



Wisconsin MAPPING BULLETIN

Academy recommends national approach to NSDI

by Bob Gurda

In a report just released, the National Academy of Public Administration (NAPA) advocates a major shift in how the nation collects and manages spatial data. As a key component, a study panel assembled by NAPA recommends creation of an independent National Spatial Data Council (NSDC) which would assume some of the primary roles of the existing Federal Geographic Data Committee (FGDC). Through such a council the roles of non-federal organizations would be expanded, and collaborative data development would become a fundamental activity.

Early reactions favorable; analysis set

Although there hasn't been enough time for anyone to fully absorb the content of the NAPA report, initial reactions from federal, state, and local GIS leaders have been favorable. This response to date is not surprising because the major concepts in the report have been discussed widely for a number of years.

In fact, some key parts of NAPA's recommendations surfaced several years ago in a draft position paper considered by the National States Geographic Information Council (NSGIC). That paper was written in part by William Holland, at that time the Executive Director of the Wisconsin Land Information Board.

The report was released as the FGDC hosted its third partnership meeting in Washington, D.C. (see article on page 13). FGDC and its partners agreed on a strategy to analyze NAPA's recommendations over the next six months or so. As one of FGDC's partners, the SCO will coordinate the state's consideration of NAPA's recommendations. We will be working with a variety of organizations around the state toward this end over the upcoming months.

Background and recommendations

NAPA's report, *Geographic Information for the 21st Century: Building a Strategy for the Nation*, was commissioned by a group of four federal agencies to give Congress an up-to-date analysis of the appropriate roles in surveying and

mapping functions performed by the federal sector. The study, which was conducted primarily during 1997, analyzed a variety of federal agency activities and policies including progress, or lack thereof, in implementing the National Spatial Data Infrastructure (NSDI), the role of the FGDC, setting national geographic information standards, and restructuring mapping and surveying in federal agencies.

The panel's most significant recommendations include building the NSDI with a national rather than federal focus; federal agencies ensuring rapid implementation of the NSDI in a cost-effective and cooperative manner; creating a private, non-profit National Spatial Data Council with representation from all levels of government, academia, and the private sector; providing open and low cost access; expanding partnerships and consortia; and modifying some specific federal agency functions.

How would the new Council work?

The proposed NSDC could be chartered by the Congress as an independent, non-profit structure designed to bring together the stakeholders and coordinate their investments in spatial data development and maintenance. The FGDC would speak for the collective interests of federal agencies as a member of the NSDC which itself would be funded by the organizations choosing to become members. While voluntary in that sense, government policy could in effect direct that agencies participate in a meaningful way. The

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by Ted Koch

The Wisconsin Land Information Board held its first meeting of 1998 on Thursday, January 15 in Madison. The meeting schedule for the remainder of the year has not yet been set.

Board Membership

Governor Thompson has appointed Vivian Gabower to the WLIB, replacing Lori Scully. Gabower, who took her position on the board at the recent January meeting, is currently president of the Mauston City Council. She has served on the city council for nearly five years, and she and her husband operate a private business in Mauston. Scully, who also hails from Mauston (the county seat of Juneau County), had served on the board since its beginning in 1989.

At the January meeting, Jim Gruendler and Tom Solberg were introduced as the new representatives to the board from the Departments of Transportation and Administration, respectively. Gruendler, who replaces DOT Deputy Secretary Terry Mulcahy, is Administrator of the Division of Transportation Infrastructure Development, a relatively new division which manages Information Technology and the Bureaus of Aeronautics, Environment, Highway Construction, Highway Development, Highway Operations, Highway Real Estate, and Railroads and Harbors. Gruendler is a Professional Engineer and a 28-year veteran of the department.

Solberg, who has been with the DOA for one year as its public information officer, has been with state government nearly 23 years, all with the Department of Revenue before moving on to the DOA. Solberg has many years experience as a local government elected official, and comes from a family that has operated a land surveying business in the La Crosse area for many years.

Officers Elected

The board selected new officers at its January 15 meeting. With 12 of its 13 members present and voting, the board elected Les Van Horn, a long-time member, as chair. Van Horn replaces the venerable John Laub who stepped down after serving a seven-year run as chair. Van Horn, Brown County Surveyor and Real Property Lister, has been serving as Board Secretary and Chair of the Grants Scoring Committee.

Laub, who will continue as member of the board, is Director of Administrative Services and Real Estate at the Wisconsin Power and Light Company. He will be involved in the transition process of the merger of the WP&L with two Iowa utilities to form Interstate Energy Corporation. Laub is also currently President of the Ice Age Park and Trail Foundation, and Vice President of the Madison Board of Water Utility Commissioners.

Ted Koch, State Cartographer, was elected to a second term as board Vice-Chair, and Frank Fennessy was selected as Secretary. Fennessy, from the Wisconsin Department of

Natural Resources, heads its Division of Administration and Technology.

Hopf to act as Executive Director

At the board's January meeting, John Laub announced that Georgia Hopf, the board's Grant Program Administrator, had been appointed as Temporary Acting Executive Director. She replaces Doug King who is returning to reassignment within the Department of Administration as Senior Information Technology Management Consultant for State-wide Telecommunications Systems. King's last day with the board was January 15. Once the governor appoints members to the newly created Wisconsin Land Council, formal recruitment will begin for a new executive director who will serve both the Council and the WLIB.

Board approves data exchange standard

At its January 15 meeting, the board approved a new standard, GIS Data Exchange Between Wisconsin Public Agencies. This standard, which was developed by a WLIB committee in 1996, was publically reviewed for the board by the Wisconsin Land Information Association.

This standard is designed to better facilitate inter-governmental information sharing and communication between Wisconsin's public agencies. The standard covers the areas of operating system and media alternatives, recording techniques, coding, coordinate data and precision, data field formats, documentation, and helpful hints for Unix data exchange. Last year the board had approved a companion standard which deals with data exchange between Wisconsin state agencies.

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State Cartographer's Commentary

1998 may be a defining year

The future of the WLIP is now

by Ted Koch

By many measures, 1998 is shaping up as a critical year for the Wisconsin Land Information Program. We are faced with a long list of uncertainties which make this year's task more challenging than ever:

- the yet to be defined relationship between the WLIP and the new Wisconsin Land Council;
- the recruitment of a new executive director to serve both the board and council;
- a newly elected board chair;
- deciding on a permanent local government grant program for 1999 and beyond;
- resolving a number of critical issues that have not been addressed for the past year or so.

However, for the board and program, it seems that each recent year has been a critical challenge. Last year's debate over restructuring the local government grants-in-aid program, and the board's subsequent approval of redesigned programs for both 1997 and 1998 became particularly contentious.

Even though grant funding programs for those two years are set, decisions on a more permanent program for 1999 and beyond have to be made this year. The Wisconsin Land Information Association will be making recommendations on the grant program, but as always, the responsibility for a decision on the final direction rests with the WLIP.

Judging from recent letters sent to the board, the reaction from Wisconsin counties and others to the revised (1997 & 1998) grant funding programs has been mostly quite favorable. It is easy to understand the appeal to local governments of not having to write grant applications and being able to more precisely plan budgets based on predictable levels of funding, however small.

