Overview of three data sets that I regularly use and examples of the data in various maps.

DATA SETS

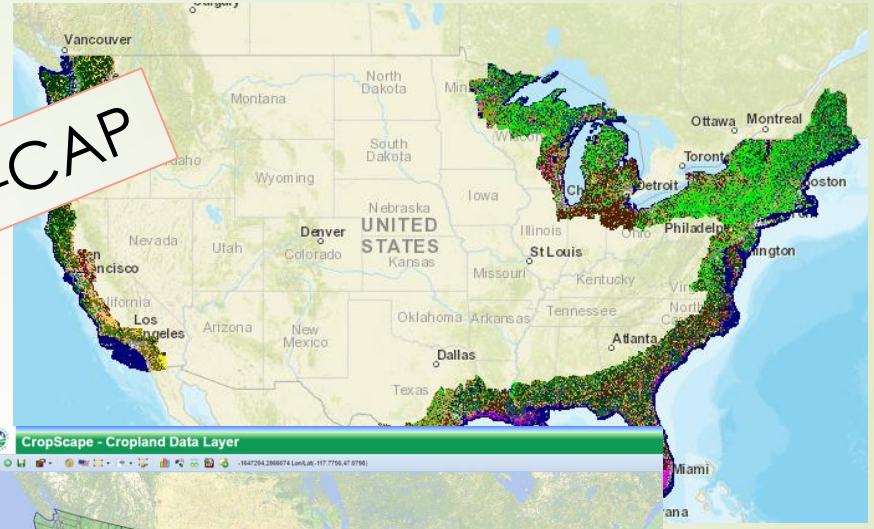
1. Coastal Change Analysis Program (**CCAP**): Land Cover/Land use

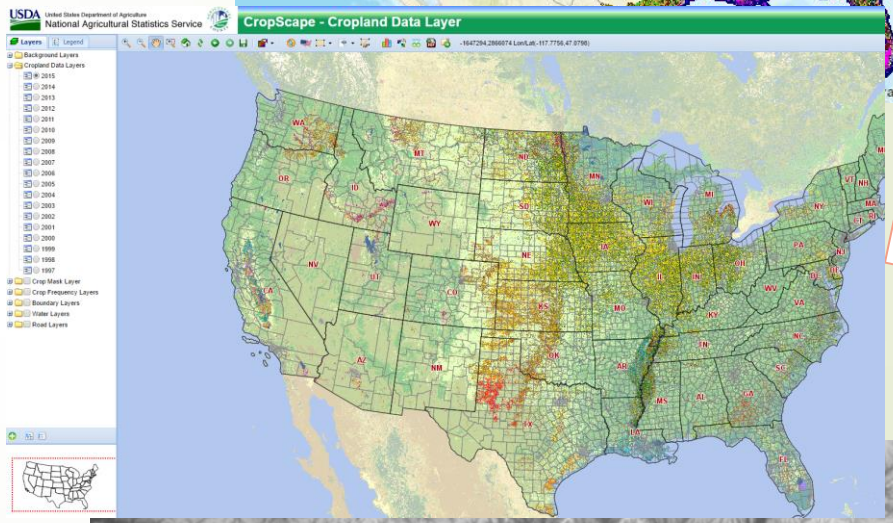
2. Cropland Data Layer (**CDL**): Agriculture

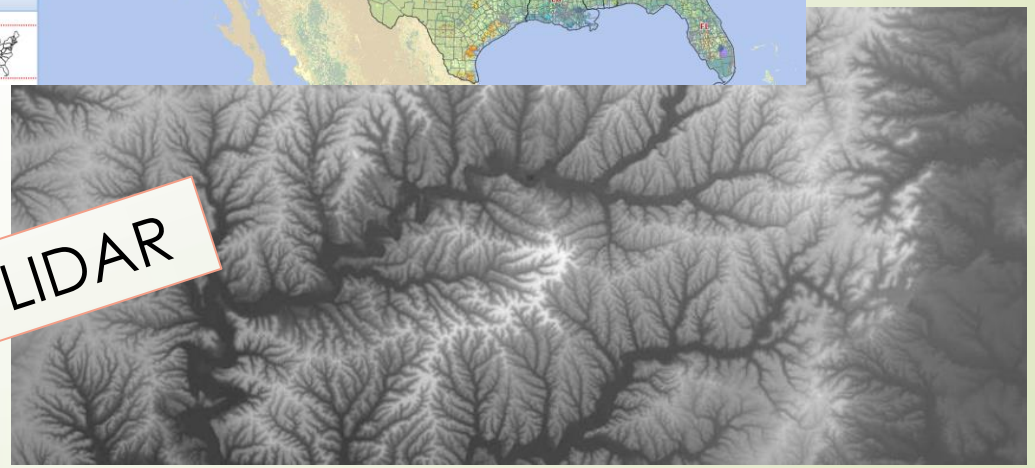
3. Light Detection And Ranging (**LIDAR**) Data: Elevation

Common Features of the Data

- Produced by Federal Government
- Free
- Available to download from the web







Jill Plescher, GIS Specialist, July 2016
Southwest Michigan Planning Commission

NOAA's Coastal Change Analysis Program (C-CAP)

A PROGAM to develop a nationally standardized database on land cover and habitat change in the coastal regions of the United States.

C-CAP inventories coastal submersed habitats, wetland habitats and adjacent uplands and monitors changes in these habitats on a 1 to 5 year cycle. (1996-2010)

This type of information and frequency of detection are required to improve scientific understanding of the linkages of coastal and submersed wetland habitats with adjacent uplands and with the distribution, abundance and health of living marine resources.

Satellite imagery (primarily Landsat Thematic Mapper), aerial photography, and field data are interpreted, classified, analyzed, and integrated with other digital data in a geographic information system (GIS). Resolution is 30 x 30 meters, and has 15 Classes and is updated every 5 years.

The resulting land cover change databases are disseminated in digital form for use by anyone wishing to conduct geographic analysis in the completed regions.

