

# **Integrated Adaptive Management Applied to the Gulf Ecosystem Monitoring and Research Program (GEM)**

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# Key Elements

- A New Look at the Gulf of Alaska (GOA)
- Background on the GEM Program
- Key Issues of Scale: *The Missing Link*
- Integrated Adaptive Management
- The Role of a Narrative in an Effective Ecosystem Monitoring Program
- Recommendations for the GEM Program

# **A New Look at the Gulf of Alaska**

- **We agree on:**
  - Scientific, economic, social importance
- **We are open to discussion of:**
  - The need to manage resources, balancing competing interests and mutually exclusive expectations
- **We are not effectively addressing:**
  - How to even talk about the same things, let alone how to arrive at an effective community agreement and a monitoring and management strategy
- **The GOA offers a unique opportunity to try a new approach**



# Background on the GEM Program

## ■ Key Dates and Events:

- **March 24, 1989:** the T/V Exxon Valdez ran aground on Bligh Reef in Prince William Sound, spilling almost eleven million gallons of North Slope crude oil
- **1991:** The State of Alaska and Exxon Oil Company Agree to a \$900M Settlement
- **1994:** Adoption of the Exxon Valdez Oil Spill Restoration Plan, and formation of the Exxon Valdez Oil Spill Trustee Council to facilitate the development and implementation of a comprehensive, interdisciplinary recovery and rehabilitation program
- **March, 1999:** Trustee Council dedicates approximately \$120 million for long-term monitoring and ecosystem-based research within the northern Gulf of Alaska, including Prince William Sound, Cook Inlet, Kodiak Island, and the Alaska Peninsula.
- **July 9, 2002:** Gulf Ecosystem Monitoring and Research Program (GEM) Plan is published

