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INDIGENOUS SPATIAL KNOWLEDGE (ISK) AND GIS DATA: CONTROL AND ACCESS ISSUES FOR INDIAN NATIONS IN THE

UNITED STATES

Abstract: Ownership, control of and access to indigenous spatial knowledge (ISK) and geographic information systems (GIS) data are long-standing issues for Indian nations in the United States, but recent federal and state court decisions, changes in federal regulations, and the sophisticated data integration and analysis capacity of GIS software have brought these concerns to the forefront. Fundamental issues are at stake, including Indian nations' rights and interests in their knowledge and resources, federal agencies' authority and decision-making processes that affect those resources, and the public's right to know. This research explores Indian nations' concerns, and the legal and regulatory circumstances under which tribes' spatial knowledge and GIS data may become accessible to third parties. To build trust and more effective working relationships, federal agencies and other organizations working with Indian nations will need to understand these issues and to develop guidelines for the ethical handling, protection and appropriate dissemination of spatial knowledge and GIS data shared by or created with Indian nations as part of these collaborations.

INTRODUCTION

The Department of Interior's Bureau of Indian Affairs (BIA) administers and manages nearly 56 million acres of land held in trust by the federal government for Indian nations and tribes.¹ Through a government-to-government relationship,

¹ Indian nations and tribes are "distinct, independent political communities"; they are sovereign nations with inherent powers of self-government and, as such, have a special legal relationship with the United States. Of note, the Federal Indian Trust Responsibility is a legally enforceable fiduciary duty and moral obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights. With some limited

the BIA and other executive agencies and bureaus have a trust responsibility toward Indian nations, and a duty to “consult” with tribal governments regarding proposed federal actions (e.g., BIA, 2000; Executive Order No. 13175). These agencies create, collect, maintain, and disseminate spatial knowledge and geographic information system (GIS) data in order to perform their trust functions and as part of the consultation process (e.g., BIA, 2003; Getter, 1995; Getter and Bonner 1986). In addition, adoption and use of spatial technologies by Indian nations in the United States has grown steadily over the last decade (e.g., Bohnenstiehl and Tuwaletsiwa, 1999; PE&RS Focus Issue: Native American Contributions to Remote Sensing, 2001; Native Geography, 2000, 2001; Goes In Center, 2000; He, 1995; Marozas, 1991, 1993, 1996; Rattling Leaf, 2002). Today, tribal governments and other organizations that work for or with tribes create, maintain, and disseminate spatial knowledge and GIS data as part of their own day-to-day government, business, research, or outreach activities.

While public access to tribal spatial knowledge, maps and GIS data (i.e., indigenous spatial knowledge (ISK)) has been a long-standing concern among Indian nations (e.g., 1976 Indian Amendment to the Freedom of Information Act (S. 2652)), recent federal and state court decisions and changes to federal regulations, as well as the sophisticated data integration and analysis capacity of GIS, have brought these concerns to the forefront. For example, in *Department of the Interior and Bureau of Indian Affairs, Petitioners v. Klamath Water Users Protective Association* (99-1871), decided on March 5, 2001, the United States Supreme Court ruled that documents shared by Indian nations with the federal government – at the government’s request – are not exempt from the Freedom of Information Act (FOIA) under Exemption 5, a provision that protects intra-agency and inter-agency records from public inspection. In addition, recent changes to OMB Circular A-110 and the implementation of the Information Quality Act and related federal policies will have a dramatic impact on the reporting requirements of federal grantees, including Indian nations and other collaborators.

Based on history, experience, and cultural and spiritual values, some Indian nations would like to assert ownership and control over the terms within which spatial knowledge and GIS data of their lands and resources are accessed, interpreted and used. But, restricting access to this information may be difficult to achieve given the United States’ long-standing domestic position of open access to government records. In particular, if this information is created by, shared with, or funded through the Federal government, it may become accessible to outside parties under federal statutes, such as the Freedom of Information Act (FOIA) as well as Office of Management and Budget (OMB) regulations.

exceptions, the internal affairs of federally recognized tribes do not fall within the purview of the federal government, nor are these tribal governments subordinate to state governments (e.g., American Indian Policy Center, 2004; Cohen, 1942; Monette, 1994, 1996; Waldron, 2001; Wood, 1994).

