



Indiana Statewide Ortho/LiDAR Program 2011-2013

Uses and Benefits

USES AND BENEFITS OF THE DATA PRODUCED THROUGH THE 2011-2013 STATEWIDE ORTHO/LIDAR PROJECT

Keywords: Energy, Environment, City, Local Government, Planning, Flooding, Drainage, Engineering, Military, Lake Michigan, Coastal, Shoreline, Erosion, Dams, Conservation, Natural Resources, Agriculture, Watersheds, Soils, Oil, Modernization, Fertilizer, Geology, Mapping, Water Wells, Economic Development, Shovel Ready, Research, Endangered ., Natural Habitat, Bathymetry, Water Quality, County, Parcels, Public Safety, Emergency Response, Sewer Utilities, Field Inventory, Dispatch, Land Survey, Public Information, Pollution, Engineering, Design, Modeling, Assessment, Land Use, Land Cover, Super Bowl, Planning, Planimetrics, Judicial, Emergency Response, Dispatch, Engineering, Surface Water, Utilities, Tree Canopy, Transportation, Impervious Surfaces, Real Estate, Redevelopment, Watersheds, Flooding, Wind, Drainage, Energy, Erosion, Public Works, Topo, Assessment, Transportation, Airports, Grant Funding, GPS, Forestry, Biology, Steel Mills, Refineries, Consulting, Storm Water, Canine, Rescue, Law Enforcement, Tribal Lands, Architects, County, Town, Water Resources, Site Design, Wetlands, Contours, Parks, Public Health, Federal Government, Art, Outdoor Recreation,

Keywords: Dams

In 2008 as part of the response to unprecedented flooding events, the DHS / FEMA National Dam Safety Board of Review raised the concern for increasing the number of Incident and Emergency Action Plans (IEAP's) for the thousands of high hazard dams throughout the nation. An IEAP is a comprehensive, single-source document providing accurate and current instructions intended to help dam owners/operators save lives, minimize property damage, and minimize environmental impacts caused by large releases from a dam, dam failure, or other events that present hazardous conditions. A national goal of 100% IEAP completion was set.

About ½ the states in the nation have state statutory mandates for owners to create IEAP's, Indiana does not have such a statute. At the time of the mandate no IEAP's existed for high hazard dams in Indiana. One of the basic and formerly cost prohibitive components of an IEAP, is the creation of a dam failure flood inundation map, utilizing detailed topographic information. This map is an essential tool for local emergency management officials and first responders as they seek to notify and temporarily remove downstream individuals from harm's way.

Indiana's 2011-2013 LiDAR based detailed topographic information has been an invaluable tool utilized in the voluntary creation of dam failure inundation maps and IEAPs for State, local, and privately owned high hazard dams throughout Indiana. The investment in LIDAR has been significantly leveraged with some very limited federal dam safety grant money to create more than twice as many IEAPs for Indiana high hazard dams than would have otherwise been possible. To date over 60 IEAP's have been created and more dam failure inundation maps and IEAP's are currently in the development process because of the existence of Indiana's LIDAR. Even at the current development rate, it will take many years to create IEAPs for all 250 known high hazard dams in the State. The availability of current LIDAR data will continue to play an essential role in producing future IEAPs and eventually updating the documents done in previous years.

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Keywords: Conservation, Natural Resources, Agriculture, Watersheds, Planning, Soils

At NRCS [Natural Resources Conservation Service, U.S. Department of Agriculture], we are using the elevation products to model local watersheds as part of the planning and design process for implementing conservation practices. The accuracy from these products has made this task achievable, particularly given the very subtle elevation changes in much of Indiana's agricultural landscape.

We are using the imagery products in our process to continuously evaluate and update NRCS Soil Survey products. It's particularly useful for identifying water features as well as changes from urban development and road construction. Our conservation planners use it to supplement conservation plan maps that are provided to agricultural producers from NRCS. When combined with USDA NAIP imagery, we are able to work with producers using leaf-on and leaf-off imagery, for two unique views of their operation. I also use it to identify features called out in survey descriptions to assist me in digitizing a representation of a survey boundary for general reference through our GIS systems. The higher resolution often makes such features recognizable on the imagery.

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Keywords: Energy, Oil

I am using the LiDAR data to track subsurface features that have the ability to produce oil from formations here in Indiana. These subsurface features in some cases do correlate with visible features on the surface. Using images created with LiDAR is the only way I can spot the features I am looking for. This program has had good initial success and has resulted in \$200,000 being earmarked to be spent on a leasing program in Indiana. The money for this project is coming out of Michigan and 100% of it is being spent in Indiana. We are currently working on more projects that will result in a larger leasing budget. Drilling and oil production will follow the leasing programs.

Having the LiDAR data available to the public is very important. Only large corporations have the budgets to run large LiDAR studies and would understandably keep the results proprietary, very few would get a chance to look at the data. Having the State of Indiana fund and make this survey available to the public means that a small guy like me can get a chance to work with and make the most of this cutting edge technology.

Jim, The Indiana GIS site is really well done and you have been a big help in getting me up and running using LiDAR.

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Keywords: Agriculture, Watersheds, Modeling, Hydrology, GPS, Soils, Erosion, Survey, Water Quality

I have used the LiDAR and Ortho data for my research in agricultural watershed management. Use of this data has allowed me to model hydrology and soil erosion in NE Indiana where topographic information is unobtainable through traditional surveying or GPS data collectors. The increased resolution from year to year also allows modeling like mine to be updated to be more accurate and provide better data on how to manage fields and identify non-point sources of soil erosion and poor water quality.

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Keywords: Agriculture, Drainage, Contours

I just wanted to drop you a line to express the importance of the States Orthophotography and LiDAR program in our county. Being a farm community, Shelby County farmers have a great need to be able to map their properties for planning purposes. Also, having the ability to display contours with elevation points is must for determining water flow for drainage. Today's young farmers are faced with many new technical challenges and we appreciate the State's effort in assisting them in meeting these challenges.

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Keywords: Modernization, Transportation

This past summer, our district completed the topography for a signal modernization project in downtown Ft. Wayne and in Elkhart. All of the intersections we worked on were busy and would have required extensive traffic control in order for us to locate lane lines, stop bars, pedestrian crossings, etc. for the engineer working on the project. Instead, we were able to overlay our field data (using Microstation) on the orthophotography and show those features without having to go into traffic. Having up to date photography provided us with information that matched current conditions and also saved time on the project as well.

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Keywords: Agriculture, Fertilizer

I'm in the business of making manure and fertilizer management plans for farmers. I really don't know how we could comply with all regulations that EPA, NRCS and others place upon us if we didn't have access to accurate and reliable GIS maps and data. The correct variable rate application of nutrients from both sources rely on ortho map data.

There is no use in having setbacks, RUSLE2 data or anything like that if we can't accurately apply the data at the field level. The one place I know I can get data rapidly and accurately is the Indiana University GIS site. I can't get that data in other state that I've tried and I don't want to lose this source.

*Lance Murrell Consulting
Lance Murrell, CPAg*

Keywords: Geology, Mapping, Water Wells

We use Indiana's 2011-2013 Orthophotography and/or LiDAR almost continuously in our geologic mapping. We use it for many tasks including locating water well records which are some of our primary data for mapping. The elevation data for these water wells is particularly valuable when obtained from LiDAR data. When searching for unlocated water wells, the orthophotography is very helpful. When compiling the geologic data, the LiDAR is again used. And finally when making the final map for printing, the hillshade of the LiDAR is used as the base for map.

Many thanks for getting this valuable data for the citizens of our state.

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Keywords: Economic Development, Shovel Ready

We use the 2012 orthophotos daily in our utility operations as well as serving the public. Also they were instrumental with economic development, by providing information to prospective industrial development as well as achieving shovel ready and food grade certification status for a parcel of land in our community. This benefit is crucial to the economic improvement and daily operations of our community.

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Keywords: Research, Endangered Species, Natural Habitat, Bathymetry, Lake Michigan, Water Quality, Contours

The information that LiDAR and orthophotography data for Indiana provides has been invaluable to research at the Indiana Dunes National Lakeshore. In 2011 and 2012, my colleagues and I utilized orthophotos to help us navigate to sampling sites for research on the endangered Karner blue butterfly. These orthophotos allowed us to familiarize ourselves with the topography and land cover in which we were conducting field experiments, prior to going to the field. We were also able to use the data to aid in developing new sampling techniques, according to ideal habitat types and slope/aspect data that were extrapolated from orthophoto data.

In 2013, I have used LiDAR data in addition to the orthophotography data in my work. LiDAR data that has resulted in bathymetric contours and models for Lake Michigan have allowed me to assess water volume at beaches/embayments, shoreline irregularity, and various other geomorphic variables, in relation to water quality, to help determine relative impacts of such factors on water quality.

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Keywords: Local Government, County, Parcels, Public Safety, Emergency Response

I can't tell you enough how beneficial this program has been to Parke County. Without your program we would still not have our parcel layer complete. But thanks to your assistance and some creative management on the county's part we have completed our parcel GIS layer, and used it already in marketing efforts to bring new business to the county. Our public safety departments utilize it all the time. We were able to more rapidly find a lost boy and his mother on that first really cold night we had. Without it response would have been delayed putting them at great risk in an area of very rugged terrain. ...and this is just from the added benefit of the extra fund assistance. Parke County has several old mine shafts and areas of rough terrain; we are greatly looking forward to receiving the LiDAR/elevation data and the added benefit potential to all aspects of emergency response. I am contacted quite frequently by Law Enforcement personnel with questions in regard to mapping. The maps assist county officers as well as conservation officers when they are planning drug searches or busts. By being able to look at the terrain specifics they can better plan and anticipate obstacles, making their efforts more successful.

Thank you, Jim, Indiana Office of Technology, and all the GIS folks for this project and all you do! It's a great project and I hope, one that continues!

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Keywords: Sewer Utilities, Mapping, Field Inventory

Here at the Sanitary District, we use the orthophotography for general overlay and more specifically to help place ground features, like manholes, catch basins and lift stations. It is beneficial to use because if the features can be identified by the orthophotography; then it may not be necessary to leave the office and locate the features manually. On occasion, the ortho photos are used to look at properties prior to going out for repairs to measure for equipment requirements. We have had a few instances where the equipment will not fit through an alley, etc. to get to our infrastructure and we have had to take additional hoses, etc. to reach the home and we try to make sure that we have measured to make sure that we have enough available resources. It saves time and money for us to plan ahead.

