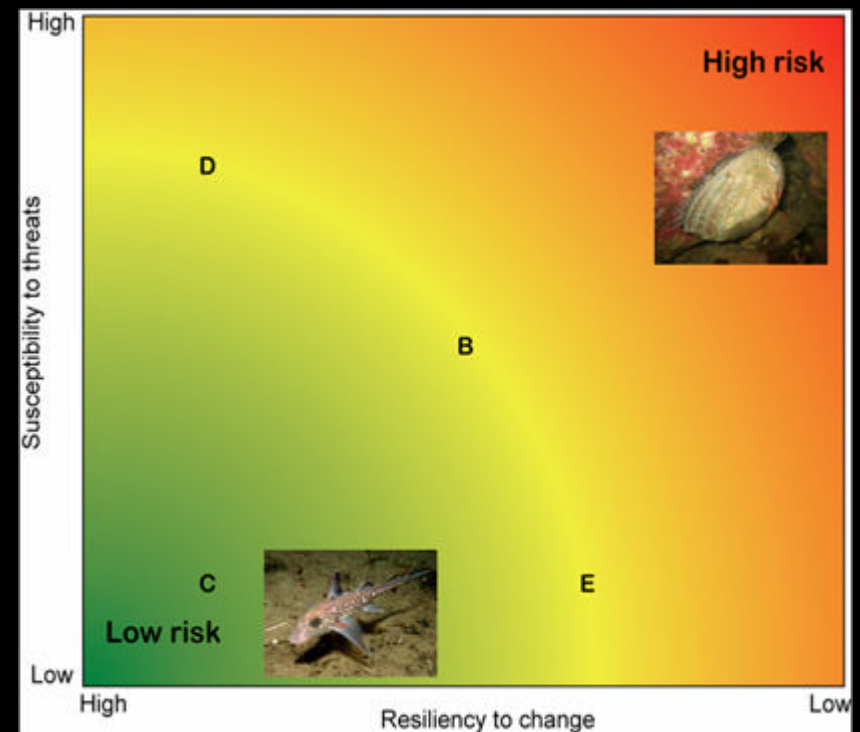
- Goals, objectives, and threats are identified and prioritized
- Scale, diversity, and relationships of different ecosystem components are laid out on the table
- A defining feature is stakeholder involvement, e.g.:
 - fisheries sectors
 - conservation groups
 - homeowners
 - business & industry
 - scientists
 - local, regional gov'ts

Indicators and targets

- Once goals and threats are scoped, you must select variables you'll measure to indicate ecosystem status, management performance
- There are any number of indicators that can be identified for a given ecosystem
- Key is to pick a SMALL SUITE of indicators that robustly track a broad range of attributes

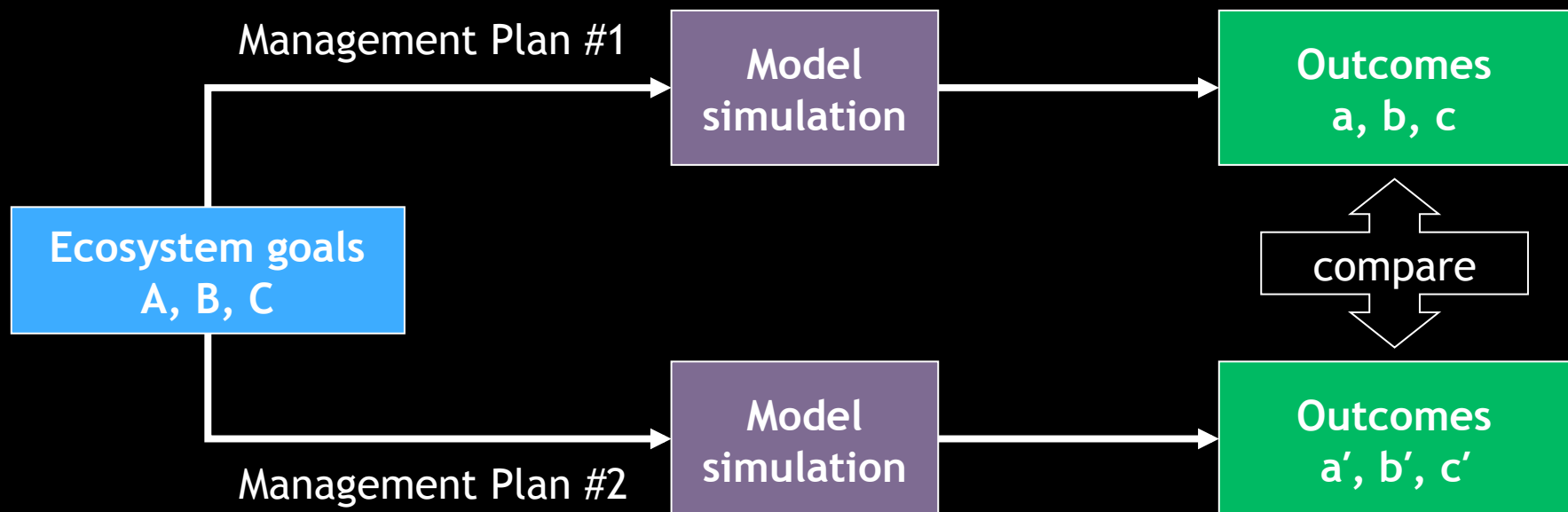
Risk analysis

- As indicators are established, we analyze or judge their risk of reaching or remaining in an “undesirable state” due to natural or human threat
- Precedes integrated assessment of ecosystem, when all indicators are considered simultaneously

