

## **Final Report: Planning the Iowa Geospatial Infrastructure**

**Agreement Number: 07HQAG0043**

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ROI Study Interviews - about 80 interviews were conducted with GIS providers and users in the state during the course of this study. The list of people interviewed and the text of their interviews is in the Appendix to the GITA report.

**Executive Summary:**

The goal of this project was to develop a business plan for the Iowa Geospatial Infrastructure (IGI), Iowa's contribution to the National Spatial Data Infrastructure (NSDI). IGIC contracted with the Geospatial Information Technology Association (GITA) to provide expertise for completing the business case and financial analysis for IGI. This combined effort assessed the needs of county governments that are not currently using geospatial technology, as well as those trying to maintain existing investments, and further support and promote the creation of high quality local datasets compatible with the IGI and NSDI.

The multi-agency financial analysis incorporated spreadsheets describing costs and benefits for all 99 counties of Iowa, 11 state agencies, three utilities plus Iowa One Call, and consulting firms. Many additional organizations were interviewed during the project but not all were able to provide quantifiable benefits. The 20 year analysis shows Net Present Value of \$271M and Return on Investment of 24.21%. Sensitivity analysis was performed to determine the effect of a delayed implementation of GIS over 20 counties and the effect of Imagery for the Nation contracting capabilities not being available. Neither of these analysis resulted in severe detriment to the project. However, sensitivity analysis on the effect of a county attempting to implement GIS in standalone mode, not using the resources of IGI, showed that such a project may have difficulty breaking even. Overall, the financial analysis shows that the IGI is a good investment for the state.

The IGI business plan is essential documentation to justify investment of resources in a statewide spatial data infrastructure in Iowa.

**Project Narrative:**

In 2007-2008, the Iowa Geographic Information Council (IGIC) received a grant from the Federal Geographic Data Committee (FGDC) to create a business plan for a statewide spatial data infrastructure. IGIC developed a plan for the Iowa Geospatial Infrastructure (IGI), which included ideas on how to address missing basic data coverage for the state, the lack of resources to build and maintain those layers, and removing institutional impediments to sharing and integrating GIS data from various jurisdictions. Using the FGDC grant, IGIC contracted with the Geographic Information Technology Association (GITA) to study the return on investment for the IGI, including the costs to build it, and the benefits of using it. GITA's ROI study clearly shows that the IGI is a good investment and will return good value to the citizens of Iowa.

During the course of the ROI study a new way of thinking about GIS cooperation emerged: data producers (county and state agencies) will voluntarily give their basic framework GIS layers to two central GIS service bureaus (one for counties, one for state agencies), which transform, merge and load the data into statewide GIS data layers, which in turn are made available in various Internet accessible forms to be used by anyone for any purpose. In return the data producers receive benefits in the form of coordination, data acquisition/creation, data storage and training services also provided by the service bureaus. The ROI study readily shows that the benefits far exceed the cost of providing the data - in fact the more the data gets used by others, the greater the

overall benefits to citizens, government, businesses. In this community of cooperation, GIS has greater potential for expanded economic development, better emergency preparedness, protection of the environment and delivery of safety, human, health and educational services.

***Summary of project activities:*** After attending the NSGIC meeting in Annapolis in 2007 and hearing the GITA presentation on return on investment (ROI), the IGIC project team decided to pursue ROI methodology in our business planning efforts. In May and June IGIC participants developed an outline of IGI components, including framework layers (seven total: control, boundaries, parcels, orthos, transportation, hydrography and elevation), web services (provides basic geographic functions and technology to host and distribute the data) and communities of practice (essentially vertical applications that cut across jurisdictions, all based on the framework data and web services architecture). An RFP was released for business planning services and GITA was selected in July. August and September saw GITA meeting with IGIC team members to set the project scope, giving an overview webinar to those interested in ROI practices, and 2-day training for 20 participants to use GITA's ROI spreadsheets. From October to December, training participants worked on their own spreadsheets related to IGI costs and benefits, including interviewing GIS users within their organizations to help determine other costs and benefits related to implementing the IGI. GITA interviewed other GIS users in the state to add metrics to county costs and benefits of participating in IGI.

