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what's inside

GIS as a Career

Livingston County

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Semiannual Meeting

Member News



GIS as a Career: A Rosy Future?

By Kathleen Weessies, Michigan State University

URISA recently released its 2003 Salary Survey for IT/GIS Professionals.

Conducted in May 2003, it returned 2,042 usable results* from the United States and Canada.

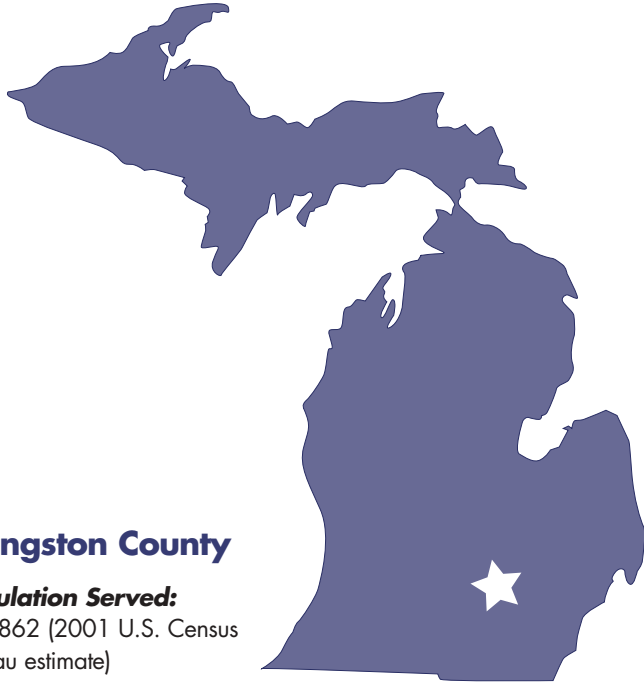
Though titled a salary survey, it also gathered general information about the state of GIS employment.

The questionnaire was distributed and advertised by email and at the URISA website and then distributed to an excess of 25,000 people. The pool of 2,042 responses is a considerable improvement from the first salary survey conducted in 1988 for which only 444 usable responses were generated. In 2000 the survey returned 837 usable responses. In this 2003 survey, the South and Northeast had the lowest percentage of respondents to the general population in their states; the West and Midwest had higher ratios of response. Of all the respondents, 42 were from Michigan.

Nationally, 71.1 % of respondents work for a government or public utility, about 25 % each working for municipal or county government. This is a drop from the 2000 survey, in which 76.9 % of respondents worked for government and only 18.4 % worked in the private sector. Department sizes vary widely from one to over one hundred GIS employees. The smaller organizations were certainly represented by the survey. Respondents were just as likely to be employed by a local county or regional government with a population of 10,000-50,000 as governments serving much larger populations. A median number of two GIS employees work in a respondent's department.

Not surprisingly, GIS people sprout up all over within organizations. The most common department is a GIS department, with the Planning department being second most popular. But many other departments were named as home to GIS staff including MIS/IS, Engineering, Public Works, Transportation, Natural Resources, and Land Records.

Who's Doing What in GIS and Spatial Technology



Livingston County

Population Served:

168,862 (2001 U.S. Census Bureau estimate)

Geographic Coverage:

585 square miles (1515.14 km²)

Number of Staff: Seven

Annual Budget: \$580,000 (2004)

The GIS Management Department goals are to:

- Assist program areas in planning, implementing, and managing GIS applications
- Define standards for GIS data management, development and distribution
- Manage data sharing through County Departments and local units
- To provide analytical and decision making tools that best meet County needs
- To standardize County-wide addressing and street naming

PROGRAM STATUS

The Livingston County Geographic Information Systems (GIS) Management Department was created to provide computer-aided mapping technology to County departments and local units. Beginning several years ago as a function of the County Planning Department, a GIS Manager position was created. Today the Department has grown to six full time employees and one full time intern position under the

direction of the Information Technology (IT) Department. The GIS Management Division provides data to various County departments including County Airport, Ambulance Department, Building Inspection, Building Services, County Clerk's Office, Drain Commissioner's Office, E-911, Equalization, Environmental Health, Planning Department, Public Health, Sheriff's Department and the Treasurer. In addition, various local units, including cities, villages and townships and other agencies utilize County GIS data. The Department delivers high quality GIS leadership, coordination, application development, services, and support that meet GIS needs of the County and all communities it serves.

