

Wis. Land Info System design to be unveiled

Project Team to report in July

by Ted Koch

On July 11, you have an opportunity to be present when the implementation plan for building a Wisconsin Land Information System (WLIS) is revealed. The group that has been developing the plan since early January, the WLIS Project Team, will be presenting their report at a meeting in Madison which will be video broadcast to six other sites around the state.

Report set for statewide video conference

The Project Team, working from the implementation issues identified in the Wisconsin Land Council Technical Working Group's Final Report (issued in May, 1999), will be presenting its recommendations to a joint meeting of the Wis. Land Information Board and the Land Council at the Pyle Center on the University of Wisconsin campus in Madison. From this location, live video/audio will be piped to facilities in **Rice Lake, La Crosse, Stevens Point, Rhinelander, Green Bay and Waukesha** starting at 1:00 pm and ending at 4:00 pm. Limited seating will be available at the Pyle Center also. Viewers at any of the six locations can ask questions of the Project Team following its presentation. Details on the location of the six video reception sites will be available from the Office of Land Information Services website (www.doa.state.wi.us/olis) and the SCO website.

The WLIS vision

The general idea of WLIS is that it will be a computer-based system of land information distributed throughout all levels of government in the state and available to everyone through the Internet. With core functions such as query processing, searching, indexing and storing data, data conversion and a set of standards, users of the system will be able to access a wide variety of data, maps, and other related documents. The system is envisioned to ultimately serve all types of users

from novice to advanced. The project team's report will contain details on system design, benefits, constraints, critical success factors and costs.

Project team members

Members of the Project Team were appointed jointly by the chairs of the Board and the Council. Their work is being coordinated by Stan

Cravens of the Office of Computer Services, Wis. Department of Administration, with staff assistance from Sarah Kemp of the DOA's Office of Land Information Services.

At the July 11 joint meeting, the WLIB and WLC will decide what additional analysis and public comment is

needed on the report. The WLIB and WLC have an October 1 deadline to submit proposals to the governor regarding the funding or legislation required to support WLIS, which may then become part of the 2001-2003 state biennial budget.

- Mike Bohn, *Manager of Geo Services Section, DNR, Madison*
- Don Dittmar, *LIS Coordinator, Waukesha County*
- Fred Halfen (Co-chair), *Vice-President, Ayres Associates, Madison*
- Noel Halvorsen, *LIO Coordinator, Brown County*
- Loren Hoffmann, (Co-Chair) *GIS Manager, Office of Land Information Services, DOA, Madison*
- Greg Landretti, *Director, Bureau of Assessment Practices, DOR, Madison*
- Pete Olsen, *Planner, City of Madison Planning Department*
- Dave Schmidt, *Director, Planning and Zoning Department, Winnebago County*
- Jay Tappen, *Senior Planner, West Central Wisconsin RPC, Eau Claire*
- Steve Ventura, *Director, Land Information & Computer Graphics Facility, UW-Madison.*

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WLIB News

by Ted Koch

Since the previous issue of the *Bulletin*, the Wisconsin Land Information Board (WLIB) met on March 2 in Lake Geneva, and May 3 in Madison. The WLIB's next two meetings are scheduled for July 11 and September 12 in Madison.

OLIS moved deeper inside DOA

The Office of Land Information Services (OLIS), which provides administration services to the WLIB and WI Land Council, has been moved to a new home within the WI Department of Administration. Previously, OLIS had been attached directly to the office of the DOA Secretary; however, recently Secretary George Lightbourn announced that OLIS will now become part of DOA's Division of Housing and Intergovernmental Relations (DHIR). This division currently includes the Coastal Management Program, the Office of Federal-State Relations, Demographic Services, and the HOME Program.

As part of the OLIS announcement, Secretary Lightbourn added that Tom Krauskopf, a long-time DOA employee and member in the late-1980s of the WI Land Records Committee, is being reassigned to the position of DHIR Deputy Administrator. The Land Records Committee, which was created by Governor Tony Earl in 1985 and reappointed by Governor Thompson, was instrumental in laying the foundation for the creation of the WLIB and the Land Information Program.

Two of four vacancies filled

Governor Thompson has appointed two new members to the WLIB and reappointed Mike Hasslinger, a current member, to another six-year term. The two new members are Ann Zillmer, an employee of GTE-North in Black River Falls, and Jim Ehram from La Crosse.

Zillmer fills the public utility slot on the WLIB which was left vacant with the resignation of John Laub this past January. Ehram, who has served as the Chair of the La Crosse County Board for 10 years, fills the position representing a county board of supervisors. The 15-member WLIB still has two vacancies, both of which also will require the Governor's appointment.

County plans approved

At its March and May meetings, the board approved a total of 28 more second-generation county land records modernization plans. With these approvals, the board has approved plans for 65 of the 72 counties. It is expected that the remaining 7 plans will be up for approval at the board's next meeting on July 11. County plans may be viewed on the Office of Land Information Services website (under Wis. Land Information Program): www.doa.state.wi.us/olis/.

1999 local grants approved

At its May meeting, the board approved setting aside \$3.1 million to fund local government grants. These are 1999 funds which have been delayed being awarded awaiting the implementation of a new Administrative Rule detailing how the funds are to be distributed. The new rule will take effect June 1. Along with the funding approval, the board set local government grant's application schedules for 1999 and 2000.

For 1999, the WLIB established grant award eligibility in three categories: training and education, base budget, and contribution-based. All counties are eligible to receive \$300 in the training and education category. Twenty-seven counties are eligible to share in base budget awards totaling \$345,000. The base budget category provides funding equivalent to the difference between total funds retained locally by a county and \$35,000. In addition to the above

two categories, each county is eligible for contribution-based awards which are proportional to the total funds collected within a county as compared to the total collected statewide. Over \$2,733,000 is available in this third category.

Applications for 1999 grants may be submitted by counties to the DOA Office of Land Information Services through the end of July, with projects due for completion by June 30, 2002. Applications for the 2000 grant cycle will be accepted at the end of this year. By October 15, the board will determine funding amounts available for 2000.

WLC News

The Wisconsin Land Council (WLC) met on February 22 (a joint hearing with the State Assembly's Committee on Conservation and Land Use), March 9, and May 18 all in Madison. Future meetings are scheduled for June 14 and July 11 (a joint meeting with the WLIB), both in Madison.

Transportation planning grants received

The WLC has received 62 applications from Wisconsin local governments requesting approximately \$1.45 million in grant funds for transportation planning. Transportation is one of nine elements included as part of the comprehensive planning legislation signed into law last fall as part of the state budget.

For the 1999 fiscal year, which ends June 30, \$1 million in transportation grant funds is available. The funding source is the Federal Highway Administration through the administration of the Wi Dept. of Transportation (DOT). DOT and OLIS are cooperating on the evaluation of the grant applications, and the awarding of the grants funds. Final decisions on this year's grant recipients will be made by June 30, 2000.

Clearinghouse Connection



Three quacks for FGDC Workshops

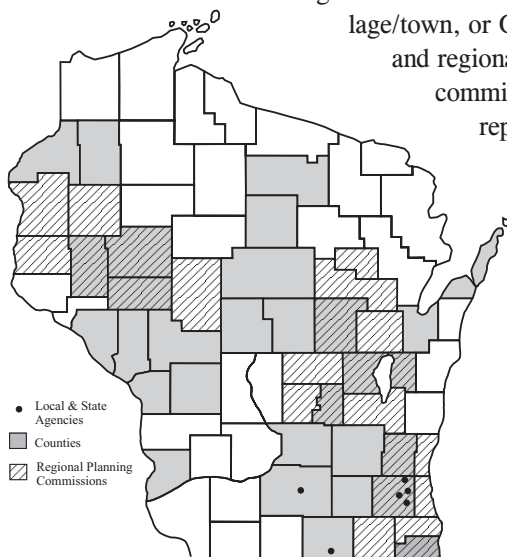
Metadata education spreads statewide

by AJ Wortley

The results are in... with eighty percent of attendees responding, the FGDC-sponsored “Don’t Duck Metadata” workshops are rated a success by a vast majority of those who attended.

