



Annual Report 2004

Vermont
Center for
Geographic
Information Inc.

Vermont GIS 2004: A Status Report

**Annual Report of the Vermont Center
for Geographic Information, Inc.
and the
Vermont Geographic Information System**

January 2004



**For
Governor Jim Douglas**

**and
Vermont House and Senate
Appropriations Committees**

Provided by the

Vermont Center for Geographic Information, Inc.

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This report could not have been prepared without the comments and contributions of the Vermont GIS community, including Vermont's regional planning commissions, commercial GIS firms, and numerous state and federal agencies. I would also like to acknowledge the VCGI staff for their assistance in the production of this document.

David F. Brotzman , VCGI Executive Director



January 15, 2004

Honorable Jim Douglas
The Statehouse
Montpelier, VT 05602

Dear Governor Douglas,

The Vermont Center for Geographic Information, Inc. (VCGI) is pleased to provide you with the Vermont Geographic Information System's (VGIS) Annual Report, **Vermont GIS 2004: A Status Report**. This year's report focuses on VCGI's achievements as well as the growth and development of the state's GIS community. Also included is a perspective on the future priorities of VCGI including a recommendation to enable the pursuit of greater efficiency and GIS data sharing in Vermont government.

Achievements for the past year include:

- Creation of initial data partnerships in what is hoped will eventually become a statewide GIS data sharing partnership that provides the opportunity for all state partners to quickly and easily access the latest, most accurate, available GIS data.
- Training and educational support to Vermont's First Responder community in the fundamentals of GIS to enable them to use GIS as a supporting technology.
- Professional support to the State's Dept. of Public Health and the Division for Historic Preservation in building their own GIS system capabilities.
- Continued significant improvement in VCGI's Internet based data services and mapping access for the Vermont GIS community.
- Data development support to VTrans for their new Linear Referencing System project.
- Yearlong support to Vermont Emergency Management's efforts to increase the use of GIS in their emergency planning, response and mitigation work.
- Continued development of the state's river and stream data layer at 1:5,000 scale allowing integration of the state's environmental information by the Agency of Natural Resources.
- Continued financial and technical support for the completion of the Vermont Statewide Soil Data Survey to be completed to SSURGO national standards.

Financially this has been a challenging year for the organization but we continue to support the general public and the state government with free or very low cost GIS related services. Most importantly, as the state looks to decrease costs through efficiencies in government we believe VCGI can play a key supporting role by coordinating the state's GIS resources and maintaining the standard for data sharing and data quality.

Copies of this report have been distributed to the Vermont General Assembly and to agencies participating in the Vermont GIS. Please feel free to contact me at any time if you have any questions or comments.

Sincerely,

David F. Brotzman
Executive Director
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2003 ACHIEVEMENTS

2003 was a year with some successes and some difficulties for VCGI. The organization continues to increase our support services to agencies and organizations that are just starting out in GIS technologies. There were several successes this year in that particular strategic area. Unfortunately, along with those successes in the outreach arena we have not seen the growth in participation that we would like in the statewide enterprise GIS data sharing agreement. This year we saw only a few of the leading GIS technology supporters in the state participate in the enterprise GIS at even a limited level.

Vermont's Geographic Information System (VGIS)

VCGI's support to the development of quality GIS data within the State continues to remain our primary focus. Given our charter, it is unlikely this will change in the near future. During 2003, VCGI continued to focus heavily upon upgrading two critical data types, Transportation Data and Hydrographic Data.

This past year VCGI worked to support VTrans in the development of their Linear Referencing System and parts of their new Route Log System. The Route Log System in particular is a major upgrade to VTrans's information technology that integrates much more Road and Transportation related information into a single integrated GIS enabled data system. VCGI provided some development support to this initiative through our efforts with the Linear Referencing System. While this work was only a small part of the full effort necessary by Vtrans and their contractors we were proud to be able to support an effort of this quality.

2003 was also the last year of our Innovative Partnership with USGS in the development of a statewide 1:5,000 scale hydrographic data layer completed to National Hydrographic Data (NHD) standards. This was a three-year effort that enables Vermont to be the first state to have hydrographic data at this scale and quality on a statewide basis.

In an effort to make the best use of this hydrographic data VCGI has been working closely with ANR's Water Quality Division to continue to upgrade the usability and value of this data and also integrate the states environmental information. Through the work with ANR, the RPCs and other groups that use the hydrographic data in their planning and mitigation efforts Vermont currently has

an excellent information resource available for unrestricted public access.

Over the past two years VCGI has systematically planned and implemented a strategy that would enable Vermont State agencies to take advantage of a statewide enterprise GIS data sharing strategy. Two years ago we purchased the hardware, software and training necessary to make the shift to an enterprise GIS. Last year we upgraded our Internet data access to further support this initiative. This past year we began the process of convincing the major GIS implementers in the state to participate.

Interest and participation in the statewide enterprise GIS has been limited, but we have seen some positive developments. Currently, ANR and the Chittenden County RPC are participating at a limited level. There is some interest from the UVM Spatial Analysis Lab, VTrans and others. We would like to see participation in this initiative increase in the upcoming year.

Every year VCGI personnel work to find new sources of GIS data throughout the state and upgrade existing data sets that are currently available and 2003 was no different in this regard. While these new or upgraded data sets are too numerous to mention here there are some notable additions. This year VCGI helped upgrade the state's administrative boundary, dam, sprawl, road, bridge and culvert data just to name a few. The process of providing upgraded data is not dependent upon VCGI alone. In many cases we rely on other agencies to release their latest available data. This year, as in years past, ANR, VTrans and E911 were the largest providers of this upgraded data.

Statewide GIS Advocacy

Every year VCGI attempts to provide those agencies, departments or organizations in the state that wish to use GIS with our expertise in helping them get started. GIS technology is not a difficult technology to use but many resources can be wasted in poorly planned implementations or abandoned startups. This year we provided implementation expertise to the Departments of Historic Preservation, Public Safety, and Vermont Emergency Management in their efforts to implement a GIS into their business processes. We also provided very low cost GIS training to Emergency First Responders through a partnership with the Vermont Police Academy. The increased exposure of emergency personnel to GIS technology remains a focus of our organization. As Homeland Security considerations become more critical to State disaster planning and mitigation GIS technologies provide an effective suite of support tools for emergency personnel.

VCGI continues to provide GIS data and VGIS products on CD for a nominal cost. VCGI will continue to offer the current suite of products on a continuing basis but the primary focus of our data and product distribution will remain the Internet.

