

2007 NSDI CAP Category 2 - Project 191830

“Developing a Service-Oriented Architecture (SOA) for the National Hydrography Dataset Plus (NHDPlus) Navigation Tools and consumption of Framework Web Feature Services (WFS) for Geospatial Analysis of the Connecticut River Watershed Atlas and Framework datasets”

Final Report - 12.2.2008

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Project Narrative

This project makes available existing complex NHDPlus network traversals tools coupled with Framework Web Feature Service (WFS) extraction tools in a Service-Oriented Architecture (SOA) to further advanced geospatial analysis with the Connecticut River Watershed and Framework datasets.

This project continues to build upon the Connecticut River Watershed Atlas to support the science priorities of creating data-sharing and geospatial analysis systems. The results of this project provide useful geospatial analysis tools within desktop GIS applications for the other science priorities associated with Connecticut River Watershed sustainability – water budgets, water quality, and ecological flow determinations. In addition, the project provides useful training and distribution of software tools to federal, state, local, academia, private sector, and non-profit organizations, such as the USGS, EPA, and The Nature Conservancy, through training and presentations at local and national geospatial-related events and the Internet.

A Service-Oriented Architecture (SOA) has been implemented as the foundation for the NHDPlus navigation tools and the Framework Web Feature Service GIS toolset for a client desktop (see figure 1). The toolset allows users to view near real-time gauging station information, build watershed boundaries from upstream/downstream reaches identified via network tracing, create attribute reports, and download/extract NHDPlus from a WFS.

Status of System Development

The software system is complete. Functional code construction was completed in March 2008 with follow-up software version upgrades occurring in Nov. 2008. The system requirements were confirmed with team members and clients through a testing phase conducted in March and April 2008.

A new Google Maps client was released which allows users to execute the watershed delineation tool and request GML and PDF reports within a Google Maps web page. In addition, the NHDPlus flowlines are mashed into Google Maps using a cached WMS service via the ArcGIS Server REST API. See figure 2. The site can be accessed at: <http://www.gcs-research.net/CTRiverAtlasGoogle/>

Due to system requirements, specific software components were developed partly on ArcGIS Server 9.2 and 9.3; hence, the system's initial installation was distributed across several servers. Pieces of the system were installed at the USGS in Pembroke, NH, GCS Research in Missoula, MT, and Horizon Systems, in Herndon, VA. Software components hosted at GCS Research were installed at the USGS in Dec. 2008. This includes client web application upgrades from ArcGIS Server Web ADF 9.2 to 9.3. A web service will remain hosted at Horizon Systems into the future.

Project management

As of December 2008, project management activities have come to a close. The team will seek one last meeting with the grant coordinator to summarize, discuss, and reflect on the project as a whole. In addition, the meeting should attempt to identify any future opportunities and/or desires to continue with additional phases or possible synergies with other projects.

Outreach and training

Over the last year, this project was discussed in sessions by team members at various events included the following:

- NHDPlus Conference in Lakewood, Colorado
- AWRA Conference
- National Water Quality Monitoring Conference
- EPA GIS User Group meeting
- USGS GIS conference in Lakewood, Colorado
- ESRI User Conference in San Diego, California
- Vermont GIS Internet Mapping Conference in Burlington, Vermont
- Northeast Arc User (NEARC) Conference in Hyannis, Massachusetts

Feedback on Cooperative Agreements Program

The team members would like to thank the NSDI grant program facilitators for providing guidance and funding for this project. This particular grant allowed the Connecticut River Watershed Atlas project to meet some of its more advanced goals such as distributing key datasets and information through internet mapping applications.

