The Rivers Component of the National Monitoring Network

Jerad Bales

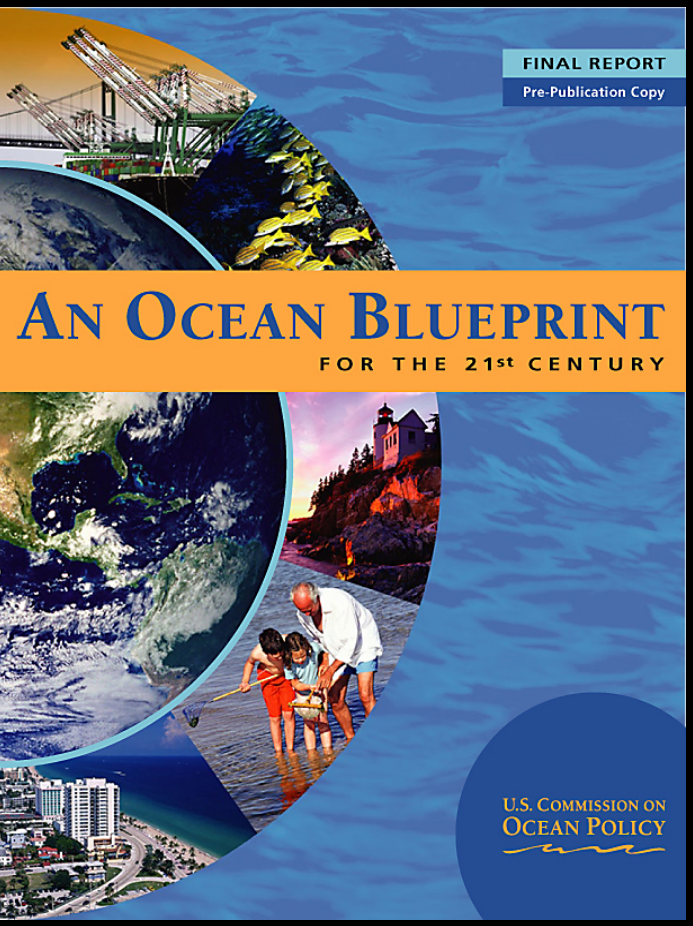
National Monitoring Conference

San Jose, CA

May 10, 2006

U.S. Department of the Interior
U.S. Geological Survey

Motivation



Chapter 15: Recommendations for
Creating a National Monitoring Network (NMN)

15-1: Develop a NMN that coordinates and expands existing efforts. . . Federal backbone . . . to assess long-term trends and conditions . . . [and] regional characteristics.

15-2 Ensure adequate coverage in coastal areas and upland areas . . . and is linked to IOOS.

15-3: Ensure that the NMN has clear goals [and] specifies core variables and appropriate sampling framework . . . determine regional and local information needs.

USGS

Monitoring Network Objectives

1. Define status and trends on a nationwide basis.
2. Provide data to determine when and where goals, standards and resource management objectives are met or not met.
3. Provide data to identify emerging problems.
4. Provide data to support coastal oceanographic and hydrologic research.
5. Provide data for use in interpretive reports and educational materials.

USGS

Approach

- Steering Committee – NWQMC members providing oversight and some guidance.
- Design Committee
  - 31 individuals from 19 organizations.
  - Monitoring design for all compartments.
  - Weekly teleconferences.
  - Two meetings concurrent with NWQMC meetings.
  - One 2-day working meeting.
  - Steering committee provided final approval

