COMMUNITY GIS INITIATIVE

A project funded by The Ford Foundation

Final Report
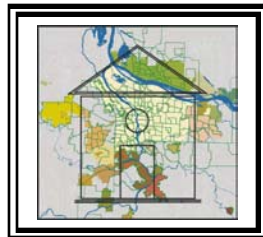
The [Open Meadow] youth presented the information they had learned to GIS professionals at the GIS in Action conference during April, and to top school district officials. The hard work and commitment to an effective partnership demonstrated by the IMS [CGP] staff led the Portland Public Schools deputy superintendent to request that similar programs be replicated within the Portland School district to benefit mainstream youth. As a result, the students of the Open Meadow CRUE program learned not only to use technology effectively, but they learned the importance and impact of their own voice, and how technology can enhance their message.

Andrew Mason, Open Meadow CRUE Program Coordinator

Our participation in the project has made it easier for us to fulfill our mission of inspiring and facilitating community investment in the Johnson Creek Watershed. . . . The support of the Community Geography staff has been fantastic, and we will miss working with them as we move into the next years. . . . I sincerely hope that many more organizations and individuals have the opportunity to build community capacity through the Community Geography Project.

David Reid, Outreach Coordinator, Johnson Creek Watershed Council

[The Ford Foundation funded] partnership has more than fulfilled our initial goals and expectations; it has blossomed into a commitment to use GIS as the primary methodology in the development of a new United States' history curriculum for Portland Public Schools' middle and high schools through a Department of Education Teaching American History grant.

Dr. Jacqueline Peterson, Vice President, Old Town History Project

We feel that the project has exceeded our expectations in the opportunities it has presented and the project's accomplishments are a testament to the contributions that the school districts and community-based nonprofit organizations can make in the community.

Benjamin Sturtz, Assistant Head Start Director, Oregon Child Development Coalition

Going into the project, students and project leaders did not know the answers to the questions . . . Once the data was plotted a pattern emerged and conclusions could be drawn. Students were able to compare data based on patterns that emerged, and to formulate meaningful questions . . . By asking questions based on the patterns they saw, they were able to get more involved in what they were studying and to pose possible solutions to what appeared as a problem.

Zita Podany, Computer Teacher/Computer Coordinator, Cleveland High School

If ever there was a modern day version of the miracle of the "loaves and fishes" our partnership on the grant would be it. What started out as a modest effort to map community assets using GIS has multiplied like loaves and fishes in the biblical story. . . . We believe that the training of youth adult partnerships in strategic thinking through GIS, is a very forward thinking model that bears a need for considerable replication.

Colleen Reed, Development Director, Sherwood Institute for Sustainability

GIS has now become a[n] integral part of our data systems which we will use in all our future decision making in all three of our planting programs. Without this opportunity that you have provided us, we would not have been able to take this technological step to help us improve the Portland Metro region's tree canopy.

Chad Honl and Karen Williams, Friends of Trees

Some excerpts from letters from the Initiative participants (Appendix C).

COMMUNITY GIS INITIATIVE
Institute of Portland Metropolitan Studies
College of Urban & Public Affairs
Portland State University

Dr. Ethan Seltzer   *Director, School of Urban Studies and Planning*
         Past Director, Institute of Portland Metropolitan Studies
         Principal Investigator

Meg Merrick   *Community Geography Project Coordinator*
         Community GIS Initiative Director

Jon Dorwart   *Community GIS Initiative Research Assistant*

Diane Besser   *Graduate Research Assistant (2000-2002)*
         Research Assistant (2002-2003)

Steve Faust   *Graduate Research Assistant (2002-2003)*

Dr. Sy Adler and Julie Odell *Assessment*

THE COMMUNITY GIS INITIATIVE
Executive Summary

In January, 2000, The Ford Foundation awarded the Institute of Portland Metropolitan Studies (IMS), at Portland State University, a $259,000 grant to provide training to six community-based organization/school partnerships, in geographic information systems (GIS) technology, asset mapping, and other supporting methodologies to empower them to ask new, more informed questions and to promote their agendas. The CBO/school partnerships were proposed as a way to sustain GIS expertise for the CBOs as well as building substantive relationships between the community-based groups and local schools.

The grant funded training and data for six CBO/school partnerships over two years (three in year one and three in year two). The partnerships in year one were: the Old Town History Project/Metropolitan Learning Center/Lincoln High School; the Wetlands Conservancy/Open Meadow Alternative School; and the Sherwood Institute for Sustainability/Sherwood Public Schools. In year two, our partners were: Friends of Trees/Portsmouth Middle School and Winterhaven School; Johnson Creek Watershed Council/Trillium Charter School; and the Oregon Child Development Coalition/Cleveland High School.

The experience of the Initiative indicates that: (1) kids and adults can learn to use GIS technology to do simple but powerful GIS analyses that are useful to CBOs; (2) the style of training is critical to the effective use of GIS as a tool for critical thinking for both kids and adults; (3) geographic and spatial literacy is a barrier both to the affective use of GIS by a CBO but also in valuing it in the first place; (4) the goal of achieving empowerment for the partners by creating a GIS "of, by, and for" them is difficult to achieve and takes time – more than one year; (5) the Initiative's model for sustainability requires well-matched partners in terms of capacity, capabilities, and economic stability; (6) digital divide issues both in terms of access to adequately functioning computers and cognitive access are still very real, especially in the K-12 school environment and for at-risk youth; (7) structural issues within public schools present barriers to innovation even when there is support within a district; (8) community-based GIS work gives kids a voice and credibility.

While the model for sustainability proved challenging, the Initiative exceeded our expectations in several respects. This can be seen in many of the map products that CBO volunteers and kids created, the continuing CBO/school relationships, the commitment of the CBO volunteers, and the new ways that participants are asking questions about community issues.

This report begins with a description of the Initiative and its goals (Introduction). It proceeds in the Community GIS Initiative Partners section, with a description of each of the partnerships (the CBO and schools), background and initial goals, progress toward the stated objectives, training and school involvement, projects and achievements,

impressions and observations, outcomes and future prospects, and partnerships developed.

This section is followed by a brief description of the Companion compact disk that we have designed as an ongoing reference guide for the participants.

The Community GIS Initiative was dedicated to providing a service to the community. In the process of providing that service, however, we have learned a great deal through the Initiative's staff's direct experience and from an assessment conducted by Dr. Sy Adler at various points over the course of the project (Appendix B). The Lessons Learned section of this report relies heavily on the staff's direct experience but is informed by Dr. Adler's assessment. The Lessons Learned section discusses in detail the following issues: digital divide and access; training; and the Community GIS Initiative model and sustainability.

Finally, this report explores, in the Future Efforts section, how we intend to build on this experience and apply what we have learned to future initiatives.

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Funded by The Ford Foundation 2000-2003

FINAL REPORT
September 30, 2003

INTRODUCTION
Background to the Proposal

In "The Informational City is a Dual City: Can It Be Reversed?" (1999), Manuel Castells describes the emergence of the modern, informational city as a "dual city," a city that is divided into islands of poverty and prosperity depending on access to information through technology. Although early solutions to this "digital divide" stressed a technical fix (the provision of computers, software, and the Internet) (Beamish, 1999; Compaine, 2001; Davis, 1997; Ferreira, 1999; National Telecommunications and Information Administration [July 1995 and 1999], 2001), recent concern has focused on the issue of cognitive access to information or literacy: if you can't understand the information you have access to, you can't use it or be empowered by it (Morrisette, 2001). Bridging the digital divide requires both kinds of access.

Geographic information systems (GIS) technology is an information system and analytical tool that creates graphic displays (maps) that make the information that underlies our communities visible and more understandable. The Community Geography Project (CGP) of the Institute of Portland Metropolitan Studies has sought to act as a catalyst for community empowerment by specifically addressing the issue of the "dual city" through education (cognitive access), access to GIS technology (training), and data.

Based on the CGP's experience in local communities and K-12 schools, in 1999 the CGP proposed the Community GIS Initiative to The Ford Foundation to provide access to GIS technology and data, through education and training, to community-based organizations (CBOs) in partnership with high schools and middle schools. Recognizing that real empowerment would mean GIS "of, by, and for" the organizations and the limitations of CBOs in terms of resources and staff, we proposed to provide service in the context of a model that we hoped could provide some level of technical sustainability for the organizations as well as build community between the CBOs and schools. The Initiative was funded by the Foundation in January, 2000.

This report describes: the Initiative (its goal, model, and partner selection process); the partners (the CBOs and schools), what was accomplished, and the partners' future plans; lessons learned; and how the experience of the Initiative will shape future efforts of the CGP.
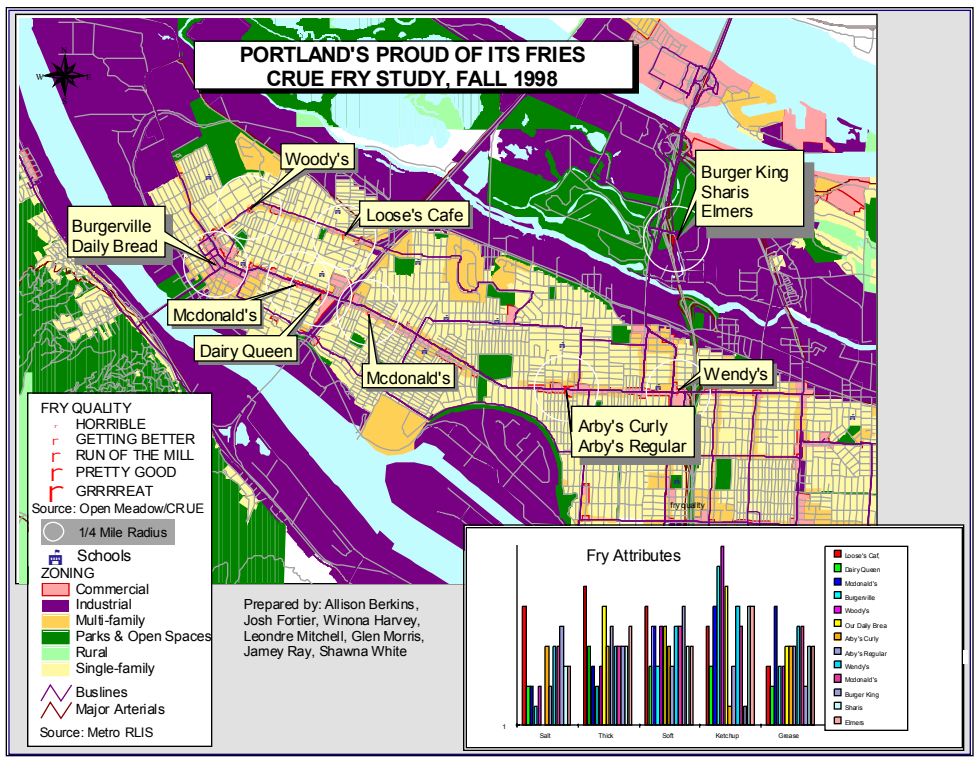
Open Meadow's CRUE (Corps for Restoring Urban Environments) students' first study in 1998, "Portland's Proud of its Fries", a French fry study of their own design in north Portland.

THE COMMUNITY GIS INITIATIVE

The Goal

The goal of the Initiative was to empower CBOs and their school partners through education and training to:

1. Use GIS technology and data to enable them to more easily see the patterns that underlie their communities and the region;

2. Use GIS, asset mapping, and other methodologies to ask new and more informed questions about issues that matter to them;

3. Use GIS to utilize information strategically;

4. Use GIS analyses and products to promote their agendas.

All projects were to be determined by the selected CBOs and their school partners, not the CGP.
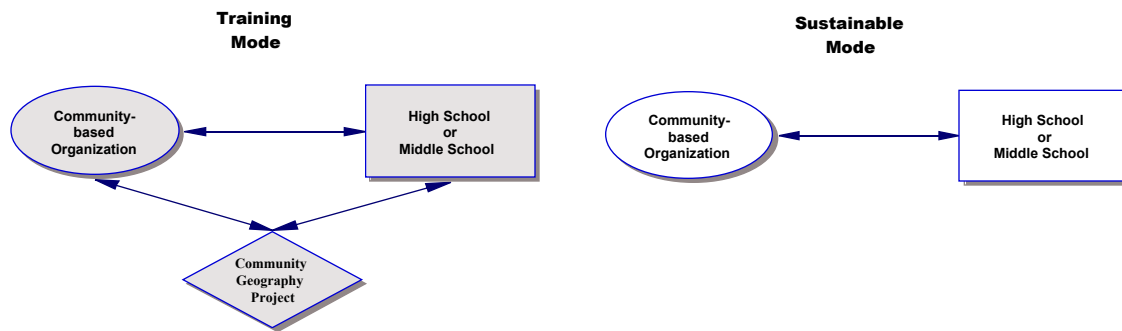
The Model

The CGP's previous experience with the community-based nonprofit sector indicated that sustaining this expertise solely within the CBOs could be problematic because of tight budgets, limited staff, and the fluidity of the volunteer workforce. Our experience with the CRUE (Corps for Restoring Urban Environments) program of Open Meadow Alternative School prior to the Initiative, suggested that high school students could perform simple but powerful GIS analyses and create output that could be useful to CBOs. Moreover, Portland Public Schools' administrators, who had seen CRUE's work, stated that this was the sort of use of technology they wanted to promote in the District as it enhanced high levels of critical thinking in the students and engaged them in their communities. Community-based learning was identified as a priority in the District's strategic plan. In addition, we made the assumption that GIS education would, over time, be adopted by school districts across the region and the nation as the software has become less expensive (it is now virtually free to K-12 schools), easier to use, and commonly used across academic disciplines and professions. Given the fact that GIS software and our regional geo-spatial dataset was/is much less expensive to K-12 schools than CBOs, partnerships between CBOs and schools could be advantageous to financially strapped organizations.

As a result, we developed the Community GIS Initiative model that required participating CBOs to partner with a school (preferably a high school) for the project and training process. The idea was that if a community-based GIS course were incorporated into the curriculum, there would always be a supply of students to work on community-based

Faces behind the model (CBO, School, and CGP): CGP staff (Meg Merrick, Diane Besser and Jon Dorwart), Sherwood Institute for Sustainability director, Colleen Reed, and Sherwood Middle School teachers, Bert Diamond and Janet Bechtold display their new GPS unit.

projects and provide sustained GIS analysis (of various levels of sophistication depending on the students' abilities and grade levels) for community-based groups. Under the grant, the CGP staff would provide training to staff and/or volunteers of the participating CBOs as well as the teacher and student partners.

Figure 1. Community GIS Initiative Model

The Selection Process

We proposed to provide education and training to six CBO/school partnerships over two years (three in Year One and three in Year Two).

In Year One, we followed a standard request for proposals (RFP) process: mailing RFPs to a large, targeted mailing list of approximately 400 regional community-based nonprofit organizations; Internet outreach; two Open Houses during after-work hours, on different days of the week; a one-month submittal period; a community-based selection committee that used published and established selection criteria and scoring.

We received six proposals for the three positions/projects. This appeared to be a low number considering the size of the mailing list and the number of phone calls we received and attendees at the Open Houses. Fortunately, the Selection Committee felt that the small pool contained some strong proposals and was able to select three with confidence.

However, based on the feedback that we got from our assessment interviews of potential applicants and actual applicants in Year One, and our own observations, we decided to create a 3-tier selection process for Year Two that included (using an enhanced mailing list of approximately 800 CBOs): a requirement of a letter of interest from interested CBOs; an interview with us (which allowed us to more fully explain the project on a one-to-one basis and gave us the opportunity to get to know the nature and needs of the applicant) to help potential applicants develop their proposals and determine whether or not the organization would be a good fit for the Initiative; a completed proposal; and the selection of projects by a community-based selection committee.

We believe that the Year Two selection process produced more focused proposals by organizations. The interview process enabled us to clearly articulate the base

responsibilities of all of the parties; this resulted in the recognition by some very promising potential partners that they were not ready or did not have the capacity to participate in such a program. (The selection processes are described in greater detail in the annual summary reports submitted to The Ford Foundation.)

	Outreach	Timeline	Pool	Selection
Year One	▪ IMS mailing list ▪ IMS Website ▪ 2 Open House presentations	▪ Grant funded 1/1/2000 ▪ 1-step RFP process ▪ 1-month turn-around	▪ 6 Proposals	5 Member Committee ↓ 3 Selected Proposals
Year Two	▪ IMS mailing list ▪ INPM mailing list ▪ IMS Website	▪ 3-Tier Proposal Process ▪ Letter of Interest ▪ Interview ▪ RFP	▪ 10 LOI ▪ 10 Interviews ▪ 7 Proposals	6 Member Committee ↓ 3 Selected Proposals

Table 1. The selection process: a comparison between years one and two.

Using ArcView GIS, Old Town History Project volunteers discuss which neighborhood
assets to include in their "tourist" map of Old Town.

<center>**COMMUNITY GIS INITIATIVE PARTNERS**</center>

<center>**Year One**</center>

Listed below are the projects recommended by the selection committees and accepted by the Institute as community partners.

Old Town History Project, Metropolitan Learning Center and Lincoln High School

Background and Initial Goal as Stated on the Application and Memorandum of Understanding:

The Old Town History Project (OTHP) has evolved into a community-based nonprofit organization striving to collect and preserve the rich multicultural history of this historic area. Neighborhood activists are collaborating to record the voices and stories of Old Town's former and present residents in this rapidly transforming and gentrifying environment. By collecting these stories through interviews, story circles, and "memory mapping" the project hopes to establish a permanent public educational site serving as a combined museum; a community based archives and collections facility; community research, outreach, and performance space. In addition, it will be a place for continuing creativity and dialogue among neighborhood members, K-12, regional universities, and arts and culture leaders. The Old Town History Project maintains that "place matters," particularly in the shifting and often conflicted terrain of the inner urban core. In light of this, individuals' and groups' memories of place are the tangible connective tissue to group identity and to a useable past. Dr. Jacqueline Peterson, a professor of history at Washington State University Vancouver, is the lead organizer for the project. The initial goals from the memorandum of understanding are as follows:

1. OBJECTIVE AND SCOPE
    a. Train community members and youth in the application of GIS and database technologies to describe, record and analyze historical and cultural information regarding Old Town Portland and its development as a distinct cultural district.

    b. Students from the Metropolitan Learning Center and Lincoln High School will be involved for the duration of the project.

2. ANTICIPATED RESULTS
    a. Youth and volunteers will have a working knowledge of ArcView GIS and Microsoft Access
        i. Specific skills in ArcView: Joining tables, exporting files, geocoding, performing heads up digitizing, and creating hotlinks.
        ii. Specific skills in Access: Creating tables, creating relationships, creating forms, developing data queries, reporting results, developing mailing labels and exporting data.
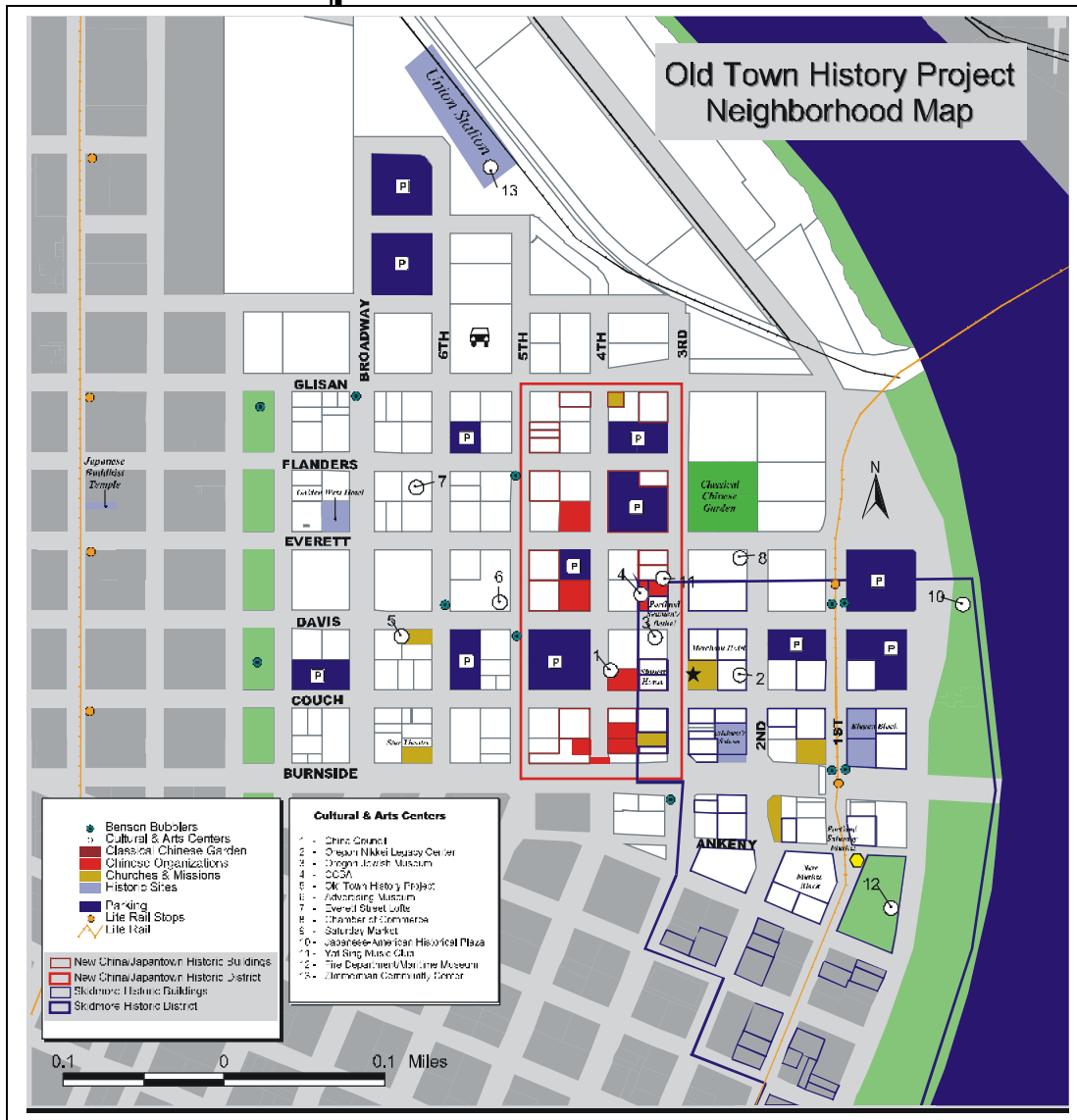
Old Town History Project's map of cultural assets, take #1.

b. Volunteers will learn the basics of cartographic conventions.
c. Volunteers will learn to articulate their research questions, methodologies, and results as well as communicate the meaning of their findings in a public forum.
d. Volunteers will pass their skills on to new volunteers to allow for project sustainability.
e. A GIS database will be created to store historically and culturally significant information ranging from survey results, documents, imagery, to audio files.

3. SPECIFIC RESPONSIBILITIES
   a. Institute of Portland Metropolitan Studies
      i. Provide training to develop community asset surveys.
      ii. Provide training and technical assistance in developing a community assets database and a GIS database.
      iii. Provide training in project planning and implementation.
   b. Partner
      i. Ensure final materials are made available to public.
      ii. Marshall volunteers as necessary.
   iii. Maintain relationship with a school partner.

Progress Toward Stated Project Goal and Objectives:

Initial Preparation and Action Taken Toward Implementing Project

Goals, possible projects for the adult volunteers and school students, and methodologies were discussed in a series of meetings between Jackie Peterson and CGP staff during April and May of 2001. Discussion focused primarily on the unique requirements of collecting and analyzing historical data and the design of a training program for novice adults with little or no familiarity with computers. The team decided to try to strike a balance between the long-term needs of the Old Town History Project and some simple short-term projects that would be achievable for the adults and could serve as training material. The team also felt that the best way to engage local students and their teachers in Old Town would be to allow them to pursue projects of interest to them so long as it served the interests of OTHP.