We conducted the one-day workshops at four state locations from October to April and were attended by nearly 80 land information professionals. Along with the WLIA “Metadata for Managers” workshop, nearly 100 people have attended metadata workshops in the last nine months.

The map below shows FGDC-sponsored workshop coverage based on municipal (city/village/town, or CVT), county, and regional planning commission (RPC) representatives attending.



The totals show 4 CVTs, 30 counties, 3 RPCs, 2 university offices, and 3 state agencies (as well as several private sector folks).

Spreading the word, sending in reports

Over ninety percent of the attendees expressed that they would share their newly acquired knowledge with colleagues, resulting in mass metadata indoctrination. As another rapid response, grant cooperators have begun submitting metadata reports to the Clearinghouse, boosting our holdings of local metadata examples to 30 current listings for local geospatial data (from seven counties). And more metadata reports are on the way.

Fresh learning resources emerge

The grant-sponsored workshops served as more than a one-time teaching series, as metadata materials were updated and packaged in the form of a workshop binder and CD. The contents of this CD-ROM/workbook combo are now available on-line, linked prominently from the front page of WISCLINC’s site. OLIS will also make available copies of the workshop materials on CD-ROM.

To further help metadata creation efforts, in April the FGDC released version 2.0 of the ever-popular CSDGM

“Green Book” workbook in .pdf format. This is also available from WISCLINC with the workshop materials, as well as from the FGDC’s website.

With updated resources abounding, if you are on the verge of diving into metadata, there is still no better time to get a foothold, talk to your neighbors who attended a workshop, and feel free to request assistance from the Clearinghouse staff if you have further questions.

If you don’t already have it bookmarked, you can find the URL for WISCLINC on page 16.

Build a foundation for your enterprise

Long-term returns on data investment

by AJ Wortley

“How much spatial data documentation can we at the local level afford to do, considering constraints of staff and time?”

That question is one we heard repeatedly over the last six months from local government people attending Wisconsin’s FGDC metadata workshops. These people also wanted to better understand why it is wise to keep the detailed records that help others use their data.

While there isn’t a single global answer to address these concerns, an enterprise analogy might supply some perspective: what does it take to run a small business that develops, maintains, and distributes land records? What planning, procedures, investments, maintenance, and insurance are prudent?

In-house priorities come first

One piece of advice consistently voiced at the workshops was that while we advocate documentation to a standard, the business of getting starting with metadata needs to take priority. Metadata should first be useful to you and/or the internal data managers in your agency, and further should be in a format that you find comfortable.

This idea is parallel to an enterprise business model where investments and functions are scaled to immediate needs. Immediate needs are subject to interpretation based on your future vision. After internal needs are addressed, other levels of consideration emerge in the form of your enterprise or organization: other agencies and external customers; and ultimately, society and the general public.

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Statewide coverage set for 2006

Cooperative soil mapping project underway for Wis.

by Anna Weitzel

According to a March 16 announcement from the Wisconsin Department of Administration (DOA), the push to complete digital soil surveys for all Wisconsin counties is underway. This long-anticipated project is a cooperative effort by the DOA, the Wisconsin Land Information Board (WLIB), and the Natural Resources Conservation Service (NRCS), which is part of the U.S. Department of Agriculture.

The total cost for the mapping activities is estimated at over \$12 million. The NRCS, which coordinates and certifies soil mapping nationwide, will contribute nearly two-thirds of the total cost while the rest will come from state government sources including the WLIB, the Department of Transportation, the Department of Natural Resources, and the Board of Commissioners of Public Lands. Statewide soil survey coverage is expected to be achieved by June 2006.

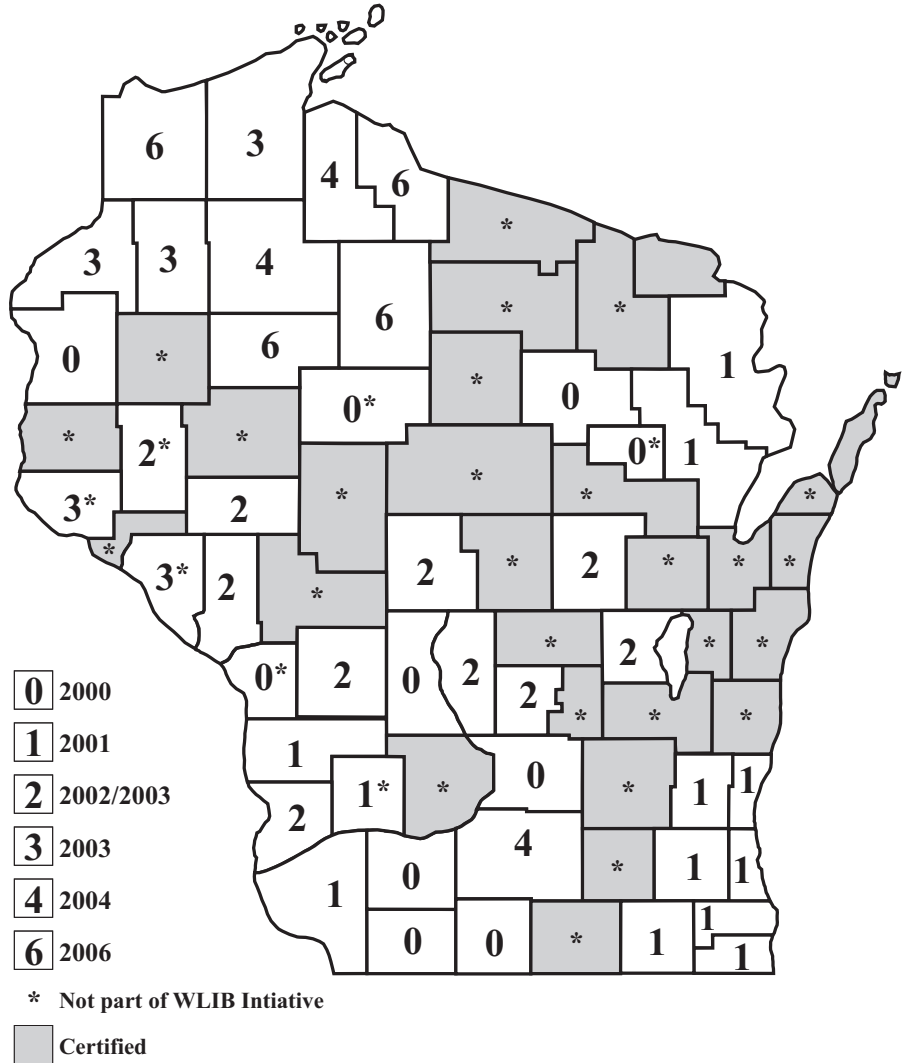
Some county surveys digital, others on the way soon

Presently, twenty of Wisconsin's 72 counties have digital soil surveys that meet current NRCS standards. Through cost-share funding with various sources, NRCS has previously scheduled completion of another 14 counties by 2004. The recent cost-share agreement between the state and the NRCS will cover complete soil survey mapping, conversion of existing maps to digital form, and NRCS certification for the remaining 38 counties. See the accompanying maps to find out where each county currently stands in this process.

