Service learning or Civic Engagement is a form of experiential education that allows students to learn by doing. Time spent working with a community-based organization becomes part of the students' course requirements.

In service-learning classes, the community serves as a "living project" for the class—a powerful source of information to complement course readings, lectures, and discussions.
How Do Students Benefit from Participating in a Service Learning Course? (theoretical)

• Improves students’ ability to apply what they are learning in “the real world”
• Improved ability to understand complexity and ambiguity
• Improves their ability to work well with others
• Builds leadership and communication skills
• Gets them out of the classroom to meet people who value what they are learning.
• Improves their social responsibility and citizenship skills
• Results in greater interest in community service after graduation
• Provides connections with professionals and community leaders for career opportunities
• Creates a stronger relationship with faculty over shared status of gowns in the town
• Provides for greater insight in how college can be a route to a career
What does it benefit teachers of a service learning course?

• Satisfaction with the quality of student learning
• New avenues for research and publication
• Providing networking opportunities with engaged faculty in other disciplines or institutions
• A better sense of where academic skills can be developed to provide jobs for graduates.

What does it benefit colleges to instruct via service learning?

• Improved institutional commitment to the curriculum
• Improved student retention
• Enhanced community relations

From National Service Learning Clearinghouse.
How to Communities Benefit from Service Learning?

• Satisfaction with student participation
• Valuable help in achieving community goals
• New energy, enthusiasm and perspectives applied to community work
• Enhanced community-university relations
What Kinds of Projects Have my GIS Students Completed?

• Mapped historic houses in Bedford, New York
• Mapped the development of Bedford, New York from 1841-1903
• Mapped historic houses and provided hyperlinked ArcReader map to Katonah, New York
• Determined properties adjacent to water in Norwalk, Connecticut
• Used recently-built plot maps to create a water detention layer for Tarrytown, New York
• Mapped out baseball fields for the town of Mount Pleasant, New York
• Created a watershed map for the Pocantico River watershed
• Determined where possible stormwater detention areas could be located in the Pocantico watershed.
• Mapped buffer areas around water sources for firefighting in Pound Ridge, New York
The Bedford, NY Historical group wanted the class to look at old maps of Bedford and see where houses were before 1908 to help enforce a teardown moratorium.

The students used an 1841 map as the first map to georeference to current data. This earliest map did not have houses mapped.

The 1851 map and all maps after that had the house location and the names of the owners.

All maps after 1867 were on multiple pages, so the maps had to be scanned and merged together, then georeferenced.

Different color dots represented houses that were on the map at the time.

Houses that appeared as new on subsequent maps were given different colors.

A video showing the changes over time was provided to the town.
Current GIS Streets in yellow
Students were able to see who the owners were during the different periods to help create a spreadsheet with dates and a record for property ownership.
1872 - green
This shows why houses had to be moved for reservoirs.
The 2007 GIS class divided up the water features in Norwalk and each student found the properties that intersected water. They each made up a map and a spreadsheet to show the work.

When I delivered the work to the Conservation Officer in Norwalk, she had just fielded a call that morning from someone wanting a list of property owners who had water abutting their land. We delivered the spreadsheet of owners and waterways and the maps like this, which each student created for their section.
2007 Project to determine what properties were adjacent to waterways in Norwalk, CT.

<table>
<thead>
<tr>
<th>Street</th>
<th>Property Name</th>
<th>Address 1</th>
<th>Address 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>FiveMileRiver</td>
<td>DEVITO JOSEPH JOHN &amp; BETTY J</td>
<td>P.O. BOX 6088</td>
<td>9545 EAST ROMPING RD</td>
</tr>
<tr>
<td></td>
<td>LAVIGNE ROBERT &amp; ENGLISH JACK</td>
<td>15 ALEWIVES RD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MURPHY HUGH R &amp; BAIRD THOMAS W</td>
<td>16 ALEWIVES RD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HOLTON STEPHEN M &amp; MARGARET M</td>
<td>9 ALEWIVES RD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ANCHOR LN PR</td>
<td>1 ANCHOR LN</td>
<td></td>
</tr>
<tr>
<td>Beechwood Rd</td>
<td>PUSACK WILLIAM J &amp; PRISCILLA S</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MEEHAN DOROTHY G</td>
<td>115 W NORWALK RD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DAGOSTINO JEFFREY M &amp; GERARDA</td>
<td>27 BEECHWOOD RD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>YEN HENG FU &amp; CHUN FU</td>
<td>22 BEECHWOOD RD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MORMAN GENE &amp; SOPHIE D</td>
<td>21 BEECHWOOD RD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bonnybrook Rd</td>
<td>32 BONNYBROOK RD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DINARDO DENISE</td>
<td>29 BONNYBROOK RD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEPTONE ROBERT &amp; WANAMAKER JR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bonnybrook Tl</td>
<td>12 BONNYBROOK TRAIL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SOFFER MADELINE &amp; RICHARD TRUS</td>
<td>15 BONNYBROOK TRL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SVEC EDWARD J JR &amp; KATHERINE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ConnecticuT Av</td>
<td>LASALLE BANK NATITAL ASSOCIATI</td>
<td>C/O GMAC COMMERCIAL MORTGAGE 550 CA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NATIONAL OFFICE PARTNERS LP</td>
<td>800 CONNECTICUT AVE</td>
<td></td>
</tr>
<tr>
<td>Cottontail Rd</td>
<td>Duffy Joseph P JR</td>
<td>11 COTTONTAIL RD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Allen Brian J</td>
<td>15 COTTONTAIL RD</td>
<td></td>
</tr>
<tr>
<td>Cudlipp St</td>
<td>KOLKOWITZ ALLEN B &amp; KUSSKE CHR</td>
<td>12 CREST RD</td>
<td></td>
</tr>
<tr>
<td>Fellow St</td>
<td>HOLLYDAY RICHARD C &amp; ADAMS JAN</td>
<td>288 FELLOW ST</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIV STEPHEN P &amp; CRAWFORD MALCOLM D &amp; VIRGINIA</td>
<td>292 FELLOW ST</td>
<td></td>
</tr>
<tr>
<td></td>
<td>KAMITANI R &amp; JARIYAWAT R</td>
<td>291 FELLOW ST</td>
<td></td>
</tr>
</tbody>
</table>
In 2010, Bedford came to us again to see if we could provide an interactive map showing the houses in the Katonah historic district, a part of Bedford.

