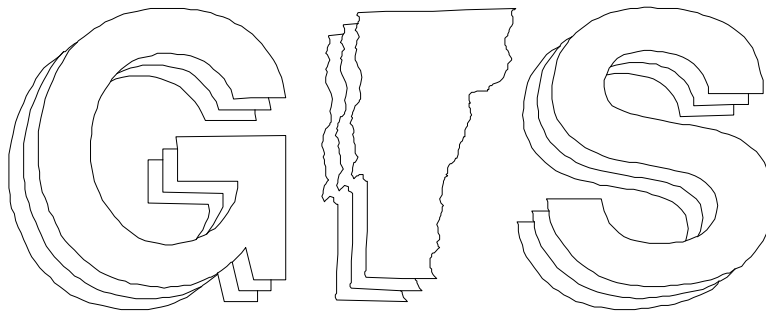


Vermont GIS 2002: A Status Report

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

January 2002



**For
Governor Howard Dean, M.D.**

**and
Vermont House and Senate
Appropriations Committees**

Provided by

Vermont Center for Geographic Information, Inc.

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, 2002

Honorable Howard Dean, M.D.
The Statehouse
Montpelier, VT 05602

Dear Governor Dean,

The Vermont Center for Geographic Information, Inc. (VCGI) is pleased to provide you with the Vermont Geographic Information System (VGIS) Annual Report. **Vermont GIS 2002: A Status Report** includes a commentary on VCGI's strategic direction for the future, a status on the more critical base data layers of the Vermont Spatial Data Infrastructure (VSDI), and a summary of VCGI's current GIS projects and activities.

Achievements for the past year include:

- ?? Continued financial and technical support for the completion of the Vermont Statewide Soil Data completed to SSURGO national standards.
- ?? Increased internet based data services and mapping access for the Vermont GIS community.
- ?? Extensive statewide outreach in support of skill development for the users of GIS at the town and local level.
- ?? GIS data development focused upon critical State decision areas such as hydrographic data and transportation data.
- ?? Continued federal and regional partnership participation with the Federal Geographic Data Committee (FGDC), National Aeronautics and Space Administration (NASA) and U.S. Geological Survey (USGS).
- ?? Increased Federal grant acquisition to develop Vermont GIS related resources.

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 if you have any questions or comments.

Sincerely,

David F. Brotzman
Executive Director
davidb@vcgi.uvm.edu



Vermont GIS 2002: A Status Report

Executive Summary

2001 ACHIEVEMENTS

During 2001, this organization focused specifically upon strengthening and diversifying our service to the Vermont GIS community. New initiatives and partnerships were developed. Existing initiatives were refocused and in some cases broadened to include more participants. The larger aspects of this year's efforts are discussed below.

Vermont's GIS Data Infrastructure

As mandated in our charter, VCGI continues to support the development of quality GIS data within the State. During this year VCGI focused specifically upon upgrading two particular data types, Transportation Data and Hydrographic Data. Both of these data types enjoy a particularly high profile in the Vermont planning community now and for the foreseeable future. Our hope is that the work we do to upgrade these data will enable the community to work from the same high quality framework in making their decisions.

Steve Sharp is the primary coordinator of Transportation Data development and maintenance. Steve works with the Vermont Agency of Transportation and the Regional Planning Commissions to help AOT ensure the State's Transportation data is accurate, useful and up to date. VCGI was also invited to participate in two national transportation conferences as a result of our intra-state coordination efforts.

VCGI is in the second year of a three year Federally funded grant to upgrade Vermont's surface hydrography data to National Hydrographic Data Standards and increase overall data accuracy. Mike Brouillette has developed a statewide partnership for this effort that includes the RPC's, the Agency of Natural Resources and several of Vermont's watershed advisory groups.

This past year's data upgrade efforts were not limited to only transportation data and hydrographic data. VCGI continues to monitor the amount and quality of data that we offer to the public. With support from the appropriate State Agencies, bridge information was upgraded along with E911 data, natural resources data and census based statistical data. The scope and value of these publicly available data resources continues to increase with every year.

Statewide GIS Advocacy

This past year, VCGI continued to expand our approach of providing

web mapping services including the development and hosting of GIS based web mapping applications. Daryl Benoit, with support and guidance from the UVM Center for Rural Studies continues to expand the web mapping application that provides a wide selection of town based statistical data in support of statewide research and planning activities.

VCGI continues to provide GIS data and VGIS products on CD for a nominal cost. The demand for these products remains relatively low but constant with a new Soil Data CD planned for release early next year. VCGI will continue to offer the current products on a continuing basis as long as demand continues but the primary focus of our data and product distribution will remain the Internet.

VCGI personnel participated in a wide range of GIS advocacy and support roles this past year. For the fourth straight year VCGI held our GIS Expo in April. Each year attendance increases as noticeably as interest in the science and business of GIS also increases. The exhibitors and participants included GIS related businesses from throughout Vermont and the northeast. The Vermont GIS EXPO has become something of a yearly milestone in the GIS business and regional technology providers anticipate it as a place to show their wares.

VCGI personnel also provided GIS related professional expertise for the following organizations:

- ?? Chittenden County Metropolitan Planning Organization Transportation/Land Use Decision Support System Steering Committee
- ?? Vermont Emergency Management Automation Effort
- ?? Vermont Department of Tourism and Marketing Cross Marketing Database Development
- ?? Center for Rural Studies at UVM
- ?? UVM Extension
- ?? Vermont Geography Bee
- ?? Burlington Legacy Project Steering Committee
- ?? Vermont Town Officer Educational Conferences
- ?? Central Vermont Chamber of Commerce
- ?? Area Health Education Center at UVM

Throughout the year VCGI worked aggressively to support the general public, UVM and State agencies in their pursuit of GIS related activities. This is an increasing challenge to us as the science of GIS becomes more widely utilized as a tool for information analysis and understanding.