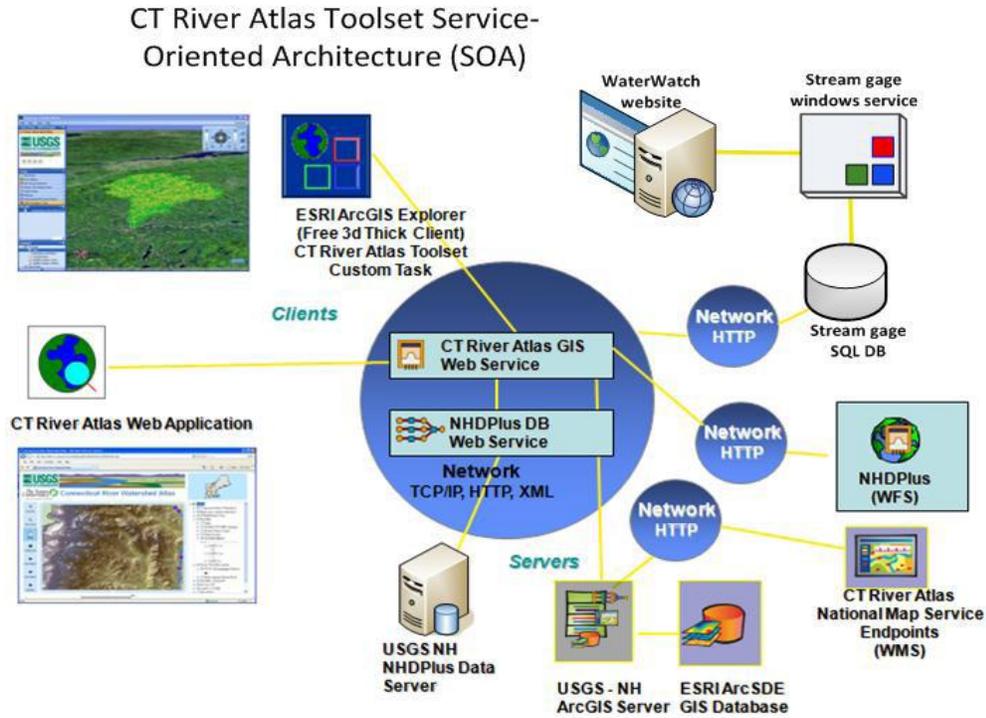


Figure 1: System architecture

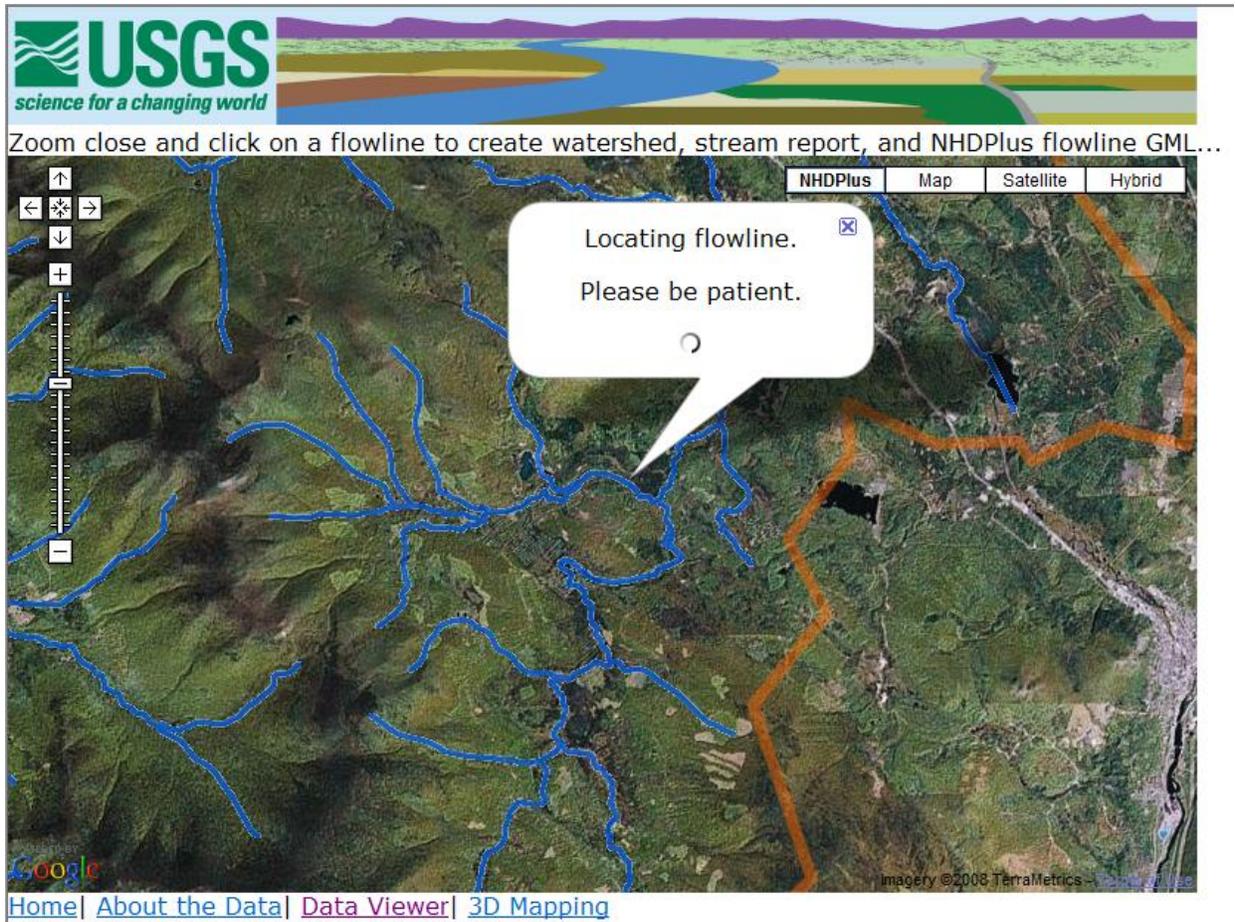


Figure 2: Google Maps client: Click on an NHDPlus flowline. The application will search for the closest flowline to the selected point.