Fundamental issues are at stake – Indian nations’ rights and interests in their information, land, water and natural resources, the decision-making processes that affect these rights and resources, and the public’s right-to-know. The incorporation of tribal expertise and information into environmental planning and policy formulation is critical if Indian nations’ rights and interests are to be protected. However, if federal agencies and other organizations are unable to guarantee confidentiality, Indian nations’ willingness to share their information may erode and, as a result, these rights and interests may be abrogated (e.g., Brown, 2004; Harding, 2000; Lum, 1999; Marcus, 1995; Waldron, 2001). Indian nations will need to decide whether and how to share their spatial knowledge and GIS data, knowing that it could be disclosed to third parties who may be adverse to their interests. To build trust and more effective working relationships, federal agencies and other organizations will need to understand these issues and to develop guidelines for the ethical handling, protection and appropriate dissemination of spatial knowledge and GIS data shared by or created with Indian nations as part of these collaborations. In particular, they will need to work with Indian nations to determine how to handle outside requests for tribal spatial information and GIS data.

PURPOSE

Within the framework of the intersection between tribal and societal interests, this research will outline Indian nations’ concerns regarding data sharing and access, will investigate the legal and regulatory circumstances under which their spatial knowledge and GIS data may become accessible to third parties, and will propose legal and administrative mechanisms that, ideally, will balance tribal governments’ need to control who has access to this information against tribal members’ need for "transparency" in their tribal government. Criteria for determining what data should be made accessible and what data should be kept confidential, as well as the processes by which these criteria are selected and applied, will be suggested. Legal instruments such as copyrights, contracts and licensing as well as data distribution policies and protocols will be explored. This paper lays out some of the issues at hand, while future publications will present the results of this research and model policies.

CONCERNS REGARDING DATA SHARING AND ACCESS

There are a number of pitfalls associated with the collection and use of indigenous spatial knowledge (ISK) for public participation GIS (PPGIS) or participatory GIS (PGIS) projects, be they initiated by a federal agency, university, non-profit, or grassroots organization.² Some of these issues as enumerated by Laituri (1998) and others include: ownership and control of ISK, diminishment of the complex subtleties in ISK (e.g., spiritual values and perceptions), protection of individual

² For definitions and discussions on what constitutes PPGIS/PGIS refer to the following literature and the bibliographies therein: Craig and Elwood, 1998; Craig, Harris and Weiner, 2002; Jankowski and Nyerges, 2003; Rambaldi and Weiner, 2004; Schlossberg and Shuford, 2005; Tulloch and Shapiro, 2003.

and community privacy, protection of sensitive information, accounting for the diversity within a community (e.g., gender, age, class), political implications for local power relations (e.g., conflict and disempowerment), use and exploitation of ISK for personal gain or project legitimization, scale of analysis and locational accuracy, and weighing ISK equally with Western scientific knowledge (e.g., Brown, 2003; Cambell, 2002; Fox, 2002; Fox, Suryanta, and Hershock, 2005; Laituri, 1998; Monmonier, 1996; Rambaldi, 2004; Rambaldi and Weiner, 2004; Rundstrom, 1995; Thom, 1997; Turnbull, 1989, 1998; Wainwright and Robertson, 2000; Weinstein, 1998; Wood, 2000).

One of the most important issues that should be addressed as part of any PPGIS/PGIS project is the matter of who owns, controls, and can have access to the spatial knowledge and GIS data created, collected and maintained as part of these activities (e.g., Fox et al, 2005; Laituri, 1998; Rambaldi, 2004a). As Rambaldi (2004a, p. 1) comments, “intellectual ownership of [the language of maps] and the content of knowledge which it communicates, are critical factors in determining the success of the processes to which mapping and maps are put.” Fox (2002) concurs, “if local people do not have control of their maps, they may not be any better off than they were before their lands were mapped.” Unfortunately, the issue of ownership and control is not always addressed. Perhaps all too commonly in PPGIS/PGIS projects, “facilitators [take] all [the] outputs with them, aerial photographs, legend, depicted community knowledge... What [is] left with the participating villagers? Nothing except the promise to come back (Rambaldi, 2004b).”