In the past year VCGI personnel also provided GIS related professional expertise and support for the following organizations:

- Chittenden County Metropolitan Planning Organization
- Vermont Bridge and Culvert Committee
- Vermont Local Roads Program
- Vermont Senate Transportation Committee
- Vermont Dept. of Water Quality
- Vermont Emergency Management
- Center for Rural Studies at UVM
- UVM Extension
- UVM Spatial Analysis Lab
- Vermont Dept. of Education
- Vermont Division of Historic Preservation
- Vermont Dept. of Health
- Vermont Police and Fire Academy
- Vermont Senate Agriculture Committee
- Vermont Town Officer Educational Conferences
- Vermont Public Service Agency
- Vermont Natural Resource Conservation Service
- Private GIS Consultants throughout the state
- Central Vermont Chamber of Commerce
- Vermont Regional Planning Commissions

2003 saw the beginning of major change in the way GIS is seen throughout the country. New and innovative data collection and data integration strategies are being implemented as the underlying technologies mature. GIS is being seen as critical technology for all levels of government and business activities. Federal and State Agencies have mandated the cross agency integration of GIS information in an effort to save resources and provide one common information source from which to implement their business processes.

CONCLUSION

VCGI continues to represent Vermont in the leading edge of GIS technologies to the best of our abilities. We continue to advocate for statewide data availability and data sharing and we continue to support those in our state that are interested in pursuing GIS technologies for the first time. It is our hope that others in the state will see the wisdom and advantages to these pursuits and expand their partnerships with VCGI in our pursuit of these goals.

I. VCGI Projects and Partnerships

This section of the Report provides the reader with some of the important activities and projects pursued by VCGI over the last year. It also provides examples of our working relationships with multiple Federal, State Agency and non-profit partners.

USGS Innovative Partnership: This project was a multiyear Federal grant with the United States Geological Survey to address the development of a large-scale, high quality surface water (hydrography) data set for the State of Vermont. Existing data were integrated with new information to create a seamless hydrographic data layer, which supports many critical uses in the GIS community. This project spanned a 3 year period starting in Sept. 2000. 2003 was the final year of the contract and VCGI is putting the finishing touches on the full data set as of the writing of this report. At completion, Vermont will be the only state with statewide 1:5,000 scale hydrographic data completed to National Hydrographic Standards.

Vermont Agency of Transportation: VCGI has a yearly contract to provide technical assistance to VTrans in the form of GIS support services and other technical support services that enhance agency objectives.

The following tasks were some of the tasks completed as part of the VTrans/VCGI partnership during the 2003 timeframe.

- Corrected railroad centerlines against 5K orthos and generated a rail line LRS system (preliminary release).
- Documented and loaded many new VTrans data types into VGIS Data Warehouse.
- Integrated over a dozen towns worth of culvert data into the master bridge and culvert layer (TRANSTRUC)
- Completed the data required for LRS2002, which will be used with VTrans's new Route Log System.

E911 Technical Assistance Contract: VCGI has a continuing agreement with the Enhanced 9-1-1 Board to provide technical assistance in several areas relating to the GIS data underlying the E911. Tasks include revising specifications & quality control (QC) procedures, quality assurance of E911 data, updating metadata for these data, and integrating the specifications and procedures with E911's standard operating procedures. VCGI reviews the data distributions from E911 every two months, updates the metadata and makes the data available to the public.

Vermont Emergency Management: VCGI continues to support VEM in their efforts to implement an automated emergency response management application. VEM is currently using a GIS web service mapping demonstration capability that we supplied to them for exercises and planning purposes. This web service application demonstration is an example of the service that VCGI could supply to all state agencies interested in using a GIS base map for their organization without the overhead of learning to be a GIS professional. VEM has started to use the web service for exercises and internal projects. We are

seeing an increase in interest in GIS related capability for this organization. VEM has requested that we continue to develop their web service application in the upcoming months. During 2003 we also supported VEM in their assessment of what GIS data resources may be available statewide for use in an emergency.

Vermont Department of Economic Development: VDED has initiated an MOU with VCGI to provide GIS services. Under this agreement VCGI is currently providing map graphics representing the telecommunications infrastructure in Vermont for use on the VDED web site. This work will continue with VDED on an as-needed basis

EPA/ANR Surface Water Grant: ANR, with VCGI as a subcontractor has been awarded a grant to create a statewide flow regime model. Rod Dehner at ANR Water Quality Division has accepted VCGI as a partner to an EPA Network Information Exchange Grant that specifically supports the further development of National Hydrographic Data in Vermont. VCGI would partner with USGS and ANR in development of this data model. Part of the work is being subcontracted through VCGI to USGS in New Hampshire. We started the work in October of 2003 and the full contract will take 2 years to complete.

ANR Impaired Waters: VCGI is also performing an additional, but much smaller project with ANR, Water Quality Division, that would develop data defining watershed boundaries for the designated impaired watersheds in Vermont. As part of the contract ANR is requesting a set of hardcopy map graphics for the impaired watersheds for use in discussions and demonstrations.

Institute for the Application of Geospatial Technology (IAGT) Mini Grant : In July a partnership composed of GIS professionals from UVM-SAL, CCRPC, City of South Burlington and VCGI submitted a grant to the NASA funded IAGT in New York. The grant was successful and work began in October of this 2003 with the acquisition of 2.4 meter multi-spectral satellite imagery over South Burlington. The grant was developed to create an impervious surface data set for the city of South Burlington using the high resolution multi-spectral satellite imagery. Leslie Morrissey and individuals at UVM-SAL will set up the image processing for the impervious surface analysis using the 2.4 meter imagery. Then CCRPC personnel, Pam Brangen and Michele Maresca, will work on completing production of the final dataset. City of Burlington personnel will help with proofing and reviewing the data and they will be the receivers of the data. VCGI will administer the contract, provide project management and reporting to IAGT.

Center for Rural Studies (CRS) – Indicator Project: The Center for Rural Studies at UVM has contracted with VCGI to upgrade the Vermont Indicators website originally developed by the same team a few years ago. Over the years VCGI has maintained the site and provided minor software upgrades. The Vermont Indicators website is an interactive mapping application that can be used by towns across Vermont in the development of their Town Plans. The Vermont Indicators site provides access to the Town's most up-to-date census and demographic data as well as the ability to compare statistics with other towns and within the entire state. VCGI will be subcontracting for some of the work at the request of CRS.

Chittenden County Metropolitan Planning Organization: VCGI participated on the Steering Committee to develop a state-of-the-art decision-support system (DSS) for transportation-land use planning in Chittenden County. A contractor was selected by the committee and work on the

development of the tool was completed this year. The final, delivered version of the DSS is currently being used by the CCMPO in their efforts to support Transportation planning initiatives.

USGS Grant Evaluation Team: On June 19 and 20 David Brotzman participated as an evaluator on the USGS CAP proposal team in Ottawa, Ontario. This team of international GIS professionals evaluated the Category 5 Innovative Partnership proposals specific to the Canadian/US data partnership development for USGS.

Technical Advisory Committee: Currently there are 15 members on the GIS Technical Advisory Committee (TAC) representing a good cross section of the different perspectives of the professional GIS community in Vermont. This past year the TAC pursued the development of a set of GPS receiver user guidelines for the state. While not complete at this time that effort is expected to be complete by late spring. The TAC did complete a Bridge and Culvert data standard. It was made available in final format for the public and it was accepted by the Board of Directors at the March meeting.

