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Broadband, Anyone? → B2
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When Minutes Matter → D2
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IndianaMap
YOUR SOURCE FOR INDIANAMAP NEWS

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FALL 2008 www.indianamap.org

$1.7 BILLION SUPPORTED BY THE INDIANAMAP

Hoosiers Stand to Gain

by JILL SALIGOE-SIMMEL, PH.D.

From transportation to public safety to economic development, the IndianaMap (*www.indianamap.org*) supports hundreds of local, regional and statewide projects each year. The IndianaMap was used for response and recovery during this year's major flooding, tornado, and earthquake events, Honda's selection of Indiana for its new facility, and much more. Stories documenting how the IndianaMap is used are presented throughout this report. Phase one of the IndianaMap is complete and the results are in—the initial investment of $8.5 million in the IndianaMap supports over 200-times its value in projects and operations—with 90% of users indicating they could not do their projects without it. As is evident from this study, the IndianaMap proves a good investment by saving taxpayer dollars and providing an information infrastructure that benefits all Hoosiers.

Still there are many challenges to completing and maintaining the IndianaMap. Conflicting interpretations of "electronic map[1]" and confusion surrounding the validity of copyrighting factual data[2], result in inconsistent access to electronic map data. Non-standard maps present technical obstacles to data integration. The importance of multi-jurisdictional data providers (local, region, state and federal) is not well recognized. But perhaps most significantly, Indiana's Legislature has not allocated funding specifically for support and maintenance of the IndianaMap. To help address these issues and justify future financing of the IndianaMap, IGIC answers the question "What are the economic and use-benefits of the IndianaMap?" 'Economic value' is taken to mean the contribution that the IndianaMap makes to Indiana's economy as a provider of geographic information.

Like roads and bridges, the IndianaMap is part of a public infrastructure that is a long-term investment in Indiana's future. There are hundreds, potentially thousands of IndianaMap users. Truly a public good, anyone can access it, anonymously, through a web viewer (e.g., *www.indianamap.org* and *www.maps.google.com*), through data download websites, off-line at public libraries, and other public access points. Because the users are widespread, it is difficult to estimate the total user base. All Hoosiers benefit through the money it saves taxpayers, as well as improved quality of life through better-managed resources, transportation, and business. For this study, input was sought from a known user base (those who are registered with the IndianaMap download sites and email distribution lists) through an appropriately designed questionnaire with the following objectives:

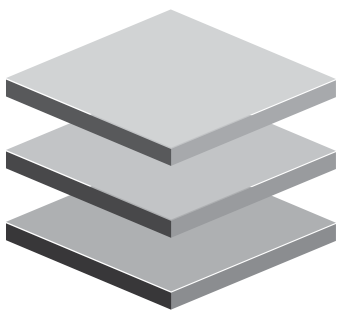
→ ***Discover what types of projects are utilizing the IndianaMap.***

→ ***Identify the priority placed on the different types of IndianaMap framework data by the users.***

→ ***Assess the importance of the IndianaMap in projects and operations by the users.***

→ ***Determine how the IndianaMap contributes to the quality and cost of the user's work.***

→ ***Estimate the dollar value of the IndianaMap to end users.*** (*$1.7 Billion* continued on page A 3) →



The IndianaMap allows users to layer data onto aerial maps to suit many needs.

ABOUT THE INDIANAMAP

Statewide Map Supports Local Initiatives

The IndianaMap is a single statewide map for Indiana. It includes everything that goes into making that map a reality—planning, partnerships, funding, coordination, and ways to make it available to people who need it. The IndianaMap embraces the role of geographic information, technologies and innovative institutional agreements to enable improved government service to citizens, and an enhanced ability for citizens to stay informed and to engage in the democratic process.

In 2002, the vision was defined to establish a uniform statewide digital map of Indiana for the following purposes:

1. *To standardize the consistency and quality of the map data across all Indiana communities.*
2. *To create efficiencies in data collection and maintenance at state and local levels.*
3. *To provide unfettered access to map data needed to support Indiana's most pressing issues.*
4. *To save tax payer dollars and reduce duplicate spending.*
5. *To support the business needs of a broad-based statewide user community, including the public, private and education sectors.*

Since then, much progress has been made. The entire state has been mapped once-over using high quality aerial photography (known as "orthophotography") and digital elevation maps. Local high-quality geographic information system (GIS) map data are beginning to be integrated.

The mapping website, *www.indianamap.org* (hosted and maintained by the Indiana Geological Survey) is well established and enables easy access to the general public and professionals to view, use, and download statewide map data. Extremely large map data sets are archived and downloadable from the massive data storage system at Indiana University's University Information Technology Services (*http://gis.iu.edu*)—the same super-computer facility that houses "Big Red."

The IndianaMap is also available through Google Maps, GoogleEarth, Microsoft Virtual Earth and the US Geological Survey. It is available at public libraries in each of Indiana's 92 counties through the Indiana State Data Center. It is provided to the Indiana National Guard and many federal agencies that conduct activities in Indiana.

In 2007, the Indiana General Assembly passed IC 4-23-7.3 Indiana GIS Mapping Standards that formally defines "framework data" as common electronic map information for a geographic area—the core data sets of the IndianaMap. This law established the State of Indiana Geographic Information Office, institutionalized the role of the Indiana Geographic Information Council, and created the Indiana Mapping Data and Standards Fund (although to date no funds have been appropriated).

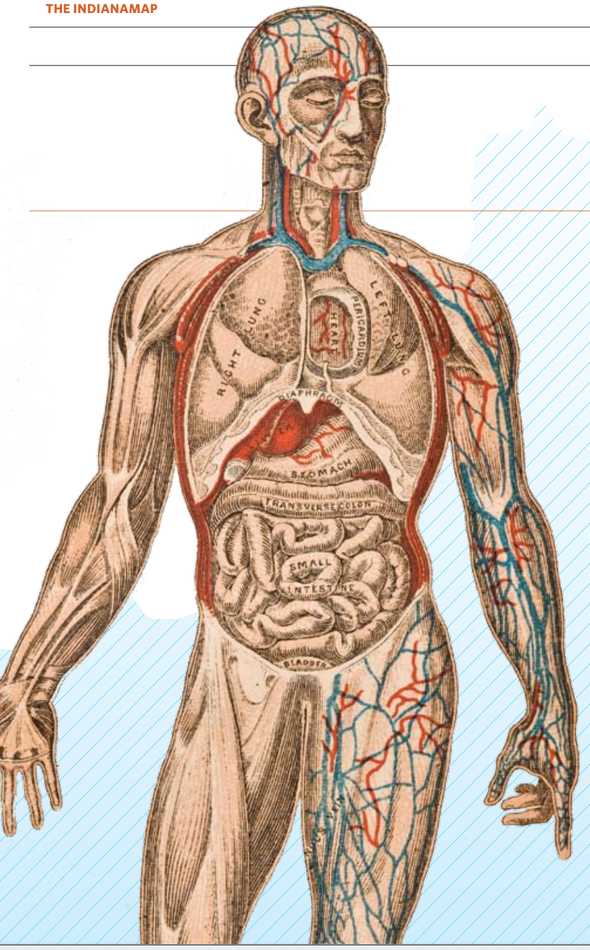
1 The meaning of "electronic map" as set forth in Indiana Code 5-14-3-2(d).

2 Feist Publications, Inc., v. Rural Telephone Service Co., 499 U.S. 340 (1991)[1], commonly called just Feist v. Rural, was a United States Supreme Court case in which Feist had copied information from Rural's telephone listings to include in its own, after Rural had refused to license the information. Rural had sued for copyright infringement. The Court ruled that information contained in Rural's phone directory was not copyrightable, and that therefore no infringement existed.

IGIC Indiana Geographic Information Council

ORTHOPHOTOGRAPHY A type of aerial photography in which the distortions due to camera tilt and topographic relief have been removed. An orthophotograph has consistent scale throughout and can be used as a map.

GIS A Geographic Information System is an organized collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information. It combines layers of information about a place to give you a better understanding of that place.



What is a

GEOGRAPHIC INFORMATION SYSTEM?

Remember those multi-layered images of the human body from middle school science class, showing the body's skeletal system, nervous system and so on? GIS is similar. It layers 20th century geographical maps—of streets, buildings, neighborhoods, even subterranean infrastructure—using 21st century technology.

GIS technology works by linking information stored in databases to a place or location. Users can question the data and present the answers in maps, tables and other graphic representations. Since 80% of all information has a geographic component, the power of GIS can be widely used to support decision-making and problem solving across all sectors—public, private, and not-for-profit.

Why do governments use GIS technology? It is an important tool for determining public policy. In a book about public policy, R.W. Greene says, "The realization is growing that almost everything that happens in a public policy context also happens in a geographic one: transportation planners, water resources studies, education subcommittees, redistricting boards, planning commissions, and crime task forces all must consider questions of where along with the usual ones of how, and why, and how much will it cost. GIS, by answering the first question, helps to answer the others."

IndianaMap Partner Organizations

The IndianaMap is not "owned" by any one organization—it is truly a "public good" available to all to use and benefit, and maintained by a community. It is the close collaboration of the following dedicated organizations that make the IndianaMap possible:

United States Geological Survey (USGS)
Building a National Map

Indiana's city and county governments
Data stewards and regional data access

Indiana Department of Transportation (INDOT)
Data distribution agreement with IGS

Department of Local Government Finance
Obtain statewide land parcel data

Indiana Geological Survey (IGS)
Data distribution and host of IndianaMap interactive

Indiana University Information Technology Services (UITS)
Data storage, retrieval, and distribution

State Data Center, State Library
Data products and public information access

Indiana Business Research Center (IBRC)
Statewide data access through Information for Indiana

Coalition of Universities for Spatial Information Sciences (CUSIS)
Work with government to advance geospatial science

Department of Homeland Security (DHS)
Integrate statewide data layers

Indiana Geographic Information Council (IGIC)
Framework data standards, development, maintenance, coordination, and distribution

IndianaView at Purdue University
Remote sensing and satellite imagery

Geographic Information Office, Indiana Office of Technology (GIO, IOT)
Increase service, reduce costs through statewide GIS leadership

State GIS Center of Excellence (CoE)
Build State GIS infrastructure and data

The IndianaMap

(*$1.7 Billion* continued from page A 1) → The results of the survey clearly indicate that over $1.7 billion in Indiana projects and government operations are supported by the IndianaMap. Meeting these objectives will help plan for future mapping projects and assess the IndianaMap in qualitative as well as monetary terms.

METHODOLOGY

The questionnaire had nine questions implemented through an online survey tool. The response rate to the survey was encouraging and exceeded commonly accepted response rates in marketing surveys. For the purposes of this study we make an estimation of total users based on a sample of 1521 registered users on the University Information Technology Services at Indiana University's download site for the IndianaMap Orthophotography (*http://gis.iu.edu*). These users download and use IndianaMap data on their own systems. They include government regulators, engineers, utilities, realtors, appraisers, mining companies, researchers, planning officials, and teachers. Three hundred fourteen (314) responses were received from May to July of 2008. This is a 20% response rate (approximately +/- 6% margin of error[3]) and is nearly four times the rate considered acceptable in the marketing industry[4].

Because the IndianaMap has many different users, as well as emerging and unknown new uses and repeated uses over time, placing a quantitative valuation on it is an extremely complex problem. Our approach is similar to that taken by mineral economists' Bhagwat and Ipe in their pioneering report "Economic Benefits of Detailed Geologic Mapping to Kentucky." Their approach is a retrospective study to first estimate the value to an individual map user and then to extend that value to all the possible map users over time to get an estimate of the aggregate benefits of a mapping program.

This approach is applicable to the IndianaMap as we can conduct a retrospective study based on currently available maps and the 2005 Statewide Orthophotography Project. Slightly modifying Bhagwat and Ipe's method to our purpose, we developed a study of the economic benefits of the IndianaMap to demonstrate the value of statewide map data, period of return, and a positive business case for funding the ongoing creation and maintenance of statewide framework data.

First, input was sought on the total costs of projects and/or operations that are supported by the IndianaMap. Of 314 responses, 69% (216 responses) provided information on the total cost of their projects and/or operations. Of those responses, some indicated a range in the cost of projects and operations. To maintain a conservative perspective, we consistently used the lesser values in cases where a range in costs was indicated. Many of those not responding indicated that total costs were difficult for them to estimate. The respondents identify $1,751,000,145 in Indiana projects and government operations that are supported by the IndianaMap. In addition, of those providing project cost information, 90% indicated that IndianaMap orthophotography was essential to their operations (defined as "project requires high resolution/accuracy data, maybe supplemented with other data; couldn't do project without it") and 6% indicated orthophotography was of secondary necessity (defined as "project requires other data that depend on high resolution/accuracy imagery to create, align, verify, and/or maintain those data"). These projects range from statewide to discrete area projects.