During the fall, project team members attended the annual NSGIC meeting in Madison, WI. and decided to add address points to the list of basic framework layers to help broaden the potential benefits to state agencies. They also met with county engineer's IT/GIS service bureau, and found a useful administrative model for providing services back to counties, in exchange for participating in IGI. The IGI service bureau will also help extract local data, transform it into statewide coverages with metadata and load it onto statewide servers. This service bureau concept was integrated into the IGI cost calculations. The idea that the service bureau provides benefits back to data providers in exchange for access to data was added later. In December, IGIC applied for 2008 CAP Category 5 funding using ROI results from a county spreadsheet for a building footprint project. Funding was later awarded to our project in February, so structures (building footprints extracted from lidar data) were added to the framework data list, making nine total data layers.

The ROI training spreadsheets were integrated and analyzed together for the first time in early 2008. Benefits of the complete IGI system did not exceed the costs after the first run. GITA continued with interviews and worked with the IGIC team to get more benefits from wider pool of potential IGI users. IGIC hired Pete Buckingham Consulting, Inc. to interview county assessors, auditors and engineers in the 30 or so counties that were most likely to not have GIS programs. His reports indicated about 13 counties without GIS in the state, with about 11 more in transition to GIS. This helped us build a cost/benefit model of how to help counties that have no GIS program.

State IGIC members organized a state agency GIS user group meeting in March 2008, identifying several more potential users of IGI. Integrated spreadsheet analysis runs in April started to show modest positive ROI. Results were presented at MAGIC Conference in Kansas City. After MAGIC, GITA continued interviewing potential IGI users for benefits, including emergency management and economic development staff at county level. Benefits became much more impressive with the addition of county engineer use of lidar and various economic development benefits. Tornadoes and floods began in May and lasted through June in Iowa. GIS was extensively used in disaster management and recovery efforts, but project team was unable to capture benefits due to project completion at the end of June. GITA delivered business plan final reports at the end of June. Results of the IGI ROI Study were presented at the IGIC July quarterly board meeting, Eastern Iowa GIS User Group meeting in July and the executive board meeting of the Iowa Counties Information Technology group in August. IGI concept was presented to the Lt. Governor by state emergency management GIS staff in September. IGI ROI will be presented to the county supervisor's statewide group in November and an article will appear in the Iowa State Association of Counties November bulletin. Two proposals for IGI components totaling over \$1 million were submitted this fall to state technology infrastructure funds. ROI analyses were used as justification for both projects.

***Key results and findings of the IGI ROI Study Project:***

- Good estimate of costs to build 9 framework layers
- Good estimate of costs to maintain framework layers
- Good estimate of overall tangible and strategic benefits of a statewide spatial data infrastructure in Iowa
- Financial analysis of base IGI program over 20 years
- Sensitivity analysis of IGI with delayed implementation of county data acquisition
- Sensitivity analysis of IGI without federal Imagery for the Nation component, replaced by doubling of state and local contribution
- Good estimate of benefits of IGI to counties with GIS
- Good estimate of costs and benefits of IGI to counties without a GIS
- Good estimate of benefits of IGI to state agencies and others (some federal)
- Interviews produced a list of benefits of GIS within counties that can be used for justification of many smaller projects
- Interviews recorded benefits of GIS to economic development that are a potentially huge justification for major expansion of GIS projects at the state or county level - much more work is needed in this area

***Explain how statewide coordination has changed as a result of this project:*** The IGI has become a rallying point for discussion of framework data projects within the state, including ortho-imagery, parcels, transportation and other data layers. These discussions were held in the past but were never connected to any over-arching concepts such as NSDI. Now they can be seen within the context of the IGI business plan and supporting NSDI concepts such as the Iowa Geospatial Data Clearinghouse, metadata creation and data sharing as a good business practice. Because the ROI analysis turned out so

positive, it gives GIS staff within many organizations the needed justification to share data with other groups, and hopefully can also be used to justify individual GIS projects and expansions within counties and state agencies. If proposals for IGI funding are successful in the next year, there will be full time staff to move the state forward on coordination of several framework layers, including transportation, structures, elevation, parcels, address points and hopefully joint ortho-imagery acquisition.