USGS

River Monitoring Design

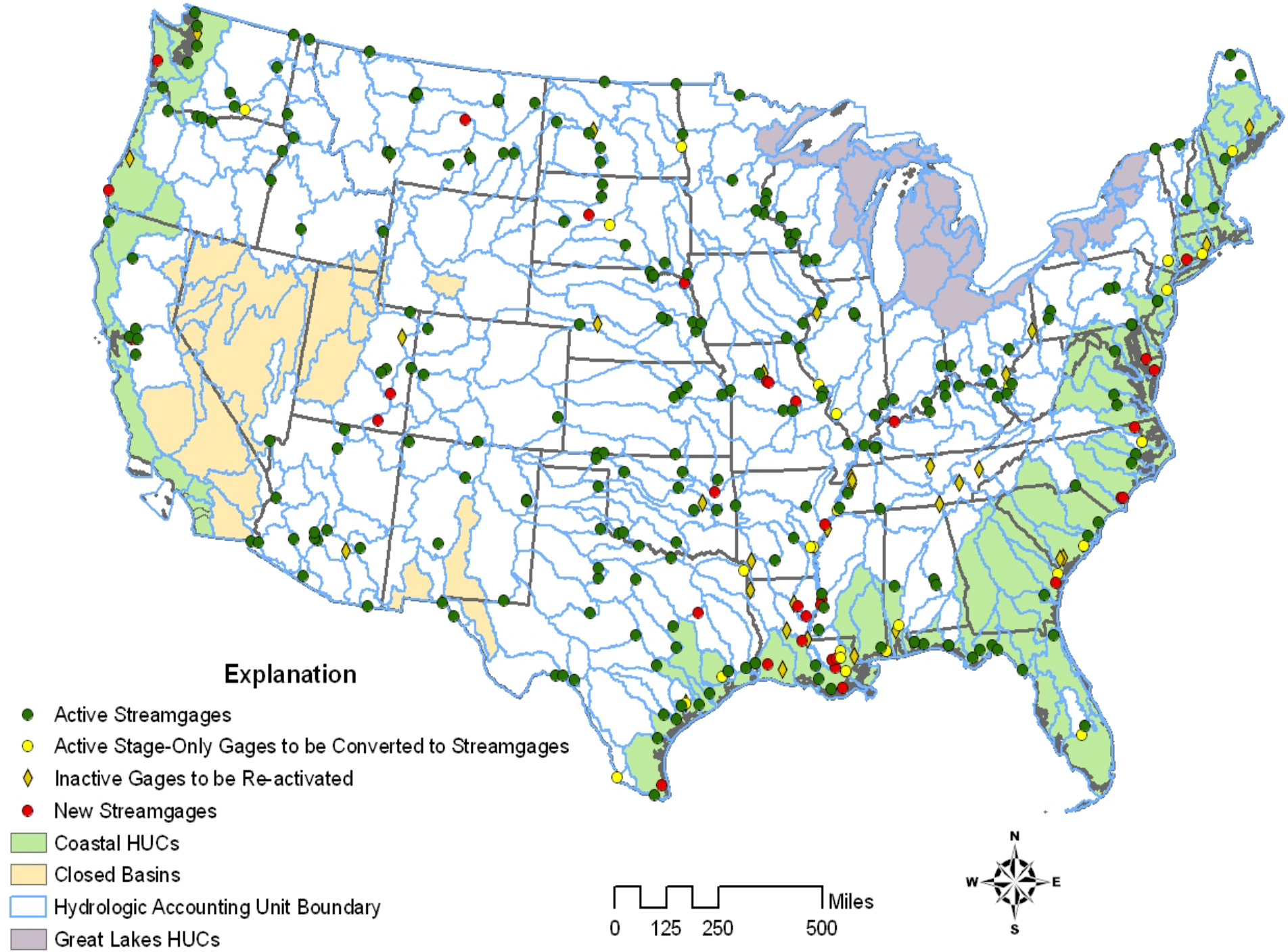
- Fixed stations
- Monitoring primarily at the HUC-6 scale
- Integrated with estuarine monitoring
- Goals:
  - Measure 90% of flux from each HUC-6.
  - Measure 90% of flux into each of 149 NMN estuaries.
  - Measure 90% of flux from U.S. to coastal ocean.

USGS

River Monitoring Design

- **Measurements:**
  - **Continuous flow**
  - **Water chemistry (12 – 15 samples / year)**
  - **Bottom sediment chemistry (annually)**
  - **Biological conditions (annually)**
  - **Adaptive sampling program**

