MAINE COORDINATES

Update of the Maine Geographical Information Systems User Group
Vol. 1, No. 3 Summer 1995

Department of Marine Resources Implements ArcView 2

Seth Barker - GIS Coordinator, MDMR

In the past four years Maine Department of Marine Resources (MDMR) has been laying the ground work for GIS to be used in the classification of shellfish growing areas and eventually other applications. The department classifies shellfish growing areas for the protection of public health. Sections of the coast are closed to harvesting for a variety of reasons including the possible presence of untreated sewage and biotoxins. This work is carried out at field offices in Boothbay Harbor and Lamoine and at the central office in Hallowell. This challenge of this application has been to find the best methods of implementation, with a very limited budget, which would produce the necessary digital files and the mechanisms to maintain and distribute data.

MDMR represents a classic example of a decentralized operation which needs to access centralized data sources. Looking beyond department databases, there are many sources and types of data that must be accessed periodically. For this reason, MDMR must think in terms of a distributed information system within state government. The information must also be available in a format that has maximum utility to users. One way to accomplish this is with desktop information systems. MDMR entrance into GIS is through applications run on PCs located at each of the three offices. The initial application will be ArcView2 based and will perform data display, query operations, and basic mapping.

At present most GIS files are maintained at the Office of GIS (OGIS) and updated at each office or through remote access to OGIS. To date this access has been limited to a 9600 modem, but we plan to follow the lead of OGIS and upgrade to faster 28.8 modems. State Wide Area Network access is available at the Hallowell office, and the Internet can be accessed from the laboratory in Boothbay Harbor. Both sites may upgrade to these better connections in the future.

Some spatial data will be created locally but only within the limits dictated by available hardware and the required accuracy of the data. As an example, GPS is presently being used extensively by Laurice Churchill for aquaculture site evaluation and also by the author for eelgrass bed mapping.

Access to and use of spatial and database information produced by other state agencies are important issues that require additional effort to work out policy and network details. For MDMR, the MDEP Oil Spill Response Project and the general support offered by OGIS have provided the initial opportunities to test database integration. More time will be required to develop needs-based access arrangements but it is not too early to begin these inter-agency discussions.

For now our plan is to have the basic ArcView2 desktop capabilities available this fall, and to continue to expand the capabilities of these desktop systems with custom ArcView Avenue based applications. Our first three copies of ArcView2 have arrived so we are off and running. □

Inside This Issue

Editor's Note

Tim Case

With the passing of summer we are faced with changes that could fundamentally reshape our organization. We say a great thanks to Nancy Allen who is leaving her position as State GIS Coordinator at Bureau of Information Services to join DOT as GIS Manager. This will be a great challenge for her, and an equal challenge to our group — filling the void of her leadership. With increasing cutbacks in state government her position, as of this writing, is uncertain.

At the same time, interest in GIS is exploding, and implementation in Maine is not far behind. This is the time to embrace cooperation for cost-savings, higher productivity, and closer integration of services. It takes only a brief look across our boarders to other states to see how effective GIS can be in providing a platform for better business decisions, government services, and personal discovery. One can also look at states that have yet to realize the great utility of GIS and related technologies. Hopefully, Maine is not and will not be in that pack.

This update is distributed with the generosity of the Bureau of Information Services. Mention of specific products does not indicate endorsement by the Maine GIS User Group or its members.

Article contributions are encouraged. Editors reserve the right to edit for length. Send materials in WP5.1 or ASCII format to: Tim Case, Maine Natural Areas Program, SHS #93, Augusta, ME 04333.
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Creating Tax Map Coverages in Arc/Info - One Method

Lucille K. Craib, Maine Mapping

As municipal officials learn about digital mapping and GIS capabilities, they often are most interested in automating the tax maps first. Tackling this elaborate jigsaw puzzle requires recognizing a few assumptions, ground rules, and planning. This article assumes that the only existing digital data for the municipality is the basic 1:24,000 USGS data from Office of GIS.