Due to cultural, historical, and spiritual differences, Indian nations in the United States do not share necessarily the same views towards information as the dominant society, nor do they foster “open access” information policies to the same extent as promulgated by federal, state, and local governments. While, as Williamson and Goes In Center (2001, p. 167) note, “it is difficult to generalize about the beliefs and worldviews of Native Peoples of North America because the over 565 recognized tribal and Alaska Native groups are highly diverse in language, religion, and cultural practices,” many Indian nations in the United States have expressed concern regarding the collection, use, and dissemination of spatial knowledge and GIS data about their communities and territories by outside parties. “The Northern Arapaho and Eastern Shoshone,” for example, “expressed concern that ‘outside’ researchers would come to the reservation and ‘take’ their knowledge, giving nothing in return” (Laituri, 1998, p. 3). Indian nations are concerned for a multitude of reasons, including the proprietary or sensitive nature of the information (e.g., information associated with cultural resources, the disclosure of which might lead to intrusion, vandalism or theft of artifacts, or the misinterpretation of which might lead to site destruction); the financial impact (e.g., loss of intellectual property rights – commercial value of the information itself – or of the resources the information describes, reduced bargaining power in lease negotiations); the regulatory impact; the potential for privacy infringement; the impact on their status as sovereign nations; and, the impact on their Trust

relationship with the federal government (e.g., Barsch, 1999; Lum, 1999; Hardzinski, 1999; Marchland and Winchell, 1994; Meyers, 1993; Wainwright and Robertson, 2000). Crystal Bond (2001), former Cartographer at the GeoData Center for the Cherokee Nation, summed up these concerns when she commented in frustration, “[t]he dominant society has taken everything else and now they want our information too.” But, again, tribal members and tribal governments can vary substantially in what spatial information and GIS data they believe should be kept confidential, even within a particular tribe.

LEGAL AND REGULATORY FRAMEWORK

Because of the concerns enumerated above, some Indian nations would like to assert ownership and control over the terms under which spatial information and GIS data of their lands and resources are accessed and used. But, if this information is created by, shared with, or funded through the Federal government, for example, it may become accessible to outside parties under federal statutes, such as the Freedom of Information Act (FOIA), and OMB regulations that are intended to ensure openness and accountability in government (e.g., Lear and Jones, 1999; Lum, 1999). In addition, this information might become accessible under states open records laws and other organizational policies depending on treaties, compacts and other agreements. To address these countervailing concerns, particularly within the federal-tribal context, this research adopts as a conceptual framework a “rights-based” model of information law and policy, as discussed by Lipton (2003), which bins basic rights into two categories with regards to information: (1) control rights, including intellectual property and privacy rights, and (2) access rights. Under this model, control refers to an exclusory right, while access is regarded as an exception to control rights (Lipton 2003, p. 745).

Rights of Control

Privacy rights, intellectual property rights, and national security are control rights that counter-balance the rights of access. A right to privacy under the federal Privacy Act only will protect federally-held spatial knowledge and GIS data that pertains to individual tribal members, not to an Indian tribe in general. However, this paper will touch briefly on the idea of collective privacy and on the privacy norms of Indian nations in order to better understand their concerns regarding potential public access to their spatial knowledge and GIS data. Rights to intellectual property, on the other hand, might be used to offset the rights of access under federal statutes and OMB regulations to some degree. Spatial knowledge and GIS data pertinent to national security concerns as defined by federal statutes, regulations, and the courts also might be protected.

Under certain circumstances, federal national security statutes and policies might provide a means for Indian nations to assert limited control over certain spatial knowledge and GIS data that they share with the federal government. Heightened concerns over “homeland security” have prompted recent changes to the federal Freedom of Information Act (FOIA). In order to safeguard national security and

support law enforcement activities, Attorney General John Ashcroft issued a FOIA Memorandum in October 2001 that emphasizes the need to protect sensitive institutional, commercial, and personal interests contained within federal agency records. Furthermore, the federal Homeland Security Act of 2002 (P.L. 107-296), which establishes the Department of Homeland Security (DHS), includes a provision that exempts disclosure of “critical infrastructure information” obtained by a federal agency, i.e., essentially Exemption 3 of FOIA, 5 U.S.C. § 552(b)(3) (2000).