In announcing the commencement of the project, DOA Secretary George Lightbourn added that statewide digital soil survey coverage will be an asset in land use planning and natural resource management as well as in agricultural

Wisconsin Digital Soil Survey Status

Projected Dates for Completion of Digitization and Certification



decision-making. Furthermore, it will signify the completion of one of the Wisconsin Land Information Program's foundational elements—that of soil mapping—as well as statewide coverage of digital orthophotos.

Will Wis. inspire other states?

State Soil Scientist Ken Lubich said he would like to see more states follow Wisconsin's example and assume active partnerships with the NRCS in order to complete soil mapping more efficiently. (See our interview with him on page 9).

However, as we reported in past issues of the *Mapping Bulletin*, the cost-share

agreement was not an easy balance to strike. In January 1999, the WLIB voted to commit program funds to the soil mapping project over six years, but the Governor's 1999-2000 budget proposed to accelerate the WLIB's contribution so that the work could be completed in only four years. After the NRCS indicated that it would be physically difficult to meet that shortened time table, the budget language finally signed in October 1999 kept the WLIB's commitment at six years but recommended that the DOA and the WLIB work together to complete the project.

Long-term returns....

continued from page 3

Looking outward, on the horizon

Next comes the growth and re-investment factor. Once metadata has been integrated into the data workload, you can begin to visualize the potential value that this detailed documentation may have. This potential includes the use of that data by outside organizations who desire to utilize most accurate and up-to-date information. Making data accessible and useable by outside organizations is a balancing act.

But rather than shape your data model or format to immediately satisfy all these users, accurate documentation will allow an end-user to transform the data themselves—something that soon may be possible ‘on the fly’.

If you build it, they will come...

A recurring trend in technology seems to be the shift from focus on product to focus on service or application utilizing the product. The data becomes the infrastructure that supports applications. But, this ‘if you build it, they will come,’ philosophy requires a leap of faith. All that can be relied on are projections that data integrators will come

to the table when its time to maintain that infrastructure investment.

Clearinghouse benefits...

Over the first year, both the average number of visits to the WISCLINC website as well as the number of metadata files viewed has tripled.

Having detailed metadata out where potential users can find it is akin to posting a product catalog on the web. It’s free advertising for agencies in the business of building infrastructure which may need to rely on a network of partnerships, alliances, and mutual effort to maintain and continually improve in the future.

Promising work uses computer power

New soil mapping technologies being tested

by Anna Weitzel

As in many fields, changing technology is opening up new possibilities and posing new challenges in the area of soil mapping. In the progress towards digital soil surveys, many obstacles have already been met and overcome. For example, the use of digital orthophotos as base maps has become viable only in recent years as computer power has risen steeply while costs have plummeted; file compression schemes make it possible to work seamlessly across an entire county.

The present challenge in soil mapping is to streamline the mapping process and improve the delivery of maps and related survey information. Two UW-Madison geography professors, Dr. A-Xing Zhu and Dr. James Burt, are working towards these goals in conjunction with the Natural Resources Conservation Service. Together they have developed software for producing and mapping detailed soil classifications.

Tools under development

Dr. Zhu’s classification method uses a technique called *fuzzy logic* to produce a representation of probable soil types in a given terrain, all based on the expert knowledge of field soil scientists. As more spatial or attribute information becomes available, it can be incorporated as an additional layer in the classification.

Dr. Burt’s program *3-D Mapper* provides powerful options for viewing soil survey and other terrain data. Starting with a digital elevation (DEM) file, it generates a 3-D perspective of the landscape with shading, and further can drape an image such as an orthophoto, and/or GIS layers such as soil polygons or water feature. *3-D Mapper* also calculates and maps slope,

curvature, aspect, and other terrain characteristics that have strong influences on soil formation, and allows editing of soil mapping unit boundaries.

Better information, better knowledge

These innovations which capitalize on soil scientists’ expertise could prove to be excellent tools in choosing sampling locations, identifying errors in soil maps, and better understanding the landscape—all of which promise to deliver more detailed and more accurate soil information along with statistical measures that convey uncertainty.

This summer Dr. Zhu and Dr. Burt will be evaluating their methods using the latest 10-meter resolution DEM for Dane County, an area which includes both glaciated and unglaciated terrain.



A portion of a 10-meter DEM as displayed in 3-D Mapper. The profile curvature of the terrain has been calculated and mapped on the surface. The dark areas are places where the curvature of the surface along a vertical north-south plane is convex, and the light areas are concave. The software can also calculate curvature along horizontal planes.

Second look at recent product

3-D TopoMaps revisited

by Bob Gurda

Following up on the “first look” at DeLorme’s new 3-D *Topoquads* in our previous issue, we have a few additional observations and comments now that we have had more time to use the product.

First of all, this is a convenient and useful resource in general. It lets you quickly zoom to any area of interest in the state, and offers a variety of zoom and detail levels. However, don’t count on it to do highly detailed mapping nor to deliver accurate terrain information.

The most detailed maps built into 3-D TopoQuads are a reformatted version of the USGS Digital Raster Graphics (DRGs) — scanned versions of the topographic quadrangle maps. The smallest object — a scanned pixel — represents 8 feet on the ground, so some map features look a bit jagged at the highest zoom level; this is a characteristic over which DeLorme had no control since they chose to use scanned map files from the USGS. Higher-resolution scanned topo maps covering entire states are not generally available from other sources.

When is the elevation *not* the elevation?

Another limitation that is less visible but potentially problematic is the product’s terrain data. That data does not appear to be as accurate as the elevation information provided in graphical form in the scanned DRGs. For instance, when you move the cursor over the map on your computer screen, a small window shows the elevations along that path, and the values often are different than the contours would indicate.

While the map and the elevation data don’t typically disagree by more than a few feet, the differences become especially obvious at lake level near shorelines. Here, it’s common to find that the elevation rises toward the land surface. Why might this be? The most likely answer is that the elevation data is derived from a less detailed source than the largest-scale topo maps themselves. If the elevation data points are too far apart, the terrain model will miss some variations and smooth over others.

The mismatch between the maps and the elevation model becomes visually obvious when you invoke the 3-D mapping function (which, at last checking, does not function at all on computers using the Windows NT operating system). In that kind of draped view, you can see the lake surface warping upward near the lake shore, especially when sizeable hills surround the lake. In most cases, the effect is modest at worst.

A great tool for understanding the landscape

All of this said, 3-D TopoQuads has many great uses. I have been able to quickly produce a number of 3-D views of Wis-

consin landscapes that help explain features such as the delta of the Chippewa River, the gorge occupied by the Brule and St. Croix Rivers’ headwaters, the Military Ridge, and bluffs along Lake Michigan. These views are very instructive, and can be captured and pasted into a slide show very easily.

A lot for the money

3-D Topoquads, for about \$150, gives you full state coverage of DRGs plus the software. The searching function is swift, and the interface is intuitive. You’ll need a computer with reasonable horsepower to get good performance, and a fast CD drive helps a lot. All in all, as long as you don’t expect precision mapping, and don’t run Windows NT, it’s a great package.

You can find more on 3-D Topoquads at www.delorme.com.



[Download text and spreadsheets!](#)

Minn. Handbook covers positional accuracy

Wondering how to implement the new national standards on positional accuracy? The Minnesota Governor’s Council on Geographic Information Standards Committee has produced a very useful set of tools.

