

New Map Reveals Richness of Wisconsin's Landscape

by Bob Gurda

Wisconsin's major landscape elements appear prominently in a new large-format map developed from satellite images. The colorful map *Wisconsin Land Cover* was published in December and already has become popular among a wide variety of people.

Our state's diverse landscape heritage makes the map a lively quilt of forest types, water and wetland, agricultural land, urban areas, etc. Patches of these land cover categories are identified on the map through a variety of colors: three shades of green, two of red, yellow, purple, lavender, blue, brown, tan, and gray.

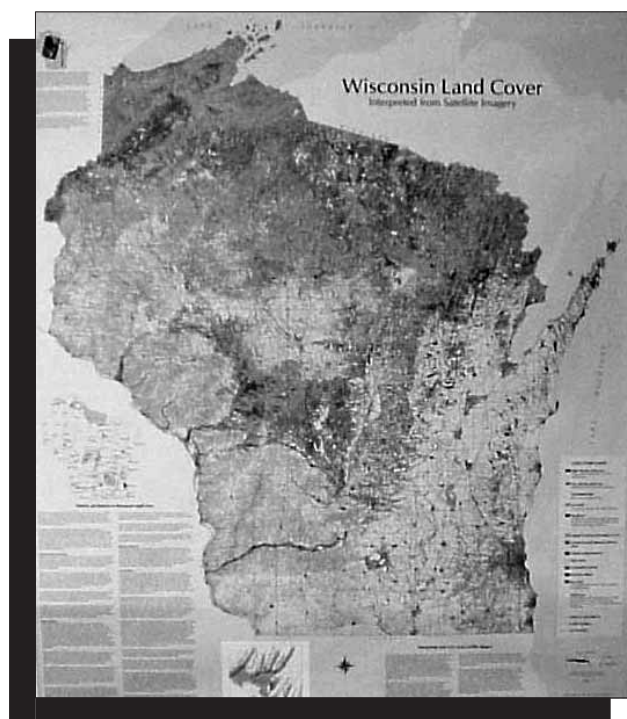
This is a large map—40 x 52 inches—at a scale of 1:500,000. It is similar in size to a number of other Wisconsin maps including the *Cultural Map of Wisconsin*, the Raven shaded relief map, and several products of the Wisconsin Geological and Natural History Survey.

A space age portrait

The map is the result of interpreting Landsat satellite images from 1992. The satellite collects information in cells with a ground size of around 100 feet (1/400th of an inch on the map), which is the natural limit on the resolution of the resulting database. Some ground features as small as 300 feet across are visible on the map.

The work of interpreting the satellite images was managed by the Wisconsin Dept. of Natural Resources with their funding supplemented by a group of federal and state agencies cooperating under the banner of WISCLAND. For more on that organization, as well as the digital data sets available, visit the SCO's web site.

An important aspect of the interpretation work was the collection and integration of 30,000 ground observations from across the state. This information helped guide the computerized interpretation of raw images into land cover categories, and provided data for accuracy testing. Several other states



have published similar maps, but none have been derived from databases built on as many field checks.

Both the familiar and obscure

Some well-known landscape features that are obvious on the map include the forests of the Kettle Moraine and Baraboo Hills, Horicon Marsh, lake districts in the north, the Driftless Area, and the heavy forest cover of Menominee County.

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WLIB News

by Ted Koch

Since the previous issue of the *Bulletin*, the Wisconsin Land Information Board (WLIB) met on October 11 (conference call), November 17, January 4, and February 1 (conference call). The WLIB's next two meetings are scheduled for March 2 in Lake Geneva (in conjunction with the annual WLIA Conference), and May 3 in Madison.

Board elects officers as vacancies increase

The board conducted the annual election of officers at its January 4 meeting. Ted Koch, State Cartographer, was selected as chair for the second consecutive year as was Fred Halfen, Ayres Associates, for vice-chair. Tom Ourada, the Wis. Dept. of Revenue's Executive Assistant was elected as board secretary. Ourada has legislative experience having served 14 years in the State Assembly representing the 35th District.

Meanwhile, in early January John Laub announced his resignation from the board. Laub, who served on the board since its inception in 1989, was also chair from 1991 to 1998. The Laub resignation leaves the 15-member board with four vacancies. These vacancies are filled from appointments made by the governor.

More county plans approved

At its November and February meetings, the board approved a total of 28 additional second-generation county land records modernization plans. This is in addition to the 9 plans initially approved by the board at its September, 1999 meeting. Plans are prepared by counties in accordance with instructions established by the board. Once submitted to the board, plans are reviewed by the Office of Land Information Services (OLIS) staff, and if determined to meet all relevant standards, are forwarded to the board for approval. It is expected that the board will consider another 29 plans at its March 2 meeting. County plans may be viewed on the OLIS Website

(under Wis. Land Information Program):
www.doa.state.wi.us/olis/

Digital Parcel Mapping standard approved

A standard for digital parcel mapping, developed by the Wisconsin Land Information Association and reviewed and recommended by the WLIB's Standards Committee, was approved by the board at its January 4 meeting. In adopting the standard, the WLIB also adopted related committee recommendations including—

- making the standard a condition for funding digital parcel mapping projects as part of the Land Information Program;
- ensuring development of a digital parcel mapping data content standard as a companion document to the mapping standard; and
- developing a procedure that will provide for regular review and updating of the standard.

Revised Administrative Rule adopted

At its January 4 meeting, the board approved final changes to the administrative rule that spells out how the board in the future will distribute grant funding to local governments in the future. In making changes to an earlier draft of the rule, the board took into consideration comments received at four public hearings conducted in December, and comments and recommendations made by the Legislative Rules Clearinghouse.

The rule, as passed by the board, has been referred to the legislature for their review. When the legislative review is complete, the Dept. of Administration will file and publish the rule in the Wisconsin Administrative Register. The new rule, once it takes effect, will guide applications and awards for the 1999 grant cycle and beyond. The new grant rule permits awards to counties in four categories: training and education; base budget; contribution-based; and strategic initiative.

Budget passage retains soils mapping initiative, stops sunset extension

The 1999-2001 Wisconsin State Budget signed by the Governor last November included the statewide soils mapping initiative which has been detailed in past issues of the *Bulletin*. Over the next six years the Natural Resources Conservation Service will convert to digital form approximately 30 existing county soil surveys, and additionally conduct original field surveys and digital mapping for nine northwestern Wisconsin counties.

The total cost of the project exceeds \$12 million with more than \$4 million of that total coming from the WLIB, and nearly \$1 million from several state agencies. When completed, this project will give Wisconsin statewide digital soil mapping coverage, and will complete one of the Land Information Program's original foundational data elements.

The governor also vetoed a budget provision to extend by two years the board's sunset beyond August 31, 2003. The governor's veto language expressed the desire to retain identical sunset dates for the board and the Wisconsin Land Council.

WLC News

The Wisconsin Land Council met on November 16, December 9, and February 3 in Madison. Future meetings are scheduled for February 22 (a joint hearing with the Assembly's Committee on Conservation and Land Use), March 9, and April 6 all in Madison.