NOAA's Coastal Change Analysis Program (C-CAP)

CLASSES

1. Developed - High Intensity
2. Developed - Low Intensity
3. Cultivated Land
4. Grassland (Fields)
5. Deciduous Forest
6. Evergreen Forest
7. Mixed Forest
8. Scrub/Shrub
9. Palustrine Forest
10. Palustrine Scrub/Shrub
11. Palustrine Emergent Wetland
12. Estuarine Emergent Wetland
13. Unconsolidated Shore
14. Bare Land
15. Water

Other Data Products Produced through the C-CAP Program

https://coast.noaa.gov/dataregistry/search/collection/info/ccapregional

C-CAP Land Cover Atlas

- Explore land cover changes by county or watershed
- Visualize different types and specific locations of change
- Share summary reports and areas of interest

https://coast.noaa.gov/digitalcoast/tools/lca

Growth Rings: Patterns of Urban Development

http://noaa.maps.arcgis.com/home/item.html?id=614b4d96244047438599e8f8eca81b27

How To Use Land Cover Data as a Water Quality Indicator

http://noaa.maps.arcgis.com/home/item.html?id=e7eb6e9decb14c17a2fef4d36fee1714

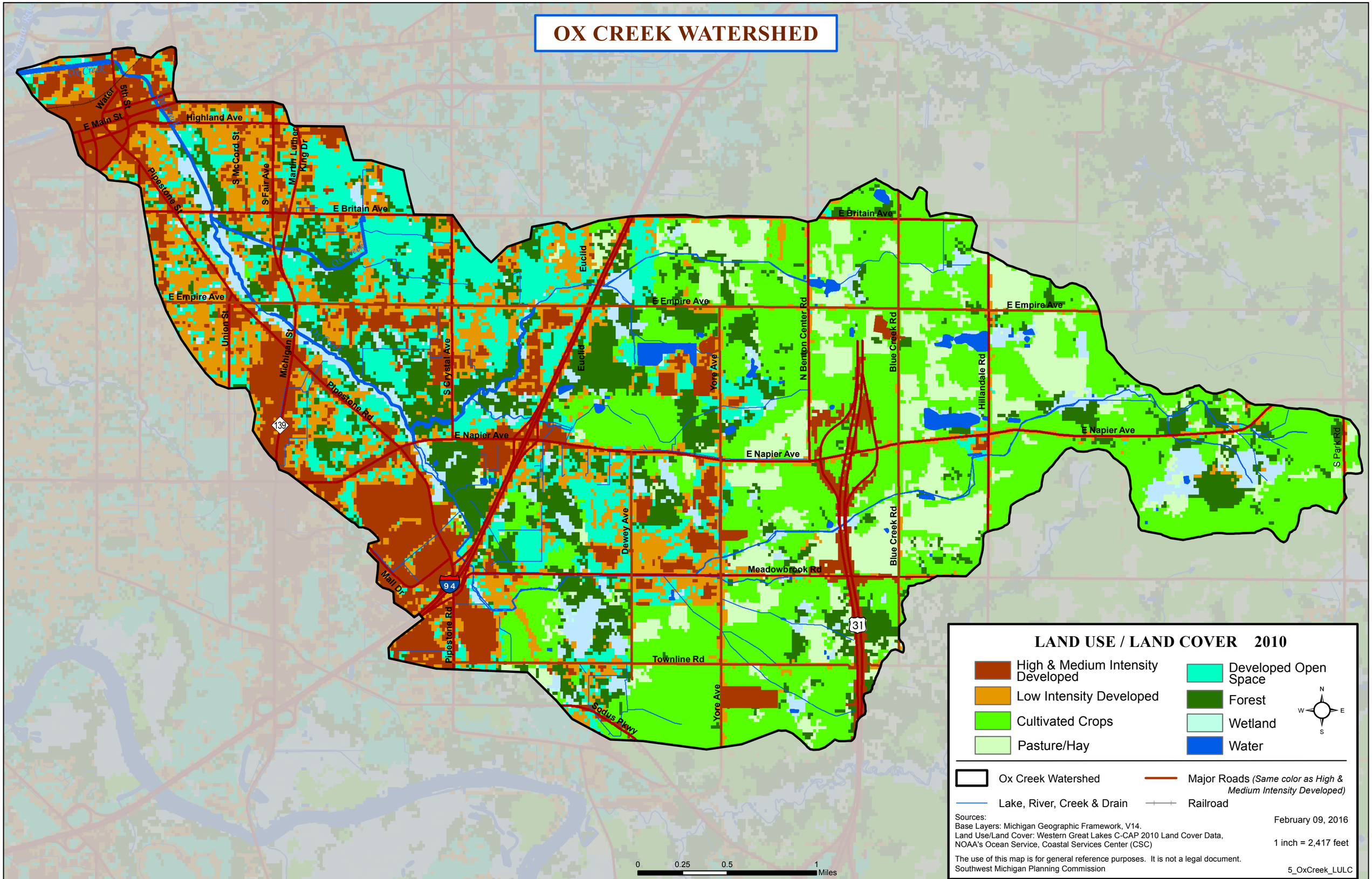
Wetland Potential Product

www.coast.noaa.gov/digitalcoast/data/wetland-potential

Forest Fragmentation

www.coast.noaa.gov/digitalcoast/data/forestfrag

OX CREEK WATERSHED



LAND USE / LAND COVER 2010

- High & Medium Intensity Developed
- Low Intensity Developed
- Cultivated Crops
- Pasture/Hay
- Developed Open Space
- Forest
- Wetland
- Water

N W E S

- Ox Creek Watershed
- Major Roads *(Same color as High & Medium Intensity Developed)*
- Lake, River, Creek & Drain
- Railroad

Sources:
Base Layers: Michigan Geographic Framework, V14.
Land Use/Land Cover: Western Great Lakes C-CAP 2010 Land Cover Data, NOAA's Ocean Service, Coastal Services Center (CSC)

February 09, 2016

1 inch = 2,417 feet

The use of this map is for general reference purposes. It is not a legal document.
Southwest Michigan Planning Commission

5_OxCreek_LULC

Lake Michigan Tributaries

NORTH SECTION

LAND USE/LAND COVER 2010

LAND USE/LAND COVER

- High & Medium Intensity Developed
- Low Intensity Developed
- Cultivated Crops
- Pasture/Hay
- Developed Open Space
- Forest
- Wetland
- Bare Land
- Water

Base Layers

- Road *(Same color as High & Medium Intensity Developed)*
- Railroad
- Streams & Drains

0 0.5 1 2 Miles

March 04, 2016

N W E S

Lake Michigan

Wall & Extension Drains

Hollis Drain

Thorton Valley Drain

Mast & Janca

Westfall & Dumrose

Decker Extension 1960

Wecko Beach

Bedortha South Branch

Rambo & Lewis Drain

Snow Road Drain

Painterville Drain

Warren Dunes

Deer Creek (Sawyer Creek)

Bethany Beach Drain

West Phall & McClellan Drains

Birchwood, etc (Prairie Road)

Harbert Drains

Cherry Beach (John Markley Dr)