CONCLUSION

The results of the survey clearly indicate that over $1.7 billion in Indiana projects and government operations are supported by the IndianaMap. In short, this means that an initial investment of $8.5 million in the IndianaMap supports over 200-times its value in projects and operations—with 90% of users indicating they could not do their projects without it.

The IndianaMap is by definition a public good—those goods that, once they have been produced, are available to all, without exclusion. While the IndianaMap has many of the characteristics of a resource, a commodity, a capital asset and infrastructure, it does not fit neatly into any of these categories. The difficulty in assigning a particular role to the IndianaMap reflects, to a large extent, the diffuse, and hence extensive, impact that it has on the economy. The gains from the IndianaMap can be categorized into three types:

→ ***Increases in efficiency, so that the same task can be performed with fewer, often significantly fewer, resources.***

→ ***Increases in effectiveness, so that the same task can be performed with greater accuracy and fewer mistakes.***

→ ***New products and services, which could not have been produced without this new technology.***

These tangible, measurable, economic impacts only partially reflect the contribution of the IndianaMap. Consideration must also be given to the social gains resulting from the use of the IndianaMap products. Such an analysis is, by its very nature, largely of a qualitative nature, but it is important to ensure that the monetary estimate deduced in this study does not detract the reader from the wider importance of the IndianaMap.

3 Van Bennekom, F. (2003) www.greatbrook.com

4 Bhagwat, S.B., and Ipe, V.C. 2000. The economic benefits of detailed geologic mapping to Kentucky. Illinois State Geological Survey Special Report 3, 39 p.

AGGREGATE In economics, this denotes the total supply or demand of a good or serfvice.

POSITIVE RETURN REALIZED IN UNDER 3 YEARS

34:1 RETURN ON INVESTMENT

IndianaMap Orthophotography Proves Its Worth As Good Investment of Public Funds

by JILL SALIGOE-SIMMEL, PH.D.

In 2005, Indiana completed an ambitious project to map the entire state once over with high quality orthophotography. These new maps became the foundation of the IndianaMap, a detailed map of Indiana to be used by government, business, and citizens. The 2005 orthophotography was part of a grant-funded project coordinated by the Indiana Geographic Information Council (IGIC). With nearly three years of usage, IGIC has conducted a retrospective study to see how the investment paid off.

Two separate methods were employed to evaluate the return on investment. The results of both methods are consistent and show a strong 34:1 return on investment in under three years.

RESEARCH METHODOLOGY

Input was sought from a known user base (those who are registered with the IndianaMap download sites and email distribution lists) through an appropriately designed questionnaire that was implemented through an online survey tool. The response rate to the survey was encouraging and exceeded commonly accepted response rates in marketing surveys.1 For the purposes of this study, we make an estimation of total users based on 1521 registered users on the University Information Technology Services at Indiana University's download site for the IndianaMap orthophotography (*http://gis.iu.edu*). These users download and use IndianaMap data on their own systems. They include government regulators, engineers, utilities, realtors, appraisers, mining companies, researchers, planning officials, and teachers. Three hundred fourteen (314) responses were received during May and June, 2008. This is a 20% response rate and is nearly four times the rate considered acceptable in the marketing business.

Statewide, the orthophotography maps consist of a series of photo "tiles" each measuring 4000 feet by 4000 feet. There are 68,592 total tiles in the statewide project. The total cost of the orthophotography project acquisition and initial data distribution was $7,432,625 (this does not include project management or secondary web distribution by the IndianaMap collaborating organizations).

For this analysis, IGIC used two standard measures of return on investment (ROI), specifically "Aggregate Value ROI", and "Usage ROI".

The results show an impressive 34:1 return on investment. The statistical calculations are derived as follows:

Aggregate Value ROI = Vpt * Dt / Ct

This can also be expressed as:

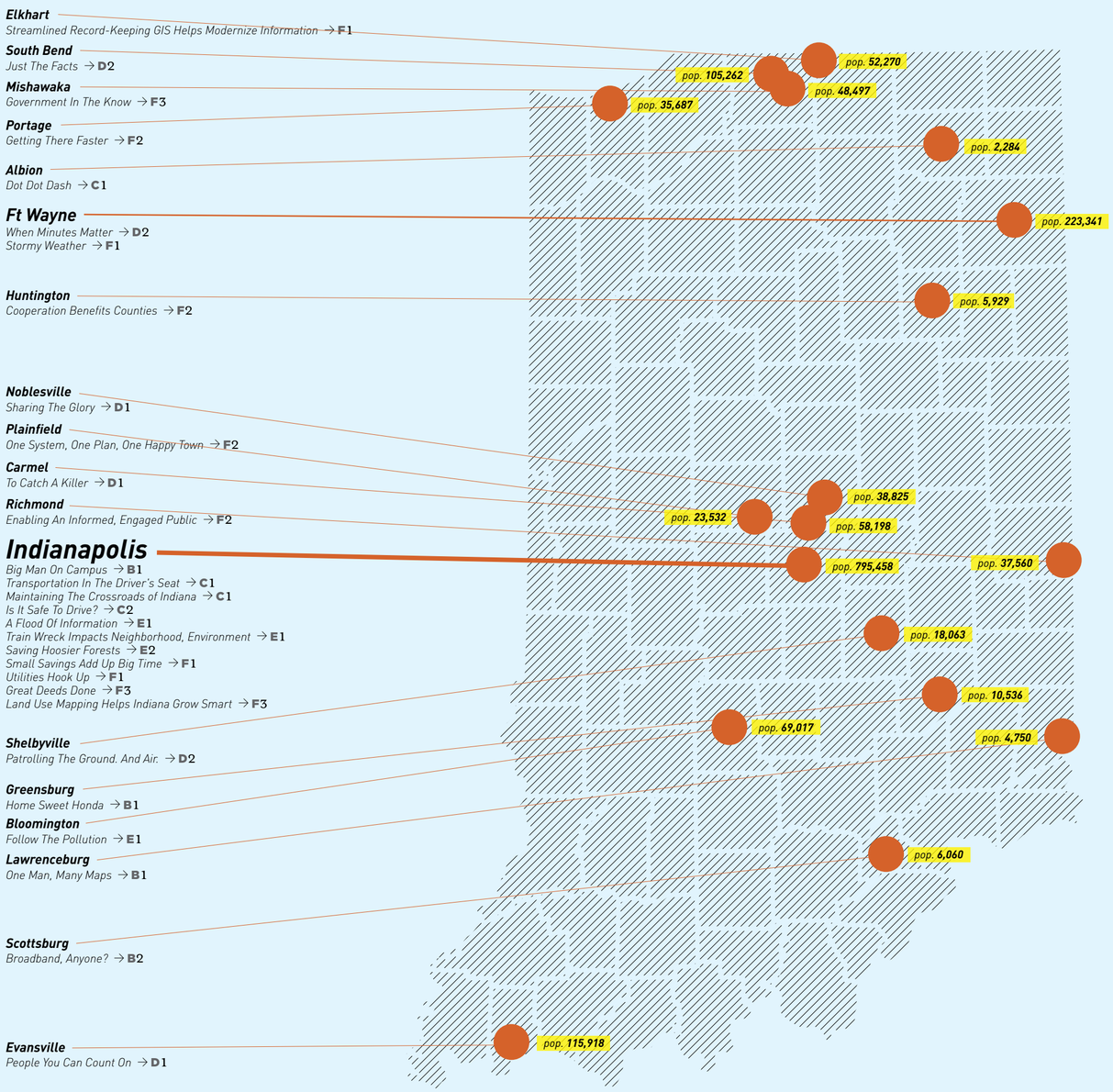
Usage ROI = Upt / BEpt

WHERE:	REFERS TO:	VALUE:
Tt	Total tiles produced statewide	**68,592 tiles**
Ct	Cost for initial production & distribution statewide	**$7,432,625**
Cpt	Cost per tile expressed as an average for production & distribution	**$108**
Vpt	Value per tile as defined by survey respondents	**$28**
BEpt	Break even per tile—the number of times a single tile must be used to break even	**3.87**
Upt	Usage per tile—the average number of times each tile has been used	**131**
Dt	Distribution total—the estimate of total tiles distributed for use, defined by survey results	**8,969,130**

(*34:1 ROI* continued on page A 5) →

The IndianaMap

Examples Of The IndianaMap's Benefits Come From All Over The State



The IndianaMap

(*34:1 ROI continued from page A 3*) →

Aggregate Value ROI

To calculate the return on investment, we must calculate the aggregate value and divide that by the total costs for data production and initial distribution. We used the survey results from 312 respondents along with known costs of production for this calculation.

Although a theoretical framework for estimating the value of maps exists[1], the relevant data required to estimate it may not be available in the real world. Therefore, we used an empirical approach to estimate a monetary value of the maps.

First, the estimate value per tile was calculated, where:

Estimate value per tile (Vpt) = average (user-defined value per project / tiles used per project)

On the survey, users were asked, "Had the 2005 orthophotography maps not been available, given the parameters of your operations and/or project, what would have been an appropriate amount of money to spend on the data?" This question was based on the premise that, in the absence of the IndianaMap orthophotography, the users would have to spend money to collect the information themselves. Such data provide a measure of the user-defined value of the maps. 204 (65%) respondents indicated a value or range of values.

Not unexpectedly the responses vary widely, for as stated by Barr and Masser[2], "Information has no inherent value, it is only of value once used and that value is related to the nature of the use rather than the nature of the information. As a result, information has very different values for different users." Of those responding, some people indicated a range in the amount of money they would have reasonably spent. To maintain a conservative perspective, we consistently used the lesser value in cases where a range in values was indicated. Many of those not responding indicated that total monetary value was difficult for them to estimate. Of those not providing a value, several indicated they had no budget to spend on the map data—their project simply would not have been possible without the availability of the IndianaMap.

We put the user-defined estimate of monetary value of the maps in the context of a single project and/or government operation for each respondent. Respondents listed the geographic coverage area of their project and/or operations. Project size ranges from single acre sites to statewide. That coverage area was used to estimate the number of map tiles used per respondent. For each respondent, the monetary value (as described above) was divided by the number of tiles used to arrive at an estimate value per tile for each respondent. To ensure the results provide a conservative perspective, these results were plotted, and outliers (in this case, all estimated value equal or greater than $300 per tile) were removed from the calculation. Finally, we averaged the results for all respondents, arriving at the estimate value per tile (Vpt) of $28.

Vpt original response summary statistics:

Mean	**70.70**
Median	**1.38**
Standard Deviation	**217.84**

Vpt summary statistics after removing outliers:

Mean	**28.17**
Median	**1.10**
Standard Deviation	**57.89**

It is noteworthy that on a per-response basis, a broad range exists in Vpt. This range reflects distinct value differences in the size of projects. When the data are grouped by size of project, the average Vpt for statewide projects ($4.71) is considerably lower than either multi-county projects ($22.14) or single county or smaller projects ($84.14). This can be interpreted as a function of the number of tiles required for different sized projects, with vastly more tiles statewide lowering the average Vpt. While smaller sized projects generally report large Vpt, it is the aggregate value of distinct (and sometimes unpredictable) uses that impart its worth, be it an important highway project, emergency response to flooding, tornado, or earthquake, or the location of a company like Honda to Indiana.

Next, we estimated use. Using the survey data, IGIC calculated the number of orthophotography map tiles used per project and/or operation and then summed the total number of map tiles used by all respondents. The results indicate an estimated total distribution and usage (Dt) of 8,969,130 tiles—a conservative estimate of usage based on a 20% response rate of known users. We use these data along with known project costs ($7,432,625) to calculate the ROI:

Aggregate Value ROI = Vpt * Dt / Ct = ($28 * 8,969,130) / $7,432,625
i.e., ***a 34:1 ROI***

Usage ROI

To test the reliability of our model, we look at the problem another way by examining the "Usage ROI" in which the return is based on an estimate of usage per tile divided by the number of times a tile must be used to break even. For this approach, we express the return on investment by the following calculations:

Usage ROI = Upt / BEpt

Where,

Upt = Dt / Tt = 8,969,130 / 68,592 = 131

And where,

BEpt = Cpt / Vpt = $108 / $28 = 3.87

First, we estimated the number of times each tile has been used by taking the estimate of use (8,969,130 tiles) divided by the total number of tiles for the statewide project (68,592). Using these data, we see that, on average, each tile has been used 131 times. Again, it should be noted this is a conservative estimate based solely on reported survey results and does not account for anonymous usage through the www.indianamap.org web site, Google Maps, public libraries, or other public access points not accounted for in this study. It also does not comprehensively account for the use of imagery by groups who have local data copies and typically do not download it, such as county GIS staff, state agencies, and the Indiana National Guard.