What the new funding programs don't adequately address is how the land information program will accomplish state-

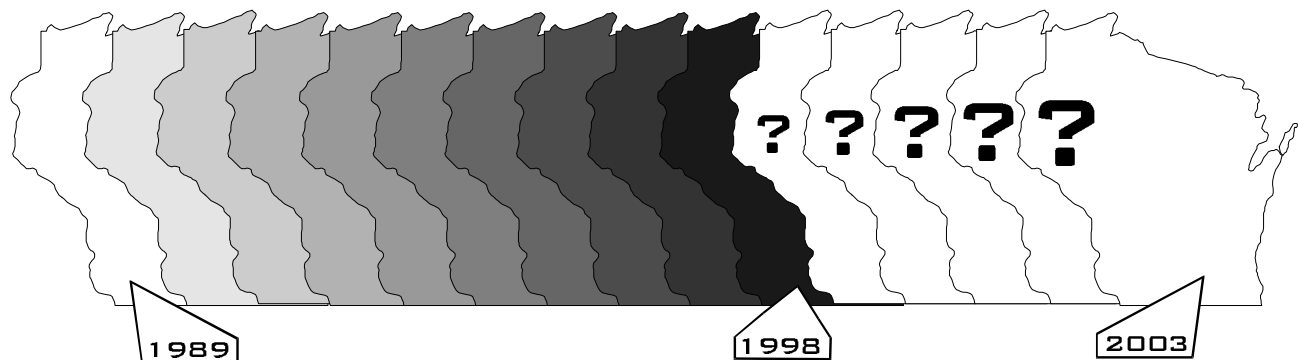
wide (and compatible) completion of any of the program's foundational elements by the year 2003. That is when the WLIP is scheduled for sunset. As another deficiency, the revised grant programs eliminate the opportunity for municipalities to receive grants directly from the board as had been the situation in the past.

Unfortunately, but maybe to be expected, so much of the debate, disagreement, and energy this past year was focused squarely on money, and who is or is not receiving how much. What has been pushed into the background is the vision, the goals surrounding the WLIP. Those visions and goals were originally articulated over 10 years ago, and have been widely admired by people outside our state. When our program took form under statute those ideas were the underpinnings.

The last decade has seen major improvements in Wisconsin. There is much more data most everywhere across the state, more computers, enhanced technical skills, many people doing things they never dreamed they could do. Most of this improvement, concentrated at the local level, is due to the land information program

Troubling questions remain, however. Are we going to accomplish things in an acceptable time frame, and will other people find that the data we are building fits together well enough to support a variety of uses? As only one example, will the U.S. Corps of Engineers be able to use locally generated land information across multiple counties to analyze problems facing the entire Lake Michigan shore? And if they can, how easy or difficult will it be?

These are not simple questions, and the answers surely are complex. However, if through this kind of reflection we become convinced that our program needs a sharper focus, it then becomes critical for the WLIP to evaluate its funding decisions. This year can be a defining time.



Geodetic Control Data

limited searches & downloads now over the web

NGS provides some control data on-line

by Bob Gurda

Looking for information about a few geodetic control points in a local area? There's an easy way now to do this, via the Internet.

The National Geodetic Survey (NGS) has created a web site where you can search their database for information on single control stations; or, you can select datasheets for up to 99 stations near a location and then download that information to your computer. You need to know either a control station name, its permanent identifier (PID), or the latitude & longitude of your place of interest.

This new service has only a few features of the full-blown sets of statewide data and retrieval software that NGS offers on CD-ROM (and that the SCO distributes as part of a customized Wisconsin package). However, for limited needs it may fit the bill, and is an easy way to check if there have been updates as compared to data sheet contents available on disc or diskettes.

To check out this new feature, look under the "Data Sheet" heading at this web site:

www.ngs.noaa.gov/products_services.html

continued from page 1....

Academy recommends nat'l forum to reach NSDI

council represents a major shift, from a focus on data development at separate levels of government to a collaborative approach.

Achieving the NSDI is a challenge

Roger Sperry, a lead NAPA staffer on this study, equated the process of creating a robust NSDI to Lewis & Clark's expedition of almost 200 years ago. "A great deal of careful planning, a high level of collaboration, and the determination to complete that journey all contributed to the success of their mission. More importantly, their efforts and experience created knowledge which became a key part of the infrastructure that paved the way for much national progress."

To find out more...

NAPA has printed copies of the full report (2.5 lbs) available for \$30.00 plus shipping, and an abbreviated summary is available at NAPA's web site (www.napawash.org).

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Package now includes Windows software

NGS datasheets for 1997 released on CD

by Bob Gurda

Fresh statewide information on geodetic control points has been issued by the National Geodetic Survey on CD-ROM. This product, packaged for 13 states including Wisconsin and all of the contiguous surrounding states, has been produced annually for several years now. This time it includes the first Windows-based datasheet extraction software program.

The SCO has copies of this CD-ROM for sale for \$50, the same price as last year. It contains information current as of November, 1997. As in previous years, we will be repackaging the Wisconsin components from the new CD, along with additional software and other files specifically built for our state. That product will again sell for \$50, also, and we expect to have it available by March.

We have not had an opportunity to use the new Windows software, but we will be reviewing it and comparing it to the previous DOS-based searching tools.

What it does for you

Each geodetic control point for which information is extracted from the NGS database is described in a specific datasheet format and organized into a set of files, one for each county. By using the datasheet extraction software, you can search for appropriate geodetic control points in an area, then pull information about them for examination or printing.

Database has some, but not all control

Note, however, that the NGS database only includes records of control points that meet certain standards and that are in certain formats. Generally, the highest quality control is in the NGS database. However, some geodetic control stations installed in recent years as part of local or regional projects have not been incorporated into the NGS database.

Third order vertical control points, installed over several decades by the U.S. Geological Survey to support topographic mapping, are also missing from the NGS information resource; however, the USGS information for Wisconsin is available in computerized form from the SCO (although not in the NGS format).

Watch for our next issue

In the April '98 issue of this newsletter, we will carry more detailed information about the latest geodetic control databases and how you can take advantage of their features.



Geodetic Control and GPS

Vertical will be improved; NGS plans a 48-state HARN

Re-observation of Wis. HARN completed

by D. David Moyer, NGS Wisconsin State Advisor

In early December, the re-observation of the Wisconsin High Accuracy Reference Network (HARN) was completed. The field work was a joint effort by National Geodetic Survey (NGS) and Wisconsin DOT field crews, supplemented with assistance from counties and consultants.

Report on the field work

The field work was coordinated by NGS and WisDOT to complete observations for four separate activities. (See details in July, 1997 *Mapping Bulletin*, page 13). Starting in early September and continuing for 12 weeks, 10 GPS receivers (5 from NGS and 5 from WisDOT) were used by 10 GPS receiver operators to make 516 observations of 168 survey marks, using Global Positioning System (GPS) technology. In addition to existing HARN and airport networks, the entire project was tied to four existing Continuously Operating Reference Stations (CORS), 32 bench marks, and similar HARN networks in Illinois, Iowa, Michigan, and Minnesota.

