GIS Conservation Grant Program Impact on FRWA (Past 2 years):

The Farmington River Watershed Association (FRWA) is a citizen-based, non-profit 501©(3) organization at the forefront of restoration and conservation issues for the Farmington River and its watershed in Connecticut and Massachusetts. FRWA's focus is on such issues as water quality, water allocation, recreational usage, open space, and wetland and floodplain protection. We work with federal, state and local governments, business and industry, and the people of the watershed’s 33 communities to protect the river and the region’s natural resources.

We have numerous GIS projects that help support many of FRWA's efforts. In broad terms, GIS has and continues to play a critical role in FRWA's advocacy, education, and research initiatives.

Over the past two years since we received the grant support for ArcView 9.2 and Spatial Analyst, we have utilized the software features, functions, tools, and cartographic capabilities. The following pages showcase some of the projects where GIS has made a difference both in term of growing our capabilities, but more importantly, protecting the watershed's resources.
GIS Project: Lower Farmington River and Salmon Brook Wild and Scenic Rivers Study

FRWA is part of a broad group of federal, state, local, and other groups studying the potential of designating the lower Farmington River and Salmon Brook into the Wild and Scenic Act. As part of this effort, the study committee is developing a management plan to be used after the river and brook are designated Wild and Scenic and also the plan would be used at the local and regional level to manage the outstanding resources and implement its goals and objectives. Below are just a few figures used for this effort.

The Study Committee has identified that the Lower Farmington River and Salmon Brook contains the following Outstanding Resource Values (ORV) (at least one ORV is required for Wild & Scenic designation): Biodiversity, Geology, Water Quality, Recreation, and Cultural. As part of the study and designation process, numerous evening open houses occurred in the fall of 2009. The GIS posters were an important feature presentation, not only to spur interest, but to also allow locals to clarify or point other important resources not already identified.

The following figures are just some of the GIS figures and analysis that will be a part of the findings and management report that will be submitted to Congress.
LOWER FARMINGTON RIVER / SALMON BROOK
Wild & Scenic Study
Arens: Bloomfield, Burlington, Canton, East Granby, Farmington, Granby, Hartford, Simsbury and Windsor, Connecticut

LEGEND
- Wild & Scenic Study Corridor
- Dominant Forest Types
  - Birch dominant
  - Conifer
  - Maple/Oak/Conifer
  - Hardwoods (Sugar Maple dominant)
  - Oak
  - Oak/Maple/Birch
  - Hard Maple
- Palustrine Emergent Wetlands
- Palustrine Forested Wetlands
- Palustrine Scrub-Shrub Wetlands

Focal Species
- Amphibian
- Bird
- Fish
- Reptile
- Imperiled Species
- Critical Habitats Areas
- Potential Vernal Pools
- NDDB Species and Communities
- Imperiled Communities

BIODIVERSITY
Habitat & Species Areas

DRAFT
This Ecoregions figure was created from multiple data sources, including the use of Spatial Analyst to identify highland areas used 10-meter statewide LIDAR data.
**Project Description: Canton, Connecticut Potential Vernal Pool (PVP) Inventory and GIS Assessment**

This project was funded by the Farmington River Coordination Committee (FRCC). The study provided an inventory of all PVP in the Town of Canton, CT, as well as provides an analysis of the quality of those pools based on surrounding habitat and any volunteered-led or other known field observations such as, species and egg masses observed at the site, etc.

The PVP mapping was conducted under the Farmington Valley Biodiversity Project (FVBP) in 2002 (circa). As part of the FVBP, a consulting firm used black and white stereo pair aerial photographs (2000 flight year; 1"=1000’ scale) (Aero-Metric, Inc. Wisconsin) to interpret areas within Canton for PVP. PVPs were identified based upon dark signatures (which often indicate surface water), canopy breaks, landscape position and surrounding land use. The former FRWA GIS Specialist transposed the identified PVP into ArcMap. Attempting to identify vernal pools on black-and-white aerial photographs has some significant limitations that can result in “false positives” (misidentifying an area as a vernal pool) and “false negatives” (failing to identify a vernal pool). As a result, the use of remote sensing data compared to actual field verification will led to misclassifications and out right missing of vernal pools.

Based on the 2002 FVBP work, it inventoried a total of 72 PVP within the Town of Canton. However, since that time, newer GIS data and other sources of aerial photography have been made available. Based on these newer sources, FRWA has revised inventory total to 74 PVP. The differences between the inventories are attributable to the newer sources negating previously identified PVP, and, conversely, identifying newer ones. Below summarizes the differences between the two:

<table>
<thead>
<tr>
<th>Year</th>
<th>Original</th>
<th>Change</th>
<th>Revised</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>72</td>
<td>-18</td>
<td>54</td>
</tr>
<tr>
<td>2009</td>
<td>n/a</td>
<td>+20</td>
<td>20</td>
</tr>
</tbody>
</table>

**Revised Total: 74**

The primary source for either confirming or negating previously identified PVP was oblique aerial photography provided by Microsoft Corporation (www.bing.com/maps) “Birds Eye” view (Pictometry, Inc.). It is estimated the Bird’s Eye imagery was collected in the spring of 2007. FRWA used ArcMap with a “Virtual Earth” script to view the Birds Eye imagery within ArcMap as...
it corresponded with the geographical extent as the ArcMap display area, which allowed for accurate editing of PVP points.
CHANGE IN VERNAL POOL HABITAT

2006 NAIP  
2008 NAIP

Example of Canton PVP Tables

After calculating each PVP's habitat areas we were able to integrate other GIS data to quantify percent developed, protected, and whether it's part of other known habitat areas.