ANNUAL REPORT CONTENT

This document provides a status report on the state of GIS in Vermont as well as a snapshot of projects and activities at the Vermont Center for

Geographic Information. Section I outlines VCGI's strategic direction for the coming years. It includes a historical discussion of the origin and purpose of Vermont's GIS, and VCGI's role in that mission. Section II discusses the status of the base data layers that make up the Vermont Spatial Data Infrastructure (VSDI). Section III provides profiles for several of VCGI's more impacting projects. Section IV contains several appendices of VCGI's financial reports for FY01.

CONCLUSION

The year 2001 was a successful year for VCGI in many ways. For the first time, VCGI successfully acquired over \$100,000 in federal grants to support State GIS related initiatives. New partnerships were developed among existing State agencies to foster the wise use of GIS resources and help eliminate data redundancy.

Nationally, VCGI participated in several GIS related conferences and data standards initiatives. Our personnel continue to work with the Regional Applications Center for New England to develop an educational program relating to the most recent advances in imagery technology. Locally, we continue to coordinate the Vermont Spatial Data Partnership and the yearly GIS EXPO in Montpelier. Both projects are highly valued as information sources within the Vermont GIS community.

With all of the work completed over the past year we still continued to support our dual role of providing GIS support to both the professional and the novice community. Available GIS data and GIS data standards development remains the primary need of Vermont's GIS professionals. The novice user requires the education programs and experience lectures provided through our in-state conferences and meetings.



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for Geographic Information, Inc. in preparing and allowing the use of copyrighted materials.”

Acronyms used in this report include:

ANR	Vermont Agency of Natural Resources (GIS Unit and Department of Environmental Conservation)
AOT	Vermont Agency of Transportation
EMS	Emergency Medical Services Division (VT Dept. of Health)
EPA	United States Environmental Protection Agency
E-911	Vermont Enhanced 911 Program
FGDC	Federal Geographic Data Committee
NRCS	Natural Resource Conservation Service (U.S. Department of Agriculture); formerly Soil Conservation Service
NSDI	National Spatial Data Infrastructure
RPCs	Vermont's twelve regional planning commissions
USFS	Forest Service (U.S. Department of Agriculture)
USGS	Geological Survey (U.S. Department of the Interior)
VCGI	Vermont Center for Geographic Information, Inc.
VGIS	Vermont geographic information system
VSDI	Vermont Spatial Data Infrastructure



Vermont GIS: A Status Report

Strategic Direction

This past year VCGI reviewed its five-year strategic plan. This section outlines the key components of that 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 Burlington, VT on the University of Vermont campus. It is staffed by an Executive Director, Business Manager, Outreach Coordinator, GIS Senior Project Manager, GIS 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 into the new millennium, 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 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 datasets 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.

CONCLUSION

As we move further into the new millennium, technology will continue to grow and become even more critical to our daily lives. VCGI is excited about the possibilities and responsibilities this brings to the VGIS. We will continue our role as the GIS resource in Vermont and will expand our efforts to provide GIS services to all Vermonters and the region.



Vermont GIS: A Status Report

VERMONT SPATIAL DATA INFRASTRUCTURE

VCGI's 2002 Annual Report provides Governor Howard Dean, the Vermont General Assembly, and our citizens with information about Vermont's steady progress in building a *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 1:5000 scale. These pictures can be measured reliably, and are a crucial tool in local planning and development efforts.

Digital orthophotographs offer new degrees of accuracy and can be used as a backdrop for computerized engineering drawings and maps. They record elevation, slope and other third dimension information of roads, streams, hills and valleys.

Status: By the fall of 2001, the latest digital orthophotographs were available for the entire state. This is a very significant milestone and one for which the State can be justifiably proud. This data is used everyday by many private businesses, public agencies and citizens in the state. At this point the focus should turn to implementing a statewide plan for updating the orthophotographs 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. Other states throughout the country are just now beginning to acquire the kind of quality image base that Vermont has wisely taken the lead on.

B. TRANSPORTATION

Vermont's transportation data layers consist of road centerline, railroad, bridge, and other associated information (ex: traffic volume, accident locations, etc.). The statewide road centerline data layer identifies all public and private roads, identifying road class, surface type and route number. This data layer has become the "skeleton" for many valuable uses of Vermont's GIS assets at the local, regional and state level.

Status: VCGI personnel worked very hard over the past year to

upgrade the available transportation data. One specific effort is intended to eliminate the divergence in representation between the road data maintained by AOT and that maintained by E911. It is hoped that within a few years we will have in place a working system that is based upon the NSDI Framework Transportation Identification Standard. Additional work was also done on the statewide bridge data layer to upgrade the locational quality of the data and develop a bridge data standard. VCGI and the Vermont Agency of Transportation are developing an even stronger relationship based upon data sharing and data quality reviews. This relationship will continue to grow in the upcoming years.

C. LAND COVER

Accurate land cover data allows Vermonters to better visualize the choices in economic growth and natural resource protection, which they face. 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 data base 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 recently completed a Land Cover analysis for the State. VCGI will continue to work with data users to develop add-on data products useful for a variety of planning and analysis purposes for business and for government, as well as for research and education.