PARCEL CONVERSION

A major project the GIS staff has undertaken is an in-house parcel conversion. The Equalization Department had a Tax Mapping Specialist who was in charge of maintaining maps in FastMap. However, FastMap software did not offer the data sharing and analysis capabilities that a GIS platform can provide. In addition, the tremendous growth the County has experienced made maintaining the tax maps virtually impossible with antiquated procedures and limited staff. In November 2001, GIS staff was charged with the task of mapping the County's 86,700 parcels. Parcels are drawn using Coordinate Geometry (COGO) or heads-up digitizing in AutoCAD and then topology is created when the CAD file is converted to an ESRI coverage. To date the Department has 79,000 parcels converted to ESRI coverage format and only 7,700 parcels to go! Along with the initial conversion of the parcels, the Department is maintaining splits and combines. Once the conversion to ESRI coverage format is complete a conversion to a geodatabase will begin. Migrating the parcel layer to a geodatabase will optimize workflow and reduce duplication of effort in parcel and road centerline maintenance. The ESRI Parcel Data Model will be a good start and will be modified to fulfill the County's needs.

DIGITAL ORTHOPHOTOGRAPHY

In 2000 true color digital orthophotography was flown for the entire County. At first the intent was to update a quadrant (four townships) each year. In 2002 the southeast

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Table 1: Software Programs Used by Employees

With which of the following types of GIS software does your job require you to be proficient?	
ESRI ArcGIS	80.3 %
ESRI ArcView 3.x	77.3 %
ESRI ArcInfo 7.x	67.4 %
ESRI ArcIMS	37.9 %
ESRI ArcSDE/Geodatabase	36.8 %
AutoDesk AutoCAD	33.1 %
Bentley Microstation	13.5 %
ERDAS	11.6 %
MapInfo Professional	11.6 %
MapObjects	11.4 %
Oracle Spatial	9.1 %
Intergraph GeoMedia	8.1 %
Caliper TransCADD	1.4 %
Caliper Maptitude	1.2 %

Length of an employee’s professional GIS experience is almost identical between the 2000 and 2003 surveys, at 7.3 and 7.4 years respectively. But educational attainment dropped slightly; in 2000 85.7 % had a bachelor’s degree or higher while in 2003 83.3 % did.

The field of GIS employees is slightly more male than the 2000 survey. The percentage of males has edged up slightly, from 68.7 % to 68.9 %. The average age has edged slightly down, from 38.2 years to 38 years.

Table 1 contains selected results from the survey showing which software programs employees must learn to be proficient. Since 2000 ArcGIS has supplanted ArcView as the overwhelmingly dominant program, though ArcView and ArcInfo both retain adherents. The question wasn’t asked in the same way in 2000, so the results are not directly comparable. Some software programs were added to the 2003 survey, and some older ones have clearly lost ground such as Smallworld GIS, Intergraph MGE, and Caliper GISPlus.

SALARIES

The average salary for all respondents was \$52,750, which is a 7 % increase from 2000. Looking at these salaries by employer type, one sees in Table 2 that County Governments came in at the bottom, while Federal employees came out on top. In 2000 Municipal employees were on the bottom rung.

