National Network of Reference Watersheds

National Water Quality Monitoring Council (NWQMC)

Advisory Committee for Water Information (ACWI)

NATIONAL WATER QUALITY MONITORING COUNCIL

Working Together for Clean Water

NWQMC

http://acwi.gov/monitoring/

Establishing a Collaborative and Multipurpose National Network of Reference Watersheds and Monitoring Sites for Freshwater Streams in the United States

A significant challenge faced by water-resource scientists in the public and private sectors is the need for reliable long-term data and information from watersheds minimally disturbed by human activities. Monitoring in areas with minimal human disturbance helps to provide (1) an understanding of natural patterns of variability that can be used to differentiate changes due to land and water use from changes associated with natural climatic cycles and (2) reference information that can be used to establish water-quality criteria or appropriate expectations for watershed restoration. Many agencies and organizations monitor streams in pristine and minimally disturbed watersheds or conduct research and other activities that would be useful to a reference watershed network (fig. 1). Much of the monitoring consists of one to several measurements at many sites, typically representing a particular hydrologic condition and a relatively short period of time. These synoptic measurements provide important information for understanding natural spatial patterns and variability. Unfortunately, there are relatively few sites among networks with long-term records for streamflow, water chemistry, and stream ecology necessary to distinguish changes associated with natural climatic cycles.

The National Water Quality Monitoring Council (NWQMC) is proposing the development of a collaborative and multipurpose national network of reference watersheds and monitoring sites that would provide quality-assured data and information for use in understanding the effects of land use change, water use, atmospheric deposition, and climate change on freshwater ecosystems. The scope of the collaborative effort will initially be limited to freshwater streams. Future collaborations would expand to freshwater lakes and wetlands. Membership in the network would be voluntary and open to individuals and institutions interested in participating in monitoring and (or) research in minimally disturbed and pristine watersheds. Funding support for the network would come from the participating agencies. The Council would provide the organizational structure and leadership to develop, enhance, and maintain collaborative, comparable, and cost-effective monitoring, research, and reporting among the Federal, State, tribal, interstate, academia, local and private sector organizations that choose to participate.

The collaborative effort would consist of three different types of activities in a tiered framework that are linked together by research and modeling. The three types of activities

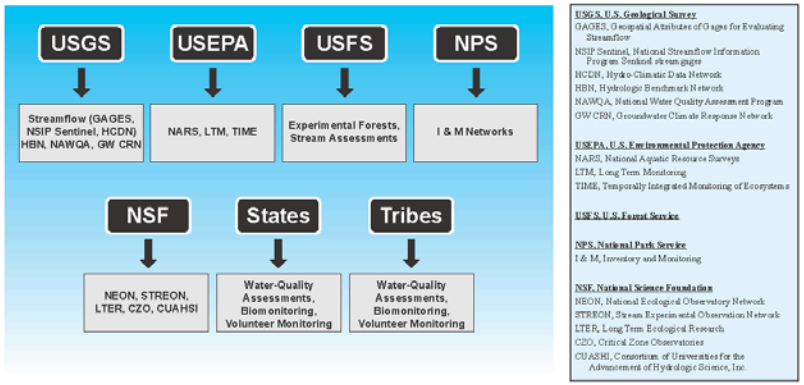

Figure 1. Monitoring networks and programs of Federal and State agencies and non-Governmental organizations that are candidates for inclusion in the design and operation of a collaborative reference watershed network.

April 2012

ACWI

NWQMC

Workgroup Members

Executive Committee – Rick Haeuber, Neil Kamman, Doug McLaughlin, Bill Wilber

Ex-officio members – Denise Argue, Jeff Deacon, Clara Funk, Jason Lynch, Mike McHale, Mark Nilles

Goals

- Provide access to documented quality data and information from minimally or least disturbed watersheds to be used in assisting with establishing “background” conditions for select hydrologic variables and water-quality.
- Increase the efficiency of monitoring with improved coordination and collaboration and increased opportunities to leverage existing reference sites, networks, and financial resources

