

The background of the slide is a faded, light-colored photograph of a marina. In the foreground, there are wooden pilings and a concrete structure. In the middle ground, several boats are docked at a pier. In the background, there are trees and buildings. The overall scene is a typical waterfront area.

Task 4: Ecological Data Synthesis

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The Problem

No comprehensive assessment of the State of the Bay and its Watersheds

Previous Work

Inform Bay Decision-Making

- Establish long-term monitoring of environmental trends, develop and track ecological indicators;
- Improve understanding of economic trends and factors, develop and track economic indicators;
- Improve the management and communication of environmental information, perhaps through the URI Coastal Institute;
- Develop a forum for collaborative planning—possibly the Coastal Institute also;
- Undertake outreach and education about the Bay for the public and decision-makers—for example, training for local officials on the regional and environmental effects of local land-use decisions.

- **April 2000: Bay Summit**

- Need better monitoring for the Bay and Watershed

- **Summer 2000: PNB**

- Creates the Indicators and Monitoring Initiative

- Monitoring W'shop, June 2001
- Indicators W'shop, October 2001

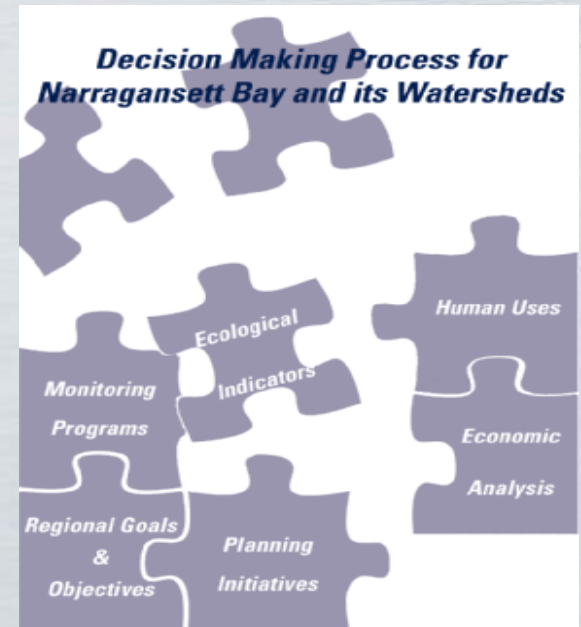
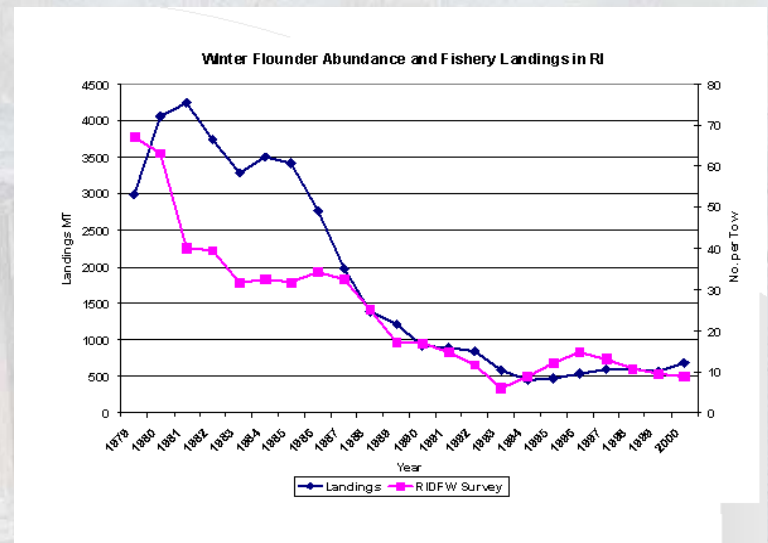


Task 4 Activities

- Identified need for overarching framework and core indicators
- Researched other programs
- Developed proposed framework for Narragansett Bay and its Watersheds
- Conducted science workshop

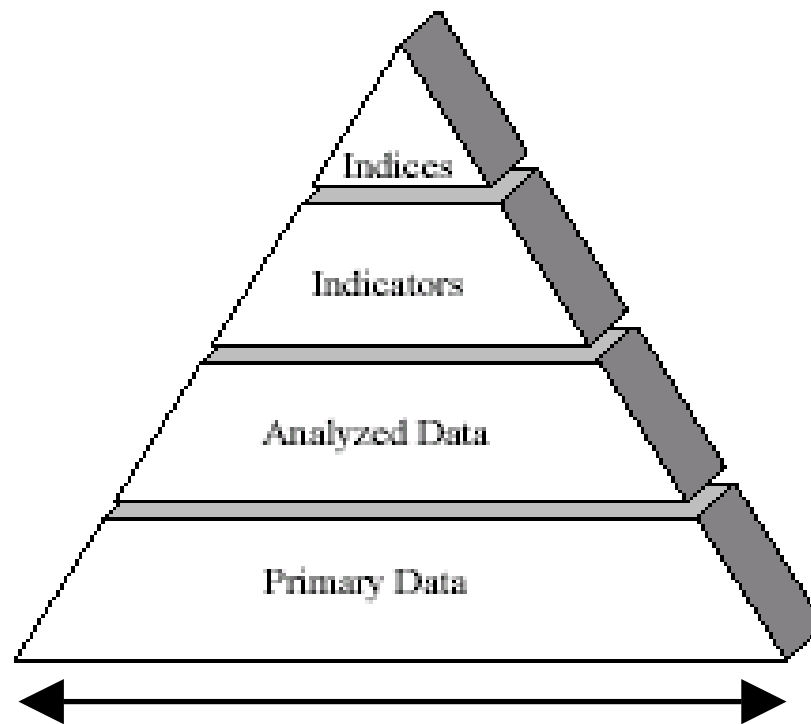
Ecological Indicators

- Scientifically based measure that conveys complex information on environmental status and trends in a concise, easily understood format
- Central to resource management
- Tells us if ?? is getting better or worse