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Keywords: Dispatch, Public Safety, Emergency Response, Economic Development, Land Survey, Public Information, Pollution, Environment, Contours

You really don't know the importance of something like aerial Imagery and LiDAR till suddenly you no longer have it. With that said every department uses the aerial imagery in some capacity. Planning and Zoning located homes and dropped address points to aid Dispatch. Dispatch uses it to guide emergency responders. We have been able to identify buildings that have been torn down, and buildings that are evaluated on the wrong parcel. Economic development uses the imagery and LiDAR to aid in engineering studies to build new businesses, and bring wealth to our communities. The Survey department uses the contours derived from the LiDAR daily. Having this imagery accessible to the public has educated them tremendously about their surroundings, and in the process saves our office time when they come in to ask questions. Highway department can better map the roads in the county. Real estate businesses, banks and land titles all use the imagery, and in the process are able to save the public money on insurance. It also promotes home ownership because it streamlines the buying process. I personal believe having this imagery available aids in environmental awareness in regards to point source pollutants. For the first time the public can easily see where the small stream in their backyards lead. This is just a snap shot of all that is done with the Aerial imagery and LiDAR. Picture not having up to date imagery, would any of the above statements be possible? Some would, but with great hindrance that equates to cost. The fact is Imagery is now ingrained in our day to day lives both in and out of work. To take this great resource away would set us all back.

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Keywords: Engineering, Design, Modeling, Field Inventory

Indianapolis Power & Light (IPL) engineers and technicians use ortho-photography in our Electric Design applications. Current ortho-photography assists IPL with greater accuracy in our electrical designs. This leads to lower cost in design and greater safety in the field for our employees.

IPL is currently studying the use of LIDAR for modeling and surveying transmission towers, but to my knowledge we have not used the State of Indiana LIDAR data.

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Keywords: Local Government, City, Mapping, Planning, Assessment, Land Use, Land Cover

The City of Evansville and Vanderburgh County use new imagery for a number of purposes:

- Updating basemaps on local GIS web maps
- Improve decision making and planning operations

- Review new and modified building structures for tax assessments
- Assistance in digitizing new GIS features

Although the City/County Enterprise has yet to use LiDAR, there are many possibilities that departments are hoping to make use of the data. These include:

- Risk assessment analysis of flooding and other natural disasters using 3D models created from the point cloud data
- Improved Land Use/Land Cover change analysis
- Future development and planning models

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Keywords: Local Government, City, Mapping

The 2011 Aerial photography is a base layer that is used as a base for a lot of the projects that we work on. We would be lost without this valuable dataset in our data collection. We are looking forward to receiving the 2014 photography.

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Keywords: Local Government, City, Mapping, Super Bowl, Planning, Planimetrics, Judicial, Emergency Response, Dispatch, Engineering, Surface Water, Utilities, Tree Canopy, Transportation, Impervious Surfaces, Real Estate, Redevelopment, Watersheds, Flooding, Wind, Drainage, Energy, Erosion

The 2011 aerial photos were used for:

- Super Bowl planning by the City, State, FBI, DHS, USGS, NGA
- Collecting planimetric features (buildings, pavement, and streams) for use by City planners, Assessor, utility managers.
- Developing exhibits to be used for judicial cases.
- Creating the urbanized area boundary in 9 counties to use for transportation planning and funding.
- Used as part of the 911 emergency dispatch system.
- Used a backdrop for engineering design for utilities, roads, sidewalks and construction development.
- Used to improve the accuracy and completeness of the stream network.

- Modeling urban heat and tree canopy.
- Used as a background for transportation, pedestrian, and transit planning.
- Identifying impervious surfaces for storm water utility billing.
- Used as a background for real estate sales and redevelopment websites

The LiDAR/DEM/DSM was used for:

- Improving the positional accuracy of aerial photography.
- Improving the accuracy of watershed boundaries.
- Aiding in the improvement of stream network.
- Improving the positional accuracy of flood boundaries.
- Identifying bank-full depths for flood modeling.
- Modeling wind through urban canyons.
- Location analyses for wind and solar farms.
- Calculating line-of-sight for microwave relay, and public safety (SWAT).
- Modeling drainage and runoff.
- Identifying fluvial erosion zones.

Jim Stout

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Keywords: Planning, Utilities, Drainage

We have primarily used the orthophotography in planning and utility layout projects for municipalities. On occasion we've used LiDAR data to prepare Rule 5 drawings or general drainage pattern analysis.

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Keywords: Local Government, City, Utilities, Public Works, Inventory, Impervious Surfaces

Three important uses of the orthophotography for us at Fort Wayne City Utilities/Public Works, due to the clarity, quality, and accuracy:

- Seeing the locations of new manholes in the past three years that were placed through barren fields and wooded areas, so that we can map them accurately. We typically receive asset location measurements and plans with no real coordinates or aerial backdrops, and that's tough to map when there are not any reference points. Also, the orthos can get you a location as good as a GPS point since it's 6" accuracy, so we save so much time and money for employees to go back out to the site and collect GPS points for the mappers.

- Same goes for fire hydrants. They're installed on projects and we usually just get location measurements that many times are not correct, so when we received the new orthos, we could see the new project was installed and we can see the hydrants and relocate them precisely.
- Non-residential impervious surfaces mapping review, to support our storm water utility billing program. We have a comprehensive checks and balances system to catch any impervious surface changes to properties throughout the year, but there are those that slip through the cracks in a city this size. New orthos make these surface differences "pop out" so we can update them.

*Kevin Holle, GISP
City of Fort Wayne
City Utilities/Public Works*

Keywords: Assessment, Field Verification, Economic development, Planning

The City of West Lafayette has used the latest aerials to accurately assess the surrounding areas as we evaluated our need to annex. Without the current up to date aerials, there would have been many added man hours of field verification. This would have been time wasted while weighing the project.

The 2013 aerials have also been extremely valuable in our plans to further develop the City. As rapid growth continues in our area it is vital that we be able to rely on accurate and current data to assist us in our planning.

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Keywords: Transportation

The firm I work for constantly uses this data to provide the most up to date background information for our clients in the transportation industry.

Reviewers of our reports also prefer the most up to date info so that we can show why an area was tested.

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Keywords: Landscape Architect, Development

As a landscape architect, I have used the orthophotography resource often! We use the aerials as background for concept graphics, to get a feel for the character and scale of project sites, and others. It is a great resource to anyone in the land development/landscape fields.

*M.J. Meneley, ASLA, LEED AP
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Keywords: Grant Funding, Boundaries, Mapping, Environment, Transportation, Planning

At Indiana 15 Regional Planning Commission we use the Orthophotography data on a regular basis to support the applications for grant funding for the local governments in our 6 counties. These include project boundary maps, and maps to support the environmental review process required of local infrastructure and community facility projects through Office of Community and Rural Affairs. Recent aerial images are also essential to the community basemap project funded through INDOT Small Urban and Rural Transportation Planning Grant in which wall maps depicting the corporate boundaries and platted streets and lots among other cadastral information are produced for our communities. Without the continued support of regular orthophotography updates many of the successful projects we complete would not be possible.

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Keywords: Education, Hydrology, Modeling, Watersheds

I have been using the LiDAR data for hydrologic modeling in my master's thesis at Purdue University. We are working toward more precise field-scale watershed delineations for use in mobile applications by field conservation agents. Without this data, this would not be possible.

Samuel Noel

Keywords: Energy, Mapping, Public Information

WIN Energy REMC uses the color orthophotography in a variety of ways.

- Checking service territory for use in the field.
- map lines do not translate well to the real world, so taking the territory maps and superimposing on orthos makes it easier locate in the real world.
- Plotting INDOT proposals on Orthos (I-69 as an example) makes it easier to work with land owners to re-route electric utility lines if the land owner can see this on orthos.

We use this for a lot of internal applications as well.

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Keywords: GPS, Archaeology, Mapping

Indiana's 2011-2013 orthophotography datasets were loaded onto our GPS systems and provided critical reference images for our archaeological survey teams. They helped us successfully navigate

proposed transmission line routes in northern Indiana. Without this data, we would have used the traditional USGS topographic maps which are usually out-of-date and less useful for on-the-ground navigation via GPS. We will also use the orthophotography imagery as background imagery in our final reports and archaeological site location maps.

This dataset is an invaluable tool for archaeological research and cultural resources compliance.

Thanks for providing this resource.

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Keywords: Forestry, Energy, Mapping

I have used the Ortho photos your organization has provided to create very accurate maps for NIPSCO's forestry operations. Without this resource the cost of keeping our power utilities is likely to increase due to mistakes made in the field by tree crews lacking accurate maps to work off of.

Zachary Hassler

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Keywords: Mapping, Biology, Transportation

I operate as the companies' primary GIS technician. Over the past few years I've used orthophotography from this program to make both field and production maps. These maps have been used by biologists to navigate in the field and included in reports for publication. Some of these reports have been produced for various INDOT projects. Up-to-date maps were important for showing the actual field conditions and producing meaningful, functional maps.

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Keywords: Lake Michigan, Steel Mills, Refineries, Energy, Parks

We have been regular users of the orthophoto data, and would like to become users of the LiDAR data in addition. The orthophotos were invaluable as backdrops for use in our projects related to Indiana Dunes Park, and for work with Lake Michigan-based steel mills and refineries.

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Keywords: Education, Local Government, City, Planning, Environment, Parks

As a professional planner we utilize the aerial photography weekly as we prepare planning projects for municipal clients. We use it for park planning studies, greenway development, urban planning, etc. The data is wonderful and inserts nicely into our CAD mapping software. Please fight to continue the gathering of this valuable information as it is vital to our planning efforts.

Michael J. Bultinck, RLA

Lehman & Lehman, Inc.

Landscape Architects and Planners

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Keywords: Modeling, Agriculture, Soils, Environment, Watersheds

I would like to let you know that the IN LiDAR data has been a great offering for us. Not all states are embracing this new technology and the accuracy is great.

We are using that data for terrain modeling to help our customers understand their agriculture fields better. This assists them in reducing input costs and improve the Indiana environment, soils and watersheds with better management practices.

Nick Olson

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Keywords: Environment, Consulting, Hydrology, Land Use, Habitat, Endangered Species

I make extensive use of the orthophotography for many environmental consulting projects that we have in Indiana. My use is mainly to determine vegetation cover, hydrology, locality, land use, and habitat for endangered and threatened species. It is very useful to continue these programs since monitoring the changes in the landscape are vital to my projects.

Benjamin Schuplin

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Keywords: Natural Resources, Geology

I am charged with coordinating airborne LiDAR data stewardship for Illinois, and wanted to respond to your call for feedback about Indiana Orthoimagery and LiDAR data collections. In the past, efforts to share Illinois Orthoimagery via the Illinois Natural Resources Geospatial Data Clearinghouse have relied on Indiana Orthoimagery to better depict ground conditions for our geologic field staff near the border of Indiana and Illinois. Having overlap between your data collections and ours has been very beneficial.

With respect to your recent LiDAR acquisition in western Indiana, our data users are keenly anticipating the release of your data. A large swath of Illinois LiDAR along the shared state boundary was acquired by federal agencies cutting the boundary very fine; other areas have data that is 10 years old or not at all. There is hope that the Indiana acquisition will cover the river valley from bluff to bluff towards the south, and also hope that overlap into Illinois will be useful for the Illinois counties that have not yet been acquired in the north.

In any case, the success of Indiana's GIS efforts are a frequent topic of conversation here in Illinois. Your progress has been enviable, and provides direction for our own efforts to better address statewide coordination of large geospatial data sets.

Sheena K. Beaverson

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Keywords: Energy

We access this data to help monitor changes along the Right-of-Way for our pipelines as well as checking for encroachments in areas that may not be visible from roadways.