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. It is apparent that different types of land cover data based upon different user needs will be required in the future. The best first step to being able to define a wide variety of land cover information would be the acquisition of large scale multi-spectral satellite imagery. Unfortunately the cost of this imagery is still not cost effective for Vermont on a statewide basis.

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. No significant updates were made to this data during the 2001 timeframe.

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 parcel data are available in just over 60% of Vermont's towns but not all of it is in the VGIS format.

GIS 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.

Status: 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.

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.

Status: Updated and accurate Digital Elevation Model (DEM) information 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 photographs.

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.

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: Digital soils data are available for eleven of the fourteen counties in Vermont. NRCS field work in Essex, and Orleans is ongoing and will continue for several years to come. Fieldwork in Caledonia county is scheduled to finish up this year. In order to complete the acquisition of statewide soil information VCGI will continue funding of field sampling for another five years in order that NRCS be able to invest in conversion of remaining counties, and continue the final checking of data.

H. HYDROGRAPHY

Vermont's rivers, streams and the lakes and ponds through and into which they flow form a visible and valuable part of our landscape. The accurate and complete location of these features is crucial to many related planning activities in both the public and commercial sectors on which the protection of Vermont's natural resources and thoughtful economic development depend. Accurate delineation of soils necessary for farmers and for developers requires accurate referencing of watercourses. Protection of watersheds from potential pollutants upstream depends on accurately networked stream data.

Status: Hydrography (surface waters) data are available throughout Vermont, but previously they were of inconsistent scale, accuracy and quality. As part of VCGI's three-year partnership with USGS and our work with Vermont ANR and the RPC's, the state's surface water data is being systematically improved. The data is being upgraded for accuracy of delineation and attribution on a watershed by watershed basis using the 1:5,000 scale statewide orthophotographs as a base. As of the end of 2001 the following watersheds have been processed:

Missisquoi
Lamoille
Passumpsic
White
Nulhegan
St. Francois

This data will be conflated with the surface water data from the 1:24,000 scale data and made to conform to National Hydrographic Data (NHD) format before being released to USGS as part of the National Hydrographic Dataset. Additional attribution was included to make the hydrographic data conform to Vermont Hydrographic standards and increase applicability within the state.

I. GEODETIC CONTROL

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

Status: This data set exists statewide. Over the past year the AOT Geodetic Survey Unit significantly increased the number of Geodetic Control Points within the State. Many were done in support of the Vermont Mapping Program's digital orthophoto program.

J. POLITICAL UNITS

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

Status: These data sets are available statewide. Recent redistricting efforts within the state utilized digital GIS data as base material in the decision making process. As a result there may be increased accuracy in some of the political boundary data used in that process. VCGI will make every effort to acquire that data for public distribution when it is made available.

K. FUTURE EFFORTS

In 2002, VCGI plans to participate in the national Implementation Team (I-Team) program supported by the Federal Geographic Data Committee (FGDC) and the Office of Management and Budget (OMB). I-Teams are created at the state level but they include participating Federal

and local partners. The teams coordinate resources and identify needs based upon a commonly defined set of core data set types such as defined in the ten data types above. These core data sets are then the focus of the team's efforts in the future.

A community of developers and users is defined for each data type. This community then makes decisions on what is required in the future for that data type. Data acquisition goals are commonly defined. Data is shared among the partners and limited resources are planned to focus on the needs of the larger community.



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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, our working relationships with multiple federal, state agency and non-profit partners, as well as an idea of the benefits of this work to Vermont GIS stakeholders.

TRANSPORTATION DATA INFRASTRUCTURE

In the past year VCGI has actively supported the **Agency of Transportation** on many GIS related initiatives. Transportation data issues were one of two focus areas for the organization this past year with hydrographic data being the other. The following transportation data related tasks were performed by VCGI either in concert with the efforts of VAOT or as a standalone project.

Updated Statewide Road Data Layer

As in previous years, VCGI worked with VTrans to update statewide road data layer by providing QA/QC for the data. VCGI would review the data in accordance with written procedures and resubmit the results of the QA/QC work back to VAOT along with any irresolvable data artifacts.

Developed a VTrans/RPC Road Data Exchange Protocol

VCGI designed a Road Data Exchange Protocol to facilitate collaborative maintenance of Vermont's master road centerline data layer between VTrans and the RPCs. Both groups were consulted and actively participated in the development of this protocol that will enable better data sharing between the two.

E-911/VAOT Redundant Data Reduction

VCGI continues to foster collaboration between VTrans and E911 in order to reduce redundant data collection efforts. Currently, both parties are maintaining independent road centerline data layers. VCGI encouraged collaboration through discussion and drafted an MOU for data sharing, which the parties are currently reviewing.

This effort was developed at VCGI as part of a recently completed federally funded pilot study, which evaluated the potential of the *NSDI Framework Transportation Identification Standard* to provide a mechanism for transportation data sharing.

Statewide Bridge Data

In partnership with VTrans, VCGI reviewed existing bridge data against the state digital orthophotos and subsequently developed a more accurate comprehensive statewide bridge data layer consisting of over 7000 bridges. Also as part of this effort a VGIS Bridge Data Standard was developed. The VGIS Technical Advisory Committee will review this standard in early 2002.

Regenerated VTran's Linear Referencing System Data Layer

The Linear Referencing System data layer is used to map mile-marker based data such as traffic volumes, accident locations, pavement conditions, construction projects, etc. This data layer will be used in VTran's new Route Log System.

VCGI and the **Agency of Transportation** continue cooperative efforts on the development and maintenance of transportation related data, data standards and data issues. Future efforts will continue the QA/QC work done yearly while increasing the level of data sharing between the two organizations and increase the dynamic level of data distribution.