- It pays to like to digitize. I do not recommend scanning.
- Many (if not most) tax maps in Maine were drawn originally from uncorrected aerial photos enlarged to approximate 1" = 100' to 1" = 400'.
- Be patient. Tax maps of various scales don't always fit together. Plan to document areas of concern for municipal officials to review.
- Don't forget that these are tax maps designed originally for assessing by assessors. They are not property surveys!
- Once automated don't ever forget from whence it came! Just because you can reproduce tax maps at 1"= 1' doesn't make it more accurate.
- At the same time, a composite of the parcels, in a GIS, provides very valuable information to municipalities addressing issues such as zoning, community services, and taxation.

Planning comes next

- Review the characteristics of the tax maps - number, media (mylar preferred) scale, etc.
- Decide how you are going to label the polygons including easements, rights of way, water bodies, etc., as well as parcels. Determine if there is available an existing data base to incorporate. Municipalities vary in their capacity to output their files.
- Decide if you are going to maintain an arc attribute table to document the source and type of the arcs you put in the coverage.
- Decide what projection you want - usually UTM or State Plane.
- Plan a grid at the scale of the tax maps (more than one may be necessary) that maximizes both your plotter capacity, and digitizer capacity.
- Determine the coordinates of the grid, create a tic file from the coordinates, and create a coverage using these tics.
- Write a macro that will plot a grid cell with the tics and available digital data at the scale of the existing tax maps. Plot a test of this macro.

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Tax Mapping

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Finally comes the fun part!
(Turn on the music)

- Register on the digitizer the test plot based on the tic file you created earlier. Overlay the mylar tax map. Review the fit. Is it realistic? If not, go back and check coordinates, projection, & scale.

- Determine a methodology to digitize by. I recommend retrieving arcs that are concurrent with other layers first (town lines, shorelines), then digitizing the rights of way of small regions, then filling in with the interior lot lines. Use autoincrement = off to keep track of the categories of the arcs, if you are building an .AAT, well as a .PAT.

Digitize the tax maps that fit the cell. If all goes well proceed with the rest. If you have problems consult with someone. Document problem areas. Remember, two heads are better than one!

Assuming you have now sailed through digitizing the line work, and cleaned up the dangles, it's now time to label the polygons. I recommend adding known label points and then using joinitem for the data base. Use createlabels later to locate the polygons that were missed and to detect sliver polygons. Start with a base number that is out of range to avoid duplicate ids. Proof plots are in order. Edit as necessary.

Arcview is very useful in helping pinpoint problems, in addition to all the tools in Arc/Info. Backing up a copy of the coverage is cheap insurance!

[Editor's note: Linda has outlined an excellent method for quickly getting 'thematic' parcel information into GIS. Decision-makers should be clear about the relative accuracy of the final data set. This is not a cadastral system by any means, but for a minimal investment towns can have something on which to attach assessor and tax databases.] □

Maine I.S. ... on the Move
Maine Government Technology Conference Highlights GIS

By now most GIS User Group members have received a brochure describing the September 19-21 conference in Augusta. Thursday has been dedicated as GIS Day and members should come on that day to hear national leaders in the GIS field and show your support for this important event.

If there was one GIS gathering to go to in Maine this year this is it!
Below is the schedule for the GIS track.

September 19

Session I : 1pm **Executive Seminar on GIS**

Welcome - GIS Track
Dan Walters, Maine Office of GIS

Welcome and Introduction to Keynote Speaker
Evan Rickert, Director State Planning Office

Keynote: GIS...Giving South Carolina the Competitive Edge
Mr. Martin Roche
South Carolina Department of Commerce

Session II: 3pm **Local Government Applications**
Barry Tibbetts, Town of Kennebuck
Elery Keane, Kennebec Valley Council of Governments
Kevin Flanders, Woodard and Curran

September 20

Session III: 10 am

Implementing GIS - State Program Perspectives
Seth Barker, Department of Marine Resources
Robert Marvinney, Maine Geological Survey
Richard Dressler, Dept of Inland Fish and Wildlife
Molly Docherty, Maine Natural Areas Program

Session IV: 1pm

GIS Applications

Maine's GENIE - Supporting Business Decisions
Tim Case, Maine Office of GIS

Rapid Results:GIS and Internet for Urban Airshed Modelling
Cliff Michaelson, Dept. Environmental Protection
Bill Duffy, Maine Office of GIS

