

## EDUCATION-COMMUNICATIONS REPORT AND RECOMMENDATIONS

Attendee's Name and Report Writer:

**Joseph Kerski, Geographer:  
Education/GIS, USGS, Denver, Colorado.**

Locations: Fort Yates, North Dakota,  
Pierre, South Dakota, and Rosebud, South  
Dakota

Event: Conduct GIS Workshop for  
Standing Rock Sioux Tribal Professionals,  
South Dakota K-12 Educators, and meet  
with James Rattling Leaf, Sinte Gleska  
University, Rosebud Sioux Tribe

Dates: 3-8 February 2004

### **1. Standing Rock Sioux GIS Workshop**

At the invitation of a former employee of the Lands Division of the Standing Rock Sioux Tribe, I conducted a GIS workshop with Lands Professionals. Also in attendance were tribal professionals from the EPA, NRCS, and elsewhere. All of these groups work together on issues such as water quality, cultural resource management, land leasing, housing, health and human services, and other issues that require the use of GIS and GPS technology.

The workshop consisted of two main emphases: (1) How to download, format, and use USGS spatial data within ArcGIS. The tribal government has tapped into the BIA – ESRI license agreement for the software, and they are all using ArcGIS 8.3. (2) An overview of the functionality of the Spatial Analyst and 3D Extensions to ArcGIS. The Lands Division owns these extensions, but they have not yet had the opportunity to do much with them. Therefore, we spent time analyzing National Land Cover Data, DEMs, and the National

Elevation Dataset with these extensions. We discussed raster-based query, fly-throughs, importing raster and SDTS data through ArcCatalog, and related topics. I emphasized data for the local Fort Yates area and Standing Rock region. The tribal government, of course, already has a wealth of data for the tribal lands.



*The GIS workshop was held in the New Standing Rock Sioux Administrative Building and Tribal Headquarters, an impressive structure overlooking Lake Oahe in Fort Yates, North Dakota. The Standing Rock Sioux Tribe is part of the Great Sioux Nation that includes the Hunkpapa and Blackfoot bands.*



*Standing Rock GIS Coordinator Joseph Smith, right, with one of the Standing Rock*

*Tribal Surveyors and with USGS materials during our GIS workshop. I distributed USGS GIS guidelines, procedures that I had created, USGS local maps and Indian lands maps, water quality reports, data set descriptions, ArcGIS documentation, National Map information, and other items.*



*Great Seal of the Standing Rock Sioux Tribe inscribed on the floor outside of the Tribal Council Chambers inside the administrative building. The Tribal Council was meeting during the time I was in the building, and so I had the privilege of sitting in and listening to some of the proceedings, presided over by Charles Murphy, Tribal Chairman.*



*Joseph Kerski at the Standing Rock Sioux Tribal Headquarters. It was a great privilege to work with the Standing Rock*

*Sioux staff, and I look forward to working with them in the future.*

Collaboration among Native American governments, scientists, and educators, and the USGS can help build Tribal capabilities to effectively manage Tribal resources, plan for the future, and to improve the education of future generations of Tribal leaders. Working with the Native American community is rewarding—one learns a great deal from these professionals and educators.

In addition, we need to be working closely with the Tribal Governments with regard to building *The National Map*. The tribal government has a wealth of data and knowledge that we would be wise to partner with.



*New water intake in Lake Oahe under construction in February 2004. Fort Yates and several other communities were without water during November 2003 due to continued low levels of Lake Oahe and the Missouri River. Could our USGS water resources folks assist at all with this effort and work with the tribal environmental staffpersons?*

## **2. Meeting with Faculty at Sitting Bull College**



*Sitting Bull College, Fort Yates, North Dakota. The College has been serving the educational needs of students since 1973, and is accredited by the Higher Learning Commission of North Central Association of Colleges and Schools, and is a member of the American Indian Higher Education Consortium (AIHEC) and the North Dakota Tribal College Association. Enrollment is approximately 350. The College is relocating to a new site across the street, and the new plans are displayed throughout the campus.*

I briefly spoke with Ron His Horse Is Thunder, President of Sitting Bull College, before meeting with the faculty. I met the President at our USGS information exhibit at the National Indian Education Association conference three months ago in North Carolina. He is the great-great grandson of Sitting Bull ! It was a great pleasure to see Ron again and to begin discussions with his staff about GIS.