The field work proceeded relatively smoothly, considering the complex nature of the project and multiple agencies involved. The few problems that did arise regarding access to survey marks and obstructions that reduce satellite visibility were quickly resolved, and the field work was completed on schedule.

Now the computing begins

As part of the cooperative agreement between NGS and WisDOT, NGS has agreed to adjust computer final coordinates from all of the data in one adjustment. This information should be available by late spring.

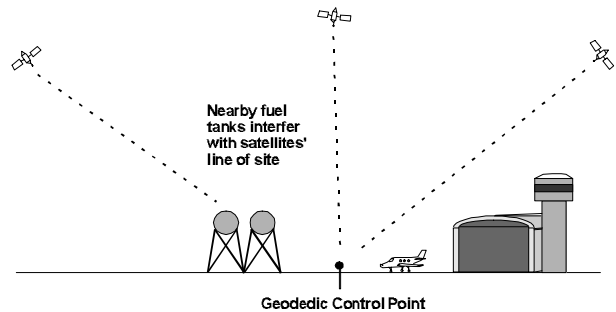
While no major shifts in horizontal coordinates are expected as compared to the 1991 adjustment, there will likely be some relatively minor changes to coordinates for certain survey monuments. More importantly, this project will improve vertical values that are needed by many users of the geodetic network in Wisconsin.

NGS next to link the states

Just prior to coming to Wisconsin, NGS crews completed the country's final state HARN (Indiana). As a result, NGS is developing plans for a nationwide adjustment that will incorporate all lower 48 states in one continuous high accuracy network. Such an adjustment will alleviate problems that exist near state boundaries, problems that individual state HARN network adjustments created.

Need details?

For further information contact Paul Hartzheim: 608/267-2462, Glen Schaefer: 608/266-8485, or David Moyer: 608/266-3919.



Even HARN points vulnerable to being obscured

GPS receivers need clear view of sky

by Bob Gurda

With all the attention provided GPS in recent years, it is still easy to cause unintended problems for this positioning technology. At the SCO we are fielding an increasing number of inquiries from people who are trying to make the best use of their equipment but most of whom aren't fully aware of how GPS works (or doesn't work).

A recent example is a particularly painful example. One of Wisconsin's HARN stations, at the airport in Medford, has had its utility compromised by the installation of an elevated fuel storage tank nearby. The tank is so close to the monument that it actually obscures part of the sky that a GPS receiver, set up over the point, scans to lock onto signals as the GPS satellites pass overhead. Because the sky window is reduced at this control point, fewer satellites can be used (or for shorter periods).

In fact, the tank not only blocks some signals, but it also reflects other signals causing multipath distortion (when the same signal arrives at the receiver from different angles). Multipath problems are a common cause of "ghosting" with TV signals received in urban areas where multiple buildings reflect the signals in a variety of directions.



SCO on the Web

Downloadable GIS data offerings expand

WISCLINC covers more ground

by Esteban Chiriboga

Over the last couple of months we have added a large number of statewide data files along with their respective metadata files to the Wisconsin Land Information Clearinghouse (WISCLINC). We expect to add more of this type of data in the near future.

From the Wis. Dept. of Administration:

- Boundaries - Statewide
- Municipalities
- Tribal Lands
- Zip Codes
- Congressional Districts
- State Senate Districts
- State Assembly Districts
- Technical College Districts
- Lake Winnebago
- US/State highways
- UW System campus locations
- Wisconsin Technical College campus locations

These files, based on the 1999 & 1992 TIGER data produced by the U.S. Bureau of the Census, are generalized and not suitable for detailed local analysis. All files are in Arcview shapefile format. You can also view and/or download the FGDC compliant metadata associated with these shapefiles as well as images of the shapefiles in .gif format.

From the Wis. Dept. of Natural Resources:

- State Soil Geographic Database (STATSGO, produced by USDA-NRCS)
- 1:225,000 scale hydrologic Units
- 1:2,000,000 scale hydrologic Units

These files are in Arc/Info interchange format. FGDC compliant metadata and .gif format images of these coverages are also available for download.

Development and maintenance of WISCLINC at the SCO has been supported in part by funds from the Wisconsin Land Information Board. The data and metadata reside on a computer managed by the Wisconsin Department of Administration.

To visit WISCLINC, point your web browser to: badger.state.wi.us/agencies/wlib/sco/pages/wisclinc.html or link through the SCO website.



A variety of additions and enhancements

SCO website news

by Esteban Chiriboga

The SCO website has continued to expand in the last few months. In addition to some new sections, we have worked to keep up with the latest advances in the mapping world by updating several existing sections.

For the younger set...

As promised in the previous *Bulletin*, the SCO web page now includes a section that explores cartography at a K-12 level. The *Mapping and Related Topics for K-12 Education* section contains an extensive list of sites that young geographers, cartographers and their teachers will find both interesting and challenging.

Statistics, anyone?

Another new section covers mapping related facts and stats for Wisconsin. If you need to know the highest and lowest elevation points of the state or any number of other Wisconsin related mapping tidbits, this is the place for you. This section includes a list of highest point in each county.

Just click to download

Several products offered by the SCO are now easily available for download from our webpage. These products include our recently developed Wisconsin digital outline maps series. These maps offer users simple outline maps for the state and are available in several different file formats. Also available for download is the SCO's digital orthophoto demo. This product illustrates the use of digital orthophotos through instructional computer programs.

ZIP code and photography updates

We have updated our section on ZIP code maps as well as the Wisconsin Catalog of Aerial Photography. In addition we continue to maintain notices of mapping related jobs and a calendar of important events throughout Wisconsin.

Feedback regarding the SCO and WISCLINC web pages is very important to us. Please contact us with information or suggestions regarding our online resources so that further expansion of our Internet site can better serve Wisconsin's mapping community.

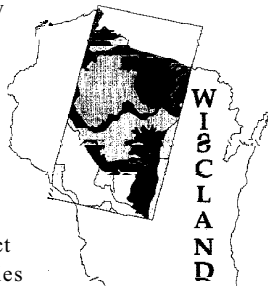
WISCLAND Update

Landsat-derived interpretation is almost ready

WISCLAND covers the state, again

by Bob Gurda

The most detailed statewide view of Wisconsin's land cover is only a few months from release. Organized under the Wisconsin Initiative for State-wide Cooperation on Landscape Analysis and Data (WISCLAND), the work leading up to this final computerized product has produced dozens of categories of vegetation and other land covers down to a resolution of a few acres. The complex process uses Landsat Thematic Mapper imagery as its primary input.



The land cover layer is WISCLAND's latest statewide layer to be completed, following the 1:24,000-scale Landnet, the 1:24,000-scale Digital Raster Graphics, and digital conversion of the Wisconsin Wetland Inventory.

Cooperation is the key

A long list of organizations have collaborated in defining and funding the WISCLAND land cover project. Twenty-five organizations have signed WISCLAND's *Articles of Participation*, although each organization decides how many resources to allocate to any given project during any one of its fiscal years.