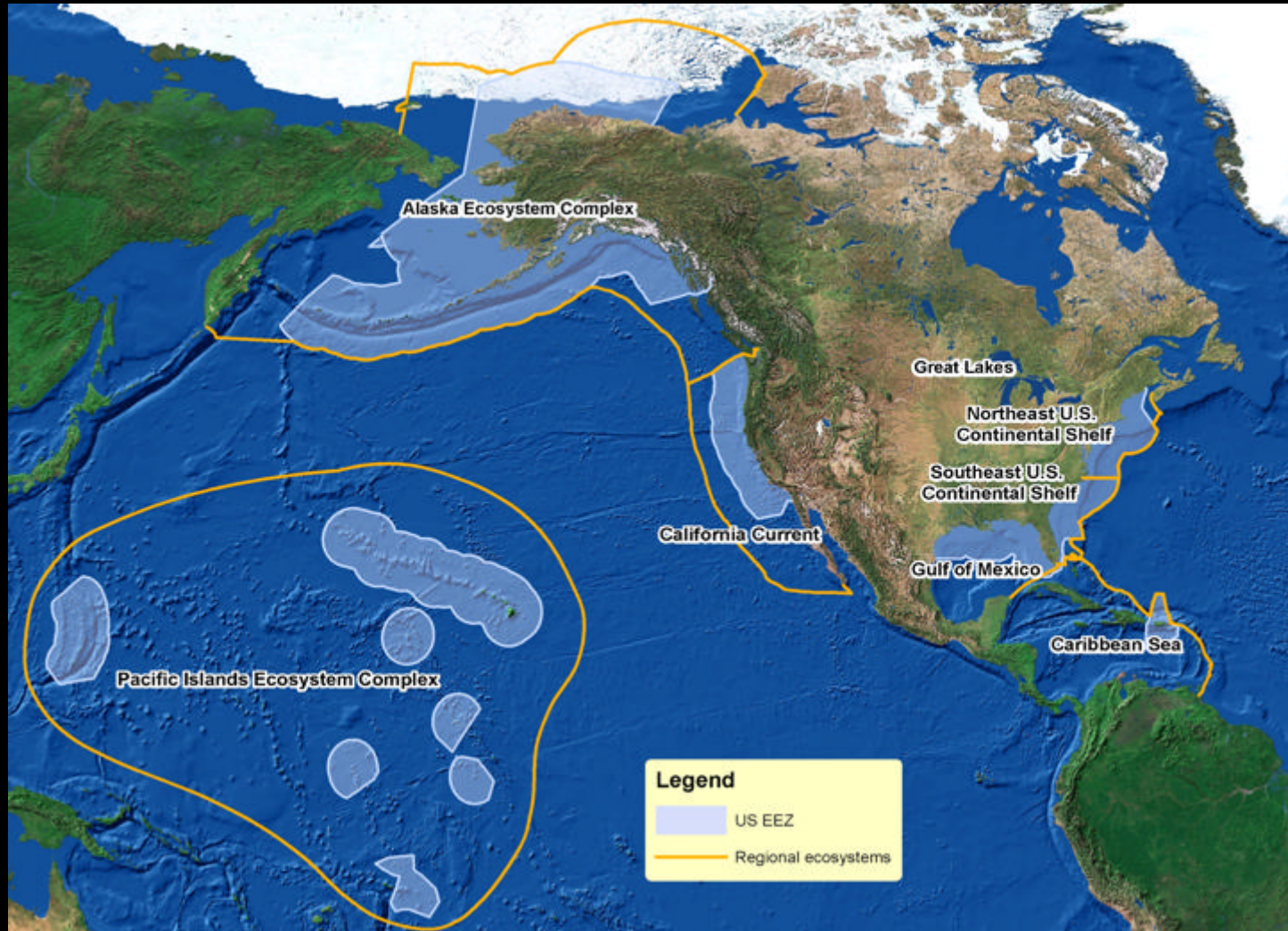


Management Strategy Evaluation (MSE)

- comparing alternate management plans, often with a model
- management plans are evaluated based on their performance relative to pre-set management targets and decision rules
- facilitates analysis of trade-offs among plans with respect to goals, sectors, natural resources, etc.