Madsen (1994), however, takes security a step further. Citing several examples, including Burma, Sudan, Mexico, Iraq, and Canada, Madsen argues that information privacy is necessary to ensure community security, particularly of native peoples. A right to privacy may be expressed in many ways as enumerated by Flaherty (1988), such as a right to autonomy, a right to left alone, a right to minimize intrusiveness, a right to control information about oneself, a right to secrecy, and a right to expect confidentiality. Arguably, a right to privacy also might pertain to a group or community, such as an Indian nation, which asserts a separate identity from the dominant society. Privacy is already extended to groups in certain social settings, notably doctors and patients, attorneys and clients, and priests and parishioners. In addition, the idea of collective or cultural privacy is gaining wider recognition in literature (e.g., Bloustein, 1978; Brandt, 1980; Brown, 2003; Burgess, 1981; Curry, 1998; Herdt, 1990; Madsen, 1994; Moreland, 1991; Peladeau, 1994; Post, 1995; Roberts and Gregor, 1971; Schroeder, 1998; Tefft, 1980). Even so, no constitutional collective right to privacy exists in United States. Rather, these rights inure to the individual.

That said it is important to note that for Indian nations privacy and secrecy can be “deeply embedded cultural norms, sometimes interwoven with kinship and religion” (Harding, 2000; see also Brandt, 1980; Brown, 2003). Their expectations of privacy may differ from what is considered “reasonable” by the dominant society; for example, their expectations of privacy are not necessarily greater within a residence (structure) than in an “open field”, i.e., not every place of cultural or spiritual significance is enclosed within a building (Warren, 2004). In addition, GIS data sets that may be commonly accessible under open records laws, such as land parcels or jurisdictional boundaries, may be considered highly confidential by some Indian nations (e.g., BIA, 1997). Furthermore, information about and maps of archaeological sites, historic sites, cultural resource areas, and spiritually significant sites often are considered private knowledge and, as such, are rarely made public (Marchland and Winchell, 1994, p. 51; see also Goodman, 2000); in some circumstances, this sensitive information might not be recorded or might not be shared among tribal government departments or citizens even though other tribal departments may benefit from access to them. But, even within an Indian nation, tribal government departments and tribal members may rate the sensitivity of spatial knowledge and GIS data differently.

Intellectual property rights, on the other hand, such as copyrights, trade secrets, and patents, may be used as a form of control over tribal spatial information and GIS data. Intellectual property rights protect the ownership of a creative work by an author, i.e., individual or legal entity. For example, copyright allows an author to protect her interests in even a small amount of creative expression in her map products, geographic databases and GIS data sets; however, others provides may still copy the factual information in this work, such as the boundaries of a lake, without violating the copyright (e.g., Cho, 2005; Karjala, 1995; Litman, 2000; NRC, 2004; Onsrud, 2005). Thus, copyright offers only “thin protection”. Furthermore, while copyright offers a limited monopoly for a limited amount of time, eventually the information must be made publicly accessible. Thus, some would describe intellectual property rights as “affirmative rights” not “protection” because intellectual property rights do not provide a “defensive shield” against unauthorized use (Elias, 1999), but rather give the owner the right to seek enforcement of these rights through the courts.

Copyright protection for tribal spatial knowledge and GIS data might be bolstered, however, if intellectual property rights are used in conjunction with contracts and licensing. Nevertheless, this too may not provide ironclad protection from public access under FOIA and other federal statutes and regulations (e.g., NRC, 2004, pp. 122-131; Perritt, 2001, pp. 757-758). For general discussions on contracts and licensing of geographic data and services refer to Cho (2005), NRC (2004), Onsrud (2005), and Perritt (2001).

