The Potential of GIS for Managing Tribal Information

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To meet the rising demand of organizing current tribal information and to better preserve tribal heritage, GIS is stepping in as a key component in tribal data management. Geographic Information Systems, or GIS, provides the ability to produce digital maps and to perform geographic analysis of data. The advantage of digital maps is that the user chooses which data layers to include and at what scale it should be seen. Data layers might include county boundaries, road networks, lakes and streams, or municipal boundaries. GIS can be used to map the physical landscape, political boundaries, or identify cultural sites. Information can be gathered through field survey, aerial photography, or conversion from hard copy to a digital format.

Red Plains Professional (RPP) is a civil engineering firm with professional and personal ties to various tribes in Oklahoma and across the United States. In addition to site development on tribal lands, RPP has been involved with transportation planning for tribes and the Indian Reservation Roads (IRR) inventory. RPP uses ArcGIS produced by ESRI, which is available to tribes through a standing contract with the BIA.

Anyone who has worked with the IRR inventory knows what a time-consuming and detail-oriented process it entails. The roads must be surveyed and traveled using GPS units; the GPS data must be converted to usable GIS data; and forms must be completed and maps produced that are in complete agreement. GIS makes this whole process more accurate and more efficient. Given the inevitability of human error and occasional unreliability of satellites, bringing GPS readings into a GIS allows for easy route corrections. For example, the surveyor may forget to stop the GPS unit at the end of a route. By placing the route over an aerial photo, the route line can be shortened to match exactly. In another instance, when satellite signals are low, the GPS unit may not be able to record data. Using aerial photography in a GIS, routes can be digitized along its precise location. Furthermore, map production becomes a thing of ease once the maps are established.

Gradually, we are incorporating GIS into more and more projects. In many of our projects, it has become necessary to provide location information in multiple forms. The engineers may
to be continued on pg. 5
Editor’s Corner

Being a borderline computer and software junky, and having considerable CAD experience, I’ve always thought that the emergence and evolution of Geographic Information Systems (GIS) was an extremely powerful and natural development for the transportation industry. Given the importance of managing IRR inventory data, tribal agencies would be well served to manage their inventory data with GIS. To that end, we have an article on page 1 provided by a consultant that specializes in working with tribal agencies. Related to this article is an introduction on page 5 to the RoadSoft® system which was developed in the Transportation Institute at Michigan Technological University. Speaking of IRR inventory data, this was discussed quite a bit at the 2008 Midwest Regional BIA Meeting that was held in Green Bay, Wisconsin. I’ve provided a quick recap of the meeting on page 3.

Another topic that has really caught my eye over the last few years is an up-and-coming safety initiative being undertaken by numerous transportation agencies - centerline rumble strips. Studies have shown a dramatic decrease in left-of-center accidents after the installation of centerline rumble strips. The Michigan DOT has recently announced an $8 million, three-year safety initiative to install centerline rumble strips on rural non-freeway roads throughout the state. Details can be found on page 4.

As a borderline Generation-X member, I’m always amazed when I hear or read stories of people dedicating 40+ years to a given profession. James Garrigan is one such individual that has dedicated his career to tribal transportation. Read about the recent recognition for his efforts on page 6.

You’ll find the rest of our regular offerings in the Resource Library section on page 7, and our Upcoming Events section on page 8.

-Scott

The deadline for contributing suggestions, corrections, or information for publication in the next Pathways, Volume 14, No. 2, is September 5, 2008. Any contributions made after that date will appear in Volume 14, No. 3. You may contribute information for publication on www.ttap.mtu.edu at any time.

Pathways is published quarterly by the Tribal Technical Assistance Program, in the Michigan Tech Transportation Institute at Michigan Technological University. The Tribal Technical Assistance Program is part of a nationwide effort jointly financed by the Federal Highway Administration (FHWA) and the Bureau of Indian Affairs (BIA). It intends to relay the latest technology and information on tribal roads and bridges, tourism, recreational travel, and related economic development to tribal transportation and planning personnel. Tribes in the Michigan Tech TTAP region include those in the Minneapolis and Eastern BIA Regions. Contact the TTAP office for a free Pathways subscription, or to submit articles and suggestions.

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U.S. Department of Transportation
Federal Highway Administration

U.S. Department of the Interior
Bureau of Indian Affairs
Midwest Regional BIA Meeting Wrap-up
This year's consolidated meeting a success.

Scott Bershing
TTAP Editor

The 2008 Midwest Bureau of Indian Affairs Regional Tribal Transportation Meeting was held on April 1-3, at the Radisson Hotel & Conference Center in Green Bay, Wisconsin. Formerly known as the Midwest Annual Tribal Transportation Meeting, the name was changed this year to reflect the expanded agenda and areas of interest for the entire region. In addition to a new name, this year’s meeting also combined and consolidated presentations to address all of the states within the region. Previously, the Midwest Bureau of Indian Affairs (BIA) held separate meetings in each state to address specific topics. The Midwest BIA was assisted in the planning, facilitation, participant registration, and hosting of this event by the Michigan Tech Tribal Technical Assistance Program.