Exec. Committee, third work group established

At its November 17 meeting, WLC Chair Tim Hanna announced his appointment of a WLC Executive Committee composed of himself; WLC

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Examples of other features that may not be so obvious out on the land—but that stand out on the map—include the St. Croix Barrens, glacial outwash plains around Antigo and Rice Lake, deltas of major tributaries of the Mississippi River, and numerous areas of glacial drumlins.

To help identify and understand these kinds of features and patterns, the map includes a small locator map and explanatory text, as well as another small map showing the extent and configuration of the lobes of the most recent glaciation.

How to order

The map is available for \$10 plus tax and shipping from two outlets in Madison, including the SCO. You can find an order form on the SCO web site, or give us a call for more information.

Copies of the map are posted in a number of public places around the state. Contact us if you would like to locate the map on display somewhere in your vicinity.



WLC News

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Vice-Chair Terry Mulcahy, WI Dept of Transportation; WLC Secretary Arnold Clement, Racine County; David Schmiedicke, WI Dept of Administration; and William Mielke, Rukert and Mielke.

In November, the WLC agreed to establish a third working group—this one representing state and local government and the private sector—composed of 23 people representing many diverse interests. The actual members of the group will be appointed by the WLC chair.

WLIS Project Team selected

Last October, both the WLC and WLIB passed resolutions that authorized the chairs of the two groups to jointly select a ten-member team to further study and recommend strategies for implementation of the computer-based WI Land Information System (WLIS).

Studying and making recommendations to the governor regarding WLIS is a duty of the WLC. In December the two chairs selected the ten-member team, and the team held its first meeting in late January. The team has until July 1 to bring its recommendations to both the WLC and WLIB.

State Cartographer's Commentary

The Challenges Ahead

by Ted Koch

A few months ago, as the millennium ended and a new one began, the media was full of special stories—you know, the ones listing the “best” or “most influential” in some category or other over the past 100 years.

Similar articles tried to predict what will happen with this or that in the next 100 or 1000 years. The end of one millennium and beginning of another seemed to bring out the need to look back and ahead at the same time.

I suppose this reflection on where we've been, and where we might be headed, is good. I enjoyed listening to and contemplating views of the past, present and future. The only one that confounded me was the selection of Bill Clinton as Man-of-the-Century by Wisconsin residents (according to one poll).

So what are the last century's achievements in cartography, mapping, and GIS? And, looking forward, what will the next 100 years bring? I don't have enough space here, and too fuzzy a crystal ball to answer either. Or maybe I should say my crystal ball doesn't have sufficient “resolution.”

Constantly adapting to constant change

At any rate, changes in the recent past surely have been dramatic. Most of us hadn't heard the term GIS until 10-15 years ago or so. The varied processes used for collecting data and making maps has changed dramatically also. Most of this change we ascribe to technology shifts, through the advent of new tools such as computers, GPS, imaging systems, the Internet, and so on. Into the near-term future, I have no reason to believe the rate of technological change will slow.

What seems more important; however, is how we as individuals, and as the human components that make up organizations, adapt to the changing landscape.

Here in Wisconsin we are very proud of the state's Land Information Program. The results from the 1998 County Land Information Office Survey are very revealing. Survey results, which will soon be posted on the Web, show impressive growth at the local level in data collection and maintenance. Even more impressive, is the definite trend toward using all this information for problem evaluation and decision making.

Solving problems is the key

The application of information to solving problems will be critical into the future. The success of these applications will prove to be the ultimate worth of our various programs. As a member of both the Land Information Board and Land Council, I know first-hand this past year has been one of many challenges. That condition will not change this year or next, nor should it, for the challenges ahead will lead to growth just as they have in the past.

So, in our business, the look back is satisfying, the look ahead is stimulating. I just can't figure out this Bill Clinton thing.

Clearinghouse Connection



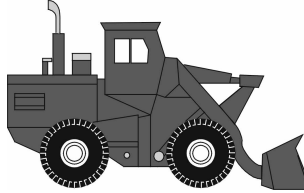
OGC's neutral standards promote "open" GIS

Smoothing the way for a GIS Superhighway

by AJ Wortley

As I go about the business of maintaining and enhancing an NSDI Clearinghouse node, I watch for trends that help forecast the future of GIS. This helps me predict the needs of the land information community for tomorrow.

One interesting venue of late has been the Open GIS Consortium (OGC). As standards emerge through the OGC process, forecasts of a bright future abound—based on the integration of geospatial data into a multitude of applications.



Automation...integration...application

Metadata Motivation

by AJ Wortley

"An investment in thorough data documentation can pay for itself through increased data longevity, a greater ability to share data, decreased user support requirements, and in extreme cases, the avoidance of litigation related to data misuse or copyright violations."

Minnesota LMIC

The Open GIS Consortium, Inc. is a non-profit

Membership organization that addresses the lack of interoperability among systems that process georeferenced data. OGC's mission is to give the world's information systems a new connection to physical reality by making georeferenced data behave like just another standard data type in systems of all kinds. You can visit OGC on the web at www.opengis.org/.

This quote from the Minnesota Land Management Information Center is one we are fond of using in the current Wisconsin series of FGDC-sponsored "Don't Duck Metadata" workshops. It is a good summary statement for the role of metadata and why it is a necessary part of initial GIS data creation. Combining this quote with the theme of the recent WLIA conference, "*Automation -> Integration -> Application: Achieving the Vision*," some resounding motivation for metadata shines through.

Increased data longevity

Connections, integration, applications

Recent news at the national level has pointed to the OGC's Catalogue Services Specification and Open Web Mapping Interoperability Initiative as two activities that may dramatically change the way we look at data sharing and application. One overriding goal of these activities and many others at the OGC is to enable applications to pull in distributed geospatial data and integrate it regardless of OS platform, vendor format, or map server software. This means more distributed GIS applications as well as a dramatic increase in use of geospatial data as medium for communicating other types of georeferenced information on the World Wide Web. So what does all of this have to do with the Wisconsin Land Information Clearinghouse (WISCLINC) and our state land information community?

To date the land information community has expended a lot of energy creating the essential geospatial data sets necessary for core GIS applications. It's called 'Framework Data' at the federal level, or 'Foundational Elements' at the state level, but whichever terminology, the investment begins to yield value through the *use* of these data in applications. This is where GIS technology begins to pay for itself.

Metadata is the key to interoperability

In order for geospatial information to be accessible to such distributed use, it first must be accompanied by some recognized schema or standard of documentation... a.k.a. metadata. Secondly, the fact that the data exist and are shareable must be known to users. These are two primary functions of the WISCLINC. Creation of FGDC-compliant metadata and submission to the Clearinghouse enables others to consider using that data in the future.