USGS

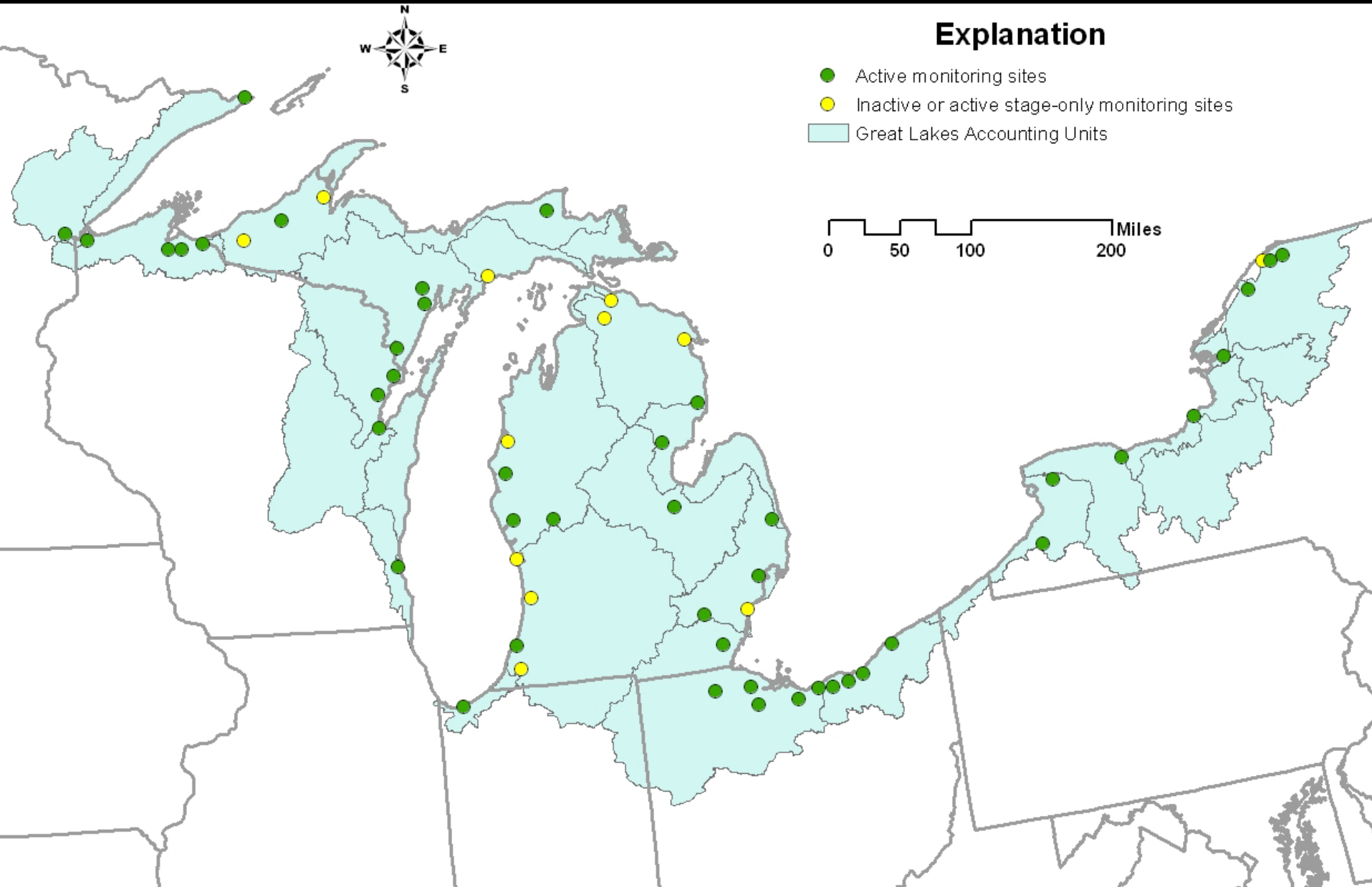

Explanation
Active Streamgages
Active Stage-Only Gages to be Converted to Streamgages
Inactive Gages to be Re-activated
New Streamgages
Coastal HUCs
Closed Basins
Hydrologic Accounting Unit Boundary
Great Lakes HUCs
0 125 250 500 Miles
N
W
E
S