It also should be noted that the question of whether it is appropriate to apply intellectual property rights to tribal spatial knowledge and GIS data is a difficult one. Paterson and Karjala (2003, pp. 633-635) decry the dilemma faced by indigenous people who are “either forced to commodify their own cultural property and thereby perhaps misappropriate its position in the indigenous community [e.g., “diminishing the inherent spirituality or dignity of native heritage”] or [to] renounce commoditization, thus allowing other non-indigenous people to appropriate indigenous cultural traditions.” Here, commodification “can be defined as the conversion of intangible cultural property into items of economic worth that can be traded for commercial gain by such means as license, rental, or sale” (see also Barsch, 1999; Brown, 1998, 2003; IIRRM, 2002).

Rights of Access

Balancing competing rights and interests in freedom of information, privacy, national security, and intellectual property, U.S. public information policy by in large encourages federal government transparency by promoting public access to government information (e.g., Lessig, 1999; Onsrud, 2004; Perritt, 1994). This policy is advanced through numerous federal statutes and regulations, some of which are mentioned below. However, the source of funding for data creation and the contractual and licensing agreements under which that data is created and shared may affect whether the federal government may disclose this information under these statutes and regulations.

The Paperwork Reduction Act of 1995, for example, which prohibits restrictive policies with respect to the release of public information, and OMB Circular A-130 obligates federal agencies to disseminate their information proactively (Perritt, 2001, p. 733). But, notably, A-130 also directs agencies to “[e]nsure that Federal information system requirements do not unnecessarily restrict the prerogatives of state, local and tribal governments” (Onsrud, 2005; see also Onsrud and Lopez, 1994, 1998).

The U.S. Freedom of Information Act (FOIA), which provides a right to access federal government records, was crafted to balance the countervailing tensions of the “the public’s interests in the effective and efficient operations of government” and “in the prudent governmental use of limited fiscal resources” (rights of access) with “the preservation of the confidentiality of sensitive personal, commercial, and governmental information” (rights of control). The FOIA generally supports a policy of broad disclosure by the federal government, and, until recently its exceptions have been narrowly construed by the courts in favor of disclosure. Homeland security statutes, however, have expanded what information can be withheld from disclosure. On the other hand, the revised OMB Circular A-110 requires that research data created by private research institutions using federal awards be made publicly accessible under the FOIA.

OMB Circular A-16, along with Executive Order 13286, provides for the “improvements in coordination and use of spatial data,” by encouraging the development of a National Spatial Data Infrastructure (NSDI) and by promoting wide spread access to spatial data. But, this circular also recognizes proprietary rights by making a distinction between federally funded and privately funded data (e.g., Holland, 2004; Onsrud, 2005). Similarly, Federal Acquisition Regulations (FARs), which govern contracts to which the federal government is a party, specify that when the government has funded the creation of data, it should be able to distribute it to the public; however, when a private entity substantially funds the creation of data, it should be able to impose restrictions on government’s use and distribution of that data to the public (NRC, 2005, 127-129; see also Onsrud, 2005).

The Information Quality Act (also known as the “Data Quality Act”), Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (sec. 515, P.L.106-554), amended the Paperwork Reduction Act (Ch. 35, Title 44, US Code) and requires that the OMB must issue guidelines that “provide policy and procedural guidance to Federal Agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies (NRC, 2004, pp. 133-134).” Furthermore, individual agencies also must issue their own guidelines, which include “administrative mechanisms to challenge the quality of the information disseminated by the government and for “correcting” information that does not meet the guidelines.” For example, the BIA Quality Information Guidelines

(2002, p. 3) state: “[i]f access to data and methods cannot occur due to compelling interests such as privacy, trade secrets, intellectual property, Tribal sovereignty, Trust responsibilities, existing or pending litigation and other confidentiality protections, Indian Affairs will, to the extent practicable, verify information and document that verification steps were taken.”

This act will require that tribal spatial knowledge and GIS data collected or created under a federal grant or shared with a federal agency be made publicly accessible in some form, although in what form is perhaps open for debate. In particular, when this information forms the basis of a government policy, regulation or other action, such as federal rule-making, it must be made accessible for public and judicial review. However, if a contract restricts public access to the information, then the agency’s action may be overturned (e.g., Bolton, 2004; Federal Advisory Committee Act, 5 U.S.C. Appendix I; Provisions of the Administrative Procedure Act; NRC, 2004, pp. 131-132).