# **Gulf Ecosystem Monitoring and Research Program (GEM) Plan**

**With such meticulous planning, everything  
should be right on track...**

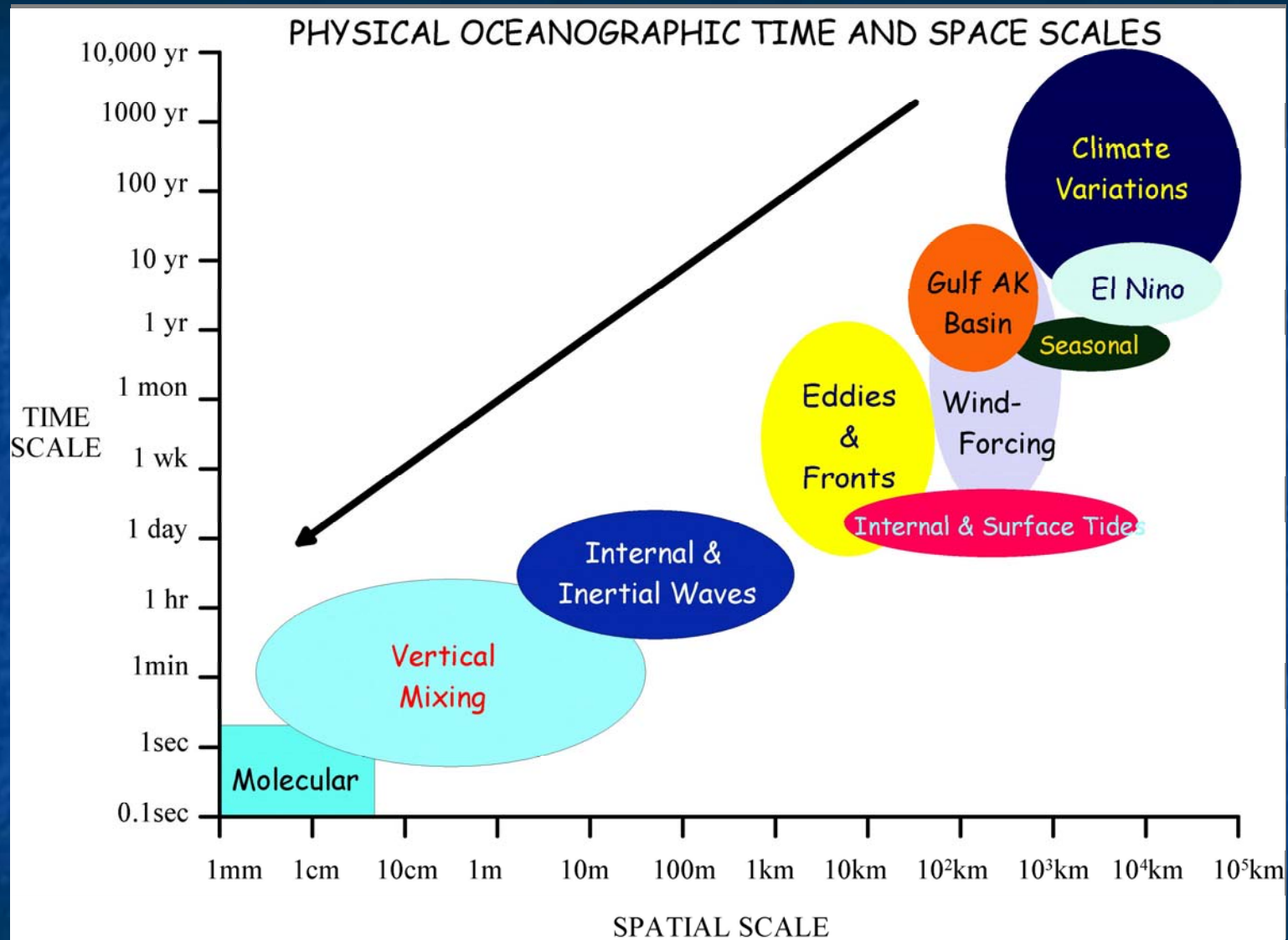
**Right?**

**Well, not quite...**

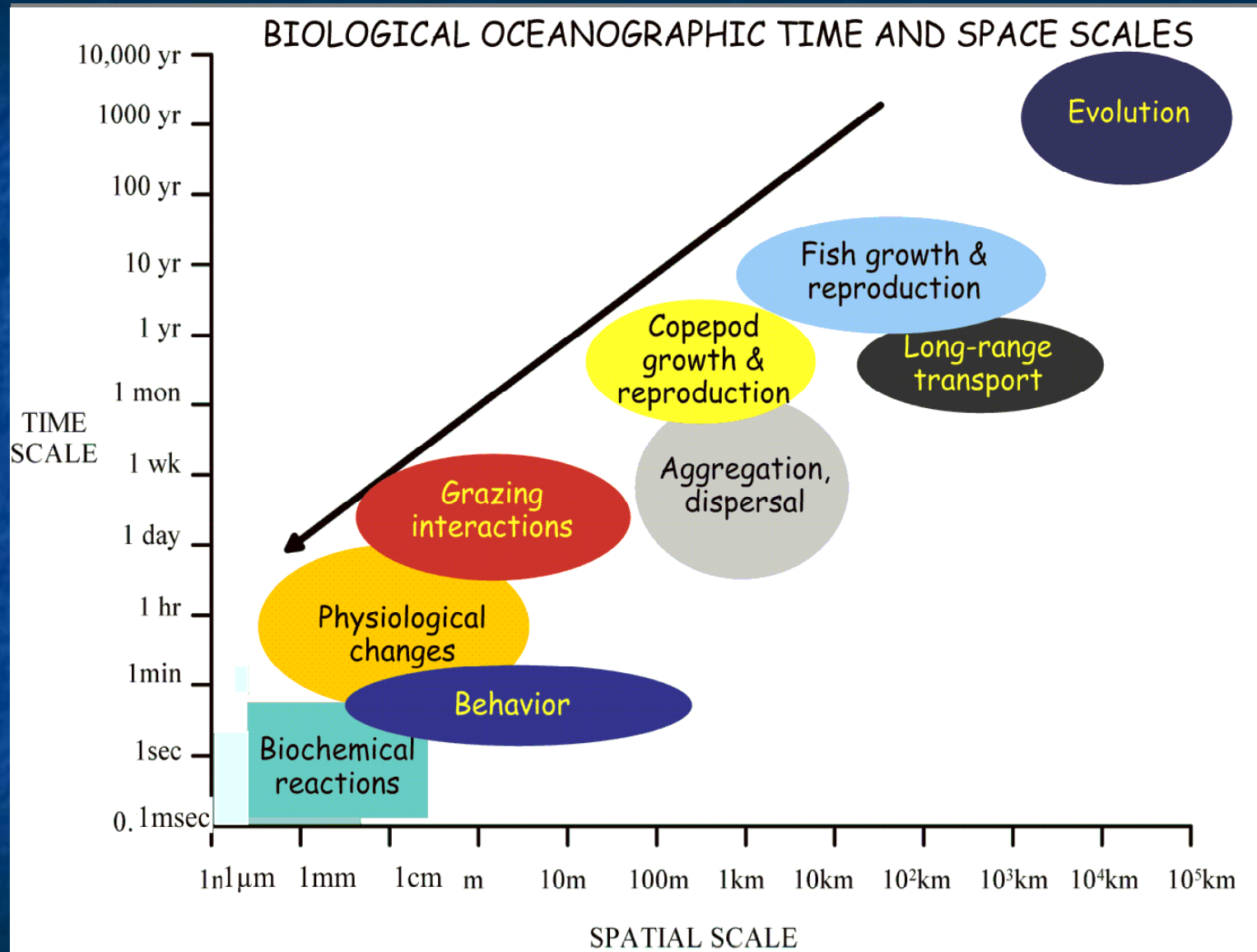
# **Key Issues of Scale: *The Missing Link***