I met the Dean for Academic Affairs, Koreen Ressler, and spoke with the Science Coordinator, Gary Halvorson. Students at Sitting Bull can take GIS via an online course through Oglala Lakota College in South Dakota. I invited Gary to our GIS institute for educators this June in Colorado. He was interested in conducting a GIS workshop at the College for his staff this

June, as well. We discussed our shared vision of how GIS and spatial analysis fits in so well with the college's programs of environmental studies, business, buffalo management, and science, as well as providing interdisciplinary, career-oriented opportunities for students. In addition to all of this, studying the Earth is a longstanding tradition with Native Americans. Even the "Four Directional Song" of the Standing Rock Sioux, rich in meaning and symbolism, points to the four cardinal directions, anchoring geography and the Earth to the Tribal Culture. GIS can be a significant component to students' appreciation of and understanding of the complexities of the Earth and its people.

#### Additional Visit

I also took the opportunity to pay Wilbur Red Tomahawk a visit, with whom I worked while I was a Census Bureau employee the last time I visited Standing Rock. We worked on establishing the block group boundaries and updating the TIGER system; Wilbur is now the supervisor of the Tribal Gaming Commission. The Standing Rock operates two casinos on its lands.

### **3. South Dakota GIS Workshop; for Educators**

Imagine a place with a statewide license for GIS for all public, tribal, and private K-12 schools, support from the State Department of Education, and support from the State GIS department, even from the state GIS coordinator. A place where one walks up to a school and the first sight is students using GPS receivers! Such a place does exist—it is South Dakota!





*A GIS workshop for interested South Dakota K-12 educators was held at a middle school across the street from the South Dakota State Capitol. The Capitol Building is an impressive structure, and I took the opportunity to walk through the building to see the state legislators, who had recently arrived for the new legislative session. I also had a conversation about GIS with security guards from the South Dakota State Patrol. They, of course, use GIS and GPS in their own organization.*



*Ron Woodburn, South Dakota State GIS Coordinator, in an office that one would expect a GIS coordinator to have—full of maps, data, globes, and other geographical items! Over the past few weeks, I have been surprised to learn how much Ron has been supportive of GIS in education,*

*through the coordination of the statewide K-12 ESRI license, provision of data, and supporting training. South Dakota was the second state (after Montana) to set up an agreement with ESRI to provide free ArcView 3 or ArcGIS 8 software to schools who request it. Ron's work is an excellent model for other states to follow. Ron also is a part-time instructor of geography and so he "practices what he preaches." Ron mentioned that out of all the skills required for college internships at the state government, GIS was mentioned more than any other single skill. We made sure he mentioned this to the teachers at the workshop, as well, so that they would realize that GIS is an interdisciplinary tool with excellent career pathways.*



*Joseph Kerski outside the South Dakota Department of Education building. The DOE staff—Gay Pickner, Mark Heilmann, and others—have also been very supportive of technology in education, including spatial technologies such as GIS and GPS.*

I was interviewed during the event by Tony Mangan, news director of KCCR Radio.



*Site of training—Georgia Morse Middle School, Pierre South Dakota. I would like to thank the staff of the school for supporting our workshop. It was a pleasure to work with them and meet some of their students (below).*



*Students at Georgia Morse Middle School measuring acceleration in their science class while we were setting up for the GIS workshop.*



*The middle school featured one of the most impressive technology labs I have ever seen at the K-12 level, including a Driver Simulation workstation (above). The technology teacher, Ms Fluth, participated in our GIS workshop. It was her students whom I had seen navigating with GPS units on the school grounds upon my arrival.*

Our GIS activities included gathering GPS coordinates and attributes and mapping those attributes atop a topographic map and aerial photograph, examining population and change across South Dakota for the past 100 years, examining local Pierre population and housing, analyzing South Dakota minerals, rainfall, land ownership, and other data, examining tornadoes, earthquakes, and hurricanes, creating slope, hillshade, contour, and other data



from USGS digital elevation data, creating and querying tabular and spatial data, locating study sites for riparian plants, and other activities.