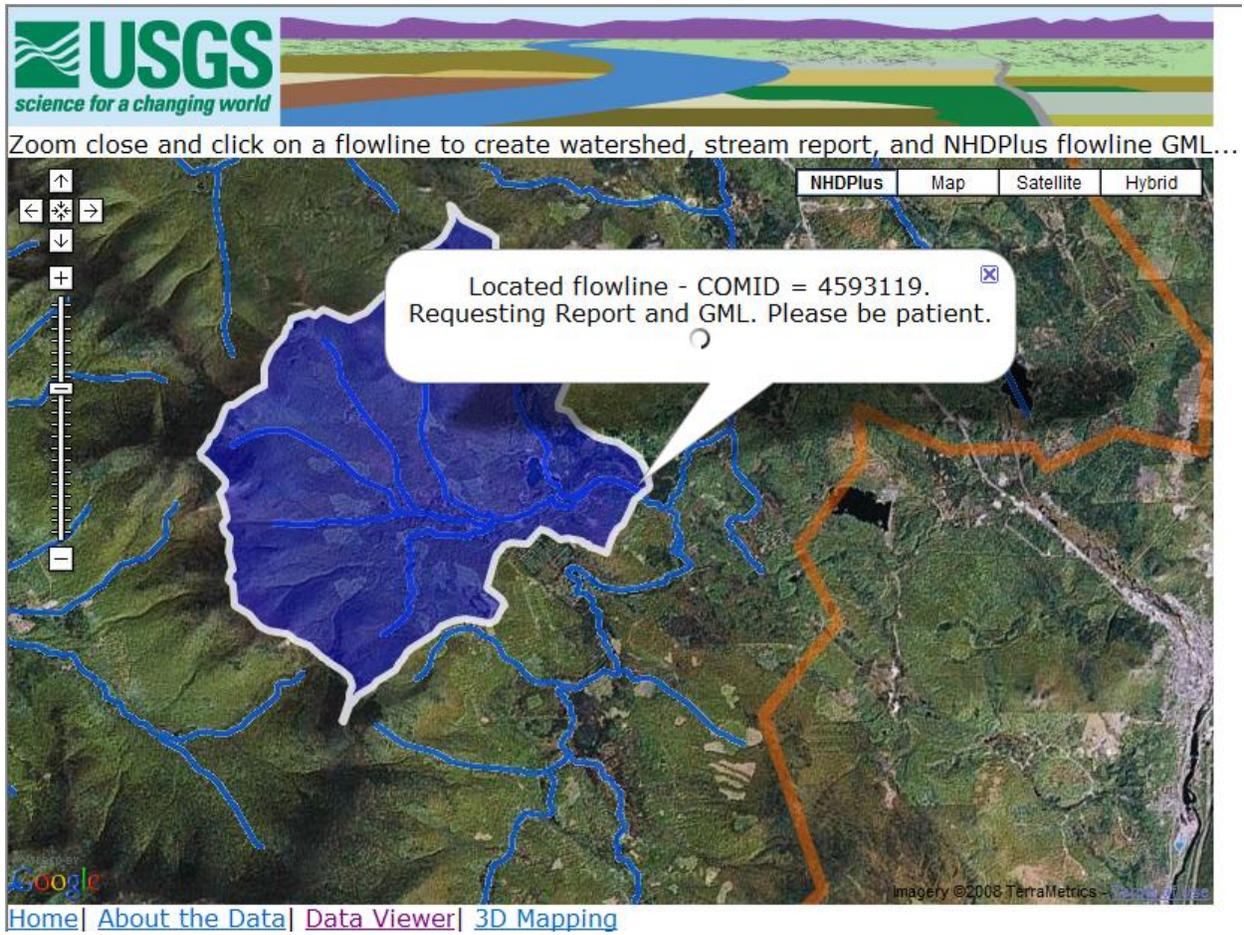


Figure 3: Google Maps client: A watershed delineation is created on-the-fly and displayed in the Google Maps client.