Over the 4-year duration of the land cover project, federal and state contributions have totaled \$1.5 million. It is very unlikely that any one of the contributors could have generated that amount, and without collaborating it is likely that we would today have only a patchwork of similar (and not necessarily compatible) interpretations.

Production and continued management

The single largest contributor, the Wis. Dept of Natural Resources, also carried out the land cover interpretation work and will continue to serve as steward of this data set after it is released. Bob Goldmann, who is relocating to DNR's Forestry Bureau as the land cover project winds down, managed the production team.

A thumbnail sketch of the data set

At this point, the project participants are evaluating an early release of the statewide data set. It appears likely that the product for general use will be available on CD-ROM in several formats along with extensive documentation and some related GIS data layers.

As an Arc Grid file, the statewide land cover interpretation is under 100 MB. Landsat Thematic Mapper (TM) data is a grid or raster of cells, each being 30 x 30 meters (approximately 0.22 acres). Features distinguishable on the interpreted land cover are typically an acre or more in size.

The TM data from which the interpretation was gleaned were selected as the best available from a variety of dates from the year 1992. But, it was impossible to have "perfect" satellite data to work from. Similarly, the staff coordinated the collection of "ground truth" data from thousands of local sites (the most robust effort by any state, ever) but was necessarily limited to serving as a sample. As a result, the final product does not perfectly delineate every type of land cover with the same degree of success in every part of the state. Despite these caveats, the land cover layer is by a huge margin the most detailed and consistent statewide interpretation ever developed.

Find out more in March

Several key players in developing WISCLAND's land cover data set will present an overview of its production, its contents, and ideas on how it can be used at the WLIA meeting in Middleton on March 4 at 8:00 a.m. (See page 14 for a conference preview and contact information).

Product schedule, digital and printed

We expect final release of the land cover data sometime in the spring. There will be a modest charge for copies of the CD-ROM.

WISCLAND is also planning to produce one or more printed maps depicting the entire state as seen through Landsat images (prior to interpretation) as well as after interpretation. Look for news on these poster-sized products later this year.

Other active WISCLAND initiatives

WISCLAND is active on several other fronts. Work continues toward a 1:24,000-scale digital GIS database designed to organize, track, and analyze information relating to surface waters. Another coordination goal is completing statewide digital orthophotos by the end of 1999.

A new potential focus which is in the early stages of discussion involves identifying lands which are under various forms of public management. While this kind of geospatial information will ultimately be available from local sources once land records modernization is complete, in the shorter term a less robust cataloging and mapping of these lands will suffice to meet the needs of a number of organizations.

For further information, contact Bob Gurda at the SCO, 608/262-6850.

People & Organizations

FGDC continues to promote NSDI

1998 funding programs announced

by Ted Koch

The Federal Geographic Data Committee (FGDC) is inviting applications before February 28, 1998 for participation in three separate awards programs it administers for encouraging participation in the National Spatial Data Infrastructure (NSDI). The purpose of the awards programs is to develop cost-effective production, availability, and wider use of high quality geospatial data nationwide. Proposals must involve partnering between two or more organizations, and may be submitted by government organizations, educational institutions, private firms and foundations, and native American tribes.

There are three distinct NSDI awards programs: Cooperative Agreements; Benefits; and Framework Demonstrations.

The Cooperative Agreements Program funds projects focused on metadata collection and creating clearinghouses linked to the Internet, developing standards, and advancing the NSDI through education and organizing and strengthening data sharing. The Benefits Program funds projects that assess the benefits of using shared data to solve particular problems over a specific geographic area. The Framework Demonstration Projects Program funds projects that demonstrate the technical and operational capabilities to create and maintain basic or "framework" data.

(source: Federal Geographic Data Committee)

Second Wis. university to participate

UW-Milwaukee joins UCGIS

by Bob Gurda

The University of Wisconsin-Milwaukee has joined the University Consortium for Geographic Information Science (UCGIS). As covered in our previous issue (October '97), UCGIS is a national group of universities with major GIS teaching and research programs.

UW-M joins the Madison campus which is one of the charter members of UCGIS.

Krueger returns to Hdqs. to manage GIS

Casper retires from DOT

by Bob Gurda

With a recent changing of the guard, GIS support at the Wisconsin Department of Transportation is under new direction. David Casper, who has managed these activities from the Madison headquarters since 1992, is retiring after 28 years with the agency.

Taking over the reins is Mike Krueger who moved back to Madison from the district office in Rhinelander. He has been with DOT for over 9 years, back to the days when David Fletcher started DOT's GIS group in Madison. There are now GIS staff in each of the district offices.



Wisconsin's response approaches 90%

National "framework" survey underway

by Ted Koch

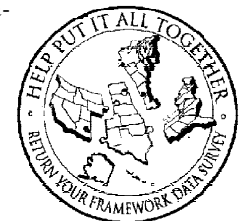
A national survey of digital geospatial data holdings is now well underway. As we reported in our previous issue, the SCO is coordinating this survey in Wisconsin

In early December, we mailed the survey diskette and accompanying materials to 125 recipients including 72 county land information

offices, 9 regional planning commissions, 12 state agencies, and the 32 largest (by population) municipalities in the state. As we go to press, approximately 86% of the 125 surveys had been completed and returned to the National States Geographic Information Council which is the organization that designed and tested the survey.

The term "framework" data was developed by the Federal Geographic Data Committee to describe digital data that is used as a foundation for many mapping and GIS projects. Framework encompasses eight categories of data, transportation, hydrography, elevation, digital orthoimagery, political boundaries, geodetic control, cadastral reference systems (PLSS), and publicly owned lands.

Within the next several months, results from the survey will be tabulated, analyzed and summaries developed for each state. Since Wisconsin's responses were among the first to be returned, we are hopeful that we will receive early results. We may have some of this information to present at the WLIA annual meeting in early March.



Questions & Answers

Q: I saw a claim that by scanning NAPP aerial photographs at 12.5 microns I'll be able to see on my computer screen objects such as small house pets. Is this possible?

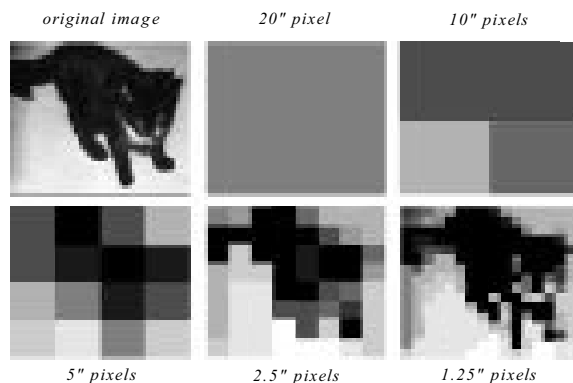
A: That would be quite a stretch. A "pixel" (picture element) in such an image would, at ground scale, be about 20 X 20 inches (based on NAPP's standard scale of 1:40,000). A large house cat might be about that long but (hopefully) not that wide.

