GIS AND OUTREACH

What is Outreach?

Outreach is simply defined as: “reaching out” according to the dictionary (Merriam-Webster) but outreach can mean many different things depending on who is directing the act of reaching out. A definition of outreach relevant to an environmental agency or NGO is “two-way communication between the [agency] and the public to establish mutual understanding, promote involvement, and influence attitudes and actions, with the goal of improving joint stewardship of our natural resources” (www.fws.gov). A university might define outreach as “the function of applying academic expertise to the direct benefit of external audience” (www.auburn.edu). The primary goal of any outreach effort, however, is to make information about a relevant issue available and accessible to some target audience.

Outreach efforts occur in fields as diverse as public health, animal rights, watershed ecology and religion. Organizations conducting outreach may be government agencies, NGO’s or community groups. The demographics of the audience being addressed can vary significantly, but the nature of outreach is such that the outreach agency is trying to educate a targeted audience about a topic with which they are unfamiliar. The primary challenge to the outreach effort is effective communication.

Why is GIS a relevant technology to support Outreach Efforts?

Geographic Information Systems (GIS) play a vital role in delivering the message of the outreach agency. The primary challenge of any outreach effort is convincing the target audience the issue at hand should be of personal concern. The average citizen has a hard time understanding the importance of any environmental, public health, or socio-economic issue, until a direct and local relevance can be demonstrated. GIS is a powerful tool for demonstrating these spatial relationships and has been utilized in a variety of settings to convince a skeptical community ‘why they should care’. Additionally GIS allows a method of communicating data to an audience who may be more comfortable with pictures than words, an important benefit, which should not be overlooked.

In what ways can GIS be used by an Outreach Effort?

Craig and Elwood (1998) describe four types of GIS information usage in their study of community groups in the Minneapolis-St Paul Metropolitan Area:

1. Strategic – The first step in any outreach effort is to define the problem and identify the relevant audience. Geospatial data is often the most efficient way to overlay information from a variety of sources and locate communities likely to be impacted by the issue. Researchers in North Carolina working to combat childhood lead poisoning used census and tax assessor data to identify neighborhoods likely to have a high incidence of unmaintained lead-painted residences (Miranda et al., 2002). These areas are then considered hotspots for lead poisoning and public health agencies can focus outreach efforts in the appropriate communities.
2. Tactical – Often the outreach goal is to educate a community about an issue in order to promote an educated decision making process. The University of Connecticut has several projects that use remote-sensing data to facilitate local land-use DSS - decision support systems. The purpose of the project is to provide the land-use officials with the ability to use remote-sensing derived information as part of the DSS process. Outreach ranges from computer projection presentations of Landsat TM Imagery and GIS-derived land-use maps, to instruction in actual data analysis and map creation (Arnold et al., 2000).

3. Administrative – Once an outreach program has been initiated, GIS data can be used to keep track of completed and ongoing projects. Neighborhood improvement organizations may keep databases that list the names and addresses of problem properties that need to be addressed. Maps displaying the progress of a project can be useful at meetings and to determine further allocation of resources (Craig and Elwood, 1998).

4. Organizing – A primary challenge of any organization involved in outreach, government, non-profit, or grassroots, is to convince society of the importance and credibility of the outreach mission. Community-based organizations may use GIS-generated maps to demonstrate the spatial relevance of an issue to a potential interest group. The strength of the organization is often viewed as a direct correlation to the size of the organization and its constituents. As a result, GIS may be a critical tool for the organization to increase its membership (Craig and Elwood, 1998).

What is the future of GIS and Outreach Efforts?

There are many challenges to utilization of GIS for organizations with limited funding and resources. GIS requires adequate technology and some degree of training. Data access and availability can also be roadblocks for some organizations. Many researchers are investigating alternate ways to provide GIS data to organizations that may not have the resources to establish an internal GIS. Leitner, et al. (2000) discuss five modes of GIS provision for neighborhood organizations – community-based (in-house) GIS, use of GIS facilities in universities and public libraries, university-community partnerships, creation and use of central data distribution facilities, and internet map servers. Merrick (2003) describes a project in Portland, Oregon, which creates partnerships between community organizations and K-12 schools. A project based at the Institute of Geography, Victoria University of Wellington, New Zealand, is investigating the potential of a Mobile Interactive GIS (MIGIS). MIGIS is designed to bring GIS into remote regions so that the technology can be utilized for participatory decision-making processes in rural and low literacy environments (McConchie and McKinnon, 2002). These alternative methods differ in the ability of the GIS to effectively communicate the information in question and the cost to the outreach agency.