Assessing Unmet Need
Mark Byron, Maine WIC
John Armentrout, Maine Office of GIS

Maine Oil Spill Information System
Dave Pollock, Dept. of Environmental Protection

Session V: 3pm

Looking at Data in New Ways - GIS Analyses

Assessing Coastal Change
Bill Duffy, Maine Office of GIS
Steve Dixon, Maine Geological Survey

GIS Shows Maine Water Unlikely to Contain Asbestos
Paul Hunt, DHS Drinking Water Program

Spatial Analysis of Mercury in the Environment Protection
Vicki Schmidt, Dept. of Environmental Protection

Innovative Uses of Spatial Data for Decision-making
James Barker, Geo-Systems

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September 21 - Maine GIS User Group Day

Plenary Session 8:30am

Partnerships, Coordination and Cooperation

Welcome, Maine GIS Users Group
Nancy Allen, Dept. of Transportation

Development of a National Spatial Data Infrastructure:
What it means to state and local government
Kathy Covert, State Liaison for the Federal Geographic Data Committee

Impact of Information Policy on the Development of a Spatial Data Infrastructure
Harlan Onsrud, Dept. of Spatial Information Science and Engineering, University of Maine

Session VI: 10am

GIS Technology Trends

The Value of GIS Research and Education to Maine's Economy
Max Egenhoffer, National Center for Geographic Information and Analysis, University of Maine

What "Open GIS" Means to GIS Users
Lance McKee, Open GIS Consortium

Session VII: 1pm

Workshop: Issues Related to the Production, Access and Use of Digital Spatial Libraries
Dan Walters and the Maine Office of GIS staff

National Trends in the Development of Digital Spatial Libraries
Kate Beard, Dept. of Spatial Information Science and Engineering, UMaine

To find out more details about the conference call 624-7840. We apologize for the short notice on the schedule of events, and hope that members can still attend. The User group plans to hold an informal lunch gathering on Thursday.

Registrations are due by September 13th.

Shapes of Maine

[Note: This information is compiled by User group planning group members. If you have news about staff, equipment, or projects please send it in by October 25th. Editors are note responsible for errors.]

Art Speiss, State archeologist at the Maine Historic Preservation Commission, now has ArcCAD and ArcView 2 software which Liz Troutman, MHPC staff, has installed after being in the two day state sponsored ArcView training session in June.

Ray Fongerme at Department of Labor sponsored an AtlasGIS training session at UM Orono in August.

Paula Olson at Maine State Housing Authority used a copy of MapInfo donated by HUD to complete a map of soup kitchen and homeless shelter locations across Maine. The map was published in the 1994 Consolidated Report.

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Thank you for your leadership

We extend a special "Thank You" to two people who had a lot to do with initiating GIS in Maine State Government, as they move on to new roles: C. Edwin Meadows, former Commissioner of the Department of Conservation and Susan J. Bell, former Deputy Commissioner for the department and most recently Maine Forest Service Director.

During the infancy of GIS, Sue recognized the broad application and benefit GIS could provide to Maine. She was instrumental in creating the GIS Steering Committee, developing the initial strategic plan, and implementing the Office of GIS. Sue has now left the department to take a position with the Governor's Office.

Over the past six years Ed has guided GIS in Maine State Government through many critical junctures during his tenure at DOC and as GIS Steering Committee Chair. We appreciate the support he gave to the survival of the Office of GIS, even though it meant losing direct access when the Office was moved out of Conservation. This spring Ed moved on to take a position as Deputy Director with the Michigan Department of Natural Resources, which includes that state's GIS office.

The GIS community in the State thanks you both for your support, energy and commitment to GIS in the State of Maine and wishes you well in your new endeavors. □

Roger Applegate has left the Habitat group in the Bangor offices of Inland Fish and Wildlife for a position in the Kansas Department of Wildlife and Parks. Rich Dressler has been interviewing for his replacement -- someone to manage their Arc/Info workstation running on a SUN SPARC 10.

Norm Kalloch at Natural Resource Conservation Service (formerly SCS) reports their SUN SPARC 10 purchased late last year is performing well. His office is automating medium intensity soil surveys in York County and Southern Piscataquis County. Both projects will be completed in late September.