While OGC-based approaches are currently in test phase and focused at the national (and global) level, this functionality has significant implications at the local level. Soon, counties and municipalities may be able to integrate data across GIS software platforms *without first converting the data to a common software format!*

Integration of imagery and other raster data as a backdrop for other GIS information should become easier. Applications that use local data extending across multiple jurisdictions could be greatly simplified.. The future may also find the Clearinghouse concept itself extending to all levels of GIS data creation and custodianship. With such breakthroughs on the horizon, the future looks bright for the land information community and their investment in high quality data.

Unfortunately, it's become apparent that large-scale, highly accurate data creation takes time, and while some data are recently completed, others have begun to age. The need for data maintenance and update is then integrated into

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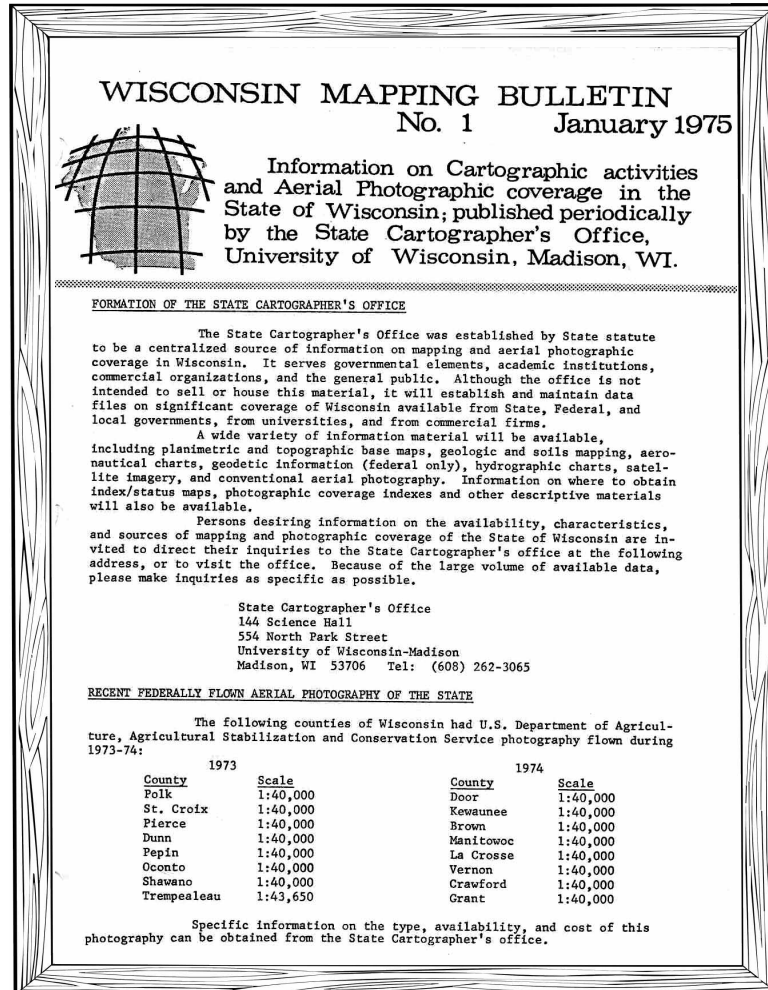
First issue published 25 years ago

Bulletin has a long history

by Bob Gurda

The State Cartographer's Office had its 25th anniversary last summer, but the most visible and enduring aspect of the office is just now passing the same milestone.

It was in January of 1975 that Art Ziegler produced the first issue of the SCO's newsletter. It has been published regularly since, four issues per year. We have reproduced the first page of that initial issue. While much has changed in the way that we handle the *Bulletin's* production, much of today's content is similar to 25 years ago—for instance, reports on recent aerial photography projects.



New faces abound

SCO staff mix changes again

by Bob Gurda

The SCO's staff is undergoing more rapid change now than in recent years. Liz Krug, who provided general office support for us half-time since 1994, retired in January. We have filled that position temporarily with Ana Rumm who will be our Financial Specialist.

A student who had been with us for 18 months, Kate Giblin, graduated in December. She was instrumental in standardizing our web site. We have hired Gary Meddock to work on web site tasks, and hope to hire additional help this spring. Gary is pursuing a degree at UW-Superior through a distance learning program.

John Marks joined the SCO recently to help AJ Worley with the project to expand WISCLINC (the Wisconsin Land Information Clearinghouse); John is enrolled in the Geography Department's GIS Certificate Program. Very recently, Doug Kolom, another graduate student working with AJ, left to take a full-time job in the private sector; we hope to fill that vacancy soon.



NW part of Wis. completed summer '99

New batch of forestry photos available

by Bob Gurda

The northwestern quadrant of Wisconsin has a fresh edition of aerial photographs acquired this last summer. Produced at a scale of 1:15,840 (4 inches = 1 mile), each photograph covers a bit more than 2 x 2 miles.

These photographs are part of an on-going program operated by the Wisconsin Department of Natural Resources' Forestry Bureau. Approximately one quarter of the state is slated for new photographs every other year—an eight-year cycle to cover the entire state.

The northeastern counties had coverage under this program in 1997, and southwest and southeast quadrants are slated for 2001 and 2003, respectively.

Unlike aerial photographs acquired in the spring, these summer images depict the leafy canopy of forests, thus features on the ground may be difficult to see. Black-and-white infrared film is used to accentuate variations in the canopy, thereby enhancing interpretation of the vegetation. Water features appear black which helps in delineating shorelines.

Prints from the most recent forestry photo projects in any particular part of the state are available from DNR's contractor, HAS Images. Contact prints for local areas can be viewed at certain DNR field offices.

Visit the SCO web site's Aerial Photography Catalog to find links to DNR's web site and ordering information.

Commercial partner selected

National Atlas goes electronic

by Bob Gurda

The U.S. Geological Survey is joining forces with a private-sector firm to further develop its National Atlas. Chicago Map Corporation, a unit of Lexon Technologies, will be working with the USGS to help users make customized maps.

For a look at the maps on line, surf the web to www.nationalatlas.gov.

(source: USGS)

Books, books, books!!

Publishers pumping out GIS titles

by Bob Gurda

Major technical publishers have been active in the GIS arena for a number of years now. But recently released titles have made a big contribution to the existing bookshelf.

Taylor and Francis alone has eight new titles including

- *GIS, Organizations, and People*
- *GeoComputation*
- *Object-Oriented Design for Temporal GIS*
- *Spatial Multimedia and Virtual Reality*
- *Marine and Coastal Geographical Information Systems*
- *Map Projection Transformation*
- *Remote Sensing Change Detection*
- *Practical Applications of GIS for Archeologists*

Call 800/821-8312 for details

Ann Arbor Press carried the same *Remote Sensing Change Detection* carried by Taylor and Francis, as well as the new *Spatial Accuracy Assessment: Land Information Uncertainty in Natural Resources*.

Call 800/858-5299 for details.

Both firms carry much longer lists of related titles published over the last several years.

Publication now on the web

Topographic Map Symbols online

by Brenda Hemstead

The popular USGS publication "Topographic Map Symbols" is now online in an easy-to-use HTML version at map-ping.usgs.gov/mac/isb/pubs/booklets/symbols/. This much requested booklet explains the distinctive characteristics of a topographic map, explains how to interpret the map, and gives an explanation of the symbols used.