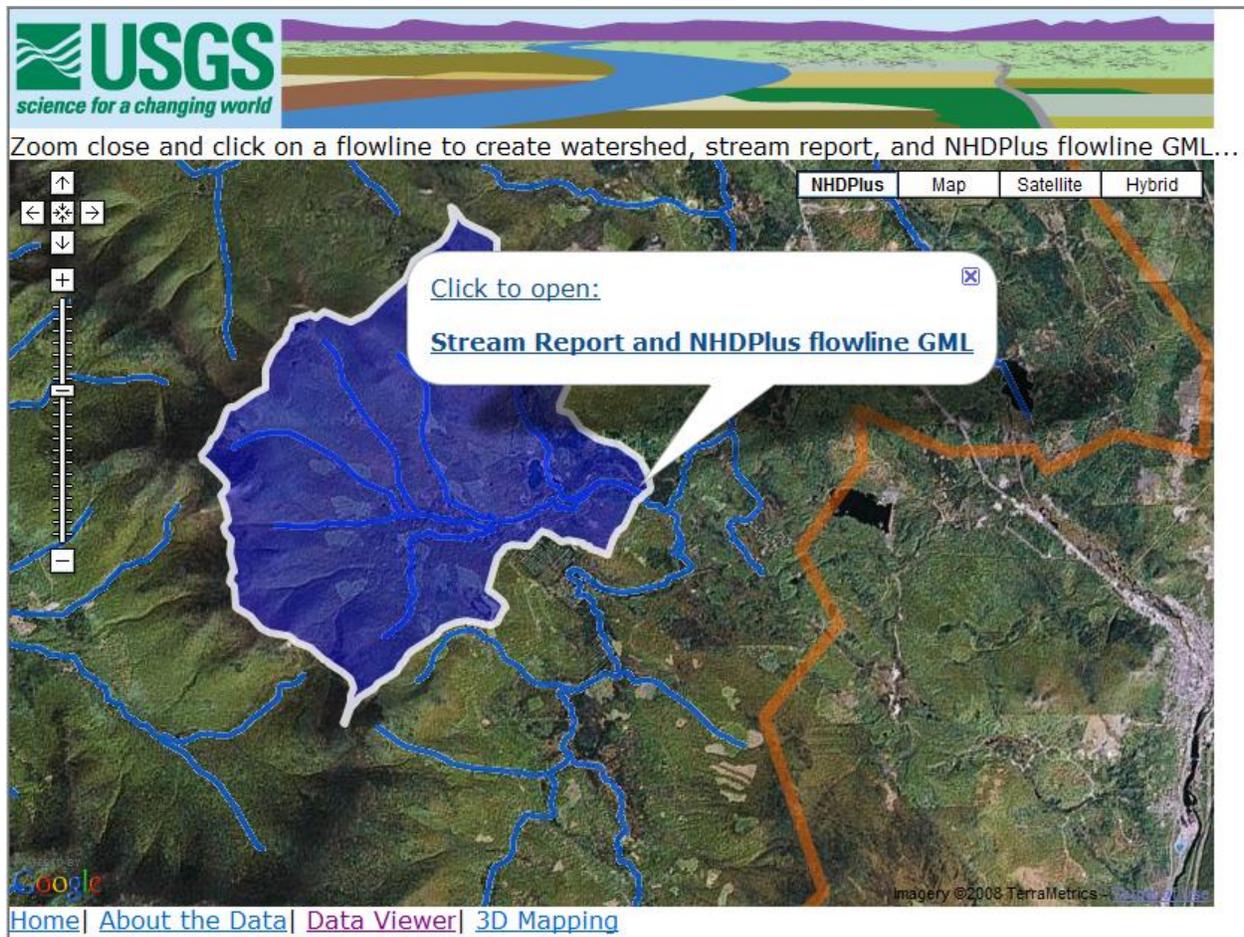


Figure 4: Google Maps client: The application creates a report and GML for the selected NHDPlus flowline.