Swift #2 Drain

Fanaly Drain

Tiffany-Orchard Beach

94

JOHN BEERS RD

RED ARROW HWY

W LINCO RD

LEMON CREEK RD

WILSON LN

GAST RD

FLORAL LN

W SNOW RD

CALIFORNIA RD

SNOW RD

BALDWIN RD

BROWNTOWN RD

SAWYER RD

HARBERT RD

PRAIRIE RD

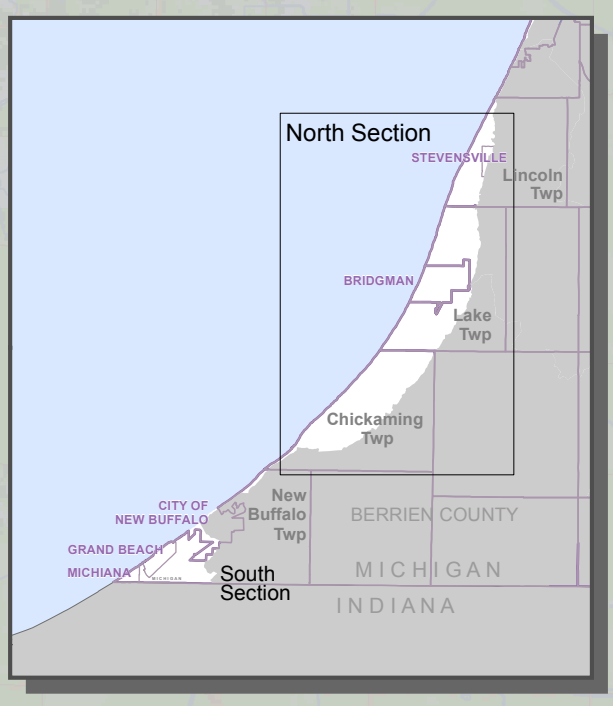
THREE OAKS RD

W EAST RD

LAKESIDE

BERRIEN COUNTY

Southwest Michigan Planning Commission



Sources
Base Map: Framework v14a, Michigan Center for Georgraphic Information, 2015
Lakes & Streams: Framework v14a, Michigan Center for Georgraphic Information, 2015
Drains: Berrien County, 2007
Land Use/Land Cover: Western Great Lakes C-CAP 2010 Land Cover Data, NOAA's Ocean Service, Coastal Services Center (CSC)

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10_North_LULC

3 of Lake Michigan Coastal Sub-watersheds

Deer Creek

CLASS_NAME	ACRES
High Intensity Developed	29.36
Medium Intensity Developed	40.48
Low Intensity Developed	97.85
Developed Open Space	37.36
Cultivated	5.34
Pasture/Hay	0.22
Grassland	23.57
Deciduous Forest	418.99
Evergreen Forest	25.35
Mixed Forest	85.40
Scrub/Shrub	14.01
Palustrine Forested Wetland	5.34
Palustrine Scrub/Shrub Wetland	2.67
Palustrine Emergent Wetland	5.34
Bare Land	206.60
Water	7.56
TOTAL	1,005.44

Grand Mere

CLASS NAME	ACRES	PERCENT
High & Medium Intensity Developed	69.83	6.95%
Low Intensity Developed	97.85	9.73%
Cultivated Crops	5.34	0.53%
Pasture/Hay	23.80	2.37%
Developed Open Space	37.36	3.72%
Forest	543.75	54.08%
Wetland	13.34	1.33%
Water	7.56	0.75%
Sand	206.60	20.55%

John Markley Drain

CLASS NAME	ACRES	PERCENT
High & Medium Intensity Developed	42.25	2.53%
Low Intensity Developed	86.96	5.20%
Cultivated Crops	491.27	29.38%
Pasture/Hay	215.05	12.86%
Developed Open Space	26.46	1.58%
Forest	635.16	37.99%
Wetland	167.02	9.99%
Water	6.00	0.36%
Sand	1.78	0.11%

Acres and Percentage Land Use/Land Cover → ***Map on Next Page***

Land Cover categories are reclassified into a broader classification system, which provides an overview of the types of land cover within a watershed.

Source: Coastal Change Analysis Program (C-CAP) High Resolution Land Cover and Change Data. Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), Office for Coastal Management (OCM), 2010.

Lake Michigan Tributaries

NORTH SECTION

N
W E
S

Subwatersheds

- Birchwood Creek
- Chikaming Creek
- Deer Creek
- John Markley Drain
- Lakeside Creek
- Painterville Drain
- Swift Creek
- Valley Drain
- Weko Beach

Coastal Watersheds*

- Grand Mere
- Timber Lane
- Warren Dunes

Base Layers

- Municipal Boundary
- Railroad
- Drain
- Stream

Sources
Base Map: Framework v14a, Michigan Center for Georgraphic Information, 2015
Lakes & Streams: Framework v14a, Michigan Center for Georgraphic Information, 2015
Drains: Berrien County, 2007
Subwatersheds: SWMPC 2013

Lake Michigan

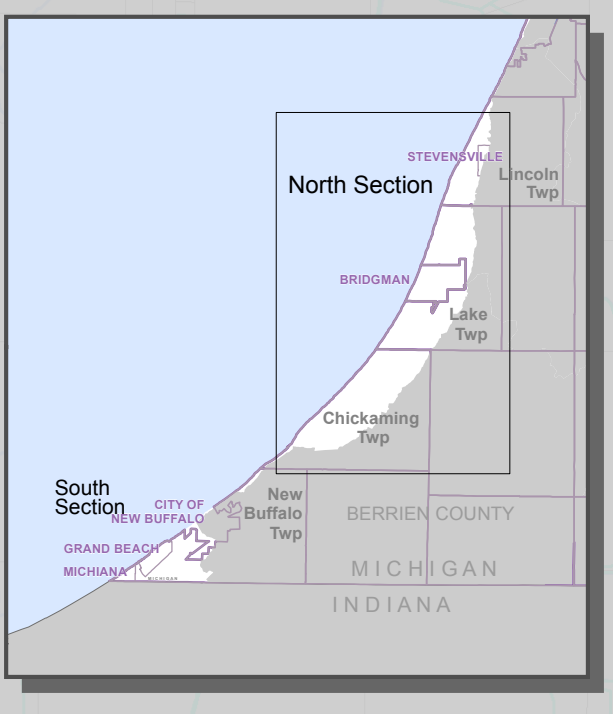
Wall & Extension Drains
North Lake
Hollis Drain
Middle Lake
South Lake
Thorton Valley Drain
Stama Industrial Park Drain
Morris
Mast & Janca
Westfall & Dumrose
Lemon Creek
Decker Extension 1960
Stuhelm Drain
Wecko Beach
Bridgeman-Kaschube Branch
Bedortha South Branch
Rambo & Lewis Drain
Snow Road Drain
Painterville Drain
Warren Dunes
Deer Creek (Sawyer Creek)
Wolcott Avenue Drains
Bethany Beach Drain
West Phall & McClellan Drains
Birchwood, etc (Prairie Road)
Sawyer Village Drain
Harbert Drains
Cherry Beach (John Markley Dr)
Swift #2 Drain
Fanaly Drain
Gleason & Wilson Drains
Tiffany-Orchard Beach
Lakeside
John Morley Branch

RIDGEWAY PATH
N ROOSEVELT
PUETZ RD
94
JOHN BEERS RD
STEVENSVILLE
GRAND MERE RD
LEGION RD
Lincoln Township
RED ARROW HWY
WILLOW DR
W LINCO RD
Lake Township
LIVINGSTON RD
LEMON CREEK RD
BRIDGMAN
LAKE ST
WILSON LN
CALIFORNIA RD
GAST RD
FLORAL LN
W SNOW RD
SNOW RD
BALDWIN RD
BERRIEN COUNTY
BROWNTOWN RD
Weesaw Township
HOLLOWAY DR
WOLCOTT ST
FLYNN RD
SAWYER RD
HARBERT RD
W YOUNGREN RD
PRAIRIE RD
THREE OAKS RD
W WILSON RD
W EAST RD
PIER RD
BELL
LAKESIDE
KRUSE ST
Chikaming Township

0 0.5 1 2 Miles

April 05, 2016

*Coastal Watersheds are areas where there is a general surface run-off into Lake Michigan. These areas were divided as a means to focus the analyses and do not represent the landfoms topographic features.



