Advancing GIS Education and Community Stewardship

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Abstract: (as submitted to ESRI)

In a region currently threatened by urban sprawl, a planned approach to growth is required to preserve remaining natural heritage and cultural/historical features valued by the local community. Through the utilization of a GIS Internship, the Alliance for a Better Georgina, a regional NGO in Ontario, Canada is working in conjunction with the Geomatics Institute at Sir Sanford Fleming College, provincial, regional, and municipal governments and private industries to create a community mapping series. The series will function as a planning tool that identifies, prioritizes and protects local environmental, cultural, and historical features of the area. A website is planned for interactive use by local schools using GIS mapping in the study of history, geography, sociology, etc. Community member planning and participation is essential to the project, thereby increasing interest, pride and empowering local activity in support of neighbourhood values for the protection of environmental and cultural features.

Introduction

This discussion will focus on the role of the community and students in the community mapping process. There will be visual clips of the map used to highlight the contributions of the community and the applications of the project.

It has been estimated that the current population of the Town of Georgina (a historic farming community in south-central Ontario, Canada) will increase by a minimum of 30,000 people in the next twenty (20) years; which represents a 50% increase in new residents. The size and spread of this growth has the potential to replicate the urban sprawl that has dominated the Greater Toronto Area (GTA) in the last 25 years. By contrast, there is a potential to move in a more sustainable direction as identified by local community residents.

If a community can learn from other local communities about honouring the past and identifying features and places as valued and special, then there exists an opportunity to preserve and enhance; In other words, when that inevitable growth comes knocking the residents of these communities will have developed a greater sense of pride and community, a greater appreciation and knowledge of their environment and history and a better understanding of the priorities established.

The goal of this project is to develop a community capacity-building process wherein all community members are encouraged to take a proactive role in the identification and articulation of local values. Rather than responding on an ad hoc, reactive basis to incremental, impending development change, citizens are taking an active lead in

planning for their individual communities. This mapping process creates the vitally important context for the exchange of professional expertise and local knowledge.
As these community members – planners, environmental scientists, naturalists, writers, local residents, educators - work together toward consensus in aspects of the mapping product, new partnerships are developed, community ties and pride are strengthened, and community stewardship is greatly enhanced. Goals for growth and sustainability of the community are forged.

GIS and the Internet as a Mapping Tool

Faced with ever-increasing development impacts and the associated need to identify a broad consensus-based community approach to sustainable growth, community mapping using GIS technology has been identified as the best, most efficient means of meeting this challenge. Often community growth decisions are based on incomplete data or information regarding local environmental and cultural heritage features to be considered when land changes or development proposals are considered. This project is designed explicitly to fill this gap in significant information and to better reflect the community voice. Community members develop skills in mapping and use of GIS while being provided with the means and technology for identifying valued aspects of their environmental and cultural heritage. Having identified these values, the community is then empowered to take the next steps necessary to protect them. For example, some important natural areas may be targeted for conservation easements or land trusts.

Community members will use this mapping process as a vehicle for identifying specific items that they would like protected or changed, and to clearly map what they "like best", a type of weighting of values specific to local natural, built and cultural heritage features, and favourite places. Specific layers of data to be collected include:

Roads
Land use – e.g. properties
Watercourses
Forest edge/hedgerows
Greenlands components
Topography/geology
Wetlands – from both identified MNR evaluated wetland data and unevaluated wetlands – residents' data
Woodlands – from both Conservation Authority and residents
Natural features – e.g. rock outcroppings, special landscape characteristics, trout streams, mature woodlots, riparian zones
Archaeological/First Nations
Favourite places, walking and bike trails, view, vistas
Historical (cultural and built heritage), oral histories
All available data from York Region – as shared via Ontario Geospatial Data Exchange – ESAs (Environmentally Significant Areas)
ANSI's, (Areas of Natural and Scientific Interest) other environmental layers, etc.
All available data from naturalists clubs, etc.

Habitat for Species of Concern – Ministry of Natural Resources, Natural Heritage Information Centre (NHIC) 1km. squares

The mapping is intended to combine existing environmental and historical feature data sets with new data collected by community. In so doing, all significant ecological areas, water bodies, built features, and important historical and cultural features will be, for the first time ever, clearly integrated and visualized for the community as designations for protection and enhancement.

The project will provide an essential education and focus for volunteers who wish to take an active role in becoming stewards of their community. Both the mapping exercise and end products can assist in targeting opportunities for volunteer action in one or more of the following areas:

- Stream and wetland restoration or enhancements
- Tree, shrub and riparian plantings
- Trail development and maintenance
- Wildlife and fish habitat improvements
- Shoreline stabilization
- Community monitoring of flora and fauna species at risk
- Woodlot management
- Environmental education initiatives
- Cultural or historical heritage site preservation
- First Nations sites and trail identification

The maps will be accessible in hard copy and on a website. Map data can be continually augmented or altered over time as necessary. The printed maps will have many uses. They will share information and promote the best that Georgina has. And we are currently in the initiation phase of developing an internet-based application, a user-friendly tool for viewing maps and spatial data sets that is accessible to the community at large, including local schools. Community members will be able to visualize their communities and to engage directly in the ongoing identification and preservation of important local environmental and cultural features; students will use this interactive application as a significant learning media while studying environmental sciences, geography, local history and Geographic Information Systems in their school curriculum. Planners and developers will have a tool to assess what people feel is important as they plan growth. And tourists and business will be able to access the data they need to discover the Town from their points' of view.

