

# **Be Healthy Berrien**

## ***Geographic Information Systems (GIS) Report***

### **Factors that Influence the Prevalence of Obesity in Berrien County, Michigan**

## **Acknowledgements**

The Be Healthy Berrien Geographic Information System (GIS) Report would not be possible without the Southwest Michigan Planning Commission. We are grateful to John Egelhaaf and Jill Plescher who lead efforts in researching, collecting, analyzing, and mapping key data. Special thanks to Ms. Plescher for going above and beyond to create the wonderful resources that Be Healthy Berrien will continue to rely on for many years.

Be Healthy Berrien is also appreciative of the financial support provided by Berrien Health Plan/Healthy Berrien Consortium, Southwest Michigan Planning Commission, and United Way of Southwest Michigan.

We acknowledge the assistance provided by the Berrien County Health Department for providing expertise in data analysis and reporting, and primary Health Indicator Data from the Behavior Risk Factor Survey.

Special thanks to the Be Healthy Berrien Steering Committee Organizations for providing support and guidance in the development of this project.

Berrien County Health Department  
Lakeland Health  
Southwest Michigan Planning Commission  
United Way of Southwest Michigan  
Benton Harbor-St. Joseph YMCA  
Niles-Buchanan YMCA

Created in 2016

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## Introduction

Be Healthy Berrien is a county-wide partnership of Berrien County Health Department, Lakeland Health, Southwest Michigan Planning Commission, United Way of Southwest Michigan, Benton Harbor-St. Joseph YMCA, and Niles-Buchanan YMCA. Our partners are committed to working together to reduce obesity and chronic illness through policy, systems, and environmental change. Be Healthy Berrien is working with community partners to increase access to healthy foods and physical activity for all residents, making healthy choices easy for people regardless of age, disability/mobility, or socioeconomic status.

The Be Healthy Berrien Geographic Information System (GIS) Report is a collection of key data that identifies communities in Berrien County with higher obesity-related disparities and risks as well as key community assets. Using GIS maps to visually portray this data clearly pinpoints areas in Berrien County with the greatest need for intervention. Multiple data sources were used in compiling this information, which has been categorized by Individual, Family-Social, Living-Working, Community Resource, and Policy-Program data. Health indicator data from the Berrien County Behavior Risk Factor Survey will be added to the collection of maps when it becomes available.

This is the first year that Be Healthy Berrien has created this GIS Report. Moving forward, the data and maps will be updated regularly. Updating the data regularly will allow Be Healthy Berrien to track trends over time to see longer-term impacts of interventions.

The Be Healthy Berrien GIS Report will also be used to:

- Help align obesity-related interventions in Berrien County;
- Inform decision-makers about the connection between “place” and health;
- Build the capacity of other groups and organizations to create interventions that create long-term change and community-level impact.

The Be Healthy Berrien GIS report will serve as an important tool for strategic planning for Be Healthy Berrien and our partners.

Many factors influence the risk and prevalence of obesity. The framework Be Healthy Berrien used for mapping this risk was a multi-level approach adapted from the social-ecological model of health promotion. This model demonstrates that many layers of influence have impact in determining risk. Individual factors are at the core of the model, surrounded by influence from Family-Social factors, Living-Working factors, Community Resource factors, and finally Policy-Program factors. Each layer contains specific features that have been identified as influencers on the risk and prevalence of obesity. These specific features in the higher layers impact the risk within each of the lower layers. The Be Healthy Berrien 2015-2020 Strategic Plan determined the specific features that were assessed in this framework.



# ***PART 1***

## ***Theme Maps***

## 1. Individual Factors

- Percent of Population 5-17 Years Old - page 5
- Percent of Population 64-74 Years Old - page 6
- Race Density, Dot Map - page 7

Special features of the Individual factors that can influence the risk of obesity include age and race. While obesity is a significant problem among the entire adult population, some groups are disproportionately affected. Among U.S. adults, Black and Latino populations have substantially higher rates of obesity than do White populations. This is true among both men and women.<sup>1</sup> In Berrien county, those between the ages of 25 and 64 are more likely to be obese than younger or older populations.<sup>2</sup> Mapping this data at the population level can pinpoint locations with greater obesity risk based on key Individual factors.

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<sup>1</sup> Trust for America's Health and Robert Wood Johnson Foundation, 2004-2014.  
<http://stateofobesity.org/disparities/>

<sup>2</sup> Berrien County Behavior Risk Factor Survey. 2011 Status Report

# BERRIEN COUNTY, MICHIGAN

## PERCENT OF THE POPULATION 5 TO 17 YEARS OLD BY CENSUS BLOCK GROUP

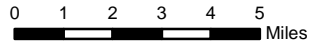


Census Block Groups are outlined in white.

- 2% - 5%
- 6% - 10%
- 11% - 20%
- 21% - 30%
- 31% - 40%

PERCENT OF POPULATION  
5-17 YEARS OLD (2014)  
Nationally: 16.9%  
Michigan: 16.6%  
Berrien County: 17.0%

● City & Village



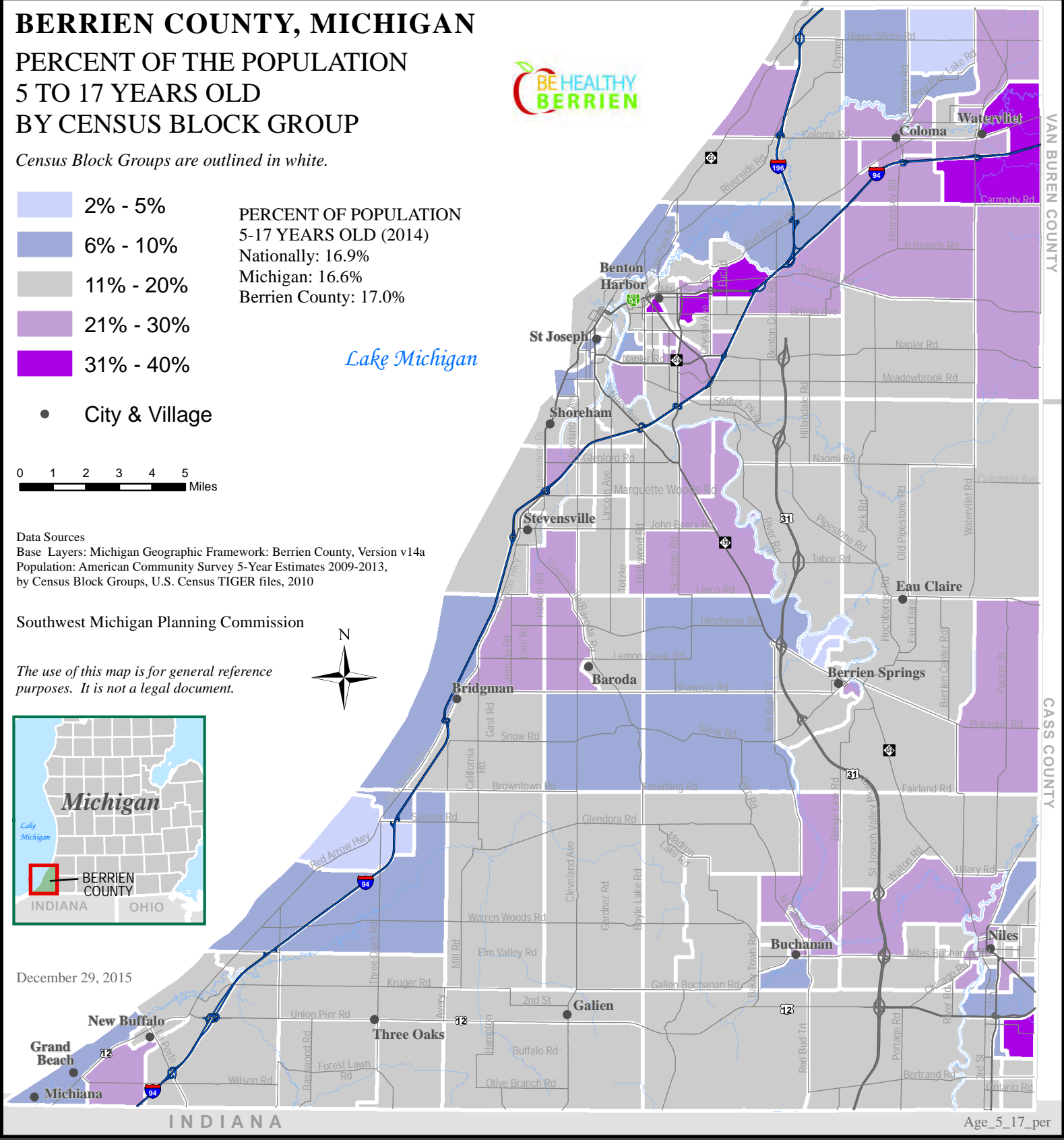
Data Sources  
Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
Population: American Community Survey 5-Year Estimates 2009-2013,  
by Census Block Groups, U.S. Census TIGER files, 2010

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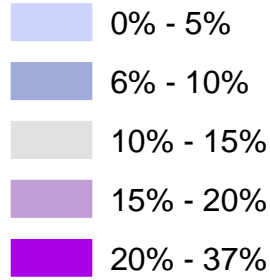
Age\_5\_17\_per

# BERRIEN COUNTY, MICHIGAN

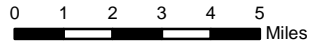
## PERCENT OF POPULATION 65 TO 74 YEARS OLD BY CENSUS BLOCK GROUP



Census Block Group are outlined in white.



● City & Village



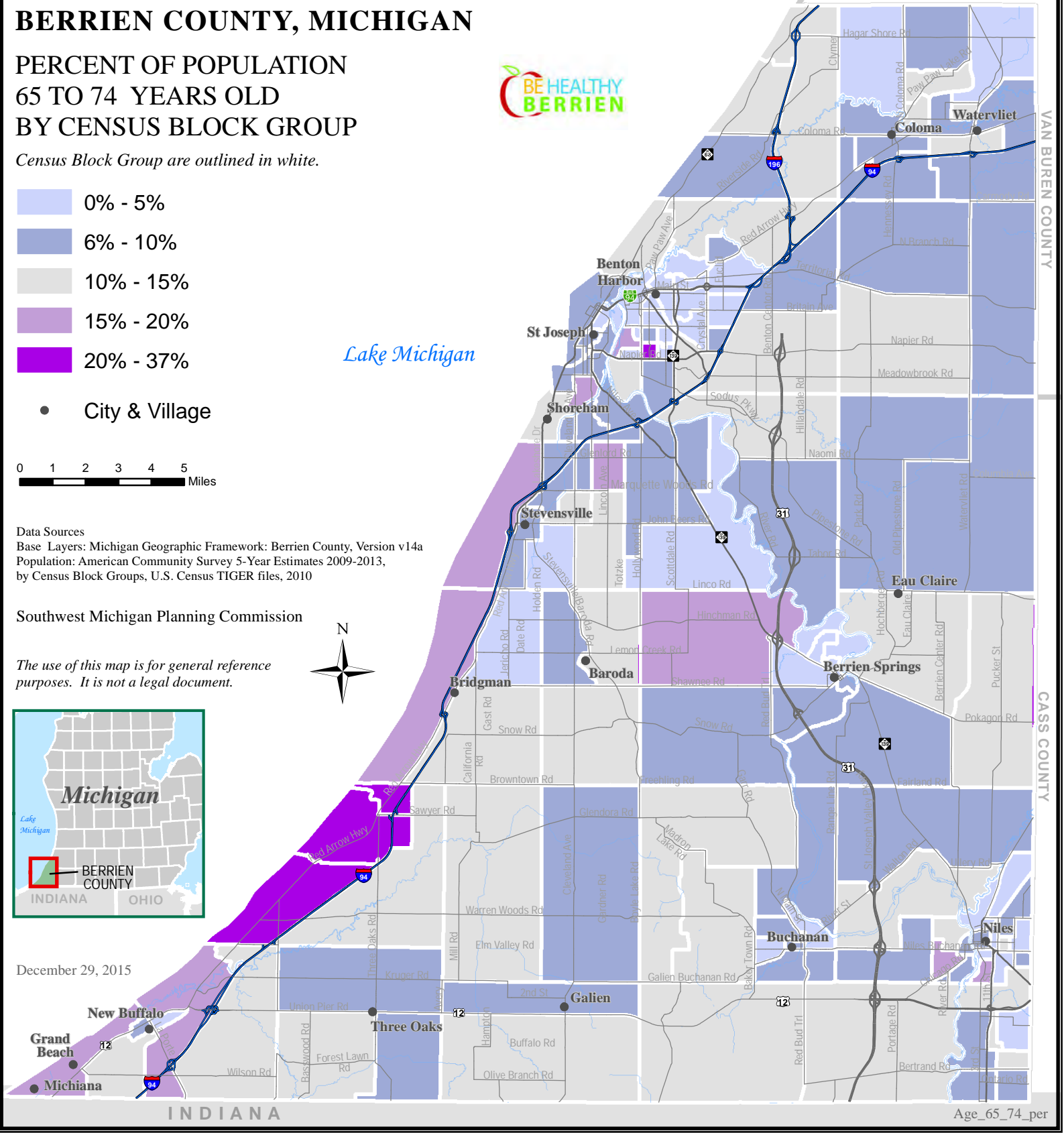
Data Sources  
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Age\_65\_74\_per

# BERRIEN COUNTY, MICHIGAN



## Racial Dot Map

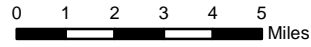
1 Dot = 1 Person\*

*Legend*

- Black
- Hispanic
- Other Race
- White

\*The locations of the dots do not represent actual addresses. Individual dots are randomly located within a census block to match aggregate population totals for that block.