Ecological Indicators

Increasing
Condensation
of Data



Total Quality of Information



The Reporting Framework *(continued)*

Table 2.1

Ecosystem Characteristic	Indicator Description
SYSTEM DIMENSIONS	
Extent	Area of an ecosystem or land cover type and its major components
Fragmentation and Landscape Pattern	Shapes and sizes of patches of an ecosystem type, and their relation to one another
CHEMICAL AND PHYSICAL CONDITIONS	
Nutrients, Carbon, Oxygen	Amounts and concentrations of key plant nutrients (nitrogen and phosphorus) and key ecosystem elements (oxygen and carbon)
Chemical Contaminants	Numbers of selected contaminants found in ecosystems, and how often these chemicals exceed regulatory or advisory thresholds
Physical Conditions	Condition of key aspects of the physical makeup of an ecosystem, such as erosion or water temperature
BIOLOGICAL COMPONENTS	
Plants and Animals	Status of native and non-native plant and animal species
Biological Communities	Condition of the plant and animal communities that make up an ecosystem
Ecological Productivity	Plant growth on land and in the water
HUMAN USE	
Food, Fiber, and Water	Amounts and values of key products for human use
Other Services, Including Recreation	Tangible and intangible services provided by ecosystems

Are the Waters and Sediments Getting Cleaner?

Table of Contents

Hypoxia

- ◆ Introduction to Hypoxia
- ◆ Dissolved Oxygen in Bottom Waters
- ◆ DO Area and Duration
- ◆ Biological Nutrient Removal (BNR)
- ◆ Sewage Treatment Plant Effluent
 - With and Without BNR
- ◆ Point Source Nitrogen Load
- ◆ Tributary Trends
- ◆ River and Coastal Nonpoint Source Pollution
- ◆ Total Nitrogen: Point and Nonpoint Sources
- ◆ Chlorophyll-a Levels

Toxic Contaminants

- ◆ Introduction to Toxic Contaminants
- ◆ End-of-Pipe Toxicity
- ◆ Connecticut Industrial Chemical Discharges
- ◆ New York Industrial Chemical Discharges
- ◆ Contaminant Trends in Mussels
- ◆ Lead in Surface Sediments
- ◆ Mercury Concentrations in Sediment

Pathogens

- ◆ Introduction to Pathogens
- ◆ Beach Closure Days
- ◆ Vessel Pumpout Stations

Floatable Debris

- ◆ Introduction to Floatable Debris
- ◆ International Coastal Cleanup
- ◆ Composition of Debris Collected in CT
- ◆ Pounds of Debris and Miles of Beach Cleaned Around Long Island Sound



Photo by CT DEP

Next

[LISS: Sound Health](#)

Framework Principles

- Minimum core suite of measures
- Be practical in a difficult economy
- Include terrestrial/watershed measures as well as estuarine/coastal
- Be consistent across state lines
- Don't be tied to what is being measured now, be creative



Focus on:

- **What is measured?**
- **How often?**
- **Where?**
- **Who interprets & synthesizes the data?**
- *How is it documented, archived, and distributed? (another forum)*
- *How is it communicated to scientists, decision-makers, legislators, & citizens. (another forum)*

Workshop

- **2 day, by invitation**
- **~ 40 regional scientists**
- **Reviewed and refined proposed framework**
- **Focused on structure, indicators, and data sets**

Key Ecosystem Characteristics	Core Indicators	Type*
1. Landscape Composition and Use	a. Land Cover/Use b. Demographics	1,2 1
2. Water and Sediment Conditions	a. State Variables (e.g. temperature) b. Sediment Quality c. Fate and Transport (e.g. flows) d. Hypoxia, Fish Kills e. Eutrophication f. Productivity	1 1,2 1,2 1,2 2 2
3. Habitat Quantity and Quality	a. Anadromous Fish Habitat b. Coastal and Freshwater Wetlands c. Forested Lands	1,2 1,2,3 1
4. Fish and Wildlife (species assemblages and relative abundance)	a. Fish and Invertebrates b. Shellfish c. Benthic Infauna/Macroinvertebrates d. Birds e. Phytoplankton and Zooplankton f. Amphibians and Reptiles g. Mammals	1,2 2,3 2,3 1 2 ? ?

***Types of Indicators**

Type 1 - Currently supported by existing data set. Adequate data are available to present a status or trend

Type 2 - Data is being collected, but modifications necessary to fully support status or trends analysis

Type 3 - Systematic data collection is not in place. Significant data gap.

Landscape Composition and Use

Bay Metrics

Core Indicators	Metrics	Type
Land Cover/Use	• Areal extent of impervious surface adjacent to shoreline	2
	• Coastal river miles with adequate natural buffers	2

Watershed Metrics

Core Indicators	Metrics	Type
Land Cover/Use	• Areal extent of impervious surface	1
	- build-out potential	2
	- percent impervious	
	• Percent natural land protected and connectivity of this land	2
	• Percent agricultural land	1
Demographics	• Population density	1
	• Housing starts	1

*Types of Indicators

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Next Steps

Short-Term

- Prepare report on indicators framework

Longer-Term

- Pilot test indicators – compile data for distinct geographic area
- Peer review of pilot/indicator refinement
- Develop State of the Bay report