



PROPOSAL

NWIS Web Services Snapshot for ArcGIS

United States Geological Survey
Austin, Texas
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NWIS Web Services Snapshot for ArcGIS

Overview

Retrieving a “snapshot” of National Water Information System (NWIS) data into an ArcGIS geodatabase was conceived in 2002 to reduce the steps required to retrieve and analyze NWIS data. The snapshot process was also designed to serve as a learning tool for new or infrequent NWIS users as well as provide direct documentation of the numerous codes commonly found in NWIS data output. More than 22 water science centers have actively utilized the snapshot process for projects, NWIS database administration, basic data analysis, and map production. In addition, at least four well-funded USGS water availability programs have utilized the snapshot to facilitate NWIS data management and analysis (High Plains, Columbia River Plateau, Mississippi Embayment, and the Great Basin).

New NWIS data distribution methods such as web services and web mapping are evolving, and with them, the NWIS snapshot. Past snapshot development focused on output directly from an NWIS database installation, typically only available to USGS scientists in Water Science Centers. Now, snapshot development focuses on retrieving output from web services. Produced in 2010 and 2011 to leverage USGS investment in streaming data from web services, the NWIS Web Services Snapshot for ArcGIS represents the next generation of data retrieval and management (Figure 1). The newest Snapshot allows instant access to NWIS data from four different web services through ArcGIS, software available to all USGS scientists. The Snapshot database design enables efficient data compilation and preparation which is fundamental and pre-requisite to achieving the USGS Science Strategy vision of integrated ecosystem science based on integrated data.

The NWIS Web Services Geodatabase Snapshot improves retrieval and management of data within a well-defined database (Figure 2). This data was previously only accessible by database experts. A proposed next phase of Snapshot development is now required to keep pace with evolving science needs and state-of-the-art technologies. Now that NWIS data can be quickly and easily retrieved and effectively managed, we propose to continue to provide feedback to web services developers and enhance and maintain the software. There will be an increased emphasis on training, outreach and partnership building to raise awareness about the Snapshot tool. Deliverables include an updated and maintained software package and website, outreach activities including a hands-on training session, feedback to web services developers, updated tutorials, and an updated and maintained user community website. By raising awareness, more data integration, visualization and analysis tools will emerge that build on the output from this project and, ultimately, facilitate integrated ecosystem science.

Figure 1. Overview of the NWIS Web Services Snapshot for ArcGIS.