These houses were moved on rails, pulled by horses to their current locations when New York City was to use the “Old Katonah” as a reservoir.
2011 Project – Historic Houses in Katonah, NY
Students went on a field trip to Katonah with the Bedford Town Planner and the Town Historian, so that the relevance of the historic houses could be told to them during the bus trip and subsequent walking tour of the town.

The students took photos, which they captioned and were hyperlinked to the historic houses.

They each created an ArcReader map through Publisher that could be used by the Historical Society or anyone by downloading the free ArcReader application.
In 2014, the students were given plot plans that included storm water detention spots on the properties in Tarrytown, NY. The task was to make a single shapefile for the town that would include all the built storm water detention areas.

We took a trip to the site and used a GPS to map out the swales to see if our georeferencing was accurate. They learned how to input GIS data to their maps after they already georeferenced the plans and saw that the two methods lined up well.
Some of the plans that were georeferenced to make a swale layer for the town’s stormwater detention map.
This is one of the swales that the kids walked with a GPS.

Part of the team that walked the perimeters of the swales to ground truth the maps they had georeferenced.
In 2015, the class responded to a request from the Pocantico Watershed Alliance to determine if there were areas on undeveloped sites that could be used for stormwater detention.
This spring, the Pound Ridge Volunteer Fire Department wanted our class to develop buffers around all the sources of firefighting water, usually ponds or dry hydrants connected to ponds.

The class took a field trip, guided by the fire chief and a member of the Conservation Commission. The class learned why only certain water bodies would provide enough water, which eliminated simple buffering around each good-sized pond.

In addition, there were requirements, such as the pumper being able to get close enough to the water to connect. Some water bodies were on private land and were inaccessible.

Students learned that there is a lot of complexity in these real-community situations. We had to work with the assistant fire chief to learn where they have found water in the past and what areas are impossible.
This takes the department-identified water sources and creates a one-mile buffer. The truck has 5,000 foot total of hose, but can connect to other hoses. They start at the fire and go toward the water source while the tanker delivers interim water.
Areas not within the 1-mile buffer were noted. While there is a deep river on the west side, the slope to the water makes it unuseable.

These are areas where cisterns for firefighting water would be helpful. There are cisterns in other parts of the town.
How have the students benefitted from these projects?

• They get out of the academic setting to interact with working people.
• Get a sense of purpose for materials they are learning
• Allowed the students to learn skills, as needed, to solve the practical problems
• Gotten the students to work as a group, dividing up the work
• Given the students a project to present on Science Day at Pace
• Made students aware of community problems and projects
• Given students ideas for their senior thesis projects
• Opens possibilities for internships in agencies
• Starts creating a network of professionals in the field for students
• It gives students something to talk about at lunch.
What problems have arisen?

• It’s hard to get funds for a bus field trip, which is crucial to the experience.
• Volunteer groups don’t give us all the information we need.
• Communications within client groups are not consistent.
• The students’ skills are not good until the class is halfway through (March) and the course ends around May 5th.
• Group projects require that all students participate. Someone has to pick up the work of anyone who lags in order to make a final product.
• Even with successful projects, most clients don’t thank the students (except Bedford)
• Clients expect to see wall-size maps. Free.
• Clients want changes continuously. If it’s a group, each person wants to see something different
• Clients associate price with value. Free has its burdens.