Next, we used known cost figures to calculate how many times the maps need to be used for the investment to break even. There are 68,592 total tiles in the statewide project. The production and initial distribution costs to the counties and the state was $7,432,625. Thus, the average production cost was $108 per tile.

Using the estimate value per tile previously calculated ($28), we calculate the usage ROI:

Usage ROI = 131 / ($108 / $28)
i.e., a ***34:1 ROI***

CONCLUSION

→ **Two separate methods were employed to evaluate the return on investment. The results of both methods are consistent and show a strong return on investment in under three years.**

1 Bhagwat, S.B., and Ipe, V.C. 2000. The economic benefits of detailed geologic mapping to Kentucky. Illinois State Geological Survey Special Report 3, 39 p.

2 Barr, R., and I. Masser. 1997. The economic nature of geographic information. In Z. Kemp (editor) Advances in GIS 4. London: Taylor and Francis.

The IndianaMap

TOP 10 SECTORS USING THE INDIANAMAP

Mapping departments within local and state government, education, non-profits and private industry use geographic information systems map data every day. In a survey of the Economic Benefits of the IndianaMap, 312 respondents told how they use it. Here are the top ten use-areas among the public and private sector—

01 TRANSPORTATION

For trains, planes and automobiles there are numerous government agencies, surveying and engineering firms, and community organizations who use the IndianaMap for proposed transportation routes, environmental assessments, infrastructure management, airport and roadway improvements, maintenance, accident locations, new facilities, emergency response and evacuation, state and federal reporting requirements, and system-wide transportation management

02 UTILITIES

Public and private utilities use the IndianaMap in their customer billing systems, routing meter-reading and inspections, load-testing, infrastructure planning and improvement, "call before you dig" locations, and emergency response

03 NATURAL RESOURCES

Public, private, and non-profit organizations use the IndianaMap on a daily basis to protect endangered species and habitat, manage natural resource exploration and exploitation, protect the public from natural hazards such as flooding and earthquakes, manage wildlife for hunting and fishing, maintain parks and facilities, and manage forests, fish and wildlife for the benefit of all Hoosiersv

04 ECONOMIC DEVELOPMENT

We may not know when the next major corporation is looking at Indiana for their new home, but with the IndianaMap they can quickly see why the Hoosier state stands out; Indiana's economic developers use the IndianaMap to locate sites for potential development, plan tax incentive zones, clear regulatory requirements, help existing businesses, and attract new business for a growing economy

05 ENGINEERING/SURVEYING

Whether used for preliminary survey work, evaluating impacts to home owners, or managing construction phases, the IndianaMap saves hundreds of thousands of dollars when new developments are planned, bridges built, levees are constructed, pipelines are routed, and much, much more

06 PLANNING/LAND USE

Communities and planning organizations use the IndianaMap to visualize land use patterns and trends, zoning, plan developments, acquire state and federal grants, and improve quality of life factors as part of "smart growth" initiatives; developers, assessors, and real estate professionals use it to look at current the landscape and changes over time

07 INFRASTRUCTURE

From bridges to telecommunications, communities use the IndianaMap to assess and maintain their infrastructure, including Governmental Accounting Standards Board (GASB) reporting requirements

08 ENVIRONMENTAL

Government agencies entrusted with the responsibility of protecting our environment use the IndianaMap to track and manage regulated facilities and on-the-ground hazards, improve the environment through remediation, conservation, and preservation, and to communicate with citizens; private and non-profit organizations use the same consistent map information for conservation and preservation, and to assure environmental compliance within areas of new development, existing sites, and areas of concern

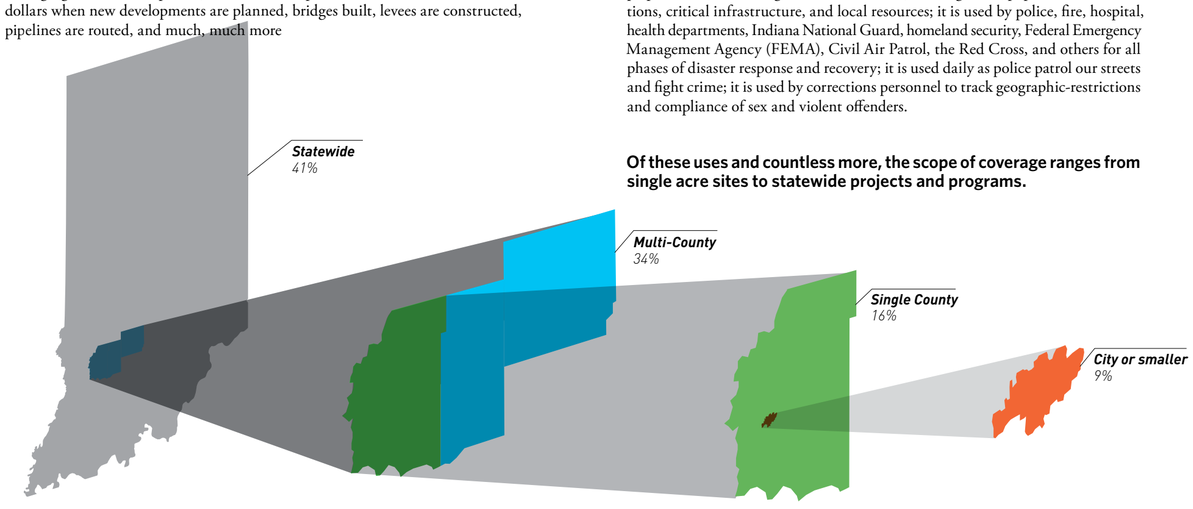
09 WASTEWATER/STORMWATER

From flooding, to community growth, to modernizing outdated sewer overflows and protecting public health, utilities and communities use the IndianaMap to see where the water goes and manage the impact of that flow

10 PUBLIC SAFETY

The IndianaMap saves lives—it helps quickly get emergency responders to where they need to go; as an interoperable communications tool it is used for community preparedness, examining locations of shelters, warning sirens, population concentrations, critical infrastructure, and local resources; it is used by police, fire, hospital, health departments, Indiana National Guard, homeland security, Federal Emergency Management Agency (FEMA), Civil Air Patrol, the Red Cross, and others for all phases of disaster response and recovery; it is used daily as police patrol our streets and fight crime; it is used by corrections personnel to track geographic-restrictions and compliance of sex and violent offenders.

Of these uses and countless more, the scope of coverage ranges from single acre sites to statewide projects and programs.



The IndianaMap

THE INDIANAMAP NEEDS YOU.

The IndianaMap is for all Hoosiers. However, this message is for a select few.

This message is for legislators, county commissioners, county clerks, mayors, sheriffs, engineers, economic developers, and others who, with their votes or phone calls, can further the progress and ensure the long-term viability of the IndianaMap.

Funding is critical to complete and maintain the IndianaMap. Fortunately, a mechanism for handling funds exists through the Indiana Mapping Data and Standards Fund (Indiana Code 4-23-7.3-4 was established in 2007 but is not yet funded). Without funding, we slip backwards quickly to an inefficient system of mismatched and non-standard data with questionable availability.

The IndianaMap represents the work of many contributors. At the city, county, and state level, the IndianaMap helps create, maintain, and preserve map data. In the process, it helps protect the health and safety of Hoosiers. And since it needs to be shared, it needs to be standardized. If it's properly maintained, the IndianaMap can improve almost any governmental task. And that's where funding comes in.

Map data mirrors the surface of a changing world. When property is bought and sold, land records need updated with new ownership information. When homes and businesses are built, infrastructure is also built to service them. Addresses must be accurate and current to save lives on e-911 calls. When rivers flood, entire floodplains can change—along with the affected communities. All these events and more require the maps be updated. It makes sense that some of those activities that help change the world help fund the maintenance of the land records.

FUNDING OPTIONS

How to fund any new expenditure during tough economic times is a serious issue. That's why critically evaluating the economic benefits of the IndianaMap was imperative. The IndianaMap requires a $12 million biennial investment for full implementation. Results of the IndianaMap study showed the initial investment of $8 million supports over $1.7 billion worth of projects and operations with a strong return on investment. Funding the IndianaMap is a vital investment in Indiana that supports literally hundreds of projects and government operations each year. This level of funding will directly maintain the most essential IndianaMap data layers—including statewide orthophotography, the needed technology infrastructure, development of mapping data standards, and help offset costs to local government for maintaining rapidly changing map data. As demonstrated by the Economic Benefits of the IndianaMap, the return on this investment will be substantial and immediate. The fact is, the IndianaMap has already produced significant economic and user-benefits.

FLOOD BOUNDARIES. TAXABLE PROPERTIES. ROADS. NATURAL RESOURCES. WHEREVER INFORMATION CAN BE TIED TO LOCATION, THE INDIANAMAP CAN HELP PEOPLE WORK MORE EFFICIENTLY. AND NOW, THANKS TO MANY COLLABORATORS, HOOSIERS HAVE ONLINE ACCESS TO THESE AND HUNDREDS OF OTHER DATA LAYERS WITH ADDITIONAL STATEWIDE DATA LAYERS IN PROGRESS.

To date, the IndianaMap has been jump-started with mission-driven funding, primarily in the form of one-time grants. However, that mission-driven funding was short-term and does not facilitate long-term maintenance necessary for success. Multi-jurisdictional programs require sustained funding for planning, buy-in, and leveraging of additional grant dollars. Homeland security and transportation have been primary funding sources for supporting statewide GIS efforts, with local jurisdictions self-funding their operations often at great expense. However, these sources should not be viewed as a long-term solution for the IndianaMap. For example, the State has seen reductions in federal homeland security grants and should anticipate further decreases in future years.

Stable funding is critical for data creation and also for continued maintenance. Without upkeep, information quickly becomes out of date and useless for most business applications and decision-making. Many states have developed "Land Information Funds" or their equivalents that support statewide mapping efforts, and virtually all states use a combination of sources and approaches of funding to support statewide map data and coordination. Indiana has already established the Indiana Mapping Data and Standards Fund, and the intent here is to provide an evaluation of funding options. One of the best sources of funding for any function of government is a dedicated source of revenue that provides a continuing stream of funding, often in perpetuity.

Funding Option #1

Land Record Recordation Fee

A recordation fee is appropriate because most recorded documents describe property transactions that change the landscape; in turn, those changes require updated maps and databases. Wisconsin, Vermont, Oregon and Montana are examples of states that have implemented land record recordation fees specifically to fund their state map programs. Wisconsin's fee, collected by each County Register of Deeds, ranges from $4 to $8 for the first page (depending on county GIS management structure) and $2 for each additional page. Wisconsin generates approximately $7m per year ($71m 1990-2000), distributed among counties and the state. In 2000, Oregon's legislature authorized the addition of a $1.00 fee to each land transfer to help develop a statewide property tax map. Montana's fee is $1 per page on multi-page documents, with revenue distributed among counties and the state. It is estimated that Indiana has approximately 200,000 land transfers per year. If Indiana were to implement a land recordation fee that averaged $15 per transaction, it would generate approximately $3 million per year (about half of the necessary $12m biennial investment for full implementation).

