

# National Aquatic Resource Surveys



Monitoring Branch  
EPA Office of Wetlands, Oceans and Watersheds  
July 10, 2008

# Monitoring Initiative

- Critiques of state and EPA monitoring and reporting on water quality
- Workload model documents budget gap
- Budget initiative specifically for monitoring
  - Capacity building to implement monitoring strategies
  - Collaborate on implementation of surveys
- Address accountability for water resource protection and restoration

# Limitations of Traditional State 305(b) Reports

- Nationally, a small portion of water resources are assessed
  - Rivers and Streams – 19%
  - Lakes and Reservoirs – 37%
  - Bays and Estuaries – 35%
- Methods to define extent of water assessed vary
- Indicators, parameters, and sampling procedures vary
- Data not representative of water conditions beyond specific sites sampled

# Monitoring Initiative Objective

## Increase Funds to:

- Strengthen State monitoring programs through developing and implementing monitoring strategies (\$10 million)
  - Implement strategies to fill water monitoring gaps
  - Reflect priorities of individual states
- Assess the condition of all of the Nation's waters and trends over time (\$8.5 million)
  - Create collaboration amongst EPA, States, Tribes to implement National Aquatic Resource Surveys
  - Address limitations of traditional approach



Estuaries



Lakes



Wetlands



# National Aquatic Resources Surveys

Streams



Rivers





# What are the National Aquatic Resource Surveys?

- Designed to yield unbiased estimates



# Probabilistic Monitoring is the best way to measure the effectiveness of management efforts





A photograph of a forest stream. A large tree trunk leans over the water, with its roots exposed on the bank. The water is flowing over rocks, creating white rapids. The background is a dense forest with green foliage.

National Surveys seek to answer questions like:

What are the problems?

What is the extent of the problems?

How serious are the problems?



# Address Key Questions

- What is the condition of aquatic resources nationally and regionally and how is it changing over time? For example:
  - What is the % in good, fair, poor condition based on interpretation of biological assemblages?
  - What is the % supporting recreational goals based on fish tissue or pathogen indicators?
- What extent of waters are affected by key stressors? For example:
  - What is the % with elevated nutrient levels?
  - What is the % with pathogen levels that may pose concerns for recreational use?

# Collaborating to Survey the Nation's Waters

- Create partnership to design and implement surveys
- Report on status and trends in condition of all waters in a statistically representative, cost-effective manner
- Examine key stressors, their prevalence and impact on water quality to support national and regional priority setting
- Report on effectiveness of water quality management efforts in protecting and restoring waters
- Support State capacity for implementation of statistical surveys with consistent indicators



# Collaborators

- State and Tribal Agencies
  - Environment and Public Health
  - Natural Resource and Conservation
  - Coastal Management
  - Agriculture
- U.S. EPA Regional Offices and Labs
- U.S. Geological Survey
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- National Oceanographic and Atmospheric Administration
- National Park Service

# Areas of Collaboration

- Design requirements
- Core indicators
- Standardized or consistent protocols and training
- Sample collection and processing
- Identification of supplemental reference sites
- Supplemental funding
- Data analysis and interpretation
- Feedback, refinement, and future direction



# National Aquatic Resource Survey Schedule

	2006	2007	2008	2009	2010	2011	2012
Lakes	Design	Field	Lab,data	Report	Research	Design	Field
Rivers	Research	Design	Field	Lab,data	Report	Research	Design
Streams	Report	Research	Design	Field	Lab,data	Report	Research
Coastal			Research	Design	Field	Lab,data	Report
Wetlands	Research	Research	Research	Research	Design	Field	Lab,data

Funds appropriated during design year are allocated to fund the field year for a resource.