Total Population = 156,914  
 Black = 23,766  
 Hispanic = 7,055  
 Other Minority = 6,604  
 White = 119,489



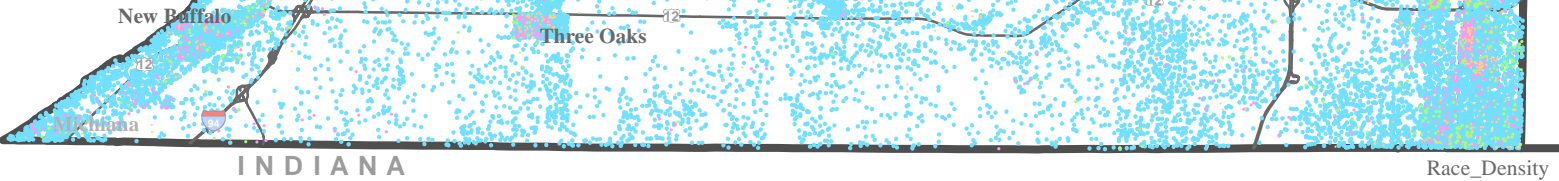
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Population: 2010 Decennial Census, Census Block TIGER Line Shapefile,  
 U.S. Department of Commerce, U.S. Census Bureau, Geography Division, 2010  
 Methodology: 2010 Racial Dot Map, Weldon Cooper Center for Public Service,  
 Rector and Visitors of the University of Virginia, 2013  
<http://www.coopercenter.org/demographics/Racial-Dot-Map>

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VAN BUREN COUNTY

CASS COUNTY

INDIANA

Race\_Density

## 2. Family-Social Factors

- 2014 Crime Index (page 9)
- Percent of the Population 25 Years and Over with a Bachelor Degree - page 10
- Percent of the Population 25 Years and Over with No High School Diploma - page 11
- Percent of Households with No Vehicle - page 12
- Percent of the Population with Income Below the Poverty Level - page 13
- Percent of Households that have received SNAP Benefits in the Past 12 Months - page 14
- Number of Female Heads of Household (in Households with Children - page 15)

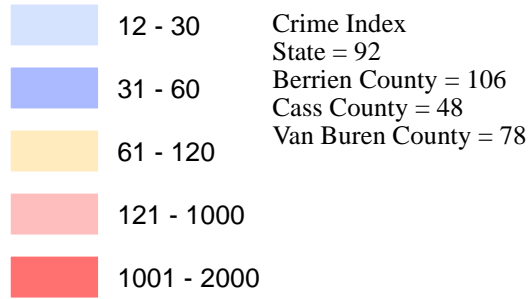
Health is determined, in part, by access to social and economic opportunities. The conditions in which people live, Family-Social factors, help explain why some Americans are less healthy than others. Features in Family-Social factors include educational attainment, living in poverty, access to a vehicle, living in single-parent households, and living in areas with high crime. These features are associated with disparate burdens and poor health outcomes, including higher rates of illness and early death. Mapping Family-Social factor data can identify populations with a higher risk of poor health and developing chronic health conditions.



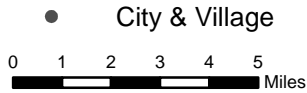
# BERRIEN COUNTY, MICHIGAN

## CRIME INDEX 2014\*

### BY CENSUS BLOCK GROUP



\*Esri's Crime Indexes data contains statistics about major categories of personal and property crime. Updated semi-annually, the Crime Index data variables include information about murder, rape, robbery, assault, burglary, and motor vehicle theft. The Index is relative to the National total.

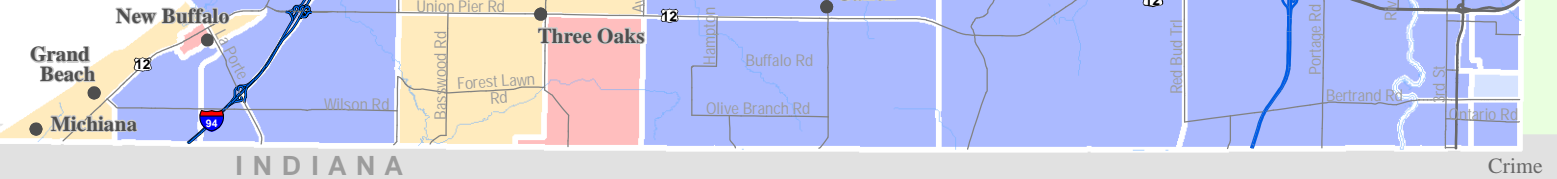


Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Crime Index: ESRI 2014

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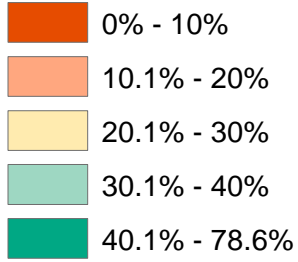


# BERRIEN COUNTY, MICHIGAN

## PERCENT OF THE POPULATION 25 YEARS OLD AND OVER WITH BACHELOR DEGREE OR HIGHER



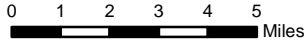
by Census Block Group



PERCENT OF POPULATION WITH BACHELOR DEGREE OR HIGHER  
 Nationally: 28.8%  
 Michigan: 25.9%  
 Berrien County : 24.2%  
 Source: ACS 5-year 2009-2013

Lake Michigan

● City & Village



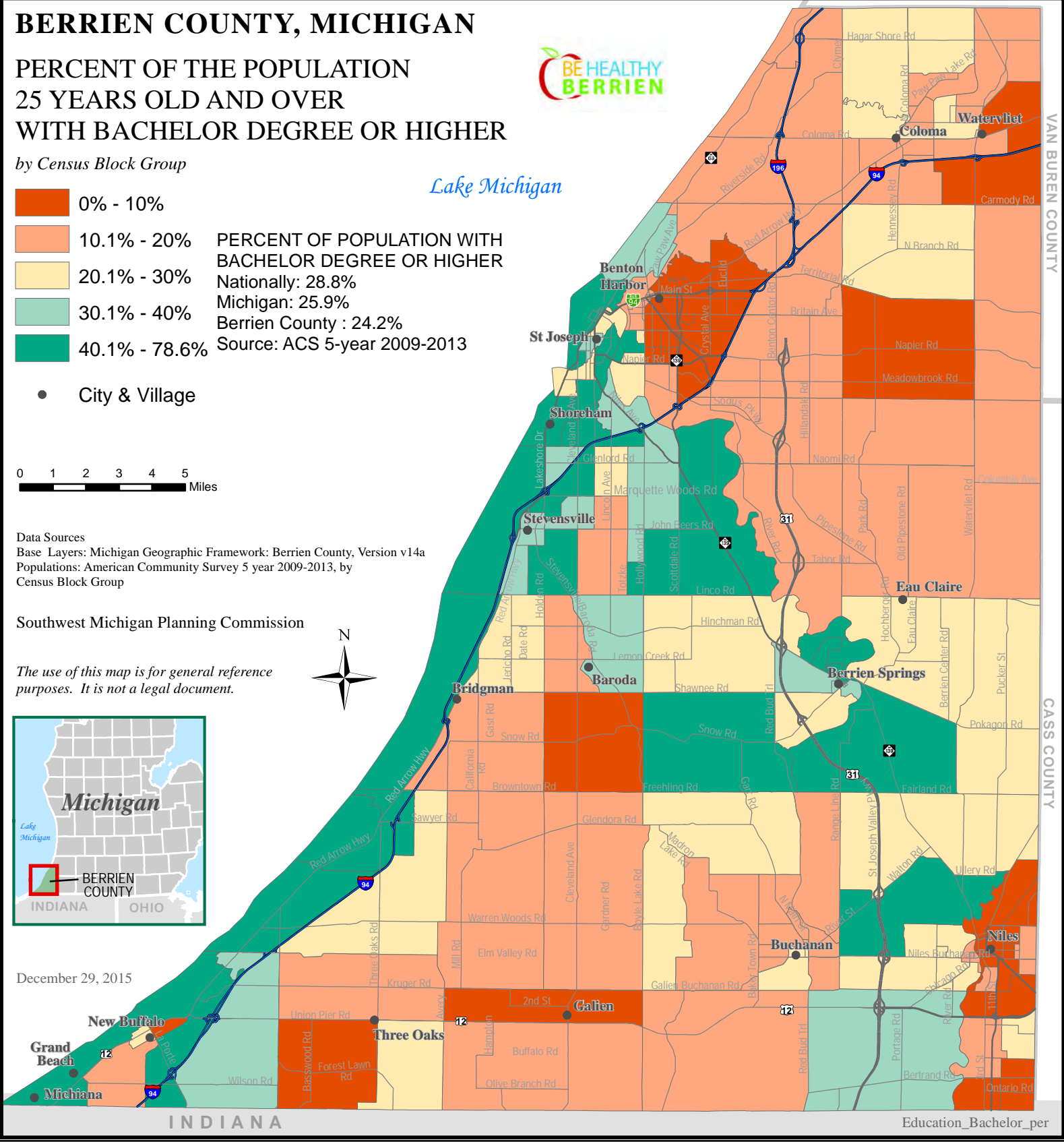
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Populations: American Community Survey 5 year 2009-2013, by Census Block Group

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Education\_Bachelor\_per

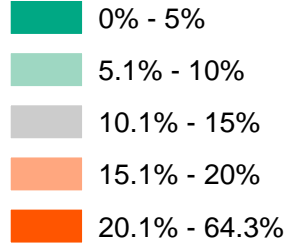


# BERRIEN COUNTY, MICHIGAN

## PERCENT OF POPULATION 25 YEARS OLD AND OVER WITH NO HIGH SCHOOL DIPLOMA BY CENSUS BLOCK GROUP

Lake Michigan

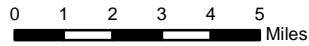
Census Block Groups are outlined in white.



PERCENT OF POPULATIONS WITH NO HIGH SCHOOL DIPLOMA  
 Nationally: 13.9 %  
 Michigan: 11.1 %  
 Berrien County : 12.6 %  
 Source: ACS 5-year 2009-2013



● City & Village



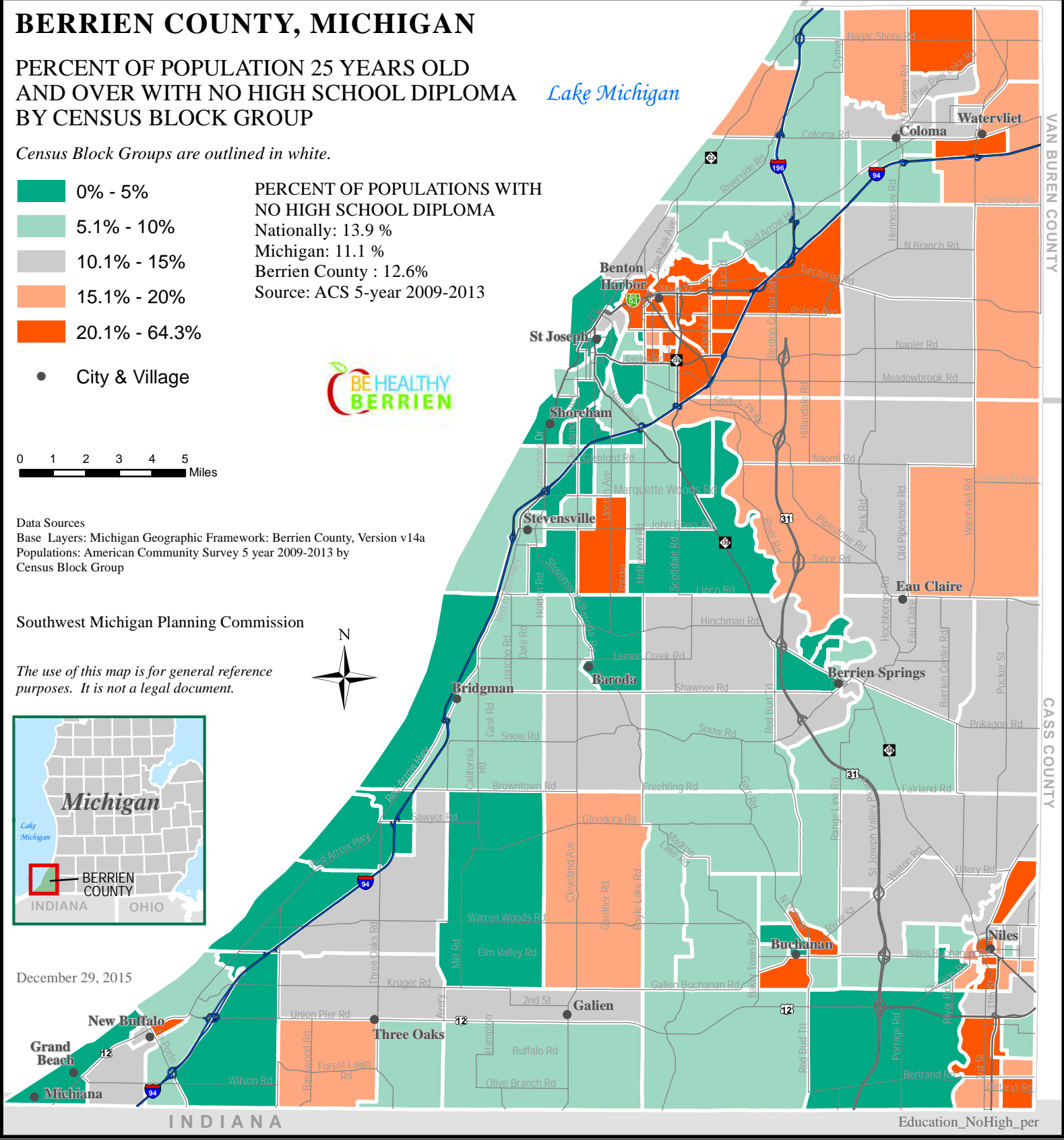
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Populations: American Community Survey 5 year 2009-2013 by Census Block Group

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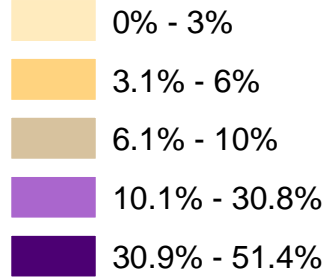


Education\_NoHigh\_per

# BERRIEN COUNTY, MICHIGAN

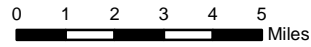
## HOUSEHOLDS WITH NO VEHICLE BY CENSUS BLOCK GROUP

Census Block Group is outlined in white.