More importantly, for you to clearly identify an object that size in any image, it would need to be represented by several adjoining pixels that contrast in gray level or color with the surrounding pixels. As the rule, the pixels need to be half the size or less as compared to the object itself.

Below is an example of how a black house cat might look at several pixel sizes. You be the judge as to where the threshold lies when you can start being confident about what you're seeing.

Now, you might think that a solution to this problem is simply to scan the photograph at higher resolution, yielding smaller pixels. This is logical, but unfortunately not practical. First, scanners at this point in time can't go much finer than 10 microns (1/100 of a millimeter, or 1/2500 of an inch). Second, even if the scanners could perform that well, the original photograph has a limited amount of information. At 10 microns, we are just about at the resolution limit of most aerial photography films (at least those available for domestic uses). In other words, if the cat isn't visible on the film, there is no way to capture it into a scanned image.

So, the only certain way to view an object the size of a small house pet from an aerial photograph is to acquire a more detailed photograph than NAPP, either by flying closer to the ground or by using a telephoto lens. Oh....and make sure the cat is outside when the plane flies over to take the picture.



Q: I want to take advantage of this spring's scheduled NAPP photography mission to get orthophotos for my county. What should I do about putting down targets to use as control points?

A: The short answer is that you don't have to do anything now. It isn't practical to place panels for NAPP, but you may be called upon later to provide some control information from your local area.

The primary reason that panelling for NAPP is impractical relates to the fairly high altitude from which NAPP photography is acquired (see the article on page 10 about the spring 1998 plans for Wisconsin). In order to be visible in the photographs, the panels would have to be very large. This means unwieldy materials and significant investment and effort.

There are further complications. The time window in the spring can be short, after snow melt but before leaves come out. This can make the placing of panels or painting of targets on pavement a rush job. Further, the NAPP contractors are responsible for acquiring photographs over large areas, and you won't know which day they'll be flying over your locale.

You are correct to be concerned about control points, though, since they (or other photo-identifiable objects) are essential to the orthophoto correction process. Under the National Orthophoto Program (which relies on NAPP photographs), the U.S. Geological Survey first uses control point information that they collected as part of 1:24,000-scale topographic mapping. Much of the photo-identifiable control from older (and more detailed) photographs can be transferred to the new NAPP images.

After evaluating their existing control records, the USGS may need to seek out other sources which can include state and local agencies. So, if your county becomes scheduled for production under the NDOP, you may be called on for help locating additional photo-identifiable control—that is, linking high quality mapping coordinates to objects clearly visible in the NAPP image.

If the 1998 NAPP mission for Wisconsin were to include simultaneous acquisition of camera position data via airborne GPS, the need for ground control would be much reduced. However, we are not expecting our flight to include that feature.

Editor's Note: If you have a question, or had a question for which you found an answer that might be of interest to others, please let us know.

Aerial Photography

Similar to 1992 acquisition

Second statewide NAPP photography mission set to fly this Spring

by Ted Koch

Wisconsin's skies will be somewhat busier in a few months with the recent scheduling of statewide aerial photography. Contracted by the National Aerial Photography Program (NAPP), Wisconsin is one of ten states scheduled for coverage this year, including the neighboring states of Illinois and Michigan.

Contract and funding details

For NAPP contracting purposes, Wisconsin is divided into four narrow bands each extending the full north-south length of the state. Contracts for the four areas have been awarded to two private aerial photography firms on a low-bid basis for the total cost of \$386,018.

That contract amount is essentially the same as Wisconsin's first (1992) NAPP photo project cost. At that time, a collection of five public agencies and one utility contributed \$140,000 to the NAPP flight, but in 1998 the entire cost will be borne by the five federal agencies that provide NAPP funding support.

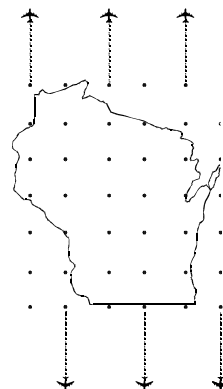
Film, scale, and timing details

NAPP photos for Wisconsin will be panchromatic (normal) black-and-white images, exposed at a flying height of nearly four miles. This will yield a photo scale of approximately 1:40,000 or 1"= 3333'. With weather and ground conditions (snow and ice free) permitting, the photos can be acquired between March 1 and May 31 as long as no leaf growth is visible. Photos not successfully acquired this spring can be acquired during the spring season of 1999.

The affect on orthophoto production

The acquisition of NAPP photos is a separate activity from any derivative use such a development of orthophotos. However, NAPP photos are used as the source imagery to produce orthophotos under the National Digital Orthophoto Program (NDOP). The NDOP currently offers a 75% cost share for areas with no orthophoto coverage, but does not at this time fund production for second generation orthophotos.

(source: NAPP Contracting Office, USGS)



Turn-around should be quicker; rush orders possible

DNR photos again available for ordering

by Bob Gurda

You can once again order copies of the "forestry photographs" acquired by the Wis. Dept. of Natural Resources (DNR) over the entire state in recent years. DNR recently selected a new vendor for this purpose. Order forms are available from a network of DNR field offices as well as the headquarters in Madison.

The original photographs are one of two vintages. For fourteen counties in the northeastern quadrant of the state, new images from this last summer are available now for the first time. Over the remainder of the state the photos are from 1992-1994, but scheduled for reflights in 1999-2003. (Prints from 1991 photos over the northeastern quadrant are currently unavailable).

The new vendor is HAS Images, Inc. of Dayton, Ohio. HAS commits to deliver all orders of 1-100 contact prints in ten working days or less—a major improvement over the previous contract which expired last summer. Bigger orders or enlargements will take longer. HAS will also quote prices for rush orders.

Per a revised price schedule, a single paper contact print is \$8.90, and at the other extreme a 4 X 4 foot enlargement is \$140.00. Shipping is \$10 for up to fifty contact prints or \$15 for up to five enlargements. A wide variety of print sizes and degrees of enlargement are available, and quantity orders gain discounts.

The original photographs are 1:15,840-scale (4" = 1 mile), on black-and-white infrared film, and acquired during summer. A set of contact prints for the entire state is split up among DNR forestry offices across the state, where you can view before deciding on a purchase. We have linked this list of offices to our web site's *Wisconsin Catalog of Aerial Photography*.

The forestry offices have flight indexes to assist in identifying the appropriate roll/frame numbers to order, although up to nine prints can be ordered simply by reference to Town/Range/Section.

For an order form, contact one of the listed DNR field offices or call Jill Mrotek at 608/266-5202. For information and assistance more generally on aerial photographs including leaf-off, historical, and color, contact us at the SCO or visit our web site.

(source: DNR Forestry)

correction...correction

The Wis. Department of Natural Resources is *not* treating the enhanced DRG files as copyrighted items. This is contrary to what we printed on page 4 of our October '97 issue.

Statewide Data

Statewide coverage coming in months

30-meter DEMs to be done soon

by Bob Gurda

Another batch of statewide computerized geographic data is about to be completed. This time it is a set of more than one thousand files comprising sets of elevation data points spaced at a regular 30 meters on the UTM coordinate grid. Each file corresponds to an area of 7.5 x 7.5 minutes of latitude and longitude.