# 1800 NRSA Sites



State No. Sites

Alabama	36
Arizona	36
Arkansas	37
California	44
Colorado	48
Connecticut	22
Delaware	21
Florida	29
Georgia	27
Idaho	35
Illinois	35
Indiana	33
Iowa	46
Kansas	44
Kentucky	40
Louisiana	38
Maine	21
Maryland	28
Massachusetts	19
Michigan	52
Minnesota	48
Mississippi	33
Missouri	36
Montana	62

State No. Sites

Nebraska	44
Nevada	40
New Hampshire	16
New Jersey	15
New Mexico	31
New York	46
North Carolina	41
North Dakota	61
Ohio	36
Oklahoma	52
Oregon	37
Pennsylvania	39
Rhode Island	14
South Carolina	24
South Dakota	65
Tennessee	33
Texas	56
Utah	41
Vermont	23
Virginia	38
Washington	36
West Virginia	32
Wisconsin	55
Wyoming	55



# Indicator Selection Goals and Criteria

- Indicators were selected to represent three major resource conditions: ecological, water quality, recreation.
- Workgroups evaluated previous efforts and ongoing state monitoring programs
- Standardized methods were selected that all trained field crews must be able to implement within one day for the majority of sites.
- Indicators need to be applicable across a broad geographic distribution.
- Indicators needed to be interpretable for that water resource type.



Benthic macroinvertebrates



Water Quality



Algal community



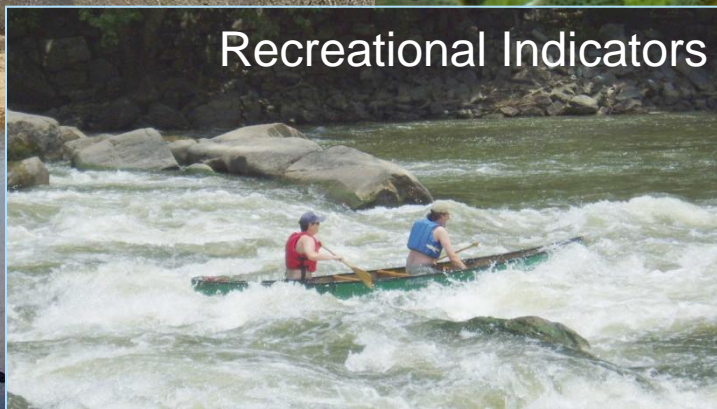
Physical habitat



Fish community and fish tissue



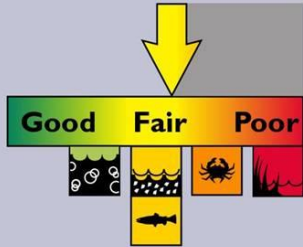
Recreational Indicators





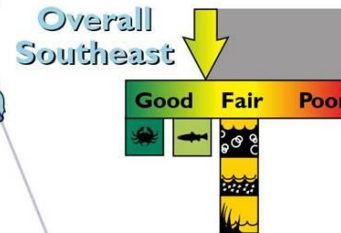
# National Coastal Condition Report

## Overall National Coastal Condition

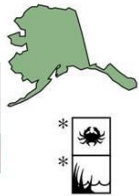


### Ecological Health

- Water Quality Index
- Sediment Quality Index
- Benthic Index
- Coastal Habitat Index
- Fish Tissue Index

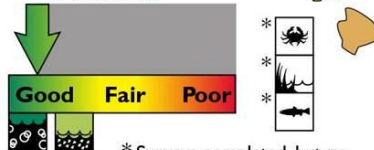


## Overall Alaska



\* Surveys completed, but no index data available until the next report.

## Overall Hawaii



\* Surveys completed, but no index data available until the next report.

## Overall Puerto Rico



\* Surveys completed, but no index data available until the next report.