- **What we have been discussing at PICES:**
  - **Physical Scales**
  - **Biological Scales**
  - **Interaction of these two scales**
- **What nobody is talking about:**
  - **Management Scales**
  - **Economic Scales**
  - **Subsistence Scales**
  - **The “Scale of Expectations”**





Courtesy: T. Weingartner, University of Alaska, Fairbanks

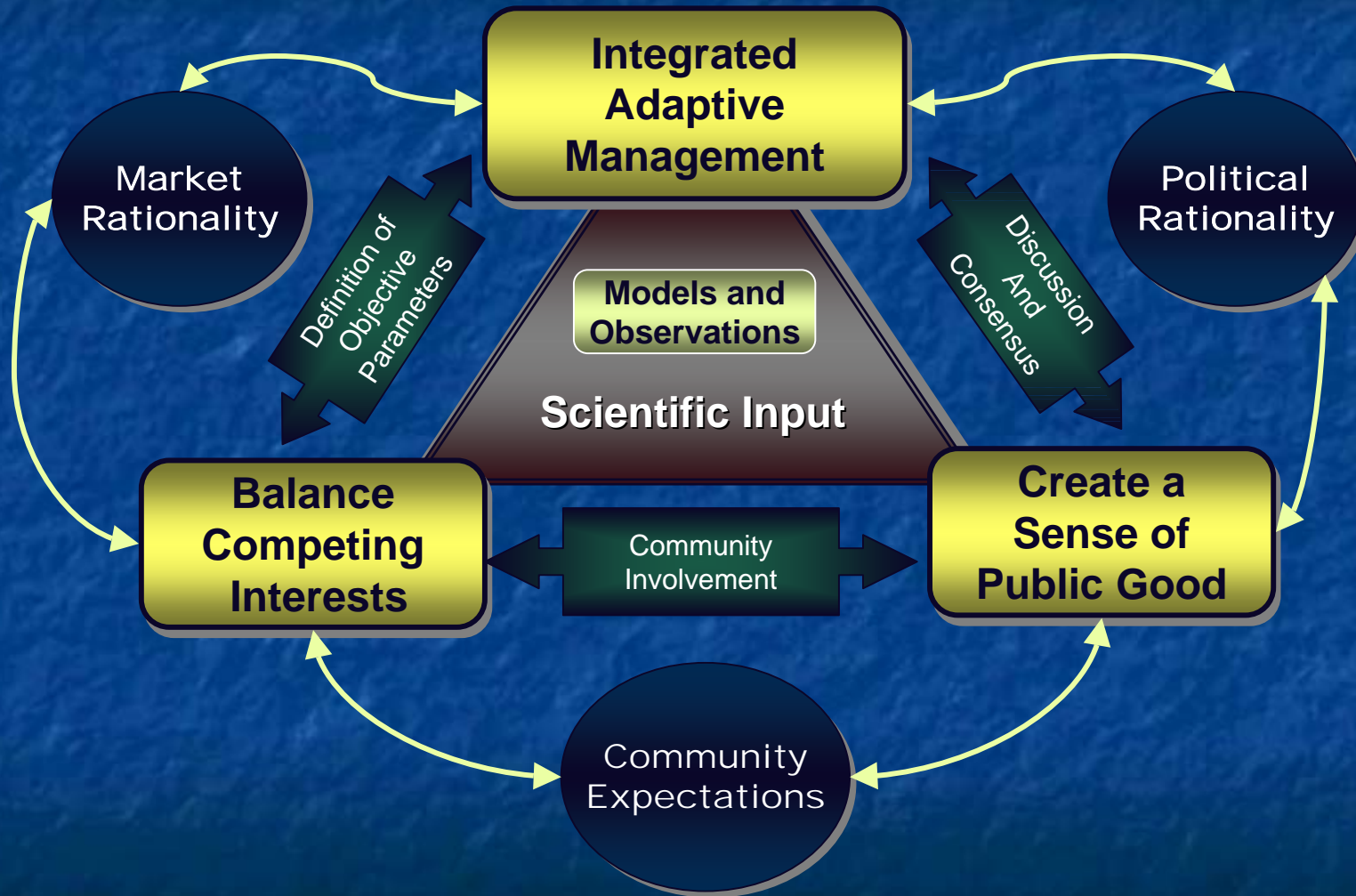


Courtesy, S. Strom, W. Washington University



QuickTime?and a  
TIFF (LZW) decompressor  
are needed to see this picture.

# The “Scale of Expectations”



*Modified from: Williams and Metheny, 1995*

# Integrated Adaptive Management

Combines two approaches to solving the problem of competing expectations:

- **Integrated Management:**

- Effectively applied in Canada in areas such as the Scotian Shelf (O'Boyle, et al., *in press*; Jamieson, et al., 2003)
- Integrates Management (or conservation) Objectives with Community (sector) Objectives to derive Operational Objectives
- This provides a means of defining key indicators and reference points valuable to the larger community
- Uses these indices to design and implement a framework for a monitoring program
- The design, by definition, contains its own user-defined metrics for evaluation

- **Adaptive Management:**

- Relies on the use of indicators and reference points to provide information for decision-making even when there are few data available

