

# National Monitoring Programs: Can They Help Define A Regional Vital Signs Report Card?

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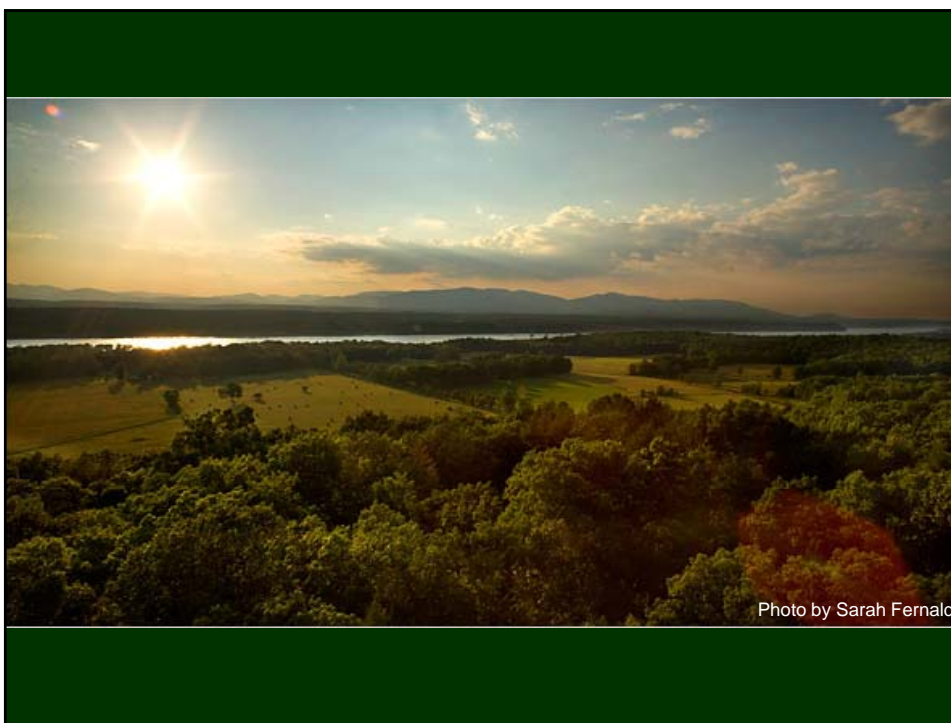


Photo by Sarah Fernald

## Programs reviewed

- National Parks Vital Signs Monitoring Program
- EPA National Coastal Condition Report
- NOAA Coastal Change Analysis Program (C-CAP)
- EPA 305b Reports

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## NPS Vital Signs Monitoring Program

### Objectives:

- 1) to assess current status and trends in ecosystems
- 2) to assess outcomes of current management practices
- 3) to contribute to overall health of the nation

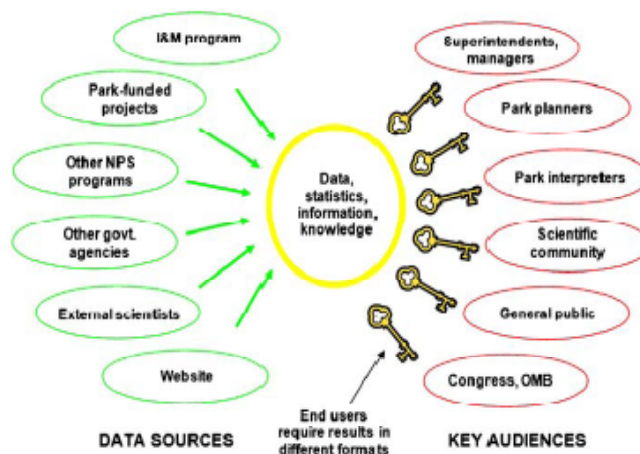
## NPS Vital Signs Monitoring Program

**Audience:** managers, scientists, policy makers

**Data Sources:** parks inventory and monitoring program, park funded projects, external scientists, non-government agencies

## National Parks Vital Sign Monitoring Program

Fig. 1 Scientific data for monitoring the condition of park natural resources are obtained from a number of sources, and are managed, analyzed, and distributed in various formats to maximize utility and availability of results. The I&M Program has made a large investment in information management to ensure that relevant monitoring data are managed, analyzed, and reported to key audiences.