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Keywords: Planning, Design, Consulting, Storm Water, Transportation, Topo

The various DLZ Indiana offices use Indiana orthophotography and LIDAR quite extensively for planning, studies, and design services. Both are an invaluable tool for all sorts of different projects. Both orthophotography and LIDAR are used on almost every single storm water or roadway project that we design as a supplement to our topographical surveys. In the case of many studies, we use both of them and various other available data in lieu of survey information.

Discontinuing the annual collection of this information would be detrimental to the quality level of service and deliverables we are able to provide our clients. We really hope that this annual collection of information can continue.

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Keywords: Canine, Rescue, Law Enforcement

My name is Steven Wallace, and I have been member of the Argus Canine Search and Rescue organization in Bloomington Indiana. Argus responds to requests from law enforcement agencies to assist with finding lost persons.

Argus maintains a set of mapping and radio resources that is uses during searches. The mapping resources include complete ortho coverage of Indiana. Argus is able to plot in realtime the position of its searchers, as well as document the areas previously searched. It's common for Argus to share its mapping resources with law enforcement to aid their search planning. Typically there isn't broadband access at search sites, so the ability to bring a complete set of maps via a laptop and hard drive brings the utility of a "google earth" to the search.

Having up to date orthos of Indiana better equips first responders and volunteer aid organizations to serve.

*Steven Wallace
Argus Canine Search and Rescue
Bloomington, IN*

Keywords: Agriculture

We have just begun using this data set in a direct manner and have found it very valuable. We've worked with the Orthophotography for years through third party software but now find direct use for the LiDAR information. Please keep up the good work and let us know if we can help as well.

*Daryl Starr, Founder & CEO
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Keywords: Engineering, Consulting, Local Government, City, Town

The Orthophotography and LiDAR data have become an integral component of civil engineering projects. By making this information freely available to all consulting firms and municipalities, Cities, Towns, and Industry are able to allocate their available funds towards much needed capital projects, rather than independently collecting this data independently, a potentially cost prohibitive choice for many. Wessler Engineering encourages the Indiana Legislature to continue supporting this important provision through UITS.

*Ryan Brauen, P.E.
Project Manager
Wessler Engineering
Indianapolis, IN*

Keywords: Natural Resources, Tribal Land

I would like to relay on behalf of Pokagon Band of Potawatomi – Department of Natural Resources, how valuable Indiana's Orthophotography imaging is. Pokagon DNR uses Indiana Imagery in conjunction with Arc-GIS software on a daily basis. Having the most current data available to work with, has been critical to management of Tribal Lands and to future planning efforts. Having..... "up to date"-referenced Imagery available for use with Arc GIS is critically important to myself and other office co-workers.

*Pokégnek Bodéwadmik
POKAGON BAND OF POTAWATOMI*

Robert J. Frank
Natural Resources Manager
Certified Wildlife Biologist ®
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Keywords: Natural Resources, Consulting

I work for a natural resources consulting group in Ohio. We have done many projects in Indiana that have required us to use orthophotography to produce high quality AutoCAD and GIS map deliverables for many clients. Indiana currently has some of the best orthophotography available on line in the United States and it would be a shame to see it disappear, not to mention make our jobs much more difficult. I hope your state government sees how valuable orthophotography is by continuing to fund it well into the future. Thank you.

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Keywords: Consulting, Architect, Engineering, Watersheds, Surface Waters

As a consultant in the architectural/engineering industry, I often need to use orthophotography while performing watershed management, stream restoration, or floodplain analyses for clients. I have successfully downloaded and used orthophotos from the Indiana University portal on a number of occasions. While I have not needed to download LiDAR, I appreciate its availability and may use it in the future.

Thank you for the opportunity to provide you with comments regarding the State's program. I wish you the best in your continuing efforts and appreciate the availability of data through the Indiana University portal.

Jennifer Berthiaume, GISP | GIS Analyst I | jennifer.berthiaume@arcadis-us.com
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Keywords: Survey, Boundaries, Local Government, County, City, Town

I routinely use the aerial photography on surveying projects to help with proper boundary line placement and showing existing lines of occupation. We also use the LiDAR data to help keep the survey project costs low for municipal clients. For several large survey projects we have used the LiDAR for a basis of our design surface and have taken sample cross sections to look for any problem areas (areas

where the LiDAR data does not quite fit field measured elevations). This allows us to drastically cut down the amount of data collection by hand which helps keep survey costs affordable for smaller counties and towns. On average I would say that I use these data sets once a week.

Jacob T. Hoffman, PS

Project Surveyor

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Keywords: Mapping, State Government, Transportation, Local Government, City, Town, Consulting

We use these images at my company on a daily basis. These images provide us the backdrop for all of the project documents/maps that we do for the State of Indiana (INDOT), and all cities and towns. Without these datasets (both the Orthophotography and LiDAR), we would have to use online aerial imagery datasets that are 1) not as high of resolution and therefore blurry at the scales that we use them and 2) if we would not have access to the current downloadable aerial photography for use on our local servers, it would take a lot longer to use online datasets due to the regeneration time it takes from within our GIS and CAD applications (not to mention that we cannot perform the same analysis tasks with the online map services as compared to having the actual GeoTiff's on our local server). There are several state and local government agencies, along with several engineering consulting firms that use these datasets on a daily basis to provide documentation for projects ranging from environmental analysis, transportation planning, highway design, right-of-way engineering and water/wastewater design. It would be detrimental to the operations of engineering consulting firms if this program is not continued, unless the State of Indiana is going to provide free access to continually updated aerial photography from other sources.

RANDY A. WEAVER

Systems Administrator/Engineering Designer II

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Keywords: GPS, Consultant, Water Resources

I am a board officer and GPS/GIS consultant for a non-profit water distribution company serving eastern Monroe County and westernmost Brown County. We rely heavily on the public domain orthophotography (leaves off) in our service area to provide a vital backdrop to our digitally mapped water utility valves, meters, lines, etc. Field personnel are equipped with laptop computers so that they can use this information to assist in rapidly locating critical valves and lines during water service outages and repairs. The various landmarks that help us "spot" our equipment, such as buildings, driveways,

even mailboxes and specific trees, are especially useful in rural settings such as ours. Accurate, up to date, ortho imagery is vital for this function. Thank you for your efforts.

Jeff Cook

Consultant to East Monroe Water Corp

812-929-7362

Keywords: Watersheds, Drainage, Local Government, Assessment

We have used the LiDAR data to identify watersheds, drainage basins so that local governments can more accurately assess taxable property. We have used the LiDAR data to do preliminary drainage work which keeps prices and costs low for the local governments we often work for. We use the orthophotography everyday in a variety of circumstances.

I have forwarded this information to my co-workers.

Jon Polson

Land Surveyor Assistant

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Keywords: Survey, Planning, Consulting, Mapping

The 2011-2013 Orthophotography has been a very valuable aid to my everyday work as a land surveyor. Current orthophotography can be a tremendous aid throughout the process of a survey, from initial project planning through supplementing field reconnaissance and execution of the survey. Having that information publicly available really helps paint a more complete picture when performing our work. I have used background orthophotography in nearly every survey I have worked on while here at Schneider, even sometimes using that orthophotography as a background for visual displays of survey information.

Michael G. Judt, LSIT | Project Surveyor

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Keywords: Environment, Consulting

As an environmental professional I use Indiana's Orthophotography to prepare Site plans, plan investigations and prepare remediation strategies. They are an important tool for understanding the potential receptors, surrounding land use and natural/manmade features which might affect contaminant migration from a chemical spill/release. This is all done without the time and expense of travelling to the Site.

I previously worked in the Civil Engineering field where we frequently used orthophotography to aid in Site development.

Marty Clifford

Project Manager

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Keywords: Survey, Boundaries, Site Development, Transportation

I would like to inform you that our company frequently uses the Orthophotography information made available from Indiana University's web site. We use this information on a daily basis as an overlay for Land Surveying Boundary work, Site Development, Route surveys and nearly every aspect of our surveying and site design. Overlaying the Orthophotography allows us to confirm occupied lines for survey boundary work and illustrates topography for our site design and route surveys.

We have become dependent of this reliable source of information and it would be a huge loss if it was to be discontinued. I encourage you to persuade our State Leaders to continue and support the future use of the Orthophotography/LiDAR program.

Bill Griepenstroh, PLS
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Keywords: Watersheds, Drainage, Consulting

I can say that this data is extremely important to the private industry. I have used both the LIDAR, the resulting elevation models and the imagery on two watershed plans in the last year. I have used it for pollution load modeling, delineating drainage areas and calculating flood storage. Having good imagery and elevation data is very important and of all the states I work in, Indiana is top of the list in terms of GIS data availability and I can say it makes my job a lot easier and I can provide my clients with a better product as a result.

Jeff Boeckler | Principal Water Resource Specialist | Northwater Consulting
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Keywords: Environment, Consulting, Wetlands, Soils, Development

I'm with an environmental consulting company. We do wetland delineations and wetland permitting (among other things). We use aerial photos across years to assess whether a site has wetland signatures: visibly saturated or inundated soils. We use this so that we can come up with our proposal amounts without having to go out to the site first. We also use it to assess the site and come up with a plan before starting a delineation. We also use aerials to determine if and when wetlands have been filled in. We are occasionally called in as consultants on violations where someone has illegally filled in their wetland. It's useful to be able to go through several years of aerial photos to determine when the wetlands were filled in and how much area was filled in.

We also use the most recent ortho imagery available as the base layer in the majority of the maps we produce with our reports. Development occurs so rapidly in northwest Indiana that the landscape changes very quickly. We often use the 2005 ortho because the detail level is better but on the majority of our sites, the 2005 ortho does not reflect current site conditions. So we use the most current orthos to reflect current site conditions.

As far as I know, LIDAR is not yet available on the ISDP site for the counties in which we primarily work, Lake, Porter, and LaPorte. But, we have had access to LIDAR for Porter County during the short time that they hosted the data on a website. It was immensely useful while we had access to it. We were able to identify small drainage ways, wetlands within depressions, and wetland connectivity all using LIDAR before even visiting a site.

I hope the state continues to fund data acquisition because we'd almost be lost and blind without it.

Lydia Miramontes Loyd

Botanist

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Keywords: Local Government, City, Models, Survey, Parcels, Mapping

The City of Kokomo uses both products [Ortho and LiDAR] in our GIS. The Design department uses the LiDAR to create surface models to enhance and extend field surveys thereby saving time in the field.

The photos are a useful base for parcel and right of way mapping and verification.

Jesse h Johnson

System Project Designer

for City of Kokomo Engineering Dept.

765-456-7411

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Keywords: Design, Modeling, Engineering, State Government, Local Government

The program is widely used in an everyday/project use for design, modeling, reports, and studies for various GIS and Civil Engineering work within our firm (multiple departments use all aspects of the data referred to by IGIC and IU online downloadable data). This is a cost effective way to determine the areas terrain prior to a project survey for State and Local Government projects, the lack of this general but detailed and valuable data ensures accuracy of the above mentioned formats and types of projects to just name a few applications.