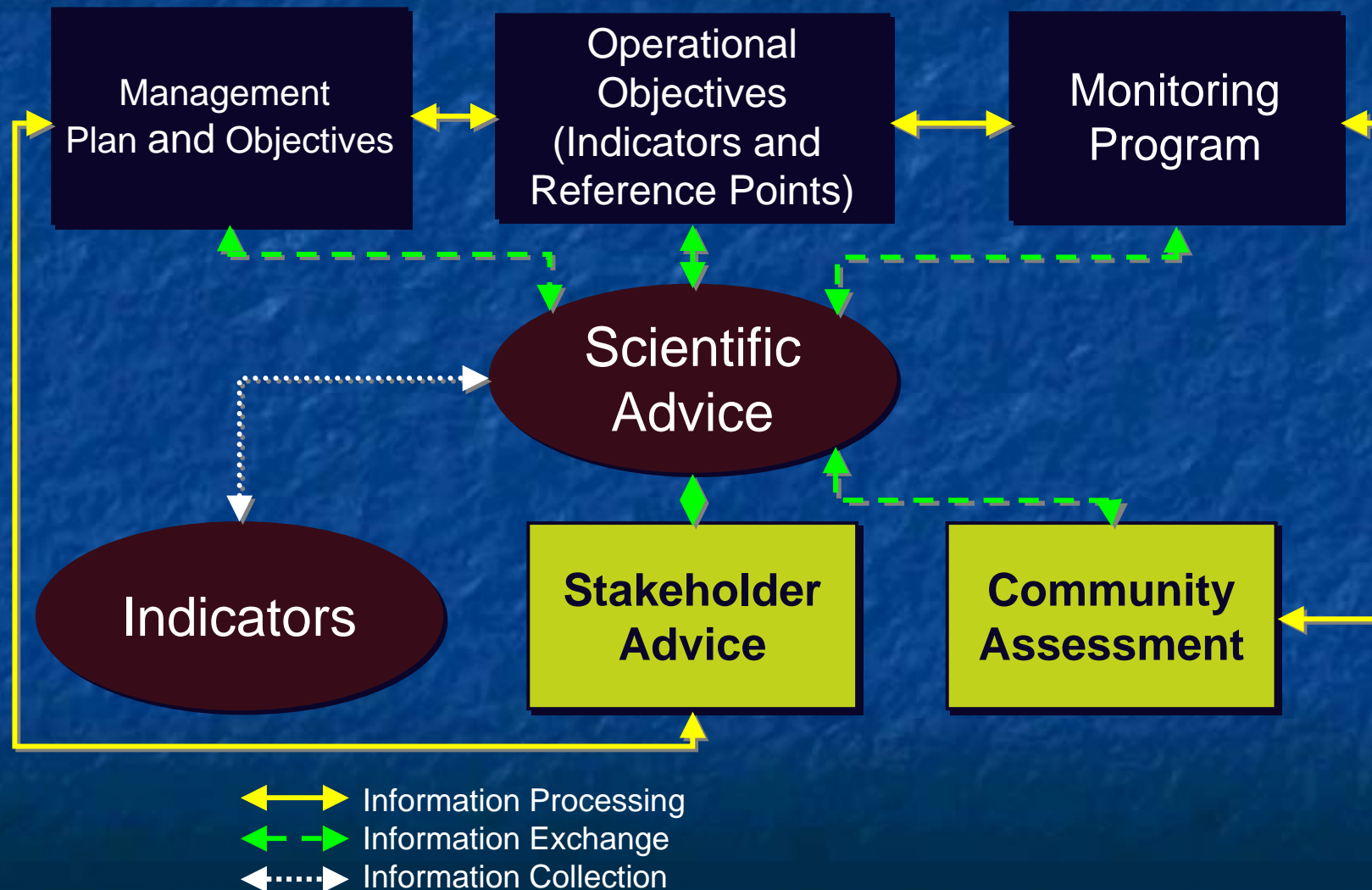


# **Integrated Management for GEM**

**There are eight steps to the Integrated Management approach:**

- 1. Define Management (Conservation) Objectives  
the top down process**
- 2. Define Community Objectives (Stakeholders)  
the bottom-up process**
- 3. Create Operational Objectives  
the unpacking process**
- 1. Define a few key indicators and reference points**
- 2. Design a monitoring program that addresses these indicators  
and reference points**
- 3. Establish a framework for assessing the monitoring program**
- 4. Create a reporting process**
- 5. Formulate advice to stakeholders, managers and  
policymakers**

# Integrated Management Approach



*After Johnson, 1999 and O'Boyle, in press*

# **Defining the Management Objectives**

## **The Top Down Process**

- **Who are the users (or stakeholders)?**
- **What are their needs and expectations?**
- **What are the main issues?**
- **Who has a role in governance?**
- **What regulatory frameworks are in place?**
- **What guiding documents are already published?**
- **What legal and political requirements must be met?**
- **What are the major obstacles to implementing the Management Objectives?**



# **Defining the Community Objectives The Bottom-up Process**

- **Who are the users (or stakeholders)?**
- **What are the needs and expectations of each stakeholder group by sector?**
- **Are the expectations of the stakeholders mutually exclusive?**
- **Is there consensus on some objectives?**
- **What are the major obstacles to implementing the Community Objectives compared to the Management Objectives?**

# Defining the Operational Objectives The Unpacking Process

**Comparison of Management and Community Objectives provides guidelines for development of a community-driven monitoring program by providing:**

- a measure of importance of each indicator to each user group
- reference points defining the importance of each indicator to each sector
- Specifics on the information needs and expectations of each sector

**Deriving Operational Objectives in this manner helps define what indicators to measure, and offers insight into the status of these indices while creating a cooperative framework for implementation and cost-sharing.**



# Defining Indicators and Reference Points

**The crucial role of the scientific community is to develop sound criteria for selection of a small suite of key indicators and their reference points, while taking into account the larger framework for the use of the indicators, for example:**

- **Scientific Basis-** How uniformly do experts accept the indicators? Are there usable reference points? Do the data exist in a usable format?
- **Public Awareness-** Do the public and experts interpret the indicator the same way? Will it motivate any action or reaction? Is there positive or negative feedback?
- **Management Information Needs-** do the indicators provide the information necessary to support the management or conservation objectives?
- **Complexity and Cost-** are the indicators even feasible to use? Which can actually provide the most information?



# Using Indicators and Reference Points

**Program Objective + Ecosystem Component = Operational Objective**

Sustain a healthy and biologically diverse marine ecosystem in the northern GOA + understand how productivity is influenced by human and natural changes = Observe and model species interactions and response to ecosystem and human-induced changes

**Ecosystem Component + Operational Objective = Monitoring Objective**

Maintain overall species diversity + Understand status of species at risk = Monitor effects of fisheries on species at risk

**Monitoring Objective + Strategy = Management Objective**

Monitor effects of fisheries on species at risk + Maintain sanctity of spawning areas = Define areas and times corresponding to specific target species

