Chapter 4
Geographic Information Networks in American Indian Governments and Communities

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ABSTRACT

This article describes advantages and disadvantages of federal government centralized geographic information networks and decentralized peer-to-peer geographic information networks as they pertain to North American Indian tribal governments and communities. Geographic information systems (GIS) are used by indigenous groups for natural resource management, land claims, water rights, and cultural revitalization activities on a global-scale. North American groups use GIS for the same reasons, but questions regarding culturally appropriate GIS, cross-cultural understandings of geographic knowledge, and cultural assimilation through Western digital technologies have been raised by scholars. Two network models are germane to American Indian government operations and community organizations. The first is a prescriptive top-down network emanating from federal government agencies. Federal agencies are responsible for the diffusion of nationwide GIS programs throughout indigenous communities in the United States. A second, potentially more inclusive model is a decentralized peer-to-peer network in which all nodes are responsible for the success of the network.

INTRODUCTION

Geographic information systems (GIS) are digital software packages that incorporate spatially referenced database information that can be analyzed statistically or through the creation of maps and cartographic models. As with other database systems, information is collected, stored in computers, and can be manipulated. Information and communication technologies (ICT) like GIS can transform cultural concepts like community, privacy, space, time and reality which can funda-

mentally change cultural practices (Brey, 2003). GIS are now important resource management tools for indigenous people on a global-scale, including North American Indian tribal governments (Chapin et al., 2005; Smith, 2008). Many American Indian tribal governments make every effort to retain control over proprietary geographic information and GIS applications. Some scholars raised concerns about the security of proprietary knowledge and information held within digital systems like GIS (Marchand & Winchell, 1992; Palmer, 2007; Rundstrom, 1995). Other concerns involved development of a new model for providing technical assistance and training to members of American Indian tribal governments and communities which emphasizes peer-to-peer networks over the expert instructor/student experience (Palmer, 2009). This article describes some of the advantages and disadvantages of federal government centralized GIS networks and decentralized peer-to-peer geographic information networks as they pertain to North American Indian tribal governments and communities.

Issues regarding the centralization of geographic information held in large, nationwide repositories were among the many topics that emerged in the GIS and society debate during the 1990s. Important contributions regarding the social implications of GIS include a book entitled *Ground Truth* by John Pickles (1995); a 1995 special issue of *Cartography and Geographic Information Systems* (*CaGIS)* on GIS and society; a special issue of *CaGIS* on public participation GIS in 1998; and the book *Digital Places* by Michael Curry (1998). In a very broad sense, the debate informed scholars and practitioners that GIS simultaneously shape and are shaped by the institutions that construct, implement, and transfer the technology to other locations and organizations (Harvey & Chrisman, 1998; Sheppard, 1995). This includes government agencies.

The United States Bureau of Indian Affairs (BIA) serves as an example of a top-down GIS model that emanated from the agency's center and diffused throughout Indian Country. As with most state developed, nationwide mapping and GIS programs, the BIA constructed a standardized system that could be implemented within interdepartmental offices. Some scholars argue that GIS standardization can have adverse affects upon epistemological diversity within American Indian communities and represent yet another method of assimilating all American Indians into the fabric of American society (Palmer, 2007; Rundstrom, 1995). On the other hand, North American Indian groups and communities adopt scientifically constructed maps, geographic information, and computer software to revitalize their communities (Duernden & Kahn, 1996; Smith, 2008; Sparke, 1998).

Digital technologies can simultaneously empower and marginalize indigenous communities (Dyson et al., 2007; Palmer, 2009). In recent years, indigenous groups have adopted digital forms of media—especially audio and video recording—to represent inter-related concepts of place and identity. The capacity of emerging technologies to foster humanistic cultural expression has been noted by Dyson:

The multimedia capabilities, storage capacity and communication tools offered by information technology provide new opportunities to revitalize indigenous cultures and languages, and to repatriate material back to communities from national cultural institutions. In particular the graphical, video and audio facilities of multimedia speak directly to cultures which are principally rooted in spoken language, music, dance, ceremony and visual forms of artistic expression. (2007)

New digital technologies have the capacity to mediate not only indigenous cultural practices, but also the socio-spatial characteristics of indigenous communities. How can the adoption of audio-visual media *and* geographic information systems facilitate sovereignty for indigenous peoples?

Other research on information technologies and indigenous people explores the positive and negative impacts or the transformative capabilities

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