NOAA's IEA Regions – US LMEs



NOAA's Proposed IEA Schedule:

- California Current
- Gulf of Mexico
- Northeast Shelf
- **Alaska Complex**
- Pacific Islands

Followed by:

- Caribbean Sea
- Southeast Shelf
- Great Lakes



Order determined by series of criteria:

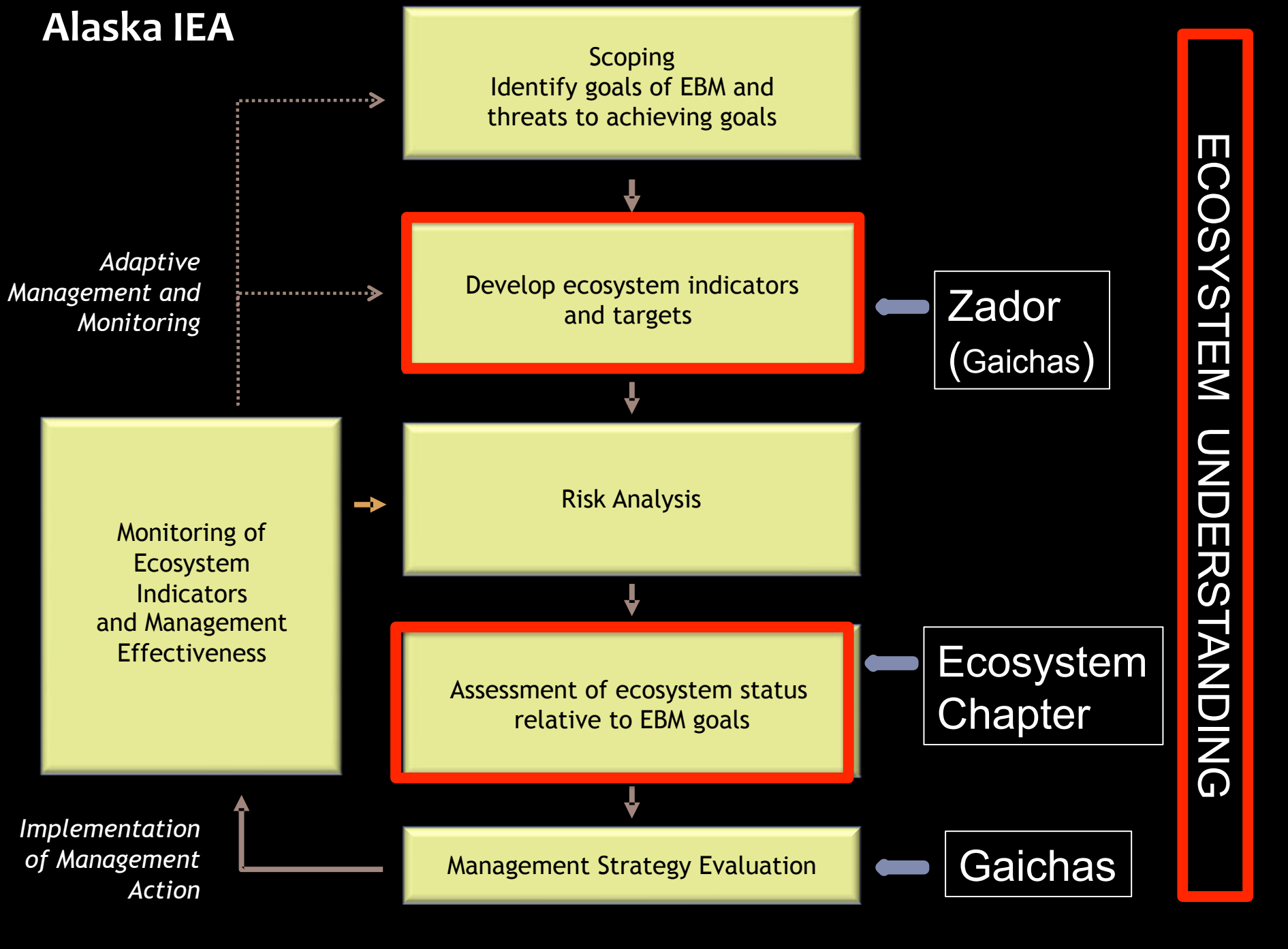
- regional NOAA capabilities to support IEA development
- emerging regional needs
- strength of NOAA statutory missions
- broad-based external partnerships
(states, academia, regional govts., federal agencies)



Alaska Region IEA



Alaska IEA



Understanding ecosystem processes in the Bering Sea

A comprehensive \$52 million investigation to understand how climate change is affecting the Bering Sea ecosystem ranging from lower trophic levels (e.g. plankton) to fish, seabirds, marine mammals, and ultimately humans.