PERCENT HOUSEHOLDS WITH NO VEHICLE  
 Nationally: 9.1%  
 Michigan: 7.8%  
 Berrien County: 8.4%

● City & Village



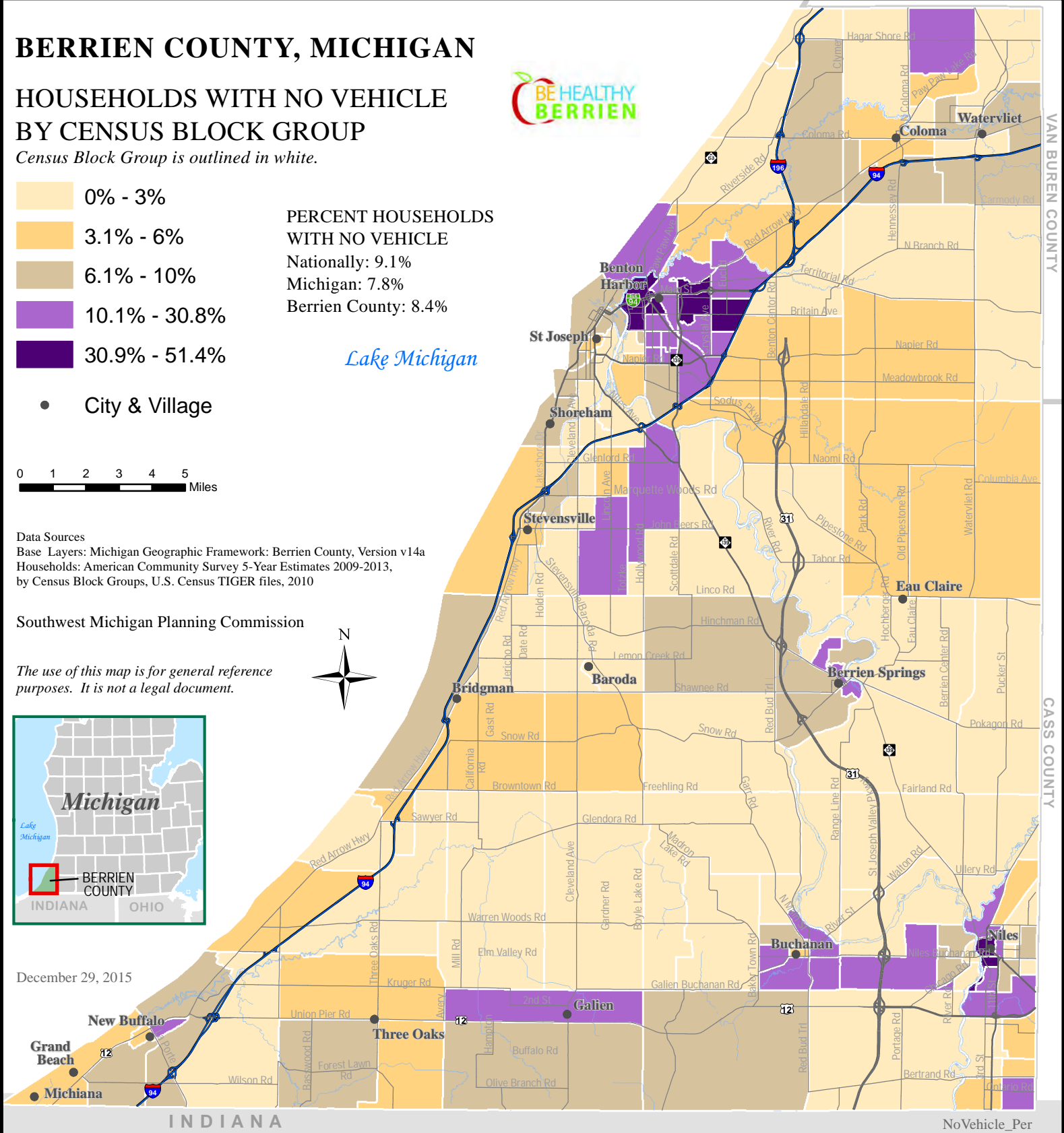
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Households: American Community Survey 5-Year Estimates 2009-2013,  
 by Census Block Groups, U.S. Census TIGER files, 2010

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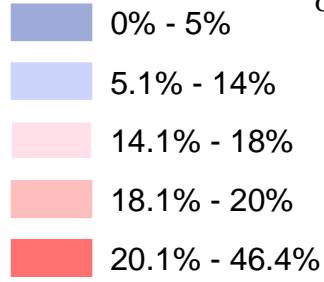


NoVehicle\_Per

# BERRIEN COUNTY, MICHIGAN



## HOUSEHOLDS WITH INCOME BELOW POVERTY LEVEL

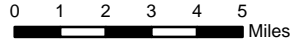


*Census Block Group is outlined in white.*

### PERCENT OF THE POPULATIONS BELOW POVERTY LEVEL

Nationally: 15.4%  
 Michigan: 16.8%  
 Berrien County: 17.5%  
 Source: ACS 5-year 2009-2013

● City & Village



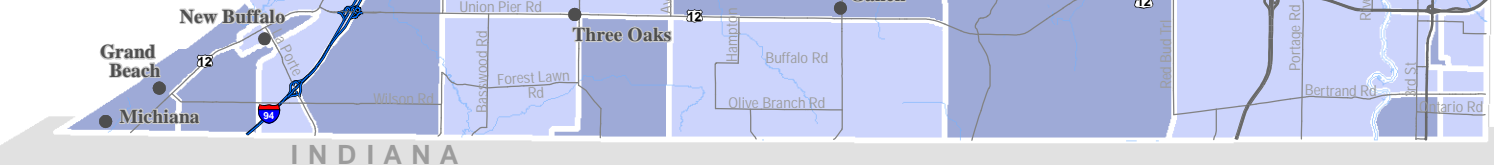
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Households: American Community Survey 5-Year Estimates 2009-2013,  
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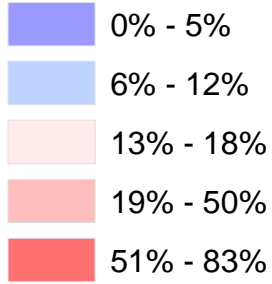
VAN BUREN COUNTY  
 CASS COUNTY

Poverty

# BERRIEN COUNTY, MICHIGAN

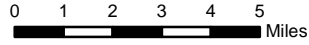


Percent of Households that received Food Stamps/Supplemental Nutrition Assistance Program (SNAP) in the past 12 months by Census Block Group. *US Census Block Groups are outlined in white.*



PERCENT OF POPULATIONS  
 Nationally: 13.5 %  
 Michigan: 16.9 %  
 Berrien County : 17.4%  
 Source: ACS 5-year 2009-2013

● City & Village



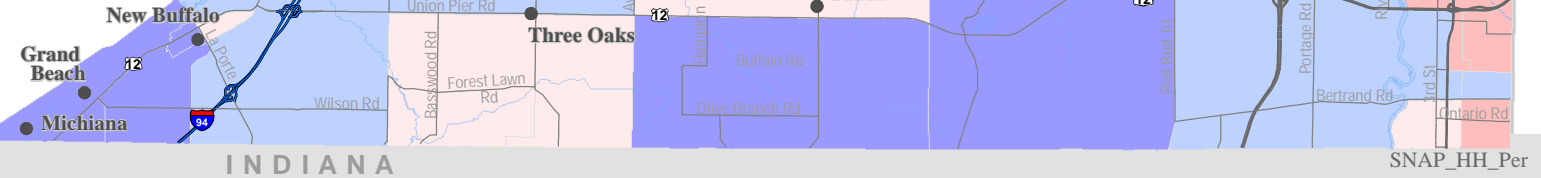
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Households: American Community Survey 5-Year Estimates 2009-2013  
 by Census Block Group, U.S. Census TIGER files, 2010

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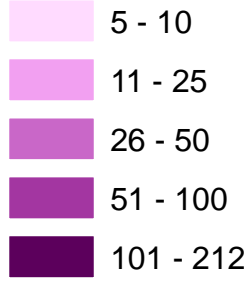
SNAP\_HH\_Per



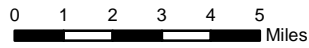
# BERRIEN COUNTY, MICHIGAN

## FEMALE HEAD OF HOUSEHOLD WITH CHILDREN

Census Block Group is outlined in white.



● City & Village



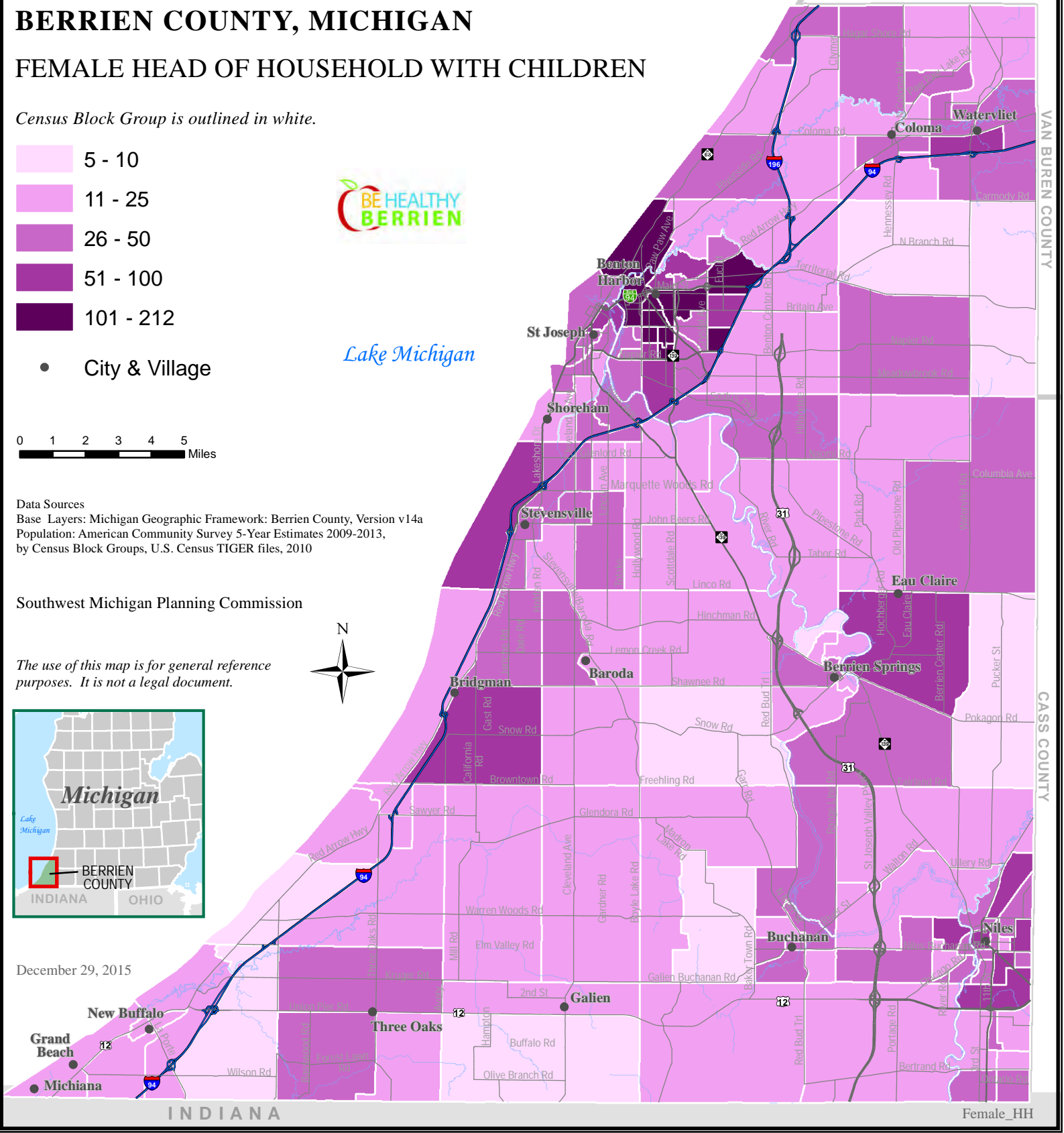
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Population: American Community Survey 5-Year Estimates 2009-2013,  
 by Census Block Groups, U.S. Census TIGER files, 2010

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Female\_HH

### **3. Living-Working Factors**

- Locations of Businesses with High Obesity-Prevalence Occupations - page 17
- K-12 School District Areas and Building Enrollment - page 18
- Percent of K-12 Students Eligible for Free/Reduced Lunch, by school building - page 19
- Total Number of Households - page 20
- Population Density, Dot Map - page 21

Community, workplace, and school structures play a key role in influencing obesity. Where people live, work, learn, and play, strongly influences social norms surrounding food, physical activity, and lifestyle. Working in occupations with high obesity-prevalence, attending schools within economically disadvantaged areas, and living in densely populated neighborhoods are factors associated with an increased risk of obesity.