These Digital Elevation Models (DEMs) are produced by the U.S. Geological Survey (USGS), and some are already available. The full set is scheduled for completion this spring, at which time they will become our most detailed, systematic set of statewide elevation data.

Uses are many and varied

You have likely seen draped "fishnet" views of various pieces of terrain. The one seen most commonly, perhaps, compares Mt. St. Helens before and after its 1980 eruption. This is only one of the more basic examples of how a DEM can be used. Another visualization application is to then use the same fishnet surface as a base upon which to drape an image such as from a satellite or from a scanned and corrected aerial photograph (an "orthophoto").

At the next more complex level, software can analyze a DEM to yield statistics about slopes and the direction they face (called "aspect"), paths for run-off, slope profiles along routes, and visibility between points. Any of these can then be displayed in map form or draped over the DEM. If a DEM has sufficient accuracy and point density, it can even be used to calculate volumes such as the amount of "cut" or "fill" needed to change the terrain's shape (as in highway construction).

Source and quality are important

No matter what the application, the quality of the result and the reliability of your conclusions will depend on how the DEM was made and its resultant qualities.

Digital elevation data is, has been, and will continue to become available in a variety of resolutions, accuracies, and formats. Digital orthophoto production is one of the most common sources of this kind of data currently. Especially given the variety of data to choose from, matching the available data to appropriate needs is not a straightforward process since you need to understand both the source and the error characteristics of each potential option.

Not the first statewide DEMs, but better

Some of the USGS 30-meter DEMs which are due for completion shortly have been available for a number of years, as have statewide DEMs with more widely spaced data points and less vertical accuracy. The more recently produced of the 30-meter DEMs are of higher quality (interpolated from a scan of the topography layer from the USGS 7.5-minute topographic quadrangle map series). Certain

software can also convert the USGS files to make them easier to utilize for viewing and analytical purposes within a geographic information system. Like any other federally produced data, these files are not copyrighted.

DEM vs. DTM vs. TIN

Actually, the USGS-style DEM is only one form commonly used to hold surface data. A digital terrain model (DTM) concentrates its elevation points in places where the terrain's slope changes, rather than in a regular grid pattern of a DEM. A DTM can be sampled and converted to DEM form, but usually with some loss of information and quality. Both DEMs and DTMs can be converted to TINs ("triangulated irregular networks") which are more convenient for some analytical purposes.

Watch for more on our web site

We are evaluating several options by which anyone will be able to display the USGS DEMs as terrain views using inexpensive or free software on typical desktop computers. Our advice in this area will become part of a new section on the SCO web site that focuses on terrain data and its uses.

We also plan to incorporate views of selected locations in Wisconsin that have particularly interesting terrain, and we are hoping to be able to offer web viewing of an example of a "fly-through" made up of a string of DEM views along a flight path.

This forthcoming web site section on DEMs (and DTMs and TINs) will cover a variety of topics to help you understand the many facets of the evolving situation with digital elevation data. We are collecting information on sources and prices of data, conversion programs, and software to view these files.

New service provides fresh information

View USGS mapping status on-line

by Bob Gurda

The U.S. Geological Survey has built a new access path you can use to check on availability of a number of digital products. Available over the Internet, there are "status graphics" with national or state views. Go to mcmcweb.er.usgs.gov/status/

Bob Lemen, USGS National Mapping Division contact for Wisconsin, encourages feedback on the utility of this new service. There is a facility to provide comment at the status graphics web site.

Publications & Products

Many new features

WISCON v.1.5 is available

by Bob Gurda

Enhancements to both functions and interface are features of the recently released version 1.5 of WISCON coordinate transformation software, which now also runs under the 32-bit environments of Windows 95 and NT. While some of the new features support specific data formats used by the Wis. Dept. of Transportation (who continues to contract with SMP, Inc. for support, maintenance, and a site license), several notable enhancements are of broader interest.

We have copies of the new version for sale (same price as previously, \$165.00). SMP will automatically send a free upgrade copy to anyone who purchased an earlier version *and who mailed in their registration card*. For background information, you can link to SMP's web site through the SCO web site (under "publications").

What's new

The new release incorporates GEOID 96 files and the capability to convert vertical information between orthometric and ellipsoidal heights. Another enhancement accommodates four different formats of geographic coordinates. Other new features are the display of projection parameters for both input and output coordinate systems, and the ability to print the results of single point conversions directly from the display screen.

The user interface has also been streamlined and hot-key activated pull-down menus control clutter while allowing more user options. In addition, the flexible format generator has many new features.

Over the horizon

Work is continuing on support for the ESRI shape file format and the SDTS Point Profile standard. Both are expected to be ready for release later this year.

Wis. DOT is still testing this version to resolve any problems before releasing it internally in February. A department representative will be demonstrating the software March 3-4 at the Annual Conference of the WLIA in Middleton (see page 14 for details).

(sources: *SMP & WisDOT*)

The SCO's Wisconsin Outline Map Package is now available in two ways: free via individual file download from the SCO website, or compressed on a single diskette for \$10 through our normal order process. See the "Publications" section of the SCO website or give us a call.

Plus, "Q&As" from conference available on the web

Metadata video available

by Ted Koch

The National States Geographic Information Council (NSGIC) is selling video (VHS) copies of its highly successful two-hour Metadata Satellite Video Conference



for a fee of \$30. The conference, which was broadcast from Madison throughout the US and Canada on October 15, 1997, attracted over 1500 viewers at 109 downlink sites (33 in Wisconsin and 15 in Minnesota) in 34 states and 3 Canadian provinces.

A table providing more details on each of the downlink sites, and a section devoted to responses to faxed questions not answered during the question and answer sessions of the satellite video conference appear on the NSGIC website. Access to this site can be reached through "Metadata Resources" on the Wisconsin Land Information Clearinghouse web site (see the address on page 16, or link through the SCO site).

The address for ordering the two-hour video (\$30) is:

NSGIC
45 Lyme Road, Suite 304
Hanover, NH 03755-1223
Phone: (603) 643-1600
e-mail: nsgic@aol.com

(source: *NSGIC*)

Wall maps focus on Madison & environs

by Bob Gurda

Two new wall maps of the state's second largest urban area are now available from Milwaukee Map Service. Each map is available in several styles for wall hanging including framed in metal or wood and on a Springroller.

The larger of the two maps covers the Madison metropolitan area at 35" X 50" in full color. It depicts over 600 new streets, new ZIP code boundaries, and more features compared to the previous edition.

The second map measures 30" X 24" and depicts south-central Wisconsin centered on Madison. It reaches Wisconsin Dells, Oconomowoc, the state line, and Richland Center, to the north, east, south, and west respectively.

Prices range from \$75 to \$200 plus shipping and tax. For details, contact Milwaukee Map Service at 800/525-3822.

(source: *Milwaukee Map Service*)

National Mapping

Collaboration set on action items and NAPA report

FGDC & partners seek national approach

by Bob Gurda

Coordinated progress toward more and better geospatial data, nation wide, is of increasing interest to states, counties, cities, and others. The latest evidence of this trend is the strong attendance and vigorous discussion at the most recent Partnership Meeting hosted by the Federal Geographic Data Committee (FGDC) in January.