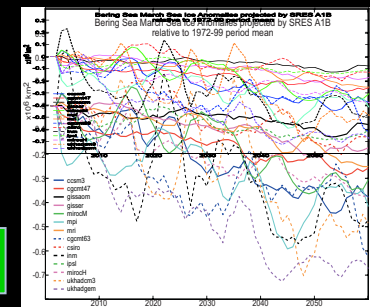
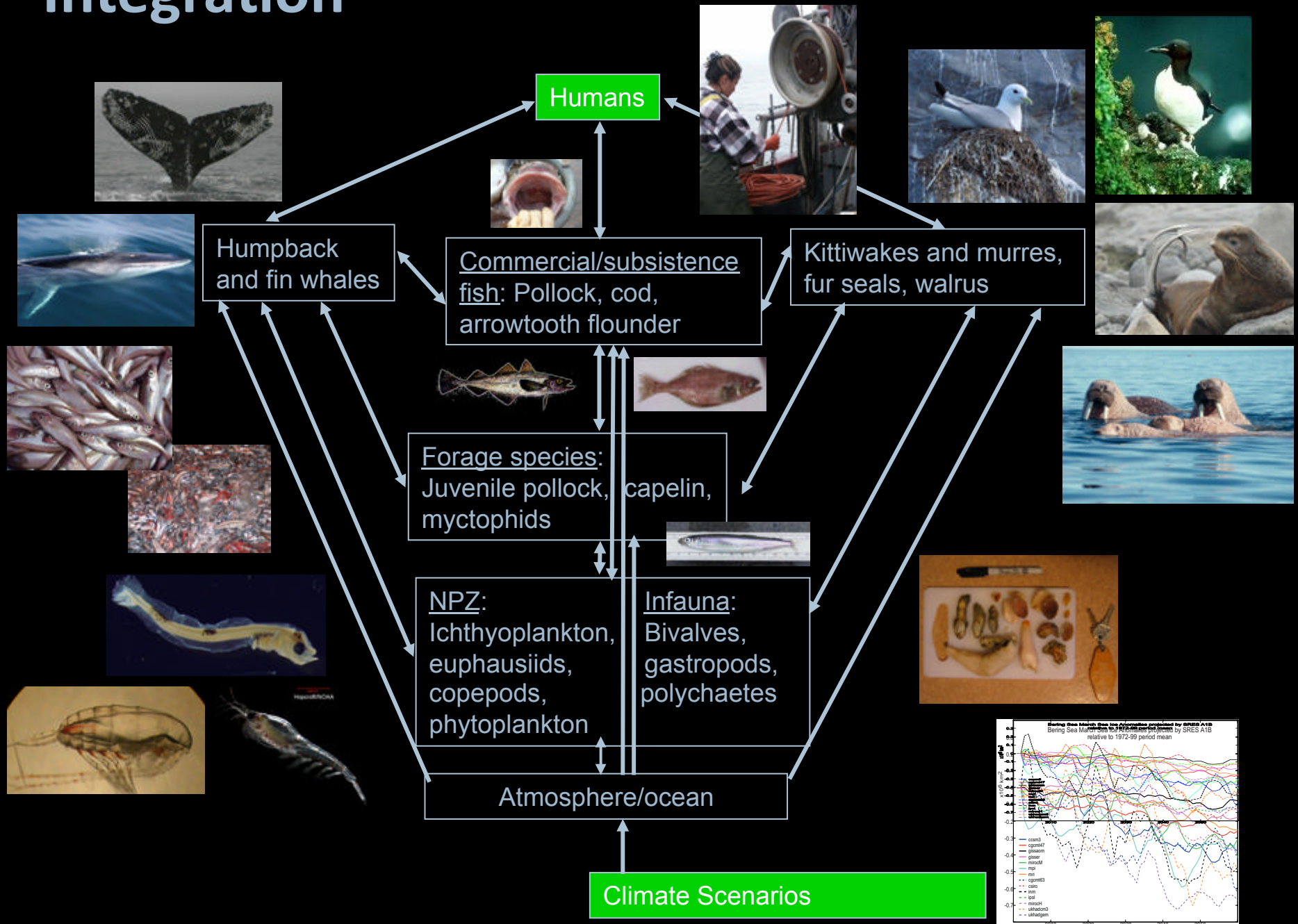
SIX YEARS
93 SCIENTISTS
MILLIONS
OF CREATURES
ONE STORMY SEA