The use of this map is for general reference purposes. It is not a legal document.

7_North_SubWS_2

Southwest Michigan Planning Commission

Cropland Data Layer (**CDL**): Crop-specific land cover

In 2009, the National Agricultural Statistics Service (NASS) released a crop-specific land cover classification product encompassing the entire conterminous United States (U.S.). Termed the Cropland Data Layer (CDL). The product depicts type and location for crops planted during the summer and is produced yearly from 2007 to the present.

The CDL product is disseminated with CropScape. CropScape offers a free and open access to digital geospatial data layers in a web format. Users can query, compute statistics, perform change analysis, map, and visualize the entire inventory of CDL data derived at 30 m or .09 hectares resolution and show field level accuracy. Any of the data is available to download as a geospatial product or as tables. Through Cropscape, the user can define an area of interest by selecting municipality boundaries or a custom area.

The CDL is reproduced annually and available annually, a few months upon completion of the growing season.

CROPSCAPE https://nassgeodata.gmu.edu/CropScape

Shown on the right is the complete list of classes defined in the CDL. In the mapping products that I have produced, the classes have been combined into 12 classes. It should be noted that the scale of the data is 30 x 30 meters, which is an aspect of the accuracy for which a specific crops can be identified. More information about CDL Program visit https://www.nass.usda.gov/Research_and_Science/Cropland/sarsfaqs2.php

2013 CROPLAND DATA LAYER - BERRIEN COUNTY, MICHIGAN

Cropland

- Corn
- Developed
- Grains
- Grape
- Orchards & Nurseries
- Pasture/Hay
- Soybean
- Undeveloped
- Vegetables
- Water
- Wetlands

*Crop Land Data Layer (CDL) Reclassification**

Corn: Corn

Developed: Developed: Open Space, Low Intensity, Medium Intensity, High Intensity & Barren

Grains: Barley, Oats, Rye, Sorghum, Winter/Spring Wheat

Grape: Grape

Orchards/Nurseries: Apple, Asparagus, Blueberry, Cranberry, Caneberries, Cherry, Christmas Tree, Herbs, Peach, Pear, Plum, Sod/Grass Seed, Strawberry, & Walnut

Pasture/Hay: Alfalfa, Clover/Wildflowers, Fallow/Idle Cropland & Other Hay/Non Alfalfa

Soybean: Soybean

Undeveloped: Forests, Grassland & Shrubland

Vegetables: Carrot, Celery, Cucumber, Dry Bean, Onion, Pepper, Pop or Orn Corn, Potato, Pumpkin, Radish, Squash, Sugar Beets, Sunflower, Sweet Corn, Tomato & Watermelon

Water: Open Water

Wetlands: Herbaceous & Woody

*The Original Crop Land Data Layer is classified into the categories shown above, whereas the data for this map is reclassification according to the classes shown in the legend, "Cropland", shown on the right.

The boundaries for Cities, Villages & Townships are outlined in white.

0 0.5 1 2 3 4 5 Miles

Southwest Michigan Planning Commission
www.swmpc.org

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January 12, 2015

N

Lake Michigan

Coloma
Watervliet
Benton Harbor
St Joseph
Shoreham
Stevensville
Eau Claire
Baroda
Bridgman
Berrien Springs
Buchanan
Niles
Three Oaks
Galien
New Buffalo
Grand Beach
Michiana

BERRIEN COUNTY

Land Cover	Acres	Percent
Corn	59,513	16.1%
Developed	74,309	20.0%
Grains	5,000	1.3%
Grape	10,795	2.9%
Orchards	12,976	3.5%
Pasture/Hay	15,688	4.2%
Soybean	47,860	12.9%
Undeveloped	100,941	27.2%
Vegetables	3,678	1.0%
Water	4,181	1.1%
Wetlands	35,761	9.6%

Cropland Data Layer (Metadata)
www.nass.usda.gov/research/Cropland/metadata/metadata_mi12.htm
CropScape Geospatial Data Service
http://nassgeodata.gmu.edu/CropScape/

SIGNIFICANT AGRICULTURAL STATISTICS

MICHIGAN NATIONAL RANKINGS

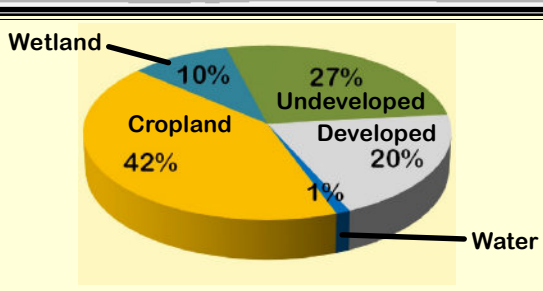
1st: Cucumbers, Tart Cherries, Blueberries, Grapes (juice) and Flowering Bedding Plants
2nd: Celery, Carrots and Vegetable Bedding Plants
3rd: Apples and Asparagus
4th: Perenials, Sweet Cherries, Sugar Beets, and Tomatoes
Source: National Agriculture Statistics Service (NASS) 2011.

