

THE MAP LEGEND

Congress Threatens to Abolish U. S. Geological Survey and U. S. Bureau of Mines

The U. S. Geological Survey and the U. S. Bureau of Mines are facing one of the most serious challenges in their history. Both agencies have been targeted for complete elimination according to an attachment to the Contract with America. The Contract contains a package of 10 bills that 224 Republican members of Congress have pledged to introduce in the first 100 days of the new Congress. The attachment identifies \$176 billion in possible spending cuts over five years. Although many programs would be reduced, restructured, or frozen, the USGS and the USBM are among a handful of organizations that have been targeted for abolition. "We are deeply concerned about the Contract with America proposal, because it reflects a lack of understanding about the broad range of scientific activities conducted by the U.S. Geological Survey, as well as our active role within all 50 states," says Gordon P. Eaton, Director of USGS. "We serve as the archivist of this nation's Earth resources—monitoring the rivers, for example, and helping to maintain healthy water standards. Our geoscientists help citizens prepare for emergencies such as earthquakes and floods; and we address the challenges of sustainable development of our oil, gas, and mineral resources. The USGS touches the lives of every American citizen every day."

"We serve as the archivist of this nation's Earth resources..."

The geosciences would absorb a disproportionate share of spending cuts relative to other scientific disciplines, and the U. S. Geological Survey and the U. S. Bureau of Mines would take the most direct hits. Abolishing the USGS ranks as the fifth largest single reduction for any science and technology program. Congressional staff members indicate that abolishing the U. S. Geological Survey might be accomplished by transferring some of its functions to other organizations. They suggest that some programs in the Water Resources Division might go to the Environmental Protection Agency. Likewise, certain functions of the National Mapping Division might move to the Defense Mapping Agency or to the private sector, while some functions of the Geologic Division might be transferred to universities. But shifting programs from one agency to

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Surface Management Responsibility Map

The Bureau of Land Management (BLM) New Mexico State Office announces the availability of the updated surface ownership map for the state of New Mexico. The map includes land ownerships, elevations, roads, drainages, and county and political boundaries. The map is an excellent resource for recreationists, hunters, and others.

The 1994 newly revised version of this map merges traditional cartographic processes and digital data processing technology. Automation of the data captured for this map enabled BLM to produce a more accurate map and will enable BLM to more efficiently maintain data for future projects at a lower cost.

Digital data used to create the map have been contributed to the Resource Geographic Information System which serves as New Mexico's "clearinghouse" for GIS data. The map also includes elevation information in two formats through combined use of contours and shaded relief. Maps are available from any BLM office for \$8 (1:500,000) and \$4 (1:1,000,000).

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From the President Richard Friedman



While reviewing information on new technologies, there are two subjects that seem to be the current areas of interest. Everywhere you turn there seems to be someone talking about the "information highway" and improved GIS software. The morning session of our spring meeting will be devoted to the "information highway," and in the afternoon we will have a Vendors Forum to highlight products and services that are currently available.

Anyone who deals with geographic information understands that in order to get to a location you need to know where you are going and how you are going to get there. A simple road map can make your planning for a trip much easier. The same is true for navigating the information highway. Whether you are "surfing the Internet" or logging onto a local Bulletin Board Service (BBS), you still need to know where you are going and how you can get there. Unfortunately, the information highway was not designed by Geographers, so road maps are not easily accessible. During the morning session we will provide information you need to get onto, and navigate, the information highway. You will also get a simplified road map to geographic information that is available along the highway and how to get to it. For anyone who is not connected to the highway, this session will be valuable in helping you decide if you should be one of the highway's frequent travelers to access the geographic data "hot spots."

The afternoon portion of our program will focus on products and services that are currently available from the vendors exhibiting at the meeting. The 15 to 20 minute presentation by each vendor will provide valuable insight to the products and services provided by our exhibiting vendors. We hope this session will help you focus the balance of your time on the vendors who have products and services that you or your organization may need.

I feel that the spring meeting will provide some very important and timely information. The two sessions have been chosen to provide information that will assist you in making decisions on the use of technology that is available today to assist you tomorrow. I plan on seeing everyone on April 14!

National Geodetic Survey Publishes Its Mission, Vision, and Strategic Goals



The National Geodetic Survey (NGS), an office of the National Oceanic and Atmospheric Administration, recently completed a process of reassessing its mission, vision, and goals. This resulted in the publication of a document, *National Geodetic Survey: Its Mission, Vision, and Strategic Goals*, now available to interested parties. The mission of NGS is to apply state-of-the-art methods of precise positioning and advanced geodetic, photogrammetric, and remote sensing techniques to establish and maintain a consistent national coordinate system, and to support mapping, charting, navigation, boundary determination, property delineation, infrastructure development, resource evaluation surveys, and scientific applications.

The statement of NGS's mission is followed by one outlining the vision of the agency. The vision of NGS is to lead the rapidly expanding community of geodetic data users into the 21st century. The vision statement describes the community of users that should benefit from these activities and lists the types of products that will be involved.