II. Vermont Spatial Data Infrastructure

VCGI's 2004 Annual Report provides the Governor, the Vermont General Assembly, and our citizens with information about Vermont's steady progress in building a high quality *Vermont Spatial Data Infrastructure*.

This section provides a status on these base data layers.

A. DIGITAL

ORTHOPHOTOGRAPHY Orthophotographs are detailed aerial photographs from which all distortion has been removed. Since 1975 Vermont has provided orthophotographs showing taxpayers their lands and buildings at 1:5,000 scale. These pictures can be measured reliably, and they remain a crucial tool in local planning and development efforts. As of 1994 these photos were being made available in both digital and hardcopy format

Some towns and cities also have, at their own expense, paid to purchase additional orthophotography at the larger scale of 1:1,250, thereby enabling greater feature definition of ground objects and increased feature recognition. Towns or Cities that have 1:1,250 orthophotos as of this report are;

- Barre City
- Randolph Village
- Winooski
- Burlington
- S. Burlington

Status: As of the fall of 2001, the latest digital orthophotographs were available for the entire state. The current suite of statewide orthophotography is in black and white with 'leaf off' vegetation to meet the statutory requirements of the Vermont Mapping Program. Having statewide coverage now available it is time for the state to follow through on updating the current photography on a regular basis with full state update coverage being completed every five years.

The statewide orthophoto base is a tremendous asset for local and state planning and research efforts. It provides a common, accurate base upon which the important issues of resource management, economic development, pollution control, emergency management and many others can be pursued.

Unfortunately, these photographs inevitably become less valuable with time as new development takes place and local land use changes. For this information to remain viable it is necessary to recollect orthoimagery on a continuing basis. By recollecting every five years the state will maintain a realistic balance between the availability of funding and the operational need for updated photographs. As new photographs are taken the state will also gain advantage from the previously existing photographs as a historical record. With each

subsequent collection of photographs the state will develop a more robust library of historically accurate spatial information in support of development trend and land change analysis.

B. TRANSPORTATION Vermont's transportation data layers consist of road centerline, railroad, bridge, and other associated information (ex: traffic volume, accident locations, etc.). The quality of transportation data in Vermont is nationally recognized as being very high.

The state has two primary road centerline data layers; one maintained by the 1) Vermont Agency of Transportation (VTrans), another maintained by the 2) Enhanced 911 Board (E911). VTrans and E911 have specific application requirements which have resulted in the creation of two distinct road centerline layers. VTrans' road centerline data layer identifies all public and most private roads, including road class, surface type and route number. E911's version includes some of the same attributes, with the addition of all public and private roads as well as road name and address range information. E911 maintains a separate layer depicting long driveways (to facilitate emergency response).

VCGI maintains a statewide bridge and culvert layer. The layer is maintained in collaboration with VTrans and Regional Planning Commissions (RPCs). The layer includes all known bridges in the state of Vermont, and all major culverts (> 6 ft) on Interstate, US, and State highways. Local culvert data has also been integrated into the statewide layer for a number of towns.

Status: This year VTrans and VCGI completed several initiatives critical to the success of VTrans' new Route Log System, including a new Linear Referencing System (LRS) data layer (LRS2003). VCGI generates a LRS data layer annually based on the latest route information and road centerline data.

Nearly a dozen local culvert datasets were integrated into the statewide bridge and culvert layer this year. VCGI will be working closely with VTrans and RPCs to update this layer, and integrate additional culvert data from local municipalities. VTrans has also received funds this year to develop a bridge and culvert inventory software package for RPCs and municipalities. VCGI, along with several other agencies (eg: ANR), are collaborating with VTrans on this important initiative.

VCGI will continue to encourage state agencies, RPCs, and others to utilize existing VGIS transportation data standards in order to ensure all data gathered by state agencies is in a form "compatible with, useful to, and shared with" the Vermont Geographic Information System (VGIS).

C. LAND COVER Accurate land cover data allows Vermonters to better visualize the choices in economic growth and natural resource protection. Land cover data shows areas broken down into many categories of Forests, Wetlands, Water, Rock,

Cleared Land, and Urbanized landscapes. This imagery combined with on the ground verification can provide foresters and agricultural experts detailed information such as breakdowns in forest and crop types. Combined with other Vermont data we can make important observations about changes to our productive lands, protection of ecosystems, and where we can encourage development with least harm to important land areas.

Status: Land Cover data suitable for use at county or regional scale mapping and analysis has been derived from satellite imagery (LANDSAT Thematic Mapper), and is highly compatible with similar data for New York and New Hampshire. The database was completed in September 1997, after years of effort by the contractor and VCGI staff, with funding support from the Lake Champlain Basin Program, the Northern Forest Lands Resource Inventory, and the EPA.

The Spatial Analysis Lab at UVM has also completed a 2002 Land Cover analysis for the state that specifically identifies publicly and privately owned conserved lands. Only parts of this data are publicly available through VCGI as privacy issues remain that relate to land ownership for some of the property. Additionally, USGS has undertaken a small scale source (30 meter imagery) based collection of Land Cover data over the Northeast in support of a national Land Cover / Land Use dataset. This data set is not yet completed but when it is it will be made available for public access. Lastly in 2003 the Farm Services Agency completed a visual survey of farmland across Vermont as part of a nationwide effort. This survey identifies the spatial extent and crop type for farmland across the state. Though complete in Vermont this information is not yet available to the public because of privacy issues being worked at the Federal level.

It would seem from these efforts that the state has an adequate amount of Land Cover data available. Unfortunately, this is still not true. Much of the available data is either of too small scale to be applicable for regional and local planning or too old to be accurate enough. A large scale, single standard statewide Land Cover / Land Use data set remains one of the most desired data types in the state particularly in the areas of the state where loss of prime farmland is occurring. The development and acquisition of Land Cover related data is becoming a more pressing concern as the state determines its environmental, planning and economic development priorities.

D. REGULATORY WETLANDS

Wetlands are a key feature needed both by planners and environmental officials and by commercial interests. They are necessary for identifying growth centers, areas to protect, and areas suitable for development. A standardized statewide wetlands database allows both public and private interests to identify areas of possible state regulatory concern. This data should not be used to replace in-the-field assessment of any particular site; rather, it should be used as a starting point in the permitting process.

Status: Maps provided in the late 1970s by the National Wetlands Inventory

(NWI) program show the approximate locations of wetlands regulated by the State of Vermont. Vermont's Significant Wetlands Inventory (VSWI) includes many of the wetlands delineated on the National Wetlands Inventory. The complete VSWI data base and the official maps produced by ANR from this data are useful for indicating the approximate locations of wetlands that are recognized by the Vermont Wetland Rules. The statewide database is complete, and ANR has completed the time-consuming checking of individual town maps prior to release of certified copies.

However, the availability of data representing the accurate positional location of wetlands across the state remains an issue. 1:5,000 scale minimum, single standard, positionally accurate, field checked wetland data is sorely needed across the state to meet the needs of planners, land owners, and town personnel just to name a few.