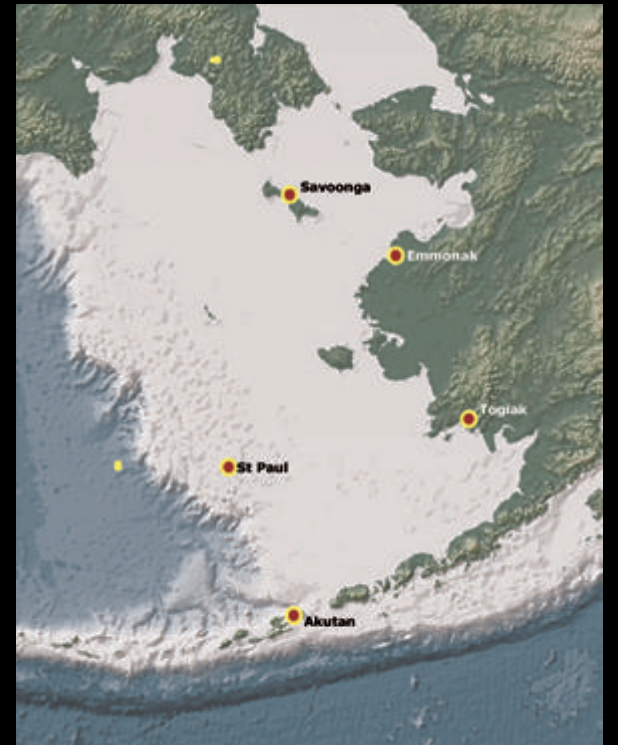


BERING SEA PROJECT: www.bsierp.nprb.org

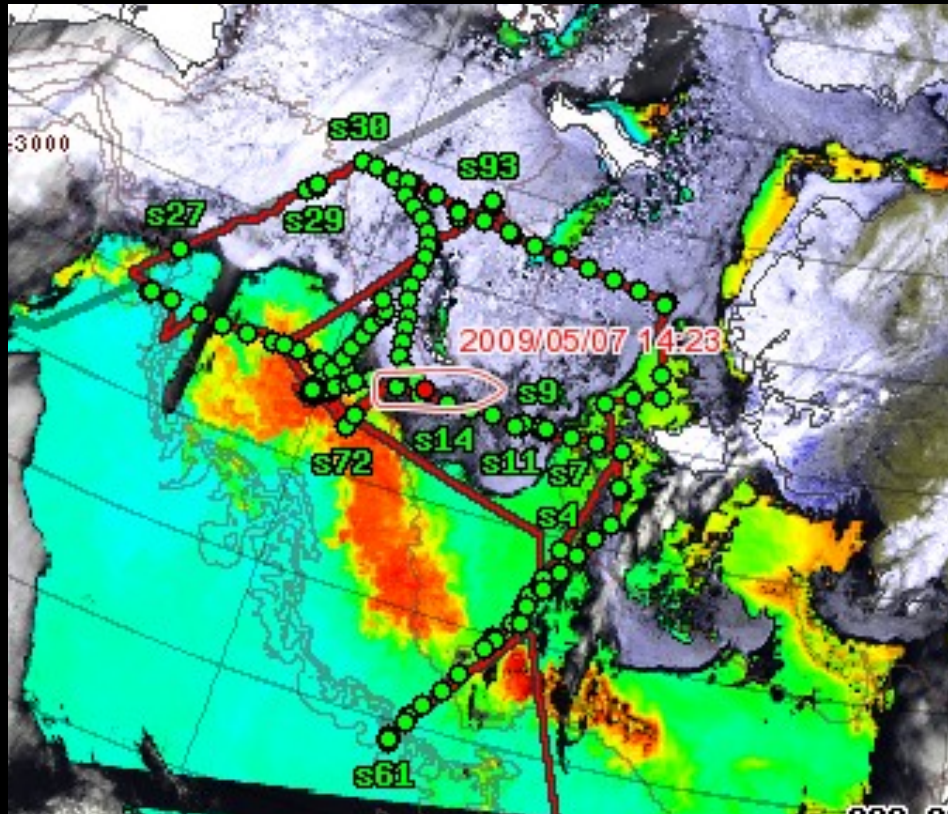


Integration



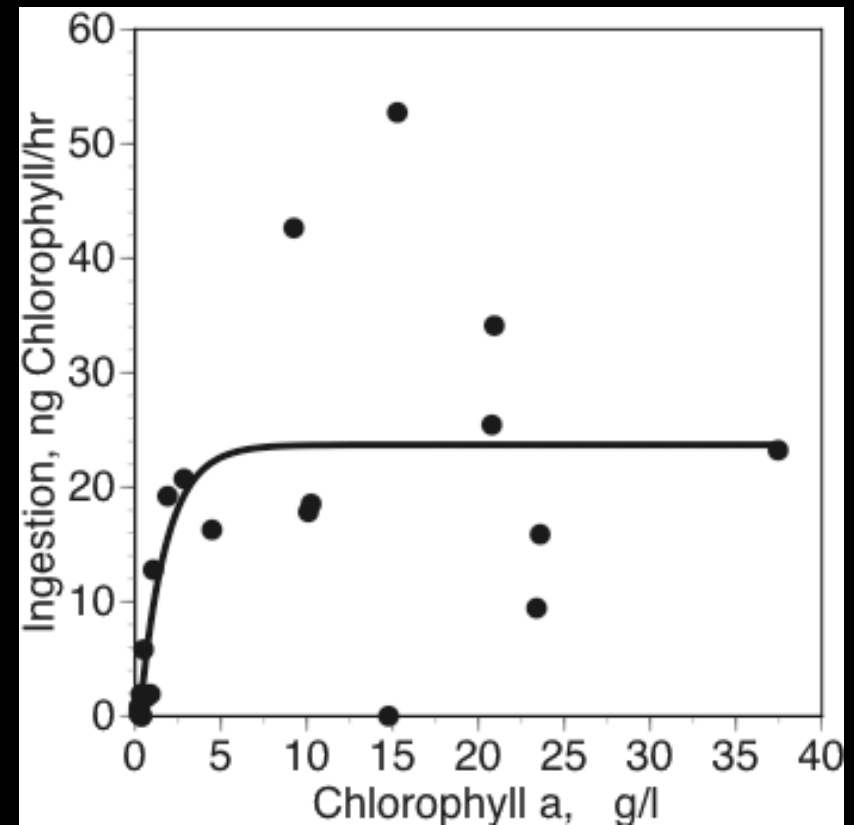