COUNTY RANKINGS IN MICHIGAN

BERRIEN COUNTY

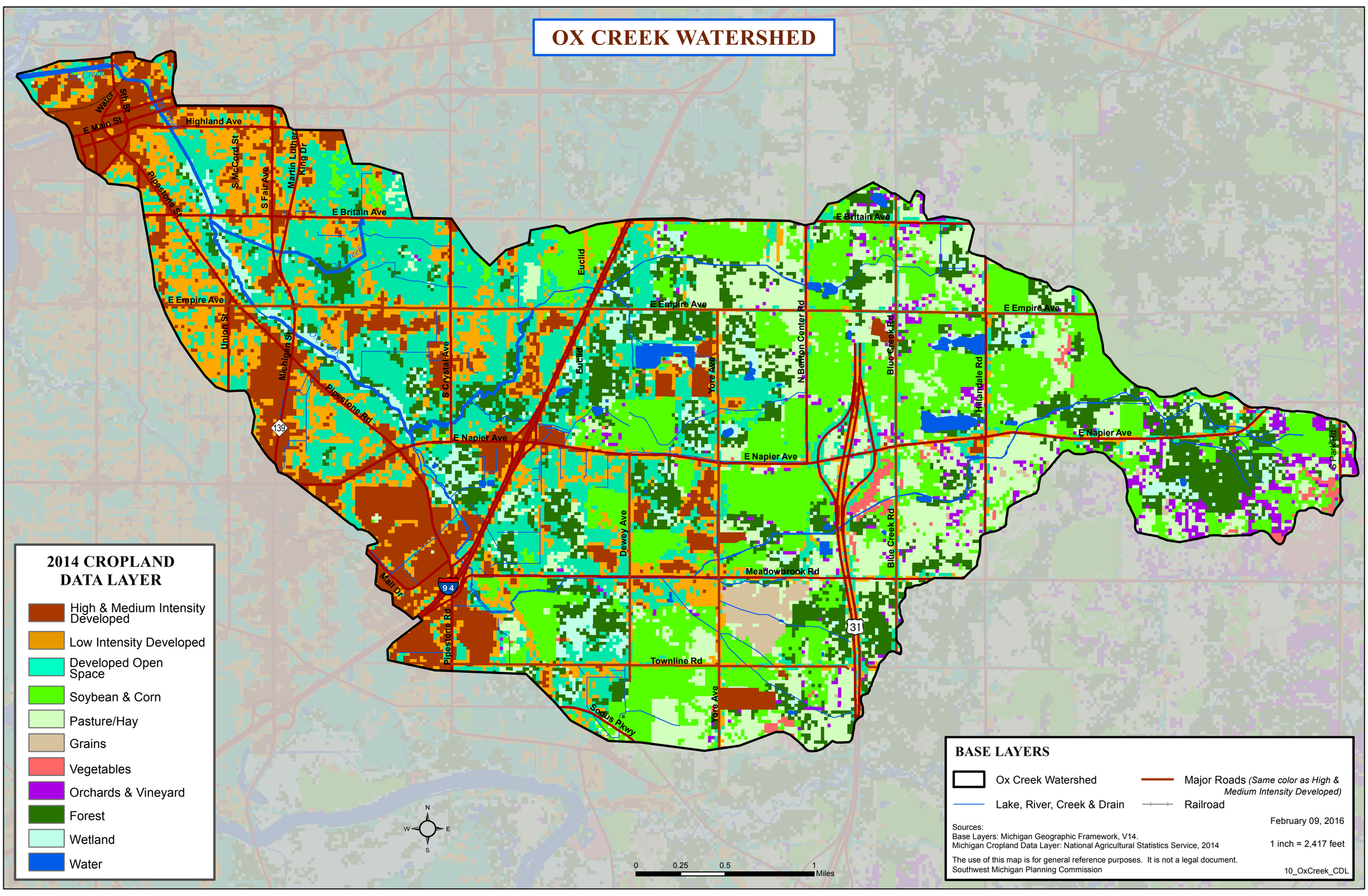
#1 Direct-to-consumer sales of agricultural products ($8,492,000)
#1 Acres of grapes (7,744 acres)
#2 Acres of fruit, tree nuts, and berries (18,267 acres)
#2 Revenue from vegetables ($33,849,000)
#4 Number of controlled atmosphere storage facilities (3)
#5 Colonies of bees (4,639)
#5 Number of farms using organic production methods (22)
Source: Michigan Department of Agriculture – July 2009

Data Sources
Michigan Cropland Data Layer: National Agricultural Statistics Service, 2013
Base Layers: Michigan Geographic Framework, V14a
Tribal Land: Pokagon Band of Potawatomi Indians, 2011



The USDA, NASS Cropland Data Layer (CDL) is a raster, geo-referenced, crop-specific land cover data layer. The 2013 CDL has a ground resolution of 30 meters. The CDL is produced using satellite imagery from the Landsat 5 TM sensor, Landsat 7 ETM+ sensor, and other satellite systems collected during the growing season. Some States use additional satellite imagery and ancillary inputs to supplement and improve the classification. These additional sources can include the National Elevation Dataset, the imperviousness and canopy data layers from the National Land Cover Database 2006 (NLCD 2006), Moderate Resolution Imaging Spectroradiometer (MODIS) 250 meter 16 day Normalized Difference Vegetation Index (NDVI) composites. Agricultural training and validation data are derived from the Farm Service Agency Common Land Unit (CLU) Program. The NLCD 2006 is used as non-agricultural areas.

OX CREEK WATERSHED



2014 CROPLAND DATA LAYER

- High & Medium Intensity Developed
- Low Intensity Developed
- Developed Open Space
- Soybean & Corn
- Pasture/Hay
- Grains
- Vegetables
- Orchards & Vineyard
- Forest
- Wetland
- Water

BASE LAYERS

- Ox Creek Watershed
- Major Roads *(Same color as High & Medium Intensity Developed)*
- Lake, River, Creek & Drain
- Railroad

February 09, 2016

Sources:
Base Layers: Michigan Geographic Framework, V14.
Michigan Cropland Data Layer: National Agricultural Statistics Service, 2014

1 inch = 2,417 feet

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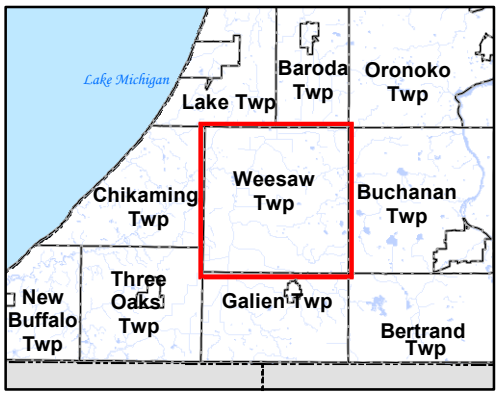
Southwest Michigan Planning Commission

10_OxCreek_CDL

Weesaw Township



Base Map

Township

Road

Lake, River, Stream & Drain

N W E S

Cropland Data Layer - 2013

- Corn
- Developed
- Grains
- Grape
- Orchards/Nurseries
- Pasture/Hay
- Soybean
- Undeveloped
- Vegetables
- Water
- Wetlands

0 0.25 0.5 1 Miles

Sources

Base Layers: Michigan Geographic Framework v14a.

