Survey of the Nation's Non-wadeable Streams and Rivers

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United States Environmental Protection Agency

The U.S. EPA has engaged states, tribes and other parties in a national survey to assess the condition of non-wadeable streams and rivers. This is one of a series of surveys being implemented as a partnership among states, tribes, and U.S. EPA, with the collaboration of the U.S. Geological Survey and other organizations. The first national survey of the Nation's flowing waters, conducted in 2004-2005, examined only wadeable streams and rivers. Non-wadeable waters were not surveyed because methods were not widely available. This survey will target all flowing waters, including non-wadeable streams and rivers.

Objectives of Surveys

- Periodically generate statistically valid and environmentally relevant reports on the condition of the Nation's waters
- Facilitate improved collaboration across jurisdictional boundaries
- Enhance states' and tribes' ability to assess and manage water quality

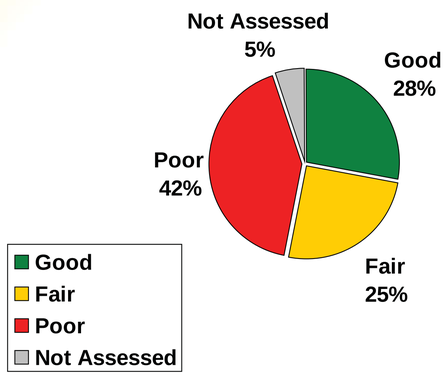
Key questions being asked by this survey

- What percent of the Nation's non-wadeable rivers and streams are in good, fair, and poor condition for key indicators of ecological health and human activities?
- What is the relative importance of key stressors such as nutrients and pathogens?

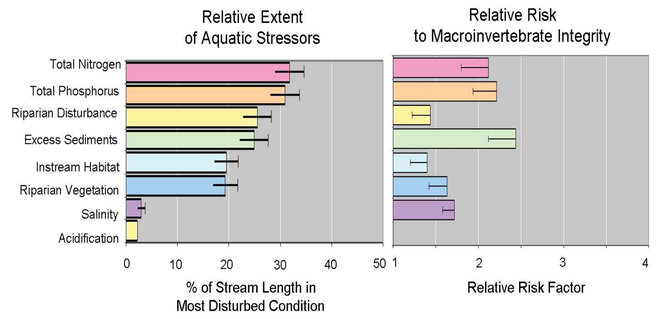
Example outputs from the 2004-2005 Wadeable Streams Assessment

(Final report available - Spring 2007)

Biological Condition of Streams (Index of Biotic Integrity)



Ranking of Stressors to Biological Condition



Planning the Non-wadeable Survey

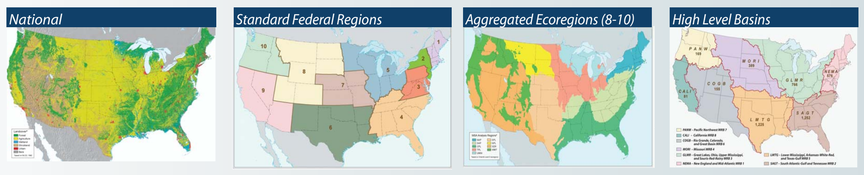
In January of 2007, an initial planning meeting was held in San Antonio, TX to engage states, tribes and other interested parties regarding the survey. Discussion topics included sampling design, indicators, reference condition, analysis, and how to best enhance states' and tribes' ability to manage water quality. Feedback from the meeting was used by a steering committee and focused workgroups to advance the overall study design.

A key outcome of this meeting was the suggestion that EPA conduct a single survey of all flowing waters over a two year period (2008-2009) rather than conducting a survey focused on non-wadeable streams and rivers followed by the scheduled re-sampling of wadeable streams in 2009.

Target Population

- All NHD+ perennial steams/rivers that are determined to have flowing water during the study index period (n=1800 sites)
  - o Excludes tidal rivers up to head of salt
  - o Includes Great Rivers
  - o Includes Alaska, Hawaii, and the National Trust lands
- Conduct study over two years
  - o Complete initial site evaluation during first year
  - o Target nonwadeable systems in first year and wadeable systems in second year to minimize climate effects within each class

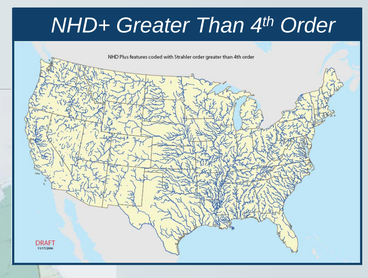
Options for Reporting Results



Special subpopulations under consideration include Outstanding Natural Resource Waters (ONRW) and flowing waters by landuse categories (e.g., agriculture, forest, urban, other)

Additional design requirements

- Balance sample size equally across Strahler order:
  - o 1st - 4th order (~900 sites)
    - o Balance 1st-2nd, 3rd, and 4th
  - o 5th + order (~900 sites)
    - o Balance 5th-6th, 7th, 8th, 9th +
- Resample 450 sites from 2004 wadeable stream assessment to estimate change
- Include sufficient sites per state to permit state-level assessment
  - o States would be required to fund additional sites
- Consider using sites from compatible state-wide probability design programs where they exist



Benchmark or Standard for Assessment of Condition

(a.k.a: reference condition)

- Required to interpret the data collected and assess current ecological condition, chemical, physical, and biological measurements
- Meeting attendees endorsed the use of a "least-disturbed" approach
  - o Defined as the biological condition found in water bodies with the least amount of human disturbance compared to similar water bodies in the region of interest
  - o "Least disturbed" may vary by region to reflect the natural variability
  - o In regions where there has been widespread human influence on the landscape, "least disturbed" condition may include some degree of human-caused variability

Indicators Included in Survey

The survey is measuring a wide variety of variables intended to characterize the chemical, physical, and biological condition of the Nation's flowing waters. These include water chemistry, nutrients, chlorophyll-a, sediment enzymes, enterococci, fish tissue, physical habitat characteristics, and biological assessments including sampling of phytoplankton, periphyton, benthic macroinvertebrates, and fish community.

Water Chemistry

Detailed information on each of these indictors are contained in the National Rivers and Streams Assessment: Field Operations Manual (United States Environmental Protection Agency, Office of Water, Office of Environmental Information, Washington, DC, EPA-841-B-07-009. A pdf of this document is available upon request.

Status of the Survey

A total of 858 sites were sampled in 2008, by over 50 field crews. Of these, 492 were sampled using wadeable methods, and 282 using boatable methods. There are approximately 1386 sites remaining to be sampled in 2009.

Human Health and Recreational Indicator

(e.g. Pathogens, Fish Tissue)

Physical Habitat

Bioindicators

Collaborators identified the development of regionally applicable field protocols as a critical element towards building state and tribal capacities to conduct future surverys of these and other resources.

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