PLANKTON

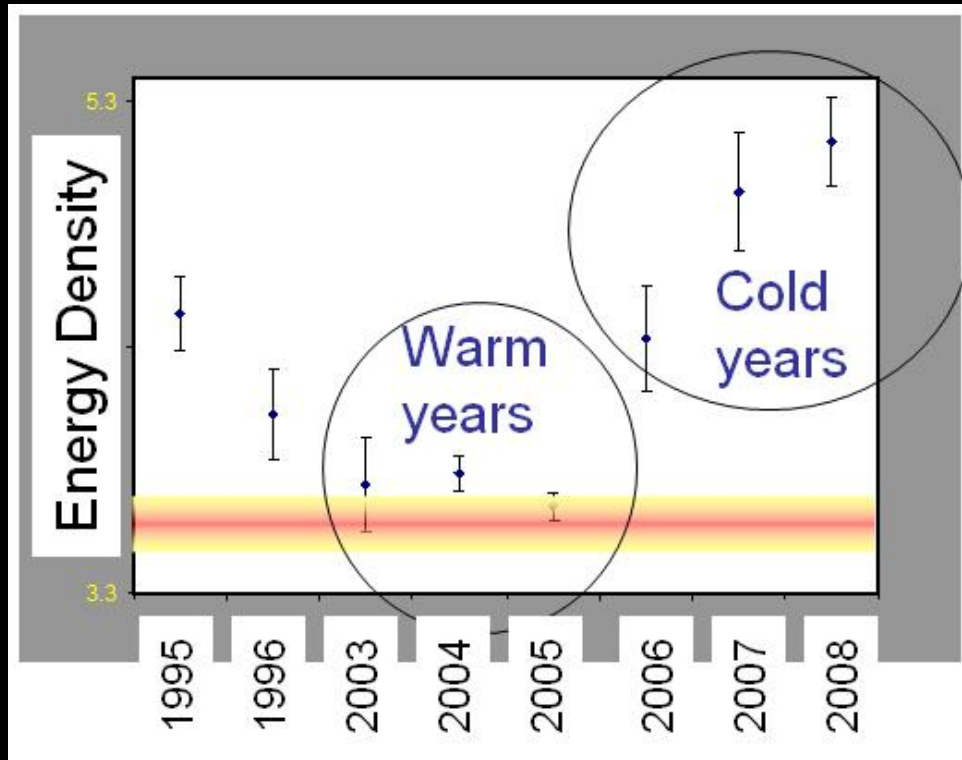


Spring bloom
sampled for several
days in 2009

Large zooplankton are not
food-limited during the
spring bloom