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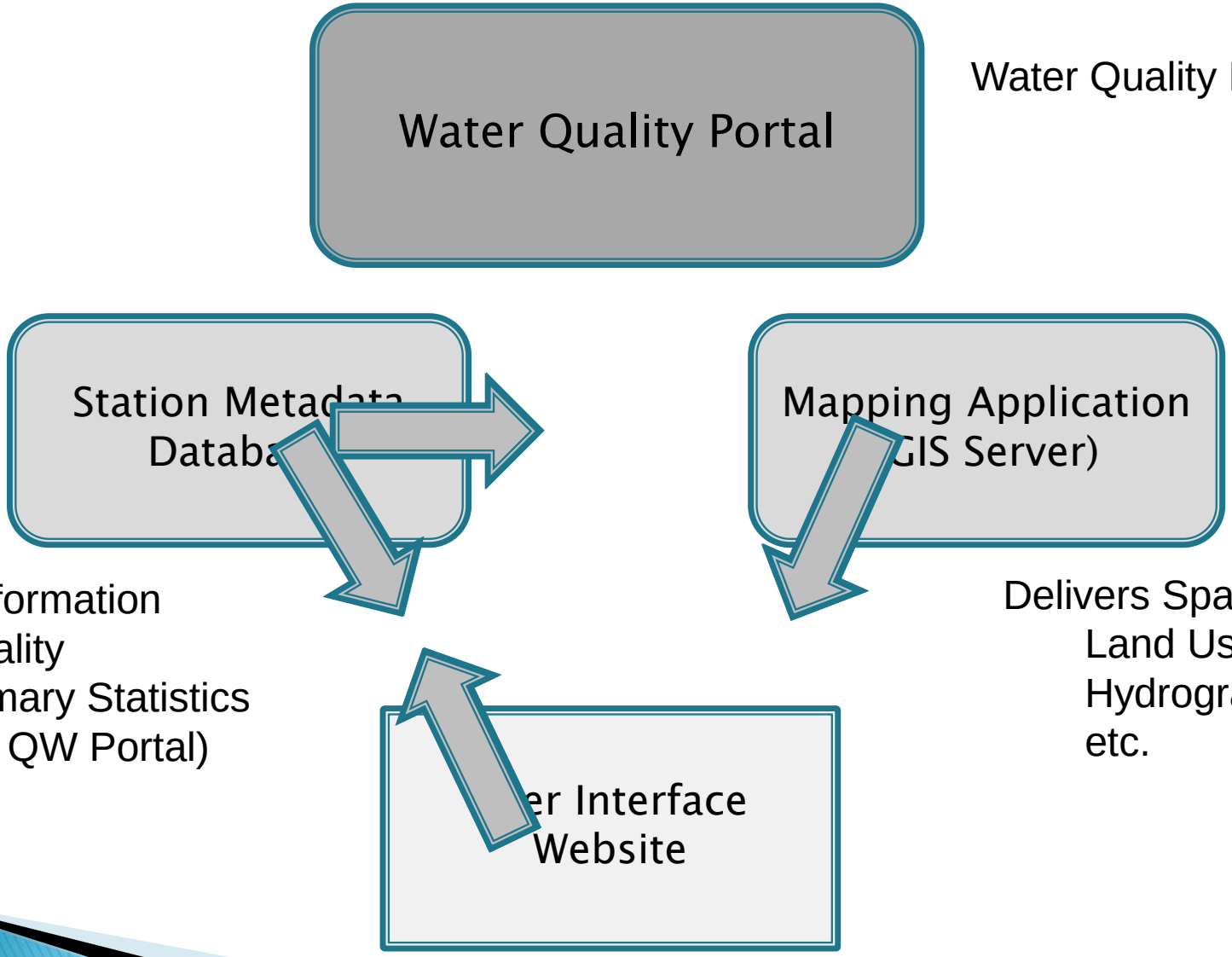
NNRW Web Resource



Water Quality Data

Station Information
Water Quality
Summary Statistics
(from QW Portal)

Delivers Spatial Data
Land Use
Hydrography
etc.