# BERRIEN COUNTY, MICHIGAN

## OBESITY BY OCCUPATION

A sampling of U.S. jobs and the prevalence of obesity in the occupational group

- 41% Police officers, firefighters, security guards
- 36% Social workers, clergy, counselors
- 35% Home health aids, massage therapists
- 34% Architects, engineers
- 33% Bus drivers, truckers, garbage collectors



Source: *The Wall Street Journal, American Journal of Preventive Medicine's 2014 report based on 2010 data*

### Location of Businesses by Occupation with 10 or More Employees

- Architects/Engineers
- Health Aids
- Police/Fire Persons
- Social Workers
- Truck/Bus Drivers

● City & Village

0 1 2 3 4 5 Miles

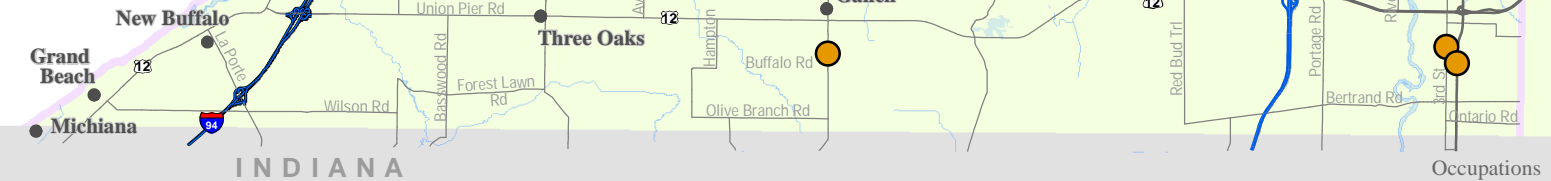
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Businesses: Standard Industrial Classification (SIC), ESRI, Community Analyst, 2015

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# BERRIEN COUNTY, MICHIGAN

## SCHOOL DISTRICTS

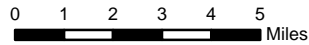
### Student Enrollment Per School



- 0 - 100
- 101 - 250
- 251 - 500
- 501 - 1018

*School District - Student Population*

- City & Village
- Selected Lake, River or Stream
- County



Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Student Population: Michigan School Data, 2014

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**New Buffalo**  
**Grand Beach**  
**Michiana**  
**New Buffalo Area Schools - 572**

**Three Oaks**

**River Valley School District - 605**

**Bridgman Public Schools - 949**

**Bridgman**

**Lakeshore School District - 2,797**

**Stevensville**

**Berrien Springs Public Schools - 2,706**

**Baroda**

**Buchanan Community Schools - 1,572**

**Buchanan**

**Niles Community School District - 3,791**

**Niles**

**Brandywine Community Schools - 1,357**

*(Galien Township School District)*

**Hagar Township S/D #6 - 63**

**Coloma Community Schools - 1,617**

**Watervliet School District - 1,434**

**Benton Harbor Area Schools - 2,468**

**Benton Harbor**

**St. Joseph Public Schools - 2,920**

**St Joseph**

**Eau Claire Public Schools - 918**

**Eau Claire**

VAN BUREN COUNTY

CASS COUNTY

INDIANA

School\_District\_Enrollment



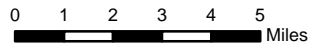
# BERRIEN COUNTY, MICHIGAN

## PERCENT OF STUDENTS ELIGIBILITY FOR REDUCED OR FREE LUNCH PROGRAM BY SCHOOL BUILDING ENROLLMENT



- 0% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%

- City & Village
- Selected Lake, River or Stream
- County



Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Student Population: Michigan School Data, 2014

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Grand Beach

Michiana

New Buffalo

Three Oaks

Galien

Buchanan

Berrien Springs

Bau Claire

Stevensville

Shoreham

St Joseph

Benton Harbor

Coloma

Watervliet

INDIANA

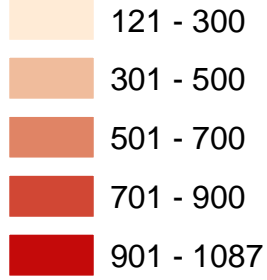
School\_Snap

# BERRIEN COUNTY, MICHIGAN



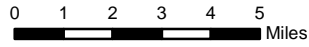
## TOTAL NUMBER OF HOUSEHOLDS BY CENSUS BLOCK GROUP

### HOUSEHOLDS



*Census Block Group is outlined in white.*

• City & Village



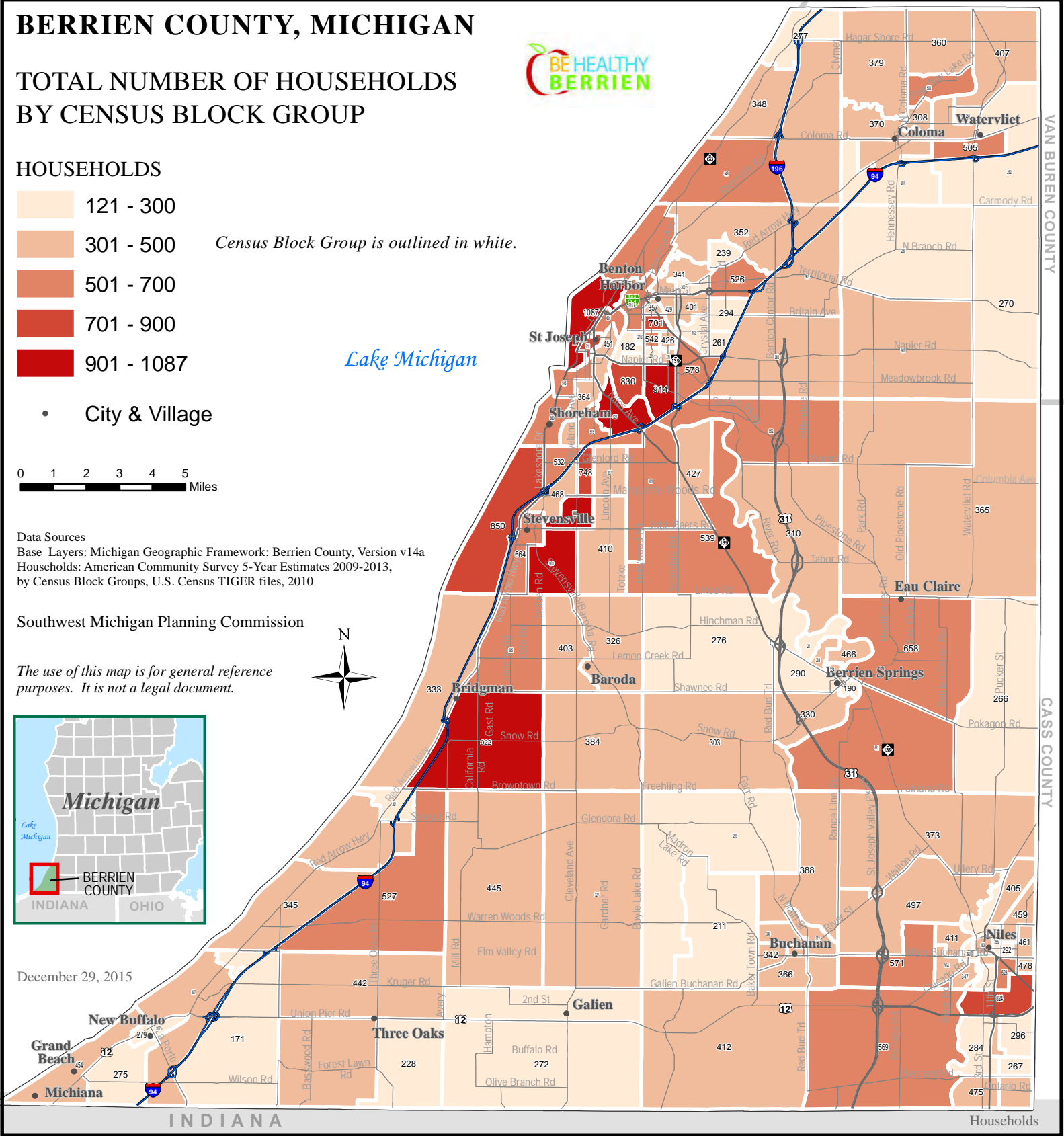
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 Households: American Community Survey 5-Year Estimates 2009-2013,  
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Households

# BERRIEN COUNTY, MICHIGAN



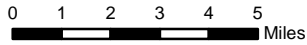
## Population Dot Map

1 Dot = 1 Person\*

\*The locations of the dots do not represent actual addresses. Individual dots are randomly located within a census block to match aggregate population totals for that block.

Berrien County Total Population = 156,914

Lake Michigan



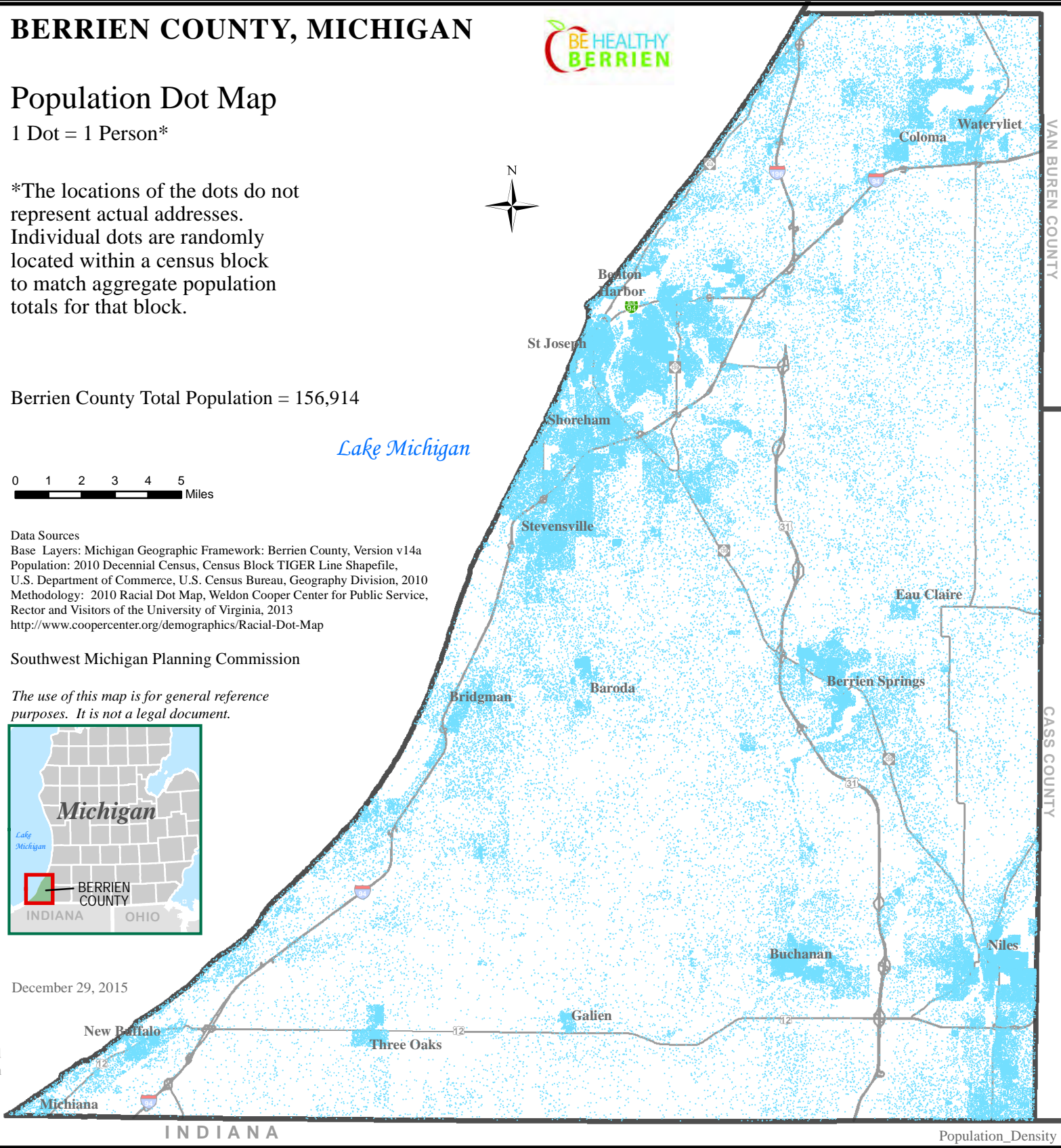
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Population: 2010 Decennial Census, Census Block TIGER Line Shapefile,  
U.S. Department of Commerce, U.S. Census Bureau, Geography Division, 2010  
Methodology: 2010 Racial Dot Map, Weldon Cooper Center for Public Service,  
Rector and Visitors of the University of Virginia, 2013  
<http://www.coopercenter.org/demographics/Racial-Dot-Map>

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Population\_Density

## 4. Community Resource Factors

- Locations of Places of Worship - page 23
- Locations of Places to Purchase Fresh Fruits and Vegetables (seasonal) - page 24
- Locations of Grocery Stores that sell Fresh Fruits and Vegetables - page 25
- Locations of Medical Services - page 26
- Existing Non-Motorized Travel Routes - page 27
- K-12 School Buildings open for Community Fitness, Outside of School Hours - page 28
- Locations of Park and Recreational Areas - page 29
- Public Transportation Service Areas and Fixed Routes - page 30

Lack of access to key community resources can contribute to poor health behaviors associated with obesity and other obesity-related illness, such as diabetes and heart disease. Many places of worship engage with the health of their communities and offer support to those dealing with health-related challenges. Lack of access to places to purchase healthy food contributes to a poor diet low in fruits and vegetables and is associated with higher obesity rates and illness. Those who live far away from medical services are less likely to receive necessary treatment and preventative care. Lack of access to places for recreation, such as parks and community fitness opportunities, is associated with lower levels of physical activity and higher obesity rates, particularly among adolescents. Lack of access to public or non-motorized transportation limits access to a wide variety of resources. Identifying locations with low access can help focus environmental interventions aimed at filling gaps in infrastructure or service.