The discussions at this third such meeting broadened concepts developed at the previous (April '97) meeting, and resulted in the FGDC Steering Committee unanimously endorsing a set of actions recommended by the partners. These recommendations, all surrounding the idea of a National Spatial Data Infrastructure (NSDI) cover four major areas (see below for additional detail):

- *Cooperatively building foundational data sets by maximizing the use of existing resources, particularly shifting focus from projects to a geographical areas.*
- *Enhancing federal field office involvement in local spatial data coordination and development.*
- *Assuring a partners' role in FGDC standards activities.*
- *Evaluating the recently released NAPA report (see page 1) which is germane to the FGDC and the cooperative partnering process it has established so far.*

Participation continues to grow

The FGDC's set of formally cooperating non-federal organizations has swelled since the previous meeting. Eight states, the National League of Cities, and the National Science Foundation have joined the discussions of how best to build the NSDI. These groups are in addition to the sixteen states, the National States Geographic Information Council, the National Association of Counties, and the University Consortium on Geographic Information Science all of which signed on earlier.

The SCO is Wisconsin's representative to the FGDC, formally representing the Wisconsin Land Information Board and WISCLAND, and informally representing all other groups in the state. We welcome your input.

Babbitt is active, informed, and supportive

The Secretary of the Interior, Bruce Babbitt, continues to chair the FGDC, a remarkable fact considering his other responsibilities. From his background as governor of Arizona, he appreciates the potential benefits for the federal government in collaboration with others, and as a trained scientist he understands the importance of good data to decision making. His interest raises the visibility of both the NSDI as a concept as well as the ongoing quest to make it a reality.

Action items in more detail

The FGDC partners believe that progress can be made on several fronts through a set of strategies advanced by specific actions. Now with FGDC endorsement, FGDC and federal agency staff will collaborate with the partners to carry out these actions.

Cooperatively building data sets

The partners want to see a paradigm shift so that federal program funds can be directed toward basic geospatial data development that meets multiple needs in the realm of collaborative decision making. A prime example is the process of developing environmental impact statements (and the data to support them) and similar activities involved with issuance of various type of permits. If a portion of these funds were steered into investments that contribute to building the NSDI, everyone would benefit with no increase in costs. To advance in this area, FGDC and the partners will conduct test-bed projects and document the results to measure the feasibility of developing innovative approaches to creating the highest quality data for a geographic area.

Enhancing field office role

To move forward on increasing federal field office involvement, the group will develop lists of contacts of such offices (in, or serving each state and the state partners will initiate state-level NSDI cooperation. The FGDC and partners together will propose the content, format, and funding mechanism for a coordination handbook. The partners also urged FGDC agencies to incorporate NSDI goals into their respective budgeting and planning exercises. (Note that a representative of the federal Office of Management and Budget attended this FGDC meeting!) Finally, the partners urged FGDC support of regional, issue-driven cooperative efforts that further the NSDI; current examples exist for the Colorado Plateau and the southeastern states.

Coordinating standards development

In the standards area, the partners are progressing to build a process by which to select members to serve on FGDC standards committees and work groups. There is also interest in accelerating certain standards work (hydrography is one example). The partners asked FGDC to represent their views before national and international standards bodies, and for their part agreed to coordinate standards support activities at the state and local level.

Evaluating the NAPA report

Finally, both the FGDC and the partners seemed intrigued by many of the recommendations contained in the NAPA report. Most people involved in the meeting had not had an opportunity to study the entire report, but initial reactions were positive. Secretary Babbitt urged a careful consideration of the recommendations, not to delay attempts to implement them but in order to build absolute consensus on as many points as possible. He noted that NSDI is not an issue that is on most politicians' radar screens, and that progress will come only after agreement is reached among the constituencies. FGDC and its partners will establish a timetable for consideration of the report and it will probably be a major topic of discussion at the next partnership meeting which may occur before summer.

In Wisconsin, we will establish a review process in parallel with the other states. To keep on schedule, this process will need to be concluded sometime in late spring.

Events

Goodchild offers esteemed outside perspective

UW-Madison hosts GIS symposium

by Ted Koch

Ranging from the activities in the departments of Anthropology and Art History to Rural Sociology and Wildlife Ecology, the applications and research areas in geographic information science at the UW-Madison cover an amazingly broad array. Over 125 attendees learned of this breadth of GIS in a day-long campus-wide symposium held November 14 in Madison.

The morning was devoted to a series of short presentations on GIS applications and research given by campus departmental faculty and staff from a variety of disciplines including anthropology, art history, forest ecology, biological systems, geography, geology and geophysics, natural resources, civil engineering, and the School of Business. These glimpses represented only a sample of GIS activities on the campus.

A history of GIS...

The highlight of the day was a wide-ranging keynote address by Michael Goodchild, Director of the National Center for Geospatial Information and Analysis at the University of California-Santa Barbara, who attracted a packed house. Goodchild began his address by reflecting on our views and expectations of GIS 10 years ago, then turning his attention to the present and future. He observed that the common themes of geographic information science today are the emphasis on the data, not the system, the notion of the user being in control, the depth of understanding and knowledge required to effectively use and understand GIS, and that the concept and structure of the National Spatial Data Infrastructure is here now.

...and its future

After summarizing today's themes, Goodchild moved on to list some of the forces that will affect future directions in the field: the fact that computer power doubles every 18 months, but the cost doesn't change; that GIS is increasingly subject to globalization forces which will mean less control and the privatization of many mapping functions; and localization of data creation which has been influenced by the devolution of government and the building of detailed data sets from the bottom-up.

The symposium was organized by the Spatial Information and Analysis Consortium (SIAC), a campus-wide organization providing leadership and coordination among numerous academic programs involved in the collection, management, analysis, and application of geospatial information. The consortium is composed of representatives from all campus departments, centers and facilities which are involved in land and geographic information systems. Abstracts of the sixteen campus GIS talks are located on SIAC's web site at rs320h.ersc.wisc.edu/siac/.

in Middleton, March 2-5

WLIA set to "deliver" 11th Annual Conference

by Brenda Hemstead

The Marriott Madison West (formerly the Holiday Inn-West) in Middleton will be the site of the 11th annual conference of the Wisconsin Land Information Association (WLIA). Scheduled to run from March 2-5, this gathering's theme is "Wisconsin Land Information: We Deliver". WLIA expects more than 500 participants and over 30 exhibitors.



Non-members are welcome to attend this event as well as WLIA's quarterly meetings.

Choose from six workshops

Following the previous year's format, a series of six workshops will be held on Monday, March 2nd. Two of the workshops will be day-long: *Process Redesign and Information Technology Implementation: Making the Most of the Modernization Process* will provide an overview of process, work-flow and data-flow redesign; *Parcel Mapping* will help remove some of the mysteries of this complex subject and provide information to better understand the mapping process.