*Gay Pickner, above, addresses the workshop participants. Ms Pickner, from the South Dakota Department of Education, was instrumental in ensuring the workshop was funded and was a success. Teachers received mileage, lodging, food, and free training during this workshop. They even paid for my lodging. I made sure that the teachers knew what an extra special arrangement they all had by teaching in this state.*

*Department of Education activities. I was impressed that the Technology Coordinator (Ms Bauck) not only supported the event, but also participated in the workshop. Other key supporters of GIS in K12 in the state are Mary O'Neill at South Dakota State University and Cassie Soeffing, educator from Sioux Falls.*



*Ron Woodburn, above, State GIS Coordinator, demonstrates the Data Hound, an extension that he and his staff wrote to enable educators and other data uses to easily download USGS and other spatial data sets for their local area within ArcView and ArcGIS. The SD GIS site is on: <http://www.state.sd.us/gis/index.htm>*



*Above, Mark Heilmann and Tammy Bauck work with GIS during the workshop. They plan to use GIS as a tool to map standardized test scores and in other*



Above, collecting GPS coordinates and attributes across the street from the state capitol.



Group photo of most of the participants in the workshop. We had approximately 27 in attendance and were missing a few due to a snowstorm that affected the southeast part of the state.



Above, Joseph Kerski works with educators at the institute. The educators represented technology, science, geography, mathematics, agricultural education, and other subjects. The web site for the training is:

<http://www.state.sd.us/deca/ddN4Learning/satetawide/GPS/agenda.htm>

And for GIS across the state:

<http://www.state.sd.us/deca/ddN4Learning/satetawide/GPS/abtGIS.htm>



Above, photographs of educators working with GPS and GIS. Some of the educators had traveled over 100 miles to attend the workshop and we had an excellent session.





*Above, Kelly Lane works with a teacher in the workshop. Mr Lane, a teacher from Rapid City, has done much in GIS and GPS implementation, and in training others in its use and application. Everyone appreciated his help with the workshop.*

*Teachers gather maps, books, booklets, lessons, and posters that I distributed at the workshop.*



*Heading outside with the GPS receivers...*



*The lab facilities we were in were excellent; a few normal computer issues, but no major crashes. The power went out in half the town for 30 minutes, but we used that time for discussion on next steps in the GIS journey.*





*I took the opportunity to take a brief walk in the brisk weather along the Lewis and Clark Trail along the Missouri River at Pierre. I distributed several Lewis and Clark items at the K-12 workshop.*

### **Acknowledgements**

It was an honor and privilege to work with the Standing Rock Sioux. I thank Joseph Smith, Ron His Horse Is Thunder, Gary Halvorson, and others for meeting with me. It was also an honor to work with the South Dakota educational community, and I thank Gay Pickner, Tammy Bauck, Mark Heilmann, Kelly Lane, Ron Woodburn, Amber Fluth, and others for their support not only for the workshop, but also for spatial analysis in the curriculum throughout the year.

I thank the attendees of the workshop for taking time out of their busy schedules to share their expertise and enthusiasm.

I thank Mark Barber and Carrie Jucht for supporting these event with excellent materials from USGS EDC, and for their

support of education throughout South Dakota over the years. No doubt that one of the reasons why things work so well here is because of their years of diligent work with the educational community.

I appreciated the support of the event from the ESRI St Paul staff: Judy Laudenbach and Margaret Tehven.

I also appreciated the USGS' support of my participation in this event, particularly Jack Fordham. I thank Lisa Scales for the projector and Mark Thorp for the GPS units.

### **Recommendations**

I recommend that we increase our work with Tribal Governments and with the educational community. These groups can provide the USGS with input to its publications, data sets, software, and other items related to geography, science, and education. We can also provide data and assistance to the tribal professionals and students as they use GIS and USGS spatial data. It is not enough to tell what products are available from the USGS. The value-added in our involvement in education is that we work with educators to demonstrate how our products can be used in conjunction with educational standards and goals of the Tribal Governments.

Tribal and educational officials already know how to find most resources and they have access to a great deal of material. When we get involved with them--getting their input and working with them--we can understand how to best meet their needs.

I look forward to working with the Standing Rock Sioux tribe, Sitting Bull College, and the South Dakota educational community in the future.

## Additional Activities

I spoke with James Rattling Leaf while I was in South Dakota in the hopes of meeting with him and with his new GIS coordinator. They were both shortly to depart on business travel, but it was good to touch base with them. I am placing answer keys to my 10 GIS-based lessons at Sinte Gleska University online on:

<http://rockyweb.cr.usgs.gov/public/outreach/squ/squgis.html>

I plan to also develop ArcGIS versions of all the lessons.



*Halfway to the North Pole! Joseph Kerski on the 100<sup>th</sup> Meridian at 45 North.*

\*\*end of report\*\*