Funding Option #2

State Budget Appropriation

The general fund is the one major funding source that supports the daily operations and functions of nearly all State activities. Responsibilities and operations that are in the best interest of the State are funded through this source. Most GIS programs have a direct or indirect funding impact on the general fund. In certain cases the general fund is directly impacted because it is the major contributor to the GIS program. The general fund is indirectly impacted even if special funds are used. For example, INDOT is the maintainer of highway maps as directed by the State and is normally funded out of the general fund. All things considered, the general fund is in the mix somewhere regarding GIS program funding. (*IndianaMap Needs You* continued on page A 8) →

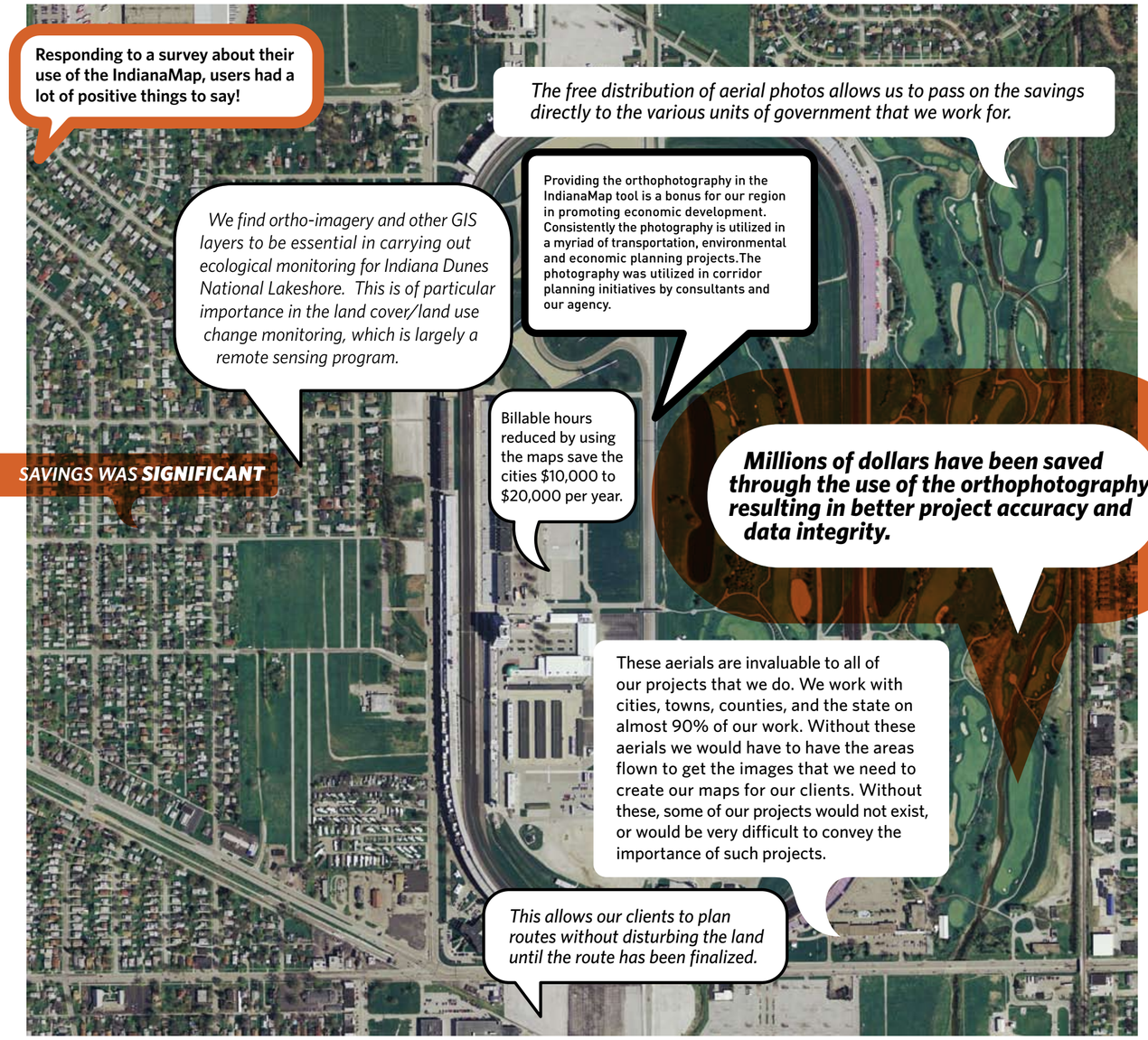
INFRASTRUCTURE These are the basic physical and organizational structures and facilities needed to operate a society.

FLOODPLAIN This is a low-lying area adjacent to a river, formed mostly of river sediment and subject to flooding.

PERPETUITY Something that lasts forever or for an indefinite period.

RECORDATION FEE This fee is imposed by governments or organizations when a document or transaction must be recorded into a record.

The IndianaMap



→ (*IndianaMap Needs You* continued from page A 7)

Funding Option #3

Redirect Existing Tax Revenue

It may be possible to redirect existing tax revenue to fund the IndianaMap. If outdated programs are identified that are appropriate for redirection, even small amounts could generate appropriate funding without raising taxes.

Funding Option #4

Assessments on Agencies / Support of State Offices

A traditional financing approach for information technology (IT) functions, both in government and industry, is to "charge" user agencies to support central IT functions and facilities. Oregon, Kentucky, Maine, Michigan and North Carolina use Assessments on Agencies to support a portion of statewide mapping development, maintenance and coordination functions (typically for state government operations). Under Service Level Agreements, each agency signs an annual agreement and contributes a predetermined amount to support the GIS operations. This predetermined amount is generally based on level of GIS activity in each agency, which ranges from $1,000 to $45,000. A key disadvantage of this approach is the fact that such support and detailed arrangements must be renewed at least each budget cycle and often annually. Some states under this model have been criticized for their focus on state agency missions, minimizing broader statewide benefits.

CONCLUSION

→ Regardless of funding model, the Indiana Geographic Information Council and the Indiana Geographic Information Officer recommend a fair system for collecting and distributing funds. States such as Vermont, Montana and Wisconsin have developed funding models that allocate funding among important statewide activities managed at the state level (such as statewide orthophotography), special projects that may represent one-time expenditures, and local government data maintenance funds. We recommend a similar model be established in ratios adequate to support the maintenance and distribution of key IndianaMap data.

Through the coordination of the Indiana Geographic Information Council (IGIC), IndianaMap workgroups are actively engaged in analyzing GIS resource needs and exploring funding options as part of the statewide data integration plan (Indiana Code 4-23-7.3-12). We urge you to participate in these important conversations and to influence the long-term success of the IndianaMap by demonstrating your support.

Economic Development

HOME SWEET HONDA

Decatur County Attracts Big Business!

GREENSBURG, INDIANA. In June 2006, Honda officially announced Decatur County would be the home of a new plant, scheduled to open in 2008. The plant will cover 1 million square feet; sit on a 1,700 acre tract; and employ 2,000 people.

As is often the case with economic development site selection, Honda was on a short timeline to select their new home. Indiana emerged as the winner in the short race to land the Honda Motor Company's newest assembly plant in North America, thanks in part to the IndianaMap. The people involved with the site selection for Honda used the IndianaMap stating, "When you only have a short period of time to find a site, this information was invaluable."

Combined with an accelerated construction schedule (existing homes on the site were being moved less than 3 months after the official announcement), the County also faced the immense challenge of responding to numerous information requests in a short period of time. There were parcel research requests for utility easements, widening of roads, property surveys, zoning, etc. On many days, County offices had people in line from open to close.

Decatur County had integrated much of their data into a geographic information system. By Spring 2006, many departments were on board: the Auditor's Office, Assessor's Office, Highway Department, Area Planning, e911, Clerk's Office and Recorder's Office. Each was using the GIS data as part of their normal daily functions.

In addition to fielding requests through the coordinated onsite system, the County's GIS website was released to the public. It proved to be a solid way of transferring information to constituents, as it allowed the public to obtain information from the GIS without any formal training.

DEPARTMENTS THAT USED TO OPERATE AS INDIVIDUAL ISLANDS NOW INTEGRATE THEIR INFORMATION AND SHARE DATA, WHICH CREATES A GENERAL RESPECT BETWEEN THE OFFICES, AND ALLOWS THE COUNTY TO SUPPLY INFORMATION TO THE PUBLIC FASTER AND MORE ACCURATELY THAN EVER BEFORE.

THE RESULTS

→ The County's investment in GIS paid off in massive time-savings, and the availability of information proved an invaluable economic development tool.

→ Mary Dickman, County Auditor's Office, says "Property information requests that used to take a couple of weeks are now answered in a matter of minutes." In addition to facilitating information retrieval, the County's GIS provided a morale boost. Tim Ortman, Decatur County GIS Coordinator, noted "...unlike any other projects, the GIS pulled the County together as a unit." Departments that used to operate as individual islands now integrate their information and share data, which creates a general respect between the offices, and allows the County to supply information to the public faster and more accurately than ever before.

BIG MAN ON CAMPUS

Eli Lilly Maps Assets

INDIANAPOLIS, INDIANA. As a Fortune 500 company, Eli Lilly is faced with the daily task of managing millions of assets, as well as planning for the future. That future includes nearly one billion dollars worth of combined corporate and municipal infrastructure improvements over several campuses.

To manage and maintain these assets, Lilly looked to an internal GIS. It needed to incorporate digital construction documents and surveys, and be capable of supporting 3D modeling and other map data.

THE RESULTS

→ The project has developed to serve multi-million dollar projects at the Lilly Corporate Center, the Lilly Technology Center, the Lilly Materials Center, the Airport Hanger, and Park Fletcher in Indianapolis and the Greenfield Labs. The GIS is on-going, and in its sixteenth year. It has come to play an essential role in coordinating hundreds of design projects among consultants across the nation as well as City, State and federal governments. This fully functional GIS provides:

Utility and asset management

Infrastructure protection

Construction layout and design

Land title surveys permit approval

Informed decision making

Successful tracking of $1.5 billion in city and private infrastructure improvements

ONE MAN, MANY MAPS

IndianaMap Helps Communities Do More With Less

LAWRENCEBURG, INDIANA. As President of the Dearborn County Economic Development Initiative, Jim West was charged with identifying economic development opportunities for Dearborn County in rural southeast Indiana.

Jim began by using the County's geographic information system (GIS) to research areas of opportunity. Using land parcel information, aerial photography, sewer maps, flood, transportation and elevation data, Jim identified three areas that had high potential for industrial development. Each area was eligible to become a Tax Increment Financing District, a major incentive to developers. With this information and maps in hand, the proposed redistricting was backed by solid, persuasive evidence illustrating the comprehensive benefits to the community.

THE RESULTS

→ Maps were vital in successfully making the case for the new tax districts.

Without GIS tools, the tax districting process would have taken years.

→ The properties are being marketed to developers with the same maps used to create the tax districts.

→ The maps were so critical, local government leadership has pledged to continue investing in GIS.

Economic Development

BROADBAND, ANYONE?

Rural Areas Get Connected

SCOTTSBURG, INDIANA. In recent years, rural areas have had difficulty obtaining high-speed Internet, which is now being regarded as a basic utility like electricity or water. When the City of Scottsburg found that private telecommunications providers were unwilling or unable to provide broadband service, the task of finding a workable solution was given to the municipal electric utility.

The utility began deploying a broadband network using satellite dishes and antenna located on towers throughout the county. The parabolic antennas used for distant links have extremely narrow beams and have to be very close to alignment to even get a base signal to tune in. So the utility turned to orthophotography—aerial photography that has been corrected for the curvature of the earth—to help.

Before the orthophotography, staff would map the direction of the link on paper, then drive to that location in order to establish landmarks and determine which direction to point the antenna. With the orthophotography staff can simply map the tower locations, draw a line between them and then look at the photos for land marks like barns, silos, forest breaks, etc.

Orthophotography has also been useful in determining a rural customer's ability to receive a signal. Jim Binkley of Scottsburg Electric relates, "A customer was listed as a "NO-GO" due to their location in an area that had seen a couple other unsuccessful site surveys. By entering the GPS of the potential customer and drawing a line to an area tower, it was plain to see the heavy tree cover in the area was negated by the alignment of two agricultural fields. The frequency of the system will go through trees but not forests. This potential customer was then scheduled and as a direct result of the orthophotography the word "potential" can now be removed and the word "new" inserted beside the customer."

"Elevations are also of great importance," Mr. Binkley continues. "While trees may weaken the signal, dirt kills it. Knowing the elevation of a potential customer before we visit allows us to schedule the use of our bucket trucks to minimize wear and tear on equipment."

THE RESULTS

⟶ The network provides broadband access to more than 90% of the county's residents.

⟶ Scottsburg Electric now has over 35 towers providing service to 8 rural counties.

⟶ Two major local employers had threatened to relocate if the city could not obtain high-speed access—both remained.

TWO MAJOR LOCAL EMPLOYERS HAD THREATENED TO RELOCATE IF THE CITY COULD NOT OBTAIN HIGH-SPEED ACCESS—BOTH REMAINED.

THESE AERIALS ARE INVALUABLE TO ALL OF OUR PROJECTS THAT WE DO.

...we are a small firm that frequently competes against larger firms with many more resources. The high resolution photography allows us to provide a highly professional product that compares favorably against work done by larger national companies. We believe this levels the playing field and allows us to capture more projects, keeping projects and jobs in Indiana.

PARABOLIC ANTENNA An antenna employing a reflector in the form of a paraboloid, or dish. This type of antenna produces collimated radiation from a feed at the focus, providing high gain and narrow beamwidth.