In support of the NGS mission and vision, a total of 15 strategic goals have been

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GISAC Announces a World Wide Web Resource

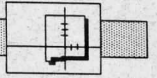


One of the roles of the New Mexico Geographic Information Systems Advisory Council (GISAC) is to support New Mexico State agencies in the development and implementation of geographic information systems and to foster a spirit and environment for effective communication and sharing of resources among GIS professionals working at those State agencies. GISAC acts as a hub for the dissemination of information regarding GIS and related activities at the various State agencies and elsewhere throughout New Mexico, the U.S., and the world.

One mechanism GISAC has at its disposal for undertaking such a task is the information exchange capabilities of the Internet. The resources of the Internet are becoming more readily available and accessible to the GIS community in New Mexico through direct connections in the workplace or through the many access providers springing up throughout the state. The World Wide Web (WWW), or Web for short, is one method for organizing the information and resources of the Internet and of streamlining access to those resources. Because of its ease of use and its capability for providing distributed access to Internet resources throughout the world, GISAC has chosen to establish a resource within the WWW environment and is pleased to announce the availability of this resource.

The GISAC WWW Resource will provide information about

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Bit Notes

USGS and Bureau of Census Sign Memorandum of Understanding

On October 4, 1994, USGS and Bureau of the Census signed a Memorandum of Understanding (MOU) that continues an historic tradition of interagency cooperation by initiating a pilot project to begin the construction of a "common core" data set that will meet the needs of many geospatial data users in the Federal, State, and local governments, academia, and the private sector. The purpose of this MOU is to continue developmental work begun earlier and to initiate a joint venture to begin the creation of the common core data set within the existing resources of both agencies.

The objective of the project is to build a geospatial data set that contains the best features of the USGS digital line graph files, the Bureau of Census Topologically Integrated Geographic Encoding and Referencing (TIGER) System data base, and selected local data holdings that will be made available to the public. To ensure the success of this pilot project, each agency will provide at least one full time employee to a Joint Program Office (JPO). The purpose of the JPO is to reach agreement on and document the data content and structure of the common core data set, to select the geographic locations for which the pilot project will create the data set, to work with other data providers, and to oversee the management of all pilot project operations.

NMGIC

Diacritical Marks Accepted in U. S. Names

Diacritical marks will be accepted in U. S. names, on a case-by-case basis, but only if those marks are part of a well-established orthography. That is the recommendation the Committee on Diacritical Marks is expected to make to the U. S. Board on Geographic Names (USBGN) at their April meeting. This recommendation, if adopted as expected, reverses a long-standing USBGN policy avoiding diacritical marks in U. S. names.

What this means for New Mexico is that future maps prepared by federal agencies will be allowed to include names from Native American languages, such as Navajo, complete with all the dots, dashes, squiggles, and other marks the Native Americans use when writing these languages.

To be sure, most map users won't have any idea what sounds those marks are suppose to represent, but Native Americans using the maps will, and as one member of the NMGIC Geographic Names Committee (GNC) observed, if we are really serious about local usage as the primary criterion in deciding which names to adopt, then we should be prepared to accept names in Native American languages, including diacriticals.

Prior to the national committee's deliberations, Bob Julyan polled the members of the GNC for their opinions and observations, which were then summarized and forwarded to the national committee. And while no vote was taken among the GNC members, a clear consensus felt the time had come for Native American languages and diacriticals to be included on maps.

Speaking of the appearance of names on maps, most map users know that the possessive apostrophe is omitted from geographic names, e. g., the stream in the Pecos Wilderness is labeled Jacks Creek, not Jack's Creek. But why? A commonly heard explanation is that it had to do with the tiny apostrophe being difficult to place on maps in the days when type was set by hand, but Roger Payne, USBGN Executive Secretary who has researched the issue, says, "That's crap." After all, he points out, the apostrophe is included in names like O'Hara. Payne said the present policy was adopted at the very first meeting of the USBGN, in 1890. The policy read: "The possessive form should be avoided whenever possible without destroying the euphony or its descriptive form." This policy was reaffirmed in various forms at ten subsequent meetings through 1971. Eventually, the USBGN relaxed its policy against retaining the terminal possessive "S," but as for the apostrophe. . . sorry.

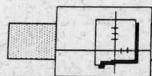
Curiously, the U. S. is unique in being apostrophobic. "We're about the only country that doesn't allow the apostrophe," says Payne. "It's very prevalent in other English-speaking countries, including Canada and the United Kingdom."

Turn to Return to Casa Colorada?

The highway map shows Turn as a tiny village south of Belen on NM 304, but since the 18th century the locality has been known as Casa Colorada, the name Turn having been given by the man who established a post office there in 1927.

In January, a longtime resident of the village contacted the GNC asking whether the name could formally be changed back to Casa Colorada, saying the name Turn is not used by local residents. Julyan said such a change is possible, indeed, a parallel situation occurred in Rio Arriba County where the community that had taken the postal name Fairview returned officially to its original name of Los Ojos because that was the name that had remained in use by the local people. Julyan met with the man, helped him fill out the name-change form, and forwarded it to the USBGN. Later, the GNC will attempt to establish just what local usage is and how much local support exists for the name change.