Example of a conceptual model of processing and analysis of data (Fancy et al. 2009)

## National Parks Vital Signs Monitoring Program

- Process
  - Clearly define goals and objectives
  - Compile and summarize existing information
  - Develop conceptual models



## National Parks Vital Signs Monitoring Program



- Prioritize and select indicators
- Develop an overall sampling design
- Develop monitoring protocols
- Establish data management, analysis, and reporting procedures

## National Parks Vital Signs Monitoring Program



32 ecoregional networks (270 parks) that share funding and professional staff (Fancy et al. 2009)

## Assessment: National Parks Vital Signs Monitoring Program

### Contribution:

- 1) organizational process
- 2) conceptual framework
- 3) adaptable to different ecosystems and audiences

### Caveats:

- 1) ecoregional scale
- 2) different measures of indicators based on ecosystem

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## EPA National Coastal Condition Report

### Objectives:

to assess the condition of U.S. coastal waters, the Great Lakes and all U.S. estuaries

to support more informed decisions about protection of these resources

increase public awareness about coastal pollution

Audience: managers, policy makers, general public

## EPA National Coastal Condition Report



### Data sources:

- 1) coastal monitoring from EPA National Coastal Assessment (NCA) and Environmental Monitoring and Assessment Program (EMAP)
- 2) offshore fisheries (individual studies)
- 3) assessment and advisory (individual studies)

## EPA National Coastal Condition Report

### Indicators:

- 1) Water quality (DO, N, P, chlorophyll a, clarity)
- 2) Sediment quality (toxicity, contaminants, total organic C)
- 3) Benthic community quality
- 4) Coastal habitat loss
- 5) Contaminant concentration in fish tissue



## EPA National Coastal Condition Report

### Report card for the Northeast:

Index	1990-96	1997-2000	2001-2002
Water Quality	1	2	4
Sediment	2	1	2
Coastal Habitat	3	4	4
Benthic Community	1	1	1
Fish Contamination	2	1	1
Overall	1.8	1.8	2.4

## EPA National Coastal Condition Report

Report card for San Francisco:

Index	1990-96	1997-2000	2001-2002
Water Quality	1	3	3
Sediment	2	2	2
Coastal Habitat	1	1	1
Benthic Community	3	3	5
Fish Contamination	3	1	1
Overall	2.0	2.0	2.4

## Assessment: EPA National Coastal Condition Report

Contribution:

- 1) nationally consistent monitoring methods
- 2) suggestions for indicators

Caveats: 1) large scale (2,000 sites)  
 2) ratings are subjective  
 3) predominantly harbor focus

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## NOAA Coastal Change Analysis Program

### Objectives:

- 1) to detect and monitor change in land use in the coastal region of the U.S.
- 2) to inform management and conservation efforts, particularly those focused on fisheries
- 3) to ultimately predict direct and indirect effects of coastal development