Drain: Berrien County GIS, 2013

State Wildlife Area: Southwest Michigan Planning Commission, 2012

Cropland Data Layer: Michigan Cropland Data Layer: National Agricultural Statistics Service, 2013

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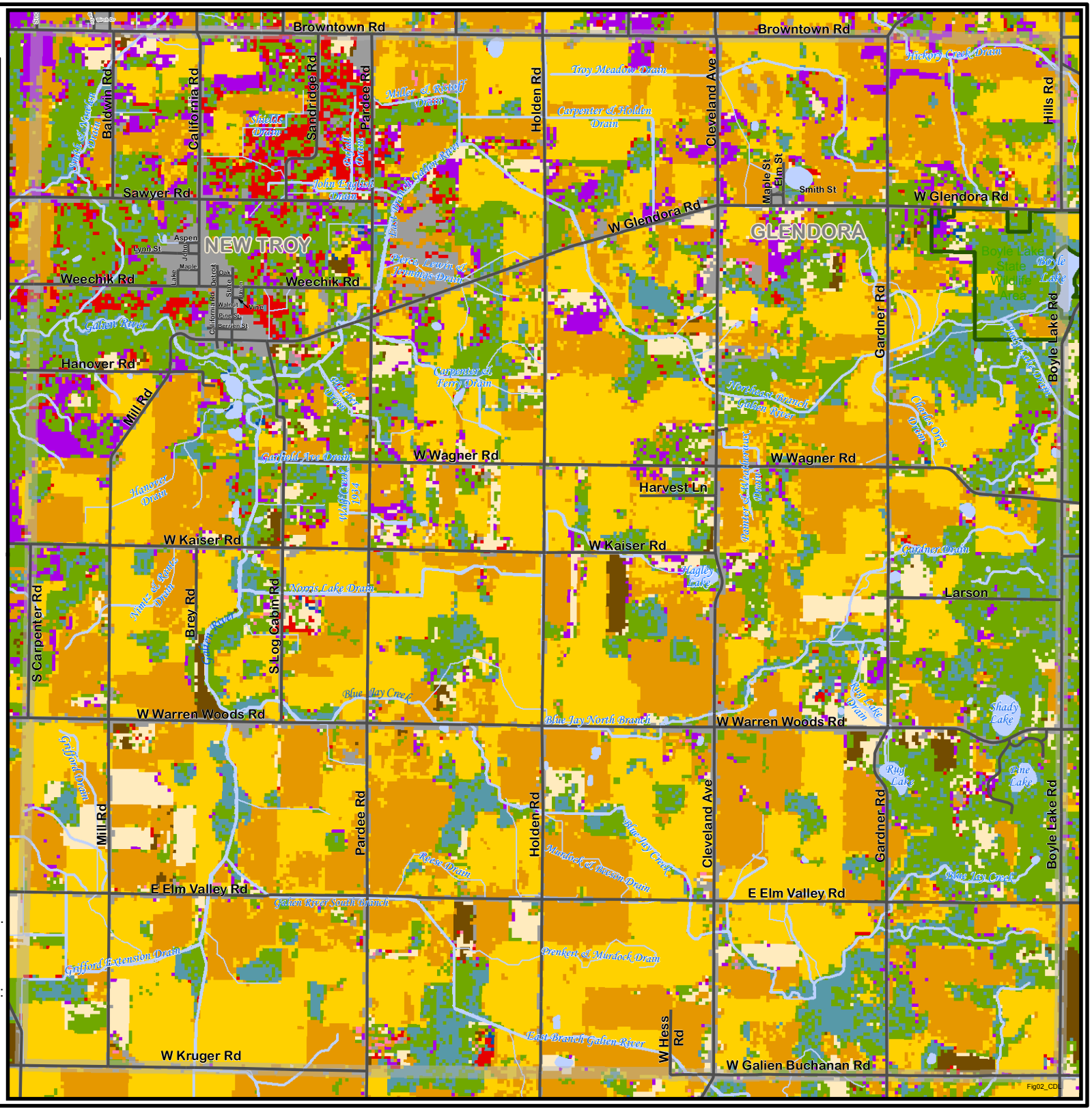
Southwest Michigan Planning Commission

www.swmpc.org

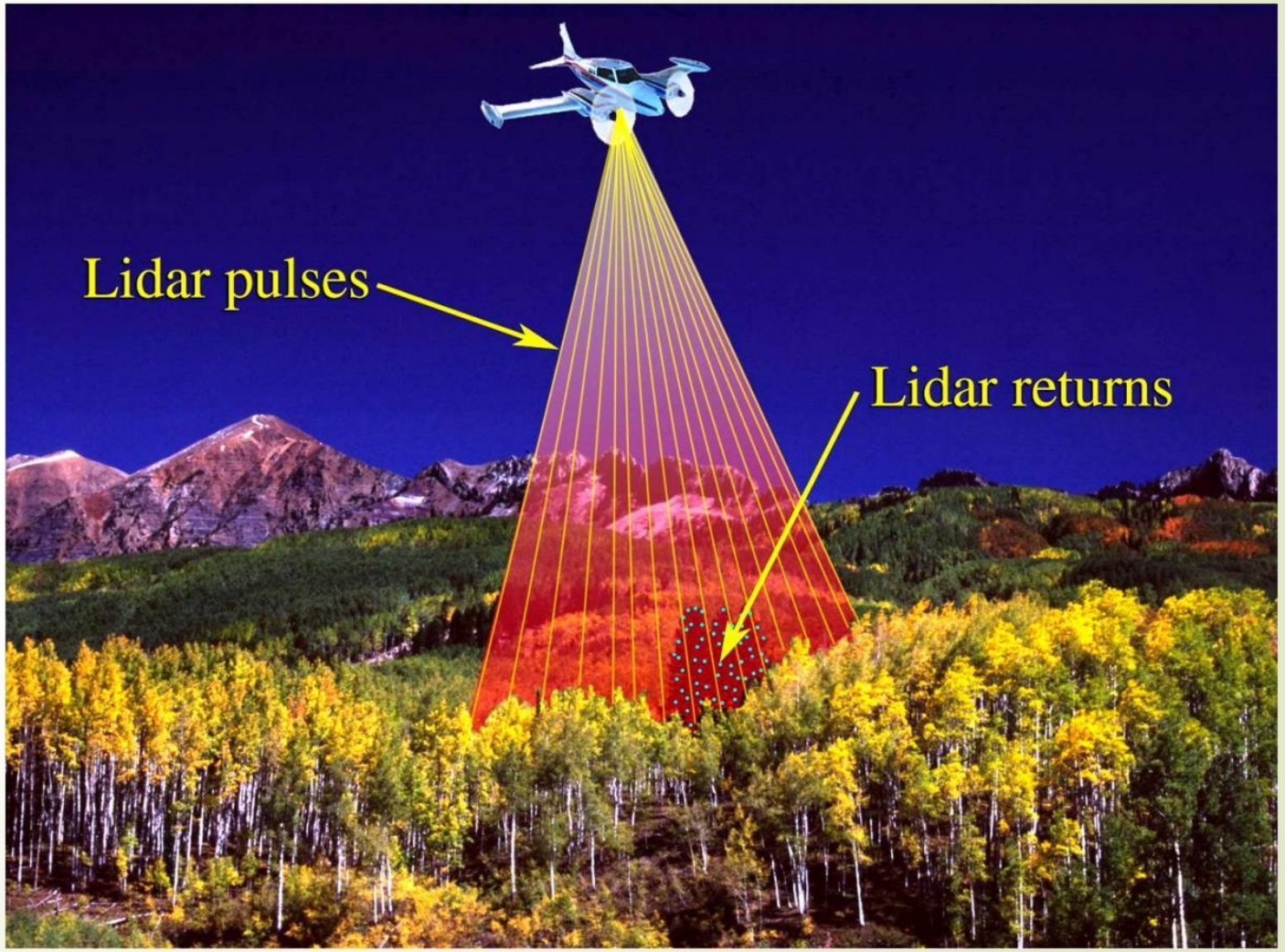
January 22, 2015



Light Detection And Ranging (LIDAR)