By Bob Julyan, Chairman, Geographic Names Committee



Congress Threatens to Abolish USGS and USBM (Continued from page 1)

another would offset some of the proposed savings, and no estimate of the net savings has been made available. It is unlikely that other organizations would pick up these programs at no expense to the nation.

Rep. John R. Kasich (R-Ohio) is a key figure behind the proposal to abolish the USGS and the USBM. Last year Rep. Kasich co-sponsored an amendment with Rep. Timothy J. Penny (D-Minnesota) that would have eliminated the two agencies (a proposal included in a package of numerous budget cuts). Although President Clinton intervened to oppose the Penny-Kasich amendment, the House of Representatives defeated it by a margin of only two votes. Now that Republicans control both the House and Senate, Rep. Kasich is expected to become Chairman of the House Budget Committee. He will be in a much stronger position to pass these measures. The Clinton Administration has made clear its support of the USGS and the USBM. Secretary of the Interior Bruce Babbitt has said, "The USGS is the Nation's premier water and earth science information agency, and its role is increasingly important at a time when we are facing many critical decisions on the environment." Last August, Secretary Babbitt stated, "This Administration is firmly committed to maintaining a strong, viable, U. S. Bureau of Mines in the Department of the Interior." In October when Rhea Graham was sworn in as director of USBM, she said, "I believe that the agency has a vital role to play in helping the nation solve its mineral-related problems, i.e., problems that involve our environmental and economic goals as well as basic human issues such as worker health and safety."

It is ironic that Congress is considering legislation to abolish the USGS and USBM at a time when the United States is beginning to recognize its increasing vulnerability to earthquakes, floods, droughts, water pollution, volcanic eruptions, global environmental change, contamination from waste disposal, and reliance on unstable sources of foreign oil and minerals. Geoscience research and information play vital roles in an ever-growing range of societal problems. Although the rationale for supporting the USGS and the USBM remains strong, Congress and the public are not generally aware of their relevance to a broad range of national goals. Over 100 years ago, the USGS was established without fanfare—created by an amendment to another bill. Today the agency stands in danger of being dismantled in much the same way it was created.

By Craig M. Schiffries
American Geological Institute
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GIS Training Schedule



The Utah Automated Geographic Reference Center will be conducting two GIS classes during the spring of 1995: Introduction to GIS (March 13-17, 1995) and Arc Macro Programming (March 20-22, 1995).

Introduction to GIS - This class covers basic GIS theory and concepts and introduces ARC/INFO. The week-long class will present the commonly used functions of ARC/INFO and the basic skills to get started with GIS activities.

Arc Macro Programming - Arc Macro Language (AML) is used daily in processing and manipulating ARC/INFO coverages. It is an important tool in developing user-friendly interfaces (menus), customized applications, and automating data processing procedures. **Prerequisite:** This class requires that the student have a working knowledge of ARC/INFO, especially ARC-PLOT and ARCEDIT. It is assumed that the student understands ARC/INFO file structures and basic processing procedures.

Training will be held at the Automated Geographic Reference Center in Salt Lake City, Utah. For more information contact: Utah Division of Information Technology Services, Attention ITS Training Coordinator, 6000 State Office Building, Salt Lake City, UT 84114. Phone: 801 538-3164.

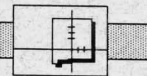
NGS (Continued from page 2)

developed and are outlined in the document. These goals address topics including: transition to the National Spatial Reference System, coordination of federal geodetic activities, development of the federal and cooperative base networks and the user densification network, geodetic research, mapping the coastal zone, surveying and mapping of airports, continuously operating GPS reference stations, GPS leveling, GPS orbits, implementation of the North American Vertical Datum of 1988, providing access to data, total quality management, and the organizational structure of NGS.

The NGS strategic goals were reviewed by a select committee of professionals in geodesy and related fields. In addition, the National Research Council also reviewed the document as well as its implementation plan. In essence, both review groups agreed that the highest priority goals for NGS should be: implementation of the continuously operating GPS reference station program; development of standards for geodetic techniques, technologies, and data; and the continuation of partnerships to develop the framework of the National Spatial Reference System.

For further information or to obtain a copy of *National Geodetic Survey: Its Mission, Vision, and Strategic Goals*, contact William Stone, New Mexico State Geodetic Advisor, National Geodetic Survey, c/o Albuquerque Public Works/Survey Section, 400 Marquette Avenue NW, Room 401, Albuquerque, NM 87102. Telephone: 505 768-3606.

By William Stone
NMGC Global Positioning System
Committee Chairman.



New Mexico Engineering Research Institute Helping USDA Protect American Agriculture

In 1991 the New Mexico Engineering Research Institute (NMERI) began a working relationship with the New Mexico office of the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine Division. APHIS is responsible for overseeing and conducting annual surveys for a variety of insect pests across the state, as well as inspections of livestock and imported produce at our state's southern border, to detour threats of pestilence to American Agriculture. To date, we have concentrated our efforts for APHIS on automating insect pest surveys; more specifically, grasshoppers on rangeland.