Training and School Involvement:

GIS training for adult volunteers began in late June, 2001, at Portland State's College of Urban and Public Affairs GIS lab. Three-hour sessions were held on Monday evenings and provided hands-on experience with existing local data sets including tax assessor and census data. Volunteers also learned how to bring their own data into the GIS by address matching, creating new GIS data layers and hyperlinking digitized imagery and audio files. Map design and the basic principals of cartography were also covered. Adult volunteers were engaged in a number of projects that used GIS and database technology.
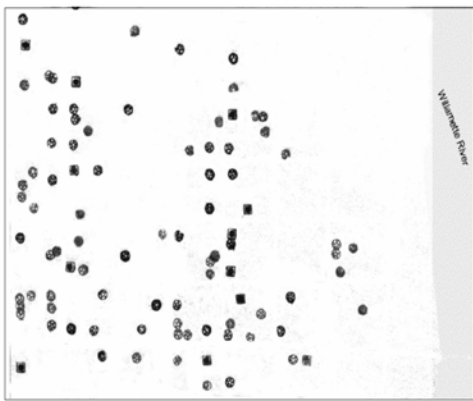
Map from the report of the Portland Vice Commission, 1913.
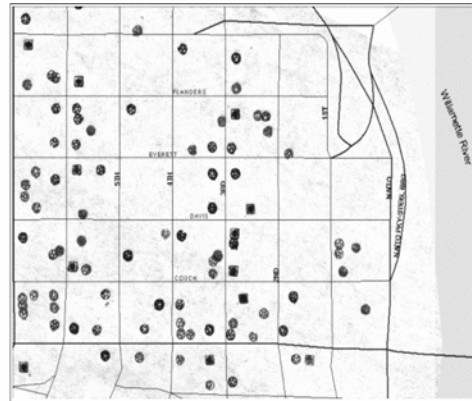
Vice Commission points rectified to street file in ArcView.

Categories

Moral Hotel
Moral Roominghse
Doubtful Roominghse
Ignored Roominghse
Preferred Immoral Roominghse
Roominghse wholly given up to Immorality
Preferred Immoral Hotel
Hotel wholly given up to Immorality
Moral Apartment
Preferred Immoral Apartment

Source: Report of the Portland Vice Commission, 1913
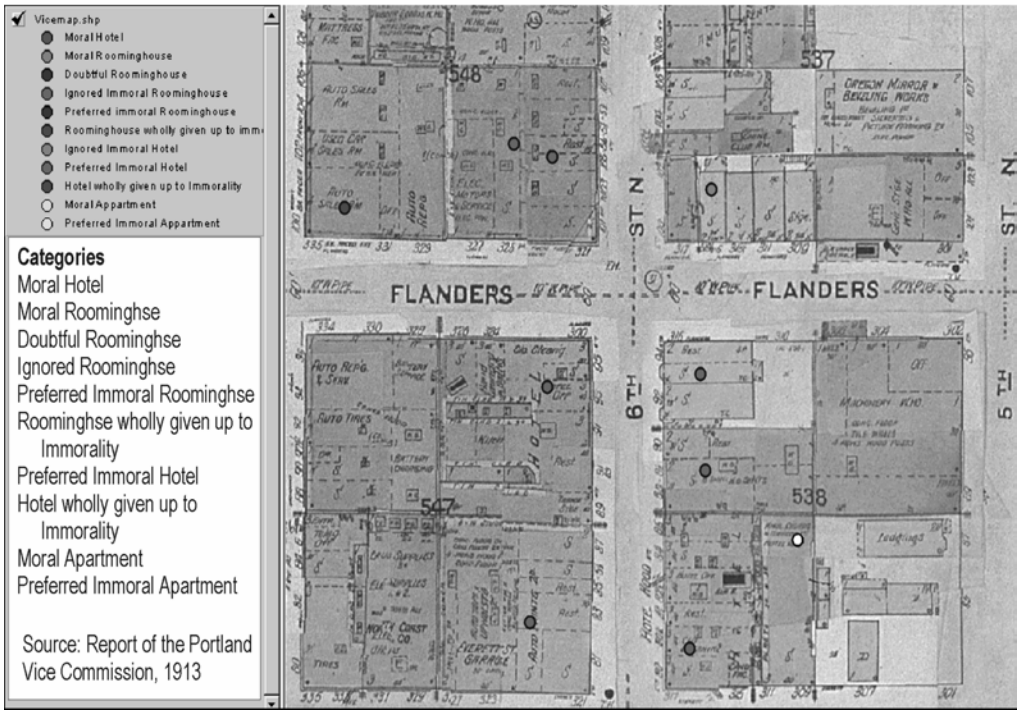
Historic vice analysis using a 1913 police vice report and a historic Sanborn Fire Insurance Map by Lincoln High School students.

These projects are explained below. Ongoing mentoring by CGP staff was provided for each project.

Students from both Metropolitan Learning Center and Lincoln High School received training at PSU's GIS lab in conjunction with the Old Town History Project. Initially, the Old Town History Project proposed to work with students from the Metropolitan Learning Center (MLC), a public alternative school near Old Town. MLC offers a nontraditional learning environment for students who wish to take a participatory role in building a program that meets their needs and interests. During the spring term in 2000, eight students were trained in GIS. MLC's involvement lagged due to budget cuts at their school. However, a new class of very excited middle school students from MLC joined the project the following fall term, 2000. With further budget and scheduling constraints, the project partnership eventually ended when the key teacher-partner moved to another school.

As a result of MLC's inability to participate in the project, Jackie Peterson pursued a partnership with Lincoln High School, also located close to Old Town. The Lincoln students began their training in fall of 2000 and continued until the project's end in spring of 2001. The Lincoln High School students were self-selected and received GIS training as an after-school independent study program for which they received extra-credit. The students applied their skills by investigating historical vice and arrest reports in Portland's Old North End. After gathering data from historical vice reports housed at the city archives they geocoded their findings against a backdrop of historical Sanborn Maps to investigate patterns of criminal and police activity in Old Town. This analysis will be used by the OTHP to identify the property owners of known houses of prostitution during the early part of the 20th century.

The Lincoln students presented their analysis and findings in a poster session at the GIS-in-Action Conference in Portland in April, 2001.

Products, Achievements, and Ongoing Projects:

- *North Park Block Farmers Market Presentation*. Community Geography Project staff offered training and assistance to the Old Town History Project in developing a multimedia display at a kiosk to promote the project's presence in the neighborhood.

- *Neighborhood Asset Map*. Adult volunteers developed a neighborhood asset map that identifies key buildings and places in Old Town that have symbolic and historical value for residents, local activists and local business owners. The map will be published and distributed by the Old Town History Project, the local neighborhood association, and Portland's nationally recognized Classical Chinese Garden.

- *Digitized Sanborn Maps and Volunteer Training*. CGP staff developed a method to digitize and register historic Sanborn maps for use in a GIS. Volunteers were also
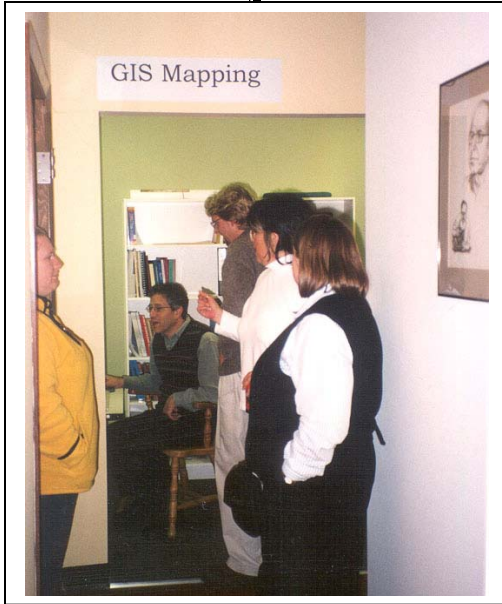
Open House at the Old Town History Project.

Atkinson School, opened in 1867, served both Chinese and Japanese families living in Old Town between 1900-39. After 1939, children from Chinatown and Japantown were sent to Couch School.

Linking historic maps, photos, and oral histories to reconstruct the history of a multi-ethnic neighborhood.

trained in that process. Currently the 1879 and 1926 atlases have been prepared for use in a GIS.

- *Archive Database Planning.* Volunteers and staff developed a system to digitize and catalogue historical photographs and interviews. The Old Town History Project has negotiated with local businesses to acquire and install an in-house computer system to house this database.

- *GIS-in-Action Conference 2002.* MLC students presented their work in a poster session at the GIS-in-Action conference in April 2002. This conference attracts GIS professionals throughout the region.

- *NEH Conference (Spring 2001).* CGP was invited to participate in the Old Town History Project Board Planning Conference sponsored by the National Endowment for the Humanities. Experts in American history and museum management from around the country presented their own work as well as provided feedback and advice to the Old Town History Project Board. Board members include representatives from Old Town and the Chinese, Japanese, Greek, and Jewish communities, which all have roots in the neighborhood.

- *Teaching American History Grant.* Because of the value that the OTHP saw in bringing young students into the process of historical research and using GIS as a tool for historical analysis, OTHP joined with the Portland Public School District and the Community Geography Project at PSU to apply for a U.S. Department of Education Teaching American History grant in June 2002. In October 2002, PPS, OTHP, and CGP were awarded an $816,000 grant that will promote the use of primary source data and making connections between local history and national historic themes using GIS technology. This 3-year grant will provide support for teachers of history throughout the District to incorporate this work into their curricula.

Impressions and Observations:

Student involvement from Lincoln High School began in early October, 2001. After an initial orientation to GIS software, the Old Town History Project and the Old Town neighborhood, students settled on investigating an early 20th century report on "Vice" in Old Town. The report came complete with a historical map pinpointing known locations of vice throughout downtown, but did not include streets to protect individual identities at the time of the release of the report. The map was, however, to scale, and with the use of GIS the students were able to rectify a scanned image of the map to current geography as well as scanned Sanborn Fire Insurance maps. With the use of historical census records and the Sanborn maps they were able to investigate the relationship between suspected areas vice and the demographic makeup of the neighborhood. Students found the project exciting because it allowed them to investigate historical records in a way that heretofore had not been done. Having the opportunity to use state of the art technology for primary research was engaging for both the students and teacher. A real sense of teamwork came

Open Meadow students present their findings to GIS professionals at the 2002 GIS-in-Action Conference in Portland, Oregon.

out of this project, as well as a sense among the students that they could contribute to groundbreaking research.

Outcomes and Future Prospects:

OTHP has done more than survive its first three critical years, it has built some capacity within its organization for GIS analysis and is moving toward building a framework (under the U.S. Department of Education, Teaching American History grant) that promotes primary source research into the middle school and high school history curricula that requires spatial thinking and the use of GIS technology.

Partnerships Developed:

- Portland Public Schools Social Studies Curriculum Department and School District
- Stanley Parr City Archives, City of Portland
- Oregon Historical Society

The Wetlands Conservancy and Open Meadow Alternative School

Background and Initial Goal as Stated on the Application and Memorandum of Understanding:

Open Meadow, located in the St. John's neighborhood of north Portland, worked with the Wetlands Conservancy to map the great wetlands of the region. Initially, they had hoped to inventory regional wetlands and include the results in a larger statewide map and database created by the Wetlands Conservancy. These products were to be presented on a web site to provide a statewide context for localized wetland projects, a tool and source of information for the prioritization of wetland restoration and conservation opportunities, a reference for case studies of a variety of restoration efforts, and an opportunity to network for groups and individuals interested in wetlands conservation.

Students from Open Meadow selected the wetlands that they proposed to investigate, with the guidance of the Wetlands Conservancy. They then worked together with local interest groups, watershed councils and public agencies to identify current and planned restoration activities for the selected wetlands. Once students collected information, the Wetlands Conservancy, PSU and other community groups plan to develop graphic digital materials that reflect restoration activities.

Open Meadow works primarily with students who have experienced limited success in traditional school environments, been expelled, or have dropped out of school altogether. During the 1999-00 school year, 98 percent of the students in the Corps for Restoring Urban Environments (CRUE) program of Open Meadow were from families that fell below federal poverty guidelines and 61 percent were racial or ethnic minorities.

The initial goals stated in the memorandum of understanding are as follows:
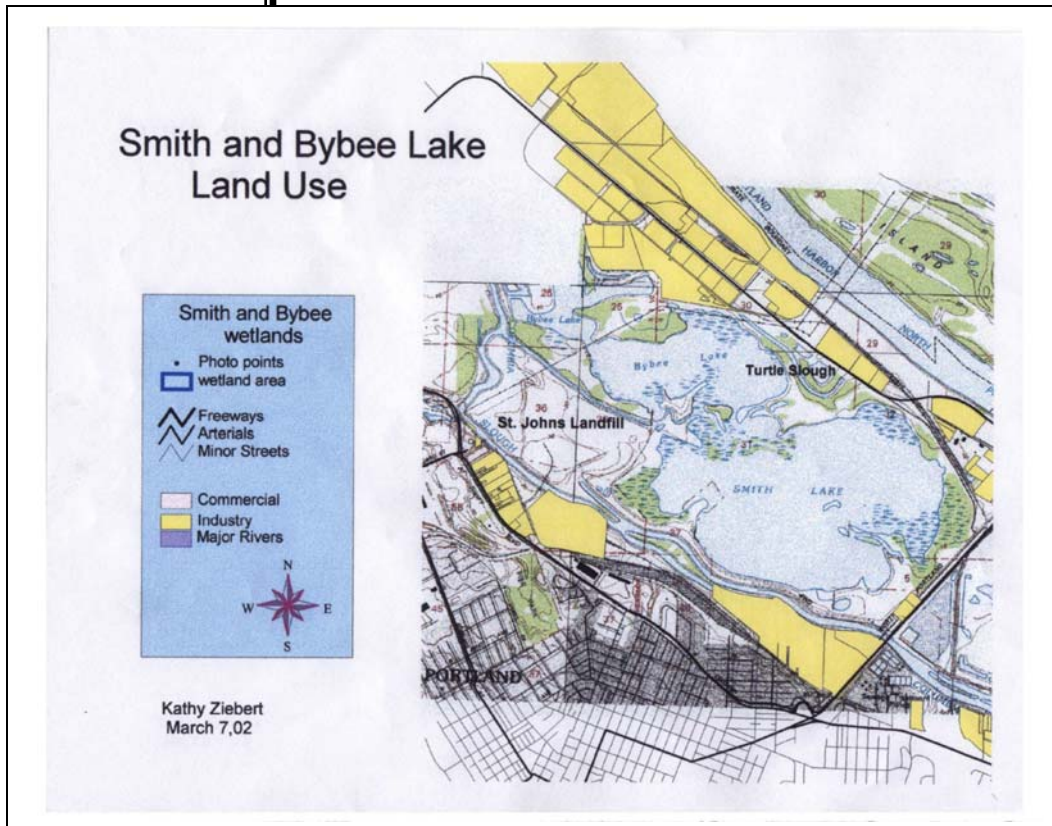
Understanding the urban wetland environment: an Open Meadow student's land use
map of Smith and Bybee Lake.

1. OBJECTIVE AND SCOPE
    a. Train community members and students in the application of GIS and database technologies to identify ecologically important wetlands by collecting data on their hydrology, soils, vegetation and wildlife use. This information will then be used to work with community members, agencies and non-profits to develop protection and restoration strategies and partnerships for these wetlands.

    b. Students from Open Meadow Alternative High School will be involved for the duration of the project.

2. ANTICIPATED RESULTS
    a. Youth and volunteers will have a working knowledge of ArcView GIS and Microsoft Access
        i.   Specific skills in ArcView: Joining tables, geocoding, performing heads up digitizing, exporting files, and creating hotlinks.
        ii. Specific skills in Access: Creating tables, creating relationships, creating forms, developing data queries, reporting results, develop mailing labels and exporting data.
    b. Students will learn the basics of cartographic conventions.
    c. Students will pass their skills on to new volunteers to allow for project sustainability.
    d. Students will learn to articulate their research questions, methodologies, and results as well as communicate the meaning of their findings in a public forum.

3. SPECIFIC RESPONSIBILITIES
    a. Institute of Portland Metropolitan Studies
        i.   Provide training to develop community asset surveys.
        ii. Provide training and technical assistance in developing a community assets database and a GIS database.
        iii. Provide training in project planning and implementation.
    b. Partner
        i.   Ensure final materials are made available to public.
        ii. Marshall volunteers as necessary.
        iii. Maintain relationship with a school partner.

Progress Toward Stated Project Goal and Objectives:

Initial Preparation and Action Taken Toward Implementing Project

Preparatory meetings for the Community Geography partnership with Open Meadow and the Wetlands Conservancy began in April and wrapped up mid summer. One challenge in getting started with this particular partnership was the timing of the school year. The

Open Meadow students collecting data in the field.

school ends relatively early and it was difficult to maintain teacher involvement in planning the year's curriculum initially. As the school year started, curriculum planning came more into focus and initial discussions indicated that the students would complete fieldwork and then analyze their findings in the classroom during GIS lab periods, which would be co-taught by the Open Meadow instructors and CGP staff. Involvement of staff from the Wetlands Conservancy was more peripheral whereby they offered guidance in locating teaching materials, relevant data, and a point of contact for experts in the field.

Training and School Involvement:

Training was limited to student and teaching staff involved with the GIS CRUE (Corps for Restoring Urban Environments) program at Open Meadow. Students were involved in ground-truthing existing wetlands data at three critical sites in the Portland metropolitan region. They gathered limited biometric data on water quality, macro invertebrates and land use patterns in these areas and compared these observations with base maps they created in class. In doing this, students learned the fundamentals of GIS and how to add GPS (global positioning system) data that they collected in the field to a GIS project. Training took place weekly in 3 hour blocks at both Open Meadow School and the PSU GIS lab. An important side benefit in bringing these students to PSU's campus was that it enabled many to envision themselves in a college environment.

Products, Achievements, and Ongoing Projects:

- *Student Presentations.* Students reported on their progress and new skills during a formal end of the semester presentation. Members of the audience included stakeholders from the Wetlands Conservancy, community leaders and funders of Open Meadow High School.

- *GIS-in-Action Conference.* Students presented their work in a poster session at the GIS-in-Action conference in April 2002. The presentation was received well with over 100 members in the audience. Many attendees expressed their enthusiasm to the students and privately to both Open Meadow and CGP staff. This conference serves GIS professionals throughout the region.

Impressions and Observations:

One of the more remarkable aspects of this particular partnership was the comments students made during interviews with Julie O'Dell, contracted to independently assess the Project. Although class attendance was at times choppy and student behavioral problems existed, many of the students expressed a great deal of enthusiasm regarding the project. As well, they were excited to interface with professionals in the field if not somewhat mystified as to why these professionals wanted to engage them. By attending sessions in the GIS lab at the University, several students were able to examine the campus in a welcoming environment – one in which they were able to situate themselves in and imagine themselves as part of such a community. Likewise, the very public nature of student presentations and the quality of their work helped students understand that they as

Turtle Habitat

Smith & Bybee Subtypes

Lacustrine Littoral w/ Aquatic Bed, influenced by tide
Lacustrine Littoral w/ Unconsolidated Shore, regularly flooded
Palustrine w/ Aquatic Bed, permanently flooded
Palustrine w/ Aquatic Bed, semi-permenantly flooded
Palustrine w/ Emergent Plants, ? (Large X means what?)
Palustrine w/ Emergent Plants, regularly flooded
Palustrine w/ Emergent Plants, seasonally flooded
Palustrine w/ Emergent Plants, seasonally flooded, excavated
Palustrine w/ Emergent Plants, seasonally tidal
Palustrine w/ Emergent Plants, semi-permanently flooded
Palustrine w/ Emergent Plants, semi-permanently tidal
Palustrine w/ Emergent Plants, temporarily flooded
Palustrine w/ Emergent Plants/Scrub-shrub, seasonally flooded
Palustrine w/ Emergent Plants/Scrub-shrub, temporarily flooded
Palustrine w/ Forested Wetland, seasonally flooded
Palustrine w/ Forested Wetland, temporarily flooded
Palustrine w/ Scrub-Shrub Wetland, seasonally flooded
Palustrine w/ Scrub-Shrub Wetland, semi-permanent tidal
Palustrine w/ Scrub-Shrub Wetland, temporarily flooded
Palustrine w/ Scrub-Shrub Wetland/ Emergent, seasonally flooded
Palustrine w/ Unconsolidated Bottom, artificially flooded, excav
Palustrine w/ Unconsolidated Bottom, permanent tidal
Palustrine w/ Unconsolidated Bottom, permanently flooded
Palustrine w/ Unconsolidated Bottom, permanently flooded, ?
Palustrine w/ Unconsolidated Shore, artificially flooded, excava
Palustrine w/ Unconsolidated Shore, seasonally flooded
Palustrine w/ Unconsolidated Shore, seasonally flooded, excavate
Riverine Tidal w/ Unconsolidated Bottom, permanent tidal
Riverine Tidal w/ Unconsolidated Shore, regularly flooded
Study Area

Habitat of the Western Painted Turtle at Smith & Bybee Lakes

N

0.4   0   0.4   0.8 Miles

An Open Meadow student's habitat study.

individuals had an important contribution to make and that learning from mistakes was respected. As expressed in interview and summarized in the project assessment:

> *. . . Each student mentioned their enthusiasm for producing work which they perceived would have an impact on the community. Stevie and Dustin hoped that, by sharing their knowledge of Smith & Bybee with the larger community, more people would take advantage of the recreational opportunities there and become interested in restoration projects. Janea was excited that they were volunteering with the Wetlands Conservancy and playing a role in helping to develop a better understanding of and accounting for the wetlands. Lea was enthused about the prospect of their projects appearing on the web site explaining to people about the wetlands "so it's like we're changing people's perspective on wetlands."*
> - from the Community Geography Initiative Assessment Report, Year 1

In an interview with Andrew Mason, the Director of the CRUE program, he stated that programs which integrate community engagement in nontraditional curriculum create an environment where:

> *. . . students buy into the system more because they feel the system really is supporting them and, in the end, they feel really endorsed by it." He felt this was their strongest goal and greatest success rather than increasing students' GIS proficiency to a certain level or producing a particular product.*
> - from the Community Geography Initiative Assessment Report, Year 1

Outcomes and Future Prospects:

The CRUE students of Open Meadow were able to present their findings to the Wetlands Conservancy, GIS professionals, and to top level administrators at Portland Public Schools. The ability to contribute to the solution to real problems was an empowering experience for many of these at-risk students. The CRUE program plans to continue the use of GIS as a vehicle for critical thinking and discovery, and to document its wetlands restoration work.

The Wetlands Conservancy's high level GIS needs could not be met with this partnership, nor does it have the capacity to have GIS work done by its own very limited staff. It has been able to obtain progress toward an Internet Map Server application through PSU's GIS Studio course.

Partnerships Developed:

- US Fish and Wildlife Service, *Partner in Metro grant project*
- EcoTrust's Tidepool Webzine, *Student writing internship* (See www.tidepool.org/features/crue.cfm)
- Awarded a *2001 Leadership Award* by the Columbia Slough Watershed Council for GIS project.

Field work in Stella Olson Park in Sherwood with park ranger, Ken Huffer.

Sherwood Institute for Sustainability and Sherwood Public Schools

Background and Initial Goal as Stated on the Application and Memorandum of Understanding:

The Sherwood Institute for Sustainability (SIS) is the result of an effort to understand what constitutes "assets" in the rapidly growing community of Sherwood and to encourage civic engagement in the development process. The Sherwood Institute was a relatively new organization, formed from a loose coalition of various community interest groups and initially called the Sherwood Institute for Community Asset Development. The mission of the SIS congealed around support and implementation of the Vision for Sustainability in Sherwood that had been developed through a coordinated effort by the City of Sherwood and the Institute of Portland Metropolitan Studies in 1995. Colleen Reed, SIS Coordinator, felt that this vision had not been realized in a coordinated way and applied for the CGP Ford grant as a way to provide a solid structure and process for SIS. Colleen stated in an interview at the start of the project in June, 2001:

> . . . we're really capitalizing on the availability of this partnership to help create a vision where activities in Sherwood are coordinated at a level above any one particular strand. That's what the grant from IMS has provided. It's provided the means for stimulating a community wide vision . . .

The Sherwood Vision contained seven integrated categories: 1) business and downtown (economics), 2) infrastructure and transportation (development), 3) youth and education, 4) environment and open spaces, 5) our community (cultural arts), 6) preserving our heritage (history), and 7) our neighborhoods (safety). Reed developed partnerships with the local organizations and institutions championing these objectives including Sherwood Middle and High Schools, the Sherwood Historical Society, Sherwood's Chamber of Commerce, Sherwood Parks and Recreation, Raindrops to Refuge (a local watershed environmental advocacy group), the Sherwood Police Department, and SALT (Senior and Law Enforcement Together).

The first step in Sherwood's broad-based community engagement effort was to learn about asset mapping strategies, the design of surveys and databases and the analysis of that data. The second step involved systematically mobilizing those assets for the benefit of the "common good," so that the interests of all might be better coordinated.