It is in my opinion, that the state has a vested interest to provide firms and agencies that do State and Local Government projects the most current and accurate data possible for the sake of public safety and design feasibilities, not to mention the cost to a projects study phase.

To lose a valuable tool of this kind takes us back to the drafting board days...Technology is the making, modification, usage, and knowledge of tools, machines, techniques, crafts, systems, and methods of organization, in order to solve a problem, improve a pre-existing solution to a problem, achieve a goal, handle an applied input/output relation or perform a specific function. It can also refer to the collection of such tools, including machinery, modifications, arrangements and procedures. Technologies significantly affect human as well as other animal species' ability to control and adapt to their natural environments. The term can either be applied generally or to specific areas: examples include construction technology, survey technology, and information technology.

H. Tom Snyder

AutoCAD Designer, Engineering Technician,

& Asbestos Building Inspector

Environmental Engineering Department

BLN

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I wanted to let you all know the importance of the Indian Map to my business. Many in our office use it quite a bit. Project planning with the assistance of the data on the site is a great tool. The number of layers is incredible as is their content.

Keywords: Engineering, Contours, Planning

In regards to the LIDAR data, it has been an invaluable resource for preliminary engineering. We have used it a lot. Nearly every engineering project that we undertake, begins with downloading the LIDAR data and processing it into contours. It is by far the best available data for our purposes early on in a project. Why should a developer invest thousands upon thousands of dollars, and sometimes tens of thousands of dollars, on conceptual planning. Will my proposed project work? And, this data benefits economic development in Indiana. Site selection is paramount. It is incredible. It is valuable. It is powerful. Keep up your crew's fantastic work and keep adding layers.

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Keywords: Environment, Natural Resources, Consulting

I would like to thank you and the GIS community for all the efforts completed in developing and maintaining GIS data in Indiana. Many years ago the business of mapping resources was started and has gotten better each year, especially with the new aerial photographs and LIDAR. I firmly believe in the availability of such data and its use in so many ways in Indiana. You and others have done a superb job and I am pleased with the improvements that have been made throughout the years. Please be advised that your contribution is significant and that I, as well as others, feel blessed to have you and others keep GIS current and the state-of-the-art for so many years in Indiana. If I can be of assistance, please advise.

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Keywords: Transportation, Engineering, Topo, Consulting, State Government

The Orthophotography maps you provide are of great need to the transportation engineering industry. We use these maps for our preliminary engineering studies to lay out new road and bridge alignments prior to us having actual topography survey information on the site. These maps allow us to accurately determine a project's scope and its impacts to the surrounding homes and buildings as we superimpose our proposed alignment on top of your maps. Without these maps, there will be much more guesswork in determining a project's scope which will result in an increase in project changes. With the Indiana Department of Transportation (INDOT) and the Federal Highway Administration (FHWA) holding the design engineer more accountable for project changes than ever before, a loss of these maps will greatly hinder our ability to provide INDOT and FHWA what they mandate from us.

Scott Minnich, P.E., S.E.

Senior Project Manager

United Consulting

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Keywords: Education

I am a graduate student at Chicago State University working toward a MA in Geography with a Geographical Information Systems concentration. I have utilized and had access to needed information for studies, term papers and for GIS situations--we have a GIS lab on campus-- from your program. The maps, shapefiles, aerial photography, your spatial data portal, map datasets and the NAIP have been of utmost importance to me and the pursuit of my degree; without which I may have been unable to successfully make it thus far. Programs and people change, move around or are simply eliminated. Please continue your program which will also enable us (CSU) to maintain and support a quality, data access filled lab for us here at Chicago State.

Ronna Dale Sajna

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Keywords: GPS, Forest, Parks

Don't know how much impact I will have but I do use the data to build maps of areas of the Hoosier National Forest as well as other locations for use in creating custom maps for my handheld GPSr's (Magellan Explorist x710 & Explorist GC) to help me while I'm out hiking in those areas. It's a great benefit having this data freely available and up to date as the landscapes are continually changing (a keen eye will notice that). I often times use this data to scout out ahead of time to find areas for parking as well as the actual hike itself. Geocaching is a MAJOR influence on my hiking trips as well I must admit. Without this data I would have to rely on other sources, some paid, to obtain the level of detail that I need/want.

Thank you for having all this data available to us. I'm sure it would be of great use if/when a major catastrophic event (or even a person lost in the woods as far as that goes). Better to have and not need than to need and not have.

-Jamison Beedie

I have been a drafter and GIS professional at a Civil Engineering and Surveying company for the past 8 years. I have used the aerial photographs obtained on this site over the past seven years to create countless presentation figures. I have also used them for the creation of GIS drawings for any project I have worked on that required high quality aerial imagery. It would have been prohibitively expensive to consistently get the same quality aerials, up to date, for the areas that we used them in. I have used the aerials for all throughout northern Indiana and in fact am currently downloading them for a project we are working on right now. This is the third GIS drawing I have created today using the aerials. I hope that we will continue to get the aerials into the future and will be using the ones already obtained into the foreseeable future.

Dan Kohn

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Keywords: Local Government, County, Engineering, Transportation, Public Health, Assessment, Mapping, Planning, Emergency Response

Some of the users of the Orthophotography and LiDAR Data for Harrison County, Indiana:

- Engineer: Preliminary work on road and bridge projects.
- Health Department: Sinkholes, trash dumping and lateral field locations.
- Assessor: Reassessment, appeals and land use determination.
- GIS Mapping: Parcels and additional layer editing, routing, future planning studies and generating maps.
- Planning and Zoning: Subdivision placement, buffers, drainage and flood analysis.
- First Responders: Terrain, access routes, structure locations, search and rescue planning and GPS coordinates.

Ralph Schoen

GIS Manager

Bartholomew County

Keywords: Geology

I have been mapping the surficial geology of the Wabash River Valley from Vincennes to the Ohio River. The project began in 2011 and I expect it to continue through 2018. I have been using orthoimagery and - as of two weeks ago – lidar data for Posey and Gibson Counties from the Indiana collection extensively for river planform change analysis, soil and landform interpretation, and verifying water and petroleum well locations. The orthoimagery is always invaluable. The new lidar data is an improvement over the previously available data of the Wabash Watershed from FEMA because of better quality control and, even though the difference in time of collection was only 2 years, sufficient change of the Wabash River has occurred that planform change detection can be accomplished. For your interest, three draft maps are available on our website, <http://www.isgs.illinois.edu/?q=maps/isgs-quads>.

Andrew Phillips, Ph.D.

Quaternary and Engineering Geology

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Keywords: Energy, Design, Engineering

I have used this product to aid in designs of pipeline. The up to date ortho-imagery and LiDAR help us visualize proposed routes. These services help us deliver a better end product with little cost.

Jeff Judycki, GISP

GIS Analyst

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Keywords: Water Resources, Sewer Utilities

Our firm works with several rural water and sewer utilities, and we use the orthophotography at least weekly to evaluate the viability of new water main routes, water storage tank locations and force main routes. We also use it regularly as general reference for project vicinity maps.

This is a valuable resource that provides some of the most current data available. It also impacts projects economically as it allows us to do preliminary work without purchasing aerial photography from a vendor.

Doug Mark

Curry & Associates

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Keywords: Environment, Engineering

We use these Ortho's on projects where we are looking around sites that we will be working on.

Also, we have placed them in figures using Arcmap and Autocad software, although, we prefer the 1 foot / 6 inch resolution.

It would be very much missed by our company if this was not offered in the future. We would be much in favor of keeping this program!

Cheryl Rumfelt

SENIOR GRAPHICS SPECIALIST

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Keywords: Geology, Hydrology

I am a Licensed Professional Geologist in Indiana with four decades of field mapping karst and caves. I have found the 2010 Monroe County LiDAR data set to be very useful in my work and more recently used some of the 2011 - 2013 data. This technology is essential to the future of groundwater hydrology in Indiana. I support continued funding myself and as a member of the American Institute of Professional Geologists.

Garre A. Conner

garreconner@yahoo.com

Keywords: Engineering

I am a GIS Specialist and Cartographer that relies on the continued support of governments to programs such as Indiana's. Being in Ohio (we have an Indianapolis office as well) we have a very similar program as well with our OGRIP program. In both cases it demonstrates that each of the statewide governing entities choose to stay on the cutting edge, and provide the best possible use of public money to help keep an up to date data inventory of their states. Working at an engineering firm I see how both products help in reducing the costs of project funds on initial data collection, and understanding of projects more completely. Thus, the costs savings is generally shared, and the cost of jobs goes down. As I see it, if more programs like this could be instituted and grown, we could develop a greater understanding of our states through coverage of all sorts of data types, and help those who want to protect it and grow intelligently.

Thank you for your efforts.

Kris Popovich

GIS Specialist/Cartographer

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Keywords: Water Resources

We use the Indiana GIS for downloading aerial photography for water main projects. This site helps keep the cost low for various water rate payers in rural areas across Indiana where cost containment is a big concern. We urge that the site continues to provide GIS information.

Jerry Luedeman

Curry & Associates, Inc.

Engineers & Architects

110 Commerce Drive

Danville, Indiana 46122

Keywords: Environment, Planning, Economic Development

I am an environmental planner and have worked in Indiana for the past 15 years on projects from local economic development to major new highway projects. As part of my work, I utilize Indiana's Orthophotography daily to review sites, assess resources, and prepare exhibits. In rapidly developing urban and suburban areas, it is vital that aerial photography be updated regularly in order to ensure that current information is being utilized to plan for future projects and encourage economic development.

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Keywords: Environment, Engineering, Water Resources

As an environmental engineer in water resources, I use LiDAR data to look up elevations around stream areas located near a project site. LiDAR data is beneficial because it saves money from having to do a survey over a large area. It allows me to have data on hand when I need it without waiting days for it. It

allows me to obtain data from hard to reach locations along a river or stream. And, it's already on the coordinate system I desire.

Bryan Grotz, EI

Project Engineer

HWC Engineering

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Keywords: Engineering, Consulting, Environment

I work for an engineering consulting and environmental firm. We often do several new construction, planning figures and phase ones for numerous projects each month. The new orthography throughout the state is nice to get a clean up to date aerial image for the desired area when we need it. I hope that this can continue to be a useful tool available for access, it is much easier than working in Michigan where this information is NOT readily available at all.

Robert J. Heiden, Jr.

Graduate Landscape Architect

JPR JONES PETRIE RAFINSKI

Keywords: Soils, Water Quality, Watersheds, Agriculture, Boundaries, Federal Government

I am a soils scientist with the USDA-ARS located in West Lafayette, Indiana. We are using the ortho data and potentially the LIDAR data in a water quality watershed scale project located in NE Indiana. I am utilizing the orthos for crop management inventories on an annual basis. The annual photography is essential for delineating current field boundaries.

Stan Livingston

USDA-ARS

National Soil Erosion Research Laboratory

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mobile 765-418-4660

Keywords: Forestry, Tree Canopy

At Keep Indianapolis Beautiful, we use these data to assess important urban forest canopy conditions. These data sets have been critical to us as we estimate current canopy and plantable spaces in Indianapolis.

Jerome Delbridge

Community Arborist

ISA Certified Arborist IN-3334 A

Keep Indianapolis Beautiful, Inc.