Table 2: Salary by Employer Type

Employer Type	Average Salary	Number of Respondents
Federal Agency	\$65,238	80
Private Sector	\$58,333	380
State or Provincial Agency	\$52,465	227
Municipal Government	\$51,857	490
Public Utility	\$51,200	60
Regional Agency or Consortium	\$46,504	101
County Government	\$45,508	455

Education pays, but doesn’t make as big a difference as it does in some career fields. Those with an Associate’s Degree average \$45,196, a Bachelor’s Degree average \$49,231, those with some postgraduate work average \$53,688, and those with a Master’s degree average \$57,055. A more significant difference is seen with work experience. Table 3 shows that the average salary ranges by over \$60,000 depending on a person’s length of GIS job experience.

Table 3: Salary by Professional GIS Experience

Tenure	Salary	Number of Respondents	% Salary increase over 2000 survey
Less than 1 year	\$44,213	94	5.1 %
1 to 2 years	\$39,938	232	5.4 %
3-4	\$44,457	405	3.8 %
5-9	\$52,250	679	6.3 %
10-14	\$61,928	368	7.6 %
15-19	\$71,611	44	9.7 %
20-29	\$85,170	44	26.4 %
30+	\$99,500	5	32.0 %

WHO'S DOING WHAT continued from page 2

quadrant was flown, and in 2003 the northeast quadrant was flown. The quadrant update this year was postponed as the County has partnered in a regional effort through SEMCOG (Southeast Michigan Council of Governments) to fly the entire seven county region in 2005.

ROAD CENTERLINE

In addition to maintaining a county-wide parcel layer, the GIS team also maintains a county-wide road centerline layer. Created for E911 Central Dispatch, the road centerline file is used to dispatch emergency responders and used for geocoding. In 2001, GIS had the centerline attributes from MIRIS vector lines conflated to a street centerline that was generated from digital orthophotography. This allowed the County to obtain a spatially accurate road centerline file with accurate address ranges. Newly constructed roads are acquired monthly by GPS and attributed in order to maintain a current road centerline file. The data is provided to E911 Central Dispatch and is available in County Sheriff's vehicles, ambulances and fire trucks in Livingston County.

QUALIFIED VOTER FILE

The Qualified Voter File (QVF) is a statewide voter registration database containing voter and street index information. Updated, edited and maintained by local clerks, any changes to the QVF are submitted to the Center for Geographic Information (CGI) to update the statewide QVF. This database is redundant in many ways to the Livingston County GIS road centerline file. The GIS team is working with CGI staff to set up a process for the County GIS Department to submit QVF Street Index changes directly to CGI. This coordination requires the local clerks to notify the County GIS Department of new streets, or street information changes. GIS will then add or edit the map data and submit the map changes to CGI. This process will be more efficient and create a standardized workflow for updating and maintaining both QVF and GIS road centerline data.

HYDROLOGY

In 2003, GIS staff developed an expandable hydrologic framework (Hydrology Data Model) to be used by various departments to aid in water management. Hydrology features were acquired from the 2000 orthophotography, topology was created and attributes were conflated from National Hydrography Datasets. A geodatabase was

designed to establish relationships between cultural features and hydrologic features and to define a geometric network to determine flow length and flow direction. This has created a hydrology dataset that meets the needs of the Drain Commissioner's Office to monitor flooding and water quality, analyze flow direction, manage watersheds, etc. Currently, the Drain Commissioner's Office is adding closed County drains to the geometric network.

DRAIN DISTRICTS PILOT PROJECT

A pilot project is underway with Eastern Michigan University's Institute for Geospatial Research and Education to create tools to convert the Drain Commissioner's drain district maps from hard copy to a GIS format. ArcGIS tools created include: 1) Aliquot Parcel Tool, generates polygons with aliquot legal description, 2) COGO Tool, generates polygons from legal descriptions with bearings and distances, 3) Lots Tool, combines selected polygons into one polygon and captures the new legal description, 4) Lots Subdivision Tool, generates polygons with legal description for one lot within a subdivision. These tools will allow the Drain Commissioner's Office to draw drain districts easily and maintain valuable attributes with a few clicks of a mouse.