E. CADASTRAL or PARCEL DATA

In 1988 Vermont's five-year GIS plan identified municipal parcel boundaries as a fundamental database to support local planning and development. Dozens of towns had invested in high quality maps over the years, and state funding (1989-91) supported conversion of maps into GIS databases.

GIS formatted parcel data help municipal officials to assure a more accurate property tax assessment. Towns link the parcel data to their Grand Lists and then can map detailed local tax information. Municipal tax officials, realtors, planners and developers use this data to show taxpayers how proposed development or changes in municipal services and regulations will affect them and their neighbors. In many towns parcel data helps to assure fair tax distribution, plan bus routes and other services, provide public notices, and many other municipal services.

Mapping can cost communities tens of thousands of dollars, depending upon the town's area and number of parcels. Most towns that have mapped parcels have difficulty finding time to update them. Of those that do not have mapped parcels, only a few towns have had the resources to contract for the initial mapping (in the absence of state financial help.) As Vermonters apply increasing scrutiny to their relative property tax burden, and planning and zoning issues increase in importance, those towns without this crucial data resource are at a disadvantage in providing information to citizens, and in assuring equitable distribution of financial burdens.

Status: During the fall of 2002, VCGI's outreach coordinator collected information from the Regional Planning Commissions regarding the status of digital parcel mapping in VT. Each RPC's GIS Specialist was asked to provide information regarding whether towns had paper maps and digital parcel data, as well as whether the RPC played a role in archiving or maintaining that data. VCGI staff had previously collected similar data in 1998.

Not surprisingly, Chittenden county has 100% coverage in digital parcel data, while northeastern and northwestern counties all have less than

50% coverage. This difference is likely due to the greater development pressure found in Chittenden county as compared to the northern corners of the state. Lamoille and Washington counties also both have greater than 80% coverage. The change seen from 1998 to 2002 seems to reflect only a gradual increase in the number of towns with digital parcel data, rather than any particular area showing an accelerated increase. Overall, 62% of VT communities have digital parcel data now, as compared to 53% in 1998. That slow rate of increase is likely to continue given no other changes in the situation and without the availability of funding support to the towns for this purpose.

F. ELEVATION DATA

Elevation data consists of Digital Elevation Model (DEM) data and contour information. DEM data provided by the U.S. Geological Survey (USGS) have been obtained by VCGI for redistribution. Contours were generated from the DEMs and can be used effectively to show general topography. The requirements for digital elevation data are becoming more rigorous as more applications are developed to use the data. Digital Elevation data is required for 3 dimensional representations of land modeling. Land modeling is often done to provide support to planning and economic development as well as environmental analysis.

Status: Updated and accurate Digital Elevation Model (DEM) information with 60 meter gridded post spacing is available for the entire state. The data was created as part of the statewide Orthophoto program and conforms to the 1:5,000 scale orthophotography.

1:24,000 scale based gridded digital elevation data is available through VCGI. This data was created by the United States Geological Survey as part of a national program based on their 7.5 minute topographic maps. 1:250,000 scale based gridded data is also available. While not as accurate on the post as the elevation data available through the orthophoto program this data is still useful in some applications and it does conform to national standards. While statewide DEM coverage is available in Vermont with 30 meter post spacing, at the end of 2003 VCGI started a process whereby that data will be 'densified' to a 10 meter spacing. This doesn't make the data more accurate but it does increase the usability of the data for larger scale projects. It does not replace the need for individually sampled 10 meter post spaced elevation data.

G. SOILS

For many years the State of Vermont has shared with the Natural Resource Conservation Service (NRCS) of the US Department of Agriculture the costs of the "Cooperative County Soil Survey."

NRCS specialists work county by county, taking detailed samples of soil characteristics, agricultural and septic suitability, slope and many other features.

After years of checking, testing, and map making this information is published in county soil survey publications, in great demand by farmers, foresters, developers, planners and others.

Status: The Vermont Soil Survey Program at NRCS provides a digital soil survey for each county to the people of Vermont through the Vermont Center

for Geographic Information (VCGI). Eleven counties now have a digital soil survey that is available at VCGI. They include the following counties: Addison, Bennington, Chittenden, Franklin, Grand Isle, Lamoille, Orange, Rutland, Washington, Windham, and Windsor.

Ten county coverages of soil data are nationally (SSURGO) certified. They are Addison, Windsor, Bennington, Franklin, Lamoille, Rutland, Washington, Orange, Grand Isle and Windham Counties.

The soil surveys for Chittenden County are out of date and do not meet SSURGO or VCGI standards for soil surveys. These soil surveys were digitized in the early 1980's and NRCS needs to conduct extensive quality control work to ensure that they meet state and national standards for digital soil surveys. Caledonia, Essex, and Orleans counties will be digitized after the mapping is completed in those counties. Orleans County is currently mapped and the digitizing is 90% complete as of this report.

The remaining counties are scheduled to be completed and submitted for SSURGO certification in the following order, as long as funding remains at current levels:

- 2004 Orleans, Chittenden, (If SSURGO Certification is practical)
- 2005 Caledonia County
- 2010 Essex County

H. HYDROGRAPHY

The rivers, streams, lakes and ponds that carve and drain Vermont's rugged landscape are now accurately represented and attributed in the Vermont Hydrography Dataset (VHD). For the first time it is possible for public and commercial entities to "index" their data to a common, statewide surface water framework that is consistent in scale, attribution and production methodology. Users in water related planning activities as diverse as Emergency Management, Water Quality and Transportation Infrastructure are now more readily able to coordinate activities and improve data sharing through this spatial framework. In the last two years VCGI has developed partnerships with parties, i.e., sections within the Water Quality Division of VANR, interested in utilizing VHD data and associated tools to support their work. VCGI plans to continue this support and reach out to other agencies, e.g., Vermont Emergency Management, that can benefit from highly accurate surface water data. In addition to statewide digital orthophotography, E911 related data sets and large scale DEM data currently under development, the VHD compliments high quality data available in Vermont.

Status: The three-year partnership with USGS, Vermont ANR and the RPC's, has produced a statewide surface water data layer compliant with the National Hydrography Dataset (NHD) standard. The data is being upgraded for accuracy of delineation and attribution at the subbasin level, i.e., 8 digit

cataloging unit, using the 1:5,000 scale statewide orthophotography as a base.

The 1:5,000 scale Vermont Hydrography Data set, in its second and final phase of construction is 93% complete. Phase II has produced a "Certified" version of the data set that is NHD compliant and populated with a wealth of attributes conflated from the 1:24,000 scale surface water data. The two outstanding subbasins (the Connecticut River Bellows Falls to Vernon Dam and Middle Connecticut River) require essential support data under construction at the USGS and will be finalized by spring 2004. Until that time "Pre-release" versions of this data are available on the VGIS.