HYDROGRAPHIC DATA

In 2000, with the partnering support of the **Vermont Agency of Natural Resources**, the **USDA-Natural Resources Conservation Service (NRCS)**, and **Vermont's 12 Regional Planning Commissions**, VCGI was awarded a grant from the **USGS National Mapping Center** to enhance Vermont's spatial data infrastructure by extending the **USGS/USEPA National Hydrographic Dataset (NHD)** standard corrected to locally generated 1:5000 scale surface waters data across the state.

The purpose of the project is to take existing surface waters (hydrography) data for all Vermont watersheds, integrate existing attributes from the NHD and add corresponding attributes to those features not shown in the NHD. The result will be a detailed, locally generated surface waters data layer, quality controlled, integrated with adjacent watersheds (horizontal integration) and integrated with other local scale features such as orthophotos and bridge locations (vertical integration).

The use of coding compatible with NHD enhances data sharing between the local, state, and national levels. As part of this effort we review and revise Vermont's existing surface water mapping standard to address the data production and integration issues raised in this project, and enhance compatibility with the principles of the National Spatial Data Infrastructure (NSDI).

During 2001, VCGI completed redelineation of 6 individual watersheds

to match the State's latest digital orthophoto base. The highest priority watershed during this period was the White River. VCGI received the 1:24,000 scale data for the White River watershed from USGS and was able to conflate that data to the Vermont 1:5000 scale data over the same geographic area.

2001 also saw the formal inclusion by VCGI of the individual watershed groups into the dialog supporting the hydrographic data development. These watershed groups represent a connection to the grassroots level resources and interests intended to support the health of the watershed. By helping to foster a dialog between the watershed groups, the scientific efforts of ANR and the data developers we believe the data can provide the common framework for future work.

As statewide priorities in water management, water runoff and water related environmental issues continue to increase VCGI's partnership efforts will help those participating in future analysis. The development of a common, accurate and consistent framework of surface water data enables all involved to focus their resources on the task of data analysis rather than data development.

E-911 TECHNICAL ASSISTANCE

VCGI continues to work with the Vermont E-911 Board and its contractors. In the past year we provided technical assistance to the E911 staff through the following tasks:

- ?? Revision of Data Specifications and QC Procedures.
- ?? Performance of QC procedures on E-911 data.
- ?? Updated metadata for the E-911 data.
- ?? Update VCGI website with the latest E911 data.
- ?? Update E911's Standard Operating Procedures to include Geospatial Standards as needed.

This past year saw increased communication between the two agencies that resulted in better data quality problem resolution, regular data deliveries and greater adherence to the data standards. Because of the nature of the initial E-911 data development there still remains several issues that will require resolution. These issues are not insurmountable and will likely be resolved in the 2002 timeframe.

WEB MAPPING SERVICES

Two years ago VCGI launched its plan to provide online Web Mapping Services (WMS) as part of its strategic direction. The provision of WMS serves the Vermont GIS (VGIS) community in several ways and maintains VCGI's leadership role in expanding GIS technologies in Vermont.

This technology allows users to create interactive maps on the Internet

and to dynamically generate spatially referenced information for analysis while online. This means that customers are able to generate maps online from the latest GIS information available in the database. It remains VCGI's vision to continue to develop web mapping capabilities and promote the concept with the user community. Web mapping application efforts were supported for the following customers in 2001:

Community Planning Demonstration Project

VCGI, in a partnership with the Lamoille County Regional Planning Commission and the Center for Rural Studies at UVM, developed a web mapping application that enables public access to census data along with many other community indicators. This data can be used for planning purposes, analysis by local school boards and other community leaders.

Burlington Legacy Indicators Project

With support from the City of Burlington, the Burlington Community and the Center for Rural Studies VCGI created a website for the Burlington Legacy Project. This website provides the public with access to geographically based indicator data to be used in support of planning and local issue resolution.

OpenGIS Compliant Web Mapping Application

In 2001, VCGI was awarded a grant from the Federal Geographic Data Committee to create a Open GIS compliant Web Mapping Application that provided access to our the data in our National Spatial Data Clearinghouse nodes. The point of this effort is to allow the public to access the GIS data as overlaid graphic files rather than as individual data files that cannot be viewed together without downloading. This enables the viewer to potentially see the dataholdings of multiple sites of geographically distributed data.

UVM Extension Reporting Application

VCGI, the Center for Rural Studies and University of Vermont Extension, completed the development and deployment of a web enabled reporting network titled Vermont Extensions Research and Reporting Network (VERRN). VERRN enables curricula and personnel planning, statistical reporting, public inquiry, and a suite of administrative reporting functions.

VERMONT SPATIAL DATA PARTNERSHIP

VCGI continues to build upon the 1996 Framework Demonstration Project Grant received from the National Digital Geospatial Data Framework Initiative of the Federal Geographic Data Committee (FGDC). This grant was intended to show how innovative institutional arrangements could ensure a robust and well-maintained framework of digital geospatial data.

One outcome of the grant was the creation of the Vermont Spatial Data Partnerships (VSDP), an informal association of spatial data stakeholders from the Vermont community that is committed to improving GIS in Vermont through networking and information exchange.