# BERRIEN COUNTY, MICHIGAN

## CHURCHES



Church

City & Village



0 1 2 3 4 5 Miles

Data Sources  
Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
Church: Southwest Michigan Planning Commission, 2015

Southwest Michigan Planning Commission

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December 29, 2015

New Buffalo

Grand Beach

Michiana

INDIANA

Lake Michigan

Benton Harbor

St Joseph

Shoreham

Stevensville

Bridgman

Baroda

Berrien Springs

Eau Claire

Buchanan

Galien

Three Oaks

Niles

Churches

VAN BUREN COUNTY

CASS COUNTY

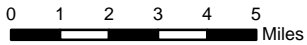
# BERRIEN COUNTY, MICHIGAN

## FRESH FRUITS & VEGETABLES



- Community Supported Agriculture (CSA) Farms
- ✱ Farm Market
- Farm Stand
- 🏠 Retail Store

● City & Village



Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Fresh Fruits & Vegetable Location: Be Healthy Berrien/Eat Local Berrien 2015  
<http://www.eatlocalberrien.org/places.asp?ait=am>

Southwest Michigan Planning Commission

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December 29, 2015

Grand Beach  
 Michiana  
 New Buffalo

INDIANA

Three Oaks  
 Galien  
 Buchanan  
 Niles

Food\_Market

Lake Michigan

VAN BUREN COUNTY

CASS COUNTY

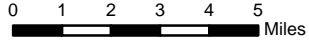
# BERRIEN COUNTY, MICHIGAN



## GROCERY STORES

Grocery Store

City & Village



Data Sources  
Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
Grocery Stores: Southwest Michigan Planning Commission, 2015

Southwest Michigan Planning Commission

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December 29, 2015

New Buffalo

Grand Beach

Michiana

INDIANA

Lake Michigan

Bridgman

Benton Harbor

St Joseph

Shoreham

Stevensville

Baroda

Galien

Eau Claire

Berrien Springs

Buchanan

Niles

Grocery\_Store

VAN BUREN COUNTY

CASS COUNTY

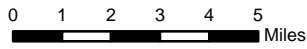
# BERRIEN COUNTY, MICHIGAN

## MEDICAL SERVICES



- Hospital
- Medical
- Mental Health
- Pharmacy

- City & Village
- Selected Lake, River or Stream
- County



Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Medical Services: Southwest Michigan Planning Commission, 2015  
 Non-Motor Trail: Southwest Michigan Planning Commission, 2013

Southwest Michigan Planning Commission

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



December 29, 2015

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

INDIANA

Medical\_Services



# BERRIEN COUNTY, MICHIGAN

## NON- MOTORIZED TRAVEL

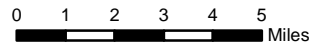
### Primary Roads with Traffic Volume\*

- Light - Under 2,500
- Medium - 2,500 to 10,000
- Heavy - Above 10,000

\*Traffic volume are estimated based on an average 24-hour period.



- 4 Ft Shoulder
- Non-motorized Trail
- Trail Head
- Highway
- Roads not Rated
- City & Village
- County



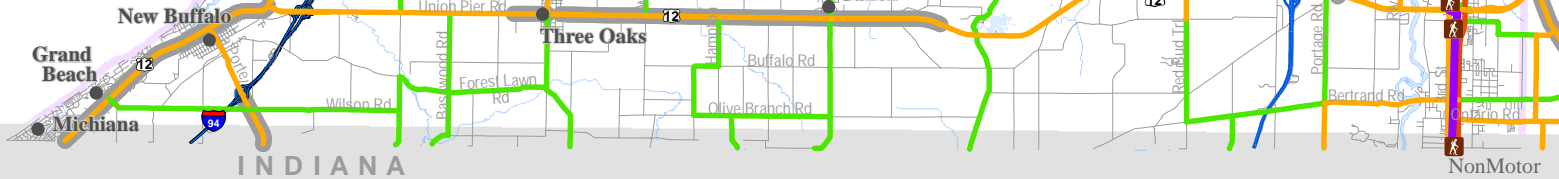
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 4 Ft Shoulders: Southwest Michigan Planning Commission, 2009  
 Non-Motor Trail: Southwest Michigan Planning Commission, 2013

Southwest Michigan Planning Commission

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



December 29, 2015



# BERRIEN COUNTY, MICHIGAN

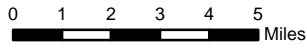
## WALKING TO WELLNESS SCHOOLS & BUILDINGS OPEN AFTER HOURS



- Building Open After Hours
- Other Schools (not open)

*Orchards Mall located at Napier and  
Pipestone is open after hours.  
All other locations are school buildings.*

- City & Village
- Selected Lake, River or Stream
- County

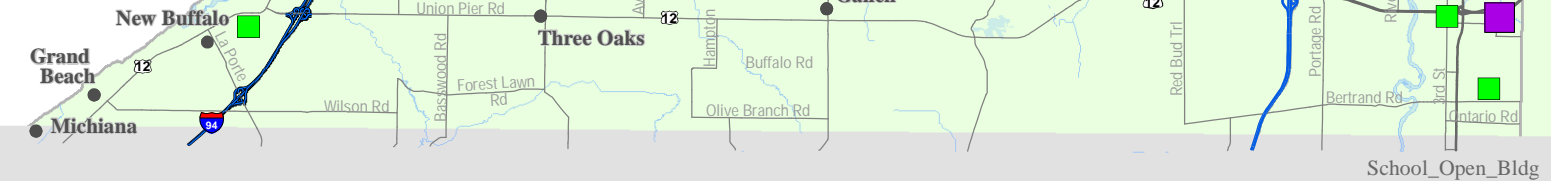


Data Sources  
Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
Schools & Buildings: Southwest Michigan Planning Commission, 2015

Southwest Michigan Planning Commission  
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purposes. It is not a legal document.*



December 29, 2015



School\_Open\_Bldg

# BERRIEN COUNTY, MICHIGAN

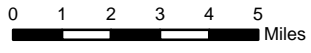
## PARKS AND RECREATIONAL AREAS



- Trailhead
- Beach
- Campground
- Golf Course
- Parks
- Public Access
- School

Recreational Areas

City & Village



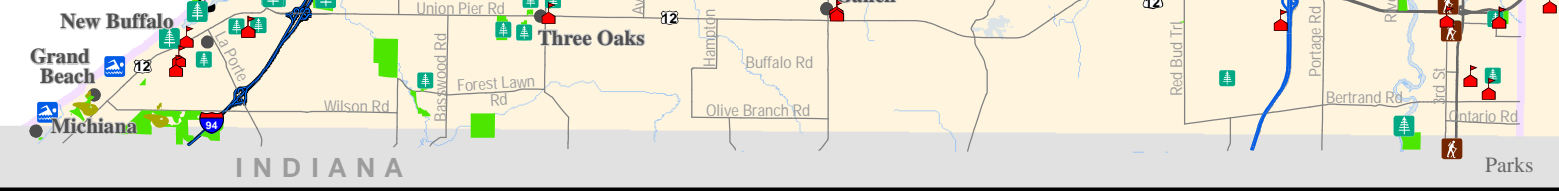
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Parks and Recreational Areas: Southwest Michigan Planning Commission, 2015

Southwest Michigan Planning Commission

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December 29, 2015

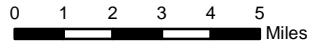


# BERRIEN COUNTY, MICHIGAN



## TRANSIT SERVICE AREAS AND FIXED ROUTES

- Berrien Bus
  - Buchanan Dial-a-Ride
  - Niles Dial-a-Ride
  - Twin Cities Area Transit Authority
  - Urban Area Without Service
- City & Village



Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Transit Areas & Bus Routes: Southwest Michigan Planning Commission, 2015

Southwest Michigan Planning Commission

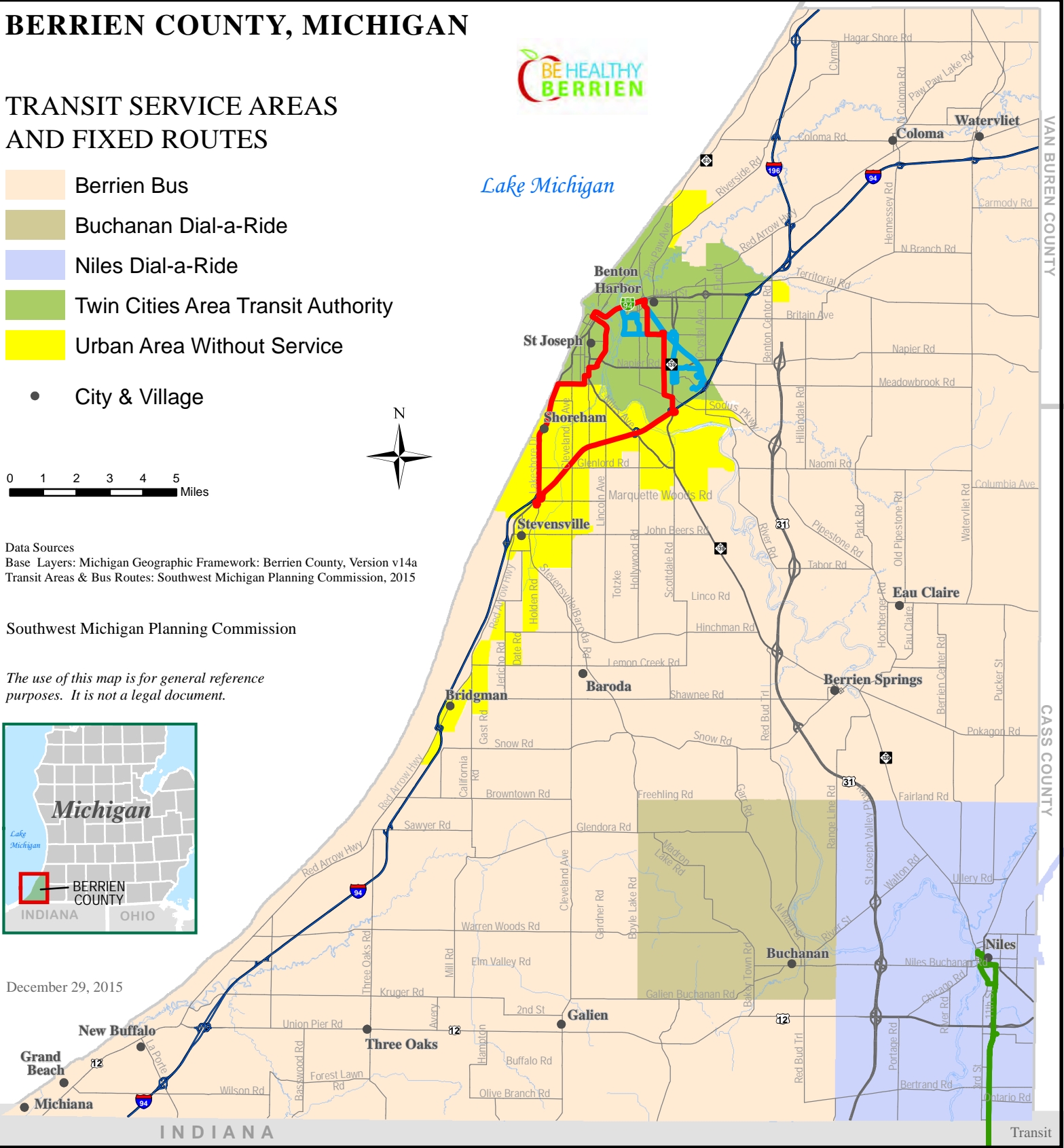
*The use of this map is for general reference purposes. It is not a legal document.*



December 29, 2015

Grand Beach  
 Michiana  
 New Buffalo

INDIANA



Transit

## 5. Policy-Program Factors

- Municipalities that have Prioritized Walkability in Master Planning - page 32
- Transportation Study Non-Motorized Travel Route Recommendations - page 33
- Transportation Study Detailed Non-Motorized Travel Route Recommendations - page 34
- Municipalities that have Prioritized Non-Motorized Facility Upgrades in Recreation Planning - page 35
- K-12 Schools that have requested Michigan Team Nutrition ® Materials - page 36
- K-12 Schools that have registered with the Safe Routes to Schools Program - page 37

Policies are laws, ordinances, or regulations, either formal or informal, which influence the risk of obesity. These factors play a major role in determining the choices individuals make regarding health behaviors. The goal of changing Policy factors is to create long-lasting change and improvement in the health of the entire community. The Be Healthy Berrien 2015-2020 Strategic Plan specifically addresses policies related to non-motorized transportation and k-12 environments.