First, there is a handbook titled *Positional Accuracy Handbook: Using the National Standard for Spatial Data Accuracy to Measure and Report Geographic Data Quality*.

This includes explanation of how to use the standard with datasets of geographic features such as roads, rivers, and property lines. Five practical examples use datasets developed by Minnesota organizations.

A second tool is formatted Excel spreadsheets that help calculate the accuracy statistics.

Both resources can be downloaded from www.mnplan.state.mn.us/press/accurate.html. You can also order a printed copy of the handbook through the web site.

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

Maps and other tools can help

Where's the nearest trout stream?

by Bob Gurda

Wisconsin has miles and miles of trout streams, but how do you find out where all the streams are, and which are likely to have a trout population?



There is no single map that identifies all the trout streams as well as public access information and a fully-labeled road network. However, with several maps or books, you should be able to make good choices.

Does the professor know?

A recently produced map of the entire state is titled *Professor Higbie's Wisconsin Stream Map*. At a scale of 1:500,000, it is the size of the *Wisconsin Land Cover Map*, and a bit larger than the standard folded *Wis. State Highway Map*. Actually, this map shows lakes as well as streams, and further divides the landscapes into watersheds. However, the map does not differentiate between streams with and without trout populations, and doesn't identify local roads and public access points. Call 800/STREAMS for further information.

Halcyon days on a trout stream

Another state map, again at about 1:500,000-scale, is produced in Madison by the Halcyon Company. Titled *Wisconsin Trout Streams, Spring Ponds and Lakes* it highlights all trout streams (blue for resident populations, yellow for migratory), and targets particularly good stretches as well as ponds and access points. Like the Higbie map, though, local roads aren't shown. As a bonus, this map provides a long paragraph describing each of eleven top trout streams in the state. Contact Halcyon, PO Box 5214, Madison WI 53705.

DNR booklet clarifies regulations by stream

Trout fishing seasons and regulations vary these days from stream to stream—in fact sometimes different stretches of a single stream have different regulations. The Wis. Dept. of Natural Resources publishes a free booklet that helps explain this complicated situation. The booklet includes a series of maps that use a color coding to categorize stream segments according to the regulations in force. Again, these maps don't show or identify all local roads. Look for this booklet at DNR field offices and businesses that sell fishing licenses.

DeLorme Atlas does the roads

To find a route to your chosen stream, the widely available *Wisconsin Atlas & Gazeteer* by DeLorme is a good choice. It not only shows all rural roads (and names them), but also de-

picts public fishing areas (where land along the stream is publicly owned). However, this resource doesn't identify which streams have trout populations.

Guide books may reveal secrets

In recent years, a number of books on trout fishing in Wisconsin have appeared. Some of these have simple maps but don't take the place of the maps described above. These books, though, may help you actually locate and catch some fish!!

To get the complete low-down, look up the local chapter of Trout Unlimited. You may be able to get page-size maps of streams in that area through that source. At the same time, you may be able to pick up a few secrets on when, where, and how to have a successful angling experience.



Now you can order over the web

New state highway map springs forth

by Bob Gurda

Wisconsin has a new state highway map this year. The Wisconsin Department of Transportation (DOT) released the map earlier this spring

You can get a single copy of the map from the Department of Tourism, and larger quantities directly from the DOT. 1.8 million copies were printed.

The map was updated to show new road construction and to correct errors in the previous edition which was published just last spring. The map will now return to a two-year publication cycle.

Contact Tourism at (800) 432-8747 or at www.travelwisconsin.com. Visit DOT's web site at www.dot.state.wi.us/opa/statemap.html.

New information, new look geodetic section

SCO's web site freshened for spring

by Anna Weitzel

The SCO web team has been busy with spring cleaning. We have been tidying up some sections of our web site and re-decorating others.

Census 2000 data and DRGs

In our Maps section, we have recently added information on when geospatial and statistical data will be available from the 2000 U.S. Census. See the Census Maps page to find out how to order data including TIGER/LINE files. Also, you will find ways to create on-line thematic maps of census demographic data. We'll carry more information on this topic in our next issue.

We have also updated our information about Digital Raster Graphics (DRGs) and our list of commercial DRG providers. Visit the DRG page in the Maps section to find out how to obtain DRGs for on-line viewing and for purchase. For your convenience, we have listed product specifications and the web addresses of some providers in the public and private sectors.

GIS in higher education

If you are looking to take a course or to apply to a college degree program in GIS, visit our Internet Links section to find a new page devoted to GIS education in Wisconsin. Here you will find links to public and private institutions in Wisconsin that currently offer courses in GIS. Watch this page grow as more colleges expand their curriculum to include new mapping technologies.

A fresh geodetic section design for spring

Finally, our section on geodetic control is sporting a new look. Thanks to the hard work of SCO student staff member Eric Brey, it is now easier to navigate through the maze of information on geodetic control publications, data, and software. Visit this section to find out about resources offered by the SCO and by the National Geodetic Survey (NGS). Also, be looking for more sections of our web site to adopt the new layout presented in the Geodetic section.

Coming attractions

In the near future, we will be updating our Internet Links section to include better on-line resources in the areas of cartography, geography, GIS, geospatial data and more. Also, watch for updates to our pages on land cover mapping and soil mapping. As always, we welcome your feedback on how we can make our site a useful information source.



Change is our only constant!

Student staff rolls along

by Bob Gurda

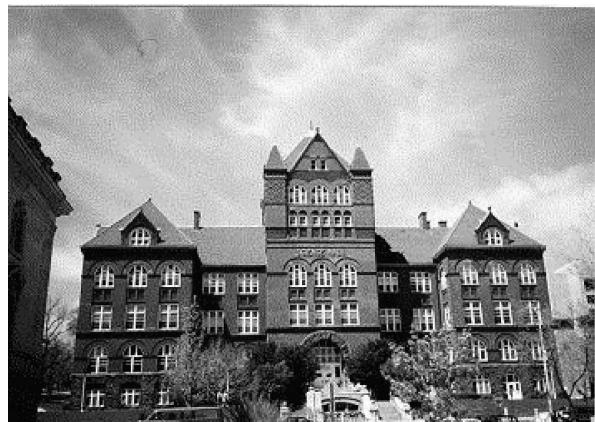
Spring is the traditional time of graduation, and we have had one member of our student staff finish her degree and get set to leave Madison. Wai Chi ("Mimi") Cheng, a native of Hong Kong, worked on numerous of our web pages over her months with us, and recently has helped behind the scenes to organize our graphics library.

Gary Meddock is also leaving in preparation for the completion of the degree he will be receiving later this year from UW-Superior (through a distance learning program). Gary's latest project has been the updating of our DRG web page.

To keep our web team running at full tilt, we have hired undergraduates Tanya Andersen and Chris Schutt.

Over at the Clearinghouse

Those of you who have visited our offices know that we occupy several rooms which are not internally connected. AJ Wortley coordinates work on WISCLINC across the hall in Room 155. His staff has been increased recently, with graduate students Ginny Mason and Christie Miller joining that group.



Science Hall (located on the UW-Madison campus)

From soil pits to national coordination

We met with Ken Lubich in late March to chat about his experiences as State Soil Scientist and his views looking forward to his new role coordinating national digital production of the most detailed soil surveys.*



When you finished your college degree in soil science, did you want to end up enmeshed in the computer revolution?

No, I really had no idea things would turn out this way. I went to work for the NRCS (it was called the SCS then) in 1975, in the field, working on county soil surveys using fully traditional techniques—including digging soil pits. Eight years later, our office got a computer, and I found that I was interested in using it to keep track of our work, particularly the soil attribute information using a database program. But, there was no computer mapping component at that time.