NEW PROJECTS/ACTIVITIES

With the recent addition of a full time GIS Application Developer, the Department has expanded its infrastructure and has prioritized future GIS projects that will help extend the GIS to meet departmental business needs. These projects include: 1) storing all GIS related data in a centralized ArcSDE geodatabase, 2) migrating the parcel maintenance process to the ArcGIS environment, 3) creating a generic ArcIMS browser application for GIS data accessed by multiple departments, and 4) developing a parcel query application.

DATA STORAGE

The Department has begun storing its spatial and non-spatial GIS data in SQL Server through ArcSDE. The County's orthophotography is being stored in ArcSDE. This allows for a reduction of time involved to retrieve and display the images for multiple simultaneous clients. The parcel maintenance migration will reduce the duplication of effort for parcel splits and combines, and will establish a more efficient method for maintenance in the geodatabase

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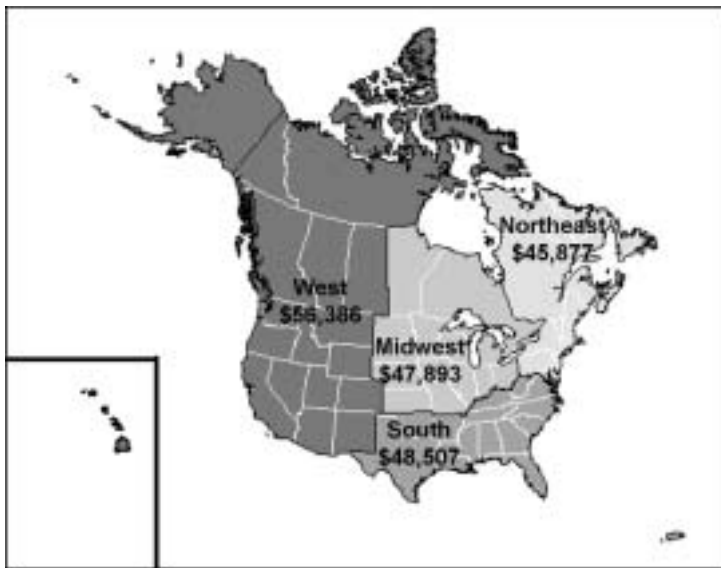
*GIS AS A CAREER continued from page 3***JOB TITLE**

Not surprisingly, directors of Information or GIS departments earned more money, averaging \$85,156. Consultants, though only 2 % of the respondents, fared well averaging \$72,741. The most common job title was GIS manager, perhaps the name given to one-person departments, averages \$59,894. Among the other most common job titles, GIS User (Heavy) averaged \$46,942, GIS Coordinators averaged \$50,181, and GIS Specialists averaged \$46,581. At the bottom of the barrel were the poor GIS technicians, averaging \$33,604.

GEOGRAPHY

Regional variations in average salaries were small, with the West and Northeast edging out the Midwest and South. Salaries in the West and Midwest went up by several thousand dollars between the 2000 and 2003 surveys, while salaries in the Northeast and South remained virtually the same. Map 1 shows a regional breakdown of average County Government GIS salaries.

Map 1: County GIS Employee Average Salary by Region



The URISA survey shows positive movement in the field. It is stable enough that changes are incremental rather than wildly erratic. Minimum salaries are up. Though average age is edging down, we aren't seeing a mass exodus of experienced employees.

These salary increases do not seem initially to be terribly impressive. But comparing the survey results to national salary data, GIS salaries are moving up more quickly than the average rate for all non-farm jobs.

A recent article in *Nature* noted that The U.S. Department of Labor recently named geotechnology as one of three emerging and evolving fields containing the hottest occupations, along with biotechnology and nanotechnology. Although the Department of Labor doesn't define the GIS professions in the same way as URISA, this is still encouraging news that salaries and job growth are both on the rise.