Note that the HTML version does not look exactly like the printed version from which it is developed. It is not a PDF file that can be printed and folded to replicate the printed copy.

(source: *GIS/LIS News*, Fall 1999)



Two different 1999 flavors, both on CD-ROM

SCO updates statewide geodetic data products

by Brenda Hemstead

Once again we have created a fresh annual set of geodetic control data and software for Wisconsin, based on the annual release of updated products from the National Geodetic Survey (NGS).

We have two new CD-ROM products, either of which sells for \$50:

- The NGS product carries data from 13 states in the north-central part of the U.S.
- The SCO version of NGS's software and data for Wisconsin, augmented by an interactive statewide High Accuracy Reference Network (HARN) location map that directly links to each individual HARN station datasheet using your local web browser, as well as a software tool for quickly finding latitude and longitude for any PLSS section in the state.

You can order these products from the SCO. Ask for an order form or print one from our web site.

Book complemented by web maps

National Geographic Atlas revised

by Bob Gurda

The National Geographic Society has unveiled the latest edition of its *Atlas of the World*. Priced at \$125, it continues their fine tradition of printed and bound atlases.

In addition, the Society is making maps available through its web site. Try out their Map Machine at www.nationalgeographic.com/maps/index.html

GLOBE data & visualizations available free

NOAA releases World Elevation Data

by Brenda Hemstead

The NOAA National Geophysical Data Center (NGDC) has released the Global Land One-kilometer Base Elevation (GLOBE) digital elevation data set. GLOBE is an international effort to create a global digital elevation model (DEM) on a nominal 1-kilometer grid. Data came from 11 sources, via 18 combinations of source/lineage processing.

Source data include satellite imagery, aerial photography, satellite altimetry, cadastral survey data, and hard copy topographic maps converted to digital format.

The GLOBE project includes two version of GLOBE: (1) a completely unrestricted version with full global coverage, which has no copyright or security restrictions on its distribution, and (2) a version that honors copyright, where the higher

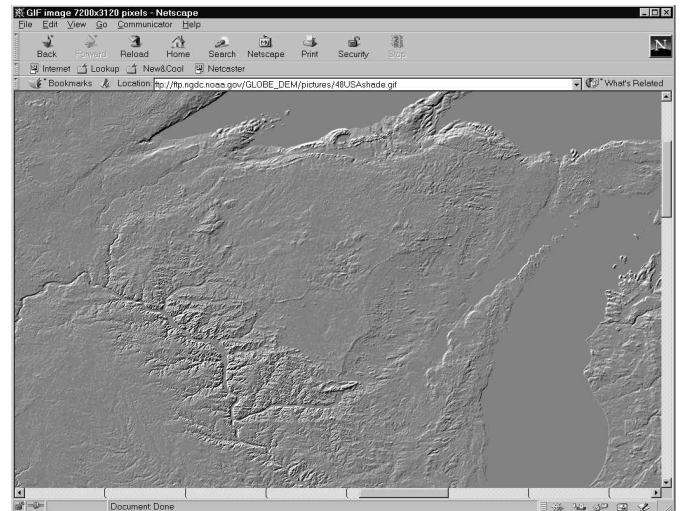
quality of the copyright data merited such inclusion, and where distribution of such data was licensed to NGDC on behalf of the GLOBE Task Team.

On the Web, GLOBE data, documentation and visualizations are available at no charge at:

www.ngdc.noaa.gov/seg/topo/globe.shtml

You can view shaded relief views, hypsometric views (color-coded by elevation), and others. Because the data is fairly coarse, the views are not detailed over small areas, and small features (such as drumlins in Wisconsin's glaciated landscapes) are generally not visible.

(source: NOAA web site)



View of the Wisconsin region from the GLOBE data set

Continuation of WGNHS Quaternary series

Glacial geology mapped for N. Oconto Co.

by Bob Gurda

The Wisconsin Geological & Natural History Survey has published another volume and map in a series of county glacial geology studies. The current publication covers the northern part of Oconto County.

The document is *Bulletin 97: Quaternary Geology of Northern Oconto County, Wisconsin*. The color map is at 1:100,000 scale and measures 24 x 15.5 inches. The accompanying booklet of 14 pages includes numerous black-and-white maps and drawings that illustrate various patterns and features found in the unconsolidated glacially-derived material that overlies the much older bedrock in that part of Wisconsin.

For information on purchasing this publication, contact the WGNHS at 608/263-7389 or visit their web site at www.uwex.edu/wgnhs/

Looking for something?

Search SCO's web site

by Anna Weitzel

If you're looking for information on a particular mapping topic, try a search of the SCO's web server. You can link to the search engine directly from the user menu at the left side of our home page.

Our new search option finds matches for keywords or boolean statements and returns a ranking of those pages which best fulfill your search criteria. Since the search covers our entire web server, some links to the



UW-Madison Geography Department web site may also be returned with the results.

Land Cover Map order form on-line

Order forms for the new *Wisconsin Land Cover Map* can be downloaded in PDF format from the SCO web site. You can link to the form from our user menu. Just print off a copy of the order form and send the completed form to the SCO.

Change your bookmarks for SCO's web site

Due to the loss of one of our servers, we are asking that visitors to our web site use a new URL. The old address, *feature.geography.wisc.edu/sco/*, will remain functional for some time, but we are making the transition to the new address, *www.geography.wisc.edu/sco/*. Please change your bookmarks accordingly.

Metadata Motivation

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the process. Metadata plays a crucial role in conveying the original state and methods implemented in creation of data to someone charged with maintaining that data. People come and go...but the data lives on.

Greater ability to share data

Fortunately, while data production has been in the works, technology has been steadily moving forward to ease the integration of GIS data into applications. Refer to the 'Clearinghouse Connection' article in this issue for a look at some of the exciting things in the works with the Open GIS Consortium and others to enable the use of distributed GIS data in different formats, projections, and coordinates for a common purpose.

This cross-platform, vendor-neutral integration is only possible though, with some "crosswalk" of information. Standardized metadata enables software to more intelligently convert data 'on the fly' and integrate it into a variety of new applications. This automated data sharing may have a dramatic impact on everything from cross-department emergency management applications to city engineering planning and management at the local level, as well as enable a new generation of regionalized applications.

Decreased user support requirements

Certainly as geospatial data is shared out for various applications, both end-users and application developers will need to know details about the data. Metadata provides a first line of defense for answering these questions as well as providing a statement from the data custodian as to the level of user support. For a data producer, fewer phone calls asking these questions means more time for data maintenance and new data creation.

...and in extreme cases

One way to avoid having other people misuse your GIS data is to not allow it to leave your building or department. A more positive approach that helps leverage more value is to provide a liability statement regarding outside use of your information. Metadata enables the sharing of data with explicit explanation of its intended purpose and helps the producer organization insulate itself from liability due to data misuse or copyright violation.

Litigation due to the misuse of GIS data has yet to become high profile. Yet as these data become integrated in areas like emergency response and other delivery of services where accuracy is critical, it never hurts to be prepared.