According to Mike Sampson, APHIS Writer/Editor, Boise Idaho, "In the history of the United States, grasshoppers have steadily competed with people and livestock for food." Colonial Americans recorded threatening grasshopper outbreaks in the mid-1700's. From 1717 to 1767 the founders of California missions faced near famine from grasshopper plagues. In the three years from 1874 to 1877, the Rocky Mountain locust (which is a grasshopper) became a familiar sight blanketing western U.S. skies.

From those days into the middle 1900's, poison baits were the most common form of chemical control. Aerial spraying for grasshoppers began in the 1940's and continues today. According to Sampson, "new and less toxic chemicals are in the spray regime now, and APHIS maintains a policy of grasshopper management, not eradication. APHIS pays strict attention to protection of environmentally sensitive areas, frequently using baits instead of sprays."

Each year, APHIS has grasshopper control programs in one or more states. "We have not seen in the 90's the large outbreaks in the western rangeland states that we saw in 1985 and 1986, but major grasshopper outbreaks tend to recur on a 6-10-year cycle. The need for continued grasshopper survey work is a must if APHIS is to be prepared for the next eventual grasshopper outbreak, which will come. As you might guess, APHIS does have new and improved tools and control options, compared to what we had 10 years ago."

In the midst of these observed natural threats to agriculture, federal agencies continue to incur budget cutbacks of manpower and other resources while continuing to be responsible for increasingly demanding mandated tasks. As a result, traditional approaches of conducting these activities are being re-evaluated, automated, and/or streamlined wherever possible. A pest management decision support system built around GIS appeared to offer much of the required solution to APHIS's challenge. The overall objective of building a GIS-based decision support system for insect pests is to facilitate rapid access to relevant information. Much of this involves automation of several tedious and time consuming manual

processes, hence the savings of time and money through increased productivity.

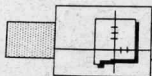
Taking the Pulse of a Pest - "For the last 40 years the USDA has been in charge of monitoring and mapping the effects of grasshopper infestation throughout the western region of the United States," said Kerry Bryan, New Mexico's APHIS, Plant Health Director. "After many years of using paper land records and nonstandardized mapping techniques, it was determined that GIS technology could do the job more efficiently," said Bryan. "The job of controlling grasshoppers can be a difficult one, especially considering the amount of land involved. For example in 1985 and 1986 APHIS sprayed about 20 million acres in the western U.S. for grasshopper control at a cost of 31.5 million dollars." The large areas involved make automated data collection and GIS a natural for project management.

"APHIS's job really begins in the field where they conduct surveys on existing rangelands and gather their data," Bryan said. "Grasshoppers eat crops as well as rangeland so both types of areas might be affected by control efforts. As a result we have to keep track of everything, area surveying as well as potential control work. Surveys are conducted from May to August. We will only treat areas that are economically infested in areas of 10,000 acres or greater," Bryan said. Bryan estimates that each year forage damage due to grasshopper consumption totals in the millions of dollars nationwide.

Data are gathered at two types of sites: a fixed site and a random site. A fixed site, commonly called a sentinel site, is one located and labeled in a selected area and visited approximately twice each year. A random site is determined by surveyors who drive along rural roads, periodically stopping to check for grasshopper densities. The degree of infestation is determined by selecting a sample site and then checking that site for the number of grasshoppers found per square yard and noting their degree of development.

Once an area is defined as having reached the infestation threshold (that level of density adversely competitive with livestock), the area is delineated and other environmental criterion are assessed. Buffers are created around waterbodies, endangered species, and friendly insects such as bees, to determine what remaining areas may be treated. APHIS, personnel observe stringent environmental regulations for buffering around crop land and water bodies, and threatened and endangered species. We can use chemical sprays, baits, or natural deterrents, whichever will deliver the most effective treatment with the least environmental impact. Throughout the survey it is important for APHIS personnel to maintain good relations with ranchers throughout the region. "If a rancher tells us that he is having a problem in a particular

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Geodetic Datums Exposed Part Two. Vertical Datums



he history of the vertical control network in the United States is somewhat analogous to that of the horizontal network. The first geodetic quality differential leveling work was done in the 1850s by the U.S. Coast Survey, predecessor of the U.S. Coast & Geodetic Survey and the National Geodetic Survey (NGS). By 1929, 75,000 km of leveling had been observed and it was determined that a general adjustment of all of these observations was needed. Originally named the Sea Level Datum of 1929, the datum name was changed in the 1970s to the National Geodetic Vertical Datum of 1929 (NGVD 29). The basis for referencing elevations in the NGVD 29 network was the local mean sea level, averaged over a 19 year period, at 26 primary tidal stations along the coasts.