The purpose of the VSDP is to inspire and sustain a culture that values high quality spatial data in Vermont. The VSDP's objectives are:

- ?? Improve Data Use
- ?? Improve Data Development and Maintenance
- ?? Improve Communication
- ?? Enhance Education
- ?? Address Specific Issues Through the Formation of Committees and Workgroups

The VSDP Steering Committee and staff person work to recruit members, plan activities, and develop informational literature about the Partnership. The VSDP sponsors informal conferences called roundtable meetings on a regular basis. GIS professionals present information about their current projects, discuss technical and non-technical issues and learn about new hardware and software from vendors. Attendees also are able to meet and network with other GIS professionals in the state.

FUTURE DIRECTION

In 2002, VCGI anticipates building the GIS infrastructure in the state toward being able to implement a limited enterprise wide data plan. The initial steps of this plan will be implemented between AOT and VCGI in the early part of 2002. This relationship will be tested as a prototype with other partners being brought on-line as technology, resources and time allows.

VCGI will continue its data development and web mapping efforts. In keeping with its strategic direction, VCGI will stay at the forefront of GIS technology and continue to develop products and services that make GIS data more accessible and usable by the public. Educational initiatives and partnerships will be developed that further the development of the GIS community within the state.

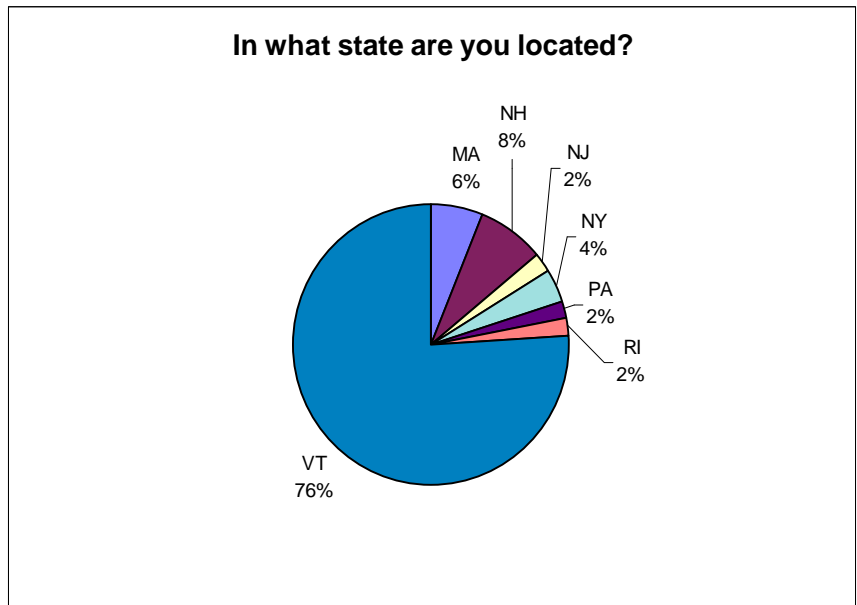


Vermont GIS: A Status Report

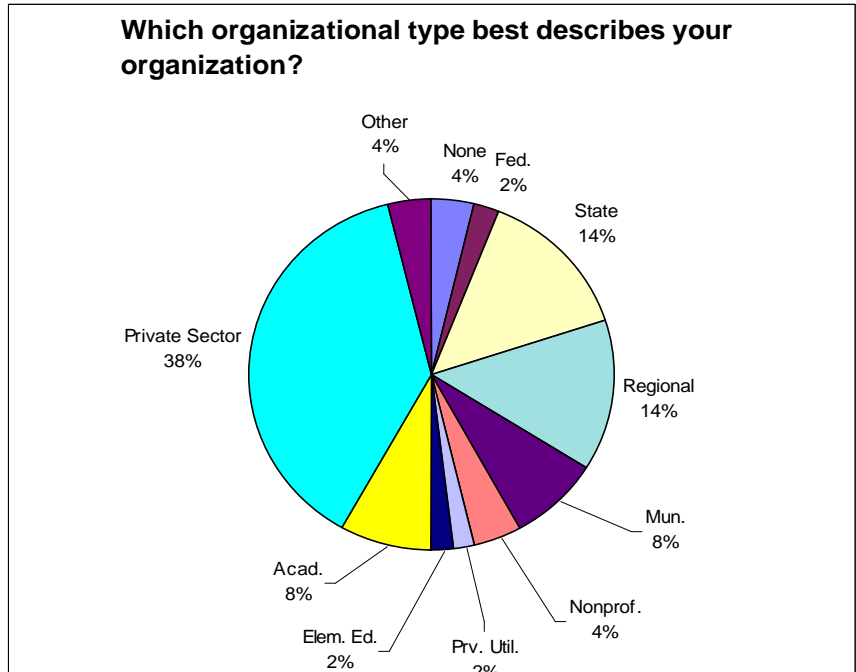
Customer Survey

This past year VCGI sent notices out to the entire Vermont GIS community and everyone that subscribes to the VGIS_L list server, that we had posted a customer survey on our website. Potential respondents were also given the option of requesting a paper survey or sending their responses via email. The following graphs and responses represent a large sampling of their responses.