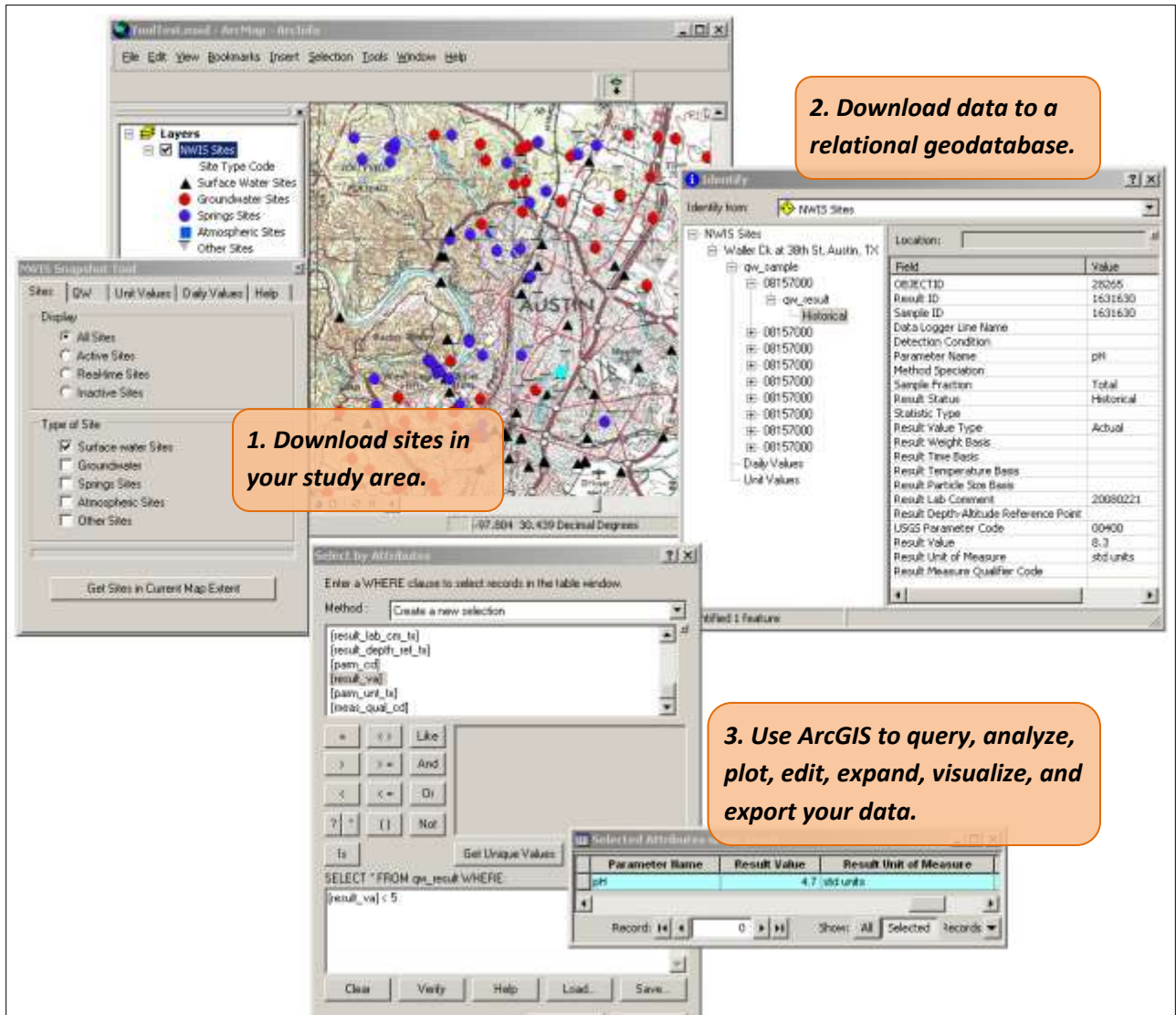
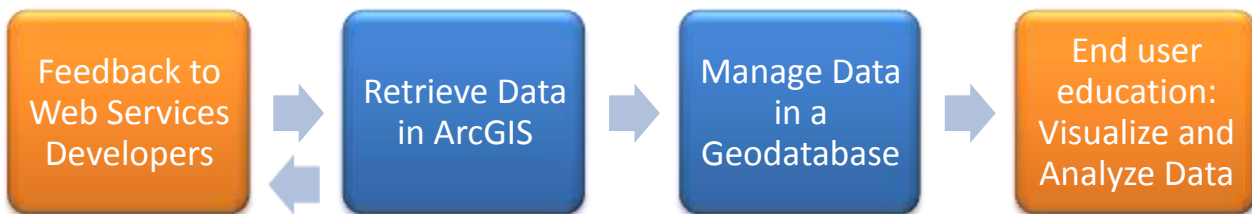


Figure 2. NWIS Web Services Snapshot enables ArcGIS users to retrieve and manage NWIS data. Feedback will continue to be provided to web services developers regarding application development needs and end user requirements.



Benefit to FSP/Scientists/Mission Areas

Produced to leverage USGS investment in streaming data from web services, the NWIS Web Services Snapshot represents the next generation of data retrieval and management. The newest Snapshot tool allows instant access to NWIS data from four different web services through ArcGIS, software available to all USGS scientists in all mission areas. Increased data retrieval efficiency reduces the steps required to retrieve and compile water data from multiple sites from what can be 20 or more steps to just a few clicks. As an end-user education tool, it promotes use of NWIS data from both web services and the NWIS database, which increases the production of scientific research and analysis that uses NWIS data. The Snapshot database design enables efficient data compilation and preparation which is fundamental and pre-requisite to achieving the USGS Science Strategy vision of integrated ecosystem science based on integrated data.

In kind funding and work leveraged

- Leveraging NWIS Web Services
- Extending previous work by David McCulloch, Brian Reece, and Texas Water Science Center CDI-supported Snapshot software
- Leveraging ArcGIS Desktop enterprise license
- In kind contributions from Core Science Informatics, Energy and Minerals, Fort Collins Science Center, CIDA, NWISWeb, and ten USGS science centers
- In kind contributions from external reviewers at partner institutions

Partnerships

Partnerships with:

- Core Science Informatics
- NWIS Web Services
- Energy and Minerals
- USGS Enterprise GIS (EGIS)
- USGS Science Centers (CIDA, FORT)