Having completed a masters degree at College of the Atlantic, Scott Dickerson is the new GIS and remote sensing personnel at the Island Institute in Rockland. He will be purchasing new imaging software to run on their Mac-based systems.

Larry Gardiner, Code Enforcement Officer in Southwest Harbor, has installed ArcView 2 software in their office and in cooperation with College of the Atlantic. They have parcel, zoning, hydrograpic and other data at their finger tips!

Greg Luddington at Champion Paper in Calais, has a summer intern working on their new Pentuim PC running Intergraph software. CP recently completed a sustained yield study on their Maine and New Brunswick properties.

Brunswick-Topsam Water District has installed ArcCAD software in their offices.

The Maine Field Office of the Nature Conservancy hired Nick Becker last fall as their Project Information Coordinator. Nick has been using ArcView 2 and AtlasGIS software with a 24"x36" digitizer to help TNC do conservation planning.

The Maine Natural Areas Program (MNAP) moved to the Department of Conservation in July, where Tim Case has ArcView 2 software running on their new Novell server. They also use terminal emulation to do Arc/Info processes at the Office of GIS, if MNAP's new SUN SPARC 2 at OGIS is in use. MNAP has automated its statewide inventory of rare plants and natural communities with the help of intern Glenn Tikkanen, UM Farrmington grad, and is distributing digital data products.

Richard Smith, Biologist at U.S. Fish and Wildlife's new offices in Falmouth, reports that they are running ERDAS on a UNIX-based Data General and using Arc/Info GRID to classify . Jed Wright, who recently received a Masters degree at Yale School of Forestry, is their new GIS Specialist and is working on their Fisheries Stewardship Project which is classifying land cover in seven downeast river watersheds.

The Marine Oil Spill GIS at Department of Environmental Protection (DEP) did presentations at the annual international ESRI conference in May. Their office hired a summer intern, John Lyman from UMFarmington, as a GIS specialist to work on their Atlas project.

Vicki Shmitt was recently appointed GIS/Environmental Specialist at DEP. Major projects include mercury monitoring and stream classification. You can see some of her products on the World Wide Web at http://www.state.me.us/dep/ .

Bob Bistrais joined the Office of GIS staff to work on Business Development and E-911 projects. Bob was previously the GIS Manager at the Addison County, Vermont GIS. Bob and Tim Case are developing a GENIE prototype application for business development through funding from Governor King's Office. Bill Duffy, programmer/analyst at OGIS, displayed a beautiful 'Maine Physiographic' plot at the ESRI User Conference and presented a paper on his Coastal Change work (see MC Winter 1994 issue).

OGIS hired several interns in recent months including, Becky Moore from UMFarmington who automated LURC zoning. She was recently succeeded by Cindy Eick previously a GIS technical for Army Corps in Louisiana. M. Nasir Shir, a geography grad from Clark University (home of IDRISI software), has been working on 9-1-1 Enhanced project. Mike Doyle, another UMF grad, has been working on the GENIE project. Earlier this year he installed a GIS for the town of Carrabassett Valley.

Jim Rea presented "Mapping Maine Natural Resources" at the 2nd International MapInfo User Conference at Orlando, Florida in May. Jim has now installed four copies of Map Info at Bureau of Public Lands offices, and one license for Bureau of Parks and Recreation.

Jon Giles at the City of Portland reports that a four by four block in his city has been slated for a detailed pilot study. Beginning early next year, planimetric and cadastral data would be automated in GIS at a 1"=50' scale or better.

Nobody can recall seeing a GIS ad on Maine television before, so Intergraph may have won the first to do it prize when they ran an ad on Portland Channel 6 in August.

Jim Fisk, City Planner in Westbrook, has installed a copy of ArcView2 and is working with the Casco Bay Estuary Project to automate tax parcels and produce digital images of downtown areas. □

9-1-1 Enhanced Project to use GPS for Municipal Addressing Support

Nancy Allen

This article is an update of the 9-1-1 Enhanced article that appeared in the Winter newsletter. As explained in that article the Office of GIS (OGIS), through an agreement with the Department of Public Safety, is providing mapping support to towns who are developing physical addresses in preparation for the 9-1-1 Enhanced system.

