Introducing GIS via College-Sponsored Community Service Activities

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Presentation Overview

- Amherst College
- Interterm Classes
 - * Original GIS Course Design
 - * Early Participation
- New Interterm Courses
 - * Ideas & Topics
 - * Participation
 - * Content & Results
 - * Feedback



- Future Directions
- Acknowledgments



Amherst College

- A liberal-arts college
- 1600 students, almost all in residence
- 1:8 faculty-student ratio
- One of the Five Colleges, along with:
 - * Hampshire College
 - * Mt. Holyoke College
 - * Smith College
 - * University of Massachusetts at Amherst





Interterm Classes

- January Interterm lasts three weeks, beginning the week after New Year's.
 - * Non-credit courses, service activities, thesis research, etc.
- Student participation is optional; open to others, including Five College students, staff, & faculty.
- Information Technology has been teaching Interterm classes for years:
 - * Outlook, Endnote, Dreamweaver, Photoshop, et al.
- Classes are typically one or two hours long, occasionally with multiple meetings.



Interterm GIS — Original Design

- Our first GIS course was taught to students during Interterm 2004.
- Three classes of two hours each:
 - * Displaying GIS data & sharing maps;
 - * Data formats and finding GIS data;
 - * Importing data into GIS formats.
- The examples & exercises used a mix of national, state, and local data:
 - * Census, political, orthophotos, scanned maps, etc.





Interterm GIS — Early Participation

- Unfortunately, student participation has not been overwhelming:
- At least part of this can be attributed to:



Participation (Student Major)

- * Less-than-active student participation in Interterm;
- * Some students had options at other times, e.g. a course we offer to summer science students;
- * Competition from a week-long Interterm class nearby!



Interterm GIS — New Course Ideas

- **Philosophy:** Make the GIS course more relevant to students by providing them with "live" data.
- Observation: The College has recently expanded its commitment to community engagement.
- Connection: Coordinate with community service and government agencies to find ways they could benefit from a GIS project, and design student activities around that.





Interterm GIS — Additional Ideas

- Prepare data in advance to focus student efforts.
- But also include some field work ("experiential").
- Involve relevant faculty and other experts.
- Teach other technologies to communicate results:
 - * Web design * Video production
- Use most of Interterm (2¹/₂ weeks).
- Give students freedom to choose projects ("self-directed").





Interterm GIS — Two New Courses

- Discussions with faculty, a governmental agency, and a community organization encouraged us to set up *two* courses in parallel:
 - * Natural-science oriented: Destructive Species and the Quabbin Reservoir: Balancing Ecological Diversity and Recreational Needs
 - * Social-science oriented: *Meeting the Health Care Needs of Under-Privileged Populations in the Holyoke Region*







Interterm GIS — Participation

• The response to these courses was a nice surprise!

Course	Signed Up	Completed	Amherst College		Smith College	University of Massachusetts	Gender
Destructive Species and the Quabbin	8	5	4	2 First-Year I Sophomore I Junior		I	3 Women 2 Men
Health Care Needs in Holyoke	23	17	14	5 First-Year 6 Sophomore 3 Junior	3		I 5 Women 2 Men
Total	31	22	18	7 First-Year 7 Sophomore 4 Junior	3	I	18 Women 4 Men

- The students came to learn one or more of these technologies (GIS or video or web development), and/or for the service opportunity —
- But every one received a basic course in GIS, including a GPS/geocaching exercise!



Interterm GIS — Design

- The courses ran M F, 9 AM to ~4 PM, with 1-hour lunch: ~30 hours/week.
- The content evolved over the $2\frac{1}{2}$ weeks:





Destructive Species and the Quabbin Reservoir Presentations: Forestry

• History and Management of the Quabbin Reservoir

Clif Read — Supervisor of Interpretive Services, Quabbin Visitors Center
Steve Ward — Forester, Quabbin Reservoir
Office of Watershed Management,
Department of Conservation and Recreation,
State of Massachusetts

- Healthy Forests and Water Quality Anna Martini – Professor of Geology Amherst College
- Massachusetts Forests John O'Keefe — Museum Coordinator Harvard Forest





Destructive Species and the Quabbin Reservoir Presentations: Species

- Introduction to Invasive and Destructive Species
 Annie Paradis – Graduate Student in Entomology
 Department of Plant, Soil, & Insect Science
 University of Massachusetts
- The Hemlock Woolly Adelgid David Orwig — Forest Ecologist Harvard Forest
- Going Wild! Hunting, Animal Rights, and the Contested Meaning of Nature Jan Dizard — Professor of Anthropology and Sociology Amherst College









Destructive Species and the Quabbin Reservoir Focus: Continuous Forest Inventory

- Continuous Forest Inventory (CFI) plots were set up in the early 1960s as a means to monitor the state of the forest.
- A regular grid of spots a half mile apart, marked by a stake, with trees visually marked from that point (gray on map)
- Originally described by "forester's directions", GPS coordinates are now more useful but only some known!
 - * Yellow Office of Watershed Management
 - * Orange Mt. Holyoke College





Destructive Species and the Quabbin Reservoir: Focus:The Hemlock Woolly Adelgid

- An invasive aphid-like insect from eastern Asia, about 1mm in size.
- Two infestations in the U.S., one per coast.
 - * The latter discovered in Virginia in the early 1950s.
 - * Reached Massachusetts in 1989.
- Adelgid nymphs attach themselves to needle bases and cover themselves with white wax.
- Adelgids feed on hemlock sap and inject a toxic saliva; trees often die after 4 8 years.
- Hemlock commonly reside on steep slopes near streams, and help reduce erosion thereon.