What follows are the goals of the partnership as stated in the memorandum of understanding:

1. OBJECTIVE AND SCOPE
   a. Train community members and students in the application of GIS and database technologies to describe and analyze community issues. Participants will be linked to Sherwood community groups who have specific projects that
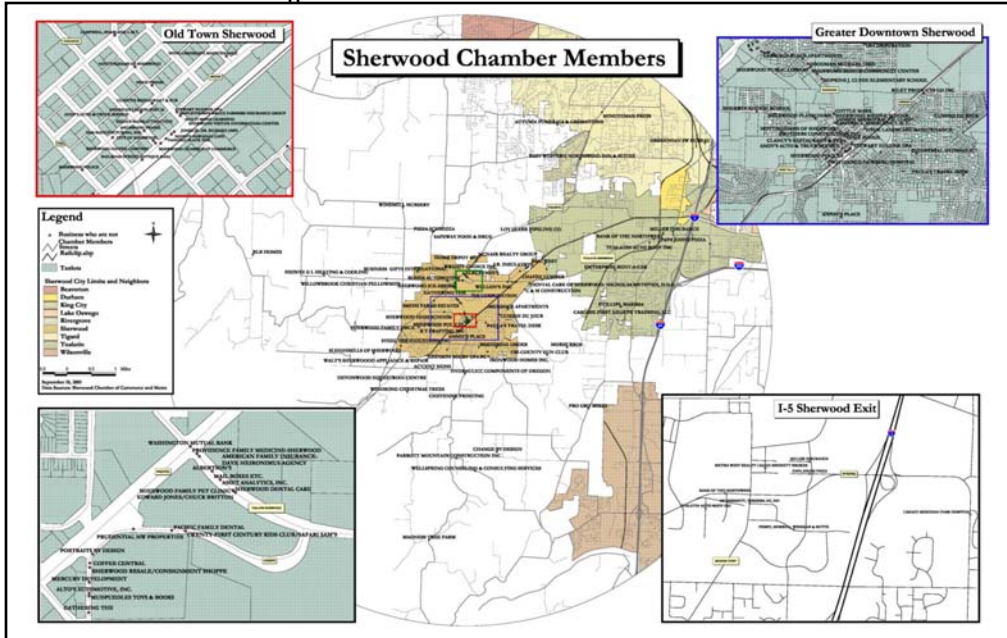
Sherwood students' map for the Sherwood Chamber of Commerce: members and nonmembers.

they would like to be addressed. In all cases, youth involved will be expected to have a choice in pursuing aspects of the project in which they are interested. The groups and projects objectives which the Institute will assist are as follows:

    i. Sherwood Parks and Recreation Department
- Assist in developing a citywide trail maintenance mapping database. Basic mapping within fabric of the city will be accomplished using existing taxlot maps and aerial photographs.
- Extent of mapping and accuracy depends on availability of equipment such as a differential GPS system.

    ii. Chamber of Commerce
- Create a community based asset map based on the Kretzmann & McKnight asset mapping methodology.

    iii. Sherwood Police Department
- Assist in geocoding crime incidents and creating a database
- Assist in analyzing crime data against other demographic and geographically referenced data.
- Developing interactive web based GIS systems are the responsibility of the Police Department.

    iv. History Project (Lion's Club)
- Assist in creating database for historical or architecturally significant features in the community.
- Record the stories of place and life histories of Sherwood residents.

b. Students from Sherwood High School will be involved for the duration of the project. Key contacts are: Dick Bishop and Terrill Smith.

2. ANTICIPATED RESULTS
   a. Youth and volunteers will have a working knowledge of ArcView GIS and Microsoft Access
      i. Specific skills in ArcView: Joining tables, exporting files, geocoding, performing heads up digitizing, and creating hotlinks.
      ii. Specific skills in Access: Creating tables, creating relationships, creating forms, developing data queries, reporting results, developing mailing labels and exporting data.
   b. Volunteers will learn the basics of cartographic conventions.
   c. Volunteers will learn to articulate their research questions, methodologies, and results as well as communicate the meaning of their findings in a public forum.
   d. Volunteers will pass their skills on to new volunteers to allow for project sustainability.
   e. The Sherwood Institute of Community Asset Development will act as champion and organizer of community-based GIS projects in Sherwood.

Sherwood high school and middle school students discuss a possible crime mapping project.

3. SPECIFIC RESPONSIBILITIES
   a. Institute of Portland Metropolitan Studies
      i. Provide training to develop community asset surveys.
      ii. Provide training and technical assistance in developing a community assets database and a GIS database.
      iii. Provide training in project planning and implementation.
   b. Sherwood Institute of Community Asset Development
      i. Ensure final materials are made available to public.
      ii. Marshall volunteers as necessary.
      iii. Maintain relationship with a school partner.

Progress Toward Stated Project Goal and Objectives:

Initial Preparation and Action Taken Toward Implementing Project

As a first step toward realizing the goals of the partnership, SIS engaged the Sherwood School District in the development of a community-based youth job-training program called the Sherwood Youth Corp. Youth Corp students received CAM (certificate of advanced mastery) credit for their involvement in the various projects. The goal of the training was to assist in incorporating GIS into the design and implementation of several projects in partnership with community groups who needed volunteer assistance, technical expertise and useful outreach/analysis products. The projects were specifically designed to address issues relevant to the seven categories in the Vision plan.
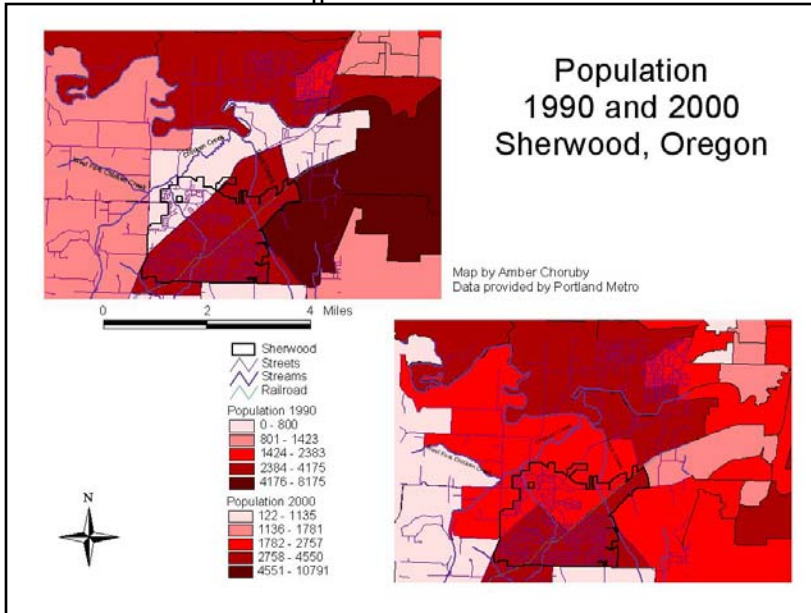
Since neither the City of Sherwood nor the School District had access to GIS software, the initial task was to secure a license for ArcView GIS software through ESRI's Community Atlas program. During the summer of 2001, approximately 24 Youth Corp students learned about GIS and cartographic techniques using internet mapping sources and a GIS freeware program, ArcExplorer. They submitted a webpage describing their city through maps which resulted in the award of a site license for ArcView GIS. This license was installed in the Middle School (the High School's computer lab was under construction at the time). The submission of two more webpages secured an additional ArcView license and an extension package (3D Analyst) for the High School.

During this time, the CGP and SIS mentored the development of several ongoing projects involving cooperation between the Youth Corp students and community organizations. In addition, the CGP provided technical training and assistance to Middle School teachers interested in incorporating GIS analysis into the technical arts and science curriculum. Adult volunteers from the Sherwood Historical Society also participated in training sessions.
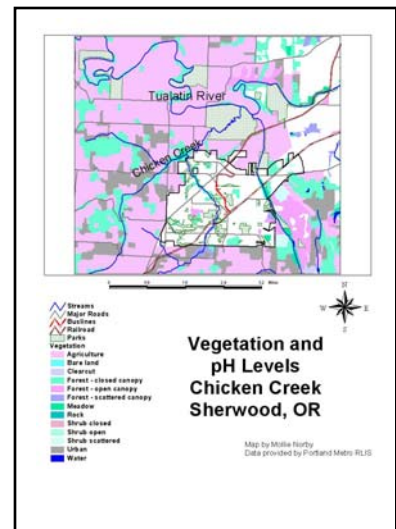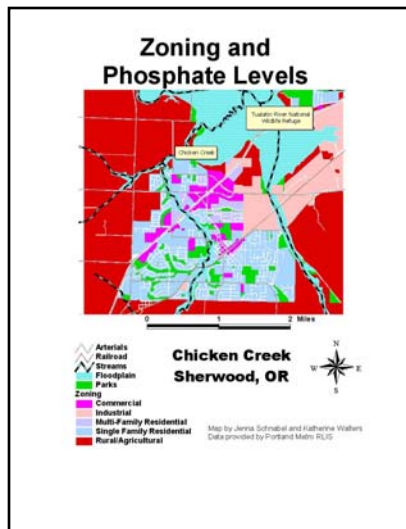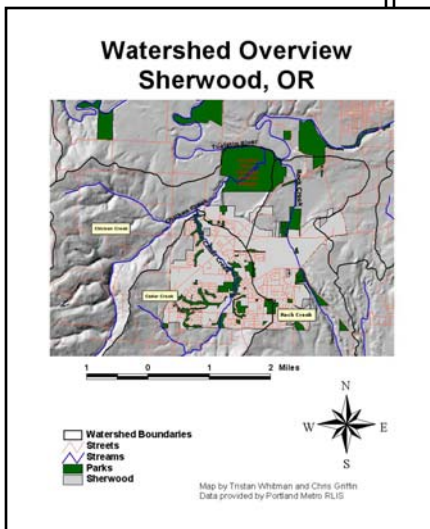
Training and School Involvement

Students from both the Sherwood High School and Middle School were recruited into the Youth Corp program. In addition, several community members and eleven teachers from

Population
1990 and 2000
Sherwood, Oregon

Map by Amber Choruby
Data provided by Portland Metro

Learning GIS through local data sets and issues that matter.

Watershed Overview
Sherwood, OR

Zoning and
Phosphate Levels

Chicken Creek
Sherwood, OR

Vegetation and
pH Levels
Chicken Creek
Sherwood, OR

both the High School and Middle School took part in a training workshop. Over the course of the partnership, the CGP staff provided various levels of training in GIS, GPS, asset mapping, database development, and geographic analysis to these students, teachers and adult volunteers.

GIS and GPS training for the Youth Corp students consisted of a three-hour session after school each week from the summer of 2001 to the end of the school year in 2002. The training was project-based. In partnership with local organizations, students were encouraged to work closely with their partner organizations in developing the questions and doing the field work necessary to gather data, input it into a GIS, and analyze the results. By understanding the needs and goals of their partners, students contributed to furthering the organizations' mission.

June Reynolds and Clyde List, of the Sherwood Historical Society, also participated often in these after-school training sessions. June worked with a number of the students, researching, photographing and mapping several Pioneer cemeteries. June and Clyde were also working on creating a Sherwood Historical Trail.

The CGP, through a continuing education course, was also able to offer a 10 hour GIS workshop for teachers at Sherwood Public Schools. Emphasis was on building basic skills in ArcView that could be incorporated into specific curriculum pieces. Many of the teachers that took part were able to build GIS skills into their projects as described below.

Students involved in the Youth Corp received CAM credit for their work. A future goal of the partnership is to build a capacity for GIS-based education in the school system through software licensing and student/teacher expertise. In the words of Colleen Reed, SIS Coordinator, "…if it is built into the curriculum at the high school and at the middle school…students will have the opportunity to meet their CAM through GIS/career-related opportunities. We'll have students who have a full high school credit in CAM before they've left middle school."

Products, Achievements and Ongoing Projects

- *Sherwood Chamber of Commerce Business Location Map.* Using the Sherwood Chamber of Commerce business database, Youth Corp students assisted in the creation of two maps that locate businesses and identify chamber members and nonmembers. By knowing the local and regional distribution of both members and nonmembers, the newly formed Sherwood Chamber of Commerce hopes to be able to refine its membership expansion strategy. Large poster-size maps were created and laminated as a resource for the Chamber and the City in its decision-making process.

- *Sherwood's Open Spaces Initiative: Raindrops to Refuge Project.* A group of students worked with Ken Huffer, the Sherwood Natural Resource Specialist, and Raindrops to Refuge, a community watershed advocacy organization, to create maps for existing community trails and to map invasive species within city parks and trail
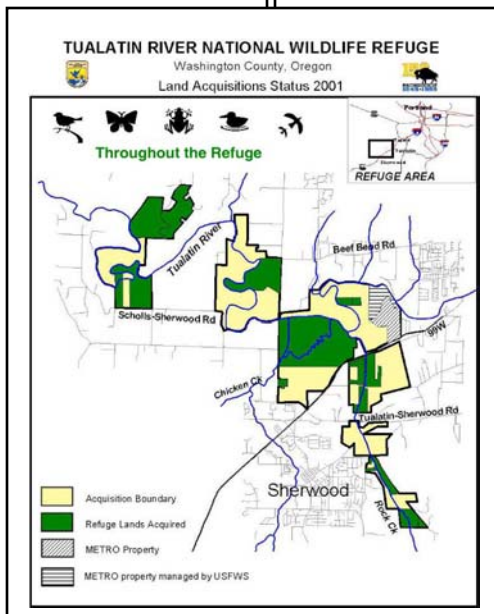
A GreenMap by the Sherwood Youth Corps.

Students teaching students about how relational databases work.

corridors. These products will help the Parks and Recreation department provide outreach materials for community residents. The involvement of students and community residents has earned substantial support from the City of Sherwood. As a result, several restoration projects and educational programs are currently in place. Maps that the students produced are currently being used in educational materials for the Open Spaces Stewardship Program which offers homeowner workshops and opportunities for residents and local business to become involved in the maintenance and restoration of Sherwood's environmental assets. Further information can be found at the City's website (www.ci.sherwood.or.us/community/environment/). In order to accurately map these trails and invasive species, the Sherwood Educational Foundation awarded a grant that helped to purchase a mapping-grade GPS unit from Trimble worth over $4000. Further grants were also used to purchase six navigation-grade Garmin E-Trex GPS units. These units are available to students and community members conducting other local research and mapping projects.

- *Sherwood Crime Mapping Project.* A group of juniors and seniors from Sherwood High School collaborated with Detective Dwight Onchi in creating a crime-tracking database in Microsoft Access. They hoped to use data gathered from the police department's paper filing system to create maps that illustrate trends of different types of crime in the community. Senior citizens from the local S.A.L.T. (Seniors and Law Enforcement Working Together) organization handled compiling the confidential crime report data. The students completed a database entry form and protocol and began entering crime data. Unfortunately, the inability of the students to continue their involvement in the Youth Corp, inadequate space and computer facilities (the confidential nature of the data necessitated strict controls) and the lack of available supervision prevented this project from progressing further. No maps have been produced but in a post-project interview with Detective Onchi, he thought they (the Police Department) were at a point of being capable of printing out a map "at any time."

- *Sherwood Historical Society.* The Sherwood Historical Society enjoyed a revitalization due in part to the CGP partnerships and mobilization of local interested parties in identifying and mapping Sherwood's cultural and historical assets (as affirmed by interviews with June Reynolds and Clyde List, Sherwood's local "historians"). Through logistical and financial support from the Washington County Historical Society, projects were developed to collect data, record oral histories and document Sherwood's past. Future plans are to create a public forum for residents and visitors to experience the richness of the local history.

- *Middleton Pioneer Cemetery Project.* High school Youth Corp members assisted the Sherwood Historical Society in mapping Middleton Pioneer Cemetery and created base maps of the cemeteries at Parrot Mountain and Ladd Hill, all historically significant landmarks for Sherwood. Using high resolution aerial photographs and GPS units, the students meticulously charted each headstone in the Middleton Pioneer Cemetery. They also conducted research, documented historical records and compiled an extensive database on Sherwood's pioneer families. The data is currently

only in digital form but future plans are to hotlink this database to the mapped cemetery points and create an interactive mapping project residing at the High School's media center. In the future, students can use this database as a resource, and also further the project by incorporating research about the cemeteries at Parrot Mountain and Ladd Hill.

- *Sherwood Historical Trail Map.* Both June Reynolds and Clyde List received GIS instruction through their participation in the Youth Corp after-school training sessions. When funding is sufficient for production, plans are to produce a Sherwood Historical Trail map for use in conjunction with a guided tour of prominent historical points of interest.

- *GreenMap Project.* The Youth Corp students produced maps and a webpage for the International GreenMapping project (http://66.154.130.83/greenmap/oregon.htm) and are linked through the Greenmap system (http://www.greenmap.com). Students prepared five maps that highlighted natural assets, environmentally friendly transportation (bike routes, bus routes), cultural arts and festivals, the positive youth development asset building presentations and projects, and the Tualatin River National Wildlife Refuge.

- *Sherwood Middle School Technology Curriculum: Sherwood Tree Inventory.* A staff member at the CGP worked closely with Bert Diamond's 7th grade Arts and Engineering class to create curriculum revolving around an inventory of trees in downtown Sherwood. During the 2001-2002 school year, 7th graders in Sherwood Middle School (approximately 200 students) received introductory instruction in GIS technology through this program. The goal was to create a project whereby the students could become advocates for their community through the use of geographic tools. The students were exposed to field data collection, GIS concepts, spatial data forms, and the limited use of ArcView GIS software to create maps. The students presented their project to Sherwood Natural Resource Specialist, Ken Huffer, and city staff who hope to generate community support for a Heritage Tree Program for the city.

- *Cross Grade Water Quality GIS Project: The Refuge Club.* Two Middle School teachers (Janet Bechtold and Debbie Frankel), received funding from the Sherwood Education Foundation to organize an after-school group to address local watershed issues. This Refuge Club was formed during the 2001-2002 school year and conducted water quality testing on Chicken Creek at its confluence with the Tualatin River. The Refuge Club is an ongoing program affiliated with Raindrop to Refuge's youth education component. Its goal is to teach middle school students about the impact of local urbanization on watershed health and make recommendations to the City Council. The CGP assisted in several GIS training sessions. Students received instruction in ArcView GIS software and created maps for a PowerPoint presentation. Since some of the students had already been exposed to the ArcView software through other forums (e.g. GIS Day and Bert Diamond's technology class), instruction went beyond simply producing maps. Students were able to use spatial

data to ask questions and draw conclusions about impacts of various factors on the watershed (e.g. zoning and pollution). Students presented their findings to the Sherwood Education Foundation Annual Meeting and the City of Sherwood. Future Refuge Club participants will continue the research.

The description of the Raindrops to Refuge youth education program highlights the importance placed on the use of GIS to broaden understanding of watershed issues. It states that "this software (GIS) allows students to create graphic representations of the data (maps) that give a clear picture of how population density, vegetation, tree canopy and stream temperature are affecting the health of Sherwood's streams…While students learn about watersheds and the importance of restoration, they are also learning to become stewards of their community's ecological health."

- *Student GIS webpages*. The Sherwood Youth Corp students have submitted three web-based projects to ESRI's Community Atlas Program incorporating their work with GIS software into web design applications. The web pages tell the "story" of Sherwood and highlight things of importance to these students. As a result of these submissions, Sherwood High School and Sherwood Middle School have been awarded three site licenses giving students access to ArcView GIS software and extensions at the high school and middle school computer labs. Their qualifying web pages are posted on ESRI's site at http://gis.esri.com/industries/k-12/commatlas/browse.cfm (search for projects in Oregon).

- *GIS-in-Action Conference.* The Sherwood Youth Corp students displayed their projects and GIS products at the GIS-in-Action conference in April 2002. This conference is sponsored by URISA and serves as a network for GIS professionals throughout the region. The students received several congratulatory awards for their work including books and complimentary software

- *Migratory Bird Festival.* On May 18, 2002, several Youth Corp students helped to put together an interactive mapping display sponsored by Raindrops to Refuge at the Migratory Bird Festival held at the Tualatin River National Wildlife Refuge facilities. The display highlighted aspects of Sherwood's three sub-watersheds (Chicken, Cedar and Rock Creeks). The students assisted the public in using the GIS software to learn about the Refuge, "where you live" inside the watershed, and the impacts of development of the health of Sherwood's environmental resources.

Impressions and Observations:

- *The Student's Perspective.* From the students' perspective, relayed in a focus group session in August 2001, their involvement in the CGP project provided a way to earn CAM credits; they thought that learning GIS would give them a good job skill for the future. They also liked having a variety of individualized projects to choose from, although most agreed that not having a "set way for you to do stuff" made the project much more time consuming and difficult. Two off-the-wall comments also provided a glimpse at more subtle effects of the students' involvement. One girl, upon
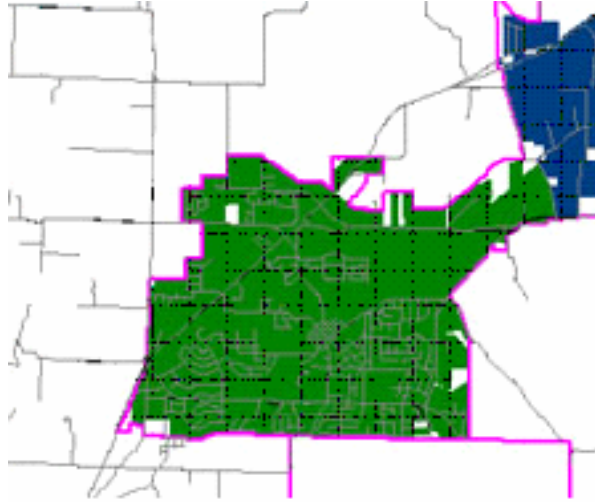
We think delaying the growth of Sherwood is a very good idea. We've testified to the METRO council in Portland, asking them to stop or delay the growth. But during the discussion we heard certain people asking the council to expand the UGB [urban growth boundary]. They were asking for that, because they wanted to sell their property for big bucks. We think that if the UGB [urban growth boundary] was not in place Sherwood would not have nearly as much farmland and rural spaces as it does now.
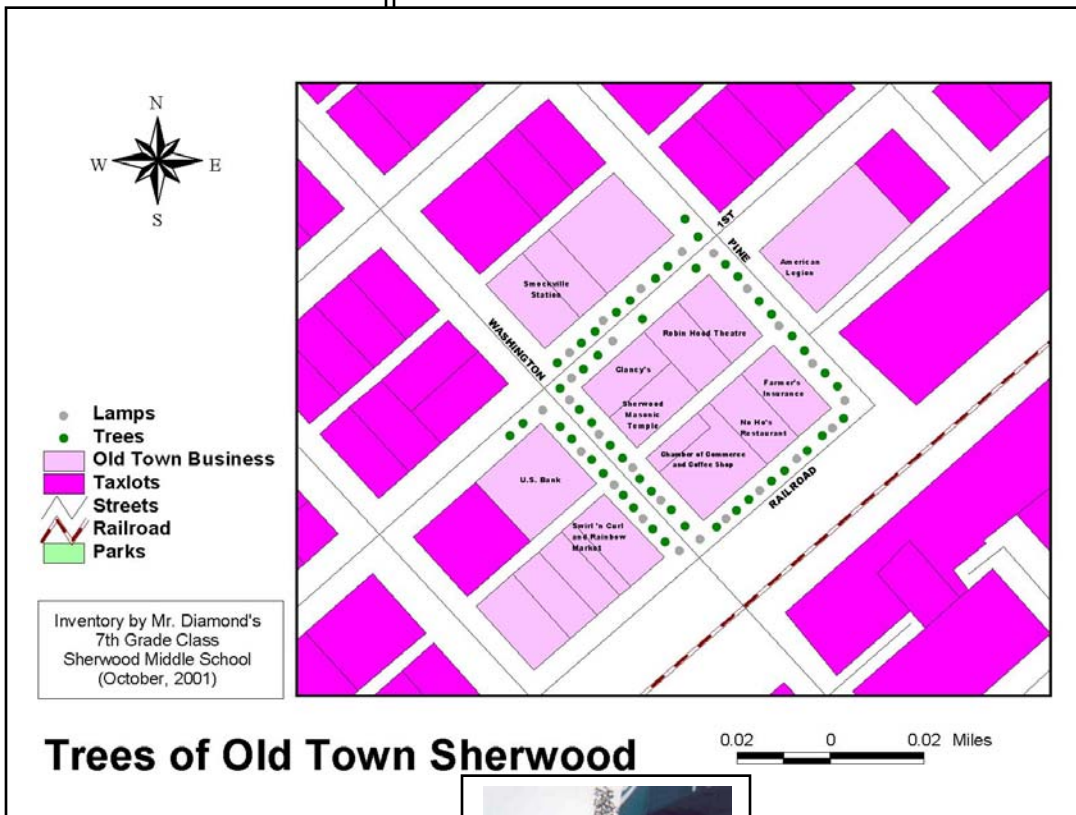
This map shows that although Sherwood has grown tremendously, it still has a little space to grow. Buy the space and use it carefully because there is not much left.

