

# Large Rivers and the OW ~~Non-wadeable Streams~~ *Flowing Waters* Assessment

Joseph Flotemersch, Treda Smith, Ellen Tarquinio,  
Steve Paulsen, and Susan Holdsworth  
U.S. Environmental Protection Agency

8<sup>th</sup> Environmental Monitoring and Assessment Program (EMAP)  
Symposium

Grand Hyatt Hotel, Washington, DC

April 10-11, 2007

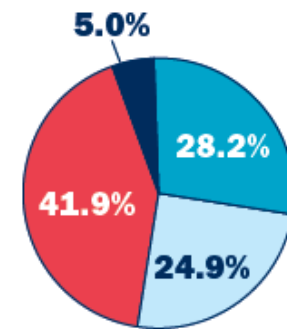
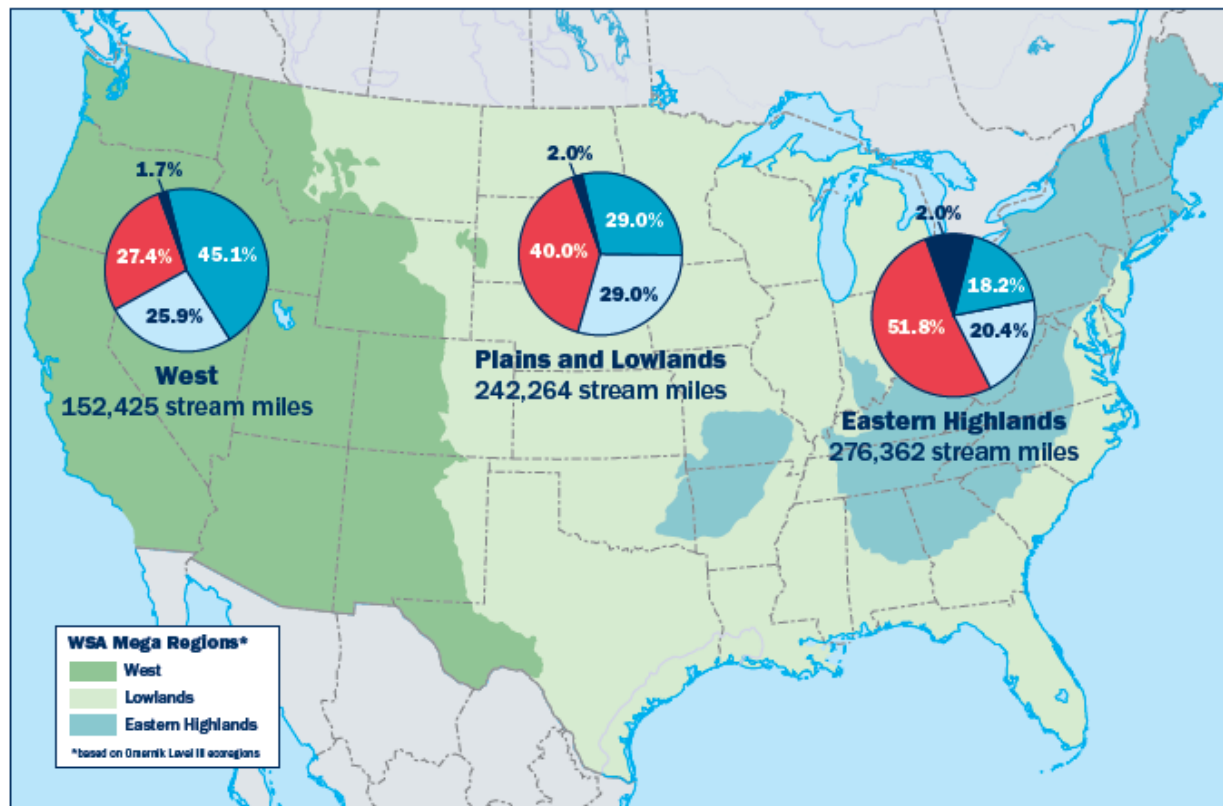
*Disclaimer: This work has been subjected to Agency review and approved for publication but is not meant to reflect Agency policy.*

# Implementing Statistically Valid Surveys of Our Nation's Waters

- Determine regional and national water quality conditions
- Promote collaboration across jurisdictional boundaries
- Build state and tribal capacity for monitoring and analysis
- Achieve a robust, statistically valid data set for better management of water resources
- Develop baseline information to evaluate progress



# Wadeable Streams Assessment 2004-2005



**National Biological Quality**



RESEARCH & DEVELOPMENT

*Building a scientific foundation for sound environmental decisions*

# National Water Resource Survey Schedule

	FY07	FY08	FY09	FY10	FY11	FY12	FY13
Lakes	Field	Lab, Data	Report	Research	Design	Field	Lab, Data
Rivers	Design	Field	Lab, Data	Report	Research	Design	Field
Streams	Research	Design	Field	Lab, Data	Report	Research	Design
Coastal	Report	Research	Design	Field	Lab, Data	Report	Research
Wetlands	Research	Research	Research	Design	Field	Lab, Data	Report



RESEARCH & DEVELOPMENT

*Building a scientific foundation for sound environmental decisions*

# 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 influence?
- What is the relative importance of key stressors such as nutrients and pathogens?