Search Results

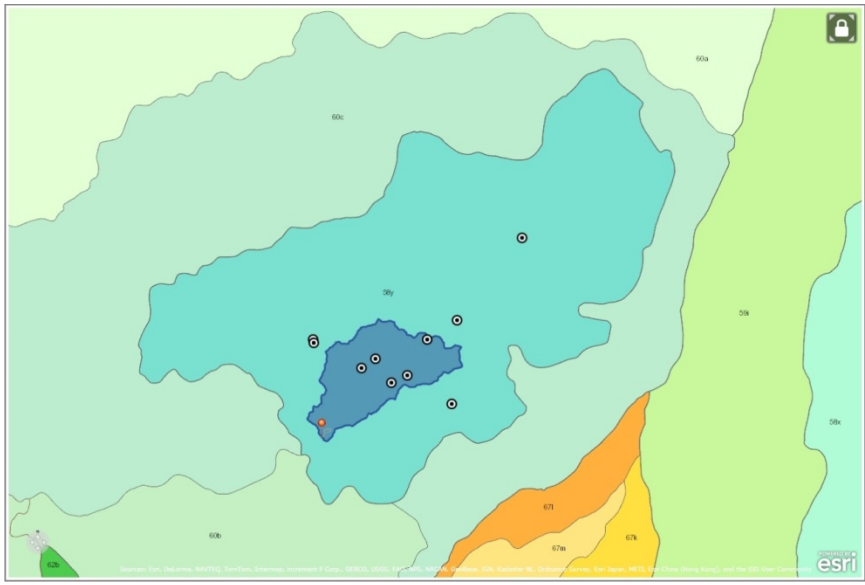
Your search has returned **11** sites in the 58Y Ecoregion. A total of **385** samples were used for these calculations.

Sample Date Range: 10/1/1990 to 3/17/2012

Reference Criteria Used: Default Reference Criteria were selected
>75% Forested, <5% Urban, <10% Residential; No flow alterations, No Pollutant discharge, water withdrawal allowed.

Statistic	SO_4^{2-} umol l^{-1}	NO_3^- umol l^{-1}
Min	13.2	5.25
Max	54.0	64.2
Mean	44.0	39.1
StdDev	6.12	13.1
Median	45.6	36.8