- two eleven year old students from Sherwood Middle School

returning from the Youth Corps presentation at the GIS in Action conference, remarked, "There were men in suits actually listening to what I had to say!" Another middle school student that provided assistance in the teacher workshop commented on how proud he was that he could actually "teach the teacher.""

It is clear that student application of their "technical expertise" must be achieved in a context in which students feel empowered, respected, and listened to. The GIS-in-Action conference provided such a context. As one student put it during the focus group session, ". . . if they ask me a problem that uses it (GIS), I'll know what they're talking about and be able to solve it."

- *Technological Barriers*. Lack of adequate computer facilities in the schools frustrated attempts to utilize the software to its fullest capacity. Networks would get bogged down trying to manage the large data files. Color printers were nonexistent. Access to limited computer facilities was often a problem. Frustrated students have very short attention spans. CGP staff learned to clip data sets to a manageable size, come prepared with several "contingency" plans, and be flexible in what we could and could not accomplish. However, our goal was to involve students and citizens in project-based GIS, looking at real-world issues of importance to them. This kind of training is not as smoothly executed as prefabricated tutorials that come with instruction books. Software and data glitches and a litany of "I don't have a clue" moments are to be expected and are, indeed, a part of the "real" GIS world.

- *Institutional Barriers and Ongoing Technical Support.* Many of the high school students were unable to continue their involvement in the Youth Corp to a large degree because of other commitments (both in school and after school). While incorporation of GIS technology was somewhat successful at the Middle School level, there is still much work to be done to foster institutional support at the High School level where curriculum is less flexible and time constraints are much more difficult to deal with. Teachers also need much more time and assistance in learning GIS and incorporating it as part of their curriculum. A 10-hour workshop is not enough. Janet Bechtold, volunteer in the Refuge Club and President of SIS, stated emphatically in a post-interview about the need for a resident GIS specialist because "teachers can't learn it in five lessons!" Both John Niebergall and Bert Diamond lamented the loss of CGP technical support. The need for creating some sort of ongoing technical resource for teachers is clearly apparent.

- *The Long Term*. The large number of projects and activities going on at the same time in Sherwood became a bit unmanageable from a project coordination standpoint. Limited resources were stretched to capacity. The pressure on the students to maintain multiple partnerships and projects led to burnout. The sheer numbers of people interested in learning about GIS technology was encouraging and no doubt many seeds were planted for future incorporation of the technology. But, in hindsight, quantity over quality may not have been the most efficient or sustainable approach. Limited resources and time prevented follow-up workshops for teachers

Trees of Old Town Sherwood

Lamps
Trees
Old Town Business
Taxlots
Streets
Railroad
Parks

Inventory by Mr. Diamond's
7th Grade Class
Sherwood Middle School
(October, 2001)

0.02   0   0.02 Miles

Tree inventory by Bert Diamond's
Sherwood Middle School students.

and community volunteers. Most received enough instruction to see the value of GIS in their respective visions, but not enough to be able to realize lofty plans without further technical assistance.

- *A "Dividing" Question.* While practical use of GIS mapping tools can be immediately appreciated, to what degree incorporation of GIS technology and, more importantly, geospatial analysis, enhances or empowers community groups and/or students is something that is not readily apparent or easily measured. As Colleen Reed put it, "literally hundreds of people have been touched by this project." In terms of the digital divide, however, whether those who have been "touched" by the technology can actually interpret and use it effectively is another "dividing" question.

Outcomes and Future Prospects:

- *The Environmental Agenda.* The partnership between the CGP, SIS and the Sherwood Schools helped to cement support for several local organizations. According to Reed, a commitment toward establishing a community-based environmental agenda through the Sherwood Vision's Open Spaces initiative helped to secure funding from the Metro Greenspaces program to hire a coordinator at Raindrops to Refuge. Also, during this grant period, budget cuts threatened the position of the Sherwood Park Ranger. Many of the CGP-SIS projects revolved around the environment and open spaces agenda, highlighting the community interest and institutional need to address these issues. The success of the ongoing projects depended on input and support from the Park Ranger with close coordination from Raindrops to Refuge. In light of this, the City decided to continue funding the Park Ranger position.

- *Tualatin River National Wildlife Refuge.* A burgeoning partnership with the Tualatin River National Wildlife Refuge, located just north of the Sherwood city boundary, also secured the City's support of the Environment and Open Spaces agenda. The establishment of the Tualatin River National Wildlife Refuge (Refuge) began in 1992, led by local residents, the City of Sherwood, US Fish and Wildlife Service, and other regional partners. The US Fish and Wildlife Service has already acquired 1,253 acres of the proposed 3,058 acres and is in the process of planning for public use facilities on the Refuge. Plans include a GIS facility available to the public for research and data sharing. Inclusion of this facility is a direct result of advocacy by SIS as a future resource for the programs being implemented in Sherwood.

- *The Sherwood Historical Society.* In addition, the "rebirth" of the Sherwood Historical Society as an official entity was also a direct outcome of a renewed interest in documenting and mapping Sherwood's pioneer past, spurred by the Sherwood Vision. The Washington County Historical Society provided financial and logistical support for the documentation of Sherwood history currently being disseminated through a webpage and local walking tour materials. June Reynolds, a local amateur historian, has also received some funding to research and compile a book of Sherwood History.

- *YMCA Teen Center*. Several of the Youth Corp students were recognized as Youth Ambassadors. They are taking the lead on the establishment of computer facilities in the new YMCA Teen Center that will provide opportunities for teens to explore GIS technology through interactive web mapping, geocaching "treasure hunts" using the Garmin E-Trex GPS units, and other technology-related activities.

- *Sherwood High School Curriculum*. John Niebergall, Industrial Arts Instructor, received an award from the Sherwood Educational Foundation to contract for technical assistance in implementing a two week GIS training course for his students during the Winter term, 2002.   His plans are to continue to seek technical assistance through grants and continue offering ArcView GIS training as an option for his industrial arts students (until he feels confident enough in his grasp of the technology to teach it solo).

What's Happening Now

Due to serious budget constraints, the City of Sherwood is no longer providing operational funding for SIS. Colleen Reed has left for another position. With the elimination of the Metro Greenspaces Grant program, Raindrops to Refuge was forced to dip into other funding to hire the second year coordinator (part-time). The organization is still functioning in a limited capacity, primarily focusing on youth and community education, while waiting for word on the availability of other grants. They are leveraging their position by partnering with other watershed advocacy groups. The Sherwood Historical Society is still proceeding with the Sherwood Historical Trail project, with assistance from the Washington County Historical Society. The Middle School Refuge Club is still collecting water quality data. The teachers expanded the data collection this past school year and are planning to incorporate the use of GIS to create maps and spatial analysis in the coming school year as well. The status of the industrial arts and technology programs in both the Middle and High School are uncertain and may still be the victim of future school budget cuts. Both teachers feel vulnerable, not ready to teach the technology themselves, and reluctant to request further funding from the Sherwood Educational Foundation, which is now besieged with funding requests.

<div align="center">

Year Two

</div>

Our Year One projects began in April, 2000 and were wrapping up when our Year Two projects commenced in May 2001. Although we didn't abandon our Year One partners entirely – we keep in touch with them to this day – we had to move on to the second group of projects.

As stated earlier, out of a concern that our Year One request for proposals process had not been entirely successful in recruiting the CBOs that could most benefit from this program, we modified the Year Two process to include an interview to allow us to better articulate what the project was about and better understand what their needs and

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limitations were. We believe that the proposals that were submitted in Year Two benefited from this process and were generally more focused.

There is, however, always a balance that is difficult to achieve between serving those organizations that are neediest and may not have adequate capacity to be entirely successful and those that can guarantee a certain level of success. Our selection committees struggled with this in both years but more so in Year Two when the capacity issues had become clearer to us. In Year Two, of the three CBOs selected, two were environmental organizations that had some level of knowledge about the benefits of GIS to their organizations and a track record of volunteerism and longevity. The third organization, Oregon Child Development Coalition, was the oldest of the organizations that we worked with but had no real knowledge of GIS or confirmed track record of volunteerism. What it did have was a service population (Hispanic migrant workers) that was very appealing to the committee as well as CGP. The Hispanic population is the fastest growing minority in the region and has thus far had no real voice in policy making. OCDC was a risk that we were willing to take on.

What follows is a description of the Initiative's Year Two partnerships.


Friends of Trees, Winterhaven and Portsmouth Middle Schools

Background and Initial Goal as Stated on the Application and Memorandum of Understanding:

Friends of Trees' current three year strategic vision focuses on the continuation of planting trees in neighborhoods, schoolyards and natural areas, adding emphasis on education and the stewardship of the urban forest. As a Community Geography partner Friends of Trees (FoT) hoped to increase the sophistication of their data gathering and analysis, as well as provide area students with a new understanding of their urban forest. They also wanted to teach students about the importance of street trees, and the process by which trees are selected to fit "the right tree in the right place". In addition, Friends of Trees hoped to use GIS as a tool to ask new and better questions with the data they have accumulated over the last twelve years and continue efforts to influence policy makers and others to support urban forestry preservation and restoration projects.

These are the goals for this project as articulated in the memorandum of understanding:

1. OBJECTIVE AND SCOPE OF TRAINING
   a. Train community members and youth in the application of GIS and database technologies to describe, record and analyze historical and present tree planting activities and their relationship to the variety of communities in the Portland Metropolitan Area.
   b. Students from the Brooklyn-Winterhaven and Portsmouth Middle Schools will be involved for the duration of the project. Key contacts are:
      i. Wendy Archibald
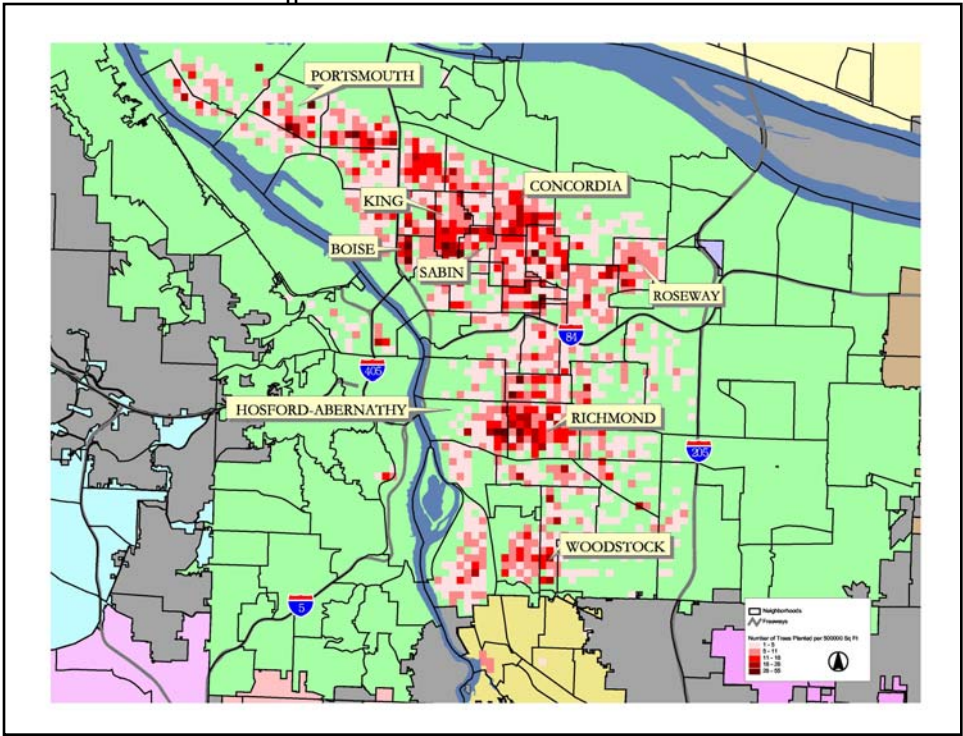
The density of Friends of Trees' trees – an analysis and map created by an FoT volunteer.

ii. Doug Saulter

2. ANTICIPATED RESULTS
   a. Youth and volunteers will have a working knowledge of ArcView GIS and Microsoft Access
      i. Specific skills in ArcView: Joining tables, exporting files, geocoding, performing heads up digitizing, and creating hotlinks.
      ii. Specific skills in Access: Creating tables, creating relationships, creating forms, developing data queries, reporting results, developing mailing labels and exporting data.
   b. Volunteers will learn the basics of cartographic conventions.
   c. Volunteers will learn to articulate their research questions, methodologies, and results as well as communicate the meaning of their findings in a public forum.
   d. Volunteers will pass their skills on to new volunteers to allow for project sustainability.
   e. A GIS database will be created to store historically and culturally significant information ranging from survey results, documents, imagery, to audio files.

3. SPECIFIC RESPONSIBILITIES
   a. Institute of Portland Metropolitan Studies
      i. Provide training to develop community asset surveys.
      ii. Provide training and technical assistance in developing a community assets database and a GIS database.
      iii. Provide training in project planning and implementation.
   b. Partner
      i. Ensure final materials are made available to public.
      ii. Marshall volunteers as necessary.
   iii. Maintain relationship with a school partner.

Progress Toward Stated Project Goal and Objectives:

Initial Preparation and Action Taken Toward Implementing Project

Initial meetings with Friends of Trees' staff took place during the summer of 2002 and were organized around planning three distinct tasks: creating a database to monitor tree orders taken and the health of planted trees, engaging adult volunteers and staff in introductory training in ArcView, and preparing curriculum to engage students in both Winterhaven and Portsmouth Middle Schools. The database, already in development, became a focus of on site consultation for CGP staff and a case study which allowed volunteers and FOT staff to learn the fundamentals of relational database design and its relationship to collecting survey data (in the case of monitoring the health of trees). Training in ArcView involved volunteers, staff and two middle school teachers, and lasted throughout the summer. The primary goal was to give participants a background in some of the simpler techniques of geographical analysis and the software. Finally,
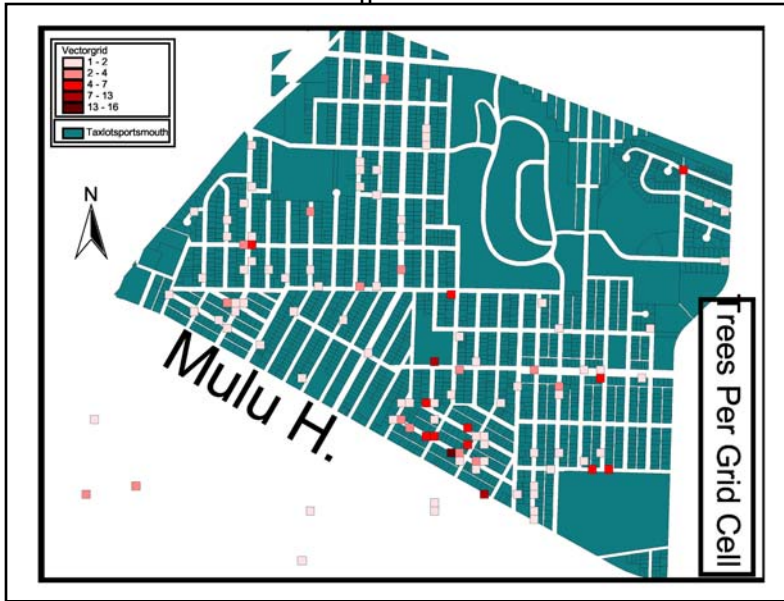
A Portsmouth student's tree analysis for his neighborhood.
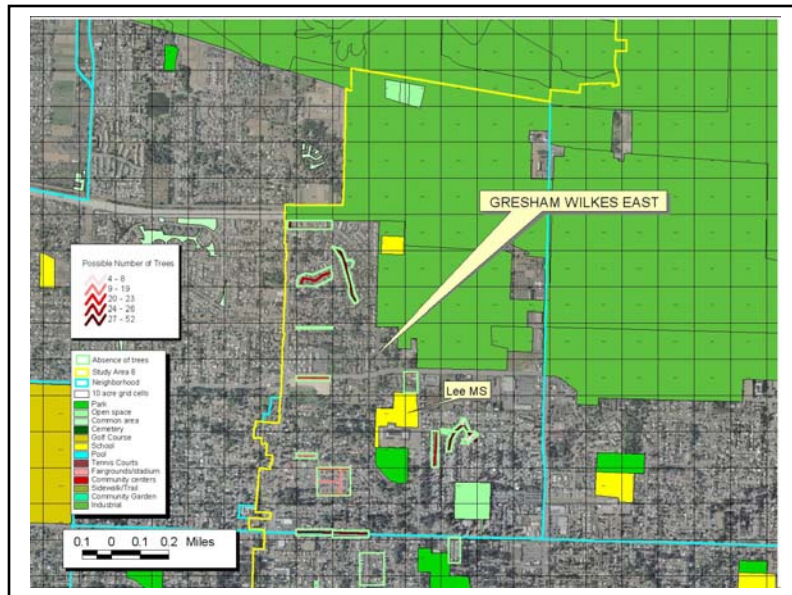
A Winterhaven student's method for selecting specific areas where street trees could be planted.

several meetings toward the end of the summer were aimed at fleshing out student participation in data collection and analysis for the upcoming school year. Both teachers, staff and volunteers from Friends of Trees were involved. All three of these efforts continued through the summer of 2003 and the respective accomplishments are enumerated below.

Training and School Involvement

Volunteer Training:

Training by staff from the Institute commenced in the summer of 2002 and consisted of weekly meetings lasting 2.5 hours through the summer of 2003. Attendance of trainings was initially around ten people. By winter, this number had dwindled to five and was later augmented in the spring by a new volunteer who was also an employee of the BLM's GIS department. Attendance did prove to be rather fluid, with the exception of four core members, and it was this dedicated core who accomplished the majority of analysis and presentations. Trainings were generally conducted by one or two CGP staff members and integrated newly collected data as part of each lesson.

School Participation:

- Portsmouth Middle School

  Eight students from Portsmouth Middle School, located in the Portsmouth neighborhood of north Portland, were involved with the project. Portsmouth M.S. serves a predominantly working class neighborhood and has 62% enrollment in the Federal Child Nutrition program. Over half of the enrolled students at the school are minorities. Students from Doug Saulter's seventh and eighth grade computer science class assisted Friends of Trees in collecting data about the health of trees planted in the neighborhood and assisted in the analysis of this data. Students received weekly instruction in GIS software and geospatial analysis techniques. They created several outstanding maps regarding the density and overall characteristics of the plantings and presented these finding to two civic organizations (Friends of Trees and the Columbia Slough Watershed Council). Their poster was also put on display at the GIS in Action Conference (see details below). One significant contribution of the students work was the inspiration it provided Friends of Trees' staff and volunteers in visualizing information about their plantings in new and creative ways. FOT staff and volunteers who were involved with the students also were able to hone their own GIS skills through teaching.

- Winterhaven-Brooklyn Middle School

  Winterhaven Middle School is a special focus school with an emphasis on math, science and technology. A group of six middle school students (mostly 7th grade) participated in the partnership with Friends of Trees. CGP staff conducted lessons in

Street Trees on Division
12th to 60th
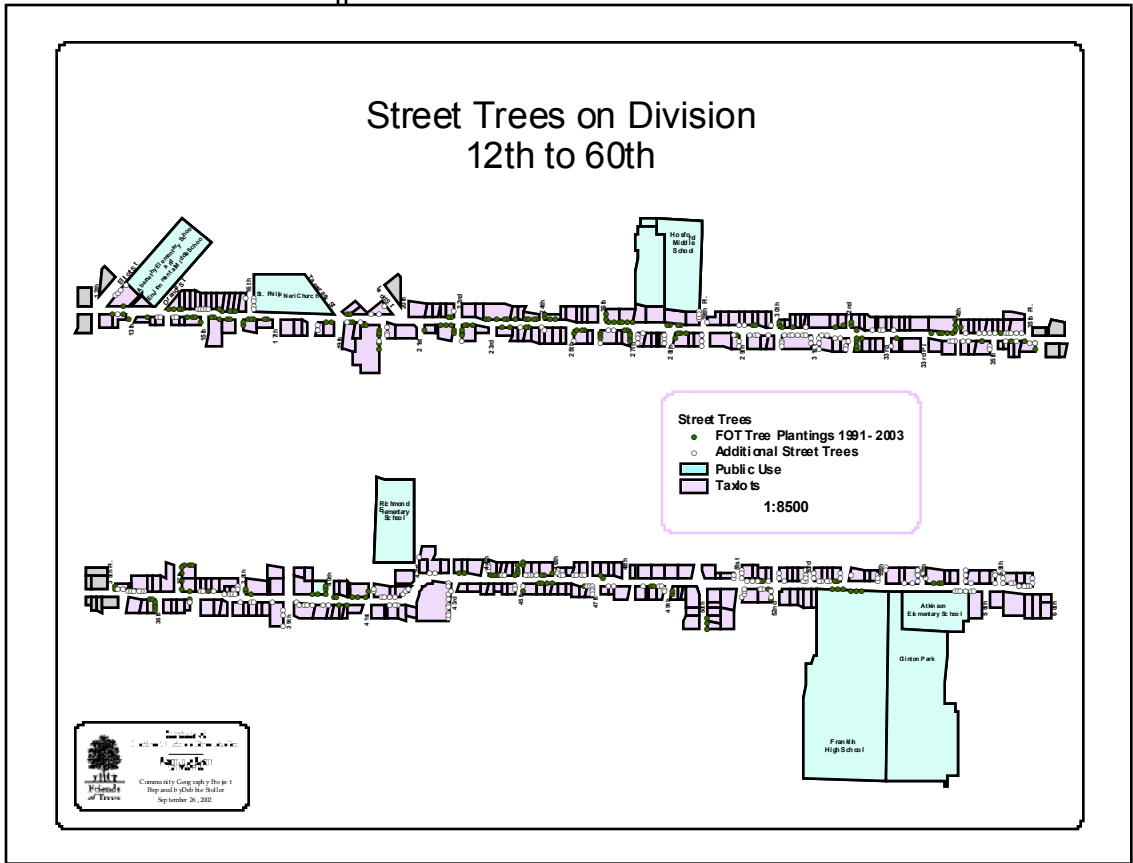
Friends of Trees and neighborhood involvement. A Friends of Trees volunteer's street tree analysis for the "Division Vision" street revitalization plan.

ArcView GIS during a morning study hall session once a week during the 2002-2003 school year. A Friends of Trees AmeriCorps volunteer also participated in these training sessions, providing valuable information about FoT activities and the Access tree planting database under construction. The Winterhaven students monitored and collected data about the trees in the Brooklyn/Sellwood neighborhood. Using FoT's city-wide dataset and local data that they collected, the students applied GIS skills such as geocoding, querying and classification. Students were asked to develop questions and create maps that helped to answer those questions. The maps that some students produced addressed the issue of species diversity, prompting FoT to remove some species from their tree selection list. Additional tasks included developing methodologies for gauging and mapping tree coverage in the Portland Metropolitan area using high resolution aerial photography to assist FoT in planning future outreach activities. The students presented these methodologies and findings at the GIS in Action conference in April 2003.

Products, Achievements and Ongoing Projects

▪ *Friends of Trees' Database.* As mentioned, the task of upgrading a comprehensive database of trees planted by Friends of Trees began before CGP staff were on the scene. Data records for tree plantings and tree health monitoring were kept in a variety of formats from paper notes to Excel spreadsheets to finally what had taken shape as a relational database in Access that a volunteer had initiated in the spring of 2002. As part of the year long project, CGP staff assisted Friends of Trees in improving the structure and interface of their existing database to better accommodate the ongoing needs of the organization. Special attention was given to managing the information relating to the health of trees already planted by the organization over the course of the last five years during FoT's "Seed the Future" campaign, which was funded by Portland General Electric. Most of these trees have now been monitored by volunteers and provide a rich data set for analysis.

Additionally, legacy data that extended as far back as 1989 was included in the new database as well as any new orders and plantings that took place during the lifetime of the Community Geography Project grant. The resulting database allows staff and volunteers to query trees by species, physical attribute, planting location, and planting date. More detail regarding the enormous analytical power provided by the database is evident in the products and analyses described below. Fundamentally, the database centralized information regarding tree plantings and allowed Friends of Trees to more easily track the health and progress of their plantings. Additionally, it provided an interface from which they could query their records for use in a GIS, a tool that allows visualization of their efforts in respect to the urban environment.