## NOAA Coastal Change Analysis Program



Audience: managers and scientists

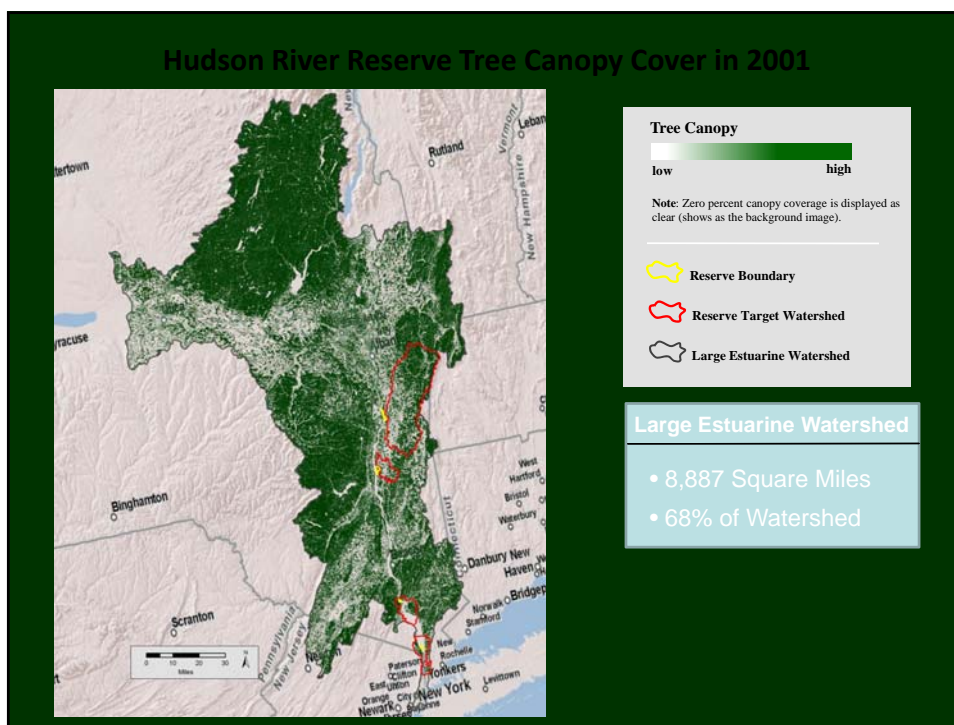
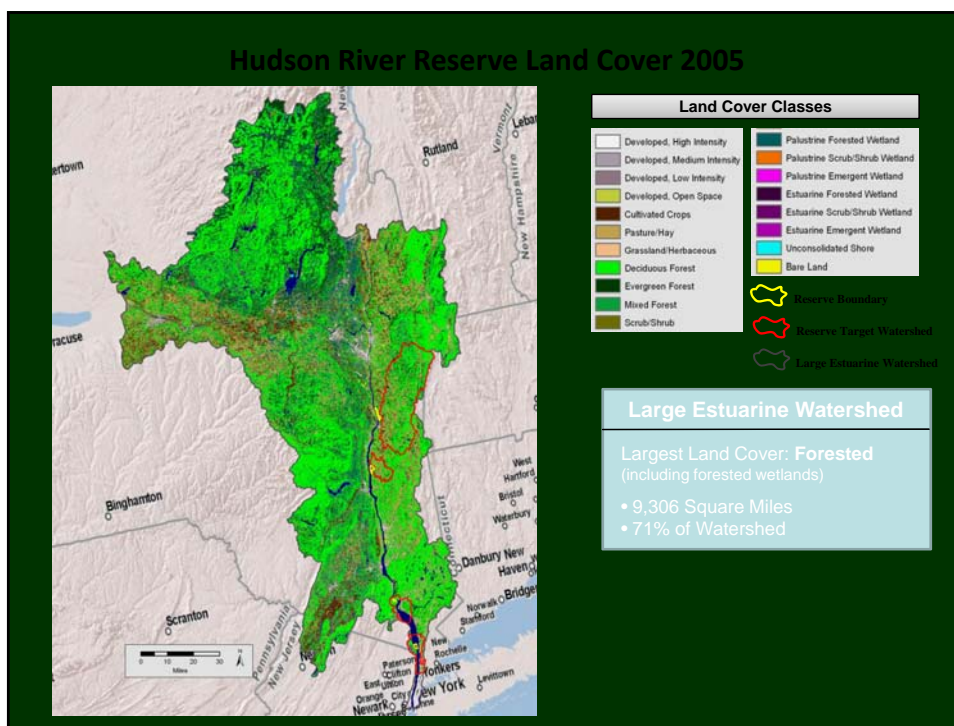
Data Source: digital remote sensor data (satellite imagery), in situ measurement data (with GPS points), and geographic information systems (GIS) data

