Implementing Participatory GIS Technologies to Meet Collaborative Needs
A Research Study Examining the Adoption and Implementation of GIS Technologies for Natural Resource Management Networks

Study Purpose: The overarching goal is to better understand capacity for adoption and implementation of web-based GIS collaboration tools by NRMs as a method for information-sharing across the network.

Problem: Disregarding the capacity of a natural resource management network to implement participatory web-based mapping tools can lead to inappropriate design of tools that are costly to develop and maintain, or may not be used appropriately in meeting network goals.

Research Goals & Methods

Phase 1 – GIS Technology Profile
Research Question: How do individual networks within the National Trails System vary across levels of engagement capacity as represented through GIS technologies implemented by networks with low, medium, and high implementation capacity?

Phase 2 – Case Study
Research Question: How do environmental and situational factors differ between networks that experience full-level implementation compared to low-level implementation of web-based GIS collaboration tools?

Research Question: How may social and technical structures of a network be jointly optimized to influence implementation of web-based collaboration GIS tools across the network?

Factors Influencing Capacity

U.S. National Trails System as Natural Resource Management Networks of Collaboration

The National Trails System Act of 1968

The Congress recognizes the valuable contributions that volunteers and private, nonprofit trail groups have made to the development and maintenance of the Nation’s trails. In recognition of these contributions, it is further the purpose of this Act to encourage and assist volunteer citizen involvement in the planning, development, maintenance, and management, where appropriate, of trails. (p. 1)

Collaborative Needs in Natural Resource Management

Adoption and Implementation of Technology

Geographic Information Science Technology in NRM
GIS is a common tool for resource managers in processes that require methods for resource inventory and monitoring and to facilitate decision-support systems. Adopting technology, such as GIS may be examined through the literature of diffusion theory and technology acceptance.

Diffusion Theory & Technology Acceptance
Important to note that decision to adopt does not mean the innovation will be implemented – the implementation phase occurs after the decision to adopt. Diffusion theory examines social constructs (“soft” technology of resulting innovation-decision processes. Diffusion of Innovation (Rogers, 2005) Diffusion Theory applied to technology adoption – influencing factors:
- Technical compatibility
- Technical complexity (ease of use)
- Relative advantage, or perceived need of the technology
- Network must have capacity to use technology
- Organizational: decision to implement
- Individual: influence of success or failure

The National Trails System (NTS) represents a diverse set of NRM Networks. NTS is divided into National Scenic Trails (NST) and National Historic Trails (NHT). Each trail is administered by a federal agency (NPS, BLM, USDA-FS) and has an affiliated (private / non-profit) association affiliated with the trail.

The National Scenic and Historic Trails system are, by design, complex partnerships of Federal agencies, state governments, nonprofit trail organizations and volunteers. According to American Trails, this people-based approach to public land stewardship also involves communities linked by these trails in management and promotion, making the National Trails System a "culture of people-based community conservation" (American Trails, n.d.). Geospatial technology tools through web-based mapping interfaces offer an innovative method for trail partners to engage with one another to meet network management needs.