Similarly, the Government Performance and Results Act (GRPA) and the related Program Assessment Rating Tool (PART) also may require public access to tribal spatial knowledge and GIS data collected or created under a federal grant or shared with a federal agency. “GRPA provides a framework under which federal agencies prepare strategic plans, performance plans, and performance reports that set goals and report on the extent to which they are achieved,” while “PART is a systematic method of assessing performance of program activities, focusing on their contribution to an agency’s achievement of its strategic and program performance goals.” These link performance to management and budget decisions (OMB, 2005).

On the other hand, OMB Circular A-76, which implements the Federal Activities Inventory Reform (FAIR) Act, requires agencies to justify engaging in “commercial” activities, which are those that are not “inherently governmental.” According to NRC (2004, p. 126), A-76 could be construed as “requir[ing] an agency to outsource the acquisition of geographic data, the contract may provide for either restricted or unrestricted rights in the data.” Furthermore, the 2003 U.S. Commercial Remote Sensing Policy, which mandates the support of a robust US commercial remote sensing industry, requires outsourcing of remote sensing data collection where feasible. This circular does not dictate whether data should be acquired with unrestricted rights or on a more limited basis.

Relevant Court Cases

Several court cases and administrative cases, including some which are ongoing, illustrate the tension between Indian nations’ need to protect tribal information and the US statutes and policies that support the general public’s right to know. Three cases will be mentioned briefly here, all of which involve water rights disputes, but a more detailed discussion will follow in future publications. In one of the most important cases in recent years, *Department of the Interior and Bureau of Indian Affairs, Petitioners v. Klamath Water Users Protective*

Association (99-1871), decided on March 5, 2001, the United States Supreme Court ruled that documents shared by Indian nations with the federal government – at the government’s request – were not exempt from the Freedom of Information Act (FOIA) under Exemption 5, a provision that protects intra-agency and inter-agency records from public inspection. Although in keeping with the Court’s history of narrowly interpreting FOIA to encourage government disclosure, this decision will have a far-reaching impact on the Federal-Tribe trust relationship. It has caused a ripple effect, sparking new conflicts over access to government-held tribal information and GIS data. This, in turn, may erode Tribes’ willingness to share information and hence, impede the federal government’s ability to perform its trust obligations. This decision brings to the forefront the double-edged sword of the trust relationship and illustrates the tension between the federal government’s two roles – as decision-maker and as trustee.

Two other cases should be mentioned. Under *Flathead Joint Board of Control v. USDOJ* (309 F.Supp.2d 1217), decided on Feb. 3, 2004 by the US District Court, D. Montana, Missoula Division, the Montana State irrigation district, which was in the process of negotiating with the tribes over state’s water rights, sought access to federally-held information regarding water rights on the reservations under the Freedom of Information Act (FOIA). The District Court concluded that this information was “commercial or financial information” and thus exempt from disclosure via FOIA Exemption 4. In *Citizens Progressive Alliance v. BIA* (241 F.Supp.2d 1342), decided Dec. 3, 2002 by the US District Court, D. New Mexico, the District Court ruled that information regarding the water rights claims of specific Indian nations did not have to be disclosed to a because Exemption 5 was applicable; in other words, the information regarding water rights was “inter-agency or intra-agency communications.”

COUNTER CONCERNS

While some tribal governments would like to assert total control over who has access to tribal information, like spatial knowledge and GIS data, ostensibly to protect the tribes’ rights and interests, others, perhaps controversially, have argued that promoting tribal government transparency may be equally as important for protecting those rights and interests and should be considered when crafting tribal open records or data protection ordinances; what is more, the overhead and costs involved in enforcement of data protection agreements and practices may be a significant burden. Indeed, some contend that Indian nations, like state governments, should provide access to the majority of their government records to tribal members under tribal open records laws, with limited exceptions, and should protect tribal member confidentiality in a fashion similar to the provisions of the federal Privacy Act (e.g., Monette, 2005). Furthermore, Onsrud (2001) suggests that legal access to government spatial information for all citizens in the United States is a “necessary prerequisite to participatory processes” (see also Onsrud, 1992; Tulloch and Shapiro, 2003).