***What have you done to bring new stakeholder groups or organizations into statewide coordination?*** The intent of this project was to extract framework data production costs from data producers and calculate benefits of access to framework data to various classes of users. The project necessitated working extensively with county and state government departments, plus some others. County GIS programs produce and maintain the best quality framework data, but this data is difficult to obtain. Several counties don't have GIS programs. Our efforts have inventoried these programs, and possible routes to coordination have been proposed.

In the past many state agencies were not rigorously involved in statewide coordination activities, including departments of health, education, human services. During this project, these agencies, plus many more were contacted to begin participating in a state agency group in the capital area, and many unknown GIS users were found. All of them are potential users of IGI framework data and services, so discussions will continue in that context. Utilities were extensively interviewed for IGI benefits, and further coordination discussions will continue with them as well. The project has identified many new stakeholder groups to bring in, including E911 coordinators, realtors, chambers of commerce, agri-businesses and others.

***What practices or activities led to success? What practices or activities have not?*** During the ROI study it was found that it is very difficult for GIS professionals to estimate the benefits of their efforts for their clientele, regardless of whether they are at the county, state or private levels. Their reported benefits mostly included efficiency measures, finding data faster, finding locations faster, and reducing some but not all redundancies. After these interview results were plugged into the GITA ROI spreadsheet, these benefits rarely exceeded costs.

Benefits increased dramatically when end users were interviewed, such as county engineers, economic development directors, conservation and planning staff, for example. These individuals were much more aware of the value that GIS played in their daily operations, how much time it saved, how much additional funding was brought in or the number of customers served. Rarely was this info made available back to the GIS staff. The lesson learned is to talk extensively with these stakeholders early in the process to learn the best value of the GIS products and services. It is also important to do a complete job of estimating the benefits to the paying organization, be it county, state or federal.

## **Next Steps:**

***How will this project continue in the future?*** IGIC needs to do additional Return on Investment studies to cover the needs of municipalities, utilities, regional governments, NGOs and tribal governments in Iowa. IGIC is planning to develop a proposal for an ROI study of municipal framework data layers, and try to address the numerous GIS "have-not" cities, like we did this time around for "have-not" counties. If IGIC can not apply to the 50 State CAP grant due to new eligibility rules for past recipients, we may try other local sources to fund this critical project.

***Describe the next steps in your project:*** The next steps in the IGI project are to look for funding for components of the IGI. IGIC members have two proposals submitted this year totaling \$1 million dollars for framework data projects. These include \$650k to start a geocoding/address point project for next year and \$400k to start a county GIS service to move individual county data files into seamless statewide data layers within IGI. There is also \$500k available to fund a portion of the statewide 2' ortho project to be flown next spring. IGIC is currently using a CAP Category 5 grant to move transportation data into IGI and develop a web tool to maintain building footprint coverages extracted from the state's lidar project. The lidar acquisition for the state is about 50% complete, and DNR continues to process this data into 1 meter DEMs and 2' contours. DNR also has a pilot project, funded by our USGS state liaison's office, to conflate NHD and NWI attributes to stream linework derived from the lidar data.

The IGI will eventually require \$2-3 million per year to sustain itself, and we are currently looking at long term funding options with the state's CIO and Lt. Governor's office. The outlook is not good for new state funding from next year's legislative session due to the massive rebuilding effort required after this year's flood. The good news is, that using the ROI study, we were able to bring IGI to the attention of the decision makers as a potential aid in fighting future floods. While we may not get any funding this next year, having the IGI discussed at the highest state level is encouraging. Having the IGI study in hand has been a great asset at this particular time.