The other four workshops will be a half-day in length:

- *Photogrammetry 101*
- *Delivering Land Use Planning: Hands-on Use of Laptops and the Internet*
- *Developments in Legislation on Private Property Rights Protection and Regulatory Takings: A Panel Discussion*
- *GIS for Coastal Development Management*

Variety in plenary, break-outs & exhibits

The conference proper will open on Tuesday morning, March 3rd with a plenary session "*10 Years of Action: Delivering the Future*" which will include a panel of past WLIA Presidents looking at the origin of WLIA, how much has been accomplished in ten years, and offer a vision for the coming decade. The luncheon keynote speaker, Tom Jadin, a Program Development Coordinator for Wisconsin's Winnebago Mental Health Institute and a part-time instructor for the University of Wisconsin will address "*Teamwork in a Time of Change and Uncertainty*".

Technical sessions are organized into three tracks: digital orthophotos and mapping; applications and local experiences; and program management and technology. A total of 37 different presentations will run Tuesday afternoon and all day on Wednesday. WLIA Business exhibitors will sponsor the conference's opening reception on Tuesday evening. Wednesday evening will be "Public Night" that is free and open to anyone.

The conference will conclude on Thursday morning with a member forum discussing current issues, and the annual member business meeting.

Selected Regional Conferences and Technical Meetings

January 28-30, 1998, The **Wisconsin Society of Land Surveyors Annual Conference** will be held at the Holiday Inn in Stevens Point, WI. Contact: WSLs at 414/549-1533.

February 13-14 and 20-21, 1998, A four-day two-course on **Practical Least Squares for Surveyors** will be held at the UW-Madison Engineering Hall. Contact: Lisa Zima at 920/430-8843.

March 2-5, 1998, The **Wisconsin Land Information Association's Annual Conference** will be held at the Marriott Madison West (formerly the Holiday Inn-West) in Middleton, WI. Contact: WLIA at 800/344-0421.

March 2-5, 1998, The **American Congress on Surveying and Mapping 1998 Annual Convention and Exhibition** will be held at the Baltimore Convention Center in Baltimore, MD. For more information visit the ACSM website at: www.landsurveyor.com/ACSM/.

March 18, 1998, The **Map Society of Wisconsin** will meet at the American Geographical Society Collection at 7 p.m., 3rd floor east, Golda Meir Library, UW-Milwaukee, WI. Contact: the Collection at 800/558-8993 or 414/229-6282.

March 25, 1998, **Northland Area GIS Users Group** will be held at the Chequamegon National Forest Headquarters in Park Falls, WI. Contact: Dennis Kantan at 715/762-5711.

April 22, 1998, The **WISCLAND Steering Committee** meeting will be held from 1pm - 4pm at the USGS-Water Resources Division office located at 8505 Research Way in Middleton, WI. Contact: Bob Gurda at 608/262-6850, email: rfgurda@facstaff.wisc.edu.

April 26-29, 1998, **AM/FM International: Conference XXI** will be held in San Jose, CA. For more information visit the conference web page at www.amfmintl.org/events/98sj_confxxi.html.

May 5, 1998, The **Map Society of Wisconsin** will meet in the American Geographical Society Collection at 7 p.m., 3rd floor east, Golda Meir Library, UW-Milwaukee, WI. Contact: the Collection at 800/558-8993 or 414/229-6282.

June 4-5, 1998, The **Wisconsin Land Information Association Quarterly Meeting** will be held at the Monona Terrace, Madison, WI. Contact: WLIA at 800/344-0421.

July 18-22, **URISA '98**, Charlotte, NC. Contact: URISA, Phone: 847/824-6300, Fax: 847/824-6363. For more information visit URISA's web page at: www.urisa.org/calendar/calendar.html.

September 3-4, 1998, The **Wisconsin Land Information Association Quarterly Meeting** will be held at the Fox Hills Resort in Mishicot, WI. Contact: WLIA at 800/344-0421.

December 3-4, 1998, The **Wisconsin Land Information Association Quarterly Meeting** will be held at the Heidl House in Green Lake, WI. Contact: WLIA at 800/344-0421.

For Bulletin and web site

Send us your calendar items

We are now focusing our calendar listing on events scheduled in Wisconsin and the nearby region. When you keep us informed of your organization's meetings, workshops, classes, etc. we can help spread the word to several thousand people.

Even if you are not seeking additional people to attend an event, announcing it keeps others informed and helps us all coordinate our schedules.

Often, events are scheduled and then occur in a time frame that is too short to get them listed here before they have taken place. To deal with this problem, we also maintain a list of scheduled events on our web site.

To deal with the events outside our region which we formerly included in the Bulletin calendar, we now provide links through our web site to national and international calendars maintained by other organizations. These listings are similar to what has been carried for years in several publications that serve the mapping and GIS fields, but which many people in our state may not have seen regularly.

Between the Bulletin and our web site, plus the linked sites, you now have access to much more information about events than previously.

About the SCO...

The State Cartographer's Office (SCO), established in 1973, is a unit of the University of Wisconsin-Madison. The SCO is located on the 1st Floor of Science Hall.

Our permanent staff consists of five people--Ted Koch, State Cartographer (608/262-6852), Bob Gurda, Assistant State Cartographer (608/262-6850), Brenda Hemstead, Administrative Assistant (608/263-4371), Paul Gunther, Information Systems Manager, and Liz Krug, Program Assistant (608/262-3065), plus several part-time graduate and undergraduate students.

The State Cartographer's position and mission is described in Wis. Statute 32.25 (12m). In addressing this role, the SCO functions in a number of ways.

- publishes the Wisconsin Mapping Bulletin, catalogs, guides, brochures, and other documents to inform the mapping community.
- inventories mapping practices, methods, accomplishments, experience, and expertise, and further acts as a clearinghouse by providing information and advice in support of sound mapping practices and map use.
- participates on committees, task forces, boards, etc. The State Cartographer is one of the 13 voting members of the Wisconsin Land Information Board.
- develops experimental and prototype products.
- serves as the state's affiliate for cartographic information in the U.S. Geological Survey's Earth Science Information Center (ESIC) network.

About our Internet Web site...

We maintain a "homepage" on the World Wide Web.

Here, you will find information on a wide range of mapping topics, news items, functions and activities of the SCO, our on-line aerial photography catalog, a calendar of events, and links to related web sites. We encourage those of you with Internet access and browsing software to check out the SCO's homepage at

<http://feature.geography.wisc.edu/sco/sco.html>



About the WISCLINC Web site...

A second Internet resource is the on-line Wisconsin Land Information Clearinghouse (WISCLINC). Its address is:

<http://badger.state.wi.us/agencies/wlib/sco/pages/wis-clinc.html>

At this site you can search prototype metadata files, download certain data files, learn about our continuing work in this area, and link to other state clearinghouses.

Wisconsin Mapping Bulletin

Published quarterly by the Wisconsin State Cartographer's Office. A University of Wisconsin-Madison outreach publication distributed free upon request.

News is welcome on completed or ongoing projects, published maps or reports, or conferences/workshops. Local and regional information is especially encouraged. The editor makes all decisions on content. Deadline for the next issue is April 3, 1998.

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