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Keywords: Engineering, Drainage, Development, Land Use

I wanted to thank you for your efforts in supplying the residents and professionals of Indiana with the exceedingly helpful tool of orthophotography throughout the state. As a civil engineer, I use this tool at least weekly as a way to learn more about a particular area in need of infrastructure improvements.

One can see drainage needs, development patterns and, over time, a historic representation of growth and changes to land use. On a personal note, I find the maps to be a favorite tool for navigating day trips within the state, or finding new ways to get from point A to point B.

Amy R. Moore, P.E.

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Keywords: Art, Surface Waters

I'd like to note that the 2011 Orthophotography was invaluable in the work I did for artist Mary Miss, on her project Flow: Can You See the River. The project was commissioned by the Indianapolis Museum of Art and developed in collaboration with numerous cultural, educational, and civic organizations across the city and region. Focusing on the Indianapolis water system, Mary Miss's work was designed to reintroduce the White River into the lives of city residents, and the Orthophotos were used to collect and visualize data, as well as to form a 45 foot diameter 'walkable map' that was installed at the IMA.

See more information about the project here: <http://flowcanyouseetheriver.org/>

and photos of the walkable map:

<http://www.flickr.com/photos/imaitsmyart/sets/72157627780269660/show/>

Lee Altman

lee@lana-lo.co.il

Keywords: Land Use, Drainage, Topo

My firm has used the orthography information for years, and find it extremely valuable for determining changes in land usage for our drainage studies. Also, this past year we have been using the LiDAR information for our planning work and to check topographic surveys. The LiDAR information is also extremely valuable to delineate accurate drainage areas that are off of our subject property. I hope Indiana's Orthophotography/LiDAR program is continued in its current form or expanded in the future.

Scott Moser, P.E.

Principal

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Keywords: Mapping, Environment, Development, Geology, Water Resources

My company uses the current orthophotography to prepare basemaps for sites undergoing environmental investigation and remediation. Such work is needed before many properties (i.e. industrial sites and gas stations) can be sold or redeveloped for other purposes. The orthophotos allow us to draw past and present site structures to a high degree of accuracy.

We sometimes do work in other states that do not have such an important resource, and we have found that it is difficult to build a reliable, complete, and georeferenced basemap without the high resolution

orthos. This lack of data affects every aspect of the investigation. Basemaps are incomplete, so borings end up being planned for areas of the site where they couldn't possibly be drilled, site structures can't be recognized, and areas of environmental concern (tanks, staining) cannot be identified in past aerials. We also use your data to plan and carry out geophysical assessments including Karst formation studies, storage tank locates, and water resource assessments.

Matthew Deaner

Project Environmental Scientist

MUNDELL & ASSOCIATES, INC.

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Keywords: Airports

I wanted to add support for continuing Indiana's lidar/orthophotography program. We use the program data every year to verify construction limits on Indiana airports and present data in GIS format.

Joe Bischoff

608-305-4469

Keywords: Education

I'm a Teaching Assistant at Indiana State University, Department of Earth and Environmental System. I used the Orthophotography in the remote sensing labs that I was writing. The purpose of the lab is for the students who are new to Remote Sensing to have a sense of image interpretation in different spatial resolutions. Orthophotography was used with GOES, MODIS, and Landsat imagery to show them how spatial resolution affects image interpretation, and help them to choose the appropriate data for their future research.

Yitong Jiang

PhD student and Teaching Assistant

Department of Earth and Environmental Systems

Indiana State University, Terre Haute, IN 47809

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Keywords: Education

I have used this high resolution imagery to create an essay titled A Hydrologic Example Using Maps and Imagery in Spectral Classification for an advanced course: Earth and Environmental Changes from Volcanic Activity: Advanced Course posted on the SEROS website <http://seros.us/moodle/>. I have also used it in many additional course applications throughout my career as a Professor of Geosciences. Since retiring, I continue to support the program and feel this high resolution imagery is imperative for all Earth and environmental science applications.

Danny Vaughn, Ph.D., CMS

Independent Scholar and Consultant

ASPRS National Board Certified Mapping Scientist (R132GS)

Former tenured Professor of Geosciences, Director of Geomatics, Applied Mapping Sciences, and Geospatial Analysis Programs

Keywords: Survey, Planning, Development

Thank you for your continued dedication to providing valuable public data sets for Hoosiers.

As a surveyor, I rely on up to date Orthophotography for planning and client relations. When a client contacts me from out of our region, or even out of state to discuss possible development, I immediately look for the most current aerial photos available. Having this data available online to the public per the maps.indiana.edu site allows any client to pull up the same information in their office, and is a great tool for economic development.

I have used the LiDAR data only minimally thus far, but advances in office software will make it a key data set for planning and development in the near future. Flood Hazard studies and feasibility studies are just two areas this data is invaluable for.

Corey D. Allen, PLS

Bledsoe, Riggert, & Guerrettaz, Inc.

516 "X" Street

Bedford, IN 47421

(812) 275-0001 phone

(812) 275-8251 fax

callen@brqcivil.com

Keywords: Survey, Drainage

I wanted to let you know how much I appreciate the use of the orthophotography. Being able to access and incorporate these are very valuable to my clients. From using them in ALTA/ACSM Land Title Surveys to show improvements, and in mapping County Regulated Drains showing improvements unable to be seen from existing roads. I do hope this information will be accessible in the future and again thank you.

Rick Alexander

Alexander Surveying, LLC

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Avon, Indiana 46123

(317)272-0877

(317)440-1199cell

Rick@Alexandersurv.com

Keywords: Natural Resources, Boundaries, Mining

As a user of your Ortho and LIDAR information I would like to provide this email in support of the continued collection of annual flights for public use. This is a vital asset for our assessments in determining where property and natural resources can be found for our business. We use it specifically in our pre-assessments of reserve estimates and boundary development for mining and operational limits.

B. Wayne King, PE, GISP

Manager of Mine Planning & Geology

Rogers Group, Inc.

421 Great Circle Road (37228)

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Nashville, Tennessee

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Direct: 615-780-5742

Mobile: 615-604-0986

Fax: 615-564-5742

Keywords: Natural Resources

Our staff use the Indiana Orthophotography quite extensively since the Hoosier covers parts of nine Indiana counties. Using up-to-date aerial photography helps in data collection and pre-field assessments for resource management, as we operate with limited resources, staff, and budgets. The prepared hillshade from the new LiDAR program shows promise for us to aid in resource management decisions for landscape design and position of activities, as well as mitigation measures to reduce or avoid effects.

Mary J. Schoeppel, Forest GIS Coordinator

Hoosier National Forest

*Office Location: Tell City Ranger District
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Fax: 812-547-6144

Keywords: Energy

Here at the co-op, we use the ortho data on a daily basis to put our facilities in their real-world locations using our GIS software. We also use the ortho data to determine what kind of situation our crews are going to get into (trees, fields, yards, etc.) before we send them to outaged locations. Both of these processes help very much in restoring power to our customers in a timely manner. And having as up to date orthos helps make sure we have the most recent information to work off of.

Rodney L. Brewer, Jr.

Engineering Technician

Harrison REMC

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Corydon, IN 47112

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Keywords: Energy, Natural Resources, Mining

I have been using Indiana's Orthophotography for a few years now and have found it useful in many ways: Freedom Energy LLC, our Indiana Company, has purchased properties in various counties and it is helpful to have an aerial view without actually having to fly the property ourselves, which the company has, on occasion, done. We can verify, for instance, whether or not a structure existed on the property during the image capture. I think the most helpful thing, though, is being able to look at recent conditions as compared to old deed descriptions. We can determine, for instance, if a road still exists that was called out in a deed that may be a hundred years old. We can see what changes have occurred to water-ways as well as other features. We can sometimes tell if mining has occurred or if other major earth disturbance has occurred. All-in-All we have certainly benefited from the imagery and have used it often and in conjunction with other forms of data such as Topography. The higher resolution photography is nice because we can see details that previously were undetectable, and that has made feature discernment an easier task. I sincerely hope that the project continues to be funded.

Dave Adams

Kentucky River Properties LLC

Geology Department

PO Box 269
Hazard, Ky 41702
(606)439-4518 ext. 108
david@kyriverprop.com

Keywords: Environment, Surface Waters, Land Use

We use the Orthophotography/LiDAR for various environmental remediation projects. I find the data very useful to identify waste disposal areas, filled materials, stream changes over time, etc. We also identify area land uses and their changes over time, possible septic areas, potential wetlands, etc. We can also identify possible subsidence at sink holes, landfills and mined areas. We are more efficient when this data is readily available, so it seems a good use of our limited resources.

*Juliet Port, LPG
IDEM Office of Land Quality
Geological Services
(317) 234-8102*

Keywords: Forestry, Tree Canopy, Education

I am using Indiana LiDAR data to monitor what is happening to the forest canopy of several properties I manage for Ball State University. I have mapped canopy trees (on the ground) and will be able to overlay the canopy with LiDAR coverage to see the damage and forest response resulting from Emerald Ash Borer infestation.

*John Taylor, Land Manager
Field Station and Environmental Education Center
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Ball State University
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jetaylor@bsu.edu
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Fax: (765) 285-8804*

Keywords: Surface Waters, Environment, Consulting

I use IN orthophotography every day, especially in conjunction with older data (2005 and 1998). Many of our sites go through extreme makeover and it is exceptionally helpful to see today's picture and the past.

We use today's images often to see how many residential structures exist over and around an area of contamination, along with waterways. It helps us understand potential exposure areas, which helps us guide efforts towards vapor intrusion investigations or not. Buildings that existed in 2005 may no longer exist in 2010/2011.

I also use the 3 versions of orthophotography for location of forgotten landfills. They have a unique signature and are often difficult to locate. Data from different years often provide different images. When put together, it is possible to figure out where the waste is, when one image by itself may not be conclusive.

*Kim Vedder
Engineering and GIS Services
OLQ
IDEM*

I am sure you already have this documented but when FEMA looks at funding new or updating flood studies, good ortho and LiDAR data is a critical factor in project selection. Anywhere FEMA can leverage data is a plus.

Bradford Hartley Jr, GISP, CFM

Senior GIS Analyst

Stantec

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Bradford.HartleyJr@stantec.com

Keywords: Environment, Wetlands

My name is Betsy Yankowiak and I work for the non-profit Little River Wetlands Project located in Allen County. In January 2013, a major local foundation paid for me to be trained in ArcGIS 10.1 through ESRI. This program allows our organization to look at a number of parameters, including existing wetlands, hydric soils, elevation, etc... From the data that we collect we are able to focus our efforts and resources into areas that wetland protection and restoration are best suited.

While all this data and subsequent maps are informative, it is pertinent for our organization to pair this data with real-time, aerial photographs. It helps form common ground as I discuss projects with other staff members, board members, our membership, and general public. Also, these aerial photos allow our organization to look at changes in our wetland restorations over time, including our efforts in invasive plant species removal.

Orthophotography of our largest nature preserve, Eagle Marsh, will also be very helpful in the next few years to chart the impact of the Watershed Separation project to stop Asian carp and the re-establishment of these areas.