All coastal States and Puerto Rico participated in monitoring

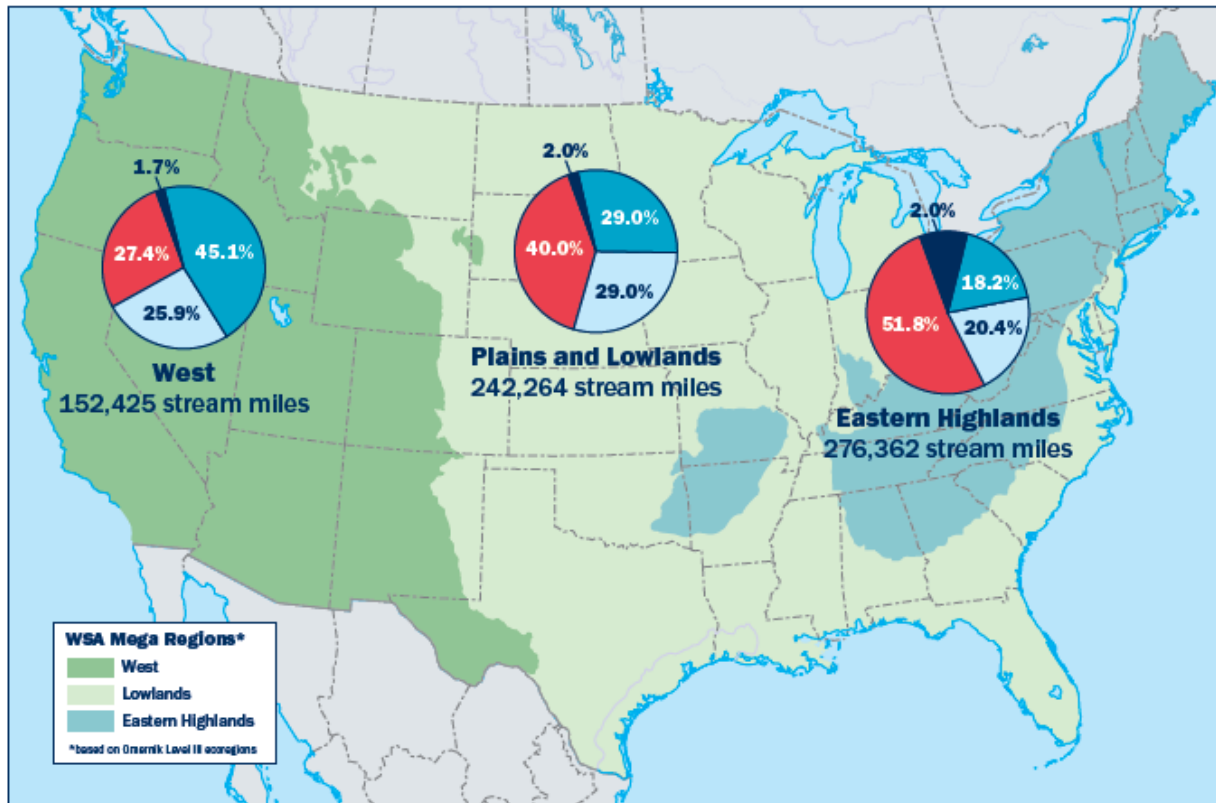
Data support status and trends at regional, State and local scales

Strong support among states to continue partnership with EPA, NOAA, others

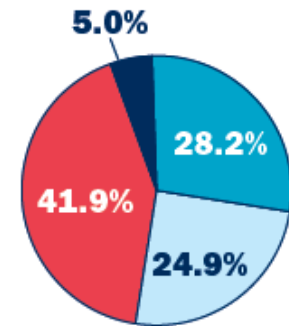
Built State capacity to assess coastal waters