# **The Role of a Narrative in a Monitoring Program**

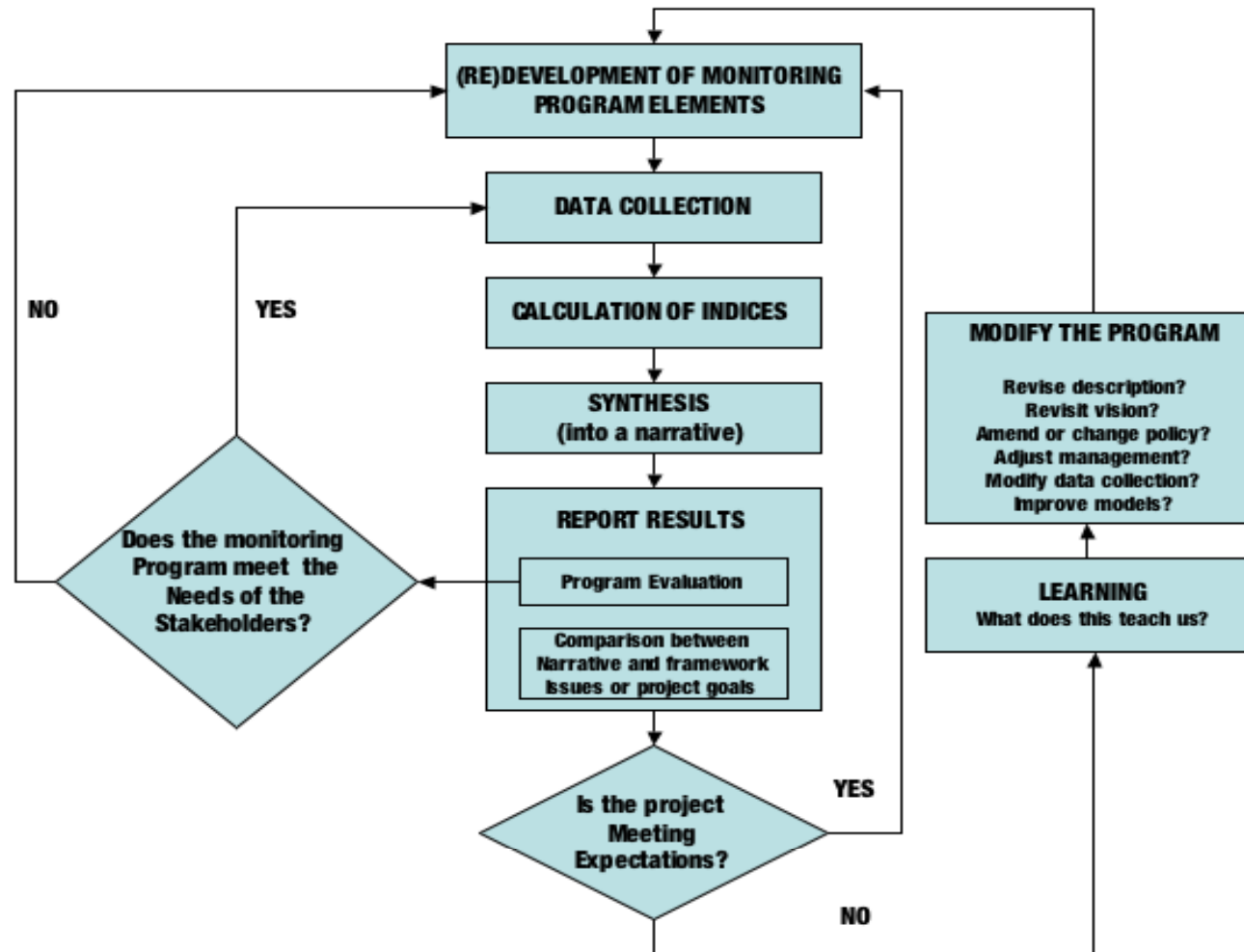
**People understand a good story, even if it is complicated.**

**Creation of a successful monitoring and modeling program with real community support relies on the creation of a compelling narrative (a good story).**

**The narrative is often the final measure of approval or disapproval, even in the science community.**

**We lack “The Mars Question”.**

# The Role of a Narrative in a Monitoring Program





# Recommendations for the GEM Program

- Adopt an Integrated Adaptive Management Approach
- Define in detail the top-down and bottom-up requirements of the stakeholder groups
- Create a more compelling narrative
- Work with the science community to develop a suite of indicators and reference points
- Establish a GEM Monitoring Program
- Re-visit, evaluate and update the program every 1-3 years