Economic Development

Scottsburg Electric deployed a broadband network using satellite dishes and antenna located on towers throughout the county. By utilizing orthophotography, the utility was able to align the dishes precisely to achieve the best signal.

Transportation

DOT DOT DASH

Automation Saves Time and Money

ALBION, INDIANA. Noble County Transportation sends out road line striping contracts each year. Staff must determine which roadways to include, total the skip and solid stripes, write it up and send it out to contractors for bids. The traditional process of totaling the stripes from the striping books takes three days to add by hand. The County knew GIS had saved on asset management - could it be used to streamline road striping?

The County began by creating digital road centerlines, marking the start and end points. Tables were associated with each line that allowed the user to include information on variables like striping, offsets, measurement in lineal feet, and road ID numbers. Users select a road, then narrow down the other options. The total lineal feet of paint for a road can then be found by highlighting the length column and choosing the statistics button.

THE RESULTS

⟶ **The first time this process was used to develop a striping contract, there was a time- savings of nearly 75%. The second time, the savings increased to 83%.**

⟶ **In addition, whenever paint totals submitted by the contractor deviate by 5% from the calculated amount, those areas must be manually measured in the field by County staff. For this project, the largest road differential was 2%, with a total contract differential of only 0.41%. Therefore, no secondary road time was required. This was a significant time-savings for Noble County, and freed up staff time to be spent on other projects.**

⟶ **This is a highly adaptable process that can be used with anything that is measured in lineal feet: curbs, sidewalks, roadways, and even legal drains. When large sections need to be repaired or replaced, they can be measured in minutes instead of hours. Quicker response and completion time benefits the County and its customers, the public.**

TRANSPORTATION IN THE DRIVER'S SEAT

From Airway to Railway to Roadway, Transportation Is In the Lead

INDIANAPOLIS, INDIANA. The IndianaMap supports mapping and geographic information system (GIS) operations in public and private organizations across the state. In a recent survey, transportation sorted to the top as the leading use of IndianaMap.

Transportation is the number one use both in terms of overall number of projects and overall value of projects and operations. In total, $538 million dollars of transportation projects and/or operations are supported by the IndianaMap. Over half of those projects are statewide in their coverage area. The survey identified which map data are most important to transportation uses. Of those responding, 97% indicated the orthophotography was essential to their project and/or operation (essential was defined as they could not do the project without it). This was followed by other essential layers: streets (65%), water (53%), public land survey (53%), and parcels (47%).

Users describe the impact the IndianaMap has on their operations:

"The 2005 digital orthophotography has been used for several redevelopment projects for the City of Gary. It has also been used in conjunction with the implementation of our MS4 permit."

"More important than the money was the time to put together multiple alternates with photography for the project. It would have taken months to have the area flown and get controlled photos."

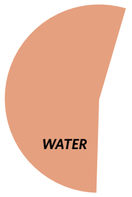
"THESE AERIALS HELP THE PUBLIC TO UNDERSTAND, IN RELATION TO THEIR HOUSE OR BUSINESS, WHERE THE IMPACTS ARE GOING TO BE IF A CERTAIN PROJECT IS BUILT."

"Millions of dollars have been saved through the use of the orthophotography, resulting in better project accuracy and data integrity."

"These aerials are more important for the public to see when we go to public meetings. It helps them to understand in relation to their house and/or business, where the impacts are going to be if a certain project is built. We deal mostly with roads, so when someone sees where that road is in relation to their property, it makes a huge impact on how they understand the project and issues related to it."

97% of transportation users indicated orthophotography was essential to their project

65% of transportation users indicated street layers were essential to their project



53% of transportation users indicated water layers were essential to their project

53% of transportation users indicated public land survey layers were essential to their project

47% of transportation users indicated parcel layers were essential to their project

MAINTAINING THE CROSSROADS OF AMERICA

Keeping Indiana's Infrastructure In Top Shape

INDIANAPOLIS, INDIANA. The Indiana Department of Transportation (INDOT) is charged with maintaining over 11,000 miles of state, federal, and interstate highways. In order to ensure the highest quality transportation system for the citizens of Indiana, INDOT needed a way to report roadway deficiencies that would ensure timely response and repair. In addition to knowing how many and what kind of deficiencies exist on a given road, INDOT also needs to know the exact location of each. This allows maintenance personnel to return to that location with the materials they needed to fix the problem: paint, pothole filler, light bulbs, etc.

INDOT decided to tailor a GIS application already in use by the department. Doing so meant they could add new GIS and GPS-location capabilities while leveraging existing product licenses, in-house training, and technical support personnel.

INDOT developed an easy-to-use computer program, and loaded the new application onto touch-screen laptops. The new system allows field crews to simply push a button when they see a problem like damaged guardrails, crumbling curbs, or a broken stoplight. Behind the scenes the application logs the type and location of the deficiency, along with the route, district, date, and other associated data.

THE RESULTS

⟶ **The data being collected by field crews is integrated into reports and tracking systems allowing INDOT management to:**

See the current condition of the state's transportation infrastructure.

Plan work crew assignments efficiently.

Purchase supplies and materials based on precise maintenance needs.

Assure appropriate distribution of supplies to District or Sub District offices.

Transportation

IS IT SAFE TO DRIVE?

Indiana Department of Transportation Uses IndianaMap To Save Motorists

INDIANAPOLIS, INDIANA. Severe weather can create hazardous driving conditions. During inclement weather, how can drivers get current information about Indiana roads? How can they tell if road conditions are safe? The Indiana Department of Transportation (INDOT) maintains weather sensors and stations along the road network throughout the state. The data from those sensors is available to a select

group of winter road operation planners to help manage road conditions. INDOT now merges these data with maps to make them available to local officials and the general public.

INDOT developed the Road Weather Information System (RWIS) and made it available via a public web portal. The site pulls data from the weather sensor servers every fifteen minutes. Users can browse the maps and select sensors for detailed information, or view summary tables of all the sensors. The user can also label the maps with the most recent information from the sensors. There are currently 30 sensors online with new ones being added as they become available.

This website is part of a larger effort to get decision-making data out to the general public, local and federal decision makers. A main priority is to take existing web pages and applications that are text-based and add meaningful mapping components to them.

THE RESULTS

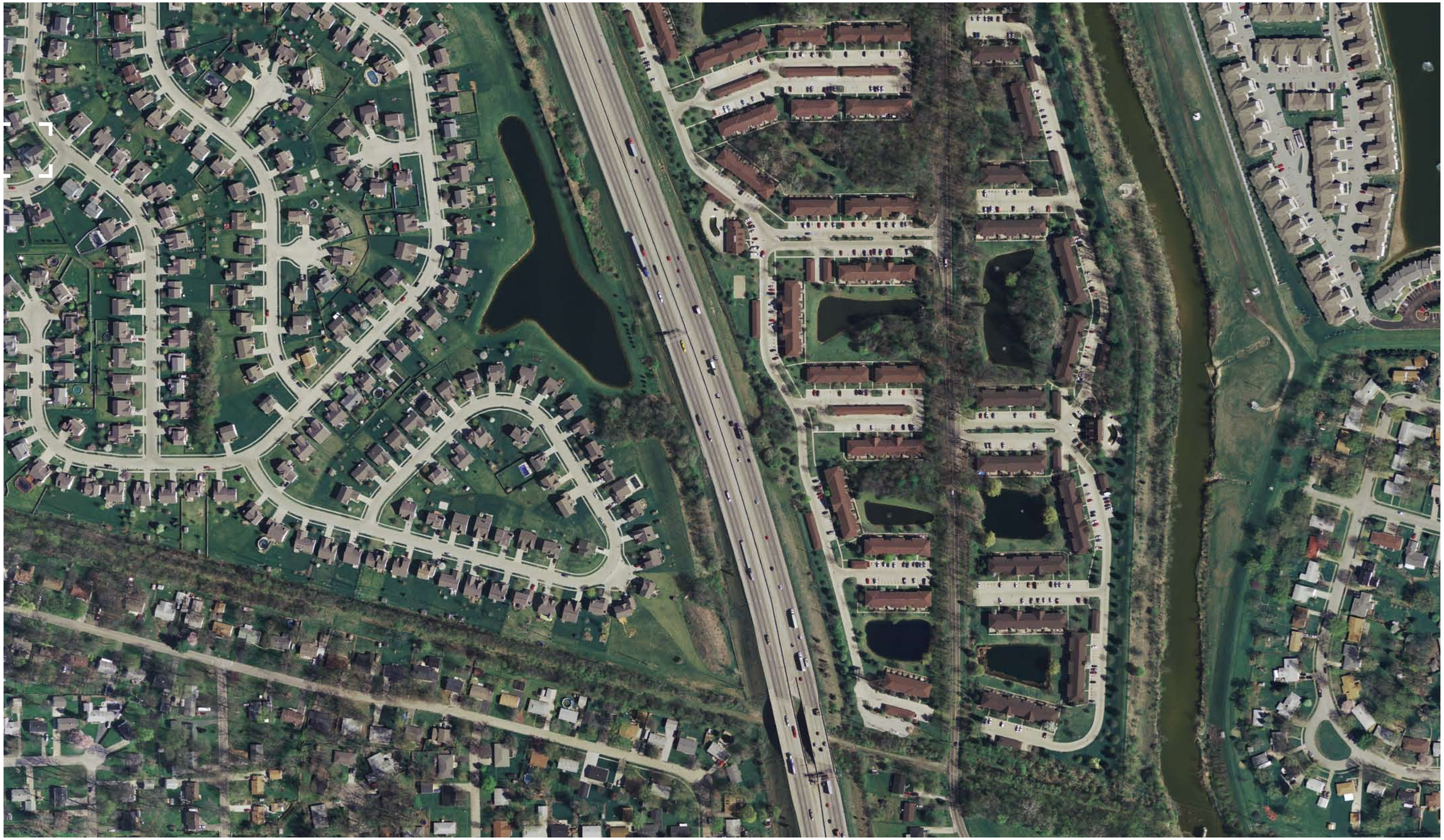
⟶ **The RWIS portal is an efficient way to disseminate usable data, without requiring expertise in geography or computer sciences. It has been very popular, especially during extreme weather events. During a single large snowstorm in December 2004, the site had tens of thousands of unique visitors with over one hundred thousand page hits for the five days snow was on the ground. Drivers were able to make intelligent, well-informed decisions about their travel plans.**

There are thirty sensors currently providing road conditions to Indiana residents, with more locations being equipped as they become available.

Using the ortho-rectified aerial maps and parcel information saved us the cost of hiring a traditional survey for a 14 mile long project. Cost of the survey plus parcel research would have been at least $600,000 plus taken 9 months or longer. With the orthophotography and parcel data we had preliminary plans complete in two days.

Transportation

Transportation



Public Health & Safety

TO CATCH A KILLER

Maps Provide High-Tech Evidence

CARMEL, INDIANA. On Monday morning November 22, 2004 Carmel Police arrested Willie J. Dumes, 30, of Indianapolis, on a warrant for the murder of Stephanie Gillum. Dumes was charged with one count of Murder and one count of being a Habitual Offender in connection with the homicide of Stephanie Gillum. Gillum had been found dead in her vehicle in a parking lot at a local park. Detective Brad Hedrick, Carmel Police Department, asked the City of Carmel GIS to create a map showing the jury where the victim was found, who she was with before the murder, and the time and location of the crime.

The first maps the Police Department requested were relatively basic: aerial photography of the investigation site, and points where evidence was found. As the investigation into the murder progressed, however, Detective Brad Hedrick approached Carmel GIS with more evidence to map.

The Detective had obtained detailed information on the victim's cell phone. Cell phones are constantly communicating with a network, sending pings to the nearest transmission tower, which enables calls to be routed correctly. As a cell phone moves, its call is handed off from tower to tower. The carrier keeps records of which towers the phone contacted and when, tracking its movement to within a few hundred yards.

Using the cell phone records and other evidence, Carmel GIS was able to create a digital "trail" of the victim's location throughout the fatal evening. The detailed map produced for the trial was one of many, many maps created for the murder investigation.

THE RESULTS

⟶ The cell phone map was used throughout the murder investigation and criminal trial. The Prosecutor and members of the jury later commented to Detective Hedrick, "The map presented case evidence in a clear, concise manner. It created a clear picture of the crime events, and we were able to focus on the visual display."

⟶ In January 2007, Willie Dumes was found guilty of killing his ex-girlfriend Stephanie Gillum, and sentenced to prison.

Without updated orthophotography, Professional Planners throughout the State of Indiana would have significant difficulty addressing the needs of a community. Without a visual representation of the built environment, it would make it much more difficult to assess the needs of a community, as well as present information in a manner that would be clear to them.