Just as with the dominant society, tribal government transparency may be needed in order to ensure tribal government accountability to tribal members. For example, journalists working for tribally-owned newspapers have tried to report allegations of misconduct and fraud or mismanagement on the part of tribal government officials, only to have their jobs on the reservation and those of their families threatened (Hamby, 2005). Moreover, in at least a few instances, tribal grassroots organizations have directly opposed tribal government decision-making and actions, claiming mismanagement on the part of the tribal government and/or the cooperating federal agency, and have used maps and GIS data to assert their claim.

Most notably, Diné Citizens Against Ruining our Environment (Diné CARE), a tribal grassroots organization, formed in order to protect the forests of the Chuska Mountains and Defiance Plateau, located within the Navajo Nation along the northern Arizona-New Mexico border, from what they considered to be “unmitigated timber cutting and mismanagement.” In 1991, this organization contested the Navajo Nation government’s forest policy as well as the sawmill’s viability. The Navajo forest operation, Diné CARE contended, was not sustainable; it was not making sufficient efforts to mitigate damage and erosion or to replant and regenerate the forest. In order to defend this claim, Diné CARE mapped the forest. After four years of struggle, Diné CARE succeeded in stopping the logging operation (Diné CARE, 2005a). Arguably, the mapping effort was a critical factor in their success.

Then, in an effort to develop a long-term restoration plan for the Sanostee Restoration Project for the Chuska Mountain forest, Diné CARE utilized GIS technology and remotely sensed imagery to map the forest. The Diné CARE website notes:

“Local people, living close to the land, herding sheep and gathering ceremonial sacred herbs, have contended that cumulative impacts of timber cutting have already caused extensive damage. With this in mind, our goal is to document precisely the condition of the forest and to offer the community a plan for commercial logging alternatives. This includes forest and watershed restoration and regeneration, identification of roads for closure and protection areas based upon endangered species, archeology and sacred sites. ... Our primary measurable objective is to have the land cover map complete and ready for use in consultation with community members” (Diné CARE, 2005b).

In a parallel effort, Diné CARE also worked to mitigate the effects of uranium mining on the Navajo Nation, including excessive radiation levels in Navajo residences and significantly increased cancer rates among the Navajo population. While in 1991 the Navajo Nation enacted a statute that prevented mining on all Navajo lands, the Navajo Nation Council's Resources Committee “consider[ed] a loophole that [would] give them the ability to approve two new leases for uranium

mining, to a company called Hydro Resources, Incorporated (HRI).” Diné CARE, as well as many Navajo communities, organizations and individuals worked to oppose this new perceived threat to their reservation. Again, they used GIS technologies to document the continued effects of uranium mines on the Navajo people in order halt the efforts of the Resources Committee and “to amend the Surface Mining Control and Reclamation Act (SMCRA) to include better reclamation standards, and the Radiation Exposure Compensation Act (RECA) to make compensation standards less.” GIS technology enabled them “to examine the relationship among health afflictions, mining activity and environmental factors...[and to] enable greater public participation and involve concerned individuals” (Diné CARE, 2005c).

The GIS data used in these projects was not obtained from the Navajo government, but rather from direct data collection on the ground and the acquisition of data from outside sources, with the assistance of university staff. An important question at hand is whether projects such as these would be possible if tribal members and tribal grassroots organizations could not obtain maps, GIS data, and other forms of spatial information about their lands and resources from the federal government; in other words, what recourse would tribal members and tribal grassroots organizations have if their tribal governments were in some way able to prevent everyone, including tribal members, from accessing federally-held tribal spatial knowledge and GIS data under federal statutes and regulations, such as FOIA? This poses a complex problem.