When I moved to the state office in Madison in 1988 to be the soil database manager, the first digital orthophotos were being produced for part of Dane County — it was a national pilot project supported by NRCS and the USGS. We were also working with UW-Madison to assess whether we could use satellite remote sensing to assist with our field work. Our office didn't have the computer power or expertise to do that evaluation on our own.

Ten years ago, it helped to have some blind faith that computers would improve dramatically.

Those early orthophotos—35 megabytes at full resolution—practically overwhelmed computers back then. Did you believe, nevertheless, that they would become manageable in the future?

In retrospect, the speed with which generic desktop computer technology improved during the 1990's was almost constant, and became something we all assumed would continue. Ten years ago, however, it helped to have some blind faith that computers would improve dramatically.

It was so obvious even then that we would want to pursue getting our county-level soil maps into the computer, with an accurate photo image backdrop for reference. We aren't quite there yet, because not all of the surveys are digitized yet and we need to improve the digital delivery mechanism—especially so that it doesn't require GIS software to be installed. But, we are continuing to work aggressively on both fronts.

A few years back, you landed one of the seven new NRCS production centers for digitizing soil surveys. How has the experience of managing that operation changed your perspective?

It has been good to see the rate of production and know that within a few years we will have all of the nation's detailed soil surveys in digital form. However, our processes can be improved, in the digitizing as well as earlier stages when surveys are being compiled by soil scientists. NRCS is committed to the digital age, and we will be adopting more improvements as we go along.

We need to increase both federal and partnership funding to accomplish our digitizing goals.

You are about to take on a new role with NRCS, as national SSURGO (Soil Survey Geographic Database) digitizing coordinator. What will that entail?

The position has been in existence since 1997, and while it was vacant for the last year I have filled the role temporarily. So, I have a pretty good idea of what is involved.

In addition to working with all seven digitizing centers, I will be involved in prioritizing the surveys to be digitized, and in allocating funds supporting that work. To help stretch our resources, we give priority to projects that involve cost sharing from other organizations. We want to complete the digitizing nation-wide within four years (for areas that already have a published soil survey), but need to increase both federal and partnership funding to accomplish that goal.

As a result, I will be strongly encouraging my compatriots in NRCS across the country to seek cooperators. Our recent success here in working with the Wisconsin Land Information Board will help me make that case.

Promising research combines GIS landscape analysis, expert knowledge, fuzzy logic, and 3-D visualization to better map soils.

What's on the horizon after the digitizing is completed?

We have been working with UW-Madison to build automated tools to help our field soil scientists, so that they can spend more time on soil sciences and less time on cartography. This work is showing great promise. It combines GIS landscape analysis, expert knowledge, fuzzy logic, and 3-D visualization. I believe that it will not only accelerate our field work but also let us do a better job of quality control, and will let us deliver more detailed maps of soils and related parameters.

These emerging tools must rely on quite a bit of digital data. Is there any one data type that's most important?

The part of the data puzzle that looks like it will be most critical to understand is the terrain information, because soil properties are very sensitive to terrain position. Right now we have statewide DEMs with 30-meter spacing between elevation points, made from the contour lines on the USGS 1:24,000-scale map series. This provides a reasonable representation of Wisconsin's terrain, however there are subtleties in our landscape that aren't captured by those maps, and some of those local variations may be critical to producing a superior soil map.

Our test area of Dane County has a wide variety of glacial features, plus part is not glaciated at all. We also have several different terrain data sets to compare here. This should help us close in on just how good the terrain data needs to be. It's an important question, because collecting high resolution and high accuracy terrain data is costly. Radar and LIDAR are promising technologies out there, but their cost/benefit is not clear yet, especially over large areas.

**Ken Lubich, a 25-year employee of the USDA Natural Resources Conservation Service, has been Wisconsin State Soil Scientist since 1991. This April he was named National Soil Survey Digitizing Coordinator.*

Q: *I have inherited a set of aerial photographs, and could use some advice on how to keep them organized.*

A: You probably have a set of “contact prints”—paper photographic prints the same scale as the negatives. Each print is 10 x 10 inches, with the image area occupying 9 x 9 inches. We’ll assume that’s what you have.

So, if you want to keep them in ordinary filing folders, they should fit in most standard file cabinet drawers. However, especially if your collection is large, you will need some scheme to help in filing and retrieving specific photos.

Look on the edge of the photos for descriptive information. Commonly, there will be a calendar date and some other numbers which usually are the flight line and frame numbers. As the airplane is flying along a line, each successive photo automatically is assigned a sequential number. So, one way to group the photos would be by flight line; in each flight line folder, sort the photos by frame number.

Sometimes, an aerial photography mission is planned to follow some existing framework on the ground, such as the Public Land Survey (Townships, Ranges, and Sections). This would be another way you could organize the photos. However, you probably have a set of stereo photos—where each frame overlaps the next one along the flight line by around 60%—so some frames would straddle two sections or townships, for example. You would then have to decide which folder to use for those frames.

An index can help in organizing your collection. You might have one already. It can be as simple as a diagram of the area covered, with flight lines (and flight direction) over-plotted, perhaps even with individual photo center points marked and annotated with frame numbers. A fancier way of doing this would be to create a GIS data layer with a point for the center of each photo, or even a rectangle approximating the area depicted on each photo.

Sometimes, an index is a reduced-scale photograph of the entire set of photos, called a photomosaic. Imagine laying out the photos from a project, overlapping them so that they more or less make up a single image of the whole area. Then, take a picture of that mosaic from a ladder.

As a final thought, well-organized collections of aerial photographs may be more valuable than you think. We have noticed in recent years that more and more people are interested in locating historical aerial photographs for a variety of purposes. If you would like to make your collection more accessible to the general public, consider donating them to a library. The Robinson Map and Airphoto Library at UW-Madison has accumulated much of its aerial photography holdings through donations.

Q: *I’ve heard of a computer file called the Landnet. Can it help me map land parcels?*

A: The “Landnet” is a GIS data product available from the Wis. Dept. of Natural Resources. It is an approximation of the layout of the state’s Public Land Survey System (PLSS), further subdivided by computerized rules to quarter-quarter sections (approximately 40 acres each).

As such, the Landnet is a matrix useful for associating and mapping characteristics of PLSS corners and/or areas directly defined by the PLSS. In that sense, the Landnet can be used as a partial surrogate for a fully researched and accurately represented parcel map—where further subdivisions or complexities such as easements aren’t a major issue.

For instance, in a rural area where land ownership is essentially composed of simple parcels such as quarter-quarter sections, the Landnet is a handy tool to keep track of uncomplicated PLSS corner remonumentation or to track land parcel characteristics such as owner, property tax payments, Managed Forest status, etc. In addition, many databases exist that house natural resource information which is referenced to the PLSS, and the Landnet provides a way of mapping and analyzing that information over large areas.

The Landnet is derived from the mapped positions of section corners as depicted on the USGS 1:24,000-scale topographic map series. These corners are not “well-defined points” (and thus not subject to traditional positional accuracy standards) and their mapped positions are of variable quality.

Despite these limitations, many people have found that section corners on the USGS maps (and in the Landnet file) often fall within 50 feet of their true position (once that has been determined on the ground).

A number of county surveyors and GIS mappers use the Landnet for parts of their county that are primarily public land such as county forest. In these areas, they expect it will be many years before they have the resources to collect reliable information on the position of sections corners, and in the interim the Landnet partially takes the place of a detailed parcel map.