We absolutely used the orthophotography on a daily basis for all county functions, including economic development, public safety, emergency response, etc.

PEOPLE YOU CAN COUNT ON

GIS Professionals Demonstrate Meaning of Community

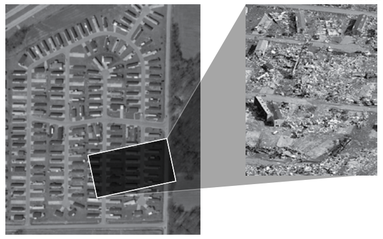
EVANSVILLE, INDIANA. At 2:00 AM, November 6, 2005, an F3 tornado crashed through Vanderburgh and Warrick counties in southern Indiana. Hundreds of buildings were damaged or destroyed, and 24 people lost their lives. GIS staff from around the state immediately offered assistance to the Evansville GIS Department and the Warrick County Surveyor's Office.

Woolpert, LLP was part of the 2005 statewide IndianaMap orthophotography acquisition team, and had the aerial photographs of Vanderburgh County at their Dayton, Ohio office. Evansville's GIS Project Manager created a GIS layer of the tornado path, and sent it to Woolpert. Their staff immediately began to pull together the photos, and quickly delivered a mosaic of the tiles along the path. Staff at IMAGIS, the Indianapolis GIS consortium, also assisted in correcting technical issues with the files.

Pinnacle Mapping Technologies, also a statewide orthophotography project team member, had the Warrick County photos in their Indianapolis office. Within a day of being contacted, Pinnacle had the Warrick County imagery posted to their FTP site for download by the Surveyor's Office. The Geospatial Analyst at the Indiana National Guard was also able to provide Evansville with photos taken by the National Oceanic and Atmospheric Administration (NOAA) showing the tornado damage.

THE RESULTS

⟶ When the counties needed it most, the Indiana GIS community—public and private organizations alike—displayed remarkable volunteer spirit and corporate citizenship. The before and after photography gave responders a clear overview of the damage, allowing them to coordinate response and recovery efforts more effectively.



Within a day of being contacted, images of the tornado destruction throughout Vanderburgh and Warrick counties were made available to emergency response teams. These photos allowed rescue workers to see the extent of the damage, and to efficiently coordinate their efforts.

SHARING THE GLORY

Cities, Towns and County Cooperate to Save Money, Time, Lives

NOBLESVILLE, INDIANA. Address and street data is used, verified and corrected by many different agencies at all levels of government. This was the case in Hamilton County, where inaccurate and outdated information was being corrected by individual cities and towns. The question was how to efficiently and effectively share that improved data between all the cities and towns, County, and public safety officials?

The Hamilton County Local Government GIS Technical Advisory Group (HAGTAG) was formed to facilitate coordination between governments in this fast-growing county. Members recognized the importance of having and sharing critical data, and began developing a multi-user database to address those needs. The database is shared over a countywide fiber optic network, and accessed by users in the Hamilton County Sheriff's Office, Carmel, Fishers, Noblesville and Westfield. Users in each location are responsible for editing the database and maps seen by all.

The first project to be implemented in this system was the Distributed Maintenance of 911 Address Data. The project involved multiple technicians simultaneously editing the same map layers, namely street centerlines and address points. This moved maintenance of the data much closer to the people who first receive it. New address and street data is incorporated into the system more accurately and sooner than ever before; in some cases, six months sooner.

THE RESULTS

⟶ With the new system, Computer Aided Dispatch operators can send police to the correct address immediately; Mobile Data Computers used by fire departments have up-to-date maps of new subdivisions; and the Communications Center can confidently coordinate response to emergencies that span municipal boundaries.

⟶ The success of the Distributed Maintenance of 911 Address Data Project can be seen daily in the correct, accurate, and up-to-date address point data and street centerline maps used by emergency personnel throughout Hamilton County. It exemplifies how cooperation and pooling resources can benefit everyone involved, including the citizens of Hamilton County.

Public Health & Safety

PATROLLING THE GROUND. AND AIR.

IndianaMap Provides Extra Set of Eyes in Patrol Cars, Fire Trucks,& Planes

SHELBYVILLE, INDIANA. All over the state, police, fire, and sheriffs' offices are using the IndianaMap in patrol car and fire truck laptop computers. In Shelby County, the 2005 orthophotography is used as a background for all of the daily GIS maps produced. It is also used on the laptop GIS system in every police patrol car in Shelby County. "This has been a tremendous value for our county," says Jim Brown, Shelby County GIS Coordinator. "The 2005 statewide orthophotography did not only save us money. It enabled us to undertake a new kind of mapping project to support emergency responders. At the time, the 2003 imagery set was not sufficient." The county prosecutor's office also relies on the maps for locating proximities to schools when prosecuting drug offenses.

"IF INDIANAMAPS DID NOT EXIST, THIS DATA WOULD HAVE TO BE PURCHASED COMMERCIALLY, AND THE PROCESS OF BIDDING ALONE, MUCH LESS THE ACTUAL COST, WOULD BE PROHIBITIVELY EXPENSIVE FOR INDIANA CIVIL AIR PATROL."

And the benefits don't stop there. Volunteers who work with the US Air Force (USAF) Auxiliary Civil Air Patrol are not funded as a Disaster Relief organization to have commercially available GIS data. With the IndianaMap, they can access the information they need for every mission.

"We depend heavily on the IndianaMap products," says Capt Matthew R. Chastain, USAF Plans and Tactics, Civil Air Patrol. "The IndianaMap allows us to precisely locate targets and field the appropriate forces to assist Federal and State agencies. If the IndianaMap did not exist, this data would have to be purchased commercially, and the process of bidding alone, much less the actual cost, would be prohibitively expensive for Indiana Civil Air Patrol."

The IndianaMap has been used to map trails, wilderness areas, and rural-suburban interface areas to support local emergency search-and-rescue responders. Even for local responders, it can be difficult to match an "address" from an e-911 call to a physical house on the ground. The IndianaMap is particularly an asset in rural areas and in southern Indiana where the ground is not flat and the roads do not run in cardinal directions.

WHEN MINUTES MATTER

E-911 Multi-Jurisdictional Mapping a 21st Century Necessity

FORT WAYNE, INDIANA. Like most county governments, Allen County wants to provide taxpayers the best services possible, especially when it comes to public safety. One of the best ways to improve emergency response services is to improve communications - give responders better information faster.

GIS has been integrated into the emergency communications center shared by the City of Fort Wayne and Allen County. The 911 dispatchers on duty can see property lines, aerial photography, streets and addresses. When a call comes in, dispatchers can see the location and relay important information directly to the people who need it most—the responders.

Emergency personnel know what to expect when they arrive at a scene—how big a yard is, if there are outbuildings, alleys, or nearby schools. Dispatchers can also supply information from the GIS while responders are in transit. During a pursuit, police can herd the offender's car into a cul-de-sac, ending a potentially dangerous situation even if they are not familiar with the area.

The GIS also works with the Federal E911 mandate that requires cell phones be locatable. In one instance, a woman called 911, said she was going to commit suicide, but hung up before dispatchers could get any other information. Using the GPS technology in her cell phone, dispatchers were able to pull up the woman's precise location and EMTs arrived within minutes.

THE RESULTS

⟶ Safer Responders—forewarned is forearmed, especially in dangerous or unpredictable situations.

⟶ Safer Public—when emergency personnel can do their jobs better and more efficiently, lives are saved.

JUST THE FACTS

South Bend Police Department Uses the IndianaMap to Fight Crime

SOUTH BEND, INDIANA. The South Bend Police Department has always kept records on all crimes officers respond to, but analyzing any relationships between individual crimes or identifying any emerging patterns has been difficult.

Working with the City, the police department created the Regional Crime Intelligence Unit (RCIU) to map out where crimes are occurring. The City made software, training and a manual available. The Bureau of GIS maintains information on streets and addresses, including an Address Locator Manager that eliminates the need to manually adjust addresses due to spelling or abbreviation issues. Crimes are entered and weighted based on the severity of the incident, and maps are produced monthly.

THE RESULTS

⟶ The new tools are used by the police department to:

Identify neighborhoods with comparatively high concentrations of crime. With this information, commanding officers can more effectively distribute police resources to those areas.

Show the impact of police resources in a community. While people's perceptions of police action can be subjective, the new tools provide objective and quantifiable measurements of crime levels.

Develop investigative leads to solve burglaries, robberies, motor vehicle thefts and a variety of other crimes. Without the new tools, police would not have a "map of an attack".

Quickly determine if drug and weapons violations occur within 1,000 feet of prohibited areas. Formerly, police would have to physically measure the distance between a drug violation and a school. With the new tools, police get spatial information instantly.

Environment

A FLOOD OF INFORMATION

IndianaMap Helps Keep Flood Boundary Maps Current

INDIANAPOLIS, INDIANA. Being located on a floodplain affects a property's insurance requirements, building guidelines, flood control options, property values, permitting constraints, and zoning. The Federal Emergency Management Agency (FEMA) maintains maps showing floodplain boundaries, but many had become outdated. The floods in 2003 and 2005 were the largest and most widespread Indiana had seen in years, and highlighted the inadequacy of the FEMA maps. Reevaluating them became a crucial task. Recent 2008 floods demonstrate the dynamic nature of keeping flood boundary maps current.

The Indiana Department of Natural Resources' Division of Water became the lead agency for updating Indiana's floodplain maps. During the first phase of the project, existing maps were converted to an electronic format, and made available at *www.floodmaps.in.gov*. For the second phase, the Division partnered with public and private firms to develop new and revised floodplain studies. Innovative project management and contracting practices resulted in significant cost savings, allowing the Division to expand the scope of the project to cover additional waterways.

An additional component of the project was notifying landowners of changes to the floodplain maps, and the ramifications of those changes. The Division developed an outreach plan, using parcel boundary data as the basis for an informational mailing sent to each affected landowner, including them in the process of correcting and updating the maps.

THE RESULTS

⟶ Accurate, reliable floodplain maps available to the public.

⟶ Informed stakeholders, including local floodplain administrators and planners, developers, bankers, insurance agents, and property owners

⟶ Better protection from flooding for current and future development.

FOLLOW THE POLLUTION

Monroe County Uses IndianaMap to Meet State and Federal Requirements

BLOOMINGTON, INDIANA. The 1987 amendments to the Clean Water Act identified urban storm water runoff as a source of water pollution, and recognized the need to study the sources of runoff and other factors contributing to water pollution. Indiana State Rule 13 is a similar measure that applies to entities with sewer system that discharge storm water. The challenge was to meet State and Federal compliance requirements, and develop a long-term water quality analysis plan.

HOW IMPERVIOUS IS YOUR WATERSHED?

Using Geographic Information Systems (GIS), the Monroe County Planning Department developed a Stream Assessment that gives an overview of water quality.

The first step was to determine the amount of runoff produced by different areas. Planners developed a unique process that uses zoning classifications to calculate both current and future impervious surface estimates. Those areas with more impervious surfaces, like parking lots and driveways, generate more runoff. Next came the lengthy process of reviewing and classifying parcels according to land use. Finally, benchmarks were used in calculations to provide a snapshot of long-term water quality impacts in a given area.

The completed assessment shows where runoff originates, indicates land use on each property, and determines which water bodies are affected by the runoff. This combined data provides a baseline for future comparison, and is a key component in analyzing the effects of land use on water quality over time.

THE RESULTS

⟶ Monroe County planners developed a highly-effective water quality analysis tool.

⟶ Planners can see which bodies of water are most heavily affected by pollution from storm water.

⟶ The impact of future development can be seen before it is approved.

⟶ Investigative and corrective resources can be prioritized based on quantifiable needs.

⟶ The evaluation process was designed to be easily replicated for use by all levels of government.

TRAIN WRECK IMPACTS NEIGHBORHOOD, ENVIRONMENT

Consistent Maps Facilitate Multi-Agency Response

INDIANAPOLIS, INDIANA. At 3:30am on January 6, 2008 local residents awake to a freight train accident involving a 100-car CSX train that derailed 35 cars on Indianapolis' west side. Two CSX employees were injured. About 1,900 gallons of diesel fuel, 27,000 gallons of soybean oil, and 21,000 gallons of lubricating oil spilled.

Response and recovery involved coordination of several agencies, including the County Health Department, fire departments, police, local emergency management, state emergency management, state environmental management, and CSX. All had access to consistent information through the IndianaMap. A hundred homes had to be notified, 30 water wells had to be tested, drainage had to be siphoned, and soil removed.