Our organization finds the state's GIS resources, especially orthophotography, important for the management of our natural resources.

Betsy Yankowiak

Director of Preserves and Programs

Little River Wetlands Project

7209 Engle Road, Suite 200

Fort Wayne, Indiana 46804

260-478-2515

www.lrwp.org

Keywords: Environment, GPS, Soils, Survey

The Indiana State Data Portal has been a valuable tool for us at KERAMIDA, Inc. We have used Orthophotography from the Multi-Resolution Seamless Image Database (MrSID) on numerous occasions to aid our Environmental reports. They have been used to aid our field personnel to locate proposed well and soil sample locations with the use of a GPS device set to Indiana State Plane Coordinates. Also, they have also been a valuable graphics resource as a back-drop for plotted survey points in our reports. In short, this is a very useful tool that we frequently use and would very much like to have it for many years to come.

James DuMond

CAD & Graphics Specialist

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Keywords: Topo, Mapping

At M.A.N. Mapping Services, we utilize the Indiana orthophotos to aid in project planning for our topographic mapping projects. We use the LiDAR data along with the mapping surface that we create as a surface to rectify our orthophotos. The up-to-date orthophotography allows us to plan our aerial photography appropriately, and the LiDAR provides a very accurate DEM that reflects current status.

Christian Bachman

*M.A.N. Mapping Services, Inc.
4090 Weaver Court South
Hilliard, Ohio 43026
(614) 876-3663
FAX (614) 876-3537*

Keywords: Mapping

I used the LiDAR available on IndianaMap to make custom maps for a Boy Scout troop. They wanted the bare earth imagery and elevation data to blaze new trails through areas with lots of undergrowth, scrubby vegetation, ravines, and varying elevations. Being able to see the bare earth imagery for their entire area made it easier for them to choose the best path for their trail.

Theresa Quill

*Map/GIS Associate
Herman B. Wells Library
Indiana University- Bloomington*

Keywords: Mapping, Parks, Environment

Our company is currently using your LiDAR to create a Digital Canopy Model (DCM) for mapping of terrestrial invasive plant species (primarily European Buckthorn) for the Five Rivers Metro Parks in Hamilton County. Your LiDAR has been indispensable in this effort. Attached is a screenshot of some of the results.

David Aslesen

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www.appliedeco.com*

Keywords: Architects, Natural Resources, Geology, Mining

As someone who works in the Indiana limestone industry, I've found the Orthophotography / LiDAR GIS data to be very useful as one part of explaining and educating Architects and others about the Geography and Geology that makes South-Central Indiana the home of one of the world's finest building stones.

Dorian Bybee

Bybee Stone Company Inc.

Ellettsville, Indiana

Keywords: Engineering, Consulting, Survey

We use orthophotography nearly every day in our profession. It serves as aid to visualizing the conditions of the area in which work is to take place. It helps tremendously in generating estimates, drafting, measurements and orientation when showing a survey drawing (which typically consists of lines and shapes) amongst others.

It is always preferable to have the recent rather than outdated photography.

Michael Cardo, LSIT | Project Surveyor

The Schneider Corporation | 8901 Otis Ave, Indianapolis, IN 46216

(o) 317-826-7164

mcardo@schneidercorp.com

www.schneidercorp.com

Keywords: Mapping, Watersheds

I have used Indiana's Orthophotography data for a variety of maps that are used in helping our company compile data and information for watershed diagnostic studies. They are very valuable to us!

Anne Pratt

Water Quality Scientist

Commonwealth Biomonitoring

8802 W. Washington St.

Indianapolis, IN 46231

(317)-297-7713

I am in charge of the Survey Section at Indianapolis Power & Light Company, and in the last year we have used the Orthophotos and LiDAR data for some very large projects.

Keywords: Energy, Sewer Utilities, Survey, Contours

At our Eagle Valley plant in Morgan County, we are preparing to build a combined cycle gas turbine generating plant to replace the old coal-fired plant. This is a fast-track project, and we were asked to provide topographic information for the plant property – over 600 acres – on short notice. We were able to generate contour maps from the Digital Elevation Model (DEM) data .img files that are part of the LiDAR data available from the Indiana Spatial Data Portal. We also noticed that preliminary designs were being drawn on Google Earth bird's-eye views that were not orthometric or even close to scale. We provided orthophotos from your dataset to correct this before the designs got off to a bad start.

At our Harding Street plant on the south side of Indianapolis, we are constructing a wastewater treatment facility as part of some environmental improvements at the plant. We are using the DEM data and orthophotos at this site also as the basis for the design work.

We have done enough conventional surveying at both of these sites to be able to compare the LiDAR data to our existing information, and we have found that the LiDAR information is very accurate.

In our latest project involving the LiDAR data, we are planning to relocate a 138 kV transmission line as part of the East 82nd Street widening project which is planned by the City of Indianapolis. We needed to have topographic data along the route of the proposed relocation, as well as heights of obstructions, in order to design the new line to meet NESC codes. Since the new route is outside of the area that was surveyed for the road plans, and since we have not yet acquired the rights to enter onto the properties involved, LiDAR data proved to be the solution. In particular, we were able to use both the .img files

from the Indiana Spatial Data Portal (for ground elevations) and the raw LiDAR data files from the IndianaMap OpenTopography download portal (for obstruction heights).

A comparison of the ground contours generated from LiDAR to the existing contours shown on the City's road plans (which were prepared using conventional field surveys) shows that the LiDAR data is accurate and more detailed than the ground surveys.

In all of these projects, the fact that the data was available immediately is a key factor. The timelines that are established for these projects do not generally give us enough time to go out and do the fieldwork ourselves, or to hire an outside consultant to do this for us. The fact that the data is of recent origin is also important. And in each of these projects, the savings in cost to our company is savings that is passed on to our ratepayers.

We are waiting for the data from the western third of the state to be released. We have more jobs at our plant in Petersburg and along our transmission lines where we will be using both the Orthophoto and LiDAR data.

Thank you for making this data available to us. We do find it extremely valuable.

*William A. Luecht, P.L.S.
Section Leader, Land Surveying
Indianapolis Power & Light Company
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bill.luecht@aes.com*

Keywords: Boundaries, Topo, Mapping

The aerial photos have been a great help in completing boundary and topographic surveys. In several instances, we have used the photos to locate topographic features without collecting data in the field. This saves many hours of work. The accuracy at which the photos have been collected is perfect for our use. Thanks for your work for the citizens of Indiana.

*Darren L. Helms
Landmark Surveying Co., Inc.
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Keywords: Survey, Engineering, Consulting, Local Government, State Government, County

The availability of high quality and recent imagery and surface data is paramount to our operations as a Surveying, Civil Engineering, and Geospatial Information Systems business. We see significant savings on both time and budget for projects where good, recent data is available and are able to pass this savings on to our clients. Additionally, the planning, engineering, and community engagement products and materials we develop for clients are of a much higher quality when the data we source from starts out as such. Our client list and annual project load is primarily the state, counties, and other local governments.

This means maintaining a database of recent, high quality orthophotography and LiDAR results in a continuing cost savings and higher quality deliverables for all levels of government in the form of Surveying, Civil Engineering, and GIS projects.

Bryan J. Tanner

Senior Engineering Technician

Lawson-Fisher Associates P.C.

525 West Washington Ave.

South Bend, IN 46601

Office: 574-234-3167

Fax: 574-236-1330

Keywords: Real Estate

I have used your orthophotography data for our commercial real estate presentations and marketing materials, and I have found it to be a valuable resource. I hope that this program continues past 2014.

Alan Inkenbrandt

Senior Graphic Designer

Cassidy Turley

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Keywords: Planning, Transportation, Development, Contours, Topo

I use the updated Orthophotography on a nearly-daily basis. It is invaluable as a planning tool, as I am preparing environmental due-dilligence information for roadway and commercial development projects statewide. Having recent, high-resolution aerial photography saves time and money for our clients, and allows us to make well informed and accurate predictions of what conditions we will encounter on a site, as well as produce high-quality maps and exhibits.

LiDAR has proved equally valuable on many projects as well. We utilize this information primarily to produce elevation contours. This saves a lot of time and money for clients when we are able to use these contours for hydraulic modeling, without the added cost and delay of performing an on-the-ground topographic survey. This has saved money for both INDOT and local roadway planning authorities. I also use this information for many projects for which we don't have detailed topographic survey available, to allow better analysis of the on-site conditions.

I'm sorry for the longer than asked for response, but I guess it is proportional to how valuable I feel this information is to planning professionals statewide. I would also be happy to give more information if this is valuable in your making the case to legislators.

Benjamin W. Harvey

Environmental Specialist, Environmental Services Group

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Keywords: Outdoor Recreation, Parks, GPS, Rescue

1. I am using maps built on the high-res Hillside-Shaded Lidar base layer (designed by Matt Johnson, Indiana Geological Survey) to develop high adventure off-trail hiking routes for use by scouts attending Maumee Scout Reservation. Of course, once the course maps are available anyone can hike these routes. I have these maps plotted on 3'x9' paper. Looking at these maps, routes are selected meeting the desired criteria. These are later vetted by hiking the terrain. Other maps of the Hoosier National Forest do not provide sufficient detail (horizontal or vertical) to allow for efficient selection of off-trail routes.

It is essential to note that having terrain maps (no canopy interfering) this accurate and detailed enables selection of off-trail routes without the necessity of marking the course. We can navigate off-trail using only compasses and Lidar-based maps - there is no trace left in the forest.

2. For his Eagle Scout Project, my son Robert is using a similar map in conjunction with a survey-grade GPS to locate and restore markers at the Story Orienteering Course. He will then create new maps of this course using the Hillside-Shaded Lidar base layer.

3. Lidar-based maps are being considered as the basis for search and rescue planning at Maumee Scout Reservation. Every year one or more hunters get lost in the rather serpentine ravines of the forest. Lidar-based maps permit numbering and systematic searching of each ravine. For further discussion of these and other applications of Lidar-based maps at Maumee, contact

Ranger Ed Laehle

812.995.3272 (Land Line)

317.496.666 (Cell)

elaehle@bsamail.org

Keywords: Modeling, Land Use

I am writing to you today in support that Indiana continues their Orthophotography/LIDAR program in perpetuity. Indiana hosts one of the finest websites for downloading and the orthophoto/LIDAR products are updated annually with the right quality. This is a successful government program that was created and has been maintained to provide a first-rate public service.

The program has been extremely important and productive.

Specifically, for me, these products have created these tremendous benefits:

- (1) Understanding land-use and operational changes annually over time at various locations in the state.
- (2) Resolving/verifying multiple GIS datasets to ensure location accuracy.
- (3) Base layers for computer modeling.
- (4) Current and past visualization capabilities for those who have not visited the site to further research understanding.

*John Mercurio
GIS Specialist*

Keywords: Military

I work for the Air Force Research Laboratory in Dayton, OH. I do research on video geo-registration algorithms (taking imagery and determining exactly where the picture was taken) and we perform flight tests at Camp Atterbury in Indiana. The ortho-imagery is used to help us determine where exactly an image was taken. We do not currently use LiDAR, but my research is moving in that direction.