So don't delay !

Metadata documentation is getting easier! It is being integrated into GIS software and there is a commercial market developing for geospatial data management. But, the process still requires start-up and a basic integration into the GIS workload.

Our small staff that works on the Wisconsin Land Information Clearinghouse project deals with metadata in some aspect every day. We welcome your questions and/or requests for assistance, big or small. We are here to help build the foundational metadata that will enable your investments to yield more in the long run.

However, our project is running for a limited time period. Through metadata training workshops, on-line materials, and individual assistance, we strive to provide the resources necessary to ease the process of documenting your spatial data and opening up your metadata portfolio... an investment that can pay off many times into the future.

The Community looking forward

For this issue we talked with Roxanne Brown who is concluding her one-year term as President of the Wisconsin Land Information Association (WLIA). She is the Real Property Lister for Burnett County, which she reminds us is truly "up north".



Given that you need to travel hundreds of miles to the locations of most WLIA events, how have you convinced your county board that your time is well spent in this pursuit?

I've worked for Burnett County since 1974, first in social services for 11 years, then for the treasurer, and since 1988 in my present role. That whole time our county board has been very supportive of training and participation in professional associations, despite the financial limitations of our modest tax base. Further, we believe that the voice of the northern counties should be heard.

The community came up with the idea of modernizing our land records, and has repeatedly convinced the legislature and governor to create the means to make it all real.

As our county has implemented computerized systems in recent years for managing land records, the value of our investment has become obvious. The products of our work make positive impacts at public hearings and board meetings.

We would have struggled to implement these systems without meeting regularly with our peers from across the state, and our county board understands the value of those contacts.

Do you sense that other county boards are similarly supportive of their staff in the land information arena?

My WLIA experiences have brought me in contact with many others who work for local government. Compared to ten years ago—when WLIA's dream of a state land information program was signed into law—the level of support is amazing. Back then, the Wisconsin Counties Association was leery of the program, but at their most recent convention several supportive resolutions were introduced. That's an amazing turn around!

What could be done to further advance the modernization and use of land information?

First, I sense a significant level of frustration around the state over vacant positions on the Wisconsin Land Information Board; some seats have been vacant for over a year. We want to be backers of the board's work, but we worry that soon the board may be hamstrung for lack of a quorum. Getting those appointments made is important.

What is most amazing about what Wisconsin has created with its land information program is how invested the community is.

Second, now that we have developed a large amount of computerized land information at the local level—and that amount continues to grow each year—it is important to take the next step: to make sure that this information can be linked across jurisdiction boundaries. I believe that this is a task that should be taken on by those of us who develop the information, not by some entity in Madison. If the community can succeed in conquering this problem, perhaps with the aid of a consultant, we would be building the basis of a *de facto* standard. Then, as with other standards developed within the WLIA, the Land Information Board could approve our proposed standard.

What is most amazing about what Wisconsin has created with its land information program is how invested the community is. The community is not just the local governments but many state agencies too. Important jobs have been done by DOT with the HARN, and DNR with WISCLAND and LandNet. The SCO, too is an integral part of the community. We couldn't have done half as much without these partners.

It's the community that came up with the ideas—the dream—and that has repeatedly

convinced the legislature and governor to create the means to make it all real. In this model, the role of the state is to enable, not to define, and that's where some disagreements have come up in the last few years..

Is it in the public's overall best interest for us to wait for Madison to make proposals, and then react?

The degree of investment that the community feels is what continues to make me optimistic that our state made the right move ten years ago when it decided to start down a new road leading toward land records modernization, with the focus on the local level. It's that strongly held belief that binds us and that will continue to yield benefits for years to come.

You mentioned disagreements in recent years. What is needed to move toward real progress?

First, it's clear that any people can disagree; it's a natural part of being human. We haven't disagreed with the legislature, but we have struggled to have our message accepted within some arms of the state government. We have objected to some attempts to pull control away from the local level, but other times we have had to be critical of inaction.

The movement to build the Wisconsin Land Information System (WLIS) has been lightning rod. Those of us who provide land information would love nothing more than to have the fruits of our labors easily accessible for everyone to use productively. However, we don't believe that a centralized computer system in Madison is the answer.

The degree of disagreement has surprised some people because we all want the same thing: land information that's accessible and easy to use—which includes that it's fully documented and not difficult to integrate.

I believe that the community has been patient, but I wonder if it is in the public's overall best interest to wait for Madison to make proposals and then have us react. The WLIA has a long record of being in the forefront and that is where we should stay.

We changed things ten years ago. We can continue that tradition and prove the nay-sayers wrong once more.

Q: *What exactly is the length of a second of latitude? I used WISCON software to compare two different coordinate systems, and the answers differ slightly.*

A: First of all, due to the vagaries of our language, the term second can mean either a span of time, or 1/3600th of a degree of latitude or longitude, or the rank that falls between first and third. Here, we're obviously talking about the geographic type of second.

To further complicate communication, degrees, minutes (as in 1/60th of a degree), and seconds (1/60th of a minute) are often indicated as follows: 45° 28' 11". Some people may read this to be 45 degrees, 28 feet, 11 inches!

The length of a geographic second, then, is what is in question. One could attempt to measure this directly across the curve of our earth's globe, technically measuring along the surface of an ellipsoid that has been created mathematically to closely approximate the size and shape of the earth.

However, horizontal distance measurements typically are made in reference to a flat surface—a mapping plane. There are a large number of such planes in use, each with its particular benefits and drawbacks. By placing a coordinate system grid on a mapping plane, one can then determine a grid distance between two points.

Typically, this distance will not be quite the same from one coordinate system to the next. Further, from one place to another in each coordinate system, the grid distance of a second may also vary. Why is this the case?

The answer is that in the process of making a map projection—mathematically flattening all or some part of the ellipsoid so that it becomes a plane—various amounts of stretching or squeezing happen and remain embedded in that plane. However, the coordinate system grid that is placed on that plane has a consistent spacing. As a result, a certain grid distance measured in various test spots on the plane equates to slightly different values expressed in seconds.

For the same reasons, a certain length as expressed in one coordinate system won't be quite the same in any other coordinate system, except for a few special cases.

In this discussion, we are referring to seconds of latitude which are regularly spaced going north and south across the globe. By contrast, seconds of longitude get progressively smaller away from the equator, ultimately disappearing as the lines of longitude converge at the poles. From Wisconsin's southern border to the Apostle Islands in Lake Superior, a second of latitude loses over 7% of its distance due to this effect.

Q: *What's the best coordinate system to use for a map covering all off Wisconsin?*

A: Each coordinate system is based on a map projection, and you should consider both factors in making your choice.

Assuming you want to depict the entirety of Wisconsin with a minimum of distortion, a good choice would be a home-grown coordinate system called Wisconsin Transverse Mercator (WTM). This is a variant on the well known Universal Transverse Mercator (UTM).