As of the end of 2003 the following watersheds have been "Certified" and are available to the public:

Black-Ottauquechee Rivers
Connecticut-Johns River to Waits River
Connecticut-Waits River to White River
Deerfield River
Hudson-Hoosic Rivers
Lake Champlain
Lake George
Lamoille River
Mississquoi River
Otter Creek
Passumpsic River
St. Francois River
Upper Connecticut River
White River
Winooski River

I. GEODETIC CONTROL

Geodetic survey horizontal and vertical control points are generated from National Geodetic Survey data maintained by the Vermont Agency of Transportation - Geodetic Survey Unit.

Status: This data set exists statewide primarily in association with the state's road network. Additionally, the Geodetic Survey Unit maintains a Continuously Operating GPS Reference Station (CORS) at 133 State Street in Montpelier. GPS users download the data and typically use it to "correct" the GPS data they have collected in the field in order to generate more accurate coordinates. In June 1996, the CORS was included in the Federal CORS Network.

J. POLITICAL UNITS

Political units consist of town boundaries, counties, supervisory unions, administrative boundaries and legislative districts (house and senate).

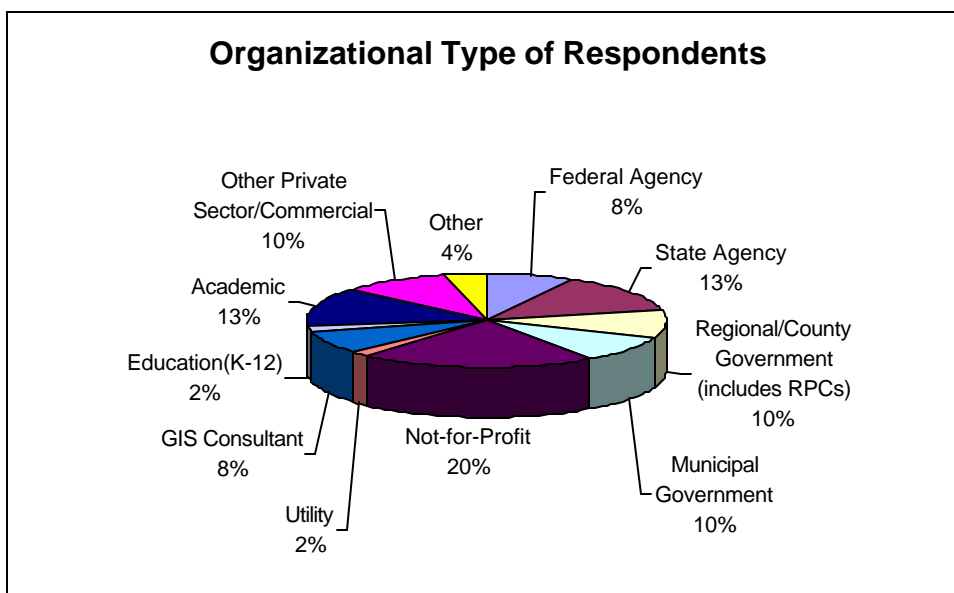
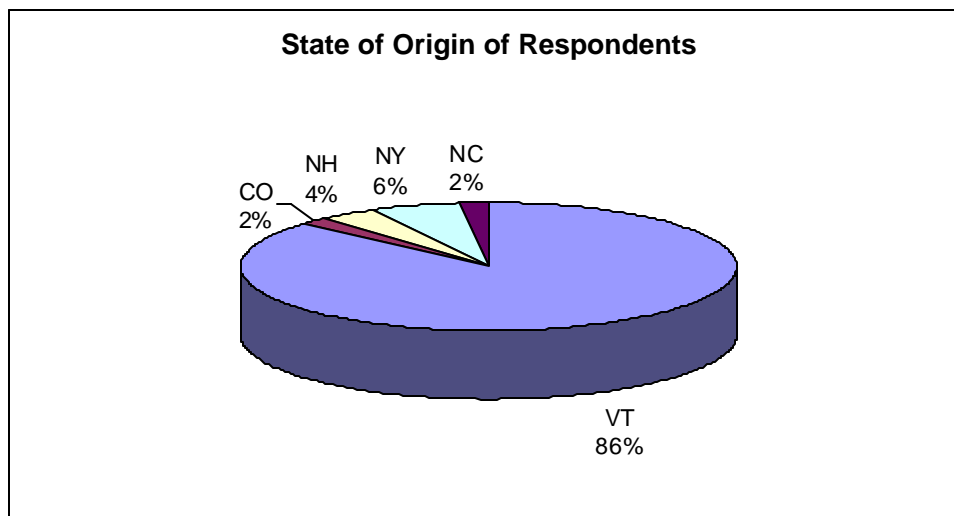
Status: Statewide coverage defining, Town, County, Regional Planning Commission, Supervisory Union and School District boundaries are available as well as VTrans' Downtown and Urban area designated boundaries. State Senatorial and House district boundaries data that reflect the 2002 legislative

redistricting efforts within the state is also available. During 2003 VCGI updated the accuracy of many town boundaries by reviewing any changes in State statutes (since 1998) that would have impacted existing town boundaries. Those changes as well as any boundary updates provided by the Towns or Regional Planning Commissions and verified by another source are integrated into the currently available boundary data layer for the state.

III. Customer Survey Results

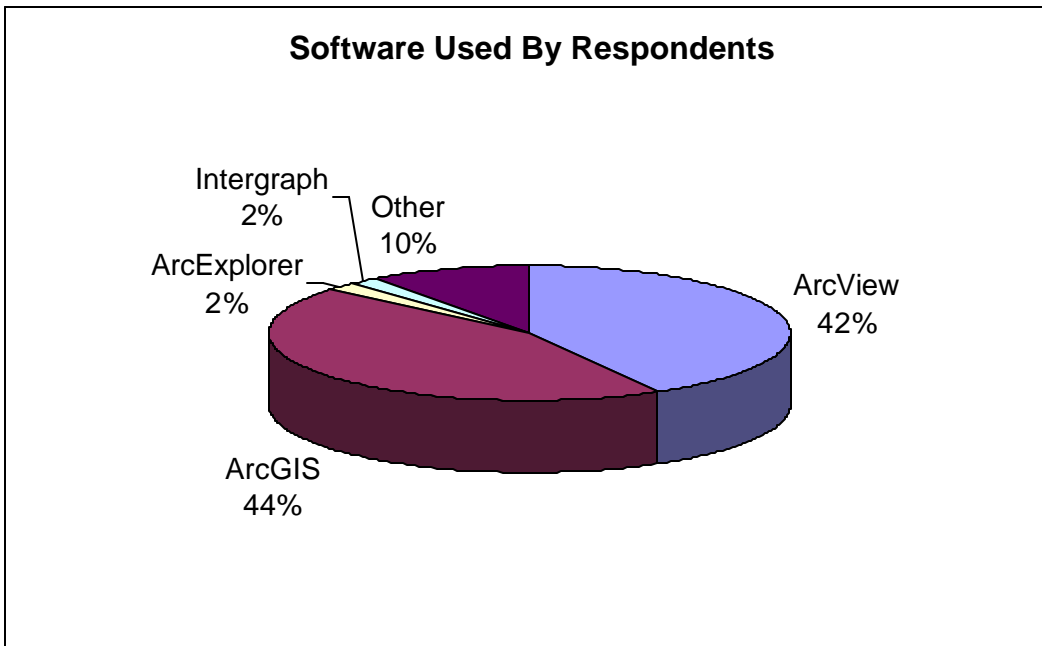
Every two years, in accordance with our statutory responsibility, VCGI takes a public poll of its customers in an effort to help determine customer satisfaction. During the summer of 2003, VCGI sent postcards to everyone on our mailing list, posted a notice at the website, and sent an email out over the VGIS-L listserv announcing that the web-enabled 2003 customer survey was available at the website. Information on how to obtain a PDF or paper survey was provided, but no one took advantage of this option. Two months later, 52 people had entered their responses.