Clark Taylor, PhD
clark.taylor.3@us.af.mil

Keywords: Local Government, Town, County, State Government, Transportation

As most of our work is with municipalities, counties and the state of Indiana; having a quick, easy available resource for downloading orthophotography for a project desk review is invaluable. It provides us the ability to review corridors, intersections and existing features prior to an on-site visit towards refining purpose and need. The added benefit is that this photography is easily stitched together for long corridors. The existing software and web client interface is simple to use and allows for easy retrieval of this information. It is our hope that this program continues.

Michael J. Guzik, P.E.
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Fax: (574) 236-1330

Keywords: Survey

I use Indiana's Orthophotography consistently. It is helpful to have up to date aerial photography for projects to visualize site conditions and verify field survey data. Having the most up to date aerial photography is essential in areas where development occurs frequently and causes changes to site conditions.

Joel Brame
Project Manager
Kruse Consulting
7384 Business Center Drive
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(317) 272-2410 (F)

Keywords: Environment

Our researchers have used the state's orthophotography to better plan and implement research projects that track the health of natural communities in our region, including plants and birds in recent seasons. Without high-quality, up-to-date aerial photographs, we would not have the ability to accurately characterize vegetation across the landscapes of our region, much of which is changing rapidly as agricultural patterns change and plant communities regenerate. Thanks to the imagery we do have, we can conduct this research much more effectively and accurately.

J. Schramm

Asst. Professor of Sustainability and Environmental Education

Merry Lea Environmental Learning Center of Goshen College

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260.799.5869 x119

merrylea.goshen.edu

Keywords: Geology, Soils, Surface Waters, Erosion, Modeling

The Center for Earth and Environmental Science is using the 2011 – 2013 Orthophotography / LiDAR collections for Indiana's Fluvial Erosion Hazard (FEH) project.

LiDAR-derived DEMs are being used in conjunction with Indiana orthophotography, surficial geology, and alluvial soils to generate refined fluvial erosion hazard corridors.

LiDAR-derived DEMs are being used to model the locations of historic meander scars in alluvial streams. These rasters are used as a visually dramatic backdrop for the refined fluvial erosion hazard corridors and serve as a teaching tool to helping people better understand stream dynamics.

We are experimenting with modeling the different levels at which meander scars and overland flow pathways activate.

J. Jeremy Webber

Research Scientist – GIS and Remote Sensing

Center for Earth and Environmental Science

Department of Earth Sciences

IUPUI

317.274.7491 (office)

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Keywords: Assessment, Local Government, County, Drainage, Economic Development

Noble County has benefitted from use of the 2012 State imagery in various ways. Our Assessor's Office uses the imagery to verify assessment values for property, especially for farm property and to verify new ponds and new structure locations. I've used the updated 2012 imagery for addressing and for locating new road centerlines and building outlines. Our Surveyor's Office uses the imagery for drainage checks and drainage projects. The Building Dept. and Plan Commission use the imagery for approving building and zoning requests. Finally, the updated imagery assists with site location maps printed for the Economic Development manager. We also have placed the imagery on our public GIS website, thereby

benefitting the public. These uses show how we can save money by viewing the imagery instead of making trips out to the field.

Noble County Government has benefitted in many ways from the State Imagery/LiDAR program and I would be in support for the continuation of this valuable program.

*Steven J. Hook, GISP | Noble County GIS Manager | GIS Department
101 North Orange Street, Courthouse-4th Floor, Albion, IN 46701
Phone: 260.636.1293 Ext. 5201 | Fax: 260.636.4001 | Cell: 260.564.0802*

Keywords: Mapping, Local Government, County

Gibson County requires up to date orthophotography and elevation data as a base layer to maintain virtually all of our geospatial data. Timely updates to these base layers are an essential step in maintaining the local data used in nearly every Gibson County office. Continuing this program will assist us in budgeting appropriately, and enable considerable staff time savings that else wise would be required to administer and execute local projects with identical goals.

*John E. Howe
GIS Director
Gibson County, IN
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jhowe@gibsoncounty-in.gov*

Keywords: Local Government, City, Planning, Parks, Outdoor Recreation

The City of Westfield, Indiana uses the most recent Ortho photography from the state in order to help plan almost every aspect of Grand Park. Grand Park is a planned youth and adult recreational sports village sure to become a family sports destination like no other. Grand Park will host a wide range of athletic competitions, local, regional and national sports tournaments, and community sporting events. This thoughtfully-designed 400-acre sports campus will feature a full-range of championship-level outdoor facilities for baseball, softball and field sports including soccer, football, rugby, field hockey, lacrosse and two indoor sports facilities designed for year round play. The entire complex will be surrounded by dining, retail and entertainment venues, all geared toward supporting and enhancing the family sports atmosphere and experience. It will host approx. 1.5 million visitors annually, 5 year economic impact to the City of Westfield will be \$1.04 Billion, 5 year total sports campus direct and indirect jobs will be 1,400, 5 year total Grand Park operation impact - direct and indirect jobs will be 15,800, the average overnight visitor to Hamilton County will spend \$136.00 per day for food, lodging, transportation, entertainment and retail, 73% of visitors to Grand Park will be non-local and stay on average 3.9 days.

*Leane C. Kmetz ☐ GIS Coordinator
The City of Westfield Informatics Department
2728 E 171st Street ☐ Westfield IN 46074
86°6'53"W, 40°2'14"N
(317) 379-1171
<http://maps.westfield.in.gov>*

Re: 2011-13 ortho data. These files have been very important to me for use in classes. I teach GIS skills in an entry level BIO course and in an upper-division GIS course and use the orthophotography and LIDAR extensively. The spectacular resolution of the ortho makes it perfect for showing students pre and post-processed GPS data and helping them get excited about GIS.

David Benson, Ph.D.

Associate Professor, Biology

Director, Marian University EcoLab

School of Mathematics and Sciences

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<http://www.marian.edu/ecolab>

Keywords: Energy, Environment

This company, my employer, produces environmental impact reports for sites across the United States. In 2013, I have been responsible for forty separate aerial analyses of eco-sensitive sites in Indiana. These were all, eventually, included in reports to IDEM for their review, comment, response and approval.

The orthographic images were crucial to our ability to complete these projects, that served to protect the State of Indiana's environment.

UITS provides us, and others, the ability to access and use up-to-date and accurate images of Indiana that are, or should be, the envy of the other 49 states.

No other resource, including federal, was able to provide the needed orthography.

Timely portrayal of changed and changing conditions is vital to one's ability to accurately analyze, portray, and potentially protect or remediate sites in Indiana.

Please be proud of and support this important resource for the State of Indiana.

David Horvath

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Keywords: City, Local Government, Planning, Flooding, Drainage, Engineering

The City of Kokomo regularly uses the most up to date orthophotography in planning project and disseminating information to citizens. Specifically, the use of LiDAR data has been essential in the development of mitigation projects after a recent 100 year flood. Additionally, LiDAR data allows us to determine the feasibility and cost of drainage and redevelopment projects prior to full surveys. I highly recommend these initiatives continue.

Carey Stranahan, P.E.

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Keywords: Military, Planning

The US Army Corps of Engineers Chicago District uses Orthos and LIDAR for various projects in Indiana. We use the data to create DEMs that are used for preliminary design, planning, plus H&H modeling. Projects: Wolf Lake, Indiana Harbor, IN (CDF), Calumet Prairie, IN, Elkhart River, IN, Ivanhoe, IN are some examples.

Planning and real estate uses the orthos to verify existing conditions.

J.D. Ennis

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Keywords: Lake Michigan, Coastal, Shoreline, Erosion

This is Dan Davis from 39 Degrees North and I just wanted to say that we used 2013 Orthophotography for the Lake Michigan Coastal Program. This program entails creating a geodatabase with feature classes such as Political Boundaries, Shoreline features, Structures and others. We used 2013 Orthophotographs to update features such as Parking lots, Marinas, Beaches, and most importantly we digitized the shoreline from various years to gain a better understanding of how erosion and other process can change the shoreline over years. I hope that Indiana keeps providing these types of photos because it allows people to understand the changing environment that we live in.

Dan Davis

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Keywords: Design, Airports, Wind, Transportation

I work for a consulting engineering firm in Wisconsin. Currently, we are working for the South Bend airport to design new airport facilities. These photos allowed us to start our design of the site with photographs of high image quality and accuracy. In a more general sense, these statewide orthophotography collections have been extremely important to our work at airports, in transportation corridors, wind farms, and in the private sector. In short, having these available has made our jobs easier and allowed us to provide our design services to clients as part of cost-effective solutions. Please do everything you can to keep these collections going.

Brauna Hartzell, GISP | GIS Analyst

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Keywords: Survey, Engineering, Planning, Drainage, Topo, Assessment, Parcels, Boundaries

I use the orthos and Lidar on a regular basis. This product is an excellent resource for surveyors, engineers and planners to use for many types of projects. The data is amazingly good.

I have used the data for projects like determining large drainage basins for ditch projects for Franklin County and Union County. I previously was hired by the County Surveyor and would do continuous RTK Topo of the area for existing regulated ditches. The reason for these topo surveys were to determine correct assessment of areas each land owner contributes to the regulated ditches that are failing. The existing maps were mostly developed in the early 1900's and were quite good for that time. These flat areas are difficult to pick up all the breaks and truly see where the water is going. The GPS RTK method was good and pretty efficient but the LiDAR changed the project time by as much as two thirds less time to determine acreage. Using LiDAR enabled me to analyze more area in less time and pick up all the drainage areas or remove areas that were once thought to be part of the drainage area due to less accurate methods.

I also used the orthos and LiDAR to supplement actual ground topo for municipal storm sewer and sidewalk projects in The City of Batesville. The data enabled me to supplement contours outside of the main corridor of the survey for calculating drainage catchments for storm sewers.

I use the orthos on a daily basis for surveys. I use the ortho as a background to help me with recon on boundary surveys, presentation to clients to help with the determination of land splits and many other applications.

This program should be continued as our urban and rural areas are continually changing. The data collected is a excellent resource and management tool to help with growth and proper land management.

I thank you for your efforts and keep up the good work.

Rob Seig, LS

President

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Benefits of 2011-13 Orthophotography/LiDAR Program to the Indiana Department of Natural Resources

Division of Fish and Wildlife

Keywords: State Government, Surface Waters, Watersheds

Fisheries uses them for measuring lake acreages, algae amounts, boat ramp locations, mapping sampling areas using landmarks, water levels, and in rivers log jam locations.

The data were recently instrumental in accurately locating all the landowner ponds in a lake watershed project on West Boggs Lake. It saved staff an untold amount of time organizing and planning the preliminary operation and has been key in tracking the field work. The watershed map has also been used in meetings to describe the scope of the project to public. A similar map set will be used under Incident Command to execute a full scale lake renovation in the fall of 2014, making it possible to more effectively and safely plan, execute, and monitor equipment and personnel throughout the operation.