UTM itself doesn't work well for the full width of our state. Although UTM is based on zones that are six degrees of longitude wide (about enough to fit the land area of Wisconsin east to west), the placement of the zones results in our state being divided about equally between UTM zones 15 and 16. Not only is this a great inconvenience, but it also means that the area of maximum distortion runs right through the middle of the state (surrounding the 90th meridian).

By simply shifting a typical UTM zone so that it is *centered* on the 90th meridian, the least distortion then coincides with the center of Wisconsin. Some people call this arrangement UTM zone 15 ½ for shorthand.

Beyond reasons relating to minimizing distortion—which is found to some degree in every map projection—there are other good reasons to choose WTM. Especially if you want to use digital geospatial data for your map, you will find it easier to find a variety of data sets to use that are already referenced to the WTM coordinate system. The new *Wisconsin Land Cover* map is based on WTM and uses such data as overlays to the interpreted satellite imagery.

One further detail you should be aware of, however, is that there are two “flavors” of WTM. The original one is called WTM 27, and the more recent has the name WTM 83. Each is designed to work with a companion horizontal datum (NAD 27 and its modernized replacement NAD 83, respectively).

In order to help users avoid confusing data referenced to one flavor versus the other, the coordinate system parameters are deliberately different. Essentially, if you integrate WTM 27 data with WTM 83 data, you will see a shift of 20,000 meters (about 12.4 miles) both north as well as east. That is, features you would otherwise expect to line up will be offset by that amount. This shift serves to tip you off that your data needs to be transformed to a common coordinate system. If you want to use WTM, then you need to choose between the two flavors!

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.

Searching for on-line maps and geographic data

Infomine reveals some Internet gems

by Anna Weitzel

Using a standard search engine to unearth on-line maps can sometimes be “like trying to find gold in a silver mine.” To aid in such searches, the Libraries of the University of California offer their Infomine collection, a virtual lode of on-line maps and GIS resources.

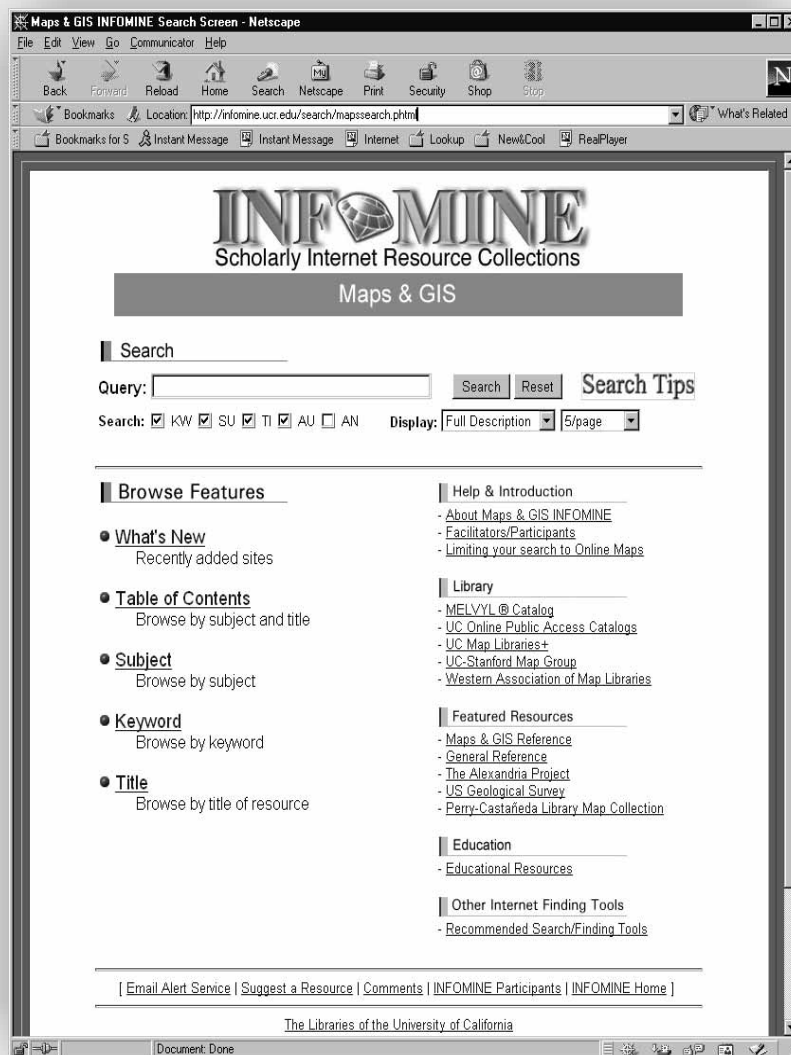
Infomine contains links to over 500 web sites of “scholarly use” for use by people seeking satellite images, photographs, geographic data, maps, e-mail forums, and similar Internet resources. Since the collection was developed by UC librarians, it emphasizes resources that are useful for research and educational purposes. Whether you are hunting for research data or just satisfying your curiosity for maps, a few minutes of browsing through Infomine will quickly prove that this site is a good starting point.

Visitors to Infomine can search or browse the collection by keyword, subject, title, or author. Also, specific commands allow you to limit the search to only those sites containing an on-line map or an interactive map. The search results are listed with a full paragraph description of that web site’s service.

Infomine is already an excellent source for on-line materials, but, like all web site collections, it is limited by the knowledge of the people who maintain it. Fortunately, Infomine has an on-line form by which users can suggest new links. This may be a good first step to getting your own mapping or GIS web site publicized.

Finally, maps are not the only gems in the Infomine. There are also separate collections of web resources relating to government, physical sciences, social sciences, and more. The same easy search tools apply to these other categories.

To visit the Infomine’s Maps and GIS collection, point your browser to infomine.ucr.edu/search/mapssearch.phtml





1% to be re-flown in 2000

Wis. NAPP almost completed

by Ted Koch

In last spring's issue of the *Bulletin*, we reported that the contractors flying over Wisconsin for the National Aerial Photography Program (NAPP) had completed acquiring photographs during April and May, 1999. With 60% of the state having been acquired during the 1998 spring season, the final 40% remained prior to last spring.

Following the recent completion of film inspection by the U.S. Geological Survey's NAPP contracting office located in Reston, VA, we have learned that approximately 1% of the photos acquired last spring have been rejected due to poor quality. Thus, that 1% will have to be re-flown this spring.

Limited area will require re-flight

Although we have not seen the specific locations of the re-flights, we understand that it involves the acquisition of approximately 50 individual images scattered about in an extended north-south area covering about one-quarter of the state. That area falls between the longitude lines of 90 and 91 degrees west. (It takes about 4500 NAPP photographs for complete state coverage).

All of the reflights are the responsibility of a single contractor. Meanwhile, to locate and order new NAPP photos now available for 99% of the state, you can search the USGS's Global Land Information System web site at edc.usgs.gov/webglis. Search the NAPP Section listed under Photography (Aerial).