The connections between health and transportation are wide-ranging. Because the transportation system helps shape how communities are designed and operate, it can have a profound influence -- both positive and negative -- on public health<sup>3</sup>. Where transportation infrastructure is designed to accommodate or even encourage non-motorized transportation, such as through complete streets policies, it can have a positive effect on public health<sup>3</sup>. By making walking and biking safe and convenient, we can make it much easier for people to build routine physical activity into their daily lives.

Health behaviors of adolescents who attend k-12 educational institutions are strongly influenced by the policies, practices, and environments of the school in which they are enrolled. Schools that have indicated an interest in enhancing nutrition programs or implementing Safe Routes to Schools ® programs are more likely to have policies and practices that support healthy behaviors, like eating fruits and vegetables and participating in physical activity.

---

<sup>3</sup> Raynault, E. & Christopher, E. (2013). How Does Transportation Affect Public Health?. Public Roads, 76(6), . Retrieved from <https://www.fhwa.dot.gov/publications/publicroads/13mayjun/05.cfm>



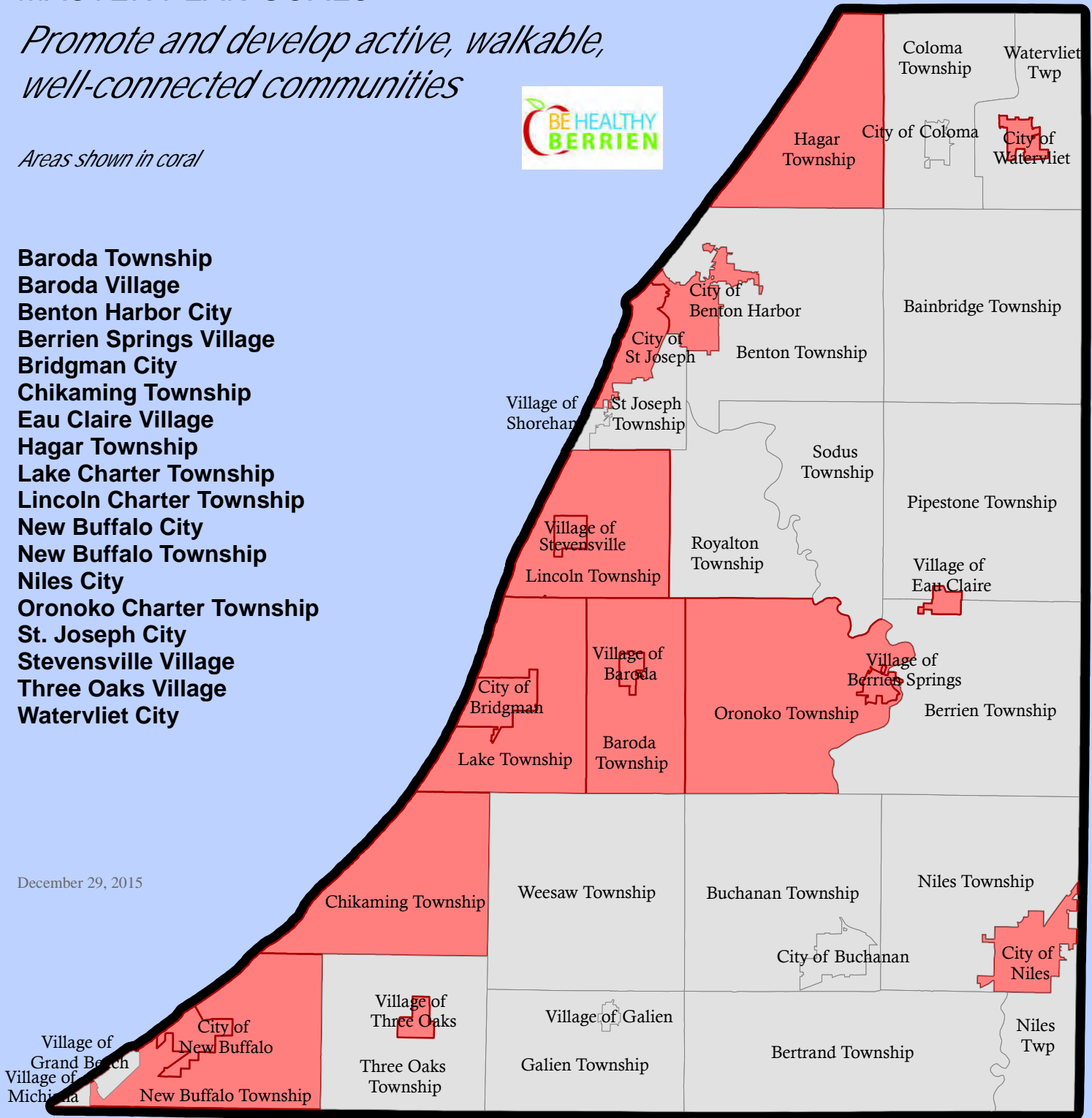
# MASTER PLAN GOALS

*Promote and develop active, walkable, well-connected communities*

*Areas shown in coral*



- Baroda Township**
- Baroda Village**
- Benton Harbor City**
- Berrien Springs Village**
- Bridgman City**
- Chikaming Township**
- Eau Claire Village**
- Hagar Township**
- Lake Charter Township**
- Lincoln Charter Township**
- New Buffalo City**
- New Buffalo Township**
- Niles City**
- Oronoko Charter Township**
- St. Joseph City**
- Stevensville Village**
- Three Oaks Village**
- Watervliet City**



December 29, 2015

# BERRIEN COUNTY, MICHIGAN

## RECOMMENDED NON-MOTORIZED TRAIL PLANS\*

 Non-motorized Local Plan


 Non-motorized Regional Plan




Selected planned, non-motorized routes were buffered at a 1 mile to highlight Regional and Local connecting trails.

\*The Non-motorized Trail Plan routes were created from a variety of sources included local master plans, public input meetings, and governmental bodies. The complete report, *Connecting Communities: A Regional Vision for Non-Motorized Transportation in Southwest Michigan* [http://www.swmpc.org/downloads/final\\_plan\\_1.pdf](http://www.swmpc.org/downloads/final_plan_1.pdf)

 4 Ft Shoulder

 Non-motorized Trail

 Trail Head

 City & Village

0 1 2 3 4 5 Miles

Lake Michigan



Data Sources

Base Layers: Michigan Geographic Framework: Berrien County, Version v14a

4 Ft Shoulders: Southwest Michigan Planning Commission, 2009

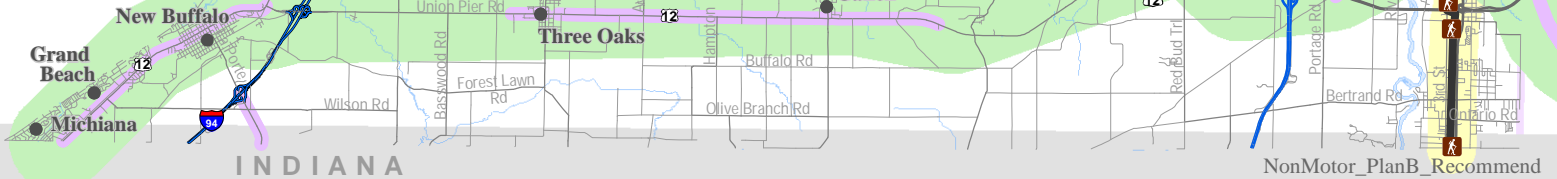
Non-Motor Trail: Southwest Michigan Planning Commission, 2013

Southwest Michigan Planning Commission

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December 29, 2015



NonMotor\_PlanB\_Recommend

# BERRIEN COUNTY, MICHIGAN



## RECOMMENDED NON-MOTORIZED TRAIL PLANS\*



-  Off Road
-  On Road





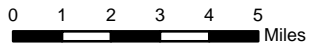
\*Non-motorized Trail Plan routes were created from a variety of sources included local master plans, public input meetings, and governmental bodies. The complete report, *Connecting Communities: A Regional Vision for Non-Motorized Transportation in Southwest Michigan* [http://www.swmpc.org/downloads/final\\_plan\\_1.pdf](http://www.swmpc.org/downloads/final_plan_1.pdf)

Selected planned, non-motorized routes were buffered at 1 mile to highlight Regional and Local connecting trails.

-  Non-motorized Local Plan
-  Non-motorized Regional Plan

-  4 Ft Shoulder
-  Non-motorized Trail

-  Trail Head
-  City & Village



Lake Michigan



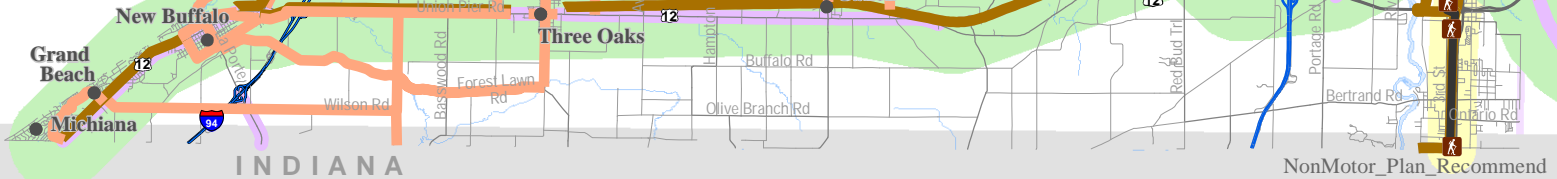
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 4 Ft Shoulders: Southwest Michigan Planning Commission, 2009  
 Non-Motor Trail: Southwest Michigan Planning Commission, 2013

Southwest Michigan Planning Commission

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December 29, 2015



NonMotor\_Plan\_Recommend





# RECREATION PLAN GOALS

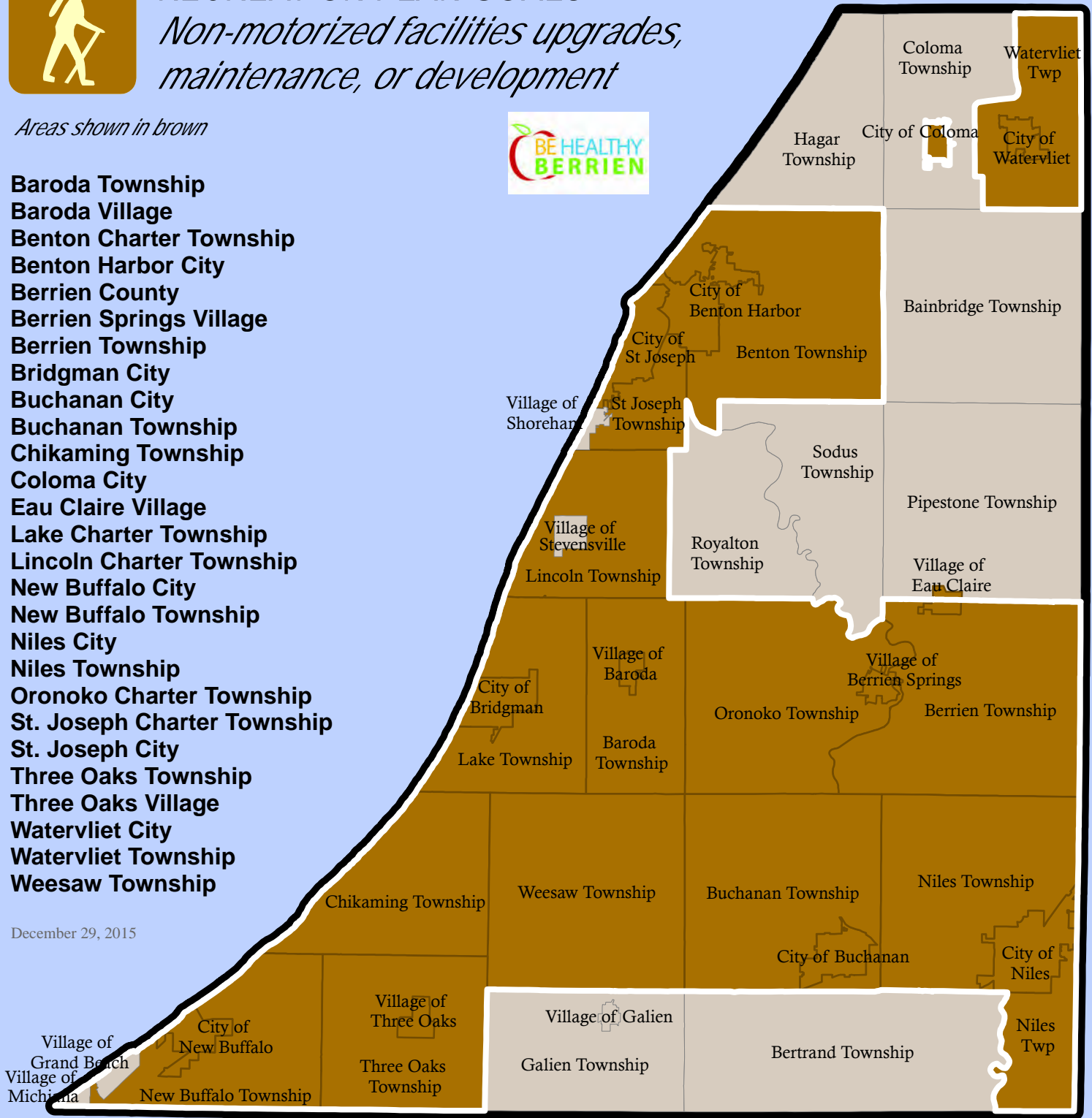
*Non-motorized facilities upgrades, maintenance, or development*