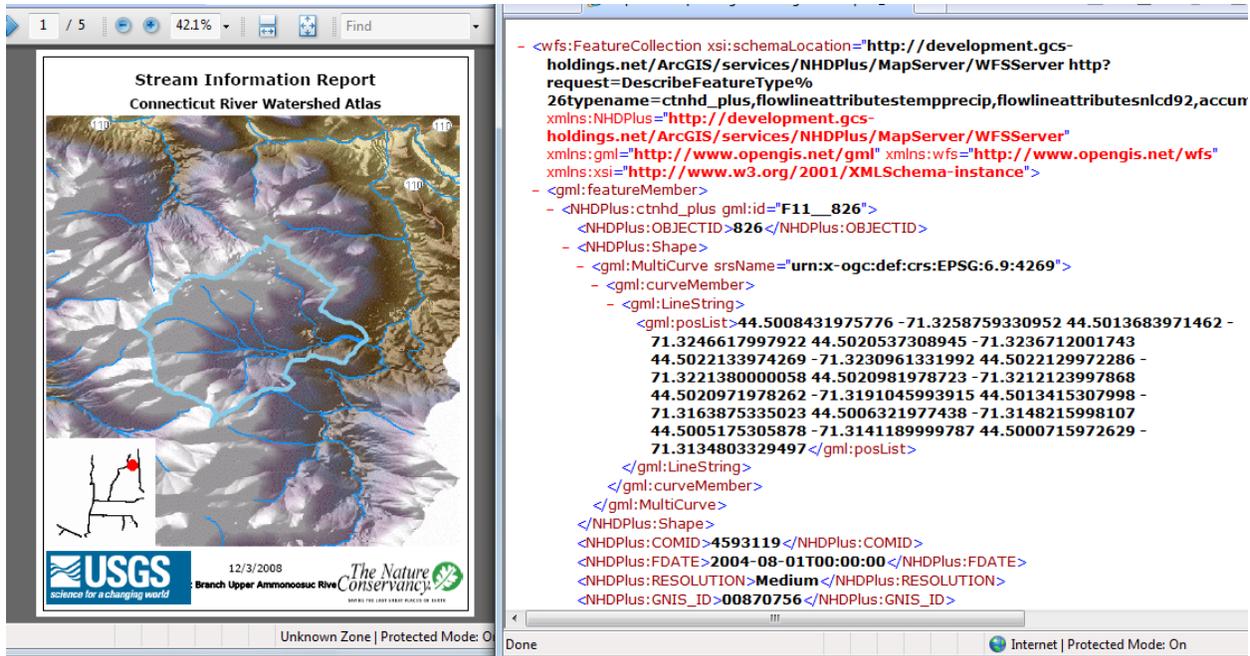


Figure 5: Google Maps client: Report and GML for the selected NHDPlus flowline.