Work plan

Task 1: Support and maintenance

- **Maintain the application code.** Code will be updated as needed based on issues reported by end users, changes in ArcGIS software, and changes in web services.
- **Maintain and update a user community support website.** (<http://tx.cr.usgs.gov/snapshot> and <http://txpub.cr.usgs.gov/snapshot>). The website, established in FY11, provides access to online help documentation, the latest version of the software for testing, and a forum for end user ideas related to the application and web services.
- **Provide feedback to NWIS web services developers.** Communicate software developer and end-user requirements to web services development teams.
- **Update technical documentation as needed.**

Task 2: Training, outreach, and awareness

- **Conduct a hands-on training session.** One hands-on training session will be conducted at the Texas Water Science Center.
- **Host an information session for USGS via WebEx.** One WebEx information session will be presented for a USGS audience.
- **Present the NWIS Web Services Snapshot Tool at a national conference.** An abstract for a presentation or poster at the ESRI International User Conference will be submitted.
- **Update online training documentation.**

Task 3: Software enhancements and updates

- **Enhance the application based on testing results, user feedback and requirements.** There were several changes that were suggested and deemed beneficial for the overall user experience and data analysis:
 - **Create a 'Cancel' option.** This will allow users to bail out of running a web services request.
 - **Refine the water quality query builder.** A "common English" predictive query builder has successfully been implemented and the ~18,000 parameter codes reduced to less than 5,000. To further support end users in selecting needed water quality parameters from 5,000 choices, the following refinements will be made: Implement search by medium code (for example, soil or water).

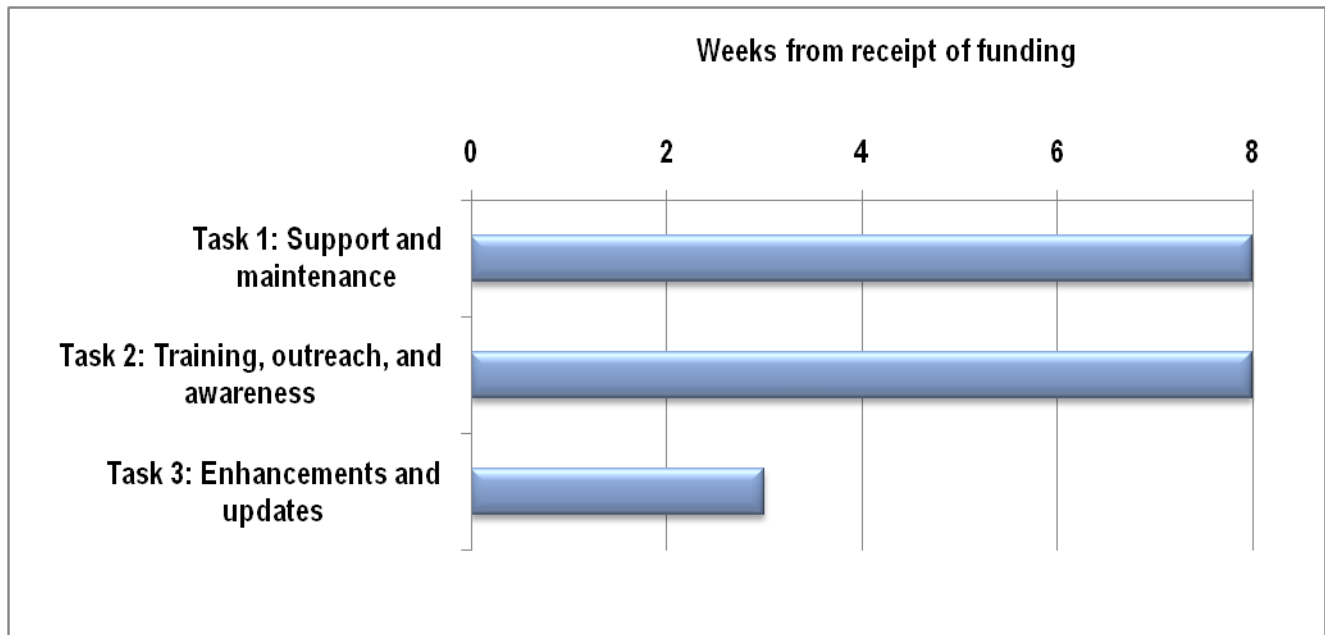
Communication

- Participate on weekly and monthly CDI conference calls.
- Monthly E-mail updates to CDI.
- Other E-mail, phone, and WebEx conference calls as needed.

Deliverables

1. ArcGIS 10 Add-In software enhancements and maintenance.
2. Training and outreach (3 presentations).
3. Feedback to web services developers.
4. User community website maintenance and updates.
5. Updated online training and technical documentation.

Timeline



Budget

The total estimated project cost for all tasks is \$60,844