▪ *Species related analysis.* Several maps were created to illustrate the aggregate number of trees planted versus a variety of species-specific information. First, the proportion of large maples planted in respect to other large trees helped influence Friends of Tree staff to withdraw the option of maples in future plantings due to the
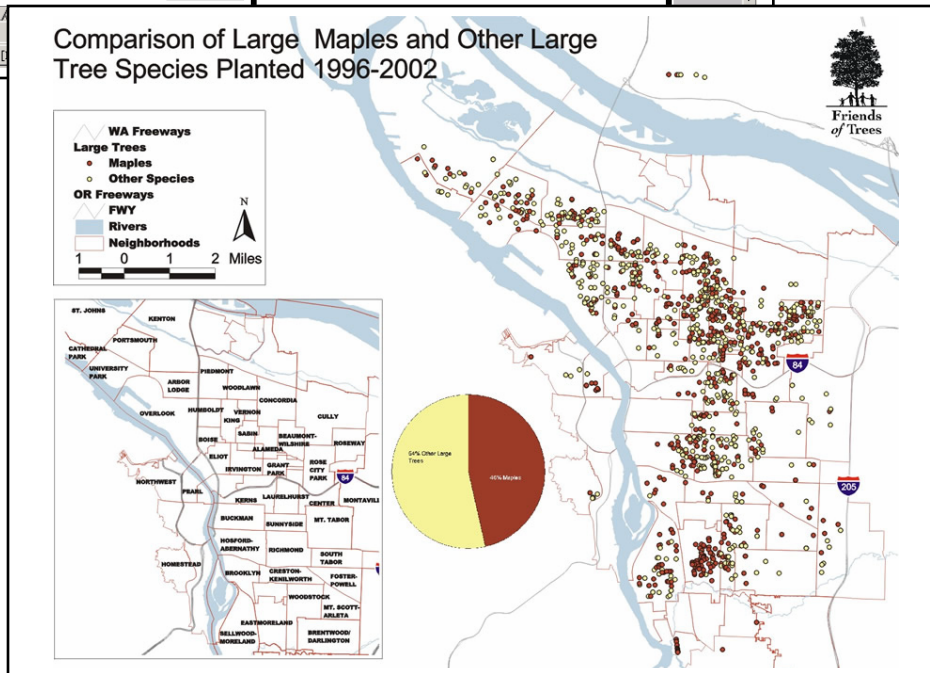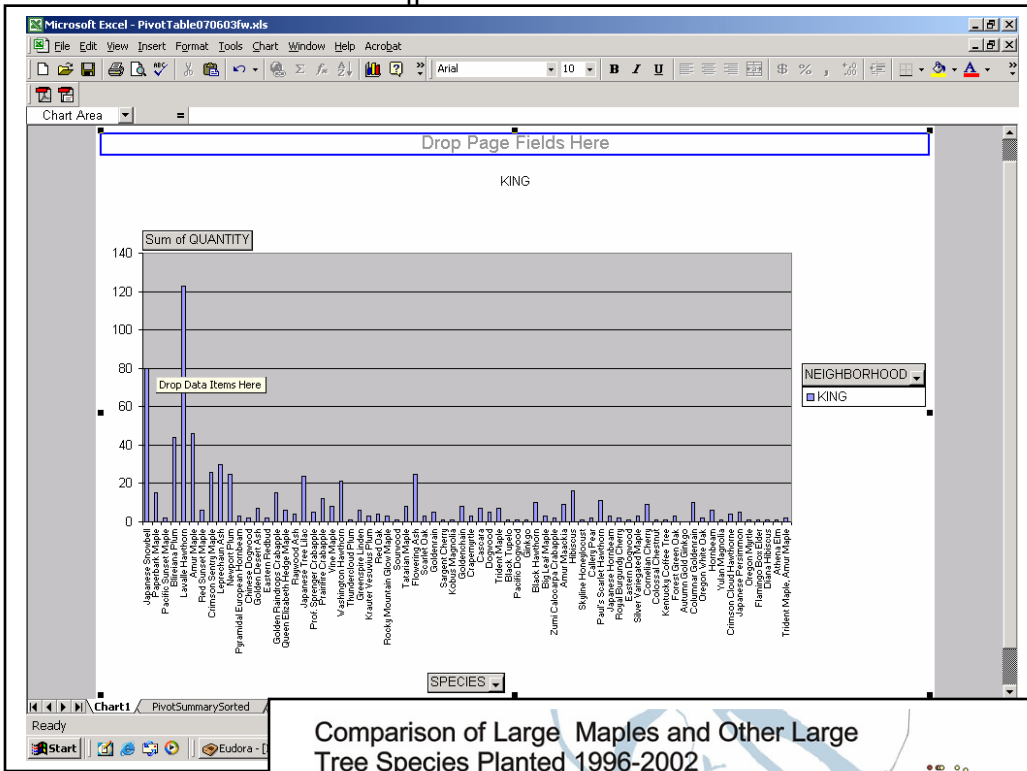
A species map that changed Friends of Trees' strategy for future plantings.

prospect of over planting and the risks associated with creating monocultures in the urban forest. Other species related information that was investigated included the proportion of ornamentals, wildlife friendly, relative longevity and relative canopy size.

- *Impact of plantings (cross tabulations).* In addition to cartographic products, volunteers used Microsoft Access to cross-tabulate tree data by neighborhood and species to help inform neighborhood planting coordinators of the mix of trees planted thus far. Supplemented with aerial photography this information helped neighborhood coordinators advise Friends of Trees staff as to the nature of trees needed and opportunities available for additional plantings in the neighborhood.

- *Documentation of plantings in natural areas and at schools.* A great deal of what Friends of Trees plants is not associated with individual households. In order to graphically demonstrate their impact in the region they produced maps that illustrated the magnitude of plantings at a variety of parks, open spaces and natural areas as well as area K-12 schools.

- *Strategic planning.* In the aggregate, these projects, products and trainings helped shape the decisions Friends of Trees' staff were making in regards to the types of trees they were planting and where they were planting them. Also, these activities helped raise interesting questions regarding neighborhood planting practice, the techniques used to monitor the health of trees, and how this information could be assessed in order to inform future planting strategies. Staff and volunteers also learned how to aggregate point instances of trees to larger aerial units (such as a uniform grid of one acre cells over the city) in order to analyze density more effectively. For instance, it was gratifying for staff and volunteers alike to see that in large part the efforts of their organization were evenly distributed among distressed and more stable neighborhoods. In conjunction with census data, the map suggested areas of opportunity to serve low-income neighborhoods that would stand to benefit from subsidized plantings. One volunteer also suggested that seeking out neighborhood coordinators in areas where less trees have been planted may be one strategy to help encourage planting in these underserved areas.

  Similarly, knowledge about neighborhood infrastructure, such as the width of planting strip and the presence of overhead wires, has been sought by Friends of Trees. In an attempt to gain insight into these aspects of neighborhood infrastructure to help gauge the species of trees that can be planted on a particular street, volunteers collected observations of sidewalk width and the presence of overhead wires per site as they monitored the health of planted trees. The immediate result has been a map of planting strip width for all monitored areas. The map will allow staff to get a fairly good sense of what trees should be offered when coupled with a quick windshield survey of the neighborhood prior to planting. When combined with information regarding the types of trees already planted staff can tailor the list of appropriate trees that should be offered at a particular neighborhood planting.
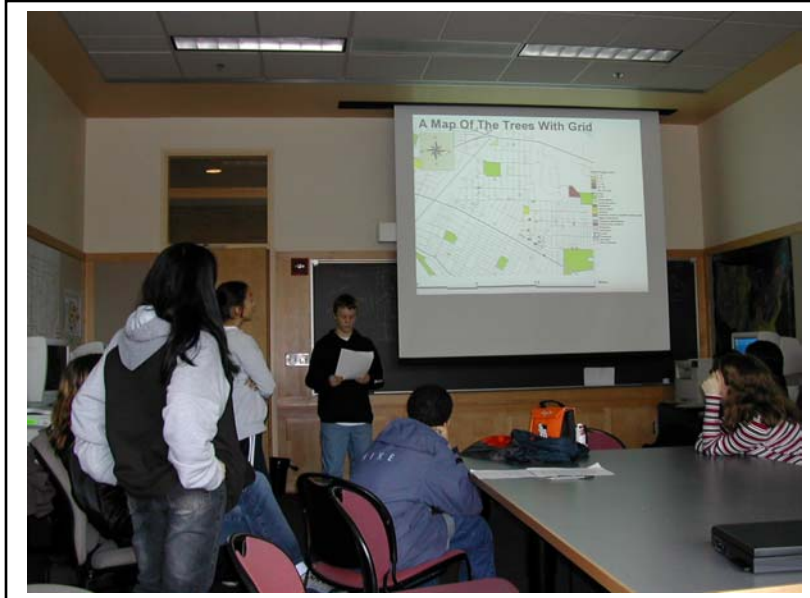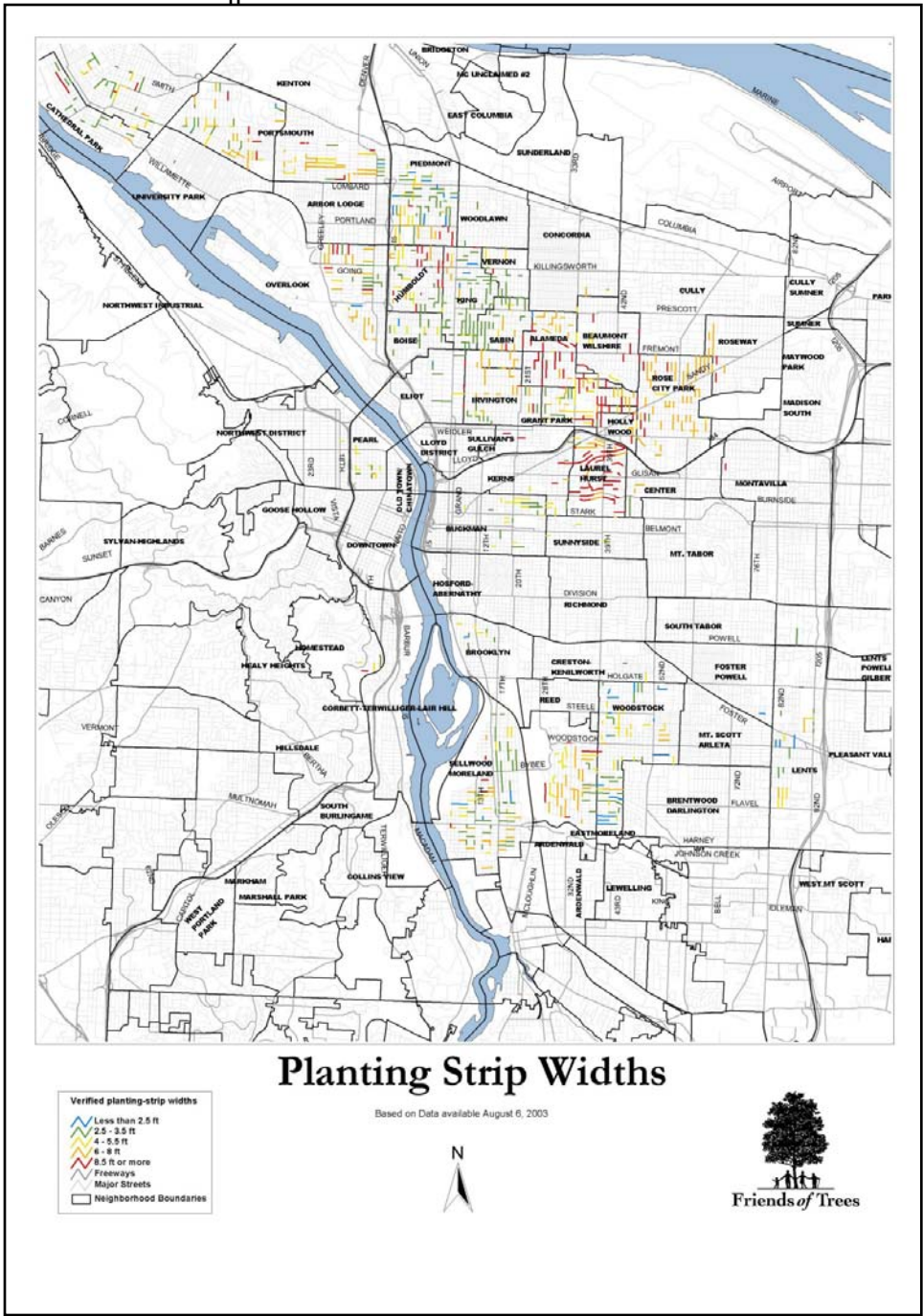
Winterhaven and Portsmouth students come together to discuss their approaches to analyzing where Friends of Trees should plant trees next.

- *Public outreach of neighborhood plantings*. Finally, GIS was used to produce maps of when and where neighborhood plantings were to occur for the upcoming planting season. This map was published on Friends of Trees website and used as a tool for public outreach.

  Volunteers, staff and students had a number of opportunities to present and display their work over the course of the year. These events helped educate members of the public about the work Friends of Trees has undertaken and helped stimulate interest in gaining a "spatial" perspective of community development activity. Students benefited from gaining access to professionals in the field of GIS and the opportunity to share their experiences with interested adults outside of the classroom.

- *First Annual Urban Ecology & Conservation Symposium, held by the Urban Ecology group (UERC) at PSU on January 24, 2003*. An Americorps volunteer for Friends of Trees presented a poster highlighting both the accomplishments of staff and students. The poster explained the unique role Friends of Trees has taken in local urban forestry and the assistance that local students had offered as part of their classroom studies. The purpose of the symposium was to provide a forum for networking, building partnerships, and exchanging information related to urban ecology and its application to natural resource conservation, natural area management, environmental planning, habitat restoration, and the social sciences.

- *GIS in Action (May 2003)*. The annual GIS in Action conference was sponsored in May 2003 by the local chapter of the Urban and Regional Land Information Systems Association. The event hosted professionals from across the region and offered a poster session in which the students were able to display their work. Several students attended and the response from professionals was enthusiastic.

- *PPGIS Conference (July 20-23, 2003)*. One volunteer from Friends of Trees participated in a panel discussion of Community Geography Project participants at the Public Participation in GIS (PPGIS) conference at PSU. The Institute of Portland Metropolitan Studies hosted this second annual conference, which was sponsored by the national URISA office. PPGIS addresses a number of issues regarding the social and institutional implications of growing public access to geographical information systems and spatial data. The conference brought together a diverse group of practitioners, community members and advocates, and researchers from around the world who presented a wide range of perspectives on community geography, GIS and issues of spatial data and analysis.

Planting Strip Widths

Based on Data available August 6, 2003

Verified planting-strip widths
- Less than 2.5 ft
- 2.5 - 3.5 ft
- 4 - 5.5 ft
- 6 - 8 ft
- 8.5 ft or more
- Freeways
- Major Streets
- Neighborhood Boundaries

N

Friends of Trees

Sophisticated GIS analysis executed by a Friends of Trees volunteer.

Impressions and Observations:

Staff and volunteers at Friends of Trees readily understood the value and need for a relational database and GIS to keep track of their resources, measure impacts, and strategize for the future. While their initial questions were limited to the locations of their trees and their health and growth relative to location and time, those working with the data and the technology were quick to see the value of looking at broader questions such as how well the organization was impacting low income neighborhoods or why the organization has been more successful in some neighborhoods than others.

Moreover, one volunteer has been able to move from a focus on the FoT trees in her own neighborhood to a related street beautification project that will essentially redirect the development of a street that bisects several adjoining neighborhoods. She has been able to make a significant contribution to this project by creating a detailed GIS layer of the trees along this arterial that has been commended by several in this citizen involvement process and is good enough for use by the design professionals on the project.

Having an Americorps volunteer to act as a representative to the school partners was critically important to maintaining a Friends of Trees presence in the schools. However, over time it became clear that a better balance between the outdoor tree inventory work and the computer work would have helped to make the connection between the organization and the schools stronger. All field work was done in the fall before the leaves dropped to make tree identification easier but that meant that all of winter and much of spring was devoted to computer work; most of the kids longed to be outside again to make the connection to the purpose of their work and Friends of Trees again. Long-term projects should help.

Finally, Portsmouth and Winterhaven in some respects are polar opposites. Portsmouth's student body comes in large part from Portland's largest public housing project; Winterhaven's students come from all across the city and are drawn to the school because of its special focus on math and science. Interestingly, Portsmouth had the best computer lab we saw and Winterhaven the worst. In fact, the situation at Winterhaven was serious enough to delay the project and limit the number of students that wanted to be involved. In spite of these differences, the students engaged in the Friends of Trees project from both schools thrived on this work. The Winterhaven students who appeared to be very competitive wanted to know at all times whether or not they were ahead of the Portsmouth students. This was not our focus or interest; however, these comments from the kids caused us to look at the issue more carefully. There is no question that the kids from both schools did equally well. Bringing them together to share their findings was an enriching experience for all of the students and their teachers.

Outcomes and Future Prospects:

Friends of Trees has been able to develop a database framework that has become fundamental to tracking and analyzing the impact of their tree planting endeavors. It has also effectively utilized GIS technology (with the FoT database as the GIS's core) as a
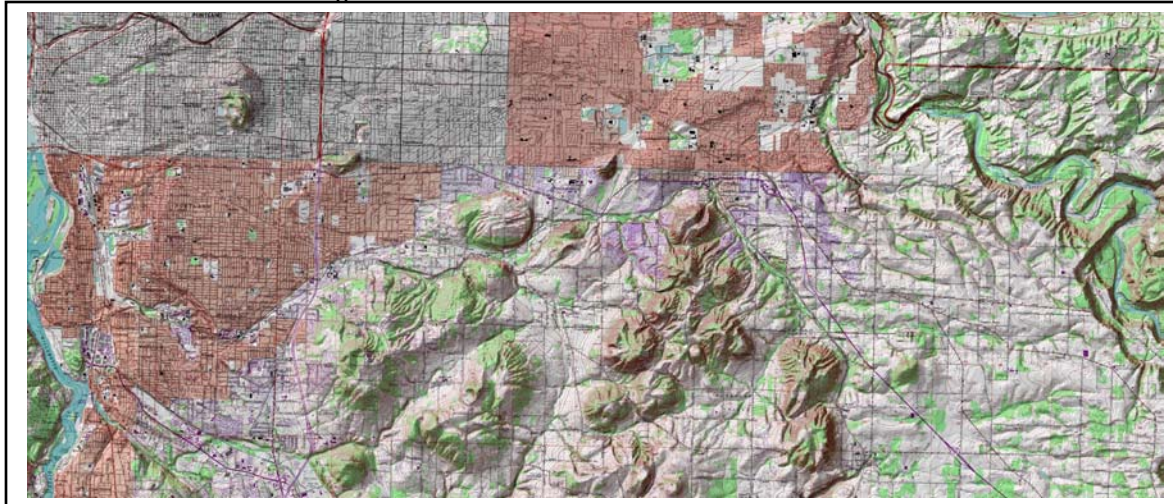
"Hillshade" of the Johnson Creek Watershed created by a PSU capstone student for the Johnson Creek Watershed Council.

strategic planning tool as well as a vehicle for understanding and communicating its efforts internally and externally.

At this point, three volunteers (two long term volunteers and one newer volunteer) are competent to use GIS for Friends of Trees' purposes. In addition the organization understands and has made a commitment to institutionalizing the use of GIS and database by having these volunteers train others.

The future of the school partnerships is mixed. While Portsmouth Middle School will move away from the street tree work, this coming academic year its students will be involved in a Friends of Trees' GIS project in the Columbia Slough.

Although Winterhaven School is committed to the use of GIS technology in its science curriculum, what that will look like is uncertain. Wendy Archibald wasn't able to get adequate training but her students are very capable of teaching her and their classmates. Currently, there is discussion between Friends of Trees and Winterhaven regarding a GIS project Oaks Bottom Wildlife Refuge where students and FoT are already engaged.

Johnson Creek Watershed Council and Trillium Charter School

Background and Initial Goal as Stated on the Application and Memorandum of Understanding:

The proposed Johnson Creek Watershed Council (JCWC) project revolved around the theme of community relationships with Johnson Creek and strove to demonstrate the linkages and connectivity among select community groups within the watershed region. It was hoped that this would promote a better understanding of the whole watershed by the community and a means to develop a way to communicate this knowledge among individuals, communities, and agencies involved with Johnson Creek.

Asset mapping of the watershed by its residents was expected to document communities' relationships to Johnson Creek and provide a basis for future citizen involvement. In addition, establishment of a strong relationship with a K-12 school would provide a long-term medium for outreach and education about watershed issues.

Specific goals of the Johnson Creek Watershed Council project included: (1) Student and volunteer development of a project exploring the role of Johnson Creek in the daily life of their peer and larger communities. This would be, in effect, a definition of their watershed neighborhood or community and (2) Development of the asset-mapping program as a means by which the Council can better understand community perception of Johnson Creek and restoration efforts. Maps and inventories of environmental as well as community assets, compared to maps based on deficits and absences would provide a basis for discussion of restoration priorities.

Flood Patterns and Elevation Contours of Tideman Johnson Park
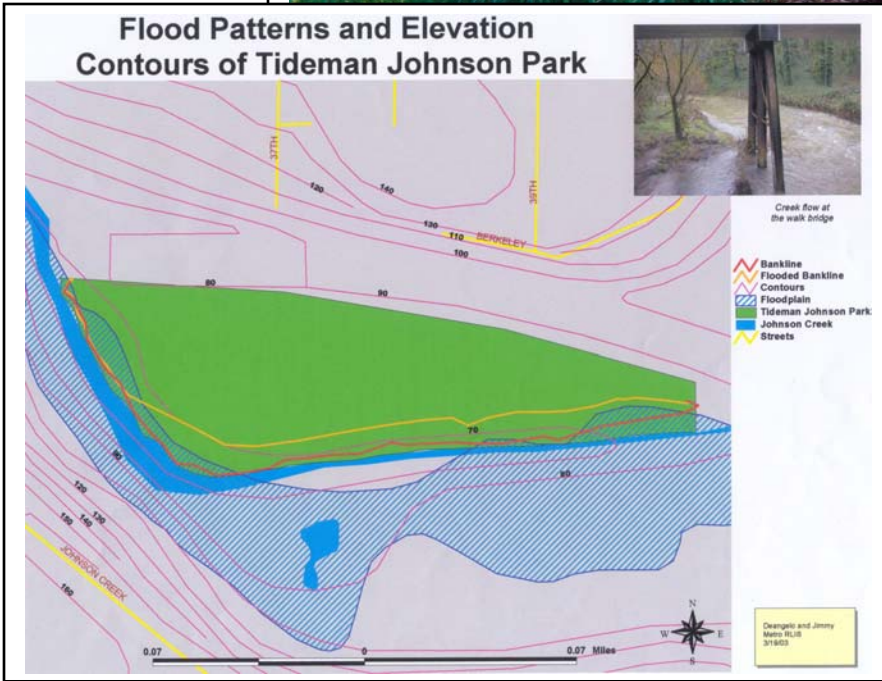
Trillium students in the field and the resulting map.

1. OBJECTIVE AND SCOPE
   a. Train community members and youth in the application of GIS and database technologies to describe, record and analyze historical and cultural information regarding the Johnson Creek Watershed.
   b. Students from the Trillium Charter School will be involved for the duration of the project. Key contacts are:
      i. Gary Rydout
      ii. David Reid
      iii. Arianne Newton

2. ANTICIPATED RESULTS
   a. Youth and volunteers will have a working knowledge of ArcView GIS and Microsoft Access
      i. Specific skills in ArcView: Joining tables, exporting files, geocoding, performing heads up digitizing, and creating hotlinks.
      ii. Specific skills in Access: Creating tables, creating relationships, creating forms, developing data queries, reporting results, developing mailing labels and exporting data.
   b. Volunteers will learn the basics of cartographic conventions.
   c. Volunteers will learn to articulate their research questions, methodologies, and results as well as communicate the meaning of their findings in a public forum.
   d. Volunteers will pass their skills on to new volunteers to allow for project sustainability.
   e. A GIS database will be created to store historically and culturally significant information ranging from survey results, documents, imagery, to audio files.

3. SPECIFIC RESPONSIBILITIES
   a. Institute of Portland Metropolitan Studies
      i. Provide training to develop community asset surveys.
      ii. Provide training and technical assistance in developing a community assets database and a GIS database.
      iii. Provide training in project planning and implementation.
   b. Partner
      i. Ensure final materials are made available to public.
      ii. Marshall volunteers as necessary.
      iii. Maintain relationship with a school partner.