Spread of the Hemlock Woolly Adelgid in Massachusetts





Eastern Hemlock (green);

The Spread of the Hemlock Woolly Adelgid in the eastern U.S. as of 2003 (red)

Destructive Species and the Quabbin Reservoir: Activity: Forest Analysis

- Two stands of eastern hemlock (red) were selected that had not previously shown signs of infestation.
 - * More southerly stands had, especially adjacent to the reservoir.
- The students traversed them, and rated the presence of the adelgid.
 - * Scale of 0 (none) to 3 (highly infested).
- The students also looked for nearby CFI plots.







Hemlock stands (red), adelgid presence (larger white dots), and CFI plots (yellow dots & blue stars)



Health Care Needs of the Under-Privileged in Holyoke Presentations: The People of Holyoke

Hispanic Americans
 Carleen Basler —
 Professor of Anthropology
 and Sociology
 Amherst College





 Challenging Structural Inequality and Building Partnerships in Holyoke Myrna Breitbart — Professor of Geography & Urban Studies School of Social Science, Hampshire College





Health Care Needs of the Under-Privileged in Holyoke Presentations: Health Care

• The Holyoke Health Center Jay Breines – Director











 Access to Health Care by the Uninsured Jessica Reyes — Professor of Economics Amherst College



Health Care Needs of the Under-Privileged in Holyoke

Activity: Diabetes

- The Holyoke Health Center (HHC) has many diabetic patients.
- An important treatment effort is to teach patients better ways to eat.
 - * In-home cooking demonstrations are well-received.
 - * Where to site them?
- HHC provided us with a list of their diabetic patient's addresses.
- Cleaned up, randomized, geocoded.





Health Care Needs of the Under-Privileged in Holyoke Activity: Home Health Visits

- The Holyoke Health Center (HHC) sends many
 "promotoras" to patients' homes for health visits.
- Another group of students mapped the location of visits, along with the locations of the diabetic patients.





Health Care Needs of the Under-Privileged in Holyoke Activity: Siting a New Health Center

- The Holyoke Health Center (HHC) also operates the Chicopee Health Center.
- They're expanding it and looking for a new location for it.
- HHC provided us with a list of their new patient's addresses.
- Cleaned up, randomized, geocoded.





Health Care Needs of the Under-Privileged in Holyoke Activity: Community Resources List

- One group of students worked with a local social worker to update a list of community resources.
 - * Childcare and Infant Programs
 - * Youth Programs and Recreation
 - * Education, Jobs, and Training
 - * Parental Support
 - * Housing, Food, and Heat
 - * Health; Counseling and Mental Health
 - * Crisis Prevention and Hotlines
- They produced a wall map of these resources and bus lines that's now at the HHC, and a brochure.





Student Survey Results

- A post-course survey obtained 1 response from a Quabbin student, 10 from Holyoke students.
- The design of the courses was highly rated.
- The technology training was highly rated.
- Students frustrated by their lack of "meaningful contribution".
- Students felt they didn't have enough time to "design their own project" and also complete it.
- Holyoke students didn't feel the need for GPS.



Response to the New Courses

- Service Recipients: Although the "products" of these courses were limited, the organizations we worked with seemed appreciative and wanted to continue again this January.
- Students' Follow-Up:
 - * Two students took a semester-long GIS course at Smith.
 - * One student did a summer research project on atmospheric mercury that recently won a GIS Day prize!
 - * A few students have continued to work with the HHC.



Future Directions

- Quabbin Course: In the interest of providing some student options, a second activity, tracking the browsing impact of moose, will be added.
- Holyoke Course: An effort will be made to prepare additional activities in advance.



Acknowledgments

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- Our librarians, Susan Kimball and Susan Edwards, who taught part of the GIS classes (finding data on the web).
- The expert speakers referenced earlier.
- The staff at Mass DCR and the Holyoke Health Center, who provided some of the data we used and sometimes worked with the students.
- And, of course, all of the wonderful students!



Resources

- Quabbin Course Web Site:
 - * http://www.amherst.edu/~ccsp01
- Holyoke Course Web Sites:
 - * Diabetes: <u>http://www.amherst.edu/~ccsp04</u> <u>http://www.amherst.edu/~ccsp05</u>
 - * Home Health Visits: <u>http://www.amherst.edu/~ccsp02/</u>
 - * Siting a New Center: <u>http://www.amherst.edu/~ccsp03/</u>
 - * Community Resources List: <u>http://www.amherst.edu/~ccsp06/</u>



External Image Credits

- Massachusetts Department of Conservation and Recreation: http://www.mass.gov/dcr/parks/central/quabbin.htm http://www.mass.gov/dcr/waterSupply/watershed/quabbin.htm
- Harvard Forest: http://harvardforest.fas.harvard.edu/research/hwa.html
- U.S. Forest Service: <u>http://na.fs.fed.us/fhp/hwa/</u>
- MassGIS: <u>http://www.mass.gov/mgis/</u>
- City of Holyoke: <u>http://www.holyoke.org/</u>
- Holyoke Community Health Center: <u>http://www.hhcinc.org/</u>