# Planning the Non-Wadeable Survey

- Engaging states, tribes and other parties in designing the national survey
- Initial planning meeting, January 2007, San Antonio, TX
  - Discussion topics included
    - Sampling design
    - Indicators
    - Reference condition
    - Analysis
    - How to best enhance states' and tribes' ability to manage water quality



# Key Outcomes

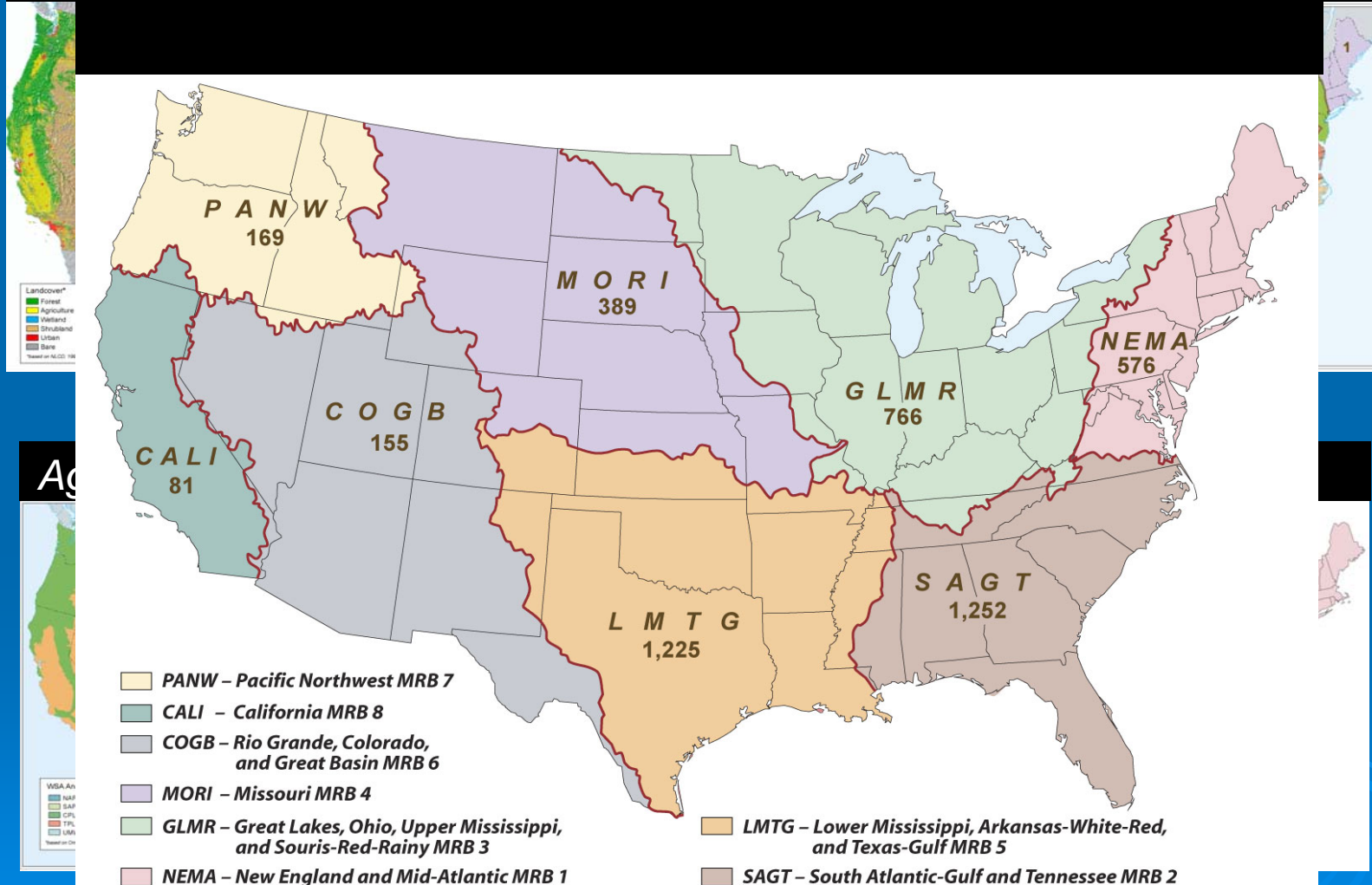
- Suggestion that EPA conduct a single survey of all flowing waters over a two year period (2008-2009)