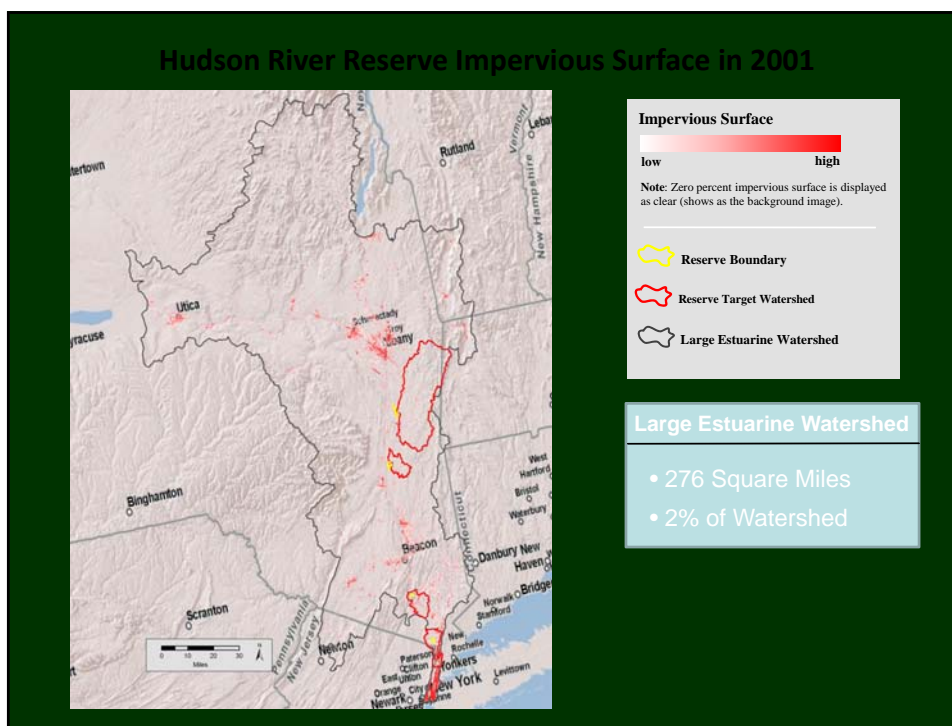
## NOAA Coastal Change Analysis Program



Example of data utility in

Hudson River National Estuarine Research Reserve (HRNERR)





## Assessment: NOAA Coastal Change Analysis Program

### Contribution :

- 1) data at regional level available
- 2) clear description of link of indicator measures with ecosystem services
- 3) standardized collection and analysis of data

### Caveats:

- 1) data with coarse resolution and limited utility for particular watershed purposes
- 2) assessment of few natural resources
- 3) 14 land use categories
- 4) metadata for HRNERR boundaries needed

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## EPA 305b Reports: The Wadeable Streams Assessment

### Objectives:

- 1) collect information on wadeable stream condition throughout the U.S. (except for Alaska and Hawai'i)
- 2) provide paradigm for State monitoring and assessment of water quality
- 3) promote collaboration across boundaries

## EPA 305b Reports: The Wadeable Streams Assessment

Audience: state agencies and managers



Data Source: Trained field crew collected data using national standardized monitoring methods

## EPA 305b Reports: The Wadeable Streams Assessment

- Nine indicators:
  - Biological Indicator (benthic invertebrate assemblage and abundance)
  - Chemical Indicators (P, N, Na+, pH)
  - Physical Indicators (streambed sediments, in stream fish, vegetation cover, riparian disturbance)

## EPA 305b Reports: The National Rivers and Streams Assessment

### Objectives:

- 1) collect information on the condition of U.S. rivers and streams
- 2) provide paradigm for State and tribal monitoring and assessment of water quality
- 3) assess trends in stream condition since Wadeable Stream Assessment (2004)

## EPA 305b Reports: The National Rivers and Streams Assessment

Audience: Managers and scientists

Data source: Trained field crew collected data using the same national standardized monitoring methods

## Assessment: EPA 305b Reports

### Contribution:

- 1) standardized monitoring protocol
- 2) standardized training methods for crew

### Caveats:

- 1) large scale
- 2) random sampling
- 3) subjective rating of indicators

## Conclusions



- NPS Vital Signs Monitoring Program and EPA 305b Reports could make most useful contribution

## Questions

- What scale is appropriate for monitoring the Hudson River watershed?
- What indicators and measures are the highest priority for this watershed?
- How do we communicate links between indicators (and their measures) and ecosystem health?

## Acknowledgments

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## Program Information

S.G. Fancy, J.E. Gross, and S.L. Carter. 2009. Monitoring the condition of natural resources in U.S. national parks. *Environmental Monitoring Assessment* 151: 161-174.

<http://science.nature.nps.gov/im/monitor> (NPS Vital Signs)

<http://www.epa.gov/owow/oceans/nccr> (EPA NCCR)

<http://www.csc.noaa.gov/crs/lca/proto2.html> (NOAA C-CAP)

<http://www.epa.gov/owow/streamsurvey/> (EPA Wadeable Streams)

[http://www.epa.gov/owow/riverssurvey/pdf/rivers\\_survey\\_factsheet\\_mar18.pdf](http://www.epa.gov/owow/riverssurvey/pdf/rivers_survey_factsheet_mar18.pdf)

(EPA Rivers and Streams)