# Wadeable Streams Assessment

## Condition of the Resource



### National Summary

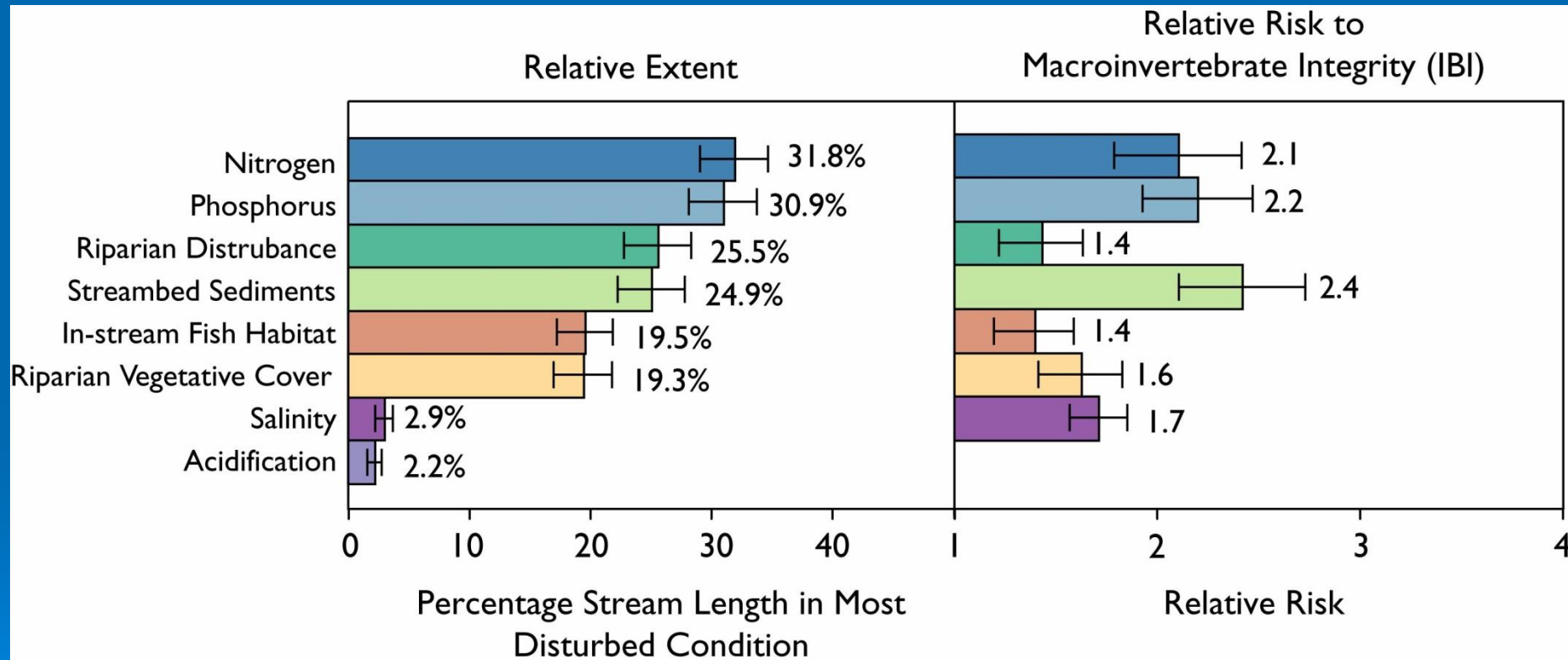


### Biological Condition of Wadeable Streams





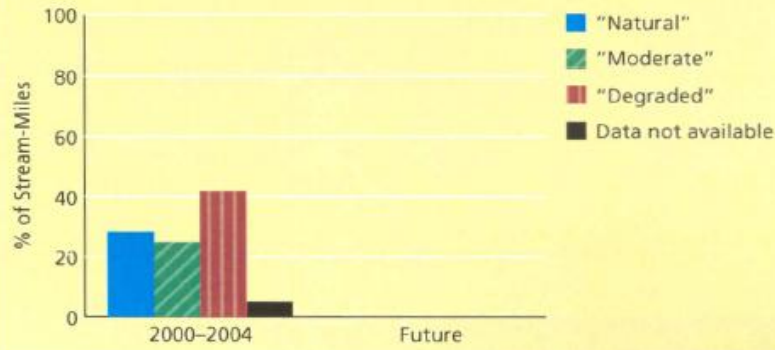
# Extent of Stressors and their Relative Risk to Condition