In the decades since the NGVD 29 adjustment, much leveling work has been performed and tied into the original network. A study initiated in the 1970s concluded that it was again time for a general adjustment of the vertical network. This conclusion was motivated, in part, by the realization that considerable distortions existed in the vertical network. These distortions could be attributed to various sources. By the 1980s, about 625,000 km of leveling work had been performed and these observations had been forced to fit into a, sometimes, inferior network. Many marks in the network had actually moved due to tectonic activity, ground subsidence, and frost heaving. In addition, many marks had been destroyed by post-World War II highway construction and vandalism. The methodology of utilizing the tidal stations for constraining the adjustment and the simplistic manner in which the shape of the earth's gravitational field was taken into account both contributed to the distorted nature of the old network.

In support of a readjustment effort, NGS identified over 80,000 km of leveling work that needed to be reobserved or established. This work was executed with highly accurate equipment and techniques (Federal Geodetic Control Subcommittee first order, class II specifications) and provided a framework of current, accurate elevation differences. A total of about 800,000 km of leveling observations, and about 500,000 benchmarks, was included in the readjustment.

An international, interagency group was convened to determine how to best define a surface of reference to be used for the adjustment. With a goal of minimizing the impact on existing elevation-related products and efforts but also of providing a modern, accurate vertical control network to support rigorous applications, the study selected a definition for the reference surface. The final network adjustment was constrained to the height above the local mean sea level of one tidal benchmark on the Saint Lawrence River in Quebec. This type of adjustment constraint removed the sea level constraint distortion that existed in the original network as well as minimizing the impact on USGS mapping products. It also brought the datums in Canada and the U.S., as well as Mexico, into consistency with each other. The readjustment made use of actual observed values of gravity around the country in order to remove some of the effects of the shape of the earth's gravitational field on the observed elevation differences. The name of the new vertical datum is the North American Vertical Datum of 1988 (NAVD 88). NAVD 88 is well suited to support both classical survey work and efforts in using GPS measurements to derive elevations.

For the continental U.S., the shift between elevations based on the NGVD 29 and NAVD 88 datums ranges from a negligible amount to over 1.5 m. The largest differences exist in the mountainous regions of the West. Shifts in the eastern half of the country are generally less than 0.5 m. Elevation differences between neighboring benchmarks will typically be no more than a few millimeters when comparing between datums.

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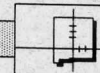
GISAC activities and GIS activities at other State agencies and access to GIS and related resources, including data and software, throughout New Mexico and elsewhere. Access to the GISAC WWW Home Page can be established via the following Uniform Resource Locator (URL): http://www.state.nm.us/gisac/gisac_home.html.

To take full advantage of the GISAC WWW Resource, one must have a direct Internet connection of a SLIP/PPP connection (if connecting via modem) and a Web browser such as NCSA Mosaic or Netscape. Those of you with only a text-based connection (such as that usually provided by a modem connection) can still take advantage of most of the resources of the GISAC WWW Resource by using a text-based browser called "lynx."

GISAC is exploring other methods of information exchange as well. For those of you with access to Internet email, we are evaluating the possibility of establishing a listserver mailing list. Subscribers to the mailing list email to a central host computer known as the listserver. The listserver then distributes the mail to all other subscribers to the mailing list. More information on this will be forthcoming.

By Bill Baillargeon
State of New Mexico GSD/ISD





NMERI Helping USDA (Continued from page 5)

area, we try to respond as quickly as possible," said Bryan. "And we have a good neighbor policy called the Crop Protection Program to treat around the perimeters of crop lands so federal rangeland won't have grasshoppers that are just outside of crop land migrating towards it."

Understandably, these efforts are a challenging data management task. Every week of the survey season we receive survey findings from remote field offices through our automated survey technique to produce maps that display a wide range of diverse information. This information is passed back to APHIS and used to deploy surveyors to areas needing more attention based on the previous week's findings, thus optimizing APHIS's available workforce.

The Automated Survey Technique - In the automated survey process several technologies are integrated to produce management level information. This technique currently combines some of the oldest laptop technology with state-of-the-art telecommunications utilities. Once in the field, Pathfinder Basic hand-held GPS units were used to collect latitude/longitude coordinates which are entered into a Tandy 102 portable computer programmed to prompt the surveyor for standardized data elements including the surveyors initials, site ID, Federal Information Processing Standard (FIPS) code, latitude/longitude, and grasshopper densities. The Tandy's were selected because they were inexpensive, rugged, and contain an internal 300 baud modem that gets the job done at the right price. In the transfer of raw files collected by surveyors in the field, the Tandy's internal telecommunication program (TelCom) and 300 baud modem are connected to a commercial telephone system and used to initiate a session via a dial-up connection to a local area network (LAN) at the University of New Mexico. Once the connection is established, an Internet Protocol (IP) address is used to direct the session control to NMERI's host computer, a DECstation 5000/200 RISC workstation. This data capture process on the host computer is completely automated and requires no user or operator interaction. The process runs entirely unattended and is available on a continuous, around-the-clock basis. PPQ field surveyors use a simple printed set of instructions to perform this upload process.