Summary of Stream Gage Needs

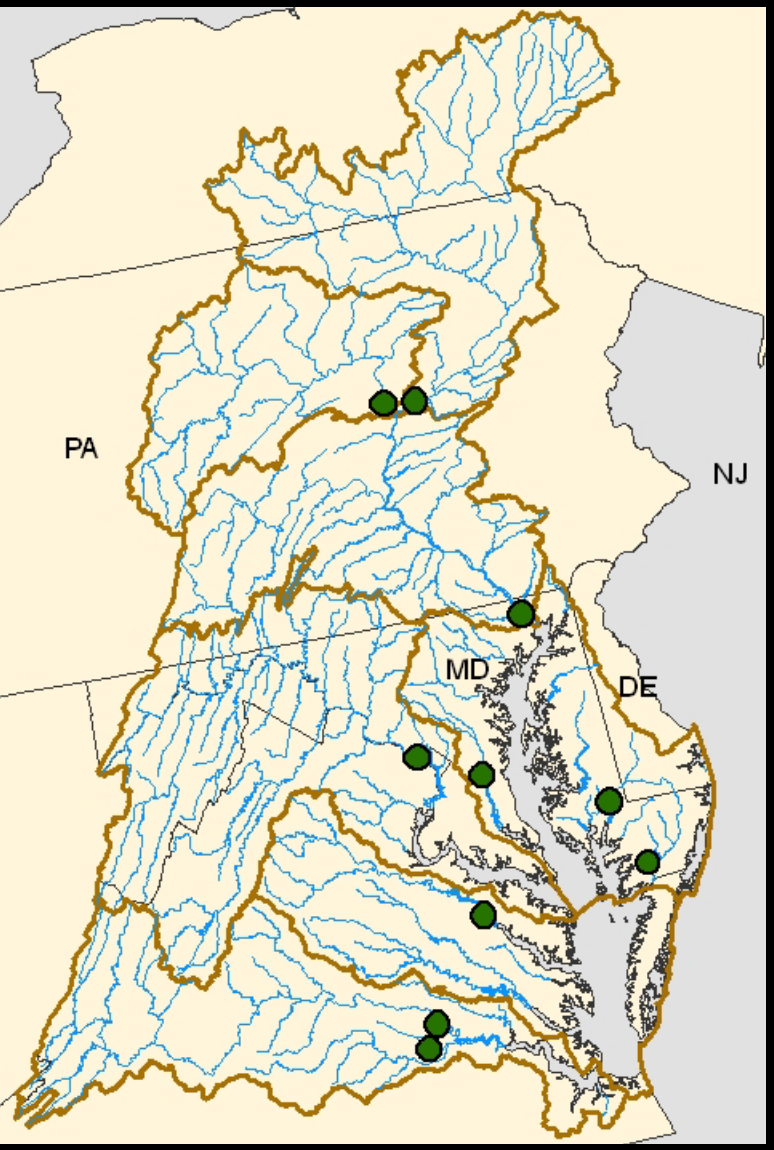
No. of HUC-6 basins	Total no. of monitoring sites	Entirely new stream gages	Stage gages converted to stream gages	Inactive gages to be reactivated
Inland Hydrologic Accounting Units				
220	258	20	17	24
Coastal Hydrologic Accounting Units				
65	72	15	12	10
Great Lakes Hydrologic Accounting Units				
22	56	0	2	10
TOTAL				
307	386	35	31	44