There were a total of 65 attendees representing 36 different agencies at the meeting. Topics were presented by the BIA, Federal Highway Administration, Office of Federal Lands Highway, the Federal Transit Administration, and the Michigan Tech Tribal Technical Assistance Program. In addition to general topics that were applicable to everyone, sessions specific to each state were also held to allow interaction with their regional BIA representatives.

“I think this new format worked out really well” stated Todd Kennedy, Midwest BIA Regional Road Engineer. “Unless we read through the evaluations and find any major objections, at this point I’m assuming we will follow the same format again next year.”

One suggestion made during the meeting was to have the meeting location rotate throughout the region. “We’ll have to look into that” added Kennedy. “We chose Green Bay this year as it is centrally located,” he added, “The goal is to try and minimize travel time and costs for everyone involved.”

Specific session topics, along with links to the presentations (where applicable), can be found at: <http://www.ttap.mtu.edu/index.php?p=2008_midwest_bia>
The Michigan Department of Transportation (MDOT) announced a three-year, $8 million safety initiative involving the installation of centerline rumble strips on 5,700 miles of rural, non-freeway roads across the state. MDOT also will add approximately 1,700 miles of shoulder rumble strips. Rumble strip installation will begin this construction season and will be completed in 2010. MDOT will improve about one-third of its selected inventory during 2008, beginning in April; one-third in 2009; and the remainder in 2010.

"We expect to save lives and reduce the number of serious crossover crashes by adding the centerline rumble strips," said MDOT Director Kirk T. Steudle. "This safety initiative supports Michigan's strategic objective to increase safety for the traveling public."

Centerline rumble strips differ slightly from the more common shoulder rumble strips, because they have a different pattern and are not as deep. Several other states have successfully launched similar safety efforts aimed at saving lives on rural roads. MDOT reviewed all two- and four-lane rural highways with a posted speed of 55 mph or higher, in order to determine where centerline and edge line rumble strips could be installed as a low-cost, high-benefit improvement.

Since the 1990s, MDOT has systematically installed rumble strips on freeway shoulders to benefit Michigan motorists. The new centerline rumble strips on rural non-freeways are proven as a cost-effective countermeasure to lane departure crashes brought on by driver drowsiness, distraction, and/or inattention.

National crash reduction studies indicate that after installation of centerline rumble strips (and some shoulder rumble strips) on rural two-and four-lane highways, MDOT can project:

- a reduction of more than 300 crashes annually
- a reduction of approximately 60 incapacitating injuries annually
- to save more than 15 lives annually

References


need a Section-Township-Range location while the biologists and archaeologists may require 
latitude and longitude coordinates. This information can be derived and displayed through a 
properly constructed map created in a GIS.

Interest in GIS is increasing as more people become aware of its potential and capabilities. 
We have shown how it can be used to make the IRR inventory more accurate and how it can 
improve geographic communication for tribal transportation projects. Further applications 
include gathering locations for the preservation of historic and cultural sites as well as aligning 
the geographic information of tribal departments like housing, roads, and utilities. Many of 
the larger tribes have trained personnel in GIS, and as training becomes more available, more 
tribes are incorporating GIS into their tribal network.

Pamela received a Masters of Geography degree in 2006 from Oklahoma State Univer-
sity. Contact Pam via email at pamj@red-plains.com or phone 405-341-4031.

RoadSoft Provides GIS Capabilities to 
Local Transportation Agencies

RoadSoft® is a GIS-based roadway infrastructure management system developed in the 
Transportation Institute at Michigan Technological University specifically for counties, cities, 
villages, and tribal governments. The system enables management of a variety of infrastructure 
including: pavements, signs, culverts, pavement markings, curb and gutter, sidewalks, drive-
ways, bridges, and traffic counts. A GPS-driven Laptop Data Collector makes data collection 
in the field time efficient and cost effective. Asset management analysis tools help agencies 
develop sophisticated long range maintenance and construction strategies, as well as optimized 
budgets. State-of-the-art traffic crash analysis features are available to agencies in Michigan using 
10 years of provided crash data.

Agencies in Michigan can receive the system, complete with the GIS base map for their 
agency jurisdiction, along with technical support, at no cost (IRR network may need to be iden-
tified and non-IRR tribal roads may need to be defined). Agencies outside of Michigan can acquire RoadSoft under 
individual agency or bulk license agreement. The MR-
GenS map generating system is available to those agencies 
for creating the necessary GIS basemap.

For more information, visit <http://www.roadsoft.org>.