Areas shown in brown



- Baroda Township**
- Baroda Village**
- Benton Charter Township**
- Benton Harbor City**
- Berrien County**
- Berrien Springs Village**
- Berrien Township**
- Bridgman City**
- Buchanan City**
- Buchanan Township**
- Chikaming Township**
- Coloma City**
- Eau Claire Village**
- Lake Charter Township**
- Lincoln Charter Township**
- New Buffalo City**
- New Buffalo Township**
- Niles City**
- Niles Township**
- Oronoko Charter Township**
- St. Joseph Charter Township**
- St. Joseph City**
- Three Oaks Township**
- Three Oaks Village**
- Watervliet City**
- Watervliet Township**
- Weesaw Township**

December 29, 2015



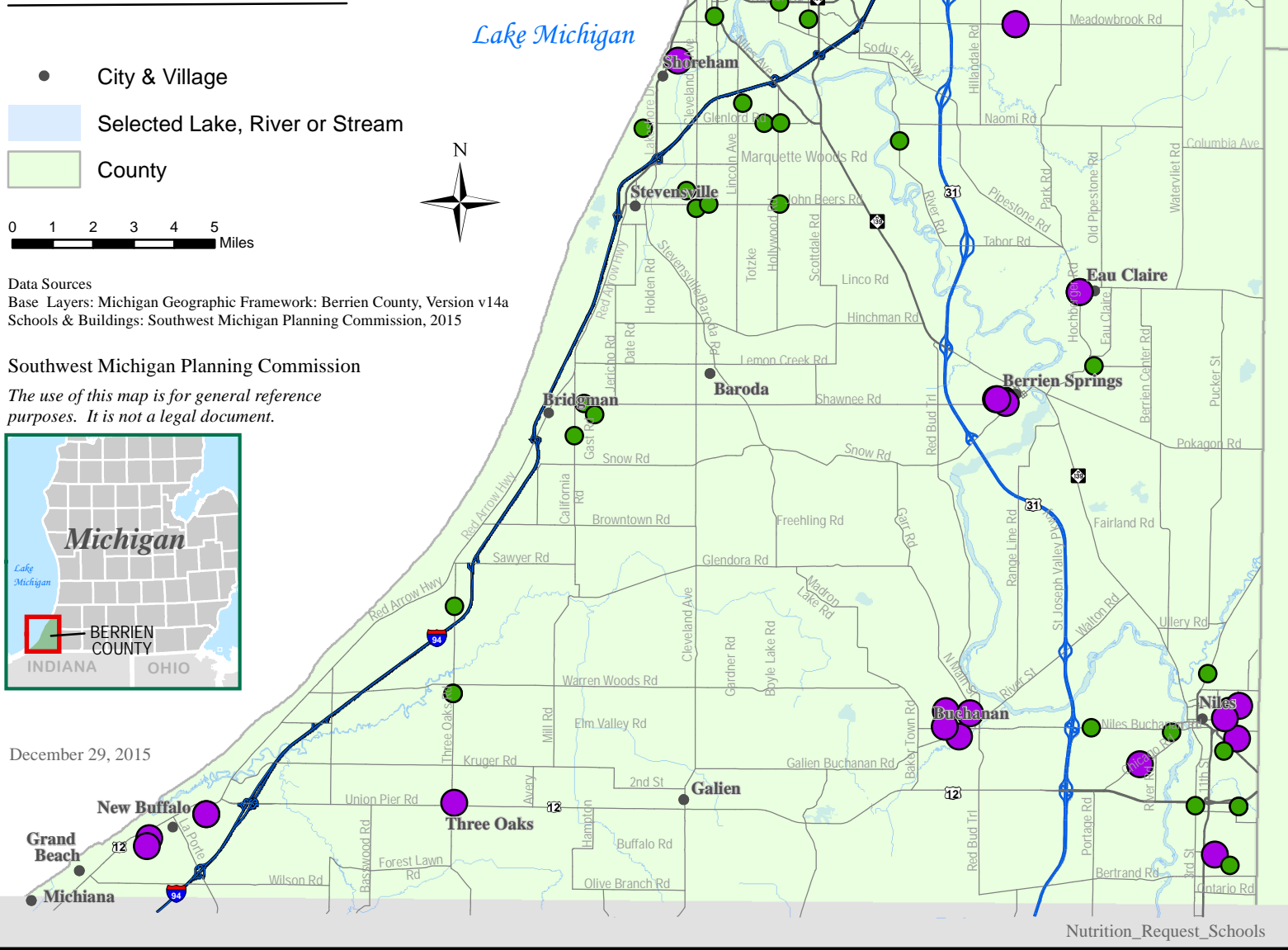
# BERRIEN COUNTY, MICHIGAN



## SCHOOLS THAT HAVE REQUESTED AND RECEIVED TEAM NUTRITION\* MATERIALS

- Schools Receiving Team Nutrition Materials
- Other School

\*Team Nutrition is an initiative of the USDA Food and Nutrition Service to support the Child Nutrition Programs through training and technical assistance for foodservice, nutrition education for children and their caregivers, and school and community support for healthy eating and physical activity. <http://www.fns.usda.gov/tn/team-nutrition>



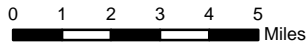
# BERRIEN COUNTY, MICHIGAN

## SCHOOLS THAT HAVE REGISTERED WITH THE SAFE ROUTES TO SCHOOL PROGRAM



- Registered Schools
- Other Schools (not registered)

- City & Village
- Selected Lake, River or Stream
- County



Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Schools & Buildings: Southwest Michigan Planning Commission, 2015

Southwest Michigan Planning Commission

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



December 29, 2015

Grand Beach  
 Michiana

New Buffalo

Three Oaks

Galion

Buchanan

Berrien Springs

Baroda

St Joseph

Stevensville

Shoreham

Benton Harbor

Coloma

Watervliet

Eau Claire

Niles

Safe\_Routes\_School

## 6. Health Indicator Maps – By Zip Code (Coming Soon)

- Obesity
- No Leisure-time Physical Activity
- Adequate Aerobic Physical Activity
- Adequate Fruit and Vegetable Consumption
- Diabetes
- Hypertension
- Cholesterol
- Cardiovascular Disease

Berrien County Health Indicator data comes from the Berrien County Behavior Risk Factor Survey (BRFS), a telephone survey conducted every three years. The BRFS is intended to monitor the health and associated behaviors of the adult population. It measures certain chronic diseases, behaviors associated with negative health outcomes, screening rates, and other health-related actions<sup>4</sup>. Mapping Health Indicator data can locate specific areas with higher rates of chronic diseases and behaviors associated with negative health outcomes. This information is useful for targeting specific health-improvement interventions to people who need it most as well as indicating areas where additional information should be gathered to learn about potential causes of the high rates.

---

<sup>4</sup> Berrien County Behavior Risk Factor Survey. 2011 Status Report.

# ***Part 2***

## ***Relationship Maps***

The process of creating Geographic Information System maps to identify areas with higher obesity-related risks helps to inform Be Healthy Berrien's action plan. This process began with identifying and collecting data sets associated with action items in the Be Healthy Berrien 2015-2020 Strategic Plan. These data sets were used to create individual maps, with one data-set per map. Complimentary action items within the Be Healthy Berrien 2015-2020 Strategic Plan were grouped into thematic approaches: Healthy Policies, Access to Healthy Food, Access to Physical Activity, Active Transportation, and Healthy k-12 Schools. Then, the individual maps were combined based on thematic approaches like, risk factors of obesity, and social determinants of health. The relationships in these layered maps were analyzed and high-risk areas were isolated and mapped.

## 1. Thematic Approach: Healthy Policies

Our health is determined in part by access to social and economic opportunities. The conditions in which we live explain in part why some Americans are healthier than others and why Americans more generally are not as healthy as they could be. The following maps were created to identify census blocks where these social determinant risk-factors are most prevalent.

- *Adults age 25 and over without a high school diploma who are living in poverty and do not have a vehicle - page 42*

This map identifies census blocks with the highest percentage of households with no vehicle combined with the highest percentage of the population (25 years and older) with no high school diploma. These areas are identified in shades of orange. This is then overlaid with black diagonal lines indicating areas with at least 16 percent of households with income below the poverty line. The national poverty average is 15.4 percent. The areas identified with black diagonal lines have a higher-than-average poverty rate. The areas with the highest risk are identified with dark orange shading with black diagonal lines. Combining these factors allows us to see the census blocks that have higher risk of obesity and poor health outcomes based on these social determinant factors. Identifying this information allows us to pinpoint census blocks where health policy interventions are most needed.

- *Healthcare access for households who are living in poverty and who don't have a vehicle - page 43*

This map identifies census blocks with the highest percentage of households with no vehicle combined with the highest percentage of the population (25 years and older) with no high school diploma. These areas are identified in shades of orange. This information is then overlaid with the locations of medical service facilities. This map displays the census blocks with populations who may have a difficult time accessing healthcare services. Identifying this information allows us to advocate for additional infrastructure in these areas that is designed to connect these individuals to the healthcare system. These interventions are aimed to increase access to help individuals receive treatment and education to improve health and reduce the risk of illness, including obesity.



# HOUSEHOLDS IN POVERTY WITH NO VEHICLE AND NO HIGH SCHOOL DIPLOMA



## BERRIEN COUNTY, MICHIGAN

### Areas with High Poverty

 > 16 % National Average 15.4 %



Highest Percentage of Households with No Vehicle and Highest Percentage of \*Populations with No High School Diploma

 High  
 Highest

\*Population 25 years and older

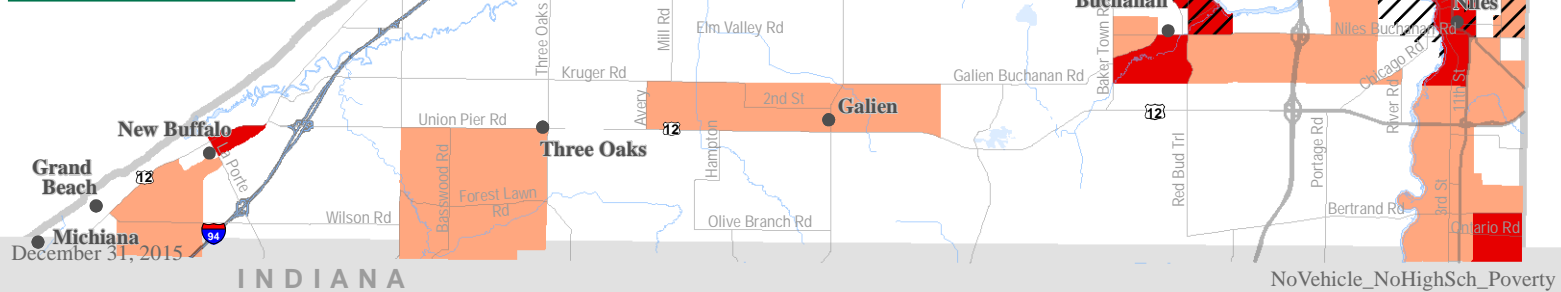
• City & Village

0 1 2 3 4 5 Miles



Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Poverty, No Vehicle, & No Diploma: American Community Survey 5-Year Estimates 2009-2013, by Census Block Groups, U.S. Census TIGER files, 2010

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



NoVehicle\_NoHighSch\_Poverty

# BERRIEN COUNTY, MICHIGAN

## HOUSEHOLDS IN POVERTY WITH NO VEHICLE ACCESS TO HEALTH CARE

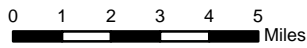
HIGHEST PERCENTAGE OF HOUSEHOLDS WITH INCOME BELOW POVERTY LEVEL & HOUSEHOLDS WITH NO VEHICLE

Census Block Group is outlined in white.