DESCRIPTIVE INFORMATION ABOUT RESPONDENTS



The chart above shows a more evenly divided variety of respondents compared to previous years. An interesting change is that the private sector went from 38% two years ago to 10% this year, while not-for-profit

went from 4% to 20%.



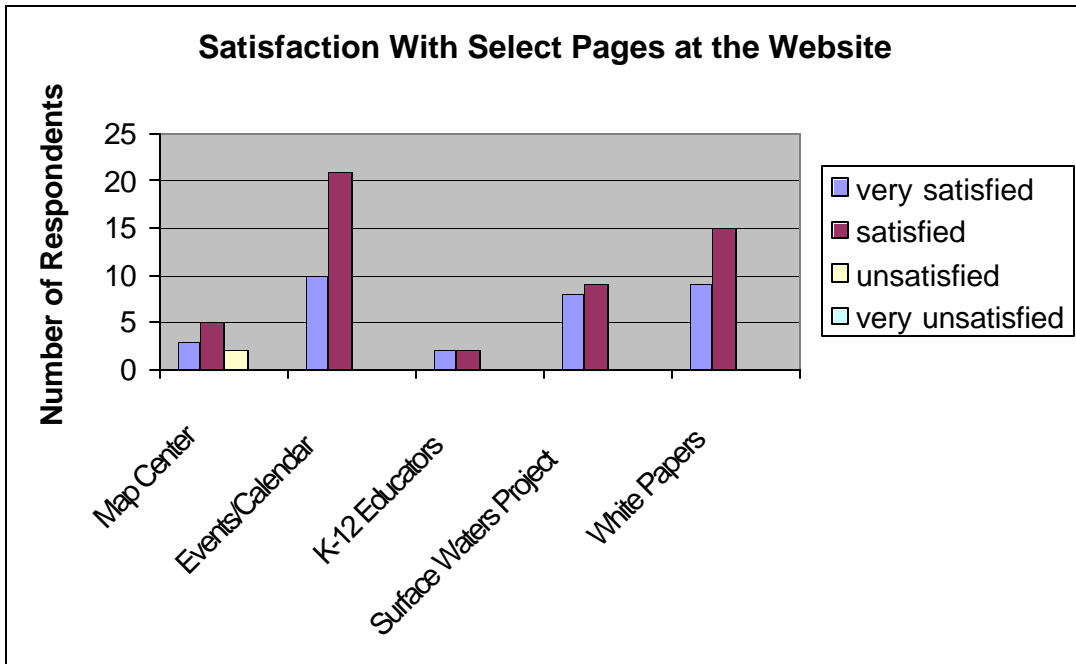
Not surprisingly, most respondents are using ESRI's "ARC" products, although respondents included the following software in the "other" category:
ERDAS, Autocad Map, Maptitude, and IDRISI.



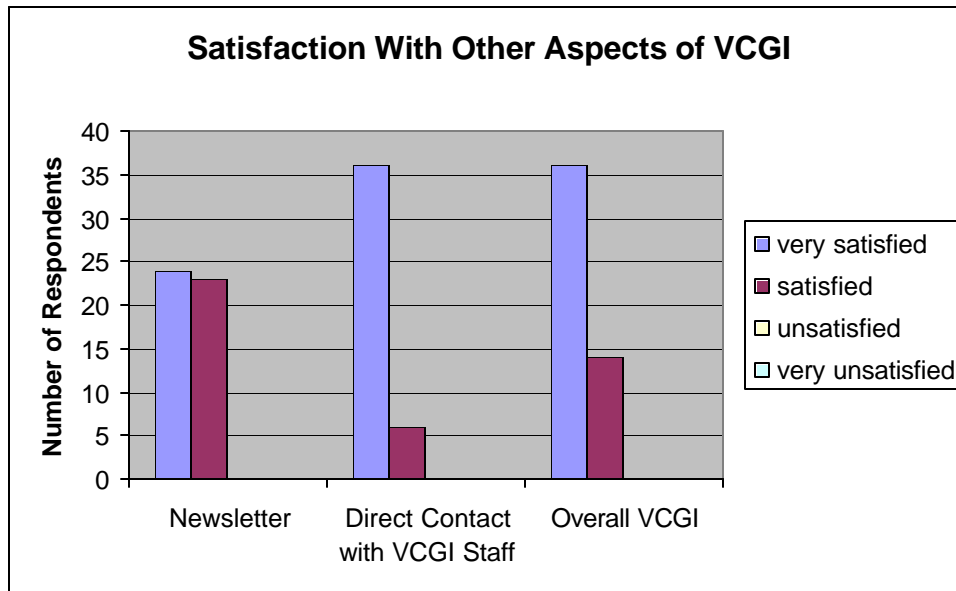
The graph above indicates that VCGI's customers continue to be satisfied with the website, though there is an indication that we should make extra efforts to improve our help pages.



The data warehouse is the most important part of VCGI’s website for many GIS professionals in Vermont. It appears the warehouse is still meeting the needs of the GIS community, and they have confidence in the quality of the data provided.



While usage of some pages of the website is quite a bit lower than the data warehouse page, those who do visit the pages seem to find value there.



It is encouraging to see that respondents were happy with one of the most important products (besides data) VCGI provides, the newsletter, as well as their contact with staff and with the job VCGI is doing overall.

A REPRESENTATIVE SAMPLE OF RESPONSES TO OPEN-ENDED QUESTIONS:

Which data layers, that VCGI currently distributes, should be updated in the next year?

- Roads & E911 data (yes it's already updated regularly, just reiterating its importance), natural resources data (deeryards, natural heritage data).
- More Geology, Flood Plains, Soils .
- It would be nice to see a more accurate roads and trails layer.
- Efforts with Town Boundaries is excellent, continued effort is requested over the course of the next year. New parcel data layers would be good to have updated. Updated land use/land cover could be useful.
- Emergency Management Districts or Regions.

Which data layers should VCGI develop or help to develop?