Progress Toward Stated Project Goal and Objectives:

Initial Preparation and Action Taken Toward Implementing Project

The initial projects formulated by staff and volunteers included an interactive fish survey webpage with a GIS element, an investigation into stream bed changes due to WPA channeling during the 1930s and a look at local and watershed-wide demographics. The

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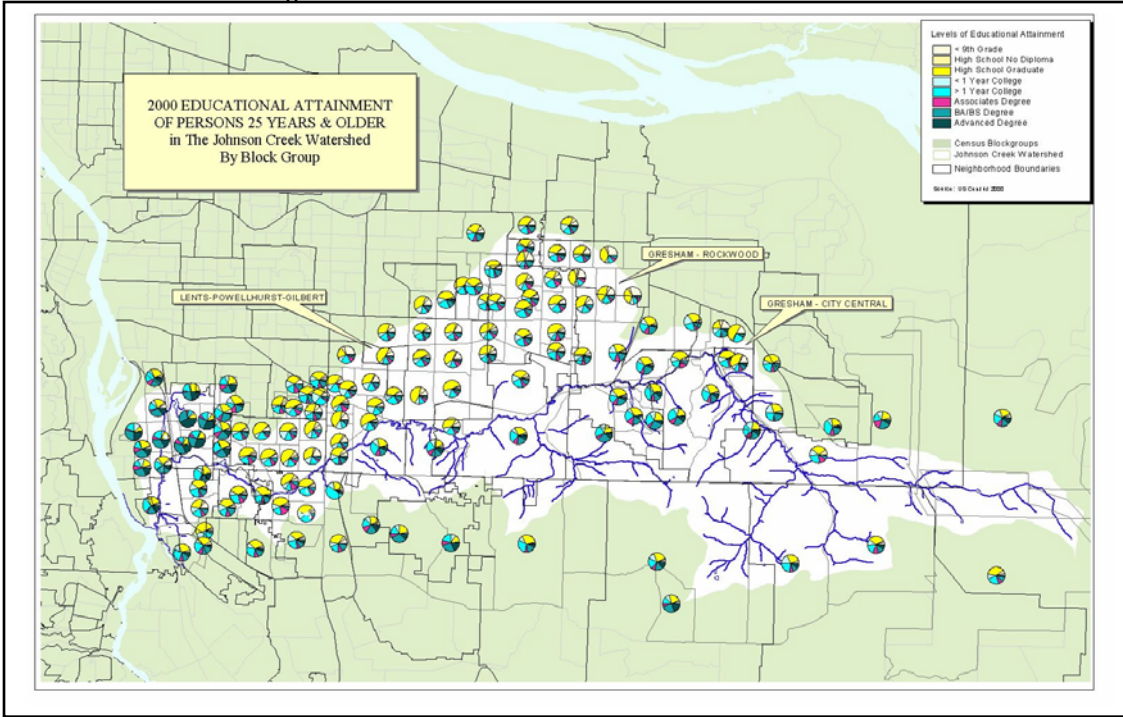
Educational attainment of adults in the Johnson Creek Watershed. Source: 2000 Census.

webpage project was concluded in early January, 2003, and the other two projects continue to be developed and have spawned a fourth poster project aimed at documenting the restoration efforts along a Johnson Creek tributary that holds the best promise for supporting native salmon populations in the watershed.

Training and School Participation:

Training of staff and volunteers commenced in July of 2002 and continued through September 2003 consisting of 2.5 hour trainings per week. Initially, training was structured around an orientation of the technology and typical applications of GIS analysis. The group then split into two groups to pursue the interactive fish survey webpage and a project to document the channelization of specific reaches of Johnson Creek and its tributaries. As the webpage wrapped up in January both groups reconvened and ultimately pursued developing a poster about streambed restoration at Crystal Springs for public education purposes.

Trillium Charter School, in partnership with the Johnson Creek Watershed Council (JCWC), has used GIS to better understand the Johnson Creek watershed and the regional and local forces that affect its overall health. A group of twelve 6th graders participated in the GIS training program. Since the school did not have an operational computer lab, these students were transported to GIS lab facilities at Portland State University once a week for a two-hour GIS lesson during the 2002-2003 school year. Students also participated in field exercises during the week.

The goal for the first trimester (Fall, 2002) was to introduce students to GIS and the concept of a watershed. Students learned basic ArcView GIS skills using local datasets, such as a background hillshade, that helped them understand how a watershed is defined. Population and zoning datasets were used to highlight the unique pressures urban development places on this particular watershed. JCWC also provided their membership database. Lessons and exercises centered on "asking spatial questions" and producing maps that informed people about something in the watershed. Before the December break, the students produced a poster of their work including maps that defined a watershed, located the JCWC membership, analyzed potential point source pollution sites along the Johnson Creek corridor, highlighted aspects of their field experiences and identified the schools within the watershed for future outreach efforts.

In January, 2003, the focus moved into using GIS as a research tool. The Trillium students "adopted" a local park within the watershed (Tideman Johnson Park) and conducted field research identifying human activity in the park, animal and plant characteristics, and aquatic habitat. The data collected provided the material for the students' continuing lessons in GIS concepts and tools. In April, 2003, the students presented their field work at the GIS in Action conference. During this time, a JCWC AmeriCorps volunteer assisted in the field work, providing a valuable connection to the community partner.

Invasive Weeds in Tideman Johnson Park
(Compared to Restoration Site Age)
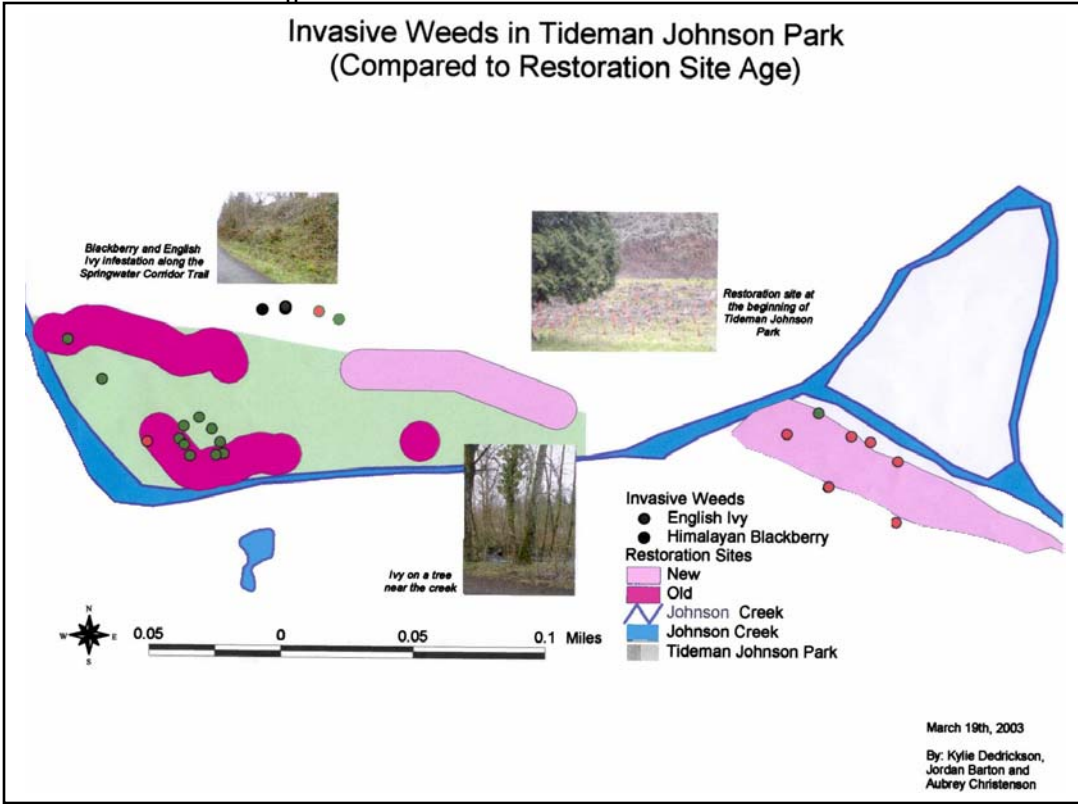
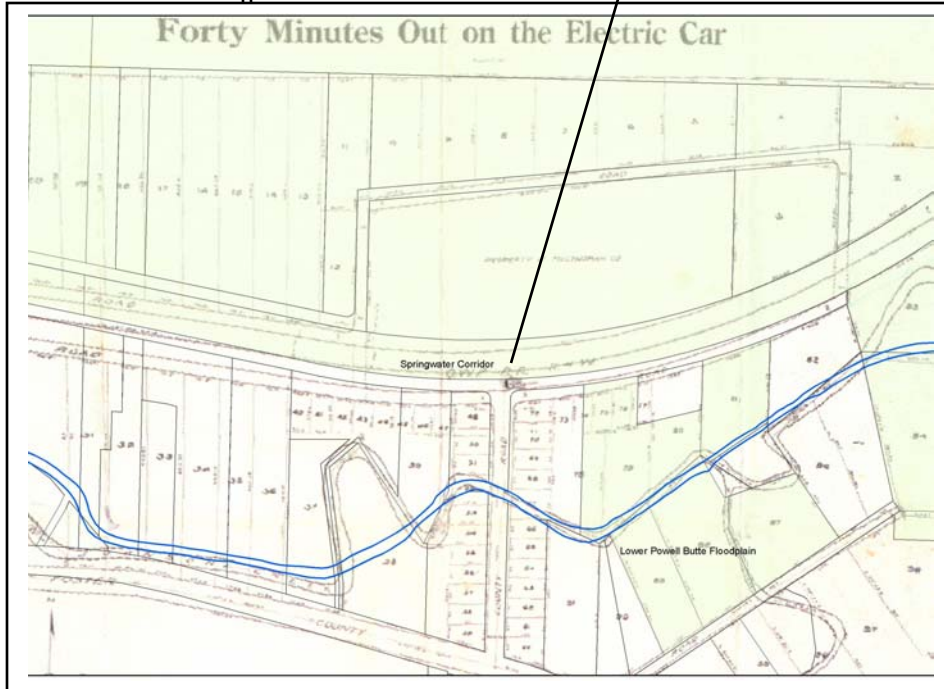Trillium students' invasive species analysis.

The third trimester continued the incorporation of the student's field research, broadening the focus to include the surrounding communities. Students worked extensively with GPS units to gather and enter their data into the GIS. Their work culminated in a PowerPoint presentation displayed at Trillium's End-of-Year Bash.

The Trillium students provided the initial data collection and base maps for ongoing curriculum centered on urban geography. Also, Trillium's efforts in "mapping" the watershed is the first step in documenting the surrounding communities' relationship to Johnson Creek. This will help to inform and enhance JCWC's education and outreach programs, creating a conduit for true community learning.

Products, Achievements and Ongoing Projects:

- *Interactive Fish Survey Webpage.* Volunteers had started a webpage to accompany an effort to survey fish sightings along Johnson Creek and its tributaries before the partnership with the Community Geography Project had started. CGP staff helped volunteers and JCWC staff develop this webpage and provided some insight into what sorts of GIS data may be useful to develop visuals for this survey instrument. The final project included an interactive map whereby volunteers could locate their sightings and survey points, which could then be recorded by JCWC staff. It is unclear if this website will be in use during the winter months, though it was successfully tested in the spring.

- *Westmoreland Park Project.* The first substantial analysis completed by volunteers concerned the channeling of Crystal Springs and current restoration proposal of adjacent Westmoreland Park. The park was chosen as an area of study because Crystal Springs, a tributary of Johnson Creek running through the park, offers some of the most viable opportunities to restore productive salmon habitat to the watershed. It also has been the site of a contested planning effort led by the Portland Parks and Recreation Department to reconfigure the uses of that area to enhance salmon habitat. Many residents view the reconfiguration as damaging to the traditional public uses of the park. In light of this, volunteers were interested in mapping the past, present and future alignments of the creek using historical survey maps and current master plan proposals to compare the change over time thereby clarifying the history of physical manipulation of the creek.

- *Membership analysis.* Census data and membership maps were combined in GIS to give a sense of where membership was coming from and what areas could be better solicited for public involvement. One interesting result of the first few maps was that at least half of JCWC's membership comes from outside of the watershed boundaries. This probably reflects public awareness throughout the region that Johnson Creek is the last free flowing creek in the city limits of Portland.

- *Crystal Springs Poster.* As a final project, volunteers settled on developing a poster of Crystal Springs that will serve as an educational tool JCWC can use at public

Cazadero Line Rail Car 1909

Sycamore Station Stop 2002

Forty Minutes Out on the Electric Car

Springwater Corridor

Lower Powell Butte Floodplain

Discovering the historic meanders of Johnson Creek and old streetcar line by overlaying the current course of the creek onto a historic plat map. PSU Capstone project for JCWC.

meetings and events. They hope the poster will provide a template for a series of maps that help explain the relationship of local tributaries and reaches to the wider watershed as well as drive home the importance of regional watershed management to concerned neighbors. Potentially, these posters could stimulate a sense of place for neighborhoods around the creek and within the greater watershed by offering a basis for concerned citizens to discuss the variety of environmental challenges that are evident both locally and throughout the region. Work on the poster continues to date.

- *The Springwater Corridor Festival in both September, 2002 and 2003.* This watershed-wide event combines hands on restoration activities with a celebration of Johnson Creek. Materials developed using GIS were presented at each of these annual events.

- *GIS-in-Action Conference, 2003.* The Trillium students presented their Tideman Johnson Creek case study at a poster session at the GIS-in-Action Conference in Portland in April, 2003.

- *PPGIS Conference (July 20-23, 2003).* Outreach Coordinator, David Reid, and JCWC Board Member, Gary Rydout, participated in the Community Geography Project panel session at the URISA, 2nd Annual Public Participation GIS Conference in Portland, July 2003. David and Gary were able to provide valuable perspectives on the Initiative representing both the staff and Board sides of a CBO.

- *PSU Capstone Involvement.* Every undergraduate student at Portland State University must complete a 6-credit hour Senior Capstone course to graduate. These courses consist of community-based projects that are achieved by multidisciplinary teams of students. The Community Geography Project and JCWC teamed together for three capstone courses (June 2002-June 2003). Products of the capstones include:

- Middle School curriculum development for Johnson Creek
- Fieldwork at Tideman-Johnson Park with Trillium students
- DRG with hillshaded geo-rectified map
- Historic Johnson Creek case study
- Signage project (watershed awareness)
- Database of Restoration Projects
- Bike and Street map
- Community Outreach Project (including preliminary maps of local demography)

Impressions and Observations:

During a student focus group held in June 2003, the Trillium students noted that their fieldwork was very important and that GIS was a useful tool for understanding and figuring out "what's really there." One student commented, "you have to go out and feel and touch to know." In teaching GIS it is easy to concentrate too much on learning the software ("technology") and not enough on the gathering and analysis of original data ("spatial awareness"). ArcView GIS is simply a tool. The broader goal of geospatial

A poster by JCWC volunteers that will be used for education and outreach.

reasoning can only be gained through engagement with real data and identifying and understanding real spatial relationships.

Students at Winterhaven (in the FOT partnership) expressed that they had become bored with their tasks and felt a disconnection with their purpose. These students spent only one hour each week working with GIS, all of it in a classroom. Their boredom could have been ameliorated by the inclusion of much more field work and collection of original data that gave them a greater sense of project "ownership."

Outcomes and Future Prospects:

Trillium's curriculum moves students through a logical progression of community, urban and global studies. At its core is the integration of geographic concepts and methodologies into the learning experience, and, in this sense, is a natural repository for GIS as a learning tool. Though the original teacher involved in the project is no longer with Trillium, Kirk Ellis, one of Trillium's new middle school teachers, and Seth, the school's math teacher, recently participated in a three day open GIS lab session, provided as a service by the CGP to area teachers. Though neither teacher had experience with GIS, they both embraced the technology as a vital tool for Trillium's curriculum program. Kirk Ellis is now researching potential funding sources to provide equipment (GPS), software, and ongoing technical assistance for teacher and student training.

Though the connection between Trillium and the watershed council was not nurtured to a great extent during the project year, both have benefited from the experience. Key participants at both Trillium and Johnson Creek Watershed Council have expressed their commitment to continuing and strengthening the partnership. Trillium's service-learning model depends on the establishment of these community partners. The Council is interested in working closely with Trillium in the development of curricular materials that they can use as a resource for teachers and community members.

Oregon Child Development Coalition and Cleveland High School

Background and Initial Goal as Stated on the Application and Memorandum of Understanding:

The Oregon Child Development Coalition (OCDC) provides family-focused, comprehensive child development services to children 0 to 6 years old. The services are provided through a comprehensive approach to collaboration and partnership with a variety of private and public organizations under the umbrella of the Head Start Bureau in Washington, D.C. In order to receive Migrant Head Start funding, the Federal Government mandates that OCDC complete a community needs assessment for their service area. OCDC hoped to fulfill this needs assessment requirement through their partnership with the Community Geography Project. OCDC chose Cleveland High
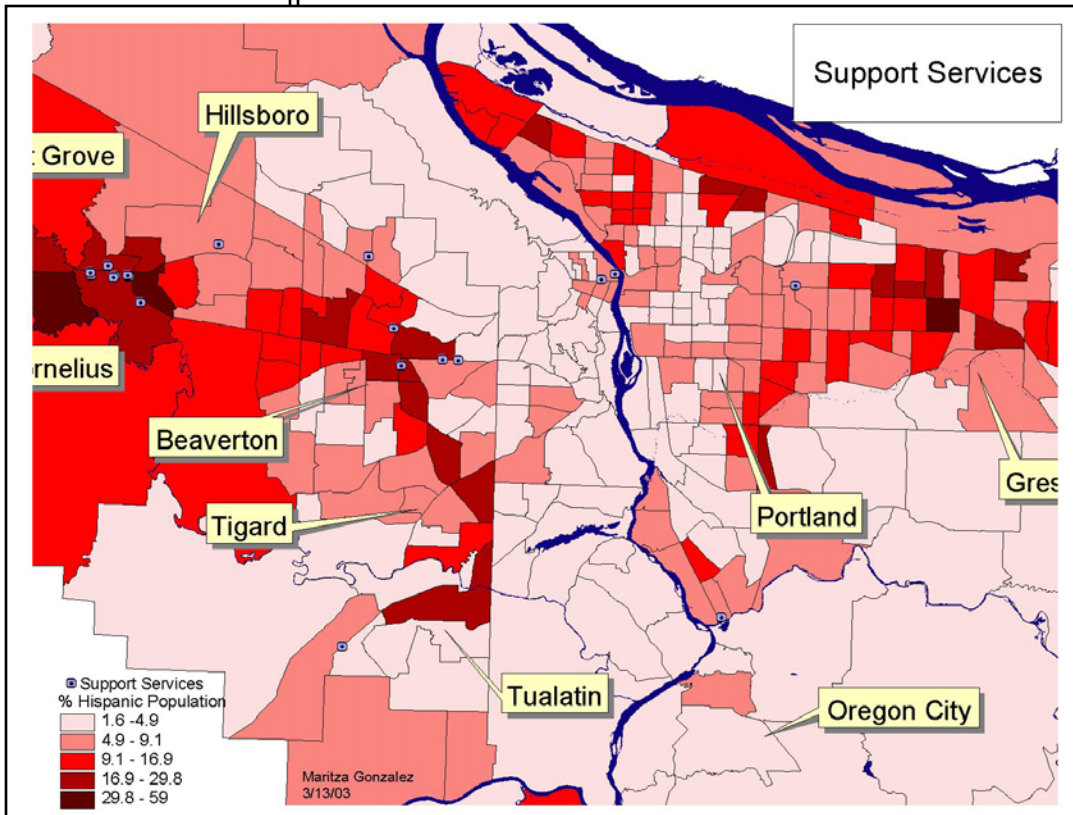
An overlay of Hispanic support services on the percent of Hispanic population per census tract by Cleveland High School student, Maritza Gonzalez.

School as its project partner. Hispanic students at Cleveland were directly targeted for this partnership. The ultimate goal for the students was to map out the location of OCDC clients in relation to transportation and social services.

What follows is are the objectives as stated in the memorandum of understanding:

1. OBJECTIVE AND SCOPE
    a. Apply CGP model in working with low-income and minority populations.
    b. Train students in the application of GIS and database technologies to present an analysis of OCDC client access to services to be used in a federally mandated needs assessment.
    c. Involve students from Cleveland High School (CHS) for the duration of the project. Key contacts at CHS:
        i. Ben Sturtz
        ii. Shana Sturtz
        iii. Guillermo Bustindui
        iv. Zita Podany

2. ANTICIPATED RESULTS
    a. Students have a working knowledge of ArcView GIS and Microsoft Excel.
        i. Specific skills in ArcView: Joining tables, exporting files, geocoding, heads-up digitizing, and creating hotlinks.
    b. GIS maps created to highlight the access of OCDC clients to social services
    c. An ongoing relationship is forged between OCDC and CHS
    d. Students develop skills in problem solving. They learn to ask good questions and become more observant of the world around them.
    e. Students develop an appreciation of computers, a confidence in their ability to work with technology, and an awareness of career opportunities in technology.

4. SPECIFIC RESPONSIBILITIES
    a. Institute of Portland Metropolitan Studies
        i. Provide students with training in the use of ArcView GIS and Microsoft Excel
        ii. Work with students to produce maps to be used in OCDC needs assessment
    b. OCDC
        i. Provide data needed for desired GIS products
        ii. Build a relationship with Cleveland High School and teach students about the issues facing local migrant populations

OCDC Clients and Support Services

• Support services
■ OCDC Clients

Jose Munoz-Campos
2/20/03

6   0   6   12 Miles
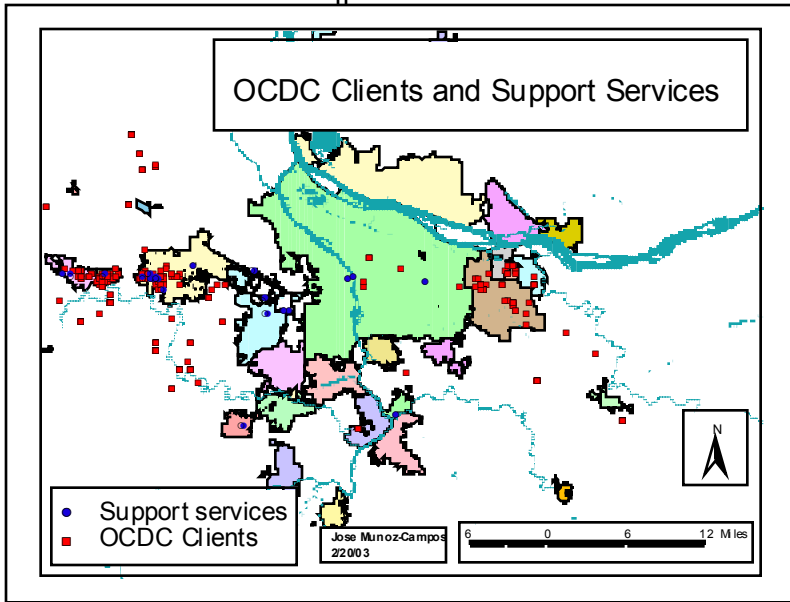
OCDC Families
Families near to services and far from services
(.5 mile)

☐ Near Families
■ Far Families

30%

70%

OCDC Clients in proximity to bus lines

• OCDC Clients not within .5 miles from a bus line
• OCDC Clients within .5 miles from a bus line

4   0   4   8 Miles

OCDC Clients

☐ Within .5 mile of bus
■ Not within .5 mile of bus

50%

50%

68
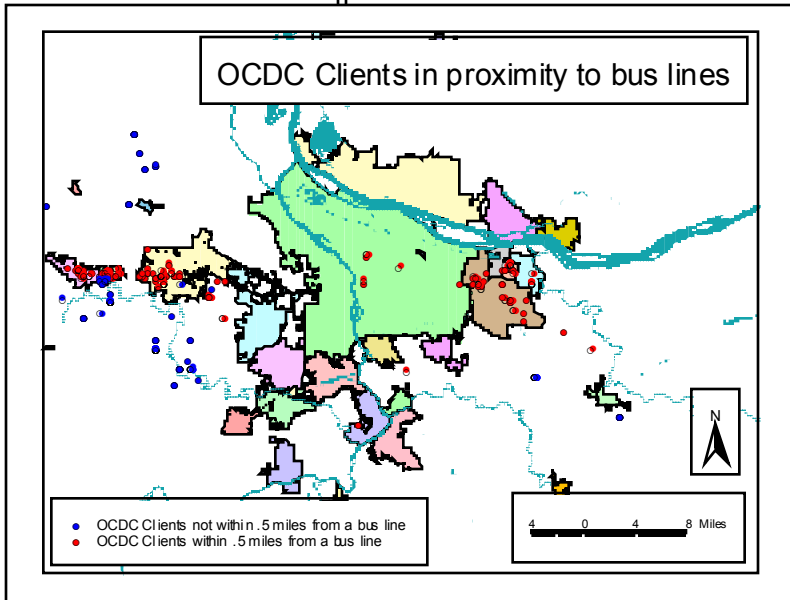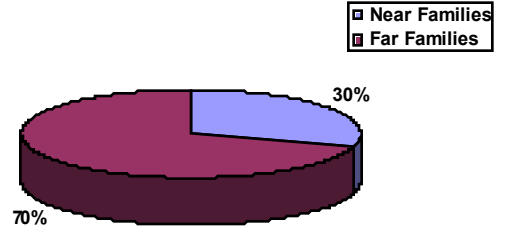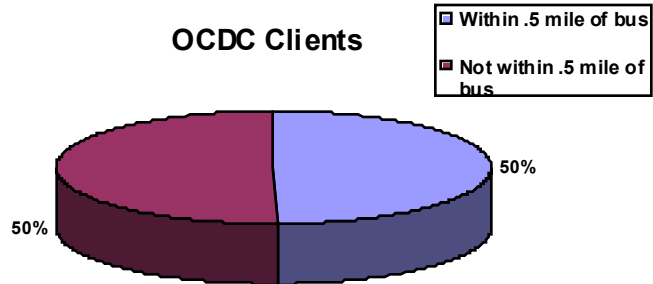
Progress towards stated goals and objectives:

Initial Preparation and Action Taken Toward Implementing Project

Although CBO staff and/or volunteer training was a critical part of the model, given the population and the need, a decision was made in the case of OCDC to provide training primarily to the high school students. Logistical and scheduling difficulties with OCDC prevented any CBO training from taking place.