A standard LIDAR system emits a beam of light from a laser source and then captures the returned light in sensors as it bounces back from a reflecting object, measuring the distance by calculating the time required for the round trip.

LIDAR systems were used by the federal government as early as the 1960s, it wasn't until after 2000 that a combination of factors resulted in a boom of LIDAR data-gathering projects that are now bearing fruit at federal, state and local government levels.

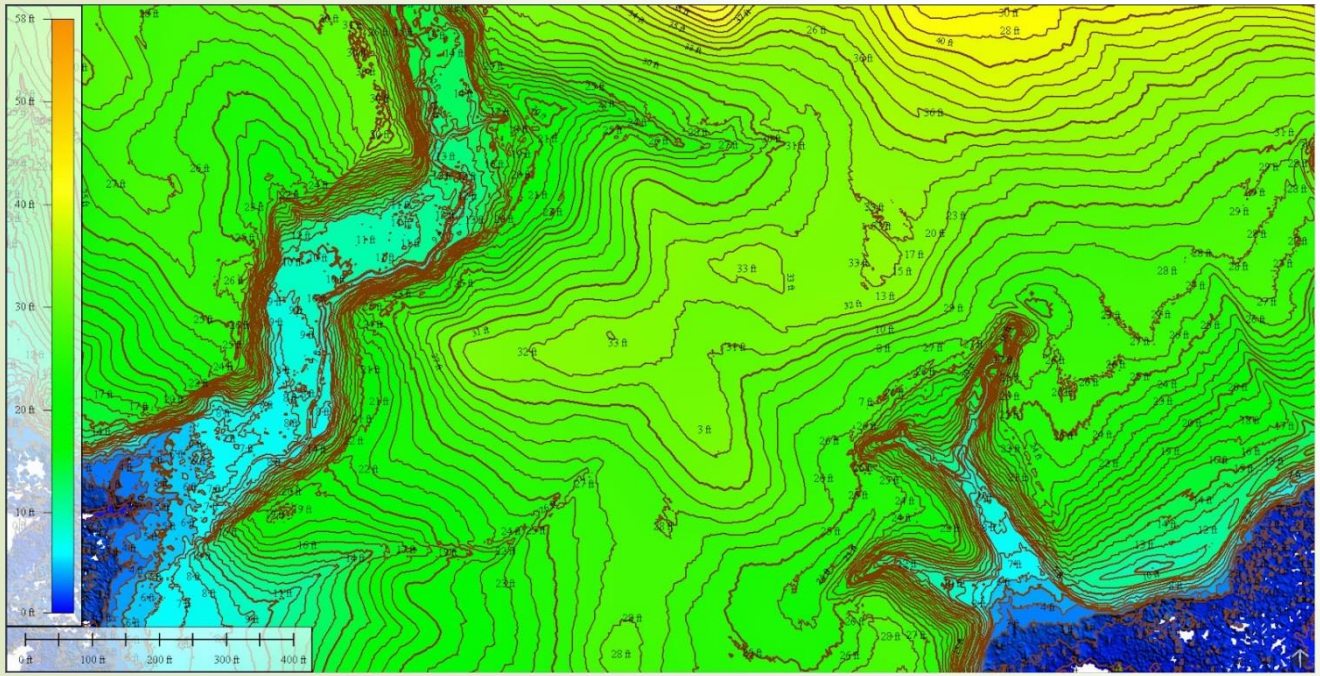


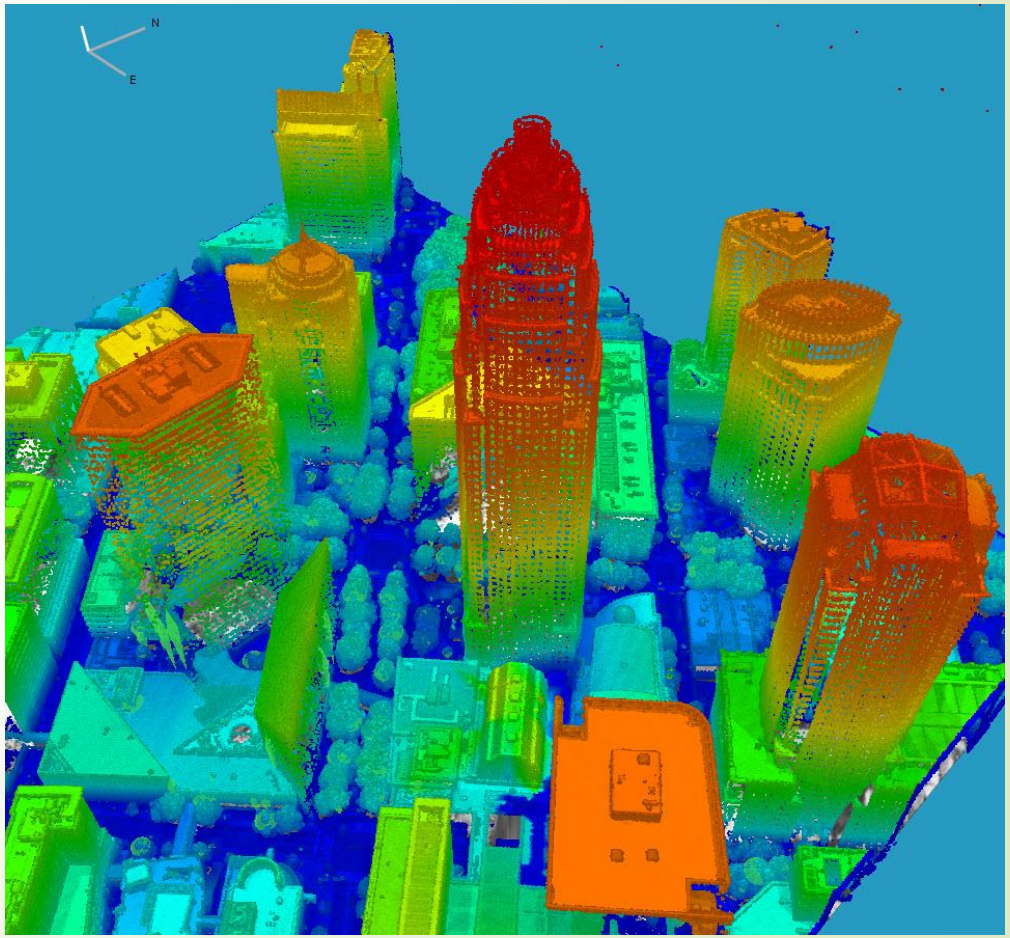
LIDAR

LIDAR can provide accurate locational and height data that allows the creation of a 3-dimensional model of the land surface, or digital terrain model (DTM). In my work, the LIDAR products are being used as a graphically representation of the topography of a landscape and showing elevation by contour lines (as shown below on the left).