- Imagery (aerial and satellite), high resolution DEM, statewide soils .
- Keep at soils and surface waters. Update other data to 1:5,000 scale where possible. Power lines from the utilities.
- Distribute town parcel data even if transparently from RPC or other server. I use parcel data a lot and it is difficult to go from town to town and RPC to RPC to collect and update.
- Land Cover change.
- Impervious Surfaces, Land Use/Land Cover.
- It would be very useful to have a set of Soil Potential Index (SPI) data available for Vermont.

- Public Works, Public Health, Safety.
- Parcel data is a difficult one, but it would be very helpful having a place to obtain this.
- It would be great to have USGS 1:24,000 DRG topo maps available online as NH and ME do.
- Data to support statewide Emergency Management and security would be helpful.
- Would be nice to have the state digital orthoquads from tax mapping department on here to download.

What products, services, or events would you like VCGI to provide/host?

- Continue with VSDP roundtables.
- Be proactive and start providing geodatabase download file structure to help drive the use and distribution of data in that format.
- Satellite imagery.
- There have been a number of questions circulated to the mailing list in the last few months that have elicited several responses from users. How about creating a bulletin board at your site with the questions, responses and links to any scripts, etc. that users provide?
- Possibly promote more users group activities.
- Perhaps create an online message/help forum for VT GIS users to share thoughts/problems/solutions.
- Make digital orthophotos available online for download and/or viewing.
- Continue to provide workshops and annual conference.
- Training days for different levels of users.
- Continued efforts defining standards and guidelines for data. Working with State Agencies to leverage geographic data using GIS to simplify processes and add efficiency.
- Please consider open source GIS software, applications and projects; also, Public Participation GIS.

How else can VCGI support you in your use of GIS?

- Stay the course, you are a great resource for the state.
- Provide access to satellite imagery and a broader array of aerial photography (new and archived).
- Continuing to coordinate training opportunities, especially as ESRI seems to believe that constant change is a good thing.
- I think VCGI provides a great service and is doing a great job.
- Continue to encourage people to share information about their work, and share their GIS data.
- More hands-on computer lab trainings (for low cost).
- Continued access to data and resources. Assistance in the review of data and hosting of data products. Continued white papers and exploration into new areas of GIS within Vermont.

- Nice if VCGI could work with RPCs to bring parcel level data to one source.



IV. Strategic Direction

This section outlines the key components of the five-year strategic plan approved by the VCGI Board of Directors in June 2001.

MISSION VCGI will pursue a comprehensive strategy for the development, maintenance and use of the Vermont GIS, and provide GIS services and support to all Vermonters.

GOALS VCGI will accomplish its mission by:

- Assuring that all VCGI data is of high quality and is compatible with, useful to, and shared with other public-sector data users.
- Encouraging the same high standards of quality and compatibility in other Vermont GIS cooperators.
- Promoting the efficient development and use of geographic information by agencies of the state, its political subdivisions, Vermont businesses and citizens.
- Facilitating the growth of commercial services within Vermont for the provision of spatial data, products, and services.

VISION As VCGI moves to meet the new challenges of the future it needs to broaden its role by facilitating the *use* and *analysis* of spatial information.

ORGANIZATION In January 1992, Governor Howard Dean, M.D. issued an executive order establishing VCGI as a non-profit corporation under the authority of a Board of Directors. The Board includes twelve directors appointed for two-year terms to represent state agencies, regional planning commissions, local government, higher education, private-sector and both chambers of the Vermont General Assembly. The Board has the responsibility for general management of and authority over the property, business and affairs of the center.

VCGI is located in Waterbury, VT. It is staffed by an Executive Director, Business Manager, Outreach Coordinator, two Senior Project Managers, and a GIS Technician. VCGI serves as a clearinghouse for Vermont GIS data.

STRATEGIC DIRECTION Since its inception, the Vermont Center for Geographic Information has focused its efforts on developing data, policies and standards; implementing a web-based data clearinghouse for the electronic distribution of data; and

providing outreach, networking, and information exchange for the Vermont GIS community. These *core activities* are essential functions for the success of GIS in Vermont. As VCGI continues to meet the needs of a changing business area it needs to broaden its role beyond the development of data toward the facilitation of the use of spatial information. VCGI's *strategic direction* is described below:

1. **State and Regional Leader** VCGI will serve as a state and regional leader in GIS. VCGI will pursue opportunities that showcase VCGI at the state, regional and national level. Making Vermont a demonstration state will provide greater opportunities for funding and provide users with GIS application examples. As the GIS market in Vermont is relatively small, regional leadership will provide "export business" for VCGI and its partners.

2. **Private Industry Partnerships** As an enhancement to our export business strategy, VCGI will seek out GIS projects and funding that are suitable for partnering with the private sector. With VCGI serving as project manager, this will enable us to take on larger contracts with partners and/or subcontractors, and bring in the private sector as appropriate. We will be able to create markets for private industry.

3. **Educational Partnerships** VCGI is expanding its partnering efforts with the University of Vermont (UVM) and other educational institutions (including state and private colleges). We will continue with this direction as this type of partnering enhances our opportunities to present a stronger solution to projects that include a GIS component.

4. **Resource to Organizations in the State** VCGI will participate in a Geographic Information Committee with State Agencies. VCGI sees this as a way to facilitate the reduction of redundant activities among different State agencies.

5. **High Tech Investment** VCGI seeks to become a regional test center for new, cutting edge, GIS technology.

6. **Revenue Distribution** VCGI would like to have its revenue distribution such that it receives less than 40% of its total revenue from its State appropriation. In addition, no single grant or contract will be greater than 20% of VCGI's project revenue. The goal is to not be dependent on any one contract or project.

7. **Maintenance Contracts** As VCGI continues in its role as the data clearinghouse for VGIS data, it needs to transition from the initial

phase of establishing data sets for distribution, into the phase of data maintenance. Providing data that is up-to-date and of quality will enhance our data dissemination efforts. VCGI will provide direction for data stewards regarding funding opportunities and technical support for data maintenance issues.

8. Stronger Coordination with Regional Planning Commissions (RPCs) and towns in the area of GIS Services that VCGI can provide include coordinating the development of a comprehensive statewide parcel data layer and providing training on VGIS technical issues.

9. New Markets VCGI has historically worked with traditional GIS segments: state and local government, and education. VCGI would like to explore opportunities in new arenas including but not limited to healthcare and real estate.

10. Organizational Upgrade VCGI will seek to upgrade its internal databases, software control and internet presence over the next few years. The internet has become an increasingly critical component for data access within the GIS community and for VCGI to be responsive to the wide range of users it is necessary for us to expand our current online capacity.

RESOURCES

VCGI is staffed with a very talented group of individuals. This group is motivated and excited about learning new technologies. Staff are willing to be trained in new technologies such as Visual Basic and Map Objects/Internet Map Server to expand our capacity. Some of this training has already taken place for a few staff members and several staff have already been involved in web application development. VCGI will not attempt to keep the web server operational 24 hours a day. VCGI will keep the server maintained during business hours (M-F, 8-5). In the event that specific applications have the requirement to be operational beyond normal business hours, VCGI will work out arrangements with the client for a fee.