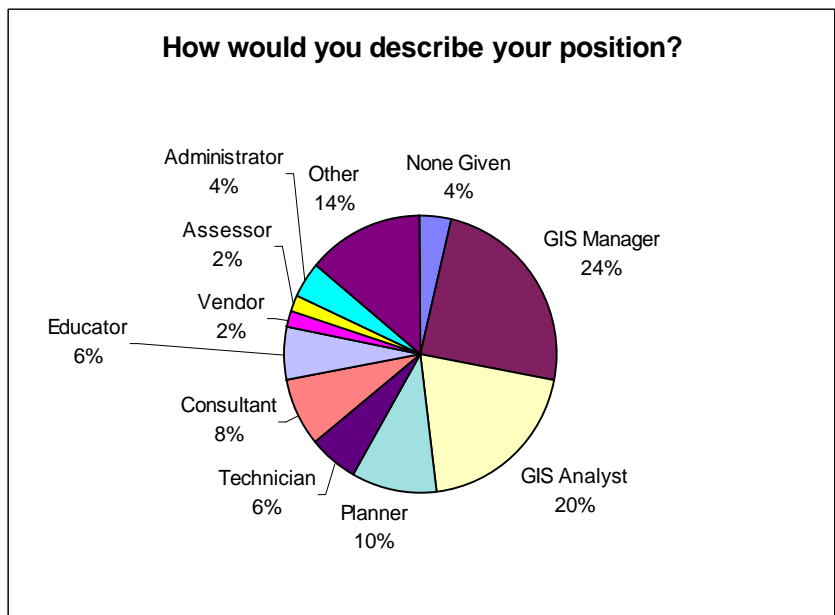
VCGI and OUR CUSTOMERS



The chart above shows that the greatest percentage of respondents are from Vermont with the rest of them being from the northeast area.

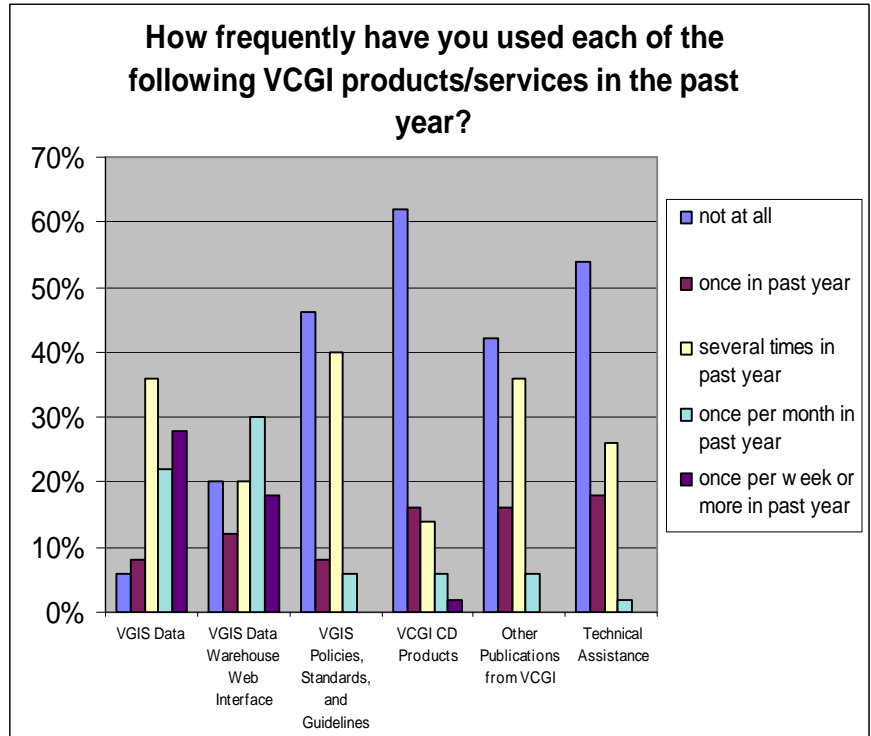


The previous chart shows that the respondents came from a fairly wide cross-section of professional organizations both public and private. There is a noticeable increase in private sector participation from the 1999 survey (increased from 23% to 38%). We believe this increase accurately reflects the growth of GIS as a tool for use by the general public.

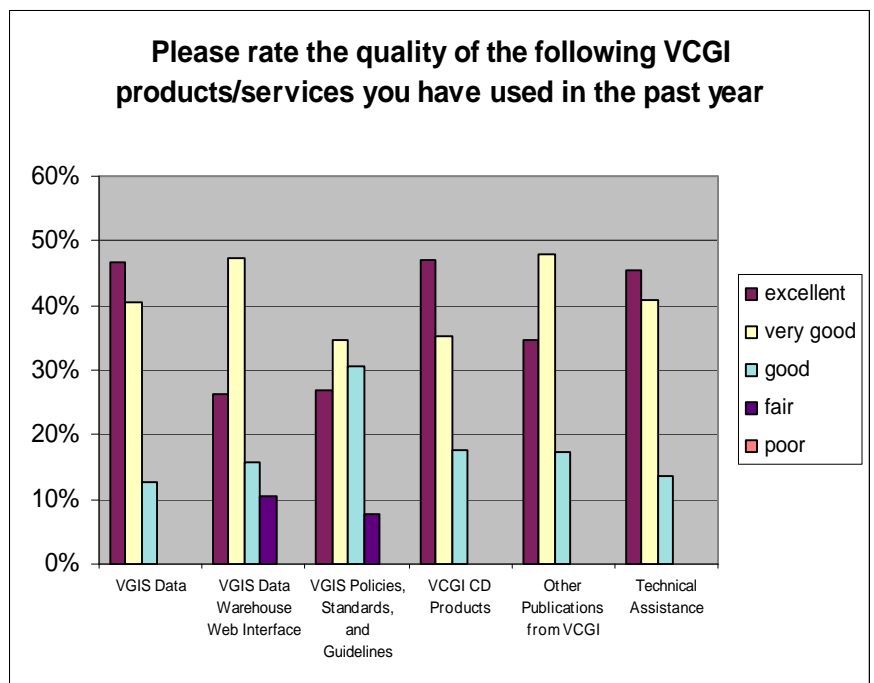


The chart above shows that the respondents come from a wide cross section of the professional GIS community.