Once received, the objective of the data processing procedure is to convert the digital survey data files into coverages, (using ARC/INFO software) without any data loss or distortion. These new GIS coverages are then merged into the APHIS Grasshopper Information Management System (GHIMS) built around ArcView software.

To accomplish the objective, a set of automated data processing scripts were developed in ARC/INFO's ARC Macro Language (AML) and used to process the data sets. The initial raw data sets are reviewed and merged into a master data set for the particular survey. This review or initial screening allows the data to be corrected to eliminate transmission noise or other unintended data. Once the screening is complete and the data collection is finalized, the data sets are processed into

point coverages using AML scripts. Sample points measuring economically infested densities are then given a measure of area by buffering out from the points, a 2½ mile radius for New Mexico. Results are summarized on a final map which displays grasshopper distributions and breaks down the economically infested areas into private, state, and federal land acreage counts using BLM's digital version of New Mexico Surface Ownership, recently made available through the RGIS Clearinghouse.

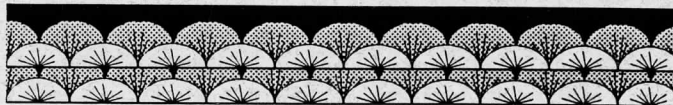
All survey results are installed into PC ArcView to meet Bryan's decision support needs. With the release of ArcView 2.0 we look forward to increasing the functionality of the system by incorporating hot linking and ancillary database ties. We feel it is significant that it only took one day to train APHIS personnel in the use of GPS units, the Tandy 102 data entry and transmission procedures. They have had excellent results over the three seasons we have used the Internet transmission approach.

Technology Transfer and Partnership Development - Glenn Olson our systems developer explains, "This technique is so straight forward that we have implemented it in two other states selected by APHIS (North Dakota and South Dakota), with duplicate success." These states were selected because they recently had active control programs and an interest in developing GIS for decision support. In each case, we have worked with the respective APHIS representatives to identify GIS cooperators to form partnerships. In North Dakota this has been the North Dakota Geological Survey, and in South Dakota, the Environment and Natural Resource Department, both ARC/INFO users. Partners were selected based on compatibility of software, UNIX-based hardware, and ftp enabled Internet access. Both cooperators are also located in each state's respective capitals.

Data flows from field offices using a commercial phone dial-up line, through the Internet to an account on the cooperator's host workstation. The amazing thing about using the Internet for these activities is that we can travel to North and South Dakota to each receiving account, referred to as "Hopper Centrals," and pull the raw data down to New Mexico for processing. We then push the processed information such as ARC export and graphic files back to the Hopper Central accounts for review by our APHIS client and for plotting by the GIS cooperator. By all indications it appears that by using this integrated approach to information management, USDA APHIS is now better equipped to meet their demanding mission "Protecting American Agriculture."

By John Peterson
New Mexico Engineering Research Institute

With excerpts from ARC/News (Summer/Fall 1994) and GeoInfo Systems (February 1995).



Open GIS and the OGIS Project

A Summary of the NSGIC Workshop

James A. Farley (University of Arkansas, Fayetteville), discussed the role of open GIS in connecting the local, state, and national spatial data infrastructure during the 1994 NSGIC meeting which was held last fall in Jackson, WY. Mr. Farley and UA Fayetteville are participants in the Open Geodata Interoperability Specification (OGIS) project.

Open GIS is similar to the open systems technology now being developed in business data processing; those business-oriented models are based on client-server architecture and standardized protocols. The OGIS vision is that its specification will result in the ability of any application developer to use geospatial data and any geospatial function or process available anywhere on "the net" from within a single environment and a single workflow.

The goals of the OGIS project are to: 1) provide a single universal spatio-temporal data and process model that will cover all existing and potential spatio-temporal applications; 2) provide a specification for each of the major database languages to implement the OGIS data model; and 3) provide a specification for each of the major distributed computing environments to implement the OGIS process model.

The OGIS requirements are numerous and include, but are not limited to: 1) maximizing the ability of, and number of, current products and producers participating; 2) minimizing the implementation cost while maximizing interoperability; 3) specifying data and processes behaviorally; 4) enabling integration of heterogeneous systems and data models across OGIS-compliant platforms; 5) providing interfaces for data, processes, database languages, locating data and related data services in a distributed environment; and 6) ensuring portability of applications. For additional information regarding the OGIS Interoperability Specification:

- <ftp://moon.cecer.army.mil/ogis/spec>
- <ftp://s2k-ftp.cs.berkeley.edu/pub/sequoia/schema/STANDARDS/OGIS>
- <http://www.regis.berkeley.edu/ogis.html>
- <http://moon.cecer.army.mil/ogis/discussion/space.html>

OGIS is a partnership project which consists of federal, private, educational, and international participants. The scheduled specification finalization date is the fourth quarter of federal FY96.

Spring 1995 Meeting

The Spring 1995 NMGIC meeting will be held April 14 at the UNM Continuing Education Conference Center in Albuquerque. The program will focus on Internet accessibility and use. Presentations on this subject will be made by Michael Goodchild, University of California-Santa Barbara, and Tom Thornhill, Technet.