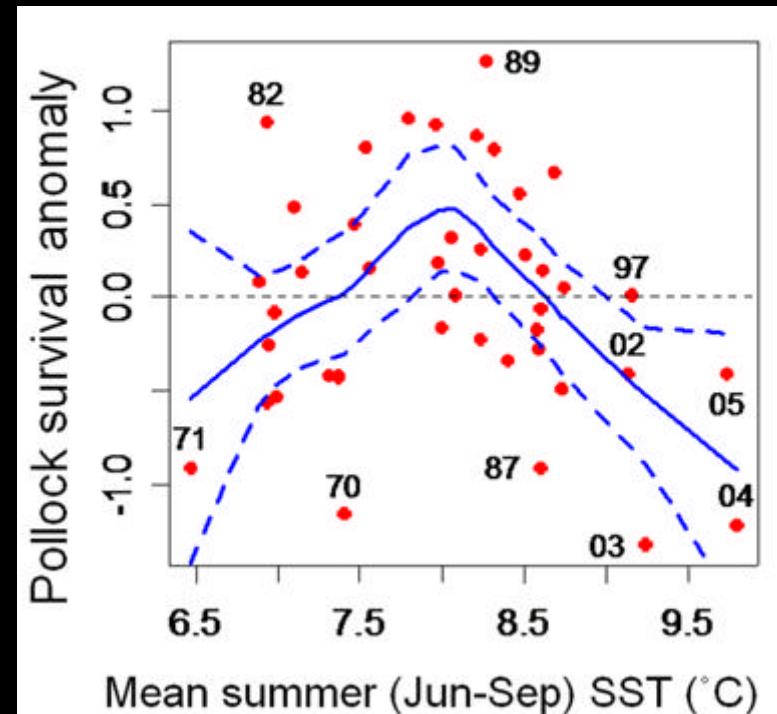


FISH



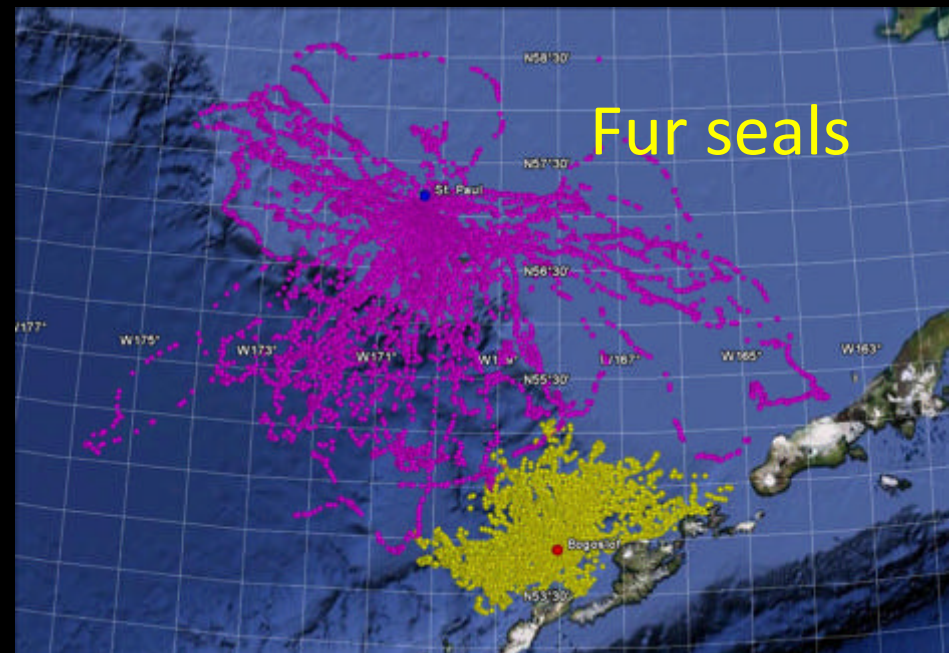
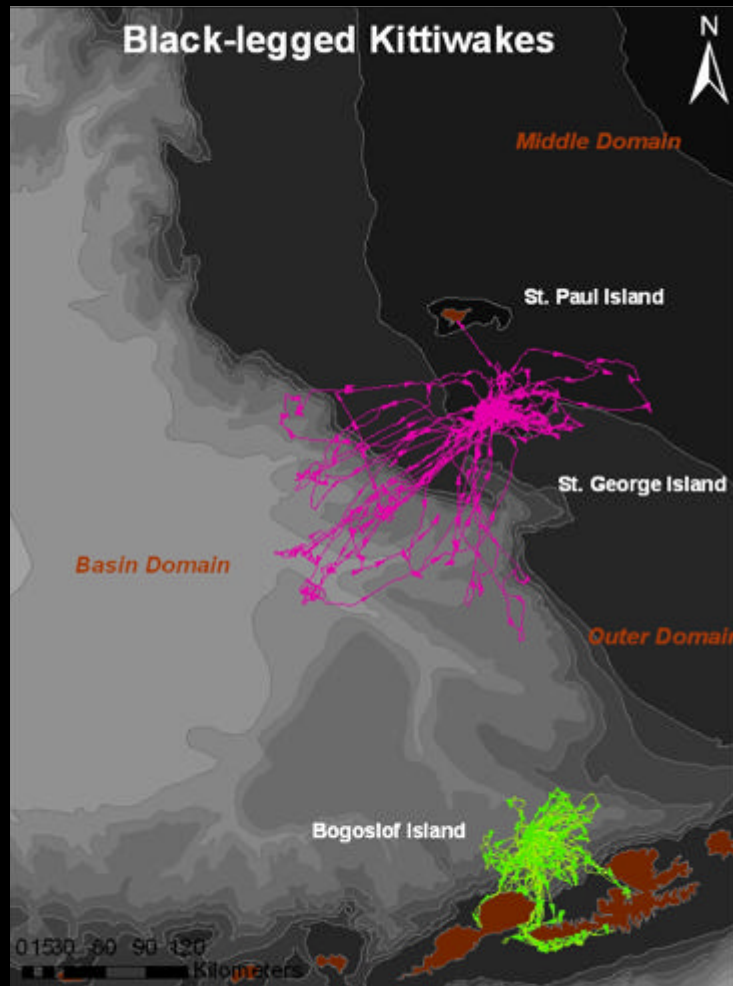
Low energy density of age-0 pollock in warm years