Partnerships with schools and universities may be the most effective and economical method of utilizing GIS for outreach. Universities often have access to the most updated technology. The faculty at the university may be more stable than the staff at the outreach agency, and so the university becomes a more efficient data archive for future outreach efforts. Data acquired through a university study often carries the (not necessarily deserved) prestige of being considered reliable and unbiased. Outsourcing the data acquisition, analysis and management aspects of GIS allows the outreach organization to focus on how to best present the information and better focus outreach efforts. Finally, a partnership with any school, particularly K-12 is in fact a form of outreach by intimately acquainting students with issues of relevance in their community.
ANNOTATED BIBLIOGRAPHY


This article investigates the use of remote sensing technology to improve local land-use decision support systems (DSS). Three DSS programs are described which introduce RS data at a range of levels. NEMO (Nonpoint Education for Municipal Officials) is a demonstration program, which uses computer projections of pre-produced maps to show the type of data provided by RS technology. Watershed Projects is a variation of NEMO that attempts to address land-use decisions at a watershed level by expanding the audience to include private landowners. In this more extensive DSS program, participants are involved in the actual mapping process through facilitation by the University of Connecticut. NAUTILUS (Northeast Applications of Useable Technology In Land planning for Urban Sprawl) is an in–process DSS program, which will involve more detailed RS data research, use of internet mapping, and four pilot watershed outreach programs. The authors conclude that remote sensing data can enhance a DSS program, provided the DSS is appropriately designed for the specific goals of the target audience.


Community organizations play a vital role in the modern day political structure and use geospatial data and maps in a variety of ways to achieve their goals. Communication of information is essential to the survival and success of these organizations, both internally and externally – to focus energy, recruit members from the community, acquire resources, build coalitions and gain support from the general public. The authors categorize use of maps by these organizations into administrative, strategic, tactical and organizing purposes. The purpose for which a specific organization uses geographic information will depend on the audience being addressed.


Community based organizations considering use of geospatial data must consider the appropriateness of a GIS to address the needs of the organization. The author describes factors contributing to the “utility” and the “capacity” of a GIS for a specific organization. The utility of the GIS can be evaluated in terms of: provision of meaningful information, technological appropriateness, various modes of use and enhanced participation in problem solving. Factors contributing to the capacity of the organization to effectively use GIS depend on data availability and access, adequacy of hardware and software technology, user skill level and the role of intermediary organizations. The author sites a
case study in which a community organization – the St. Clair-Superior Coalition – used GIS services provided by students at Cleveland State University to address a number of issues including creation of maps of historic land use and pollution hazards. The study concludes that GIS does provide meaningful information for community based organizations but appropriateness of GIS for a specific organization is dependent on factors such as existence of base maps and data, external technological resources, funding for hardware/software and attitude of the organization toward innovation.


This article classifies different modes of GIS provision for neighborhood organizations based on the authors’ observations of organizations in Minneapolis and St. Paul, Minnesota. Five modes of GIS provision are described: a community-based GIS, university and public library GIS facilities, university-community partnerships, central spatial data facilities, and internet map servers. The authors compare and contrast three components of these modes of provision: the types of stakeholders involved and their relationship to the community, communication structures within the organization, and the physical location of the GIS (in-house vs. remote). The advantages and disadvantages of each of the five modes are assessed with respect to the ability of the GIS to respond to the specific needs of the community organization and the costs of access to and use of the GIS. The authors conclude that there is no overall best mode of GIS provision, but that each community organization needs to consider the resources available and needs of the organization before selecting a mode.


MIGIS (Mobile Interactive GIS) was used in conjunction with PLA (Participatory Learning Actions) to facilitate community participation in the creation of sustainable development initiatives in a heavily deforested region of southwest China. The MIGIS was used to construct a database using information gathered by the community, identify and quantify constraints on development and compile baseline information through the creation of several maps including a DEM, Land Use and Resource maps. The project also used MIGIS to model a various projected scenarios to allow the community to decide where land use initiatives are needed for the future. The authors conclude input provided by MIGIS added an invaluable contribution to the PLA process for a community with minimal to no literacy.


The Community Geography project was established to address issues of GIS access for community organizations in Portland, Oregon. The goal of the project is both to find an effective method of GIS provision for community organizations and to promote the use of
GIS in K-12 curriculum, by creating a partnership between the organizations and the schools. The authors recognize four major obstacles to accomplishing the goal of GIS provision and ultimately citizen empowerment. Data access is complicated by the lack of free, reliable data in the Portland area. Budget constraints limit the quality of hardware and software for both the community organizations and the schools. The use of Internet Map Servers is awkward due to the limited choice of prepackaged maps and slow internet connections available to the users. Finally, the authors address the issue of “cognitive access” for an audience with limited geographic and map literacy. The Project believes that the primary educational goal should be issue driven and goal oriented rather than technology training, as a long-term investment in community comprehension of the value of GIS.


Childhood lead poisoning is a serious health risk, which is difficult to diagnose at low levels. Consequently, public health officials are recognizing the need for preventative health programs. This article describes the development of a model using GIS data to identify populations at risk for lead poisoning. The model focuses on lead paint exposure, by identifying factors, which correspond to the presence of older, unmaintained, lead-painted housing. The authors used Census and Tax Assessor data to identify risk factors such as, median household income, date of construction/remodeling, and renter vs. owner-occupied property. Blood lead screening data obtained from the North Carolina Childhood Lead Poisoning Program was overlaid to determine the level of importance of each risk factor. The model allows public health officials and other organizations with limited resources to create programs that effectively target the population at risk.