Watershed Locations

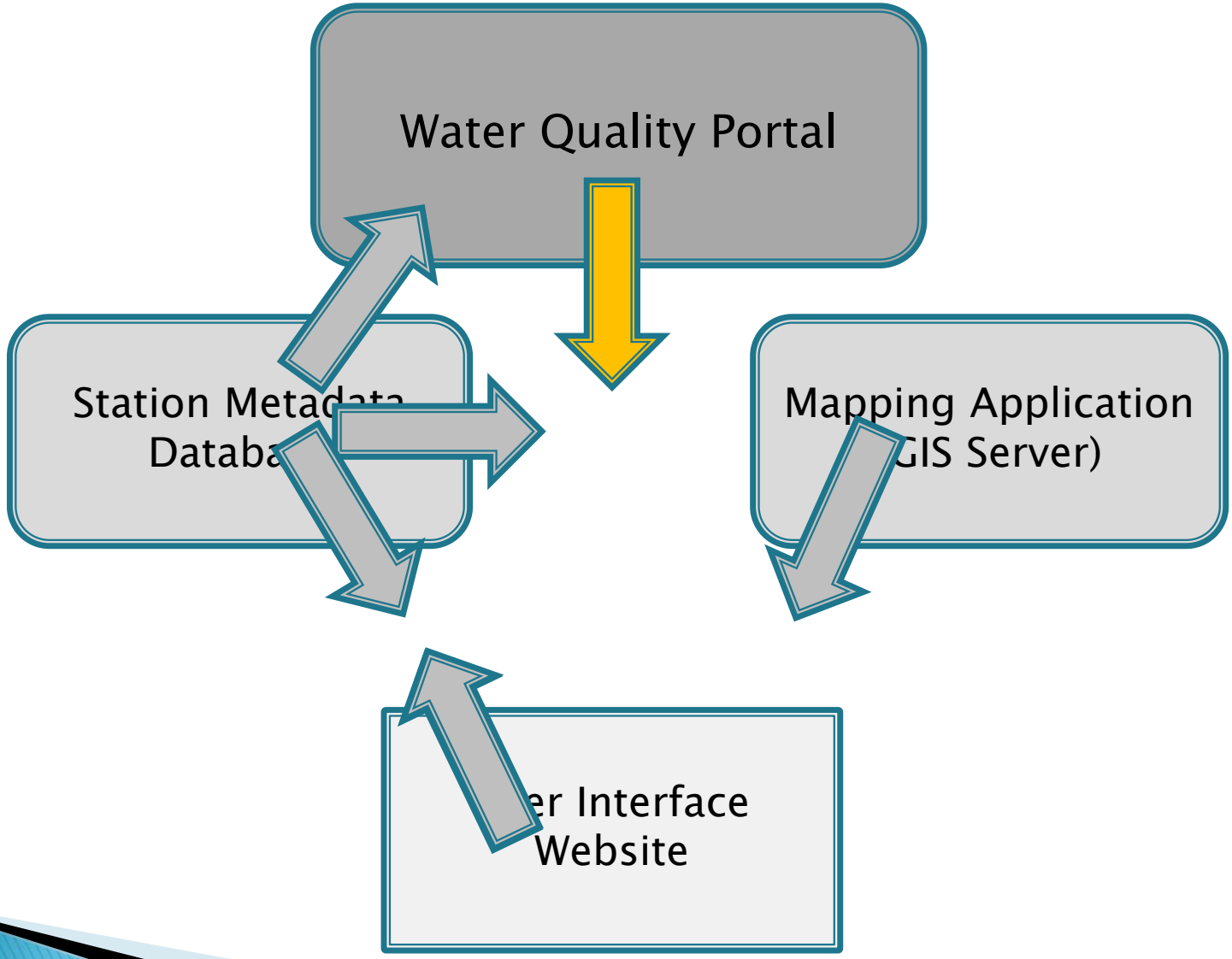


Refine Search

Save Results

Download Data Used

NNRW Web Resource



FY 2014 Workplan Tasks

1. Complete development of the NNRW Station Metadata database
2. Create an interactive network map
3. Develop default reference watershed criteria based on information available through existing web services.
4. Refinement of the network website based on user feedback.
5. Presentation at the NWQMC Meeting April 2014
6. Develop a plan to Link to the Water Quality Portal

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November Workgroup Meeting

- Target audience discussion:
  - Network participants, Scientists, Resource Managers, The general public, Academia
- Feedback on the website search options: including the ability to drill down to finer resolution for searches (e.g., county level) and the water quality parameters to include.
- Discussion on letting users know about the availability of other data types for a site – (e.g., Macroinvertebrates)
- Refine input requirements for sites

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Goals for the April Meeting

- A ‘draft functioning’ website that can be presented and will allow Council Members and a selected user group to Beta test the resource.
- A mapping interface that shows watershed locations.
- Present an NNRW disturbance metric that can be used to define default reference watershed criteria and place all watersheds in context with one another.
- A plan to link this resource to the Water Quality Portal.

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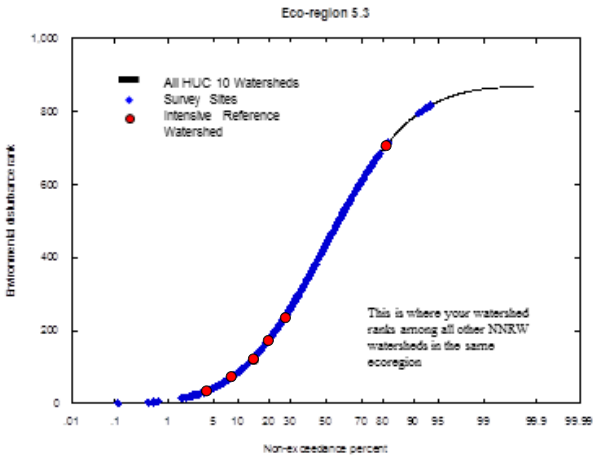
Disturbance Metric



Variables:

- Percent Agricultural Land Use
- Percent Urban Land Use
- Percent Impervious Surface Area
- Reservoir Storage
- Population Density

Approach: Use Monte Carlo Simulations to optimize an algorithm that includes these variables at the national scale and for individual Level II Ecoregions for all HUC 10 watersheds.