So, the Landnet isn’t a parcel map in the typical sense, but it does fill some needs while accurate maps are being developed around the state. For details on the Landnet GIS files, visit www.dnr.state.wi.us/org/at/et/geo/metadata/index.html.

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.

A site to see... and listen to

Phonological Atlas maps American dialects

by Anna Weitzel

How many dialects of American English are there? Where are the boundaries located? The Telsur Project at the University of Pennsylvania's Linguistics Laboratory attempts to answer these questions by surveying people from every state and examining their pronunciation of select words. The product of this survey is the Phonological Atlas of North America, which can be viewed and, in some cases, heard on-line.

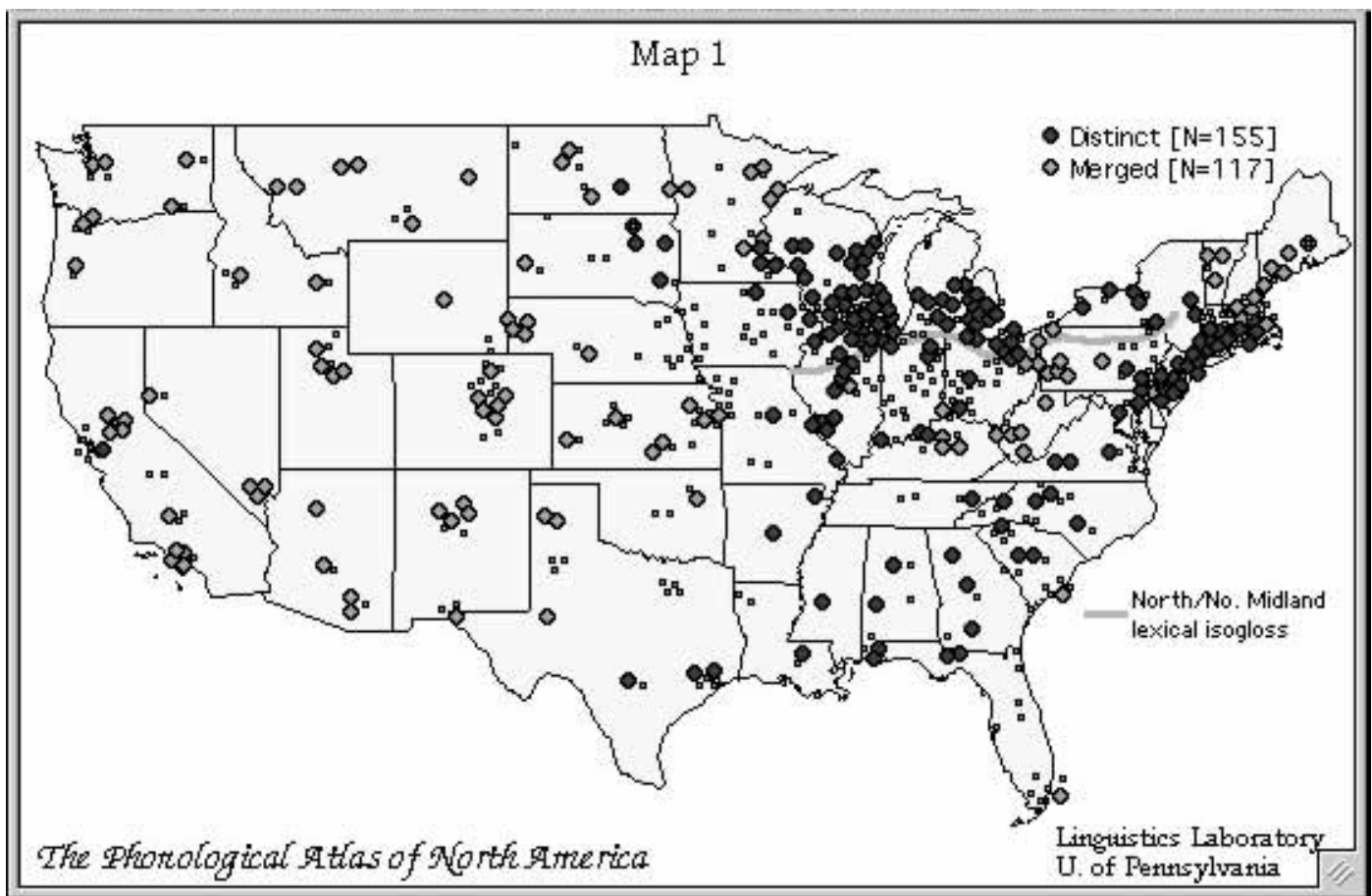
Despite the linguistic jargon in some parts of this site, the curious web surfer will still find the maps enlightening. On the interactive, regional maps each dot represents one person who was surveyed, and clicking on a dot brings up the database entry for that individual. A table shows the kinds of vowel sounds that were evaluated and, as an example, gives a pair of words that characterize the comparison being made.

The participants were evaluated on whether they perceived the words to sound distinctly different and whether they actually pronounced the words differently.

The regional map for the Inland North, which includes most of Wisconsin, also has sound files included with a few database entries. Click on the star next to Kenosha, and you can hear Martha F. pronounce words like "bag" and "says".

Other static maps on this site display nationwide trends in the pronunciation of certain vowel sounds. For example, the map shown here depicts that, while in much of the country the distinction between sounds like "sock" and "talk" has been blurred, the Upper Midwest has resisted that change in speech.

To explore, point your browser to www.ling.upenn.edu/phono_atlas/home.html



More accurate than what Wisconsin has already?

Shuttle collects elevation data

by Bob Gurda

This last February, the popular media carried stories on the radar instrument carried by the Space Shuttle that was being used to collect worldwide elevation data. Those stories have resulted in great interest among many people.

One question asked of us is “How accurate is this data?” Another is “When, where, and for what price can I get some of the data?”

Get ready to wait

First of all, it’s going to be at least a year until the data is released for civilian purposes. There is a long processing procedure that happens prior to the release. Recently, we heard that the first step, that of copying all of the tapes into an archive, had been accomplished.

What about quality?

Then, you may be surprised to find that indications so far are that the data will be less accurate than what we already have statewide for elevation data (a set of points spaced 30 meters apart). Why, then, did the news stories say that the Shuttle Radar Mission would yield the most detailed elevation data set? Well, it probably will be the most detailed and consistent on a worldwide basis, since for some parts of the earth we previously had fairly crude data—but it’s unlikely to be better than what we already have over Wisconsin.

Finally, the data released for public use will be handled by the U.S. Geological Survey, with modest prices expected.

Earth Explorer replacing GLIS

USGS upgrades spatial data search

by Bob Gurda

The EROS Data Center, a unit of the U.S. Geological Survey, is implementing a new web-based data searching service. Called Earth Explorer, the new system replaces GLIS (the Global Land Information System).

Already, Earth Explorer handles searches for satellite imagery from Landsat (MSS, TM, and ETM+) as well as the recently de-classified Corona archives. The system allows you to search either using a place name or by marking a point, rectangle, or polygon on a map. You can view low-resolution preview images using your web browser.

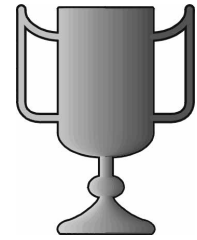
All other data categories presently searchable through GLIS are scheduled for conversion to Earth Explorer by the end of this June. The new system also offers secure handling of credit card payment.