The spring meeting also features exhibits by vendors in GIS and GPS technologies. A vendor forum will be held in the afternoon. Mark your calendar and plan now to attend the April 14th meeting.

1995 NMGIC Dues

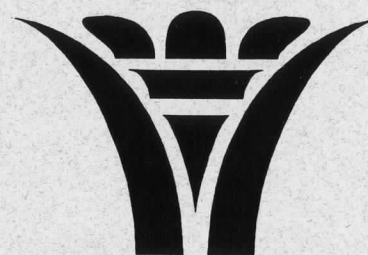
This is a reminder to those of you who have not yet paid your 1995 dues. Your dues support the operation of NMGIC and pay for the publication of *The Map Legend* and the two (Spring and Fall) bi-annual meetings. Dues are \$20 and should be sent to Amy Budge, Treasurer (see list of NMGIC Board of Directors for the address).

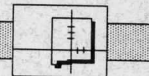
Topos for Teachers

New Mexico Bureau of Mines and Mineral Resources has accepted the remainder of the out-of-print USGS 15-minute topographic maps for the state of New Mexico. The Bureau is in the process of dividing this collection with other agencies in order to distribute them to teachers and the public. Several distribution points in New Mexico are:

1. Teachers in the Albuquerque area can receive maps by contacting Juan Abeyta at the Education Outreach Center of Sandia Labs, 505 889-2306.
2. The New Mexico Department of Education in Santa Fe will be distributing their collection of maps during school visits throughout the state.
3. Teachers from other parts of New Mexico can contact Susie Welch to request maps. The Bureau will try to coordinate delivery of maps to a local point to serve area teachers. Call Susie Welch at 505 835-5112 or 835-5420 for more information.

Teachers: watch for the New Mexico Bureau of Mines and Mineral Resources display tables at educational gatherings. We will be bringing stacks of maps to give away. Please contact Susie Welch if you know of a sizeable teachers' meeting in New Mexico where we might distribute these maps.





Committee Chair Search

Three of our NMGC committees are in search of leadership: Local Government and Land Records; Public Awareness and Education; and GPS. Currently the LGLR committee has no Chair and the committee has been dormant. Amy Budge is Acting Chair for Public Awareness and Education, but will not be able to take the committee permanently. This committee's primary function, at this time, is the production of *The Map Legend*. Bill Stone has served as Chair of the GPS Committee, but is looking for a successor due to his responsibilities on the Board. Contact Rich Friedman, NMGC President if you are interested in any of these positions, or know of someone who is.

Toponymic Trivia

Thousands of places in the U.S. are named for animals, with bears being the most popular eponym. According to the GNIS CD-ROM (still only \$57!), bears are the most common eponym, with 5,257 places named for them, not including 283 Grizzly names and 260 Cub names. In second place are deer, with 2,449 names. Beavers are third with 2,994. Toads, however, have a mere 64 places named for them. Mosquitos have more, with 359.

True story: In Colorado, some people asked a local person the name of a park. Later what he told them was recorded on maps, and the park took the name Damifino Park.

World's most odious place name: In Antarctica an expedition followed the longstanding tradition of explorers naming features for the persons who had sponsored the expedition. This particular expedition discovered a mountain range and called it the Executive Committee Range.

Geodetic Datums Exposed *Continued from page 6)*

In order to convert elevations from one datum to another, the most rigorous procedure is to perform an adjustment of differential leveling measurements that is constrained to published elevations on the system desired. NGS has written a computer program, called VERTCON (analogous to NADCON, used for horizontal datum conversions), to perform a modeled conversion between datums. This conversion is based on benchmarks across the country that have elevations determined on both datums. The program models the variation in the difference and then does an interpolation for a desired location. VERTCON is effective for mapping and other applications where geodetic level accuracy is not required. The accuracy of this conversion is 2 cm (one sigma). As in the case of NADCON, conversion accuracy is usually degraded for areas that are removed from control points used to generate the model.

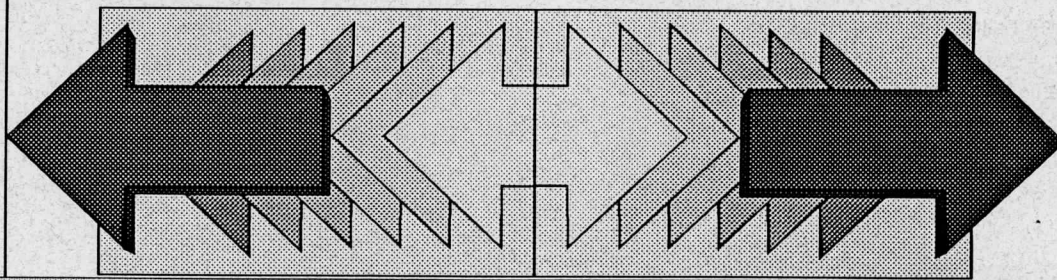
Elevations referred to both NGVD 29 and NAVD 88 are known as orthometric heights (sometimes inexactly referred to as "elevations above sea level"). This type of a height represents the vertical distance to a point from a given reference level that is defined by knowledge of the earth's gravitational field. In addition to orthometric height, the terms geoid height and ellipsoid height are often used. The ellipsoid height of a point is the height of the point above or below the reference ellipsoidal surface. Ellipsoid heights are not influenced by the earth's gravitational field and can be considered as geometric in their nature. Heights and height differences derived from GPS are generally referenced to the ellipsoid, although they may be converted to orthometric heights. The geoid height of a point is the separation between the geoid and the reference ellipsoid at the point. The geoid is the gravitational potential surface that most closely represents the mean level of the oceans and the extension of that surface in continental areas. Geoid heights vary from place to place due to the variation in the shape of the geoid which reflects changes in the earth's gravitational field.