USGS

Great Lakes drainage monitoring network



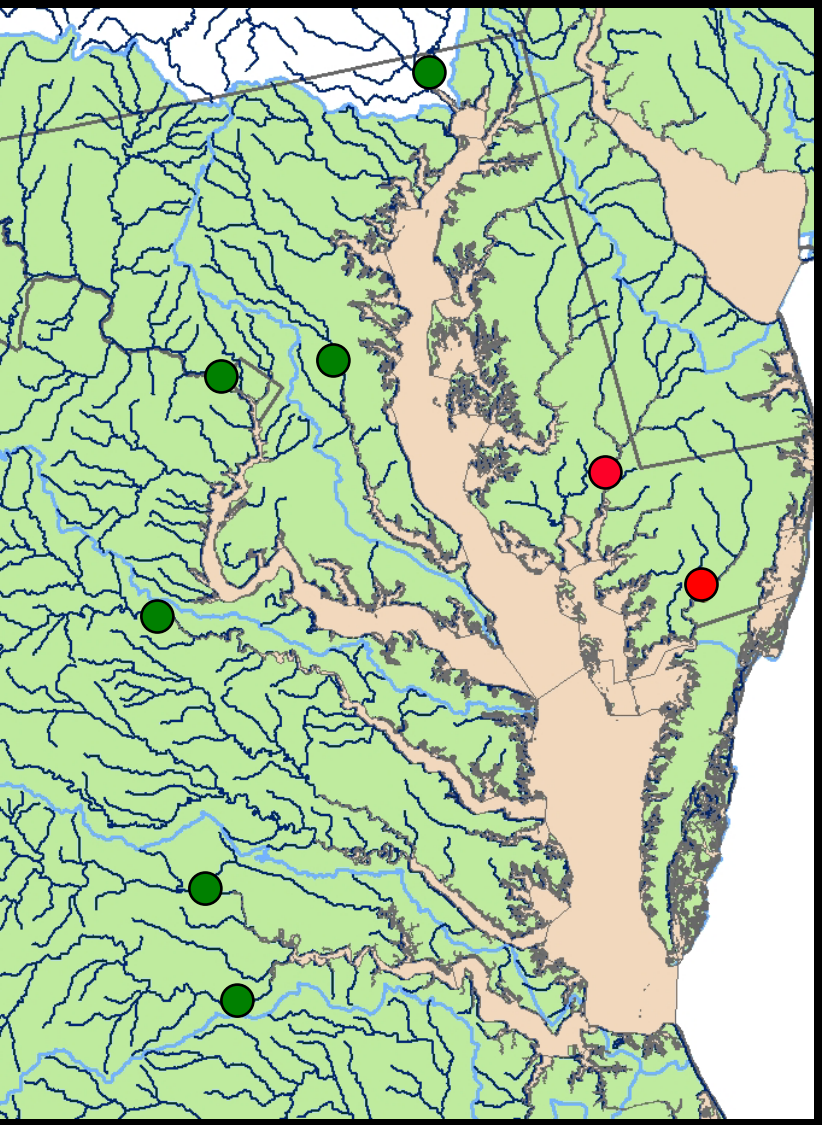
Example of Adequacy of Network



Accounting Unit	No. of Gages	Percent of HUC Measured
Upper Susq.	1	99
W. Br. Susq.	1	98
Lower Susq.	1	96
Upper Ches.	3	16
Potomac	1	81
Lower Ches.	1	24
James	2	78
TOTAL	9	75

USGS

Example of Adequacy of Network



NMN Estuary	River (NMN Site)
Ches. Bay	Susquehanna
Patuxent	Patuxent
Tangier & Pocomoke	Nanticoke & Pocomoke
Choptank	Choptank
Chester	Chester
Chincoteague Bay	None
MD Bays	None
Delaware Bays	None
Potomac	Potomac
Rappahannock	Rappahannock
York	Pamunkey, Mattaponi
James	James, App.