In May and June, a pilot was conducted with the communities of Lincoln County to collect locations of all roads and all structures using Global Positioning System technology. Four GPS contractors were hired as a result of an RFP issued earlier this year. This pilot was intended to find the answers to three main questions:

- Could address development be GIS assisted (more than just maps)?

- Could the state afford to GPS all towns who chose to participate in the OGIS process?

- What kinds of economies of scale could be realized by doing contiguous towns?

The pilot was successful in that, working with the contractors, we were able to develop procedures which bring GPS costs down to a level that the 9-1-1Enhanced project could afford. OGIS was also able to develop a process by which addresses could be created by the GIS, saving towns many hours of work. The 9-1-1Enhanced project has decided to provide the OGIS/GPS support to all towns who want to participate.

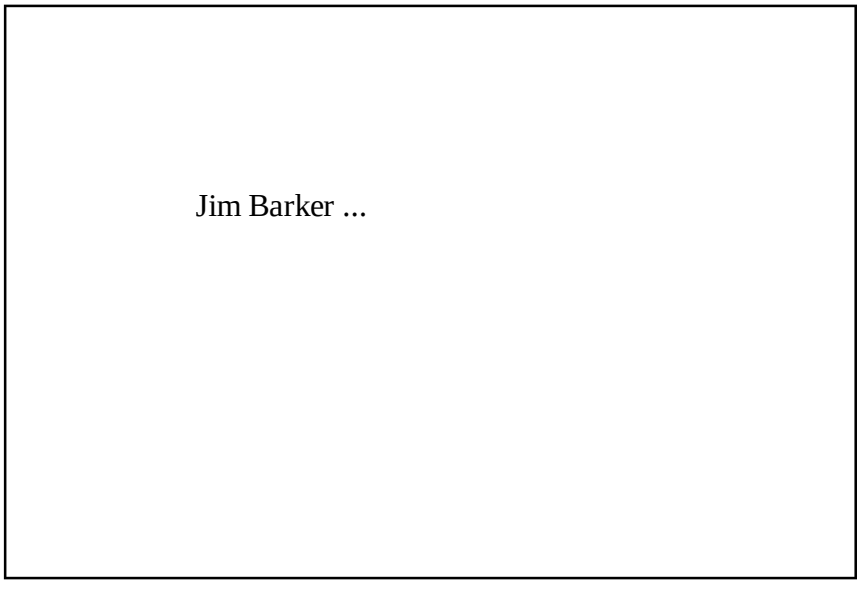
One change to the Lincoln County pilot process will be that only missing roads and structures will be GPS'ed, not all roads. Missing roads are those that towns have identified as part of their 9-1-1 network (having more than one dwelling) but are not shown on the 1:24,000 base maps. Missing roads are estimated to be about 9% of the state's roads.

This change was made based on two factors. The biggest factor was that the resulting data was not appreciably more accurate than the 1:24,000 roads. Another factor was time, our projections indicate that even with several GPS teams it may be difficult to GPS all structures within the 9-1-1Enhanced 2.5 year time frame.

The road data accuracy issues were mostly due to the compromises we had to make to keep costs at a level the project could afford. Structures that will be GPS'ed will be buildings where people live, work or play, or that have a telephone. However, if a home has a garage next to it only one point will be collected, even if the garage has a phone. The reason for collecting the data is for addressing and in this situation both buildings would have the same address.

The Office of GIS has developed Arc/Info routines to automatically assign addresses to structure points. This method saves a great deal of time for the towns. In the past, towns had to measure the distances of each house down each road using a measuring device such as a postal service vehicle or a wheel. They would then transfer the measurements onto maps and then, by counting footage intervals, create an address. This process is tedious and labor intensive, taking over 100 hours of work for many towns, and requires a lot of mental translation of data.

The GPS process requires that a town supply information like a numbering point of origin and frontage interval for addresses to OGIS and a town guide to ride with the GPS contractors to show them the lay of the town. The GPS structure points and missing roads are added to the GIS base. The GIS, using dynamic segmentation capabilities and the information supplied by the town, generates addresses and assigns one to each point. These are provided to towns on mylar overlays at tax map scale. Communities use them to find out who resides at the location so that a new address can be given to each resident. The towns still have to work to verify the system-assigned addresses as they



One of the pilot contractors being creative in the field
Photo Courtesy Boothbay Register

will not be perfect. The system cannot resolve all situations such as houses closer together than the frontage interval or those on a corner lot. These exceptions are estimated to be about 10%.