This all adds up to a powerful repository of information – accessible on people's own terms and on their own time – that can help build the identity of Georgina.

The Process: Engaging Community in Planning and Participation

The initial step, in this project was to divide the Town of Georgina in to eight identifiable communities as so designated by collaboration with town politicians and planners. We then prioritized the mapping order for the next 3 – 4 years, and initiated the project in the first two communities of Pefferlaw and Udora. (Those 2 maps were completed this year and will be visualized in the presentation.)

Community members were involved in or took responsibility for the following mapping project tasks or duties:

- Met with the Mapping Team (Director, Project Coordinator, Landscape Architect, GIS Consultant) to review mapping project goals, objectives, roles, and responsibilities
- Enhanced community participation by identifying local community leaders, compiling lists of potentially interested resident volunteers and oral history subjects,
- Helped to establish informal "teams" for heritage (including archaeological, First Nations and oral history), cultural (special places, walks, trails, rides, etc.) and environmental (geological, topographical, flora, fauna, wetlands, terrestrial etc.) features with local community "team leaders" assuming responsibility for specific areas
- Produced communication materials; flyers, articles in local papers, etc.
- Planned for first community review of draft mapping
- Participated on Steering Committee comprised of Mapping Team, local planner and politicians; assisted in definition of terms of reference, project outcomes, planning for community involvement, measures of success
- Reviewed agency and community data layers and first map drafts for input on scale, legend, contours, environmental features, accuracy, etc.
- Helped to arrange and attended large community meetings for gathering additional community data including photos, historic reference material, etc.
- Helped to develop communications for press release and feature articles.
- Assisted in planning launch event and distribution plan for first release of maps
- Provided support for initiation of web site

Education and Student Involvement

Student involvement plays an integral role in the Georgina Community Mapping Project.

This project offers immediate support to Ontario students via an affiliation with the Geomatics Institute of Sir Sandford Fleming College in employing a recent GIS graduate Intern. As the first post- secondary school intern with the project the co-author (Jason Anderson) was fully submerged in the essentials of GIS and was able to apply his educational background to "real world" GIS issues. He took responsibility for spatial data collection and management; which included GPS data collection, performing GIS data manipulation and preparing cartographic representations of the GIS information. This included digitization of data, creation of attribute and metadata, collecting and organizing spatial data identified by community members, organizing shape files, determining, converting and mapping extents of community and large natural heritage boundaries, and producing draft prototype maps for initial review.

The original data for this project came from York Region Geomatics Department and Lake Simcoe Regional Conservation Authority. Due to the large volume of data received a large amount of time went into organizing and selecting the data to be used in the final cartographic product. ArcGIS 9 became a vital part of our process as it was used in creation, modification, and analysis of all the GIS used within the project. ArcCatalogue became an important organizational tool to preview data and create metadata. ArcGIS 9 was also used to produce maps to display selected parts of data. Following the preparation of all the GIS data in ArcGIS 9, the information was then imported into Adobe Illustrator CS with Map Publisher 6.2. Other software used in the project includes Adobe Photoshop and Microsoft Word and Microsoft Excel.

High school and university students interested in the study of GIS applications will benefit from the internet- based component of this project where real community concerns and values can be visualized and analyzed using dynamic mapping products. Planned future prospects include initiating student involvement at the high school level in the fall, 2006. With cooperation from a local high school a group of students will be responsible for gathering spatial and environmental data and then applying it to community maps and an interactive web site. An example of their activity would be to take water samples at random locations along or in a body of water; the students would then document their data and mark each location using a GPS unit. Upon returning to class, students would perform a river or lake water quality analysis. The next steps available to the class could include mapping possible water quality concerns and developing hypotheses for such concern. Creating personal maps that display the student's results is an alternative project idea. Another goal of the students' activity might include collecting and sharing new community data with the Alliance for a Better Georgina for use on future community maps. This information can also be displayed on the Community Mapping Project website where community maps and information will be available for students and community members alike.

The community mapping project opens many doors for students in both high school and post secondary school. With exposure to the GIS curriculum and potential internships in post-secondary programs, highly valued careers in GIS and Geomatics are stimulated and supported.

As a post secondary intern, the ABG community mapping project allowed the author to attain hands- on experience in his field of study. Such experience was essential to the start of his career and allowed him the opportunity to explore future career possibilities. One such possibility is his current position with Landscape Planning Limited (LPL), a landscape architecture firm. (LPL was the principal location where the latest community maps were designed and produced).

In return for facilitating valuable career experience and opportunities the project team for the Alliance for a Better Georgina was provided with a creative and competent GIS consultant that was essential to the success of the launch of our first 2 community maps.

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