**Because not every person answered every question, not every result will total 2,042 respondents*

*Gewin, Virginia. (2004, January 22). Mapping Opportunities. *Nature* 427, 376-377.*

Department of Labor report.

For more information, please contact MSU Maps/GIS Librarian Kathleen Weessies at (517) 432-6123 x250 or weessie2@msu.edu

The ninth semiannual meeting of the **ESRI Northern Michigan User Group (ENMUG)** is scheduled for **June 23, 2004**.

This meeting will be hosted by the City of Traverse City at the Government Center in Traverse City.

All are welcome to attend.

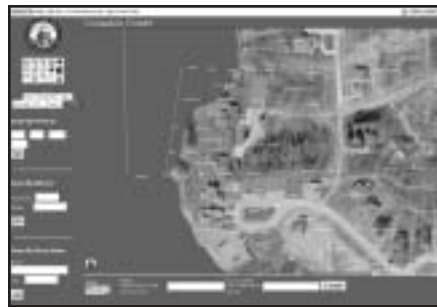
For more information, see the group's website: www.infogeographics.com/enmug

WHO'S DOING WHAT *continued from page 4*

environment. Eventually all GIS related data will be stored in the geodatabase.

Data Distribution

A generic browser application to access GIS data will deliver easy-to-use query and analysis tools to multiple departments through the deployment of an Intranet IMS application. Tools will include various buffering capabilities, utilization of parcel data and associated assessment information, mailing buffer creation and printing options. The parcel query application



will allow the GIS Department to serve internal requests for parcel information to include data from Equalization, Treasurer's, Environmental Health, Building Inspection,

Drain Commissioner's Office, County Clerk's Qualified Voter File information. Eventually, applications such as the generic browser and the parcel query application will be available through ArcIMS on the Internet.

Additional Information

The GIS Department supports other datasets that go beyond base mapping features that serve many users within the County and its local units. Data sets that are being developed include: scanned documents (Register of Deeds, Building Inspection As-Builts, Drain and Environmental Health documents), natural features inventory, land use, zoning, utilities (storm, water, and sanitary), wellheads, critical features inventory, precincts, school districts, etc.

Lessons Learned/ Recommendations to others

"The greatest thing in this world is not so much where we stand as in what direction we are moving" ~ *Oliver Wendell Holmes, Sr.* Keep moving forward one step at a time! GIS is truly a long-term investment that requires careful planning, prioritization, and ongoing development. Having access to information for decision making can add up to faster, more reliable, and safer service for the residents of Livingston County and the local units.

For more information on Livingston County's GIS, please contact County GIS Manager Dawn Siegel at (517) 548-3230 or DSiegel@co.livingston.mi.us

Member News

The Road Commission of Macomb County has selected the team of Hubbell, Roth & Clark, Inc. of Bloomfield Hills, Michigan and Dunn Engineering Associates, Inc. of Westhampton Beach, New York to design and build a Traffic Operations Center (TOC) within the existing Road Commission offices located in the City of Mount Clemens.

InfoGeographics, Inc. – a GIS products and services company – has moved into a new, larger office in Traverse City. InfoGeographics' new contact information is:

InfoGeographics, Inc.
 503 Hastings St
 Traverse City MI 49686
 Phone: (231) 995-8266
 Fax: (231) 995-8267
 Web: <http://www.infogeographics.com>

Manatron, Inc., a provider of web-based and client/server application software products and services for county, city and township governments announced that it has taken steps to consolidate its company names. The Company will change the name of its Sabre Division to Manatron Appraisal Services, and its GovernMax Division to Manatron eGovernment.

R.A. Smith & Associates, Inc., – civil engineering, planning, surveying, and technical services consultants - has been named 2004 ESRI Business Partner of the Year.

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Our members are committed to improving the quality and availability of digital data necessary to make good use of GIS.

We believe that cooperation and open communication are necessary to achieve these objectives.

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