Award given only every four years

Hist. of Cartography Project wins prize

by Bob Gurda

A recent volume of the *History of Cartography* received the 1999 James Henry Breasted Prize from the American Historical Association. Awarded only every four years, the prize was given for Volume Two, Book Three, *Cartography in the Traditional African, American, Arctic, Australian, and Pacific Societies*.



The History of Cartography Project is coordinated from offices in the Geography Department at the University of Wisconsin-Madison. Prof. David Woodward directs the Project which involves experts from around the world.

The prize-winning volume was recognized as the best English-language book in the ancient and early medieval history of African, North America, and Latin America. The Project’s work currently focuses on Volume Three (European Renaissance), Volume Four (Europe and its colonies, 1640-1800) and Volume Five (the 20th Century).

For more information, visit the project’s web site at www.geography.wisc.edu/histcart/.

(source: MADGEOGNEWS, Spring 2000)

UW-Madison holdings viewable over the web

Historical map exhibit is on-line

by Bob Gurda

The University of Wisconsin’s libraries have a large map collection, and a selection of those maps are currently on display through at least June. Not only is there a walk-in exhibit, but you can also view the maps over the web.

The maps selected for this exhibit, which is titled “Windows on the World”, focus on the European Renaissance, the subject of the History of Cartography Project’s Volume Three.

To take your own tour, surf the web to: www.library.wisc.edu/libraries/SpecialCollections/whatsnew.html



Degraded transmissions curtailed

GPS users see big increase in accuracy

by Bob Gurda

The word spread quickly earlier this spring when the federal government announced the immediate end of Selective Availability for the Global Positioning System. Essentially, this means that users of single GPS receivers now can collect positional information that is about ten times more accurate than previously possible.

Evolution to civilian uses

GPS was initially developed by the U.S. Department of Defense (DoD). To ensure that unfriendly parties could not use GPS with the same accuracy as the DoD or its partners, the satellite-generated signals available to civilian receivers were deliberately degraded in a random pattern called Selective Availability (SA). At the same time, DoD receivers could receive undegraded signals.

In the last five years or so, many commercial applications for GPS have been developed. In addition, techniques for filtering out the degraded information have come into everyday use. As a result, the protective value of SA had diminished. In any event, recent federal government policy has been that SA would be eliminated within several years.

Feds end SA abruptly

The May 1 announcement by President Clinton that SA was being lifted immediately came without warning. Earlier indications from the Interagency GPS Executive Board, which was formed in 1996 to form policy guiding the system from the military to a civilian focus, was that SA would be eliminated by 2006. The agencies involved support the new position on SA.

Improvement is significant.

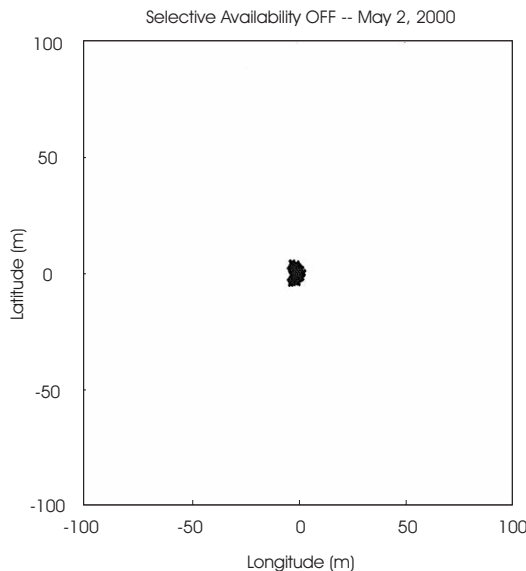
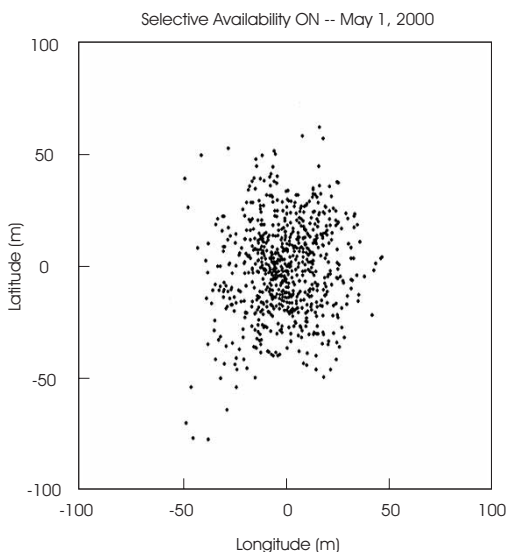
With SA turned off, people with inexpensive GPS units can quickly determine

a ground position accurate to 30 feet (or better) as compared to 300 previously. No modifications to existing equipment is needed to enjoy the improved accuracy.

As an example, a single receiver can now collect positional information that will let another person determine on which side of the road an accident has occurred. Before May 1, even on a 4-lane highway, this distinction wasn't clear. The improvement in accuracy will benefit many users for a variety of purposes.

Differential GPS still has a role

For applications requiring the greatest accuracy, use of a second fixed-position GPS unit that simultaneously receives signals will continue to be valuable. Surveying and navigation commonly use this technique called differential GPS, which will not benefit significantly from the lifting of SA.



These two images compare the accuracy of GPS with and without selective availability (SA). Each plot shows the positional scatter of 6.5 hours of data (0730 to 1400 UTC) taken at one of the Continuously Operating Reference Stations (CORS) operated by the U.S. Coast Guard at Hartsville, Tennessee. On May 2, 2000, SA was no longer present. The plots show that SA causes 95% of the points to fall within a radius of 48.3 yards. Without SA, 95% of the points fall within a radius of 4.5 yards. Comparable relative improvements are likely when using less sophisticated receivers, and/or when collecting data for shorter periods.

(source: National Geodetic Survey web site)

State Cartographer's Commentary

State's ortho success due to champions

by Ted Koch

Mentioned in several other articles in this issue (see pages 4 and 14) is the anticipated completion and availability of digital orthophoto images for the entire state. It's been a long journey, and special mention is warranted for some people who have been instrumental in the process.

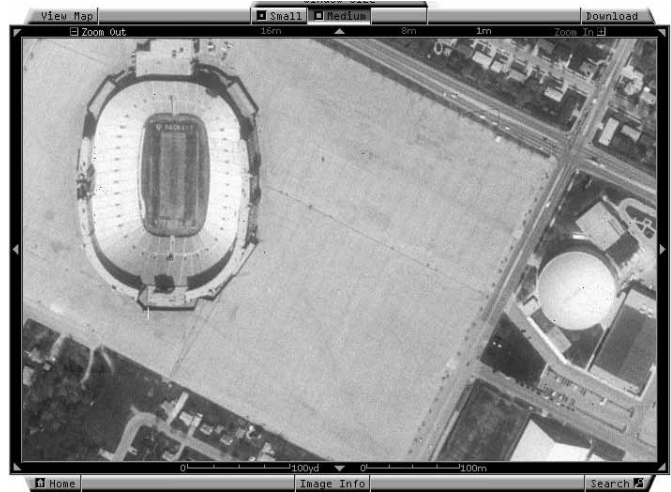
First, a great deal of the thanks should go to Ken Lubich of the NRCS (see our Guest Interview with Ken on page 9). He has worked diligently over the past 3-4 years to work soil mapping agreements with counties across the state, and as part of the soil mapping process create orthophotos which are the base map image for the soils information.

Many times Ken has gone out on a long limb in anticipation of ultimately acquiring NRCS funding support for his partnering efforts. Fortunately, he's been very skillful in obtaining commitments from his agency, most notably his recent success in obtaining funding for the last remaining ten-or-so counties in the state. Ken's dual vision of having digital soils mapping and orthophotos statewide is now on a clear path toward completion.