USGS

Measurement of Inflows to Estuaries

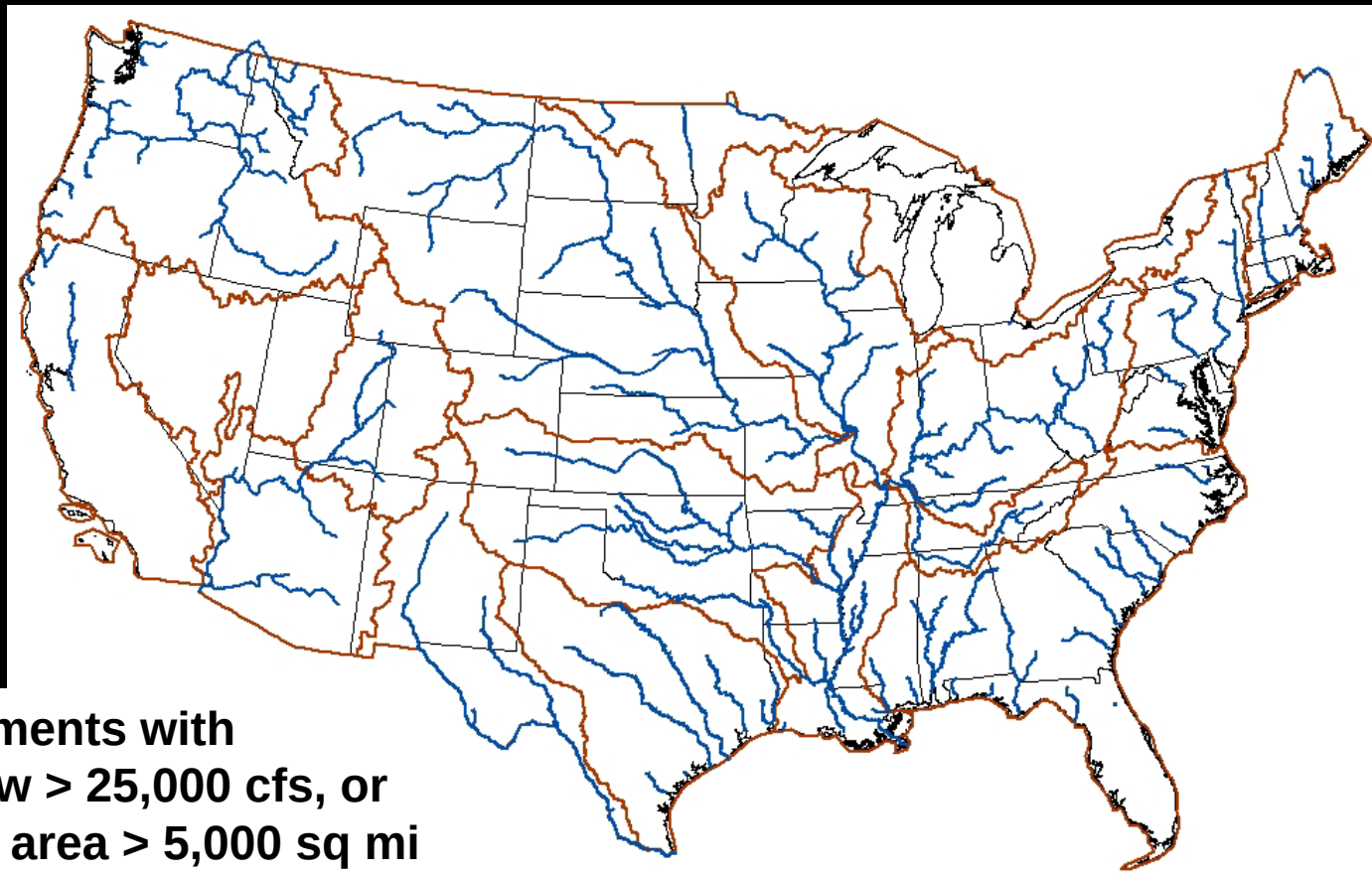
NMN Estuary	Surface area (sq km)	Mean Flow (cubic meters / second)
Chesapeake Bay Mainstem	6,974	1211
Potomac River	1,260	395
James River	640	250
Rappahannock River	377	51
York River	206	47
Patuxent River	142	14
Tangier/Pocomoke Sounds	1,057	10
Choptank River	411	6.6
Delaware Inland Bays	72	2.7
Chester River	196	1.4
Chincoteague Bay	335	0.6
Maryland Inland Bays	54	0.6

- More than 97% of freshwater flow from conterminous U.S. will be monitored.
- Based on estuary surface area, inflows to more than 75% of NMN estuaries will be measured

USGS

River Conditions

- Representative sampling in large rivers to assess national conditions
  - Build on US EPA Great Rivers and USGS BEST Programs
  - Consistent with estuarine conditions sampling.



River segments with
mean flow > 25,000 cfs, or
drainage area > 5,000 sq mi

USGS

Summary

The *Rivers* component of the NMN <u>will</u> provide data and information for

- **calculation of flows and loads at HUC-6 level**
- **estimation of trends in flows and loads**
- **computation of more than 90 percent of fluxes from U.S.**
- **calculation of fluxes into greater than 90 percent of NMN estuaries (as measured by total inflow)**
- **linkage with and incorporation into IOOS**

USGS

Summary

The *Rivers* component of the NMN <u>will not</u>

- **replace compliance or use attainment (305b and 303d) monitoring.**
- **specifically address drinking water issues.**
- **address specific issues in small basins, streams, and lakes.**
- **replace all existing monitoring.**
- **provide information on river conditions *(i.e. 23% of large rivers have summertime dissolved-oxygen concentrations less than 5 mg/L),* although future expansion may include this activity.**

USGS

For More Information

National Water Quality Monitoring Council
http://water.usgs.gov/wicp/acwi/monitoring/network/index.html

Jerad Bales
U.S. Geological Survey
3916 Sunset Ridge Road
Raleigh, NC 27607
jdbales@usgs.gov
ph: 919-571-4048

USGS