BIA & ESRI Team Up to Offer Free GIS Software and Training 
to Tribal Agencies

The ESRI software products company and the Department of Interior/Bureau of Indian Affairs 
(BIA) have teamed up to provide the ArcGIS suite for free to Federally recognized tribal agencies. The BIA also provides online "Virtual Campus Courses" to help users learn how to use the software. Funding permitting, they also provide live training seminars both at the National Indian Programs Training Center in Albuquerque, New Mexico, and at various other field locations.

In order to participate in the program, tribes are required to submit a grant application to the 
BIA. Once approved, the BIA will provide the software to the agency, as well as the training.

For more information on the grant program, as well as information on the products available, visit the ESRI/BIA site at: <http://www.esri.com/bia/>
James Garrigan Recognized for Service to the IRR Program
Longtime Tribal Road Advocate Honored by the IRR Program Coordinating Committee

James Garrigan has had a long and distinguished career in tribal transportation that spans the last forty-five years. His career has included a thirty-two year stretch at the Bureau of Indian Affairs in Tribal Transportation, an eight year stint with the Red Lake Band of Chippewa Indians, and now he is currently serving as the Tribal Roads Program Director at Engineering & Consulting, Inc. in Bemidji, Minnesota. Jim has been a long-time advocate for the Indian Reservation Roads (IRR) Program, and he was recognized for his IRR-related efforts at the 10th Annual National Tribal Transportation Conference that was held November 6-9, 2007 in Golden Colorado.

"The 45 years I've spent working in Tribal transportation have been challenging, but very rewarding," stated Garrigan. "Being involved in getting the IRR Program under self-governance is one of the things I'm most proud of."

"I've had a fantastic career, and if I have any advice for younger Tribal members that are considering getting into the transportation field, it would be to look into exploring civil engineering."

The Michigan Tech TTAP would like to extend our congratulations and thanks to Jim for all that he has done and continues to do for Tribal transportation.

NEW in the TTAP Library

These documents are available for FREE in print or online.

**TechBrief: Safety Evaluation of Increasing Retroreflectivity of STOP Signs**
This document is a technical summary of the Federal Highway Administration report, Safety Evaluation of Increasing Retroreflectivity of STOP Signs, FHWA-HRT-08-041.

*US Department of Transportation*
*Federal Highway Administration*
*Research, Development, and Technology*
*Turner-Fairbank Highway Research Center*
*FHWA Publication No.: FHWA-HRT-08-047*
*Michigan Tech TTAP Library Reference No.: 1983*

**Developing the Tribal Transportation Improvement Program**
"The purpose of this is to provide Tribal decision makers and planners with an overview of the fundamental process for developing a Tribal Transportation Improvement Program (TTIP) in coordination with Federal, State, and local governments."

*Prepared by: FHWA Office of Planning*
*In Coordination with:*
*Bureau of Indian Affairs*
*FHWA Federal Lands Highway*
*FHWA Resource Center*
*Federal Transit Administration*
*FHWA Publication No.: FHWA-HEP-08-003*
*Michigan Tech TTAP Library Reference No.: 1920*

**NCHRP Synthesis 339 - Centerline Rumble Strips**
"This report of the Transportation Research Board will be of interest to transportation agencies, as well as to others in the transportation community who are interested in the installation of centerline rumble strips (CLRS). The synthesis was undertaken to address the need for state-of-the-practice information relative to CLRS use and/or design. It summarizes current design practices, installation, configuration, dimensions, and visibility. The synthesis addresses the need for guidance on warrants, benefits, successful practices, and concerns (e.g., external noise and the reduced visibility of centerline striping material). Also addressed are pavement deterioration, ice buildup in the grooves, adverse impact on emergency vehicles, and the effect of CLRS on bicyclists. Particular attention was paid to available before-and-after (CLRS) installation crash data to document the safety aspects of CLRS and the availability of policies, guidelines, warrants, and costs regarding their use and design."

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Training Requests for 2010 are due by January, 2009.

Upcoming Events

**United South & Eastern Tribes (USET) Meeting**
September 29-October 2, 2008
Transportation Committee Training – Construction Contracting, Subpart J
Nashville, TN
Contact: USET Office, 615-872-7900

**Second Annual Michigan Inter-Governmental Meeting**
October 7-8, 2008
Island Resort & Casino
Hannahville Indian Community
Harris, MI
Contact: Stu Lindsay, Michigan DOT, lindsays@michigan.gov, or 517-335-2974

**Minnesota Tribal Safety Summit**
October 29-30, 2008
Fortune Bay Casino & Resort
Tower, MN
Contact: Linda Aitken, MNDOT Tribal Liaison, linda.aitken@dot.state.mn.us, or 218-547-0060

**2008 National Tribal Transportation Conference**
November 10-13, 2008
Oklahoma City Renaissance Hotel & Convention Center
Oklahoma City, OK
Contact: Jim Self, TTAP at Oklahoma State, jimsself@okstate.edu, or 404-744-6049