In addition to Ken and the NRCS, much credit for obtaining and using digital orthos in Wisconsin should go to private sector firms, particularly the several companies in the state that produce orthophotos for their clients. These companies have offered a wealth of technical support and application guidance that has significantly raised the technical competence level around the state.

When I arrived in Wisconsin 9 years ago there was much talk and anticipation concerning the plans of several federal agencies (this included the NRCS) to fund a \$180 million nationwide program to acquire digital orthos from coast to coast over a five year period. Of course it didn't quite work out that way but within the next several years not only Wisconsin, but virtually every other state will have border to border ortho coverage. Wisconsin's coverage may not be as unified in technical properties such as resolution and coordinate system as are some other state's, but hopefully our more flexible, locally-based needs approach has given the end users a better and more widely useful product.

Ultimately, the widespread use and application of spatial data products is the true measure of value and effectiveness. Obviously, what's notable about having statewide coverage of a particular data type, such as digital orthophotos, is not just having it, but knowing that it is truly useful product for a variety of worthwhile and cost effective applications. In digital orthophotography we have this, a recently developed product available due to much technical growth and innovation, and a foundation for building solid geographic and land information systems. Many thanks go to a variety of individuals and organizations for having helped us reach this point.



Orthophoto over Lambeau Field, Green Bay, WI

Goal will finally be realized

Statewide Ortho coverage in the works

by Bob Gurda

Wisconsin will be able to celebrate a year from now. By then we will have achieved wall-to-wall coverage of digital orthophotos (DOPs).

Production has been scheduled for the remaining areas of the state that have not had any orthophoto coverage to date - mostly in the northern, central, and western part of the state.

These products will be developed under the National Digital Orthophoto Program (NDOP), using NAPP photographs acquired in the springs of 1998-2000. The bulk of the funding is from federal sources, augmented through the state soil mapping program (see page 4). Some of the DOPs are already in the production pipeline, and some are starting to be delivered.

No longer will we have gaps in the patchwork quilt of DOPs. Whether developed under the NDOP or a locally or regionally based initiative, we will have statewide coverage at last. A remaining challenge, however, is that we will not have, at least immediately, a single seamless statewide coverage that is referenced to the same coordinate system.

Second generation coming on strong

At the same time that some counties are rejoicing that they, too, will finally have DOPs to use with their computerized mapping and GIS systems, people in other parts of the state are getting ready to use new DOPs that will replace the older ones they have been using for several years.

A large number of counties (and some cities, too) have contracted for new DOPs, some with resolution as fine as 6 inches (compared to a typical range of 1 meter down to 2 feet for many of the earlier products).

.....Selected Regional Conferences and Technical Meetings

July 11, 2000, The **Wisconsin Land Information Board** will meet in Madison, WI. Contact: OLIS at 608/267-2707.

July 11, 2000, The **Wisconsin Land Council** will meet in Madison, WI. Contact: OLIS at 608/267-2707.

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 visit www.wlia.org/

September 12, 2000, The **Wisconsin Land Information Board** will meet in Madison, WI. Contact: OLIS at 608/267-2707.

September 17-20, 2000, **Wisconsin Counties Association Annual Convention** will be held at the Grand Geneva Confer-

ence Center in Lake Geneva, WI. Visit: www.wicounties.org/

October 4-6, 2000, **Minnesota GIS/LIS Consortium** will be held at the St. Cloud Civic Center in St. Cloud, MN. Call 612/226-5312 or visit www.mngislis.org/

October 11-14, 2000, The **North American Cartographic Information Society** will present its *20th Anniversary Annual Meeting* in Knoxville, Tennessee. Contact NACIS at 414/229-6282 or visit www.nacis.org/

December 6-8, 2000, **Wisconsin Land & Water Conservation Association (WLWCA) 47th Annual Conference** will be held at the Ramada Conference Center in Wausau, WI. Visit: www.execpc.com/~wlwca/wlwcacon.html

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

January 2001

January 8-11, 2001, **Coastal GeoTools '01** will be held in Charleston, SC. Email geotools@noaa.gov or visit www.csc.noaa.gov/GeoTools/

January 24-26, 2001, The **Wisconsin Society of Land Surveyors Annual Conference** will be held at the Holiday Inn in Stevens Point, WI. Call 414/549-1533.

February 28 - March 2, 2001, The Wisconsin Land Information Association (WLIA) Annual Conference will be held in LaCrosse, WI. Contact: WLIA at 800/344-0421 or visit www.wlia.org/

March 4-7, 2001, The **Geospatial Information and Technology Association** will hold its annual conference at the San Diego Convention Center in San Diego, CA. Contact GITA at 303/337-0513 or visit www.gita.org/

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

Third year for record attendance

WLIA's Annual Conference a success

by Brenda Hemstead

The Wisconsin Land Information Association (WLIA) had a record attendance at its 13th annual conference held at the Grand Geneva Conference Center from February 29 - March 3, 2000 in Lake Geneva, WI. Over 620 people attending the 4-day event, including 156 registered exhibitors with 46 booths displaying the latest advances in technology, GIS-related hardware, software, services and information. This conference is one of the best for viewing the 'magic' of modernization and application demos.

Focused around the theme, "Automation-Integration-Application: ACHIEVING THE VISION" the event began with a day-long series of 12 pre-conference workshops with 248 participants. The workshops were a huge success and well attended.

The conference proper began the second day with a series of jam-packed informative sessions pertaining to modernization and applications. Four tracks of educational sessions suitable for novice and experienced land informants alike ran consecutively throughout the conference totaling 51 difference topics.

Other highlights of the conference:

- The first day's (Wednesday) opening plenary session was a chance to converse with the various Board and Council Members, Project and Team Leaders, and DOA staff.

The luncheon keynote address reflected on "GIS in the 21st Century".

- The next morning featured a distinguished panel discussing various Federal Agency's successes, and plans. The luncheon presentation by several high school students enchanted the membership with their information technologies and community problem-solving projects.
- Awards were given for service and special contributions to the association, including yours truly receiving the Outstanding Contribution Award which left me speechless.
- Incoming president, Steve Ventura, announced the results of elections. Jim Johnson, Land Information Director - Polk County, was chosen to be president-elect. Voted in for 2-year terms on the Board of Directors were:

- Jeff Bluske - La Crosse County
- Terry Dietzel - Fond du Lac County
- Lee Halbrook - City of Wausau
- Damon Anderson - Ozaukee County
- Sally Reedy - Shawano County
- Dianne Caffrey - Douglas County

The 2001 annual conference is scheduled for LaCrosse in late February. Visit WLIA's website for further information at www.wlia.org/

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), 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.

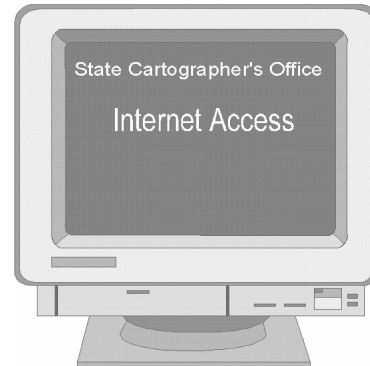
- publishes the *Wisconsin Mapping Bulletin*, catalogs, guides, brochures, and other documents and maintains a web site to inform the mapping community.
- inventories mapping practices, methods, accomplishments, experience, and expertise, and further acts as a clearinghouse by providing information and 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 July 5, 2000.

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