Division of Forestry

Keywords: State Government, Forestry, Mapping, Topo, Tree Canopy

Orthophotography is used for determining eligibility for the Classified Forest and Wildlands program, and determining violations such as buildings. The combination of LiDAR and orthophotography will help with mapping the logging and fire road system. Topography is important for timber harvests, so the higher accuracy from the LiDAR will be very useful in improved harvest plans. The LiDAR may be used to study tree canopy height and regeneration in harvest areas.

Division of Nature Preserves

Keywords: State Government, Planning, Design, Outdoor Recreation, Drainage, Wetlands

LiDAR data are used to create detailed site conservation plans for priority properties; for planning and designing recreational trail systems; and for assessing impacts and drainage in wetlands in preparation for restoration. LiDAR was recently used to locate and assess potential new acquisitions for the Bicentennial Legacy project in the Whitewater Valley.

Division of Outdoor Recreation

Keywords: State Government, Outdoor Recreation, Planning, Parks

The State Comprehensive Outdoor Recreation Plan (SCORP) is updated every five years. The SCORP relies on having the most current data on publicly-owned outdoor recreation acreage and amenities statewide. The high-resolution orthophotography is used to a large extent to provide very accurate data in support of strategic planning. The SCORP also is reviewed and approved by the National Park Service (NPS), and is Indiana's eligibility document for receiving millions of dollars in NPS Land and Water Conservation Fund grants each five-year planning cycle.

DNR maintains the state trails inventory which is a database of all known trails open to the public throughout the state. New trails are rapidly being developed across Indiana and having the latest orthophotography is extremely useful in keeping the state trails inventory up to date.

Division of Reclamation

Keywords: State Government, Mining, Natural Resources, Watersheds, Archaeology

Orthophotography of the coal region is used for a "birds-eye" geographical analysis associated with local impacts of mining. It will also be used in watershed analyses and reviews for mining and reclamation

operations, and restoration projects for abandoned mine areas. LiDAR has also been used as a screening for archaeological features.

Division of State Parks and Reservoirs

Keywords: State Government, Outdoor Recreation, Parks

The use of 2011-13 orthophotography and LiDAR data for property management at Monroe Reservoir, the largest lake in Indiana, has been substantial. The use of this data in boundary issues, crop lease management, wildlife habitat evaluations and forest cover types has allowed us to prioritize our efforts and maximize the efficiency of our operations as land managers. Continuing the up to date availability of these images will improve our efforts and save considerable funds.

Division of Water

Keywords: State Government, Engineering, Surface Waters, Modeling, Drainage, Survey, Topo, Dams

As a whole the Division of Water is using the data both to cut cost in house and to save the public unnecessary financial burdens that was obligated to them in the past. The data format has allowed us to be more accurate in our analysis and automate some processes that used to take weeks down to days.

The vast majority of Engineering projects deal with elevation data which requires extensive analysis of the DEMs. The detailed LiDAR data are used to cut high quality cross-sections across streams throughout the state to build floodplain models. The results are greatly improved compared to previous Flood Insurance Study models. Access to this data has also alleviated the need to send surveyors to the field to survey stream cross-sections which also saves money for DNR and consultants in the private world. Lidar data are also used to analyze individual cross sections to determine base flood elevation (BFE) values for private property owners. Prior to reliable elevation data, some property owners were instructed to hire surveyors to perform a cross section at their property before the Department could determine a BFE.

LiDAR is used to assign ground elevations to over 400,000 water well records in the database; previously it was estimated using topographic maps. Orthophotography is used to verify water well locations and assign much improved spatial coordinates. The data are then used for water resource evaluations such as groundwater availability and groundwater flow.

LiDAR derived elevation data are used to determine more accurate height estimates of dams for regulatory purposes. The orthophotography is studied to determine the locations of dams and levees. Elevation data and orthophotography are also used to inventory suspected levee systems within Indiana for field crews to plan evaluation visits.

Compliance programs rely heavily upon updated and historic orthophotography for change detection. When a landowner claims that the shoreline of a river, stream or lake is unaltered, the imagery can be used to detect when the alteration occurred or did not occur. Change detection is also used to predetermine if a field visit is warranted for application requests that may not have been built to approved plans.

Multiple divisions

Keywords: State Government, Survey, Mapping

DNR managers use the data when doing any work that requires digging to see where existing DNR owned copper and fiber telecommunication cable is buried before digging. DNR data is overlaid on the orthophotography to give them very close idea where cable is buried on their properties. They still have

to have the cable located but location companies do not have to spend as much time finding cable to mark locations. Also before this data was available we would have to spend months surveying and measuring to design fiber and copper paths for projects. Now it can be done in just a few hours. Example in 1999 McCormick's creek took 4 months of work in the field to survey and measure for 5 miles. This year we designed 9 miles at Potato Creek State Park in just 2 days. Keeping this data up to date is key as we need new structure and roads to show up so we know where to bore and place conduit.

Indiana State Land Office

Keywords: State Government, Boundaries, Parcels, Topo, Parcels

The statewide orthophotography program has been exceptionally useful for the State Land Office, where up-to-date imagery is critical for locating property boundaries, structures, and changes in topography. This program provides one of the important tools needed for achieving State Land Office objectives.

Robert Mueller, Indiana State Land Office

Indiana State Museum

Keywords: State Government, Archaeology

The statewide Orthophotography/Lidar program is key to what we do in archaeology at the Indiana State Museum. Its primary function for us is as a tool that helps provide for the stewardship of our administered cultural landscapes. By overlaying archaeological project areas, archaeological features or concentrations of artifacts, we are better equipped to make decisions regarding restoring/rehabilitating various aspects of our properties (e.g., the house, gardens...). More recently, we have been combining the data with remote sensing (typically magnetometry) data to locate subsurface features. This gives us an accurate image of the landscape, which enables us to plan changes to our properties accordingly, - avoiding those resources whenever possible. We also use the data in research to create accurate depictions of archaeological sites and relationships found within and between sites. Lidar data in particular will be extremely useful in creating various renderings of sites /archaeological features for research and for broader applications such as drafting recreations of prehistoric villages and towns for the general public.

Michele Greenan, Indiana State Museum

Other

Keywords: State Government, Surface Waters, Watersheds

The Indiana Local Resolution National Hydrography Dataset Upgrade project has utilized the 2011-13 data where available at the time a subbasin was upgraded. The LiDAR elevation data led to significantly more accurate generation of 6-acre basins. The LiDAR and imagery were then used in and digitizing streams and waterbodies. Not only are the features more accurate, but they reflect conditions more recent than 2005.

Dams, Conservation, Natural_Resources, Agriculture, Watersheds, Planning, Soils, Energy, Oil, Agriculture, Drainage, Modernization, Transportation, Agriculture, Fertilizer, Geology, Mapping, Water_Wells, Economic_Development, Shovel_Ready, Research, Endangered_Species, Natural_Habitat, Bathymetry, Lake_Michigan, Water_Quality, Local_Government, County, Parcels, Public_Safety, Emergency_Response, Sewer_Uilities, Mapping, Field_Inventory, Dispatch, Public_Safety, Emergency_Response, Economic_Development, Land_Survey, Public_Information, Pollution, Environment, Engineering, Design, Modeling, Field_Inventory, Local_Government, City, Mapping, Planning, Assessment, Land_Use, Land_Cover, Local_Government, City, Mapping, Local_Government, City, Mapping, Super_Bowl, Planning, Planimetrics, Judicial, Emergency_Response, Dispatch, Engineering, Surface_Water, Utilities, Tree_Canopy, Transportation, Impervious_Surfaces, Real_Estate, Redevelopment, Watersheds, Flooding, Wind, Drainage, Energy, Erosion, Planning, Utilities, Drainage, Local_Government, City, Utilities, Public_Works, Inventory, Impervious_Surfaces, Assessment, Field_Verification, Economic_Development, Planning, Survey, Engineering, Planning, Drainage, Topo, Assessment, Parcels, Transportation, Landscape_Architect, Development, Boundaries, Grant_Funding, Boundaries, Mapping, Environment, Transportation, Planning, Education, Hydrology, Modeling, Watersheds, Energy, Mapping, Public_Information, GPS, Archaeology, Mapping, Forestry, Energy, Mapping, Mapping, Biology, Transportation, Lake_Michigan, Steel_Mills, Refineries, Energy, Education, Local_Government, City, Planning, Environment, Modeling, Agriculture, Soils, Environment, Watersheds, Environment, Consulting, Hydrology, Land_Use, Habitat, Endangered_Species, Natural_Resources, Geology, Energy, Planning, Design, Consulting, Storm_Water, Transportation, Topo, Canine, Rescue, Law_Enforcement, Agriculture, Engineering, Consulting, Local_Government, City, Natural_Resources, Tribal_Land, Natural_Resources, Consulting, Consulting, Architect, Engineering, Watersheds, Surface_Water, Survey, Boundaries, Local_Government, County, City, Mapping, State_Government, Transportation, Local_Government, City, Town, Consulting, GPS, Consultant, Water_Resources, Watersheds, Drainage, Local_Government, Assessment, Survey, Planning, Consulting, Mapping, Environment, Consulting, Survey, Boundaries, Site_Development, Transportation, Survey, Boundaries, Site_Development, Transportation, Environment, Consulting, Wetlands, Soils, Development, Local_Government, City, Models, Survey, Parcels, Mapping, Design, Modeling, Engineering, State_Government, Local_Government, Engineering, Contours, Planning, Contours, Contours, Contours, Environment, Natural_Resources, Consulting, Transportation, Engineering, Topo, Consulting, State_Government, GPS, Parks, Education, Parks, Parks, Local_Government, County, Engineering, Transportation, Public_Health, Assessment, Mapping, Planning, Emergency_Response, Energy, Design, Engineering, Water_Resources, Sewer_Uilities, Environment, Engineering, Geology, Hydrology, Water_Resources, Environment, Planning, Economic_Development, Environment, Engineering, Water_Resources, Engineering, Consulting, Environment, Soils, Water_Quality, Watersheds, Agriculture, Boundaries, Federal_Government, Forestry, Tree_Canopy, Engineering, Drainage, Development, Land_Use, Art, Surface_Waters, Land_Use, Drainage, Topo, Mapping, Environment, Development, Geology, Water_Resources, Airports, Education, Education, Survey, Planning, Development, Survey, Drainage, Natural_Resources, Boundaries, Mining, Natural_Resources, Energy, Energy, Natural_Resources, Mining, Environment, Surface_Waters, Land_Use, Forestry, Tree_Canopy, Education, Surface_Waters, Environment, Consulting, Environment, Wetlands, Environment, GPS, Soils, Survey, Topo, Mapping, Mapping, Mapping, Parks, Environment, Architects, Natural_Resources, Geology, Mining, Engineering, Consulting, Survey, Mapping, Watersheds, Energy, Sewer_Uilities, Survey, Contours, Boundaries, Topo, Mapping, Survey, Engineering, Consulting, Local_Government, State_Government, County, Real_Estate, Planning, Transportation, Development, Contours, Topo, Outdoor_Recreation, Parks, GPS, Rescue, Modeling, Land_Use, Military, Local_Government, Town, County, State_Government, Transportation, Survey, Environment, Geology, Soils, Surface_Waters, Erosion, Modeling, Assessment,

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