Initial attempts by OCDC to build a relationship with a high school in their service area failed. As a result, a high school outside of OCDC's service area, Cleveland High School (CHS), was chosen to participate in the project. Cleveland was selected because Ben Sturtz at OCDC had connections there and the school had a large Hispanic population. This distance from the project's focus of study eventually caused problems in communication between OCDC and CHS and the ability of students to learn about the region's migrant population.

Anticipating cultural and language difficulties in the project, a series of meetings were held in May and June, 2002, involving OCDC, Cleveland High School's Hispanic ESL Education assistant, a school-to-work coordinator, the Inner SE Portland Caring Community Coordinator, and Community Geography Project staff to prepare for student training in Fall, 2003. OCDC was given the task of assisting in the development of appropriate final "products." The support staff at Cleveland High School were charged with recruitment of interested students from their Hispanic population, and CGP staff commenced with tailoring the GIS training to this particular group.

Training and School Involvement:

Because of scheduling constraints in the High School curriculum, initial student training in GIS took place during the students' lunch hour. These initial training sessions enjoyed a high level of attendance primarily due to aggressive recruitment by Guillermo Bustindui, ESL Education Assistant and Advisor to Cleveland's Hispanic students. However, technical difficulties in the CHS computer lab and increasingly inconsistent attendance from students during this "free" hour resulted in a lack of progress over the first months of the program. Student attendance seemed to be reliant on "shepherding" by Bustindui, who was also not consistently available due to health related issues. Progress was also slowed by the students' lack of computer literacy and apparent cultural/gender issues among some students. However, several students were able to produce quality maps of ethnicity distribution and country of origin during this time period.

A meeting was called with representatives from CGP, OCDC and CHS to address attendance problems for the GIS training. In an effort to organize a more productive training session (rather than combine it with lunch), training was rescheduled for one morning hour each week before students began their school day. To provide greater incentive for student attendance, extra credit for the course was offered by Cleveland's

Maritza Gonzalez and Jose Munoz-Campos display their poster for the GIS-in-Action Conference.

computer science teacher, Zita Podany. The re-vamped class resulted in consistent attendance from two Hispanic students. These students produced a number of maps to analyze OCDC client access to services, including public transportation, health services, support services, youth services, law services, employment services, drug treatment services and housing services. A resulting analysis by the students revealed that OCDC clients do, indeed, face significant obstacles in accessing social services.

Products, Achievements and Ongoing Projects:

- *Needs Assessment Maps and Analysis.* Students prepared several maps showing the distribution of OCDC clients, client proximity to transportation services, and the distribution of Hispanic services relative to the client population. The students also used the maps to develop an analysis of the accessibility of these services to migrant Hispanic families. The final report produced for OCDC by CHS students will be included in OCDC's community needs assessment, which will be sent to the U.S. Department of Health and Human Services.

- *Webpage Development.* The findings of this report, in addition to hardcopy, were given to OCDC in the form of a webpage also created by the students.

- *GIS-in-Action Poster Presentation.* Two Cleveland High School students presented their analysis of the accessibility of social services to Hispanic migrant families for OCDC in a poster session at the GIS-in-Action Conference in April, 2003. Their poster received an award.

- *PPGIS Conference (July 20-23, 2003).* Zita Podany, a technology teacher and chief staff support at Cleveland High School, participated in the CGP panel at URISA's 2nd Annual PPGIS Conference at PSU. Her observations about the benefits of community-based technology education from the point of view of a teacher of at-risk youth were a valuable contribution.

- **Impressions and Observations:**

- *Educational Institution Constraints.* The rigid structure of public high schools makes it difficult to integrate outside trainings into the school day. For the greatest possibility of attendance, GIS training must be linked to an existing class and curriculum to attract student participation.

- *Cultural and Economic Constraints.* The economic situation of many of the Hispanic students was also an obstacle to conducting training outside of regular school time. Many of the students held outside jobs in order to send money to their families and had less motivation for participating in activities not required by their school. Cultural/gender differences also were somewhat apparent. Students were often paired on a single "operating" computer. Female students often deferred to male students when sharing a computer.

- *Technical Constraints*. The vulnerability of school's computer lab caused immense frustration for both students and CGP training staff. Only a few computers were able to handle the GIS software and data and even then inconsistently.

- *Language vs. Literacy*. Language barriers proved to be less of a barrier to the learning of GIS technology than overall computer and spatial literacy.

- *Work Plans and Responsibilities*. An overall work plan that fully details each partner organization's roles and responsibilities is necessary and should be revisited on a regular basis. OCDC was experiencing stresses that were not communicated to CGP staff. Although a plan had been developed in June 2002, the fluidity of every aspect of the project made the initial plan impossible to follow.

Outcomes and Future Prospects:

Despite an initial lack of contact between OCDC staff and CHS students, OCDC has expressed an interest in continuing to work with CHS. Potential projects include an analysis of transportation gaps for migrant families outside of the Portland Metro Area. In addition, the two students who completed the project met last spring with Metro (Portland's regional government) GIS staff to explore possible career opportunities in GIS.

THE COMMUNITY GEOGRAPHY PROJECT COMPANION CD

The concept of a Community Geography companion CD was developed in reaction to a growing realization that a multimedia reference was going to be a necessary component of augmenting and maintaining the existing skill base related to GIS in our partner community organizations. Thus, the contents are designed for individuals who have completed training with the Community Geography Project as well as for training new volunteers and staff who come to work with these organizations. It is also something of a clearinghouse for cartography resources, additional instructional material, GIS data, and software.

The CD is organized into five main sections as follows:

1. Visualizing Place

In this section we've made an attempt to get the idea across of what GIS is, how it relates to cartography, and how this is meaningful to organizations. It addresses basic questions such as: Why would you use GIS or cartography in the first place? How does it help people understand the world better and ask new questions?

We also added some practical tutorials in chart creation, graphic design and data classification for ArcView.

2. Data

This section directs users a variety of GIS data that has been prepared for use with Metro's RLIS data. That means the data is in the same projection and will "line up" with data files prepared by Metro (a rich source of data that all of our partners have access to). We have included images that illustrate the physical relief of the region, digital elevation model (DEM), 2000 census data, National Wetlands Inventory Data, as well as data that was prepared in conjunction with many of the project we have been involved with over the past two years.

3. Arcview GIS Tutorials

This section is tailored to individuals who have been partners in the Community Geography Project. Material is presented in PowerPoint Webpages which can be easily used to deliver training to new staff and volunteers. Topics covered include the core curriculum of the Community Geography Project as well as several more advanced topics in analysis and map production.

4. Highlights from the Community Geography Project

Here we have provided a gallery of maps that can be used for inspiration. Many thanks to the volunteers, students and staff who put in the many hours to create these works of art! Also, Middle School through High School students have been involved in each partnership we have pursued. This section outlines K-12 student participation in the Community Geography Project and offers a survey of their work. A link is provided to the webpage of the Institute for Portland Metropolitan Studies for more information and updates to all of our projects.

5. Software

Several shareware software packages have been included with the CD which are discussed in the tutorials. These packages include tools to create .pdf files, a tool to create and open .zip archives, an open source Office package (complete with word processor, draw program, spreadsheet, webpage editor, and slideshow software), and several extensions for Arcview GIS.

A flowchart, complete with hyperlinks, provides a map of contents for the CD.

An invitation to volunteer from the Old Town History Project.

LESSONS LEARNED

The Community GIS Initiative was designed to offer service by providing education and training in GIS technology and other methodologies and tools to our community partners to enable them to further their agendas. The Initiative exceeded our expectations in several respects as can be seen in many of the map products that CBO volunteers and kids created, the continuing CBO/school relationships, the extraordinary commitment of many of the CBO volunteers, and the new ways that participants are asking questions about community issues.

In assessing our goal of *empowerment* for our partners through the utilization of GIS and the promotion of GISs *"of, by and for"* the CBOs, progress toward that goal was made by four out of six of the organizations (unfortunately, not the Wetlands Conservancy or Oregon Child Development Coalition). And with the four that did make progress (Friends of Trees, Johnson Creek Watershed Council, the Old Town History Project, and the Sherwood Institute), we have learned that fully attaining this goal will take more time than we expected.

The learning curve of the technology for non technical people, limited capacities of CBOs, outmoded and poorly supported computer labs in the schools, structural barriers within the public schools systems, and local and national economic conditions were all significant challenges to the Initiative's model for empowerment and sustainability; they were challenges that the Community Geography Project staff confronted on a daily basis.

While GIS technology can perform complex spatial analysis and produce revealing and persuasive graphic images or maps, the ability to utilize the power of geographic information and GIS begins with the ability to understand the significance of geographic location, distribution, and pattern – and not just knowing where things are but understanding the importance of asking geographic questions (why things are where they are or aren't) – in other words, being geographically and spatially literate (figure 2).

In addition to the aforementioned challenges, we encountered a higher level of spatial illiteracy than we anticipated from our partner CBOs. While it is true that they demonstrated some level of understanding in their proposals, during the process of working with our partners, it became clear that spatial thinking was largely unfamiliar to them. This was less the case for Friends of Trees, Johnson Creek Watershed Council, and the Old Town History Project, organizations whose missions are blatantly geographic and whose staff and volunteers tended to be highly educated but even they had limited experience with thinking spatially. Based on this experience, we suspect that a key reason why the response rate of CBOs to the requests for proposals was much lower than expected is the geographic and spatial illiteracy among the American citizenry (National Geographic-Roper Global Geographic Literacy Survey, 2002). This, we believe, is a significant observation because it comes at the point of entry: CBOs, regardless of capacity, can't be expected to value and dedicate limited resources toward something that they don't understand. This is something that we, as an educational institution, intend to investigate further and address in future initiatives.
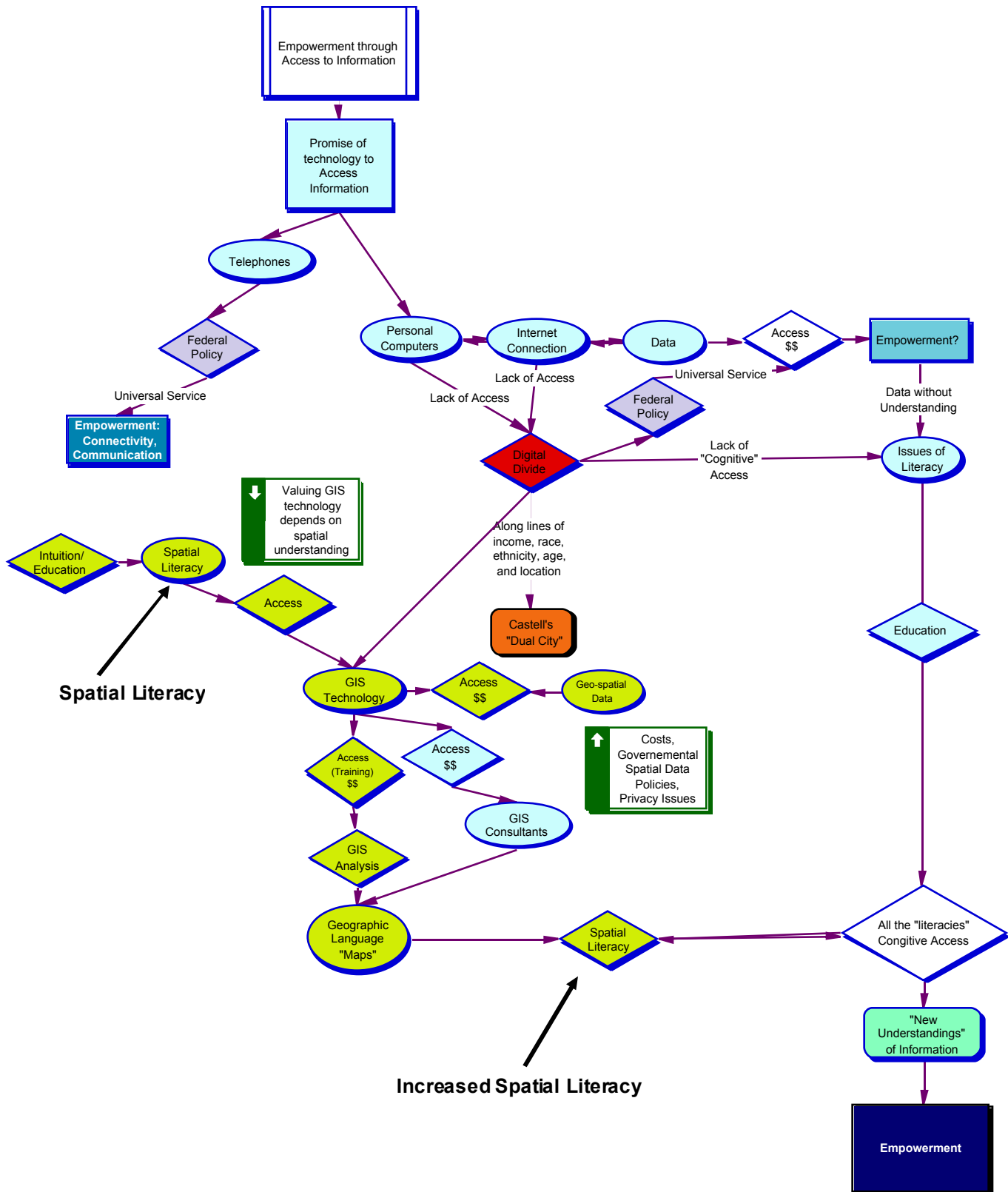
Figure 2. Empowerment through Access to Information.
Source: Merrick, 2002.

The remainder of this section describes in greater detail the lessons learned through the experience of the Initiative by first examining the issues relating to the digital divide (the concern that framed our proposal), then discussing what we have learned about training, and finally focusing on the viability of the Community GIS Initiative model.

The Digital Divide and Access

1. Hardware, software, and technical support remain obstacles:

    a. Computer capacity is limited. Although computers and Internet access were available to all of the partners, the capacity of the computers varied tremendously. Computer capacity was especially a problem in the schools. We worked in two school districts, one new Portland Public Schools' charter school (representing a different support structure), and one alternative, privately funded school. In general, students worked with outmoded equipment that broke down frequently and ran slowly. Interestingly, the quality and capacity of the hardware didn't necessarily correspond with the socio-economic status of the school. The best lab we saw was in Portsmouth Middle School located in one of the lowest income neighborhoods in Portland.

    b. Availability of PCs. The GIS software that was available to the CBOs and schools runs on a PC platform. This was initially a problem for the Old Town History Project whose only computer was an Apple. This was solved by donations of PCs to the organization. Winterhaven School also had to wait for donations of PCs for work to begin as they couldn't get to PSU for training. The limited number of PCs available at Winterhaven also limited the number of students who could participate. Winterhaven's computer lab, like many K-12 schools, is a Mac lab.

    Of the three CBOs that wanted to work directly with GIS most (the Old Town History Project, Friends of Trees, and Johnson Creek Watershed Council) only the Old Town History Project had to start a networked system from scratch (their volunteers came to Portland State for training); this they have now accomplished. All of these organizations are currently using GIS in their own facilities.

    c. Technical support in the schools varied from school site to school site. In most cases, we were, understandably, not permitted to load the software and data onto machines ourselves but given the minimal technical support that exists in K-12 schools, waiting for software and data installation sometimes created delays. Lack of technical support also contributed to frustrations for students when computers were in continuous need of repair. In the cases of Metropolitan Learning Center, Lincoln High School, Open Meadow, and Trillium Charter School, we got around these frustrations by providing most training at Portland State. This had the added benefit of introducing students to the university environment. However, this situation presents a serious challenge to the Initiative's model for sustainability that suggests that schools can provide some

level of continuing GIS expertise to CBOs. Teachers and students must be able to have access to reasonably well maintained computers to make this work.

d. <u>Cost of software is an obstacle</u>. Although ArcView GIS software licenses were provided to the CBOs through a donation by ESRI, the world's largest GIS software vendor, and we were able, by way of ESRI's Community Atlas program, to get software licenses for the schools, the cost of the software is a consideration, especially for financially strapped CBOs. Free data viewing software, ArcExplorer, is available from the ERSI website. With this "shareware" one can make very simple maps and queries, however, it cannot perform even the simple analyses and database work that the CBOs wanted.

Database software is more accessible. In many cases, MS Excel (the spreadsheet component of the MS Office Suite) was adequate and available to everyone we worked with. Where MS Access was desired, our partners already had licenses. It is packaged with the MS Office Professional suite. Where we could, we introduced our partners to other useful shareware programs such as Open Office (see the Community Geography Project Companion CD).

2. Access to geo-spatial data can be limited and costly:

a. <u>RLIS is not free</u>. Data has to be anchored to geography in order to be useful in a GIS. Fortunately, Portland is home to one of the finest geospatial databases in the nation (Metro's Regional Land Information System or RLIS). It is not free, however, and the price for nonprofits can be prohibitively high. Under the grant we were able to provide subscriptions to RLIS Lite (we were able to negotiate a deal with Metro because of the grant project) that gives the CBOs and schools extensive "base layers" to work with for as long as they like (they will have to pay for updates if they want them, however). New data can be added to these base layers by users according to their interests. Some base layers are available at no cost from the State's Geospatial Service Center but they are of much lower quality and more difficult for novices to work with. Although there is an increasing amount of geo-spatial data available online, much of it isn't free and it can be difficult to work with as well (requiring re-projection). Access to data, therefore, remains a barrier to citizen use of GIS technology. Metro's pricing structure is much better for K-12 schools than it is for nonprofits; this provided one incentive for promoting CBO/school partnerships.

3. Cognitive access and spatial literacy:

a. <u>Computer use</u>: Novice adults and high school and middle school students can learn to operate GIS software and learn to perform simple but powerful analyses and create effective maps. Not surprisingly, adults with some technical background learned much more quickly than those who didn't. And those who have continued to use GIS are those who developed some level of self-confidence with the software. Most of the adults that we worked with tended to

be "careful" with the software, not wanting to get things "wrong," not experimenting too much.

In contrast to the adults, the kids tended to be fearless on the computers, anxious to dive in and experiment. They love the graphic quality of GIS and readily respond to the interactive training method that we have developed (Merrick and Dorwart, 2002). All of the students that we worked with, regardless of socio-economic class, with the exception of the Hispanic students, had some previous experience with computers; some of the students had advanced skills such as programming. On the other hand, most of the newly arrived Hispanic students had no computer experience. This inexperience with even the most basic skills turned out to be a greater barrier than language.

While the adults tended to be careful with their work, especially with the databases, the quality of kids' work varied. Kids are kids, sometimes the work is outstanding and other times it is lacking. The best part about young students is that they are willing to take chances and are often quite imaginative in their approach. Their input can be a great way to test different approaches to analysis and cartographic communication.

b. Spatial literacy: We learned in our first year that most of the adults we worked with had little experience posing spatial questions or using maps as a vehicle for posing such questions. The interviews that we required as part of the selection process for Year Two, allowed us to help applicants to better understand the capabilities of GIS and the importance of thinking spatially. We believe that the Year Two proposals were improved as a result. However, as we worked with these new partners it became clear how limited their understanding of the relevance of spatial relationships was with regard to their respective projects. For example, it was sometimes difficult to get beyond an organization's most obvious interest such as simply mapping the incidence of fish in a watershed or newly planted trees in the region. With education and the iterative process of making and interpreting maps, Friends of Trees and Johnson Creek Watershed Council, in particular, have begun to ask broader and deeper questions stemming from the "where" and "why" of things and have begun to use this information more strategically.

Again, in contrast to the adults, we had no expectations with regard to spatial or geographic literacy of the kids, either in middle or high schools, but they surprised us. Most of them could locate themselves in terms of "home", or school, or neighborhood on a GIS display. Most of them could readily identify significant geographic markers.

Moreover, they sometimes saw relationships that took longer for some of the adults to see. One example: in introducing the Trillium students (middle schoolers) to the Johnson Creek watershed and a GIS technique called "joining tables," the students "joined" census 2000 data to a map of the watershed to create a new map of the educational attainment of people 25 years and older

residing in the watershed (p. 58). The Johnson Creek watershed is an urban watershed with tremendous socio-economic variation and where there are several census block groups with a quarter of the adult population with less than a 9th grade education. After making this demographic map, the students, with little prompting, noted that educational attainment was very uneven across the watershed and suggested that JCWC would need different sorts of approaches to outreach if they wanted to effectively communicate to all of the people in the watershed. They said that while numbers, charts and graphs might be appropriate for making a case for watershed restoration to a college educated population, such an approach might be "insulting" to people who don't know how to read charts and graphs – other approaches might be necessary to reach people with little education. Interestingly, it took longer for the Johnson Creek Watershed Council staff to see the importance of the kids' finding and curious given the geographic distribution of its membership that corresponds only with highly educated areas and areas that are flood-prone. Large areas of the watershed aren't being reached.

The kids that we worked with had a natural sense of curiosity and intuition that enabled them, with some preparation, to ask really good spatial questions and interpret maps without the prejudice of adult experience. This is a very real contribution that they can make to CBOs so long as CBOs are receptive.

Given the limited spatial literacy of our selected partners, we suspect that a key reason why the response rate of CBOs to the requests for proposals was much lower than expected is geographic and spatial illiteracy among the American citizenry. "Community-based" groups tend to be inherently geographic and their missions inherently spatial. According to the National Geographic-Roper 2002 Global Geographic Literacy Survey, which surveyed 18-24 year-olds in the U.S., Canada, France, Germany, Great Britain, Italy, Japan, Mexico, and Sweden, 11 percent of the Americans couldn't locate the U.S. on a map and 30 percent of the Americans couldn't identify the "western-most" point on a very simple map. The Americans surveyed scored next to last on the entire survey, just ahead of Mexico (National Geographic-Roper Global Geographic Literacy Survey, 2002). We cannot assume that the American citizenry has even the most fundamental grounding in geography and spatial concepts. This is important because GIS will not be used by CBOs if they don't understand its value.

Training

Given the mission and goals of the Community Geography Initiative, the style of the training that we offer is critical:

1. <u>GIS technology is a vehicle for critical thinking and spatial literacy</u>. In our approach to training, GIS technology is seen as a vehicle for critical thinking and geographic and spatial literacy rather than a software package to be learned through generic tutorials or a tool that prescribes answers to questions.

2. <u>Emphasis is should be on the "particular"</u>. In our training method, CBOs' questions provide the framework for training that also provides a strong incentive to complete the process and do high quality work. Teaching GIS to community members using data about the places they know best makes it clear them how important is to question the accuracy and lineage of the data they are using. Our community partners have spotted errors in data we thought was clean.

   This emphasis on the particular in terms of place and question means that training is largely customized. In this way, we can be sure that the "trainees" are thinking about what they are doing and are learning how to use GIS as a vehicle for generating new questions. Off-the-shelf tutorials using canned datasets about places that are unfamiliar have their place but tend to promote rote learning that is superficial in nature – from the perspective of the Initiative, this is not what GIS inquiry should be about.