***Where do you need assistance?*** We need assistance in developing the formal, blanket agreement that participating entities will sign to provide data to the IGI (and NSDI) in exchange for services. This needs to be combined with a "marketing" effort to both state and county decision makers on the value of data sharing, as well as providing support, both tangible and intangible to IGI.

## **Attachments:**

***Strategic Plan:*** After the 2007 NSGIC meeting in Annapolis the IGIC project team decided to concentrate on the IGI business plan. After seeing the GITA presentation on return on investment, it was felt this type of documentation would better lead toward building a statewide spatial data infrastructure in Iowa.

**Business Plan:** The Iowa Geospatial Infrastructure business plan consists of the following documents:

1. GITA final report on IGI Return on Investment study
2. GITA text of interviews
3. GITA spreadsheets for 20 year base analysis
4. GITA spreadsheets for sensitivity analyses of delayed construction, or no IFTN component, and counties without GIS
5. Southern Iowa GIS inventory by Pete Buckingham Consulting, Inc.
6. Northern Iowa GIS inventory by Pete Buckingham Consulting, Inc.
7. Status of Framework Layers 2008
8. Implementation Plan Spreadsheet
9. Five IGI Fact Sheets
10. IGI Powerpoint Presentation

All IGI documents are available on <http://www.iowagic.org/igi>

#### **Feedback on Cooperative Agreements Program:**

**What are the CAP Program strengths and weaknesses?** Strengths: CAP Grant funding helped spark to get things going in a state where the coordinating body is an all volunteer group. Nobody in our state has been able to work full time on these NSDI issues for the past 2 years so this grant gives us needed funding to support data gathering and coordination. Also, working with other states is very useful, seeing what is possible and what to avoid.

Weaknesses: The only thing that could possibly be considered a weakness is there just isn't enough funding resources to get done all the things that need doing at this stage such as information gathering, planning, and marketing. This is not a criticism of the CAP program, only the reality of the situation: we deeply appreciated the support of FGDC and we've tried to get the best return for FGDC's funding.

**Where does it make a difference?** For our state, the CAP Program has been absolutely essential for getting anything done since we don't have a full time GIS coordinator in the state. The CAP grant enabled us to hire a contractor to help with our IGI Business Plan. We couldn't have done this on our own.

**Was the assistance you received sufficient or effective?** Yes, the CAP ROI project has been effective for us as a rallying point for discussing coordination issues, and for talking with decision makers. The ROI study has uncovered information that will be critical to justifying new programs in the state.

**What would you recommend that the FGDC do differently?** No, we think the program currently works well as it is.

***Are there factors that are missing or additional needs that should be considered?*** In our state there is a disconnection between the GIS community and decision makers. We need to find business and industry groups that will take the message of IGI where it needs to go. FGDC could provide training to approach those groups within the state and develop a message that would bring them into discussions.

***Are there program management concerns that need to be addressed, such as the time frame?*** We required a six month extension on our project. Of course at the beginning of a project everyone thinks a year is plenty of time to accomplish the objectives. Then reality sets in and things take longer than planned. I think the current system is fine - it allows some flexibility plus keeping the deadlines clearly in mind.

We hope that you will reconsider the requirement to not reapply to the 50 State Grant for 3 years after the initial grant. We understand the desire to spread this grants around to other states, but the result will be some loss of momentum for the states that will have to wait 3 years to reapply. We have good momentum built up and because of having the ROI study completed, we were able to apply for about \$1 million in state funding for IGI projects. Most technology innovation grant funding requires addressing ROI, and we have an advantage over other good projects that have not spent any time documenting benefits. We could benefit further if we could keep the momentum up and address ROI issues with other groups like municipalities and utilities.

***If you were to do this again, what would you do differently?*** We believe that systematically gathering ROI information early in a project is essential to determining where the project benefits are, and where likely supporters will be. We would like to do an ROI study of framework data needs for towns and cities. Next time we will identify GIS end users earlier and spend more time with them during the interview process.

We wish to thank FGDC for their ongoing support for Iowa's programs and especially our USGS State Liaison, Bob Lemen, for his tireless efforts on our behalf.