CUSTOMER SATISFACTION

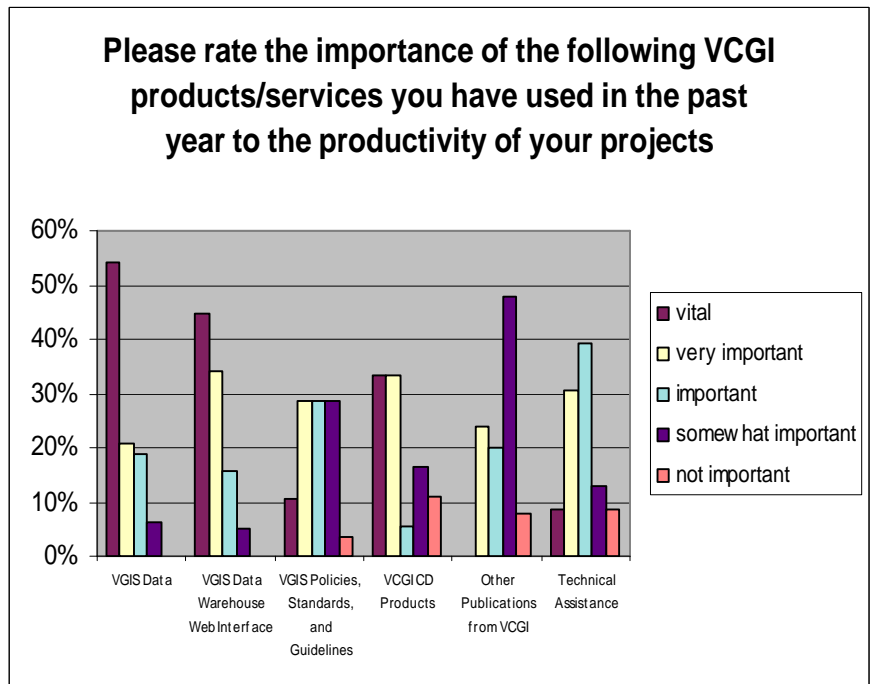


The previous chart shows that the greatest use of VCGI's products and services are directly related to the data and the data warehouse.



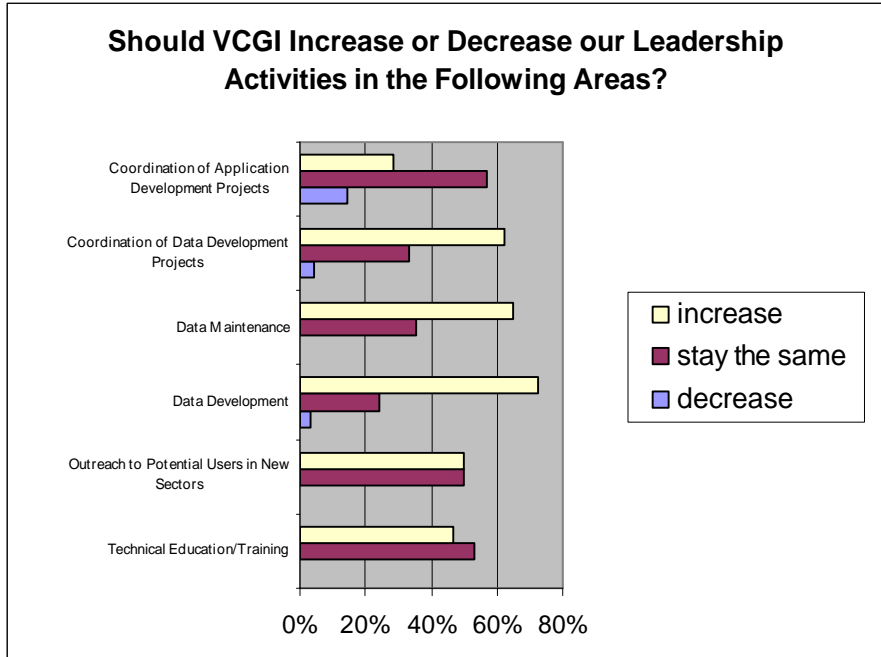
The graph above shows that the respondents have a generally positive opinion of the products and services that VCGI currently offers. Most

notable is the fact that no 'poor' responses were received.



Overall, when responding to questions relating to VCGI's services and products the respondents appeared to consistently show the strongest support for the data, data products and data related services. This response seems to underscore the organization's current direction toward increasing the quality of critical data and upgrading our data distribution capability.

LEADERSHIP ACTIVITIES



The previous graph pertains to the customer's perception of VCGI's leadership role in the GIS community. The responses again show a fundamental desire for an increase in leadership in areas pertaining to GIS data, data maintenance and data development projects. Very few leadership decrease requests were received. The most significant area where decrease requests were noted was in the application development area. Our future application development efforts are expected to remain equal to current levels.

OTHER CONCERNS

The following quotes are from some of the open-ended questions included in the 2001 VCGI survey.

What other features would you like to see on our web site?

?? More environmental data if possible.

?? Download-able metadata.

?? Town level tax information (property, school) and grand list information.

?? An option for shapefiles, or at least a CD for base layers as shapefiles.

?? GIS Jobs.

- ?? Updated old information, especially parcels.
- ?? Orthophotos in MrSid format.
- ?? More flexible search tools.
- ?? Better index listing of site features so one can find things better.
- ?? Be able to preview data before downloading.
- ?? Data basket that allows folks to download multiple tiles simultaneously.
- ?? Expand search tool to include wildcards.
- ?? An archive of historic maps.
- ?? Info on GPS base station data.