SUGGESTIONS

Given the discussion above, Indian nations and their citizens might benefit from pursuing a combination of options, including:

- Pursue both legal and political avenues to gain greater protections and to prevent abuses, including: 1) identify general criteria to assess the sensitivity of information that will apply regardless of the technology, ideally through community input; 2) identify the most culturally valuable information to be protected, ideally through community input; and 3) avoid blanket prohibitions on information gathering and dissemination.
- Propose possible Amendment to FOIA under Trust Reform Process (e.g., S. 2773 95th Congress, 2nd Session March 21, 1978)
- Enact Tribal ordinance that declares FOIA and State Open Records laws do not apply
- Enact Tribal ordinances similar to state “open records” laws and privacy laws that appropriately specifies what information is to be made public and what is to be kept confidential (e.g., Oglala Sioux Tribe, Ch. 21 Law & Order Code, Ch. 20 - Records Management, Ch. 21 – Freedom of Information, and the Oglala Sioux Tribe Water Quality Management Code Chapter 1, Part 1, 1-1-103. Public and Confidential Records; Cherokee Freedom of Information Act of 2001, The Cherokee Code: Published by Order of the Tribal Council of the Eastern Band of

Cherokee Indians, Ch. 70 – Skeletal Remains and Burial Site Preservation, Division 2: Tribal Historic Preservation Office, Sec. 70-202. Registry [of historic properties locations]; Skokomish Tribal Code Tribal Records and Freedom Of Information Act (Reserved) S.T.C. 2.09; Susanville Indian Rancheria Constitution and Bylaws, Bylaws Article I – Rights of Members, Section 2 – Right to Review [tribal and financial records]; Tulalip Tribes of Washington Codes and Regulations, Ordinance 80 - Tulalip Zoning 24.4 Confidentiality; for these and other tribal codes, see www.narf.org). For example, the Tulalip Tribes of Washington’s zoning ordinance states that “[a] map indicating the location of sites that are confidential and known only to Tribal members shall also be held by the Tulalip Tribes, subject only to *in camera* review by the Planning Commission, Board of Directors or Tribal Court in the event of appeals.”

- Assert copyright, utilize contracts and licensing, and require data sharing agreements when appropriate; however, as Lum (1999) points out, administrative rule-making will not exempt disclosure and confidentiality agreements may not withstand judicial scrutiny under FOIA.
- Be mindful of funding sources and their data access requirements, particularly of federal funding or federally funded organizations, and of collaborators and their data access policies and procedures
- Develop and implement administrative best practices, policies and standard operating procedures for asserting intellectual property rights and handling sensitive spatial knowledge and GIS data (e.g., Emery, 2000; Hansen and VanFleet, 2003; Tobias, 1997). For example, if appropriate, identify an “information steward” and oversight body to handle spatial knowledge and GIS data requests, although this may negatively impact traditional means of information exchange; educate tribal staff and collaborators on appropriate spatial knowledge and GIS data handling procedures; and require employees and contractors to adhere to a Tribal “Code of GIS Ethics” (e.g., URISA, 2003).
- Develop and implement statutes and policies for handling research on reservations, including data collected or created as part of the research process (e.g., Colville Tribal Law and Order Code, Title 6 – Regulatory Provisions, Ch. 6-6 Research Regulation; Ho-Chunk Nation Code (HCC), 3 HCC 3 - Tribal Research Code; Law and Order Code of the Rosebud Sioux Tribe, Cultural Resources Management Code; for online copies, see www.narf.org)
- Implement technical data security measures (e.g., access controls, encryption, “fuzzing” or masking the data, electronic redaction).

A data distribution and protection policy template, as well as other policy models for secure data handling, will be offered in future publications.

At the same time, as discussed in the section above, it is perhaps equally important to promote and ensure tribal government transparency (e.g.,

implementing tribal open records laws, enabling access to tribal spatial knowledge and GIS data for enrolled tribal members). One way to prevent tribal spatial knowledge and GIS data from being redistributed by tribal members to third parties, such as mining or landfill companies, is to require that all data recipients sign a data license agreement that restricts data redistribution; however, this might require more bureaucratic overhead, for example in taking time to explain the agreement to tribal members, and might be politically controversial, and difficult to track and enforce. Furthermore, Indian nations might strengthen their position by building the internal capacity to understand and use spatial technologies and GIS data to their advantage, and by keeping abreast of new sensing technologies and their possible implications.

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