

MAGIP GIS Scholarship Application

Dominique M. David

Montana State University
Bozeman, MT 59717

Research Advisor: Lisa Lone Fight

MAGIP GIS Scholarship: Project Proposal

Project Title: *Indigenous science knowledge inherent in Native language place names*

Mentors: Lisa Lone Fight & Dr. Wayne Stein

Exploring Native language place names reveals Indigenous science about the natural environment that may contribute to sustainable resource management and development in the coming generations. Based on centuries of observation, this knowledge has survived in the context of Elders' oral histories and Native language place names. Indigenous names often hold very different meaning (and inherent Indigenous knowledge) that more recent place names may not convey. When place names were put to paper they were often those of post-Columbian cultures. Some Indigenous place names remain in the U.S. Board on Geographic Names; however they have most often been stripped of their traditional context.

In order to preserve and re-contextualize these valuable scientific resources, this research project looks to GIS (Geographic Information Science) technology as a viable instrument for integrating Indigenous and Western science. Original Native American names for the Gallatin Valley Headwaters Rivers will be overlaid with ecological and topographic data layers to identify relationships between Native language place names and Indigenous science knowledge. Patterns between these place names and Western Earth science knowledge will be demonstrated in a multidimensional framework utilizing ArcGIS 10.1 mapping software. Qualitative and quantitative data will be represented in layers to provide an interactive virtual map that demonstrates the integrative qualities between Native American place names within their Indigenous context and Earth science knowledge.

As community-based participatory research, this study will allow Elders and Indigenous science experts from communities familiar with this study area to define the context surrounding Native place names. Interviews will be conducted with Elders and Indigenous science experts over the summer of 2014 to identify the context surrounding the Native place names of the Gallatin, Jefferson and Madison rivers. Interviews will be conducted according to community-based participatory research guidelines outlined by the National Congress of American Indians.

Indigenous science knowledge identified by interview participants will then be used to choose related GIS layers. GIS layers will be downloaded from relevant scientific databases such as the Natural Resource Information System (NRIS), U.S. Environmental Protection Agency (EPA), and the National Atlas. A map containing both Indigenous and Western science layers will be reviewed by participants for accuracy and relevance. Forums will be identified by participants for sharing this research (e.g. educational/community centers) and implications for future research will be discussed. Google Earth may also be utilized for sharing research results with participants.

To date I have completed a literature review and draft for an article on this study. I have also completed trainings such as the CITI IRB requirements for interviewing human subjects and an NSF Responsible Conduct of Research Seminar in preparation for this research. Funding support from the Montana Association of Geographic Information Professionals would allow me to continue developing this research while I pursue my studies in Earth Sciences at Montana State University.

I believe geospatial science technology shows great promise of providing the forum to sustain Indigenous science knowledge for our future generations. Despite the challenges of integrating qualitative traditional knowledge with quantitative data, innovative researchers are forging a path for others to navigate. The difficulties of pursuing this form of research bear little weight to the peril of losing such vast stores of Indigenous Earth science knowledge. I have already found a few case studies where GIS has been used in a similar capacity. For example, the Maori community of Aotearoa (New Zealand) has utilized GIS as a means of recording aspects of Indigenous knowledge and values that they deem to be important for future generations. Garth Harmsworth (1998) recognized that within this framework “such tools complement the indigenous knowledge systems traditionally used to store and transfer knowledge and information . . .” (p.1). I also found a valuable contribution to the scientific community in the work of Bethel (et.al.) who provide coding methods and mapping products that “provide a repeatable solution for incorporating the wealth of local knowledge with scientific data sets, including the historical and projected land-loss maps derived with geospatial technologies that are currently used by restoration managers and scientists” (2011, p. 568). In this same article benefits for integrating diverse ways of knowing in a GIS framework are recognized to include: “incorporating inputs and policies at various levels of spatial aggregation; promoting spatial and temporal thinking about issues and concerns; and creating opportunities for learning and sharing of responsibilities.” (p. 557).

How can we know how the extinction of a species, a language, a story, will affect our lives in the future? Without a bridge to carry this knowledge from one generation to the next we face a huge loss in diversity of knowledge. If we neglect to honor our Indigenous knowledge, we risk

our Elders carrying it away with them in their passing. It may take generations to find the paths of scientific experimentation and observation that led to their understandings about the natural environment. In the future, GIS models like the one developed in this study may be utilized as tools for more culturally relevant science education, natural resource management, and sustainable development. Ultimately, this research will serve as a bridge between the knowledge of Indigenous Elders and the environmental challenges that will need to be addressed by future generations.

Literature Cited:

- Bethel, M. B., Brien, L. F., Danielson, E. J., Laska, S. B., Troutman, J. P., Boshart, W. M., Giardino, M.J., & Phillips, M. A. (2011, May). Blending Geospatial Technology and Traditional Ecological Knowledge to Enhance Restoration Decision-Support Processes in Coastal Louisiana. *Journal of Coastal Research*, 27(3), 555-571.
- Harmsworth, G. (1998, December). Indigenous Values and GIS: a Method and a Framework. *Indigenous Knowledge and Development Monitor*, 6(3), 1-7.