What can we do to improve our support for you?

- ?? Encourage other organizations, agencies, contractors in Vermont to share data, metadata, etc.
- ?? More RFP announcement and development work with local agencies.
- ?? Services and support are great.
- ?? Not much - I'm always very satisfied with the support I receive.
- ?? Continue to improve, excellent work with web site.
- ?? Improve website a bit but other than that you're doing a superb job - excellent, capable staff!
- ?? Continue doing what you are doing and continue to update the data.

What is VCGI's most critical role?

- ?? Data distribution, outreach & coordination, standards, are all very

important

- ?? Supplying accurate data.
- ?? To provide complete spatial data to the public.
- ?? Data warehouse and setting standards and policies.
- ?? The base map data layers are an important public resource.
- ?? User support and data delivery.
- ?? GIS data warehouse.
- ?? Data posting, outreach, collaboration and standards.
- ?? Providing data and information to users.
- ?? Warehouse with distribution as needed.
- ?? Data clearinghouse AND project coordination.
- ?? Provide the data and news to us. Lobby to protect the state of industry - orthos and data in Vermont.
- ?? Coordination on data development across the state, standards.

CONCLUSION

Overall, from the results of the survey we believe the GIS community is pleased with the work that VCGI is doing. There was no significant change in opinion from the 1999 survey in questions relating to satisfaction. It is also clear that the community is pushing us to continue to improve our data and data access capacity.

We remain cognizant of our responsibility to stay away from areas of competition with the private sector and, I believe, we have been fairly successful in that area. However, some respondents request greater participation in development efforts while others want less. As long as we continue to work on very small new GIS technology development projects we should be safe from competitive concerns.

The focus of strategic plans for this organization enables us to be flexible in pursuing what is a quickly growing industry. As long as we continue to make GIS data the primary aspect of our work we will be supporting the public while at the same time meeting future needs of the

industry. By expanding and upgrading our distribution we will offer the community better GIS related services. To further extend this concept, long term plans for all Vermont public agency GIS developers and users in the state should include greater technical cooperation. VCGI will work to foster this cooperative effort over the next few years.



A. STATUTORY AUTHORITIES

Act 204 of 1994 (10 VSA Chapter 8) calls for the development of a comprehensive GIS strategy for Vermont, and establishes 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: FY 01 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 2001 AND 2000

REVENUE	2001	2000
State of Vermont grant	\$252,016	\$241,903
Project income	\$210,908	\$172,729
University of Vermont in-kind	\$30,000	\$30,000
Reproductions and resale of items	\$9,255	\$4,666
Interest and miscellaneous income	\$7,151	\$2,794
Net Assets released from restrictions	\$0	\$35,000
TOTAL REVENUE	<u>\$509,330</u>	<u>\$487,092</u>
DIRECT COSTS		
Direct Labor	\$172,449	\$138,789
Payroll taxes and employee benefits	\$46,036	\$30,516
Costs of projects and reproductions	\$19,585	\$19,375
Subcontract costs	\$7,718	\$25,861
TOTAL DIRECT COSTS	<u>\$245,788</u>	<u>\$214,541</u>
OPERATING EXPENSES		
Indirect salaries and wages	\$93,028	\$120,775
Payroll taxes and employee benefits	\$23,780	\$25,550
University of Vermont services	\$30,000	\$30,000
Travel and training	\$17,972	\$14,064
Computer support and maintenance	\$17,771	\$17,645
Depreciation	\$16,548	\$14,773
Professional fees	\$7,232	\$7,165
Telephone	\$6,174	\$7,632
Office expense	\$3,533	\$5,152
Miscellaneous	\$2,200	\$3,185
Interest expense	\$865	\$281
TOTAL OPERATING EXPENSES	<u>\$219,103</u>	<u>\$246,222</u>
TOTAL DIRECT & OPERATING EXPENSES	\$464,891	\$460,763
CHANGE IN NET ASSETS	\$44,439	\$26,329

VERMONT CENTER FOR GEOGRAPHIC INFORMATION, INC.
BALANCE SHEET
JUNE 30, 2001 AND 2000

	ASSETS	<u>2001</u>	<u>2000</u>
CURRENT ASSETS			
Cash - undesignated		\$55,571	\$19,726
- capital reserve		\$30,000	\$0
Accounts receivable		\$33,202	\$36,923
Unbilled receivables		\$2,547	\$5,195
Prepaid expenses		\$19,809	\$7,285
TOTAL CURRENT ASSETS		\$141,129	\$69,129
PROPERTY AND EQUIPMENT, NET		\$26,782	\$33,785
TOTAL ASSETS		\$167,911	\$102,914
	 LIABILITIES AND NET ASSETS		
CURRENT LIABILITIES			
Accounts payable		\$6,304	\$15,508
Line of credit		\$0	\$23,000
Accrued expenses		\$4,749	\$3,997
Accrued wages		\$10,011	\$10,210
Accrued vacation		\$9,294	\$9,004
Due to University of Vermont		\$0	\$1,133
Deferred project income		\$53,052	\$0
TOTAL CURRENT LIABILITIES		\$83,410	\$62,852
TOTAL LIABILITIES		\$83,410	\$62,852
NET ASSETS			
Unrestricted - Board designated for capital reserve		\$30,000	\$5,000
Unrestricted - Undesignated		\$54,501	\$35,062
TOTAL NET ASSETS		\$84,501	\$40,062
TOTAL LIABILITIES AND NET ASSETS		\$167,911	\$102,914