Many geographic information products and efforts are still based on the old datums (NAD 27 and NGVD 29). Whenever possible the migration from these datums to the more recent systems (NAD 83 and NAVD 88) should be undertaken. Certainly, any new projects should be executed using the modern datums for reference. Published items in the Federal Register have affirmed both the NAD 83 (June, 1989) and the NAVD 88 (June, 1993) as the official datums for U.S. surveying and mapping activities performed or financed by the federal government. These announcements also state that an orderly transition from the old to the new systems should be undertaken by all federal agencies dealing with geographic information. Local public agencies as well as private sector firms are advised to, whenever possible, follow the federal lead on these datum issues.

For further information, contact William Stone, New Mexico State Geodetic Advisor, National Geodetic Survey, c/o Albuquerque Public Works/Survey Section, 400 Marquette Ave. NW, Room 401, Albuquerque, NM 87102; telephone: 505-768-3606.

(Part One of this article, dealing with horizontal datums, appeared in the Summer 1994 issue of *The Map Legend*.)

By William Stone





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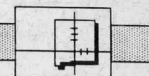


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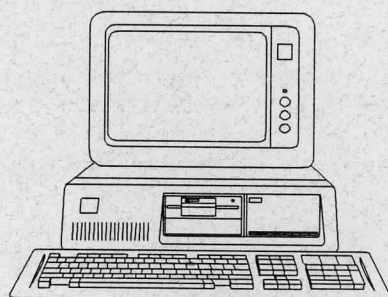


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THE MAP LEGEND



Editor: Jeanette Albany
Assembly: Amy Budge

The Map Legend is published quarterly by the New Mexico Geographic Information Council and is a benefit of membership in NMGIC. The opinions expressed are those of the contributors and do not necessarily represent the views of the New Mexico Geographic Information Council, except where specifically noted. The mention of trade names or products does not constitute an endorsement by the NMGIC. Members are invited to send articles and announcements of interest to the editor by the following deadlines: September 1, December 1, March 1, and June 1. Please direct all correspondence to:

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Local Government and Land Records Committee

No contact at this time.

Calendar

ACSM/ASPRS '95, Charlotte, North Carolina, February 27-March 2, 1995. Contact: ACSM/ASPRS '95, 5410 Grosvenor Lane, Suite 100, Bethesda, MD 20814-2122. Telephone: 301 493-0200. Fax: 301 493-8245.

ERDAS 1955 User Group Meeting, Atlanta, Georgia, March 19-22, 1995. Contact: UGM Coordinator. Telephone: 404 248-9000. Fax: 404 248-9400.

GIS '95, Vancouver, British Columbia, March 27-30, 1995. Contact: GIS '95 Symposium Office, GIS World, Inc., 155 E. Boardwalk Drive, Suite 250, Ft. Collins, CO 80525. Telephone: 303 223-4848. Fax: 303 223-5700.
Email: event-info@gisworld.com

Business Geographics '95, Chicago, Illinois, April 2-5, 1995. Contact: Business Geographics '95, GIS World, Inc., 155 E. Boardwalk Drive, Suite 250, Ft. Collins, CO 80525. Telephone: 800 447-9753 or 303 223-4848.
Email: event-info@gisworld.com

Introduction to Global Positioning Systems (GPS), Madison, Wisconsin, April 10-13, 1995. Contact: Engineering Registration, The Wisconsin Center, 702 Langdon Street, Madison, WI 53706. Telephone 800 462-0876 or 608 262-1299.

15th Annual ESRI 1955 User Conference, Palm Springs, California, May 22-26, 1995. Contact: ESRI, 380 New York Street, Redlands, CA 92373-8100. Fax: 909 793-5953. Email: ucregis@esri.com.

URISA '95, San Antonio, Texas, July 16-20, 1995. Contact: URISA, 900 Second Street NE, Suite 304, Washington, DC 20002. Telephone: 202 289-1685. Email: urisa@MACC.wisc.edu.

SPOT: Plan It, Earth, 1995 SPOT User Group Meeting, Washington, DC, August 24-25, 1995. Contact: Corporate Communications Department, SPOT Image Corporation, 1897 Preston White Drive, Reston, VA 22091. Telephone: 703 715-3100. Fax: 703 648-1813. Email: INFO@SPOT.COM.

THE MAP LEGEND



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