   This approach to training is labor intensive. Our hope, however, is that many of the adults and kids that have been trained will be able to train others. We have developed a Community Geography Project Companion compact disc that uses some of our partners' projects to review the concepts, processes, and techniques that they have learned as well as sources for assistance. This is not intended to be a generic ArcView GIS tutorial; they are available in abundance.

3. <u>Simple GIS applications and maps can be very powerful</u>. In most cases, simple applications will suffice and training should focus there. Expensive GIS systems such as ArcGIS that require a lot of computing power, and high maintenance applications such as Internet map server (IMS) applications are extremely difficult to learn and only appropriate where they can be adequately supported.

4. <u>Training should be highly interactive</u>. Training should be highly interactive promoting the questioning of data, analysis, and output, as well as the connections between the local and regional, and the past with the present and future. Training should be seen as an iterative process, a kind of "conversation" with data that begins with a question that produces a map that informs the next question that produces the next map, and so on.

5. <u>Results must be seen quickly</u>. CBO staff and volunteers and high school and middle school students must be able to see results quickly as an incentive to surmount a relatively steep learning curve. Projects should be broken into manageable and do-able increments so that trainees experience success.

6. <u>Teaching kids helps CBO staff and volunteers learn.</u> Often the best way to learn is to teach. Having staff and volunteers get involved with the community service projects that students undertook helped them gain experience with the technology and discover new ways of applying it.

Don't overburden the CBO with classroom responsibilities before it understands how it will utilize the technology. This requires that staff have gained their own experience with the tools beforehand.

7. <u>Sharing work with others provides important feedback and affirmation.</u> Having a venue, such as the GIS-in-Action Conference where the students were treated by the professional GIS community as colleagues made the students aware that they were a part of a much larger community of inquiry and empowered some of them to seek further education. This sort of experience should, whenever possible, be incorporated into any community GIS training program.

8. <u>There is a broader need to teach organizations about techniques</u> (not just technology) available to evaluate local conditions and their organization's impact. Not only are people who are new to GIS not familiar with cartographic principles and GIS's capability to query information spatially, they also may not be familiar with concepts such as cross tabulation, descriptive statistics (standard deviation, medians, variance), or the variety of geospatial data that exists in the public domain (i.e. Census, state and local data, etc.). Additionally, they may not be comfortable with using programs like MS Excel to produce charts or with utilizing graphics software to enhance presentation. While acknowledging this, we also recognize, as with our approach to GIS training, simple, readily graspable techniques are always preferred or they will not be used.

9. <u>Training takes time – more than one year</u>. There is a steep learning curve not only with the software, but also in developing a participatory process that involves volunteers. Project planning, developing research agendas, and identifying appropriate methodologies need to be negotiated upfront. It takes time to develop shared ownership in the design and agenda for community research projects. Our Year Two projects that had 1 ½ years of training were able to move considerably closer to some semblance of independence. Two years with additional consultation may be adequate.

The Community GIS Initiative Model and Sustainability

Out of concern about the capacity and fluidity of community-based groups, we created a model that we hoped could sustain some level of technical expertise for the CBOs (figure 1). GIS expertise isn't free nor can it be accessed effectively by CBOs (either on their own or with consultants) if it isn't understood at some level by the CBOs. Since our goal was empowerment, we believed that it was important to be able to remove the need for the outside expert (ourselves and others) as much as possible. Our early experience with the CRUE program of Open Meadow indicated that high school students, even "at risk" high school students, could perform simple GIS analyses and create maps that would be extremely useful to CBOs. We also assumed that community-based GIS education would be incorporated into middle and high school curricula within the next five years. This would provide a kind of structural stability that could produce a sustainable GIS resource for at least some CBOs. As a result, we developed a model that required CBOs

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to form a partnership with a school. Training, software, and data would be provided to both CBOs and schools.

We saw many benefits in this for high school and middle school students and their teachers as well. Students would be encouraged to think critically about community issues, learn to ask geographic and spatial questions, learn to use GIS technology to do analysis and create maps, learn how to design maps that communicate effectively, acquire potential job skills, teach others, do real work that mattered to a real community organizations, become more civically engaged. Teachers would increase their spatial literacy, learn how to use and teach GIS with their students, form a relationship with a community partner, get software and data. We were also given encouragement to pursue this model by administrators and teachers from Portland Public Schools and Multnomah County's Youth to Work coordinator. We developed the model when the national and local economies were booming.

The model has been sorely tested during the past 2 ½ years by a number of factors including: the limited capacities and individual characteristics of the CBOs; outmoded and poorly supported computer labs in the schools; structural barriers within the public schools systems; and local and national economic conditions that affected the stability of the schools and CBOs. These are our observations with regard to these issues:

- Dollars vs. service. Given our outreach efforts for our request for proposals processes, we were disappointed at the number of actual proposals that were submitted (table 1). The lack of spatial literacy may have impacted the number of applications submitted but there are factors that pertain to the model that probably affected the number of applicants as well. The requirements to develop a project, a partnership with a school, and having to compete for the very limited number of positions for projects that would not result in direct funding for the organizations may have seemed overwhelming to many financially strapped organizations (Appendix B: Adler and Odell).

- In tough financial times, some CBOs are tempted to stretch beyond their limits to obtain resources. All of the applicants represented that they had the capacity to make their proposed projects work, however, in two instances (one in each year), this turned out not to be the case. The Wetlands Conservancy and the Oregon Child Development Coalition wrote well received proposals but turned out not to have adequate staff or volunteers to actively participate in the projects. The irony of this is that these are the oldest, most established organizations that we worked with. A closer look at both organizations indicates that a lack of volunteer base and staff made them inappropriate for the Initiative. While none of the CBOs that we worked with had a large number of staff, they made up for that lack with volunteers and, in some cases, Americorps workers. Perhaps we should have looked more deeply into the capacities of every CBO that applied; instead, we and our selection committees took them at their word.

- **Mismatches between CBO expectations and school partner's capabilities can defeat a partnership.** According to our project assessment interviews (Appendix B: Adler and Odell), this happened in the Wetlands Conservancy/Open Meadow partnership. The Wetlands Conservancy technical and analytical desires were too sophisticated for the Open Meadow students to fulfill. Given the Wetland Conservancy's intimate knowledge of the Open Meadow program and its history of work with the Community Geography Project, it's puzzling why they submitted a proposal knowing the requirements stated in the RFP. Nevertheless, a mismatch between a CBO's needs and what can be done by high school or middle school students is a real possibility (Appendix B: Adler and Odell). In such cases, the CBO should be made aware of kinds of projects that are possible and do-able and left to decide whether or not to continue the partnership. In the case of the Wetlands Conservancy/Open Meadow partnership, the decision was made to continue because of the tremendous benefits accruing to the kids.

- **CBO instability.** Two of the organizations (Johnson Creek Watershed Council and Oregon Child Development Coalition) lost directors shortly after their projects began. In both cases, these positions took many months longer than expected to fill and is a reflection of the funding uncertainties facing nonprofits in general. This impacted these projects because our key contacts with the respective organizations essentially had dramatically increased responsibilities for most of the durations of their projects.

- **Volunteer commitment can be extraordinary.** In spite of other instabilities, we were surprised and pleased at the extraordinary level of dedication by many of the CBO volunteers to these year-long or longer projects, particularly those involved with Friends of Trees, Johnson Creek Watershed Council, Old Town History Project, and the Sherwood Institute for Sustainability. This may, indeed, be the hope for sustaining the expertise within the CBOs. We have discussed with our partners the importance of maintaining some institutional memory in this regard, and the Companion CD should help.

- **Inflexible schools require flexibility from CBOs and CGP.** Although all of the CBOs that applied for the grant were enthusiastic about the idea of partnering with schools, the reality of working within the inflexible structure of conventional public schools (the nature of the school day and year) required a high level of flexibility and capacity (staff or volunteer time) from the CBOs. Two of the CBOs (Friends of Trees and Johnson Creek Watershed Council) and one school (Lincoln High School) had Americorps workers to work on the projects; this proved beneficial to those projects (Appendix B: Adler and Odell).

- **Structural aspects of conventional public schools present significant barriers to innovation and service to underserved and at-risk youth.** Structural issues present significant barriers to innovation even when the teachers and administrators are enthusiastic about projects and understand their value for students. Furthermore,

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low income students who must work can't take advantage of after-school programs.

- o Scheduling: Scheduling was especially a problem at the high school level where course requirements and the school day are highly structured and inflexible. We realized early on that education and training for students would require a minimum of 1 ½ hrs per week for a full academic year. Fortunately, we were able to be very flexible, willing to offer training before, during, or after school, either on site or at Portland State.

  In schools where there was some flexibility in schedule and curriculum (generally the alternative schools), we were able to provide training during the school day with credit given.

  In the cases of Winterhaven and Portsmouth Middle School, we were able to offer training before school when necessary. This was not ideal as it required students to be motivated to get to school early – which, remarkably, they did. At Sherwood, all training was overseen by the Sherwood Institute and was an after-school activity.

  In addition to the two alternative high schools (Open Meadow and Metropolitan Learning Center), we worked with students from Lincoln and Cleveland high schools. The participating students from Lincoln High School were self-selected, college-bound, and willing to work on the projects after school. The incentive for them was having community work that used high technology to go on a college application. The students at Cleveland, on the other hand, were Hispanics who, in general, were recent arrivals, sent by their families to work here and send money home. All of them worked after school and their school day was totally inflexible. At first we worked with students during their lunch hour; later, during a "0" period before school was officially in session. Needless to say, we struggled to retain students. We are very concerned about what this lack of flexibility means for the participation of low-income students who must work before and/or after school in innovative programs.

- o Incentives and rewards for students: We recognized the importance of incentives for all of the students even though most students were excited just to be working with GIS. At the middle school level, the teachers were able to provide academic incentives for students to work on the projects.

  At the high school level, this was more problematic. Highly motivated college-bound students understand the value of extra-credit work for college admission. Our Hispanic students, on the other hand, didn't understand the value of computer literacy or a high school diploma to getting a better job let alone college entrance. We were fortunate to have a technology teacher who saw the value of GIS education and took a

special interest in two of her students who happened to be participating in the OCDC project. She gave them extra-credit for their work and encouraged them to go to college. These students stuck with the project and provided all of the GIS work that was actually used by Oregon Child Development Coalition. Getting credit through normal channels proved time consuming and was ultimately impossible due to the District's scheduling requirements.

Open Meadow is an alternative school for at-risk youth with an innovative curriculum and relatively flexible scheduling. The students' participation in the project was considered an integral part of their curriculum and the school instituted incentives for the students.

Perhaps the most rewarding experience for all of the students who were able to participate, was attending and presenting work at the GIS-in-Action conferences in Portland in April of 2002 and 2003. Here, students were able to articulate what they were working on and show their work to GIS professionals. Students were treated by the professional attendees as peers and were truly excited by the work the students were doing.

- Teacher discomfort with technology and the need for incentives. The teachers who agreed to be involved in the various projects, in spite of scheduling difficulties, were, without exception, thrilled to have their students receive GIS training from us. They were less comfortable with the idea of learning it themselves. Most of them were insecure about their computer skills whereas their students weren't. This put many of them in an awkward position in relationship to their students although some believed that turning the tables on the student-teacher relationship could be a confidence builder for their students.

Although free training, software, and data were adequate incentives for some teachers, for those who needed extra encouragement, we developed a CEED (continuing education) course through the Portland State School of Education that gave teachers graduate credit for their training. This one-credit course requires 10-hours of seat time that can be difficult to schedule given teachers' varying after-school responsibilities. Teacher in-service training days are the best opportunity for delivery of this type of training but those have been limited by budget cuts.

In spite of these incentives, most of the teachers still couldn't dedicate adequate time to learning geographic concepts, simple GIS analysis and map design because of curricular demands geared toward standardized tests, inflexible schedules, and the necessity of summer jobs.

Assisting teachers in the development of community-based GIS curriculum units tied to the Oregon's Certificate of Initial Mastery and Certificate of Advanced Mastery, as we are now doing under the Teaching American History grant, should provide additional incentive and sense of confidence for teachers.

- Education at all levels needs more stable funding in Oregon. The Initiative corresponded with the most devastating funding cuts to K-12 and higher education in the history of the state. Portland Public Schools was brought to its knees by cuts that threatened to knock three weeks off of the school year (lampooned in nationally syndicated cartoon, *Doonesbury*, in March 2003). Teachers worked for free for two weeks to maintain their benefits. Needless to say, teacher morale was exceedingly low. Innovation is difficult to achieve under these conditions.

- Geography and GIS coursework belong in schools of education. GIS is currently being used by a wide variety of disciplines and professions including: environmental science, geology, city planning, demography, biology, archeology, meteorology, transportation planning, crime analysis, historical analysis, emergency management, health related studies, market analyses, and military applications. And yet, no schools of education in Oregon are providing GIS training to pre-service teachers. While the number of K-12 teachers using GIS with their students is increasing around the globe, as evidenced in ESRI's educators' conferences over the last three years (www.esri.com), they are pioneers generally developing their own programs without support from their districts. Teachers' experiences, based on the proceedings of these conferences, resonate with our own in that GIS enhances young students' critical thinking skills and appeals to many students who don't necessarily excel at science, math, or technology and therefore, can provide an entry for them into the scientific and technical realm.

  Since the Initiative began, ESRI has, in fact, published two books to assist teachers in developing community-based GIS projects, *Mapping Our World: GIS Lessons for Educators* (2002), and *Community Geography: GIS in Action* (2003). These books are a testament to the understanding that ESRI has of the value of community-based work for learning GIS and its commitment to promoting it. The time to introduce this technology to teachers is, however, when they are learning pedagogy. The use of GIS should be understood and taught to teachers, and by extension their students, as an vehicle for critical thinking about the world and not a software package. This situation will change as young, computers-savvy students enter schools of education.

FUTURE EFFORTS

The Ford Foundation has provided us, through its generous grant, the opportunity to provide a valuable service to our community and us with an incredibly rich and rewarding learning experience. We have been in the trenches and we have learned a great deal. How will we incorporate what we have learned into future initiatives?

Fundamentally, our goals haven't changed. The process and products of GIS can promote spatial thinking, provide real opportunities for discovery, discernment, persuasion, community building for citizens of all ages, and grassroots empowerment. The excitement and sense of empowerment that we have seen in the people we've worked with (Appendix C: Partner letters) over the last 2 ½ years inspires us to keep doing this work and convinces us of its value. Here are some examples:

- Lincoln High School kids' excitement in discovering on their own where historic vice was located and who the property owners might be by using a 1913 dot map (that was designed to conceal the actual locations and owners) in conjunction with an historic Sanborn Fire Insurance Map, and coming up with their own questions about who these people were and why the activity was happening where it was (Merrick, 2003).

- Friends of Trees volunteers discovering that the large number of maple trees being planted were distributed in such a way that they could actually be vulnerable to an epidemic and understanding that their discovery would result in action. Friends of Trees has removed maples from their current planting list.

- Trillium middle school students' dismay at finding that there were many adults living in the Johnson Creek watershed that had less education than they did! And that they lived in places where Johnson Creek Watershed Council members didn't. They could see that JCWC's outreach efforts were not reaching the least educated and the poor. The students' suggestion for outreach was one developed out of empathy for those with little education.

- Johnson Creek Watershed Council volunteers' pride in creating a beautifully designed poster using cartography to tell the story of a sub-watershed that is an example of some of the best watershed management practices in the larger watershed. This poster will be used as an educational and outreach tool.

- Open Meadow students (high school dropouts and at-risk youth) presenting their wetlands analysis to over 100 GIS professionals at the 2002 GIS-in-Action conference with confidence and skill.

- Old Town History Project volunteers creating their own "tourist" maps for Old Town that is rich with information and *their* view of the neighborhood's assets. Soup kitchens are included in the "restaurant" category and missions as a cultural asset. This map, originally designed in 2002 is currently being updated in the Project's own office by a volunteer for production.

- Cleveland High School Hispanic students' pride in being able to create a report, website, and display for the Oregon Child Development Coalition that tells the story of the inaccessibility of services to Hispanic migrant families in the region.

- Winterhaven (a math and science magnet school) and Portsmouth (low income school) students coming together for the first time to share their findings and debate the various methodologies that they'd developed to identify where Friends of Trees should plant next.

- Sherwood Middle School kids teaching other kids and teaching their teachers to think spatially and how to use GIS and GPS technology.

- Seeing dying efforts, such as the Sherwood Historical Society, reinvigorated by the energy generated through the Initiative's projects, and new projects developed and funded as a result of The Ford Foundation grant. More than one year after the completion of CGP's involvement in Sherwood, in spite of the demise of the Sherwood Institute and funding cuts to Raindrops to Refuge, teacher John Niebergall and teacher/historian June Reynolds are continuing their collaboration having kids use GIS to tell the stories of Sherwood's history for the Sherwood Historical Society.

- In spite of frustrations, the Old Town History Project becoming determined to develop more opportunities in local schools to do local social historical research using GIS. In October, 2002, the Old Town History Project, Portland Public Schools, and the Community Geography Project were awarded an $816,000 Teaching American History grant that will promote and support this endeavor for three years.

For future work, however, based on what we've learned, we are reconsidering the model. The issue of sustainability is huge for the CBOs and the model we developed requires economic stability for both CBOs and schools, an open school environment, and is, with regard to incorporating this technical community-based work into the curriculum, somewhat ahead of its time (progress is being made – slowly). When, in fact, community-based GIS curricula are adopted by schools, we believe that the model will work well for some CBOs but the right match is critical. This model will not work for CBOs that want highly complicated analysis and/or sophisticated and costly technical applications requiring "24-7" support such as Internet Map Server technology.

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So what about future Community Geography Project initiatives? The CGP will continue to promote "community GIS" and we think a multi-pronged approach is necessary. Understanding that GIS can't be effectively employed by CBOs, either in-house or using consultants, without geographic and spatial literacy, we will have to more aggressively address this issue at the community level and most importantly in K-12 schools.

Assuming that a CBO has GIS needs, providing GIS services outside of the Initiative's model is problematic and, in general, without built-in sustainability for the CBO. Such services tend to be provided by universities and a very small number of GIS nonprofits in grant funded projects of limited duration. When the grant funding is expended, the CBO is left in the lurch. This is a concern as well for our own partners under the Initiative. Full independence will take longer than anticipated and we will offer the support we can as they move toward further independence. The issue of sustaining grassroots GIS efforts is a large and pervasive concern nationally and was a focus of the Urban and Regional Information Systems Association's 2nd Annual Public Participation GIS Conference, July, 2003.

As we end the Community GIS Initiative under our Ford Foundation funding, Community Geography Project future initiatives are in the development stage; these are some of the things we are committed to and are in development:

- Education. If GIS and/or its products are going to used (and they should be used) by CBOs, they will need first of all to have some grasp of the importance of geography and spatial relationships to their missions and they will need to be able to ask spatial questions. We need to provide this sort of education more broadly and to citizens of all ages.

  Our GIS lab was well used by the partners who could take advantage of it. This is a resource that we would like to be able to offer to the community by creating a "Community Geography Series" that would be delivered in two ways: (1) a series focusing on a particular region-wide topic such as "the region according to the U.S. Census" or "the region's watersheds" or "traffic congestion" or "health"; and (2) a customized version designed around a particular group's interest. The first series would provide not only an opportunity for community members to see data via GIS but to begin to think spatially and ask spatial questions. The more focused and customized forum would be provided to groups that know how to ask those questions. The purpose of these series would be to bring people together around a table and a projected image of the data using GIS to talk about the issues and react to the images they see – to enable them to ask more informed questions.

  We would also like to take this "on the road" to provide this opportunity at various sites around the region. This sort of forum, we believe, would be an important addition to the national and international discussion about grassroots and public participation GIS. And could provide access and empowerment to

many underserved groups. In addition, it could provide a way for us to be able to identify community groups that would be interested in pursuing the Community GIS Initiative model. Of course, such an effort takes additional staff and graduate student time and therefore funding.

- CBO/school partnerships of substance are a worthy goal and worthy of continued support and exploration. Through the experience of the Initiative, we have learned how messy such partnerships are, but our partners have also demonstrated a remarkable determination to make them work. Given the extreme stresses that both schools and CBOs are undergoing, it may be even more important to build civic capacity in this way.

- We want to continue to work with kids and their teachers using technologies of all sorts (especially GIS) to be engaged in their communities, to tell stories of place, to advocate for issues that matter to them and their communities. We are currently developing a partnership with the Oregon Museum of Science and Industry (OMSI) and others to begin to explore such a project. We intend to build on the base of partners that we have developed through the Initiative.

  There is no question that one of the success stories of this initiative was what GIS education and exploration did for the kids we worked with in terms of building analytical, technical and communication skills. For many of the kids we worked with, GIS was a confidence builder; we saw this with our own eyes and we heard it anecdotally. The analytical and technical nature of the work they did gave them credibility in the adult world that many students had never experienced. One such experience was an unintended consequence of the Initiative. The Open Meadow CRUE students were asked by Portland Public Schools administrators (including the curriculum superintendent) to demonstrate what they were doing with GIS. The students presented their wetlands analysis and answered a set of questions designed to test both their critical thinking skills and how technology had engaged them in their community. The officials were so impressed with these "at risk" students' responses that they made a commitment to promote community-based GIS inquiry in the District. More importantly however, the students understood that they had a voice and that what they'd said could have a profound impact on the larger community.

  Our new OMSI partnership, the "Transects Project," is grounded in this understanding about the value of community-based work using technology as a way to give kids a voice and to bring kids together across socio-economic boundaries to share stories of community and place, and to examine the past, present, and future of the region and state.

- Advocate for GIS coursework in schools of education. We will continue to advocate for incorporating geographic and spatial literacy and GIS technology into pre-service training for teachers in Portland State's School of Education. Critical to this is the understanding that geographic and spatial literacy is

enhanced by community-based work and community engagement. We will work toward developing community-based GIS curricula for use in K-12 schools. Additionally, we will make the development of curriculum that is tied to State standards and requirements fundamental to all of our school related projects.

- <u>Continue to investigate ways to provide sustainable GIS use *of, by, and for* CBOs</u>. Sustainability is crucial. We hope that all of our efforts described here will contribute to this goal. Given our experience, we don't underestimate the difficulties in achieving it. The Initiative's model is very labor intensive, full of obstacles as seen in this report, but we believe that it will work for some groups and has additional community building benefits that have been seen by our partners as extremely valuable. However, we know that it won't work for everyone nor can we fully support it without additional infusions of funding.

- <u>Continue to investigate ways to provide sustainable GIS services for CBOs</u>. In the current economic climate that has contributed to instability in CBOs, K-12 education, and our own institution, this is a major challenge. We should more effectively use the university's greatest resource, its students, to greater effect, however. We have already delivered several years of Capstone courses to provide asset mapping and GIS support to community groups. At this time, however, this opportunity is limited to a very small number of organizations. We are promoting greater collaboration among our own faculty and involvement of graduate students in community-based GIS projects.

- <u>Provide planning support for CBOs interested in GIS and database development</u>. As organizations grow they tend to rely on more sophisticated tools to store and retrieve information relating to their operations. Tools that effectively store and retrieve operational information create the backbone upon which GIS can add invaluable analytical insight. Most organizations will rely heavily on consultants or third parties to provide expertise in creating these systems. This is not our job. However, helping smaller organizations to have a clearly articulated comprehensive "vision" about what sorts of questions and issues the organization needs to address using GIS may indeed be a service we should consider providing.

- <u>Future initiatives will continue to specifically address the needs of all underserved populations</u>. We will continue to address Castell's "Dual City" which is very real in our region by aggressively looking for opportunities to work with underserved communities. For example, the deep divide that we saw in technical literacy between the newly arrived Hispanic youth and the others that we worked with was alarming and presented a greater barrier to training than language. Many of these young people had no experience with computers, nor did they understand how using one could benefit them. Cultural barriers are serious as well. In most cases, the girls deferred to the boys, sitting next to them but not wanting to touch the computers. Most of the Hispanic students we worked with were sent here to work and send money home; too often education takes a back seat. We have

learned a great deal from our experience about the needs of these kids and the cultural and structural barriers that face them. We would like to be instrumental in further developing coursework that engages these young people in issues that matter to them using our region as the laboratory and our interactive training style as the method. These students need advocates to promote education innovation for them; we will participate in such advocacy.

- <u>Provide a forum for grassroots and public participation GIS</u>. We will continue to support and provide a forum for the exchange of ideas around the grassroots use of GIS technology at the local, regional, and national levels.

Finally, our commitment to grassroots empowerment through technology, particularly GIS technology, is strengthened by the experience of the Initiative and most importantly by the tremendous gratitude that has been expressed to us by our partners (Appendix C).

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