A. STATUTORY AUTHORITIES

Act 204 of 1994 (10 VSA Chapter 8) calls for the development of a comprehensive GIS strategy for Vermont, and established the Vermont Center for Geographic Information, Inc.

*§ 122. VERMONT CENTER FOR GEOGRAPHIC
INFORMATION, INCORPORATED; ESTABLISHMENT*

(a) The State of Vermont shall support a comprehensive strategy for the development and use of a geographic information system. . .

In order to develop and implement that strategy, and to ensure that all data gathered by state agencies that is relevant to the VGIS shall be in a form that is compatible with, useful to, and shared with that geographic information system, there is hereby established a nonprofit public corporation to be known as the Vermont center for geographic information, hereinafter called the center, as a body corporate and politic and a public instrumentality of the state.

§ 126. REPORTS AND AUDITS

On or before January 15 of each year, the center shall prepare and submit to the governor a three-year work plan which describes the goals, objectives and activities of the center and cooperating state agencies and other public and private organizations. The plan also should include estimated cost of each major activity of the center, and a report concerning data gathered, documents generated, and problems and opportunities for use of VGIS information.

B. VCGI FINANCIAL REPORTS: FY03 AUDITED

10 VSA 126 require that *“The books of account of the center shall be audited annually and a report filed with the secretary of administration not later than October first of each year.”*

The following financial statements (two pages) have been excerpted from the report and provided by auditors engaged by VCGI. Technical notes accompanying these statements, or copies of the complete report may be obtained from VCGI.

VERMONT CENTER FOR GEOGRAPHIC INFORMATION, INC.
STATEMENTS OF REVENUE AND EXPENSES AND CHANGE IN NET ASSETS
FOR THE YEARS ENDED JUNE 2003 AND 2002

REVENUE	2003	2002
State of Vermont grant	\$370,360	\$376,992
Project income	\$163,907	\$176,527
University of Vermont in-kind	\$0	\$27,500
Reproductions and resale of items	\$8,226	\$8,326
Interest and miscellaneous income	\$3,750	\$4,704
Net Assets released from restrictions	\$0	\$0
TOTAL REVENUE	\$546,243	\$594,049
DIRECT COSTS		
Direct Labor	\$181,729	\$167,348
Payroll taxes and employee benefits	\$59,839	\$54,775
Costs of projects and reproductions	\$10,736	\$19,073
Subcontract costs	\$87,745	\$94,900
TOTAL DIRECT COSTS	\$340,049	\$336,096
OPERATING EXPENSES		
Indirect salaries and wages	\$80,219	\$113,972
Payroll taxes and employee benefits	\$27,958	\$34,374
University of Vermont services	\$0	\$27,500
Travel and training	\$11,721	\$11,267
Computer support and maintenance	\$13,105	\$18,219
Rent	\$26,316	\$0
Depreciation	\$17,705	\$19,651
Professional fees	\$11,613	\$8,986
Telephone	\$4,390	\$4,912
Relocation Expense	\$270	\$7,357
Office Expense	\$5,152	\$4,098
Utility Expense	\$2,217	\$0
Miscellaneous	\$1,293	\$1,944
Bad Debt Expense	\$0	\$230
TOTAL OPERATING EXPENSES	\$201,959	\$252,510
TOTAL DIRECT & OPERATING EXPENSES	\$542,008	\$588,606
CHANGE IN NET ASSETS	\$4,235	\$5,443

VERMONT CENTER FOR GEOGRAPHIC INFORMATION, INC.
BALANCE SHEET
JUNE 30, 2003 AND 2002

	ASSETS	<u>2003</u>	<u>2002</u>
CURRENT ASSETS			
Cash - undesignated		\$65,960	\$63,463
- capital reserve		\$30,000	\$30,000
Accounts receivable		\$30,203	\$21,379
Unbilled receivables		\$0	\$3,625
Prepaid expenses		\$8,725	\$6,690
TOTAL CURRENT ASSETS		\$134,888	\$125,157
PROPERTY AND EQUIPMENT, NET		\$15,402	\$30,331
TOTAL ASSETS		\$150,290	\$155,488
	 LIABILITIES AND NET ASSETS		
CURRENT LIABILITIES			
Accounts payable		\$796	\$3,917
Accrued expenses		\$5,657	\$11,770
Accrued wages		\$10,200	\$10,938
Accrued vacation		\$7,656	\$10,317
Deferred project income		\$31,802	\$28,602
TOTAL CURRENT LIABILITIES		\$56,111	\$65,544
TOTAL LIABILITIES		\$56,111	\$65,544
NET ASSETS			
Unrestricted - Board designated for capital reserve		\$30,000	\$30,000
Unrestricted - Undesignated		\$64,179	\$59,944
TOTAL NET ASSETS		\$94,179	\$89,944
TOTAL LIABILITIES AND NET ASSETS		\$150,290	\$155,488

VERMONT CENTER FOR GEOGRAPHIC INFORMATION, INC.
COMPARATIVE BUDGETS
FY 2003 AND FY 2004

Income	FY03 Actual	FY03 Budget	FY04 Budget	% Change FY03-FY04 Budget
Reproduction/Resale & Misc. Inc.	\$ 10,916	\$ 11,500	\$ 11,500	0.00%
Project Income	\$163,907	\$196,409	\$210,000	6.92%
State Grant Income	\$370,360	\$370,360	\$376,992	1.80%
Interest Income	\$ 1,061	\$ 1,500	\$ 1,000	-33.33%
GROSS INCOME	\$546,243	\$579,769	\$599,492	3.40%
Direct Costs				
Cost of Reproduction	\$7,162	\$8,700	\$3,650	-58.05%
Cost of Projects	\$245,142	\$225,206	\$227,287	.92%
Subcontract Costs	\$87,745	\$88,745	\$140,800	58.66%
TOTAL DIRECT COSTS	\$340,049	\$322,651	\$371,737	15.21%
Net Operating Income	\$206,194	\$257,118	\$227,755	-12.89%
Operating Expenses				
Indirect Salaries	\$80,219	\$106,440	\$97,448	-8.45%
Payroll Taxes	\$6,792	\$7,723	\$7,414	-4.00%
Employee Benefits	\$21,166	\$25,638	\$26,228	2.30%
EMPLOYEE EXPENSE	\$108,177	\$139,801	\$131,090	-6.23%
General Office Expense	\$73,529	\$77,868	\$83,075	6.69%
Travel Expense	\$1,305	\$1,500	\$6,500	333.33%
Board Expense	\$1,244	\$1,700	\$100	-94.12%
Depreciation Expense	\$17,705	\$18,000	\$11,500	-36.11%
OTHER EXPENSE	\$93,782	\$99,068	\$101,175	2.13%
Total Operating Expenses	\$201,959	\$238,869	\$232,265	-2.76%
NET INCOME (LOSS)	\$4,235	\$18,249	-\$4,510	-404.63%