A response center was set up at a nearby library, including the state mobile command vehicle. The recovery team originally started using Google Maps, but quickly decided that

these were inadequate for the task. Using GIS data from the Health Department, the City, and utilities, a set of maps were created along with a wall map that became the focus of response efforts. These maps had the data and detail to show surface drainage, storm sewers, sanitary sewers, water pipes, streets and houses.

The maps provided a single source of information for contacting homeowners, placing siphons, locating well testing, and coordinating cleanup.

THE RESULTS

⟶ Coordination of mapping efforts was a tool to assist multiple agencies from several jurisdictions in working together. It allowed quick recognition of important characteristics of the impacted area (houses, drainage, utilities) so that all of the efforts could be used for recovery.

⟶ Staging of recovery personnel and equipment were synchronized.

⟶ Citizens and official could see the impact area, the potential downstream contamination and the locations of well sampling sites.

Have been able to use aerial photos on GPS receivers to make field navigation much faster, including timber inventories. Also have used the 2005 photos to look at timber theft on state forests by GPSing tree stumps and showing them in relation to tree tops from illegally cut trees that can be seen in the photos.

FLOODPLAIN This is a low-lying area, often adjacent to a waterway, formed mostly of river sediment and subject to flooding.

RUNOFF The water and other materials that drain freely off of asphalt and other hard surfaces, sometimes flowing into combined sewers and creating polluted overflow into rivers

WATERSHED The area of land from which rainfall drains into a stream or other water body. Watersheds are also sometimes referred to as drainage basins.

Environment

SAVING HOOSIER FORESTS

Emerald Ash Borer Costs Millions—IndianaMap Saves Millions

INDIANAPOLIS, INDIANA. The Forestry division of the Indiana Department of Natural Resources strives to maintain healthy woodlands on both public and private lands. Battling invasive, sometimes virulent pests is a large part of that responsibility.

In 2002, the Emerald Ash Borer was identified in Michigan, then in Ohio in 2003 and Indiana in 2004. The larvae of this Asian beetle have devastated the ash population, already killing more than 8 million trees. Strategies to combat it include quarantining townships and counties in the three states, removing all ash trees within a half-mile of an infested tree, and creating "ash-free zones."

Using their GIS, the Forestry Division is able to act quickly and decisively to counter the Ash Borer. Forestry staff surveys wooded areas, examining trees and looking for D-shaped holes—the calling card of the Ash Borer. If they find an infested tree, they relay the GPS coordinates back to the office, where GIS staff "lights it up." The coordinates are plugged into the GIS—which includes digital aerial photography of the state - and a half-mile buffer zone is drawn around each infested tree. Staff use the photography to mark every ash tree in the buffer zone, then plan and organize removal and destruction.

"We regularly use the IndianaMap in our efforts to eradicate the Ash Borer and Gypsy Moth," says Phil Marshall, State Entomologist. "It helps reduce staff field time to map out habitat that needs treated, and helps us eliminate unnecessary treatment—resulting in increased savings."

Forestry also maintains parcel information. So not only can they find the ash trees that need to be cut and burned, they can identify and contact any property owners that will be affected. GIS then becomes a tool for explaining how important the eradication effort is. Maps showing nearby at-risk forests clearly illustrate why it is necessary to kill the trees in the buffer zone.

THE RESULTS

⟶ Using the IndianaMap improves the chances of eradicating and preventing further spread of the Emerald Ash Borer by:

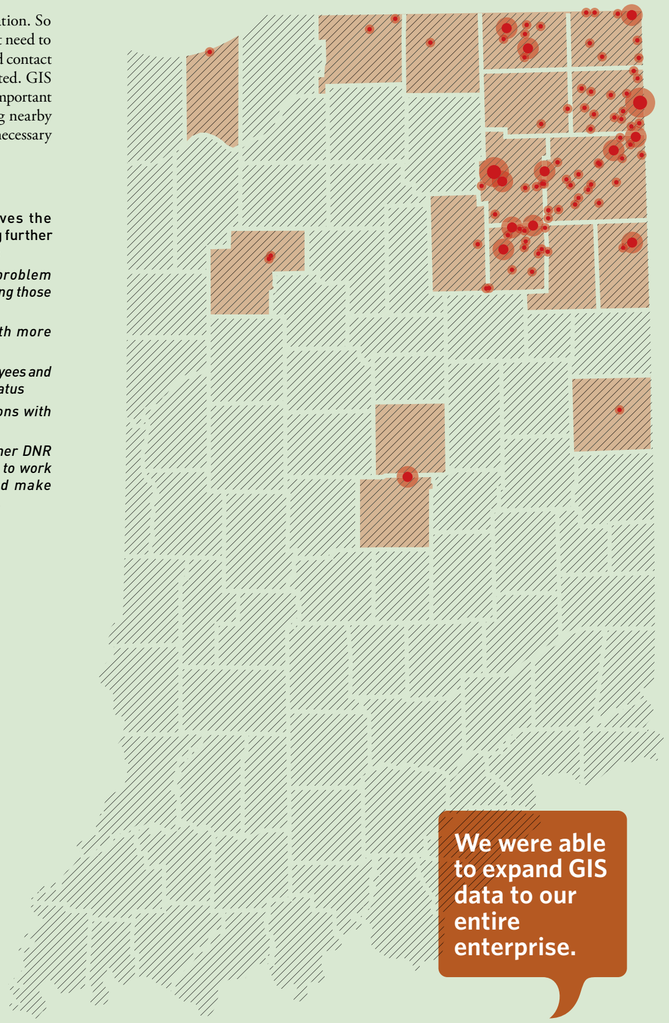
Reducing the time spent analyzing problem areas, planning a response, and enacting those plans.

Improving the quality of analysis with more accurate information.

Providing an effective tool to keep employees and supervisors informed of the project status

Improving communication and relations with the public.

Allowing foresters, entomologists, other DNR staff and project managers statewide to work together on management plans and make decisions without leaving their offices.



We were able to expand GIS data to our entire enterprise.

TO FLY NEW PHOTOGRAPHY FOR ONE COUNTY AND THE DELAY IN TIME WOULD HAVE COST AN ADDITIONAL $100,000 TO THE PROJECT.

LARVAE The active, immature form of an insect, especially one that differs greatly from its adult form.

ENTOMOLOGIST A specific type of zoologist concerned with the study of insects.

Good Government

SMALL SAVINGS ADD UP BIG TIME

Every Dollar Counts

INDIANAPOLIS, INDIANA. When local governments contract for engineering, planning, and other projects with private companies, often step one for those companies is to collect the information they need—typically mapped information—to do the job. The availability of the IndianaMap saves those companies time and money—savings that can be passed back to the local government. See what professional service companies have to say about the IndianaMap:

"The free distribution of aerial photos allows us to pass on the savings directly to the various units of government that we work for."

"Billable hours reduced by using the maps save the cities $10,000 to $20,000 per year."

"As a contract consultant, the availability of reliable public data saves Indiana public and private utilities money by reducing our overall project cost. Having access to this type of reliable consistent public GIS data ultimately translates into value added savings to the people of the State of Indiana."

"HAVING ACCESS THIS THIS TYPE OF RELIABLE CONSISTENT PUBLIC GIS DATA ULTIMATELY TRANSLATES INTO VALUE ADDED SAVINGS TO THE PEOPLE OF THE STATE OF INDIANA."

Often the savings gained is in both time and money. In one engineering firm's experience, "Using the ortho-rectified aerial maps and parcel information saved us the cost of hiring a traditional survey for a 14 mile long project. The cost of the survey plus parcel research would have been at least $600,000 plus taken 9 months or longer. With the orthophotography and parcel data we had preliminary plans (basic survey) complete in two days."

Saving can come in the form of reduced duplication. Duplication comes in many forms—time, effort, spending and projects. One value of statewide orthophotography (over separate local projects) is that it eliminates small areas of duplicated photos all over the state. When each county flies aerial photography, it captures an overlap area with its surrounding counties, or "ring." For example, when Marion flies they grab part of Hamilton, and when Hamilton flies they grab part of Marion. Although it's necessary to have the overlap, doing it twice is a complete duplication. There are approximately 7200 linear miles of county boundaries in Indiana. Most counties capture 1000-ft collar (approximately 1/5 of a mile). At $100 per square mile for orthophotography, a statewide project reduces duplication of $144,000 local dollars. "Marion captures a 1-mile collar—about 80 linear miles—that's about $8,000 of duplication (or 7% of the total project) when our neighbors fly, and they all did in 2007," says Jim Stout, Indianapolis Mapping and Geographic Infrastructure System (IMAGIS) Program Manager.

STREAMLINED RECORD-KEEPING

GIS Helps Modernize Information

ELKHART, INDIANA. Historically, the City of Elkhart Department of Public Works & Utilities maintains several sets of non-digital quarter section maps that include city limits, sewer, water, and addresses. By maintaining the maps and records in a geographic information system (GIS), time and money are saved by enabling faster updating with the ability to print new maps or view it through a web-based GIS viewer.

Several years ago, the City of Elkhart implemented a GIS. One of the goals was to reduce the number of maps that need to be updated. A large number of these hard-copy maps are over 50 years old and in need of repair.

Updating these maps individually is a time-consuming and tedious process. Work began on inputting the map data into GIS layers, allowing users to superimpose the layers during input. Using a GIS, Elkhart staff can input all the map data into GIS layers and combine these layers to create new maps as needed for the job at hand.

STORMY WEATHER

Stormwater Utility Mapping Increases Public Revenue and Accuracy

FORT WAYNE, INDIANA. Streets and parking lots do more than cover the ground, they affect an area's drainage. When it rains, all that water has to go somewhere. In places like Fort Wayne, that somewhere is the local storm-water overflow system. The City uses tax dollars to maintain and improve it, and charges fees based on a property's "impervious surfaces." So it's important to know how much pavement there is on properties around the city. The question is – how do you get that information without going out and measuring each parking lot? And once you know, how do you keep it current?

A coalition of public and private partners had helped Indiana acquire statewide orthophotography - digital aerial photography – for the first time. Local governments received 1-foot resolution photography for free. For Fort

Wayne, this meant not having to obtain the data themselves for another three years, a savings of about $100,000.

Once they had it, they were able to find, mark, and measure all the impervious surfaces in the city over one summer.

THE RESULTS

→ A net annual increase of $88,000 in revenue for the Storm-water Utility based on accurate assessments.

→ Greatly reduced staff time to credit or debit incorrectly measured properties.

→ Reduced number of disgruntled citizens that get debited for measurement discrepancies.

→ And now the new accurate boundaries can be seen by employees throughout the City's intranet. That means more departments will be able to give citizens accurate storm-water information without the citizen being passed around from department to department.

UTILITIES HOOK UP

Indiana Utility Regulatory Commission Maps Service Territories

INDIANAPOLIS, INDIANA. When a power line goes down because of a man-made disaster, bad weather, or even a simple accident, one of the first thing emergency managers need to know is, "Who do we call to fix this?" The Indiana Utility Regulatory Commission (IURC) saw this need could be addressed by having a statewide digital map showing which electric company is in charge of which area, and having that map accessible from a single location. So the IURC, began working with electric utilities to make it happen.

After months of planning, the IURC and public and private utility companies across the state began implementing a project to replace the hardcopies of service boundaries with digital versions, and house the master copy at IURC. A committee was formed to oversee the massive undertaking: gathering hardcopy service territory maps from each utility, converting them to a digital format, developing standards to be followed, and incorporating the new data into a website.

THE RESULTS

→ There now exists a single online map of all electric utility company boundaries.

→ A free online tool allows electric companies to maintain their boundaries remotely, making them more accurate and more up-to-date.

→ Electric companies can access their data online without a dedicated a computer, special software or training.

→ Emergency management and first responders have immediate, 24-hour access to the data.

→ Participants have all seen savings in costs, time, collaboration, communication, and processes.

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SURVEY A suvey is an examination and record of the features of an area for use in constructing a map, plan, or description.

Good Government

ENABLING AN INFORMED, ENGAGED PUBLIC

Wayne County Makes Public Information Public

RICHMOND, INDIANA. Web-based mapping can provide an easy, low-cost solution to data access challenges. It is an ideal method of providing information to a large number of people around the clock. Web access can also reduce the amount of time government employees spend filling simple information requests, freeing them up for other tasks. The challenge with new online technology is promoting its existence, educating the public on its uses and benefits.

Wayne County and the City of Richmond introduced a website for viewing GIS map layers. When Wayne County officials decided to promote community awareness through "GIS Days," they planned a number of activities, including an open house, a front-page article in the local paper, and presentations to elementary school students. The events had a tremendous impact on the public's use of the site. The number of new visitors increased 1,200% per week. And over the next 6 months, the average number of weekly logins was up 150% compared to the prior 6 months.