Juvenile pollock survival when temperature “just right” (Goldilocks)

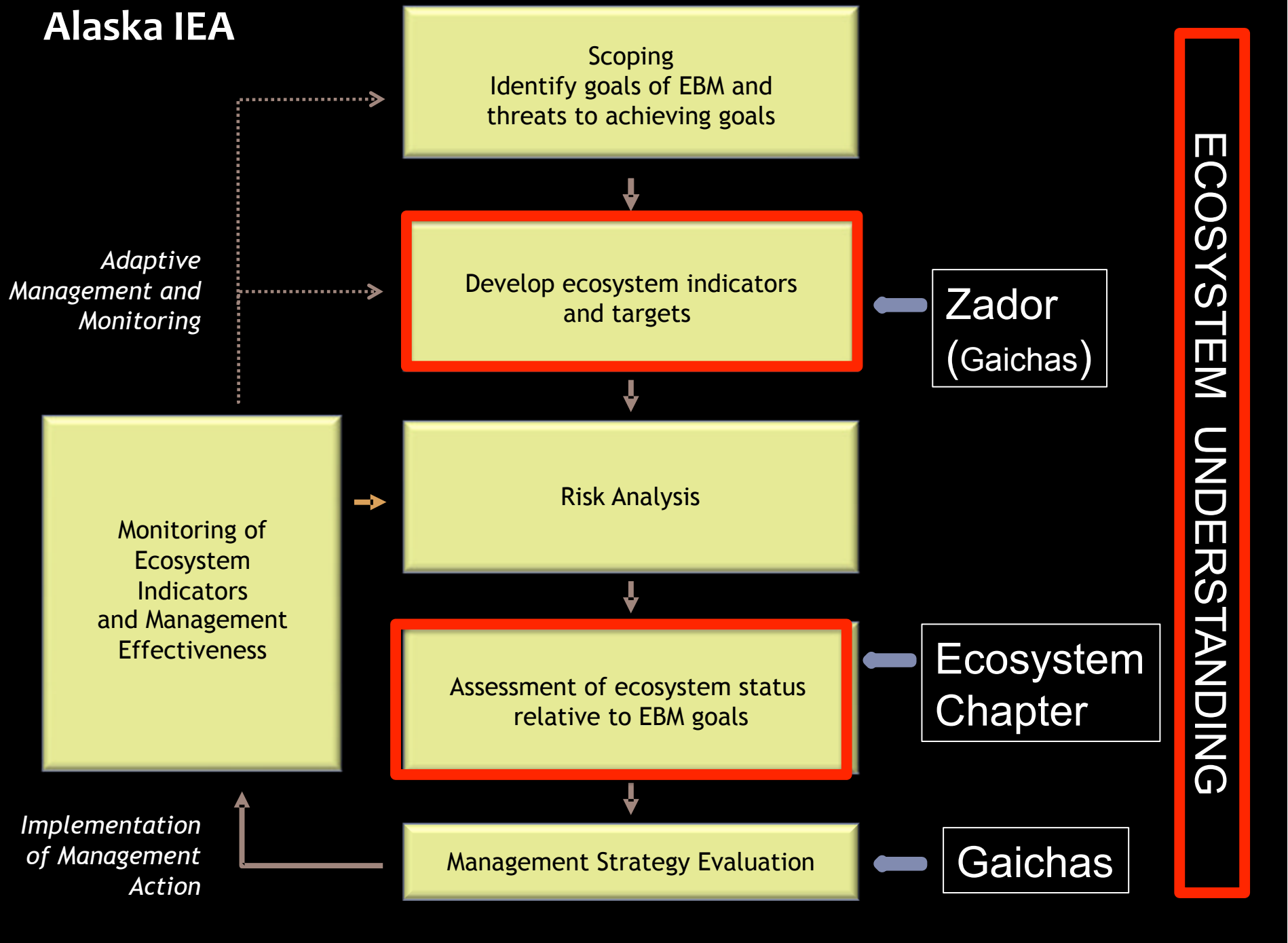


BIRDS AND MAMMALS

Kittiwakes and fur seals at Bogoslof Island made shorter foraging trips and had higher reproductive success than at Pribilof Islands



Alaska IEA



Scoping
Identify goals of EBM and
threats to achieving goals

Develop ecosystem indicators
and targets

Risk Analysis

Assessment of ecosystem status
relative to EBM goals

Management Strategy Evaluation

Monitoring of
Ecosystem
Indicators
and Management
Effectiveness

Zador
(Gaichas)

Ecosystem
Chapter

Gaichas

ECOSYSTEM UNDERSTANDING

*Adaptive
Management and
Monitoring*

*Implementation
of Management
Action*

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