NAPP is basis of DOQQs

Photographs acquired by NAPP are the raw image material for Digital Orthophoto Quarter-Quadrangles (DOQQs), the standard federal orthophoto product which has a pixel size representing 1 meter on the ground. The first NAPP flight in 1992-1993 was used to produce DOQQs over about 40% of our state.

For areas of Wisconsin having no previous digital orthophoto coverage, the new NAPP imagery will be used for DOQQ production under cost-sharing arrangements. A number of county areas in Wisconsin are slated for this product, and some production is already underway.

Areas already having an orthophoto product will not be funded through the most favorable federal cost sharing, but the NAPP images can be used for this or any other type of project since the images are in the public domain (not copyrighted).

Project converts Wis. county images to 800 quarter-quads

National orthophoto database to expand

by Ted Koch

Ayres Associates, a Madison-based photogrammetric mapping firm, the US Geological Survey (USGS), and a consortium of Wisconsin counties have entered into an agreement to transform existing Wisconsin digital orthophotos into images that will conform to national standards. The orthophotos to be reprocessed have been produced by Ayres through contracts with various counties and a Wisconsin regional planning commission.

The final orthophoto images will be produced to federal digital orthophoto quarter-quadrangle (DOQQ) standards, and then will become archived as part of the national digital orthophoto program database housed at the USGS's data center in Sioux Falls, SD. The State Cartographer's Office assisted in the preparation of the project proposal.

Innovative Partnership

This orthophoto agreement was formed under the guidelines of USGS's Innovative Partnership program, which accepts proposals from public and private organizations to acquire public domain data for inclusion into national framework data collections.

Conversion of existing images

This partnership agreement has two main components. The first specifies that Ayres will prepare 507 full DOQQs, to federal digital orthophoto standards, for areas in 12 counties: Vernon, Grant, Iowa, Lafayette, Green, Columbia, Jefferson, Clark, Vilas, Washburn, Sawyer, and Polk.

Orthophotos for these counties were produced over the past 5 years to meet county requirements for resolution, accuracy and format. In this agreement, the existing orthophotos will be reformatted to meet federal standards for content, format, coordinate system, resolution, structure, and metadata. A portion of the payment that Ayres receives for the conversion will be transferred back to the counties for use toward future digital orthophoto maintenance projects. DOQQs in this component will be delivered to the USGS this year.

Newer images also included

The second component of the agreement specifies that Ayres will prepare 295 DOQQs covering Dane and Juneau Counties, and the seven counties that compose the area of the Southeastern Wisconsin Regional Planning Commission (SEWRPC): Ozaukee, Washington, Milwaukee, Waukesha, Walworth, Racine, and Kenosha. Photography for Juneau was flown last spring, while the Dane and SEWRPC photos will be acquired this spring. The county orthophoto products will be produced first, followed by the reformatted DOQQs. DOQQs produced under this component of the agreement are scheduled for delivery to the USGS in 2001.

TerraServer & DeLorme provide new access

DRGs show up in new products

by Bob Gurda

Digital Raster Graphics (DRGs)—the scanned versions of USGS topographic maps—are available through two new sources. One is on the web, through the TerraServer which is already well known as a place to view portions of orthophoto quads. The second is a commercial product on CD-ROM, generally packaged by state.

Terraserver viewing site

The TerraServer application provides zoomed-in views of DRG images, through either a map-based search or a text search (such as “Sheboygan”). You can view and download the viewable portion of the DRG, but not the whole quad sheet file. There is also a link to commercial outlets for the full files. The Terraserver address is www.terraserver.microsoft.com.

Another entry point to the Terraserver is via the USGS Geographic Names Information System web site. Try it at mapping.usgs.gov/www/gnis/gnisform.html.

DeLorme unveils new product

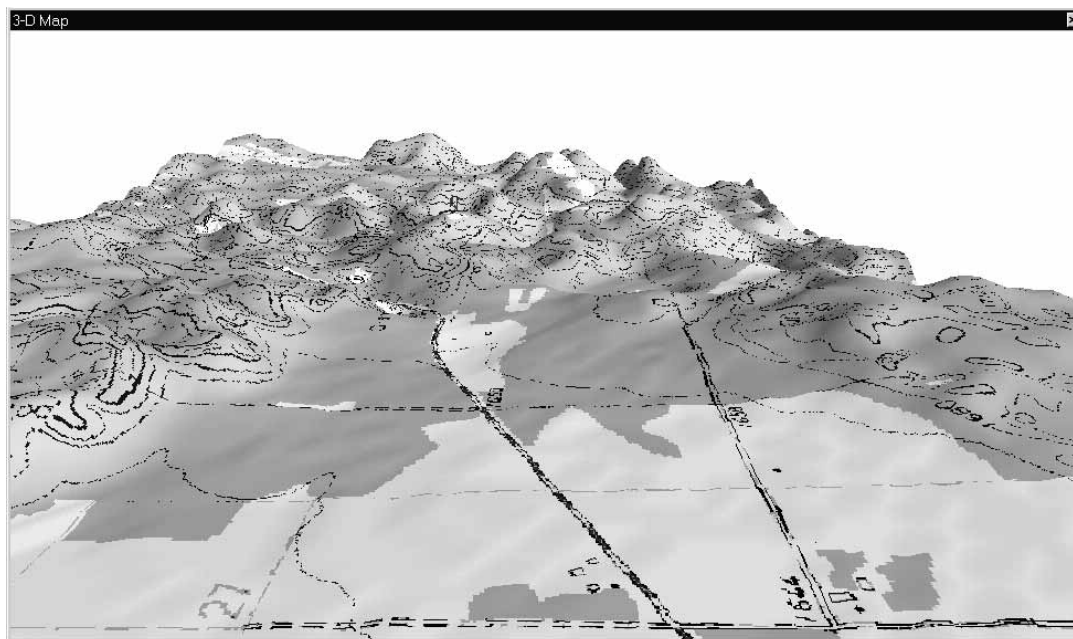
Well known for its state-by-state gazetteer series, the DeLorme company in Maine has just released a series of CD-ROM products that contain all the DRGs for a state along with elevation information and analysis and viewing software.

We received a copy to review just prior to this issue’s deadline, but at first blush it appears to be a powerful tool. Coverage of Wisconsin is on 5 CD-ROMs for a price just under \$150.

To help locate an area of interest, you can either type in a feature name (e.g., the name of a city) or you can use an overview map and outline an area. There are many levels of zoom, and the more local views use the USGS DRG images. Views of broader areas use less detailed information, similar to what DeLorme offers in their Street Atlas USA product.

DeLorme also provides terrain draping of DRGs and their other map data. This appears to require a fairly beefy computer and video card for best performance, but allows four levels of exaggeration (1, 2, 4, & 8X), vertical viewing angles between 15 and 90 degrees above the horizon, and your choice of compass direction (which can be changed instantly, causing a real-time rotation). Another feature allows tracing of routes (and their vertical profiles if desired).

We will be testing this product further and will update this report in our next issue. Also, check our web site for updated information on DRGs and similar commercial files as this data and software niche continues to evolve.