Sources to view or download LIDAR Products:

- ✓ USGS Earth Explorer http://earthexplorer.usgs.gov/
- ✓ National Oceanic and Atmospheric Administration (NOAA) Digital Coast https://coast.noaa.gov/digitalcoast/





Lake Michigan Tributaries

Elevation (feet)

High : 1033

Low : 574

North Section

Lake Michigan

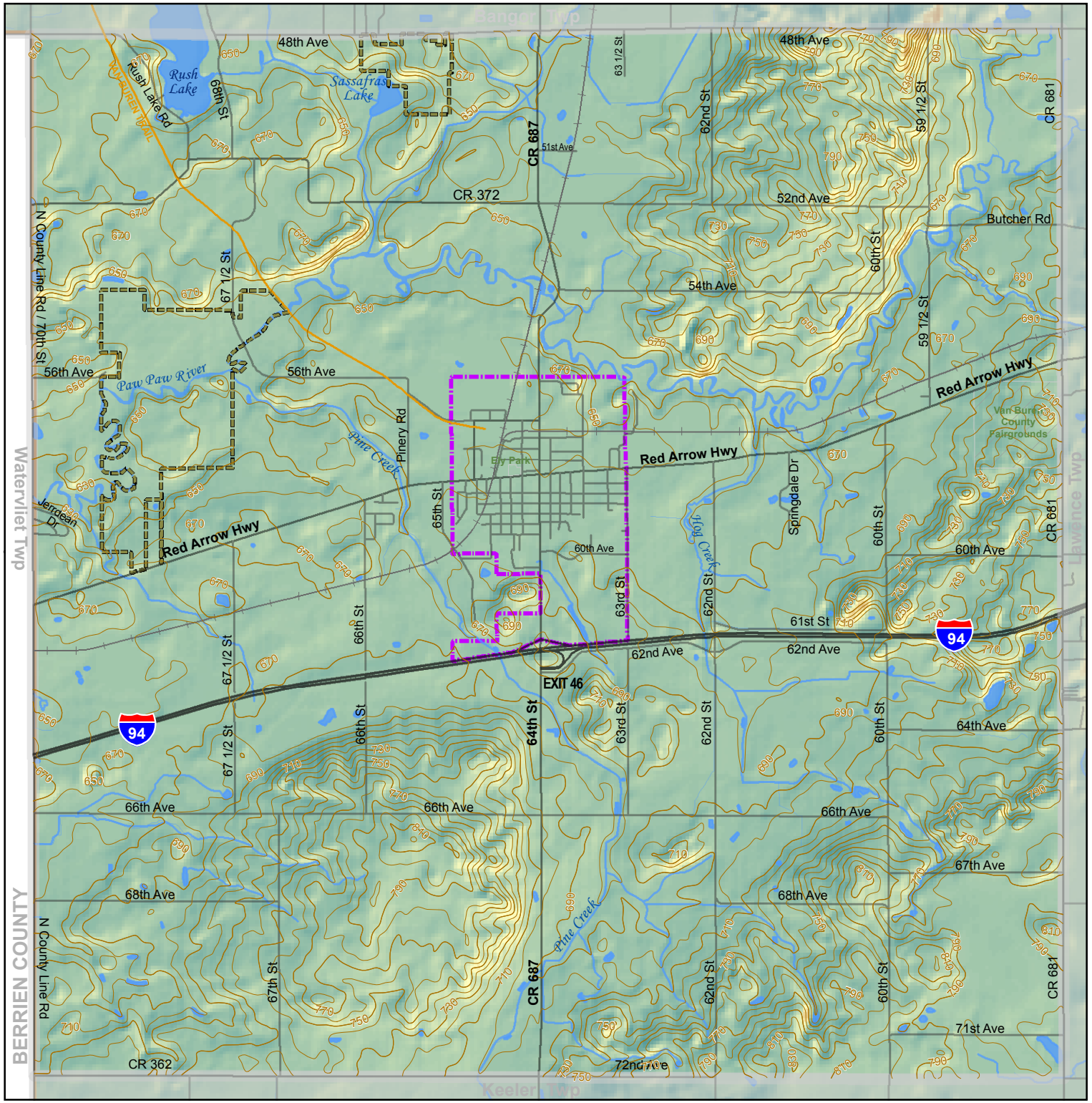
Source
Elevation: U.S. Geological Survey, 2013

April 15, 2016

Southwest Michigan Planning Commission

South Section

9_North_DEM_2



HARTFORD TOWNSHIP
Township 3S Range 16W
CITY OF HARTFORD

TOPOGRAPHY

Contour (10 ft intervals)

Contours are shown at 10 feet intervals and labeled at 20 feet intervals.
The Elevation ranges from 630 feet to 830 feet

City of Hartford

Hartford Township

Tribal Trust Land

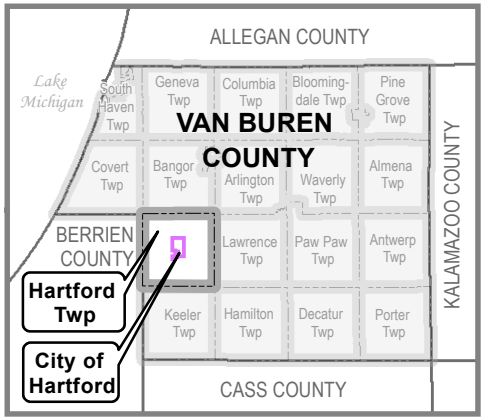
Major Road

Other Roads

Railroad

Van Buren Trail

Lake, River, Stream & Drain



Data Sources

Base Layers: Michigan Geographic Framework (MGF) v14a
Tribal Lands: Pokagon Band of Potawatomi Indians, 2011
Elevation Contours & Digital Elevation Model (DEM: Michigan Department of Natural Resources, 2000

0 0.25 0.5 1 1.5 Miles

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November 10, 2014