"GIS has always provided answers to our questions. In this time period we need to be making decisions with the most information available," said Tom Dickman, Wayne County Commissioner. As a result of GIS Days, members of the public learned the value of online GIS, and integrated it into their lives and business practices. One case typifies the results. A local engineering firm attended the open house in Wayne County. After learning about its potential, the company requested copies of the GIS data from the County. It is now used in their Hagerstown office, where it has become an important decision-making tool for development projects.

ONE SYSTEM, ONE PLAN, ONE HAPPY TOWN

GIS Enables Infrastructure Management

PLAINFIELD, INDIANA. The Belleville Conservancy District, located in southern Hendricks County, was formed in the mid-1980's to provide sanitary sewer service to the small community of Belleville and the surrounding area. After more than 20 years, a number of these facilities were beginning to show their age and the flows into the wastewater treatment plant greatly exceeded its capacity. The nearby Town of Plainfield offered to take over and incorporate it into the Town's existing wastewater system.

After making a number of immediate improvements, the Town began developing a long-range plan for upgrades and enhancements to the Belleville system. Global positioning system (GPS) location points were collected—including elevations—for major structures in the collection system. The Town was then able to identify sewers that had too much or too little slope in their pipes—an important aspect for sewer flow.

The Town also used SewerCam to collect video of the system. These images and videos were hyperlinked to corresponding features in the geographic information system (GIS), and combined with existing surveyed information. With a wealth of accurate information at their fingertips, the Town was able to effectively analyze and prioritize sewer defects based on location, type, and urgency.

THE RESULTS

→ By using GIS to tie the other disciplines together, the Town was able to:

Generate a precise and accurate inventory of the entire wastewater treatment system.

Gain extensive access to their inventory, including point-and-click access to the sewer videos.

Develop a logical, empirical method of prioritizing repairs and upgrades.

Perform computer modeling to develop an informed maintenance plan.

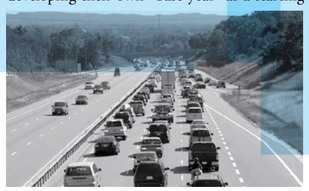
GETTING THERE FASTER

Maps Used for Long-Term Planning

PORTAGE, INDIANA. The Northwestern Indiana Regional Planning Commission (NIRPC) is the Metropolitan Planning Organization (MPO) serving the counties of Lake, Porter and LaPorte with a combined population of 741,468. As the MPO, NIRPC is responsible for developing and regularly updating the federally prescribed 20-year, long-range regional transportation plan. These plans enable the region to receive federal transportation funding. NIRPC's Connections 2030 Regional Transportation Plan is the latest in a series developed over 30 years.

Developing the plan required pulling together huge amounts of data, some of which was not readily available. Planners needed detailed information to be shown at the "traffic analysis zone" level, but delays in the release of Census data meant some of that information had to be generated from scratch.

Using GIS and existing data, NIRPC was able to recreate the missing information, developing their own "base year" as a starting



point for growth projections. GIS was then used to show changes in population, employment, and households at the traffic analysis zone level.

GIS was also used to identify special zones—concentrated elderly populations, vehicle availability, persons with disabilities, and areas of significant development—and incorporate them into the plan.

THE RESULTS

→ The use of GIS resulted in the development of a timely, accurate transportation plan.

→ GIS data developed for Connections 2030 was shared with local jurisdictions and the GIS community in Northwest Indiana.

→ Planners were able to identify and address areas with particular needs.

→ GIS maps were used to easily communicate complex information during the adoption process and were incorporated throughout the completed Connections 2030.

COOPERATION BENEFITS COUNTIES

Multi-County Collaboration Saves Tax Payers

HUNTINGTON, INDIANA. The Huntington County Surveyor's Office needed a more reliable way to calculate drainage assessments for land owners. When rain runoff flows into county-regulated drains, the quantity of water is calculated and land owners pay a fee based on that amount. The fees, in turn, fund drainage reconstruction and maintenance projects. The Huntington County Surveyor wanted to replace antiquated, unsupported assessment software with software that could utilize the County's GIS data. It also needed to be dependable, open source, user-friendly, and affordable.

The Surveyor recognized that working with other counties would result in a well-rounded, less expensive assessment program. He contacted the consulting firm that had created Huntington County's GIS and asked if they were aware of any counties who might be interested in working together.

In the end, seven counties agreed to collaborate on designing the software specifications. The specs would improve compliance with State guidelines for drainage assessment and meet the counties' exact requirements.

The consulting company organized a number of workshops to determine how the software should function. The final version of the software was built and installed based on the counties needs, and is now fully operational.

THE RESULTS

→ Customers receive fair and accurate drainage assessments.

→ Cooperation between counties lowered overall expenses for the project.

→ Adherence to State guidelines and input from multiple counties means the software can be used in any Indiana county with appropriate hardware and data.

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5280 ft

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By reducing the duplicate images of overlapping areas captured by aerial photography, the IndianaMap has saved taxpayers $144,000.

GLOBAL POSITIONING SYSTEM GPS is an accurate, worldwide navigational and surveying system utilizing the signals from satellites that orbit the Earth.

Good Government

GREAT DEEDS DONE

Saving Money for Hoosier Taxpayers

INDIANAPOLIS, INDIANA. The State Land Office uses the IndianaMap to uncovers land deeds, surplus and history. The State of Indiana through its various agencies owns approximately 377,000 acres of land. The State Land Office is charged with maintaining maps and original deeds for each parcel, approximately 6,000 in all. Historically this parcel information had been hand- drawn onto maps, along with the number of a folder in a cabinet where the deed was filed.

The main challenge was to upgrade the technology to a Geographic Information System (GIS) allowing greater use of the vast amount of information that was stored in a cumbersome and antiquated format.

Over 4,000 hand-drawn maps containing over 9,000 parcels had to be converted to a digital format. The maps were first scanned and geo-referenced. Parcels were digitally drawn, and basic information attached to each one, like the parcel ID number and which agency uses the land. The deeds then needed to be scanned and linked to the parcels. In many cases the original deeds were very old and great care was needed to ensure that the document was not damaged during the scanning.

After the legacy data had been converted to a Geographic Information System, new procedures were implemented so all future deeds would be added directly into it, including those already in digital formats. Finally, a public Internet mapping interface was developed to allow 24/7 access to all State Land Office records.

Justin Peters' job is caretaker of State land records for all Hoosiers. The IndianaMap enabled the transformation from paper to digital, in fact it couldn't have been done without it.

THE RESULTS

⟶ **Identified under-utilized or unused State-owned properties: Surplus parcels have been auctioned to private entities putting over $5.6M back into state coffers and they once again generate property tax revenues and local economic development opportunities.**

⟶ **Digital backup: All of the priceless deed information is now backed up offsite, and frail original documents are sent to the State Archives for proper care.**

⟶ **Greater public access: Instead of only being available at the State Land Office in Indianapolis during normal business hours, this information can be accessed online anytime.**

GOVERNMENT IN THE KNOW

Communication Among Departments Is #1

MISHAWAKA, INDIANA. The City of Mishawaka was striving to implement GIS on a citywide level. At the beginning, most department heads were doubtful or concerned that GIS was too difficult or expensive. Typical interaction between or within departments was limited to conversations or looking at paper diagrams and information. The challenge was to have all departments keeping their geographic information in the same digital formats.

The GIS Director cultivated departmental GIS coordinators, who were then equipped with software, training, server space, hardware, and if necessary, consulting services. Consultants helped design extensive databases for the GIS, linking Electric, Water, and Storm/Sewer systems. Using the GIS, these three departments now have accurate GPS data are able to seamlessly transfer it to each other, and the Engineering Department.

The Redevelopment, Planning, and Street Departments are now using GIS on a daily basis. The Fire Department is also working on specialized maps for Fire and EMS vehicles, and the Police Department has begun work on crime mapping and analysis.

THE RESULTS

⟶ **Any employee can go into the GIS and locate certain properties or areas. A map can be quickly printed out (or simply viewed) which includes high-resolution aerial photography and City data so that discussions with citizens are more informed. Other intelligent maps are used to communicate with the public in an intuitive, visual way.**

⟶ **GIS-generated maps have been provided to the County Prosecutor, the City Clerk, and department heads, as well as other outside organizations.**

⟶ **Duplication of effort and outdated data methods are gradually being eliminated, making city government more efficient.**

⟶ **The GIS has improved intra- and inter-departmental coordination, streamlined workflows, sped up access to information, and enabled more intuitive decision making.**

LAND USE MAPPING HELPS INDIANA GROW SMART

Communities Plan For The Future

INDIANAPOLIS, INDIANA. While Indiana communities rank high on many quality of life factors, they often place lower in environmental and health areas. At the core of the problem are often-conflicting agriculture, urban development and non-metropolitan growth land resource issues.

Indiana University Purdue University Indianapolis (IUPUI) uses GIS to educate decision-makers about "smart-growth." The concept of smart-growth embraces economic development without sacrificing environmental or health assets.

Using GIS, the IUPUI Geography Department provides information that helps local communities make informed decisions that balance land use, development, and the environment. Intelligent planning requires taking into account information on land cover, demographics, brown-fields, natural resources, and infrastructure. GIS is the ideal tool for integrating and analyzing these data.

IUPUI used GIS and satellite images to map land cover and combine it with demographic data like education and income levels. They also included land cover types and calculated trends in average rates of loss of agricultural and forest land to development.

THE RESULTS

⟶ **The results of the analysis provided baseline data to measure change over the coming years, and give a bird's-eye view of development trends statewide to local jurisdictions. The information is being used to support local decision-making by providing land cover change maps for land use planning to every county in Indiana.**

Having access this this type of reliable consistant public GIS data ultimately translates into value added savigs to the people of the State of Indiana.

Without this level of information we could easily spend thousands of dollars per project to determine those environmental contraints.

Acknowledgements

The IndianaMap Is a Collaborative Effort

IGIC owes a debt of gratitude to all our many collaborating organizations, agencies, and individuals for the outstanding cooperation and support that has gotten the IndianaMap to where it is today.

Our membership includes hundreds of individuals from all levels of government, private industry, educational institutions and other nonprofit groups. Each year, over 30 individuals and organizations commit their time and effort to serve on the IGIC board of directors.

The Indiana Geological Survey and the Indiana University-University Information Technology Services (UITS) and have provided unparalleled service in making vast stores of GIS data and mapped information accessible to all. The Indiana State Library and Indiana State Data Center have supported our core operations' main office. The State of Indiana Departments' of Transportation, Homeland Security, Health, Environmental Management, Natural Resources, and Office of Geographic Information have provided financial and other in-kind support to GIS data development and public access. Several individuals from three different administrations have help move the IndianaMap forward, with particular gratitude to Clifford Ong and Catherine O'Connor for championing homeland security grant funding for the statewide IndianaMap 2005 Orthophotography Project, and Chris Cotterill for working diligently with us through the formation of the Indiana Geographic Information Office. The Polis Center at IUPUI, IndianaView at Purdue, and the Geographic Educators' Network of Indiana have contributed selflessly to our educational efforts. Much needed financial and technical support has been provided by the U.S. Geological Survey and the Federal Geographic Data Committee. Dozens of cities, towns and counties have contributed data and expertise in a spirit of cooperation to realizing a vision that serves the common good. And too many individuals to mention have championed the cause. In particular, our gratitude goes out to Representative Scott Reske and Senator David Ford for their vision and understanding of the potential the IndianaMap holds for Indiana, and for sponsoring legislation to institutionalize its support.

"I will always think that my role in GIS has been one of my proudest contributions to Indiana."

—Sen. David Ford personal correspondence, February 22, 2008

This report is dedicated to the spirit and memory of Senator David Ford.

Jill Saligoe-Simmel, Ph.D.

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The Indiana Geographic Information Council (IGIC) is a nonprofit membership organization of GIS users, professionals and educators. Administered by an elected board of directors, IGIC is recognized as the official statewide coordinating body for Indiana geographic information. IGIC's mission is to lead the effective application of geographic information in Indiana. The IndianaMap not only advances this mission, it also contributes to present and future work of numerous state agencies, local governments, private businesses, and academic institutions involved in economic development efforts, environmental management, transportation planning, public safety, land use planning, and much more.

Our membership includes individuals from all levels of government, private industry, educational institutions and other nonprofit groups. Through our membership and elected board of directors, we strive to make a real difference in Indiana GIS—both for those who use it and those who benefit from it.

Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, building partnerships, and the IndianaMap.

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