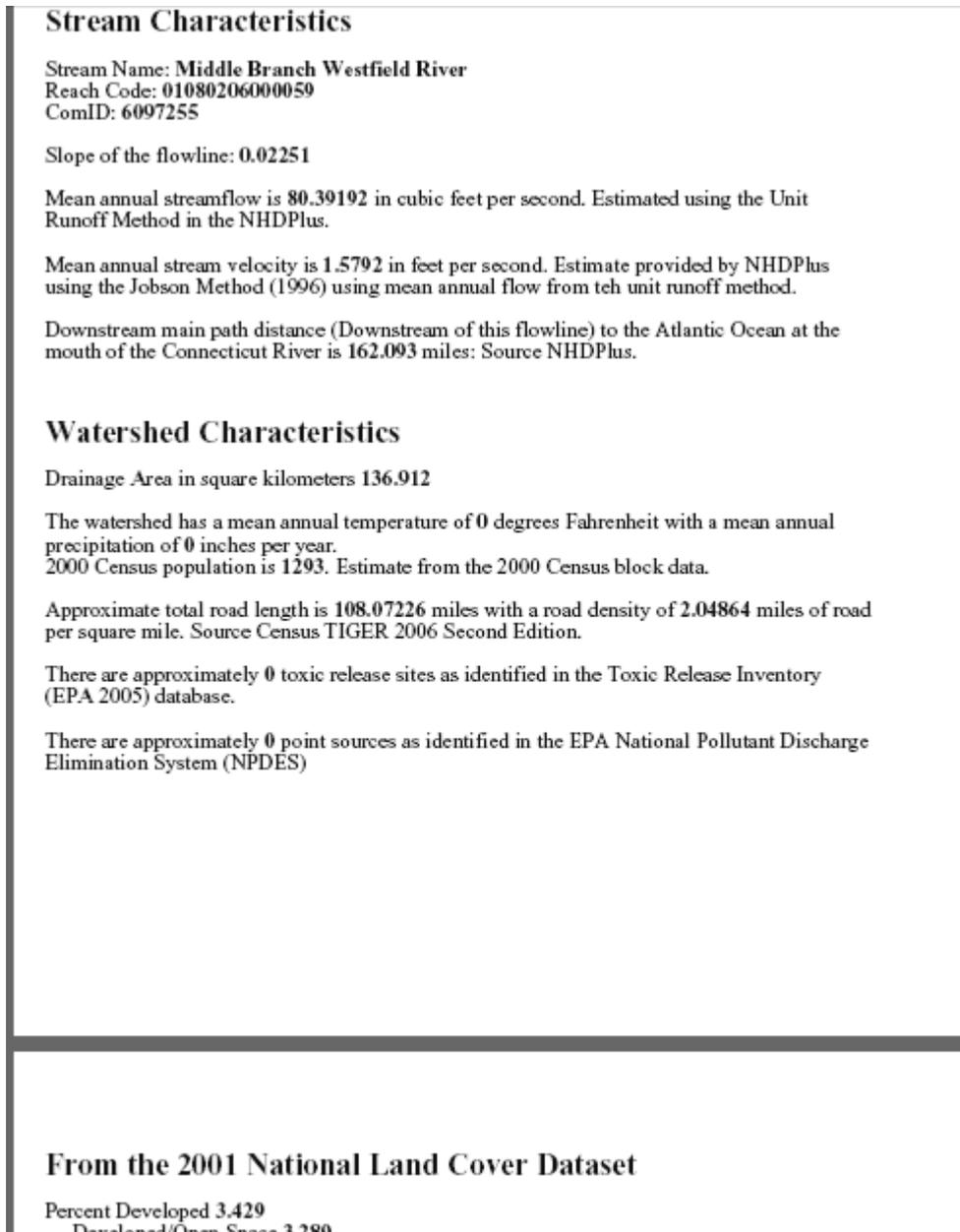


Figure 6: The report includes NHDPlus and other attributes.