# 2008 Heinz Center Report

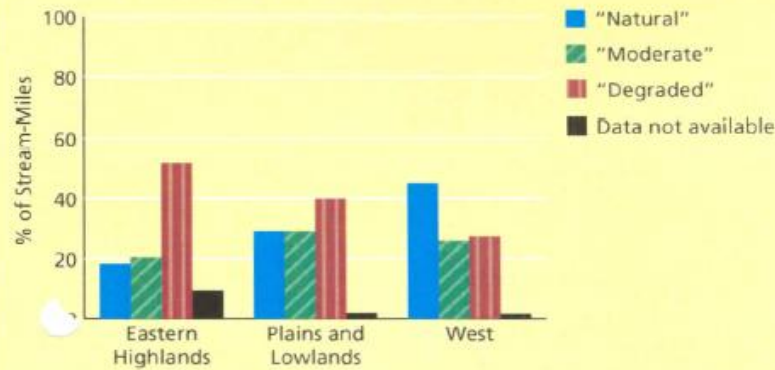
## Biological Community Integrity

Partial Indicator Data: Bottom-Dwelling Animals in Wadeable Streams



## Biological Community Integrity, by Region, 2000-2004

Partial Indicator Data: Bottom-Dwelling Animals in Wadeable Streams



### Data Gap

- Data are not adequate for national reporting on the condition of fish communities in streams, lakes, and rivers of the United States.
- Data are not adequate for national reporting on the condition of bottom-dwelling communities in lakes and rivers.



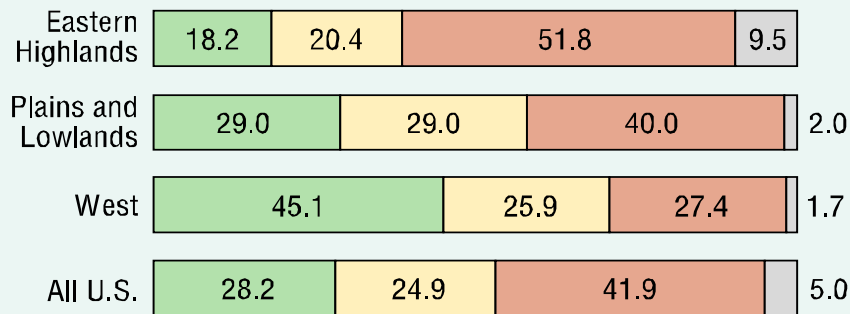
# 2007 Report on the Environment

**Exhibit 3-12.** Index of Biological Integrity (IBI) for benthic macroinvertebrates in wadeable streams of the contiguous U.S., by ecoregion, 2000-2004<sup>a</sup>

**IBI score:**

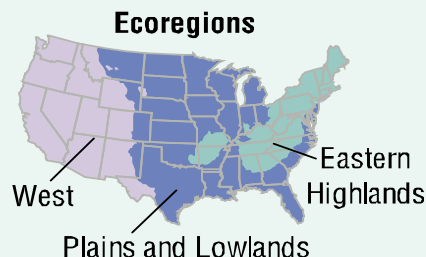
Least disturbed	Moderately disturbed	Most disturbed	Not assessed/ no data
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**Percent of stream miles in each category:**



<sup>a</sup>Ecoregions based on Omernik, 1987.

**Data source:** U.S. EPA,  
Wadeable Streams Assessment



Eight indicators are included in the newest EPA Report on the Environment from the Wadeable Streams Assessment and the National Coastal Condition Report.

# Implementation of National/Regional Surveys

## ➤ Short-term strategy

- Rotate through water resources
- Use standardized design
- Use standardized methods

## ➤ Long-term vision

- Roll state-scale surveys into national
- Explore options for more flexibility in methods, schedule, etc.
- Develop vision and roadmap for getting there



# Linking the National Surveys to NEST

- Indicators are relevant nationally, regionally and at the state/local scale
- **Data will be available for wadeable streams, lakes and coastal indicators in time for the NEST report**
  - Several survey indicators already used in EPA SOE Report and the Heinz Center Report
- National Surveys are an on-going, nation-wide effort (little or no new funds needed)
- Surveys employ consistent methods and a statistical design across the entire country
- Surveys are repeated regularly over time
- Includes involvement of a wide range of stakeholders but there are many areas where additional federal collaboration would greatly enhance the surveys
  - Reference site work – monitoring and identification
  - Comparability Studies
  - Permits

# Indicators for NEST to Consider

- Water Quality Indicators
- Biological Indicators