Addressing support through OGIS, which has been in an experimental mode is now moving into production mode. 9-1-1Enhanced service is expected to be turned on at the end of 1997 and the project hopes to have physical addresses in place at that time. A second edition of the 9-1-1 Enhanced Addressing Guidebook will be available by the end of September. This edition will be comprehensive and include step by step information for all phases of the addressing process. A copy of the new guidebook will be automatically mailed to each town.

If you have any questions please call the Office of GIS Addressing Coordinator at 287-6145. □

REMOTE SENSING -

From Cape Cod to the Bay of Fundy: An Environmental Atlas of the Gulf of Maine
272pp $29.95 paper $50 cloth

After years of development the Rockland based Island Institute, famous for their annual publications profiling coastal and island life, has released another book that uses satellite remote sensing

This 272 page book utilized satellite imagery and GIS data to identify, interpret, and display environmental patterns, processed, and problems. Data from several sensors, including SPOT, Landsat TM, CZCS, AVHRR, and RADARSAT, and applied to projects as diverse as phytoplankton productivity, seafloor mapping, flood monitoring, seabird habitat identification, and acid rain impact on vegetation. In addition, eleven remote sensing projects prepared by K-12 students in the GAIA Crossroads program are presented.

Seventeen contributing authors integrate the oceanography, climatology, geology, ecology, and human activities of the Gulf of Maine and its international watershed. The result is a rich text that considers the region as an interconnected whole. In the words of the Institute's director and publication editor, Phillip Conkling, " We hope this book serves to demonstrate the opportunity earth imagery offers to observations back to the larger region — the ecosystem — that we inhabit."

Published in association with MIT Press, the book displays 135 color and 38 b/w illustrations. Copies are available from the Institute 594-9209. □

Below:
A Coccolithophore Bloom

Using data collected by a NOAA satellite, scientists at the Bigelow Laboratory for the Ocean Sciences in Boothbay are studying blooms of the coocolithophore species of phytoplankton. This imagery, which can be collected on a daily basis, is the only feasible method for monitoring the occurrence and spatial distribution of the bloom event.

September 14-15
Intruduction to
ArcView 2
Training Course

There are still spaces in this session! If you are interested please call Office of GIS.
287-6143

I I photograph

Gis User Group is Growing...

Plan now attending for December 15th Annual Meeting!

The planning subgroup of the GIS User Group met in July to come up with recommendations for further activities. With Nancy Allen leaving the position of state GIS Coordinator in September, and quarterly meeting attendance and general interest steadily growing, the planning group has recommended that efforts begin to formalize the organization. It is clear that other people need to be recruited into organizational positions, and to facilitate the collection of even a small annual due, forming a nonprofit organization appears to be the best route to follow. Planning team will organize a proposal for presentation at the annual meeting in December. Nominations will be solicited for four organization positions: Chair, Co-chair, Secretary, and Treasurer. Suggested due levels range from $10-25 for individual members, with a higher level for organizations and corporations.

The planning group would like to hear from you! Please make comment, attend the December meeting, and get involved.

Members can be reached at the following numbers:

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Judy Colby-George 846-0507
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Portland Water District
John Giles
City of Portland
Tim White 827-3641
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Summary of Winter and Spring User Group Meetings

Sponsored by Department of Transportation and held at the DOT offices in Augusta, the User Group drew a record attendance of over 75 people. Barry Tibbetts, Town of Kennebunk, and Dan Boss, Great Northern Paper, presented program overviews before the group split into two discussion sessions. DOT gave a exciting demonstration of their GDS-based GIS.

In April Bangor Hydro Electric sponsored the meeting at the Bangor Ramada Inn. Richard Smith, U.S. Fish and Wildlife, gave a presentation of the Cobscook Bay Project. Breakout discussion sessions, looked at data sharing, remote sensing, and metadata. Kate Beard, UMO NCGIA program, discussed metadata issues.

Please inform us of address changes. Pass this update to a friend!

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