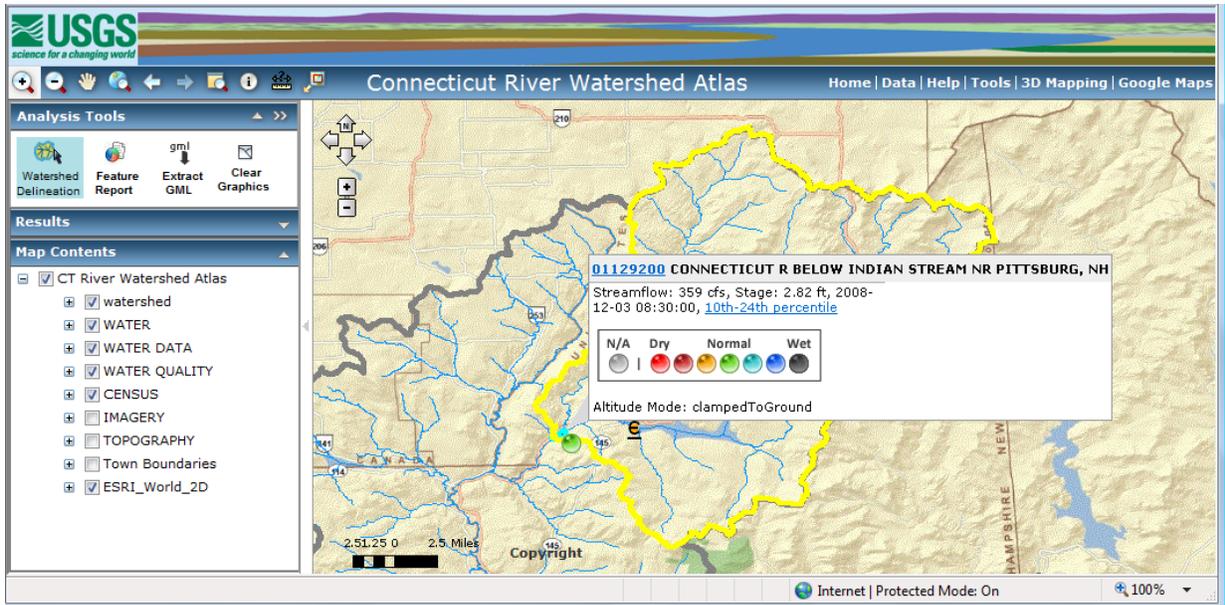


Figure 7: ArcGIS Server Web ADF web browser client. This web site has been upgraded to ArcGIS Server 9.3 .NET Web ADF.

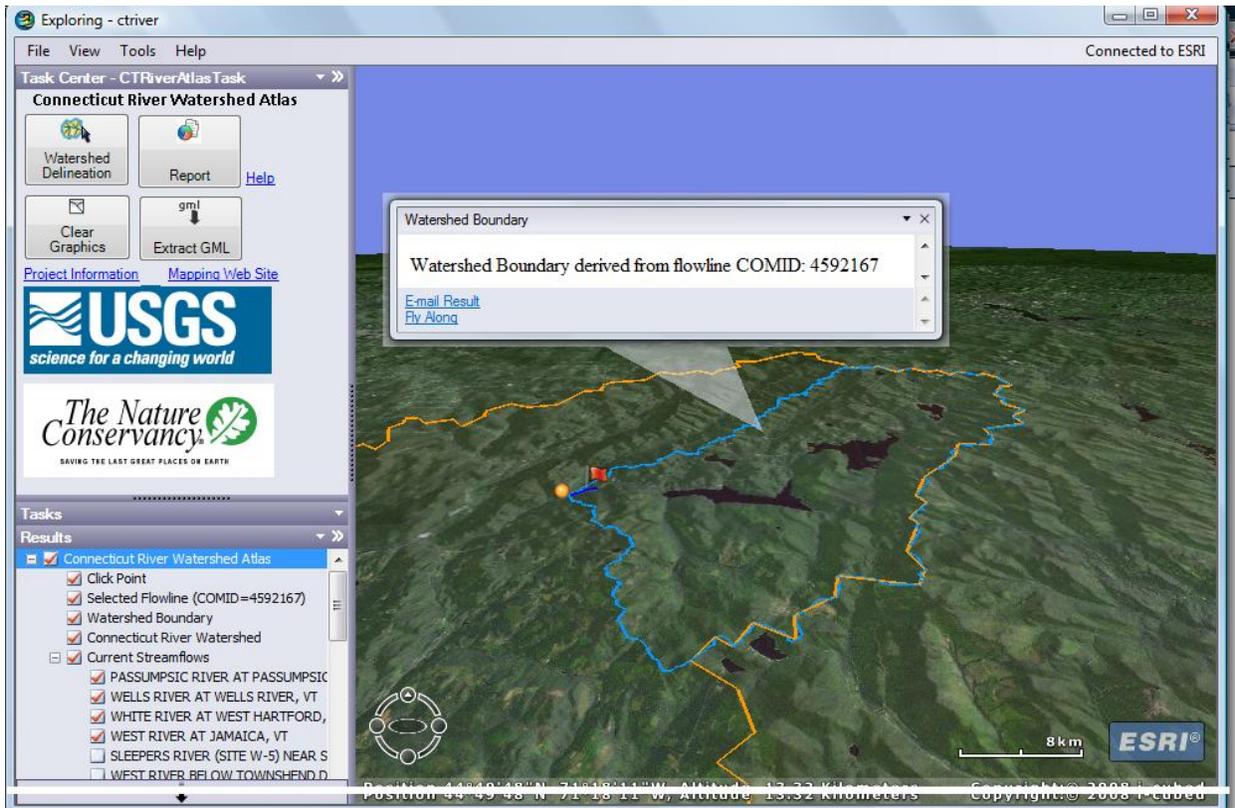


Figure 8: ArcGIS Explorer 3D Globe client with toolset