<table>
<thead>
<tr>
<th>PVP* GIS ID</th>
<th>CTH Percent Developed</th>
<th>CTH Percent Protected Open Space</th>
<th>Protected Open Space Name</th>
<th>Protected Open Space Ownership</th>
<th>Contained within Eastern Box Turtle Area (NDDB***</th>
<th>FVBP**** Habitat Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.2%</td>
<td>39.4%</td>
<td>McLean Game Refuge</td>
<td>Private</td>
<td>West Mountain</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>14.8%</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
<td>Ratlum Mtn North</td>
</tr>
<tr>
<td>3</td>
<td>1.9%</td>
<td>Unknown</td>
<td>Municipal</td>
<td></td>
<td></td>
<td>Ratlum Mtn North</td>
</tr>
<tr>
<td>4</td>
<td>3.7%</td>
<td>Unknown</td>
<td>Municipal</td>
<td></td>
<td></td>
<td>Ratlum Mtn North</td>
</tr>
</tbody>
</table>

As part of the final phase of the project, FRWA will provide the report to the Town of Canton for land use planning and decision making. Another exciting aspect is to create a separate Interactive Map site on FRCC’s website to allow the Town of actively use the data, since it does not have GIS.

While it was not part of the original project scope, FRWA’s GIS Specialist teamed up with a University of Connecticut West Hartford Branch Geography/GIS class and offered this project as a “real-world” GIS project that students could work on. This was a very positive experience for the students involved by not only expanding their learning of GIS, but also exposing them to how GIS can be used for monitoring and understanding environmental change.
Project Description: North Branch Park River Watershed Management Plan

FRWA is a partner of the Park River Watershed Revitalization Initiative and offers among other things GIS support to the Park River Watershed. The interrelationship between the two watersheds is due to the Park and Farmington River watersheds meeting along the Metacomet Ridge, they share policies and regulations of seven municipalities, and drinking water for residents of the Park River watershed is drawn from the Farmington River watershed.

Through a grant from the CT Department of Environmental Protection, a watershed management plan is being developed for the North Branch Park River. The watershed management plan will be a comprehensive, scientifically-sound, and practical planning document for the protection and restoration of water resources in the North Branch Park River watershed. The management plan will characterize the watershed conditions, identify, investigate, and address the current and emerging issues facing the watershed. FRWA provided the technical GIS support for the management plan. Below showcases the results of an intensive analysis to assess future buildout of the North Branch Park River Watershed based on (among other things) current zoning and existing developed parcels.
In addition to the North Park River Plan, for Earth Day 2009, the Park River Watershed Revitalization Initiative took out a full-2 page ad in the Hartford Courant to advertise the Park River and its watershed. FRWA GIS worked with the graphics designer to provide the map inserts. The following is a copy of the ad.
The purpose of the project is to assess land cover changes within the Upper Farmington River OPZ and within the towns since the designation of Wild and Scenic in 1995.

This project is funded and for the Farmington River Coordination Committee (FRCC). This project involves using satellite imagery from 1985, 1990, 1995, and 2002 to identify MACRO (large scale) and historic aerial photos to assess land cover changes within the Overlay Protection Zone (OPZ) corridor and each town. The satellite data shows generalized areas of development. This information is used to focus on town-wide areas of change within the each town in addition to the corridor. After these areas are identified, aerial photos are used to accurately define the type and extent of change. Also, the aerials are used to detect minor (small) changes within the corridor.
**Mapping Change Within the Wild & Scenic Corridor**

**Results Within the 100 FT. Overlay Zone**

<table>
<thead>
<tr>
<th>Wild &amp; Scenic 1994 Designation Status</th>
<th>Dates</th>
<th>Majority Within 100ft.</th>
<th>Partially within 100ft.</th>
<th>Adjacent to 100ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Designation</td>
<td>1986-1991</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1991-1995</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Post-Designation</strong></td>
<td>1995-2004</td>
<td>1</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>2004-2007</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4</td>
<td>5</td>
<td>19</td>
<td></td>
</tr>
</tbody>
</table>

Total Pre-Designation: 38% 13% 50%
Total Post-Designation: 5% 20% 75%

The results show a general trend of development occurring outside/adjacent to the overlay protection zone compared to pre-Wild & Scenic Designation. The next phase is to analyze development within the each of the entire towns and compare those results to the corridor results.

While it was not part of the original project scope, FRWA’s GIS Specialist teamed up with a University of Connecticut West Hartford Branch Geography/GIS class and offered this project as a “real-world” GIS project that students could work on. This was a very positive experience for the students involved by not only expanding their learning of GIS, but also exposing them to how GIS can be used for monitoring and understanding environmental change.