Glacial moraine hills northeast of Antigo, depicted with the terrain viewer function of DeLorme’s 3-D TopoQuads product. (Relief is exaggerated)

Wisconsin enthusiasts join in worldwide event

GIS Day 1999 proves a success

by Anna Weitzel

Several organizations around Wisconsin, including schools and universities, local governments, and businesses, sponsored GIS Day events on November 19. Response around the state, as well as nationwide, was quite positive. The American Geographical Society Library Collection at UW-Milwaukee had a total of 350 people attend workshops, visit the library and attend a GIS Day reception. Also, Brown County Land Information Office reported a successful turnout for their open house.

As part of their annual Geography Awareness Week the National Geographic Society, the Association of American Geographers, and ESRI designated November 19 to be the first annual GIS Day. The goal of GIS Day 1999 was to introduce local children and adults to some real-world applications of geographic information systems. Users and vendors of GIS were encouraged to host open houses, give demonstrations, or create exhibits which educate the public about this technology.

At final count, according to ESRI, GIS Day events were held at 2,137 sites in 91 countries. The total number of participants was 2,445,825 with nearly equal numbers of children and adults attending events. Thirty-four states and 21 cities made official GIS Day proclamations.

To hear what the sponsors and participants are saying about GIS Day 1999 and what's being planned for next year, visit the official GIS Day homepage at www.gisday.com.

On the road....

WLIA schedules quarterly meetings for 2000

by Brenda Hemstead

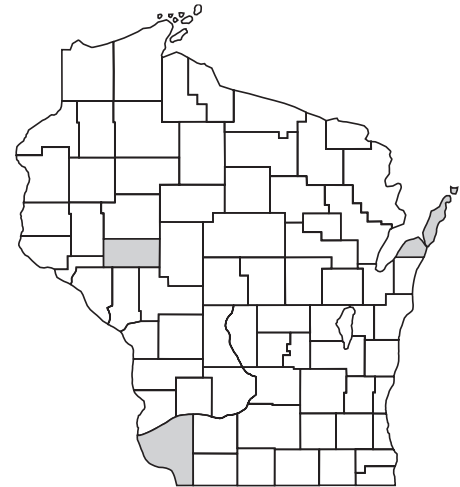
The Wisconsin Land Information Association (WLIA) has set the course for its quarterly meeting locations for the new year. As in prior years, WLIA will move its meeting around the state.

Typically, the quarterly meetings begin on Thursday and include informative workshops and a "free" evening presentation that is open to non-members. The following day is the general membership meeting that digs into technical topics and policy issues. In 1999 some technical topics were digital orthophotography, parcel mapping, imaging technology, global positioning systems, and addressing and street centerlines, just to name a few.

Locations

- June 1-2 - Eau Claire
- September 7-8 - Door County
- December 7-8 - Platteville

For additional information visit WLIA's web site at www.wlia.org/ or call 800/344-0421, or email abarrett@uniontel.net.



Free downlink event set for May 11

Satellite class to focus on GIS in public health

by Bob Gurda

GIS can be a useful tool supporting public health programs. A free training course scheduled for this spring aims to expose interested people to the use of GIS in this field.

Sponsored by two federal offices, the Agency for Toxic Substances and Disease Registry (ATSDR) and the Centers for Disease Control and Prevention (CDC), the 2.5 hour class is free and is scheduled for May 11 beginning at 11:00 a.m. CDT.

Receiving the broadcast requires specialized satellite broadcast receiving equipment. For details, visit the class web site: www.cdc.gov/phtn/gis/gis.htm.

The target audience for this class is public health professionals proficient with computers and databases who are seeking new tools and techniques for the examination and display of health, demographic, and environmental data.

You can register for this class through the web site.

(source: CDC web site)

March 14, 2000, the **Map Society of Wisconsin** is sponsoring a talk at UW- Milwaukee's Golda Meir Library at 7 pm. The topic is "AAA's Maps" presented by Tom Schreiner of American Automobile Association.

March 18-23, 2000, **American Congress on Surveying and Mapping (ACSM)** will be held at the Statehouse Convention Center in Little Rock, AK. Visit ACSM website: www.survmap.org.

March 26-29, 2000, **Geospatial Information & Technology Association (GITA) Annual Conference** will be held in Denver, CO. Contact: GITA at 303/337-0513 or their website: www.gita.org.

March 27-29, 2000, **GIS for Transportation Symposium** will be held at the Radisson South in Minneapolis, MN. Workshops will be held March 26. For more information, see the GIS-T 2000 website: www.gis-t.org.

April 5, 2000, the **Map Society of Wisconsin** is sponsoring a talk at UW-Milwaukee's Golda Meir Library at 7 pm. The topic is "Wisconsin's Past and Present: A Historical Atlas" presented by Zoltan Grossman of the Wisconsin Cartographers' Guild.

April 6, 2000, The **Wisconsin Land Council** will meet in Madison, WI. Contact: OLIS at 608/267-2707.

April 19, 2000, The **North Woods GIS User Group** will meet in Ashland, WI. Contact: Dave Lee at 715/373-6156.

May 3, 2000, The **Wisconsin Land Information Board** will meet in Madison, WI. Contact: OLIS at 608/267-2707.

May 11, 2000, **Satellite downlink class** will be held at 11am. For details, visit the class web site: www.cdc.gov/phtn/gis/gis.htm

May 22-26, 2000, **American Society for Photogrammetry & Remote Sensing (ASPRS) Annual Conference** will be held in Washington, D.C. Contact: ASPRS at 301/493-0290 or their website: www.asprs.org.

June 1-2, 2000, **Wisconsin Land Information Association Quarterly Meeting** will be held in Eau Claire, WI. Contact: WLIA at 800/344-0421 or www.wlia.org.

August 12-23, 2000, The **Urban and Regional Information Systems Association (URISA) Annual Conference** will be held in Orlando, FL. Visit their web site: www.urisa.org

September 7-8, 2000, **Wisconsin Land Information Association Quarterly Meeting** will be held in Door County, WI. Contact: WLIA at 800/344-0421 or www.wlia.org.

December 7-8, 2000, **Wisconsin Land Information Association Quarterly Meeting** will be held in Platteville, WI. Contact: WLIA at 800/344-0421 or www.wlia.org.

For Bulletin and web site

Send us your calendar items

We focus 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 problems, 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 listing 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.

To see a more extensive calendar of regional events, and to use hot links to other calendars, visit the SCO website.

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 six people—Ted Koch, State Cartographer (608/262-6852), Bob Gurda, Assistant State Cartographer (608/262-6850), A.J. Wortley, Outreach Specialist (608/265-8106), Brenda Hemstead, Administrative Assistant (608/263-4371), and Paul Gunther, Information Systems Manager, 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 and maintains a web site 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 and one of 16 voting members on the Wisconsin Land Council.
- 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 links mentioned in *Bulletin* articles, 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 check out the SCO's homepage at

<http://www.geography.wisc.edu/sco>



About the WISCLINC Web site...

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

<http://www.wisclinc.state.wi.us>

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

Wisconsin Mapping Bulletin

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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 7, 2000.

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