	FY07	FY08	FY09	FY10	FY11	FY12	FY13
Lakes	Field	Lab, Data	Report	Research	Design	Field	Lab, Data
Rivers	Design	Field	Lab, Data	Report	Research	Design	Field
Streams	Research	Design	Field	Lab, Data	Report	Research	Design
Coastal	Report	Research	Design	Field	Lab, Data	Report	Research
Wetlands	Research	Research	Research	Design	Field	Lab, Data	Report



# Options for Reporting Results

## Na High Level Basins



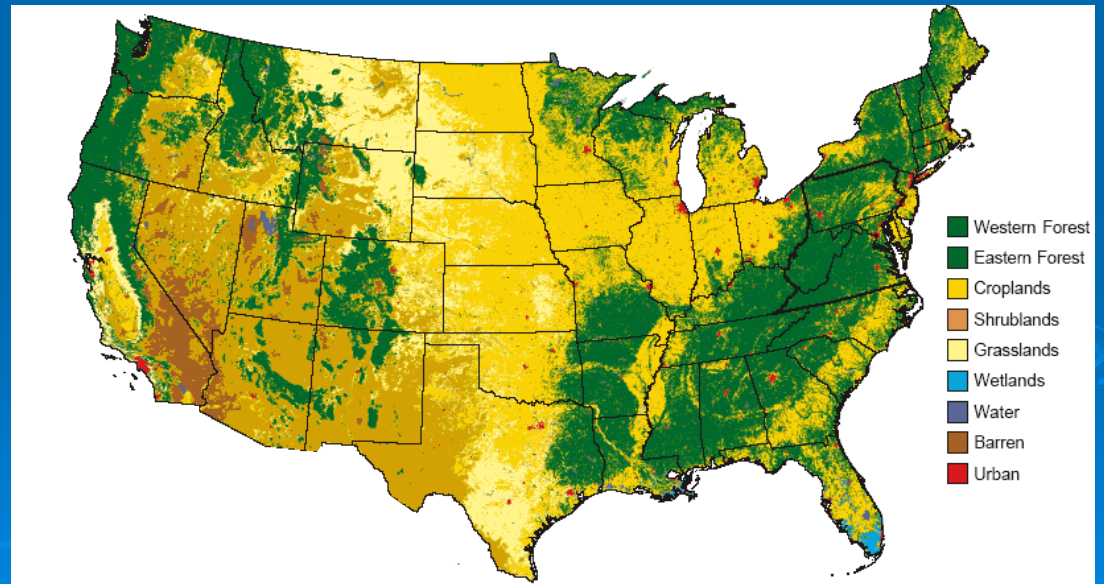
RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions



# Options for Reporting Results

- Special subpopulations under consideration
  - Outstanding Natural Resource Waters (ONRW)
  - Flowing waters by land-use categories
    - Agriculture
    - Forest
    - Urban
    - Other



RESEARCH & DEVELOPMENT

*Building a scientific foundation for sound environmental decisions*

# Target Population

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



# Additional Design Requirements Being Discussed

- How to balance sample size equally across Strahler order to permit estimates by category
  - 1<sup>st</sup> – 4<sup>th</sup> order (~900 sites)
    - Balance 1<sup>st</sup>-2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup>
  - 5<sup>th</sup>+ order (~900 sites)
    - Balance 5<sup>th</sup>-6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>+
- 450 WSA sites from 2004 will be revisited to increase the power to detect trends faster
- Include sufficient sites per state to permit state-level assessment
  - States would be required to fund additional sites
  - Consider using sites from compatible state-wide probability design programs where they exist



# Indicator Selection

➤ Interest in many indicators



➤ *“A critical element towards building state and tribal capacities to conduct future surveys of these and other resources is the **development and use of regionally applicable field protocols**”*



# Indicator under Consideration

- Water Chemistry
- Physical Habitat
- Human Health and Recreational Indicator
  - (e.g., Pathogens, Fish Tissue)
- Biological
  - Algae (Periphyton/Phytoplankton)
  - Benthic Macroinvertebrates
  - Fish



# Indicator Selection

- Workgroups are working to develop protocols, formulate cost estimates for indicators
- Develop criteria for selecting those that will be included in the survey
- The target date for selection of draft indicators w/protocols is Mid-2007



# Benchmark or Standard for Assessment of Condition

(a.k.a. reference condition)

- Define as “least disturbed”
  - 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
- Develop regionalized reference conditions
  - Not at expense of integrity of study
- Select as many reference sites as possible
- Interest in targeting highly disturbed sites
  - Not at the expense of reference sites
- Combination of hand-picked, probability-based, and screening criteria



# Additional comments and inquiries should be directed to:

Treda Smith

Tel: 202-566-0916

Email: [smith.treda@epa.gov](mailto:smith.treda@epa.gov)

Ellen Tarquinio

Tel: 202-566-2267

Email: [tarquineo.ellen@epa.gov](mailto:tarquineo.ellen@epa.gov)

USEPA OW OWOW  
1200 Pennsylvania Ave.  
N.W., Washington, DC 20460



RESEARCH & DEVELOPMENT

*Building a scientific foundation for sound environmental decisions*