- High
- Highest

- Hospital
- Medical Facility
- Mental Health Facility



Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Households: American Community Survey 5-Year Estimates 2009-2013,  
 by Census Block Groups, U.S. Census TIGER files, 2010

Southwest Michigan Planning Commission

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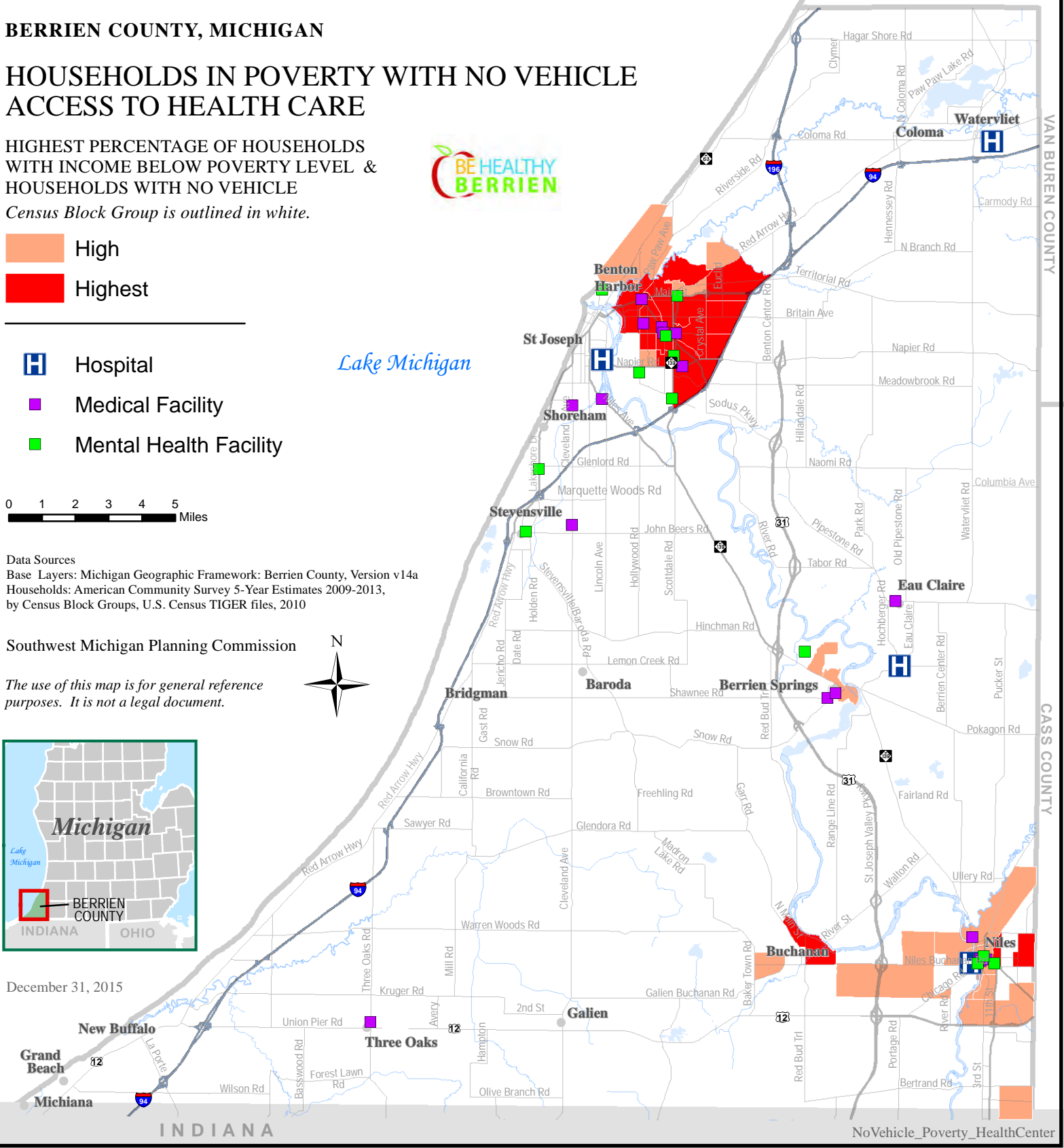


December 31, 2015

Grand Beach  
 New Buffalo  
 Michiana

INDIANA

NoVehicle\_Poverty\_HealthCenter



## 2. Thematic Approach: Access to Healthy Food

Lack of access to healthy food contributes to a poor diet and can lead to higher levels of obesity and other diet-related illness, such as diabetes and heart disease. The following maps were created to identify census blocks where it is more difficult for community members to access healthy foods, such as fruits and vegetables.

- *Pedestrian access to grocery stores - page 46*

This map identifies pedestrian access to full-service grocery stores. A one-half mile walking route buffer, indicated in orange, surrounds each full-service grocery store, which are indicated by a green dot. One-half mile is a standard distance used by planners as a reasonable walking distance to a key destination. Walking distances are created by referencing a road layer (with major highways removed), to calculate a walking distance (along the roads) from the grocery stores. The distances do not account for roads that are not pedestrian friendly due to factors such as high speeds, and lack of either shoulders or sidewalks. This map allows us to identify the census blocks that are not in close physical proximity to healthy food.

- *Food access for households that receive SNAP benefits - page 47*

This map identifies census blocks with the highest percentage of households that received SNAP (Food Stamp/Supplemental Nutrition Assistance Program) benefits within the last 12 months, indicated in shades of purple. This information is then overlaid with pedestrian access to grocery stores. Pedestrian access is defined here as a one-half mile walking route buffer, indicated in orange, surrounding each full-service grocery store. This map allows us to identify the census blocks where a high number of residents live who have financial burdens to accessing healthy food and the census blocks that have physical proximity burdens to accessing healthy food.

- *Food access for households without a vehicle - page 48*

This map identifies census blocks with the highest percentage of households with no vehicle, indicated in shades of purple. This information is then overlaid with pedestrian access to grocery stores. Pedestrian access is defined here as a one-half mile walking route buffer, indicated in orange, surrounding each full-service grocery store. Comparing these data sets allows us to identify areas where physical proximity gaps in healthy food access may be the greatest.

- *Food access for households without a vehicle who receive SNAP benefits - page 49*


This map identifies census blocks with the highest percentage of households with no vehicle combined with the highest percentage of households that received SNAP (Food Stamp/Supplemental Nutrition Assistance Program) benefits within the last 12 months, indicated in shades of purple. This information is then overlaid with pedestrian access to grocery stores. Pedestrian access is defined here as a one-half mile walking route buffer, indicated in orange, surrounding each full-service grocery store. Comparing these data sets allows us to identify areas where physical proximity gaps and financial burden gaps in healthy food access may be the greatest. This information allows us to pinpoint food access interventions to the census blocks where the greatest gaps in food access exist.

# BERRIEN COUNTY, MICHIGAN

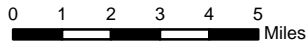
## GROCERY STORES - PEDESTRIAN ACCESS

### Walking Distance\* from Grocery Stores

 1/2 Mile

 Grocery Store

\*Walking Distances are created by referencing a road layer (with major highways removed), to calculate a walking distance (along the roads) from the grocery stores. The distances do not factor in roads that are not pedestrian friendly due to factors such as high speeds, lack of either shoulders or sidewalks.



Data Sources  
Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
Grocery Stores: Southwest Michigan Planning Commission, 2015

Southwest Michigan Planning Commission

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



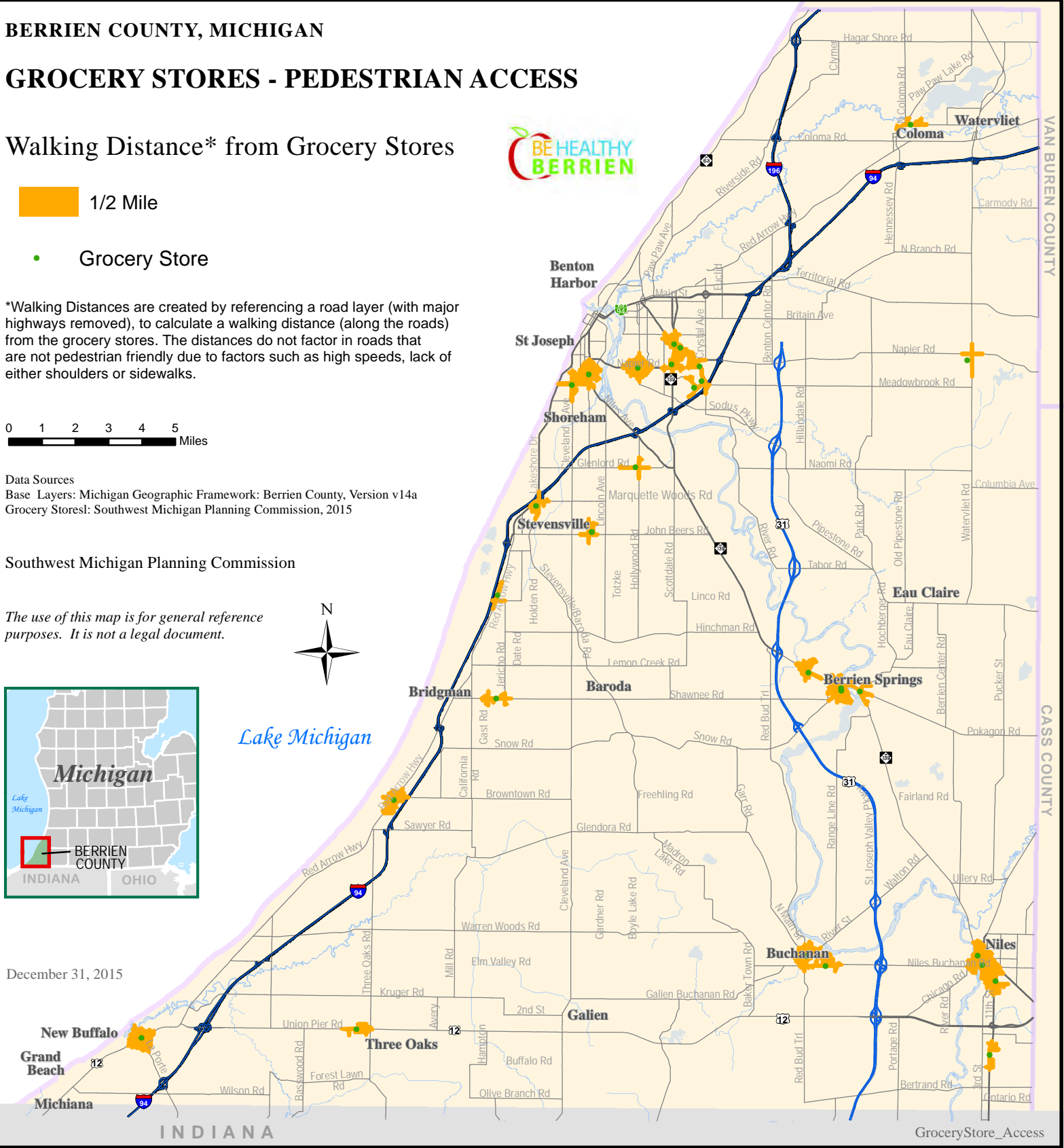
Lake Michigan



December 31, 2015

New Buffalo  
Grand Beach  
Michiana

INDIANA



GroceryStore\_Access

# BERRIEN COUNTY, MICHIGAN

## FOOD ACCESS FOR HOUSEHOLDS WITH SNAP

Highest percentage of households that received Food Stamps/Supplemental Nutrition Assistance Program (SNAP) in the past 12 months



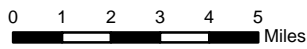
US Census Block Groups are outlined in white.

- 18% - 50%
- 51% - 83%

**PERCENT OF HOUSEHOLDS (SNAP)**  
 Nationally: 13.5 %  
 Michigan: 16.9 %  
 Berrien County : 17.4%  
 Source: ACS 5-year 2009-2013

- City & Village
- 1/2 Mile Walking Distance from a Grocery Store\*

\*Walking Distances are created by referencing a road layer (with major highways removed), to calculate a walking distance (along the roads) from the grocery stores. The distances do not factor in roads that are not pedestrian friendly due to factors such as high speeds, lack of either shoulders or sidewalks.



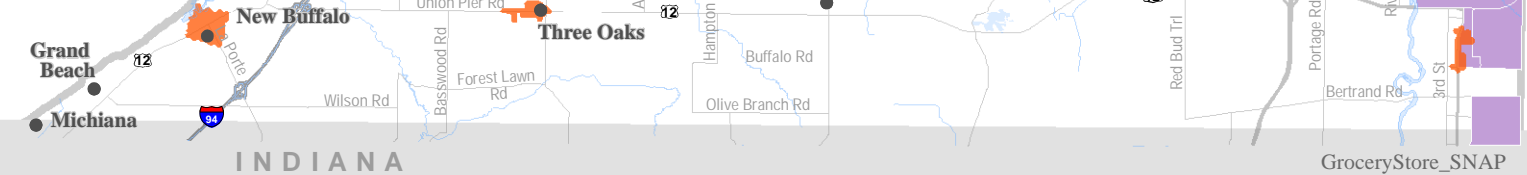
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Households: American Community Survey 5-Year Estimates 2009-2013 by Census Block Group, U.S. Census TIGER files, 2010  
 Grocery Stores & Buffer: SWMPC, 2015

Southwest Michigan Planning Commission

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December 31, 2015





# BERRIEN COUNTY, MICHIGAN

## FOOD ACCESS FOR HOUSEHOLDS WITH NO VEHICLE

### Highest Percentage of Households with No Vehicle

US Census Block Groups are outlined in white.

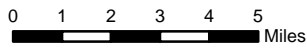


- 10% - 25%
- 25% - 51.4%

**PERCENT HOUSEHOLDS WITH NO VEHICLE**  
 Nationally: 9.1%  
 Michigan: 7.8%  
 Berrien County: 8.4%

- City & Village
- 1/2 Mile Walking Distance From a Grocery Store\*

\*Walking Distances are created by referencing a road layer (with major highways removed), to calculate a walking distance (along the roads) from the grocery stores. The distances do not factor in roads that are not pedestrian friendly due to factors such as high speeds, lack of either shoulders or sidewalks.



Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Households: American Community Survey 5-Year Estimates 2009-2013  
 by Census Block Group, U.S. Census TIGER files, 2010  
 Grocery Store & Buffers: Southwest Michigan Planning Commission, 2015

Southwest Michigan Planning Commission

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



December 31, 2015



# BERRIEN COUNTY, MICHIGAN

## FOOD ACCESS FOR HOUSEHOLDS WITH SNAP AND NO VEHICLE

Highest Percentage of Households with No Vehicle and/or Households Receiving SNAP

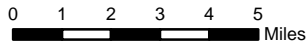
US Census Block Groups are outlined in white.

- High
- Highest

CLASSES WERE CREATED BY ADDING THE PERCENT OF OF HOUSEHOLDS WITH NO VEHICLE & THE PERCENT OF HOUSEHOLDS RECEIVING SNAP. SHOWN ARE THE HIGHER TWO CLASSES OF THE RESULTS.

1/2 Mile Walking Distance From a Grocery Store

City & Village



Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Households: American Community Survey 5-Year Estimates 2009-2013  
 by Census Block Group, U.S. Census TIGER files, 2010

Southwest Michigan Planning Commission

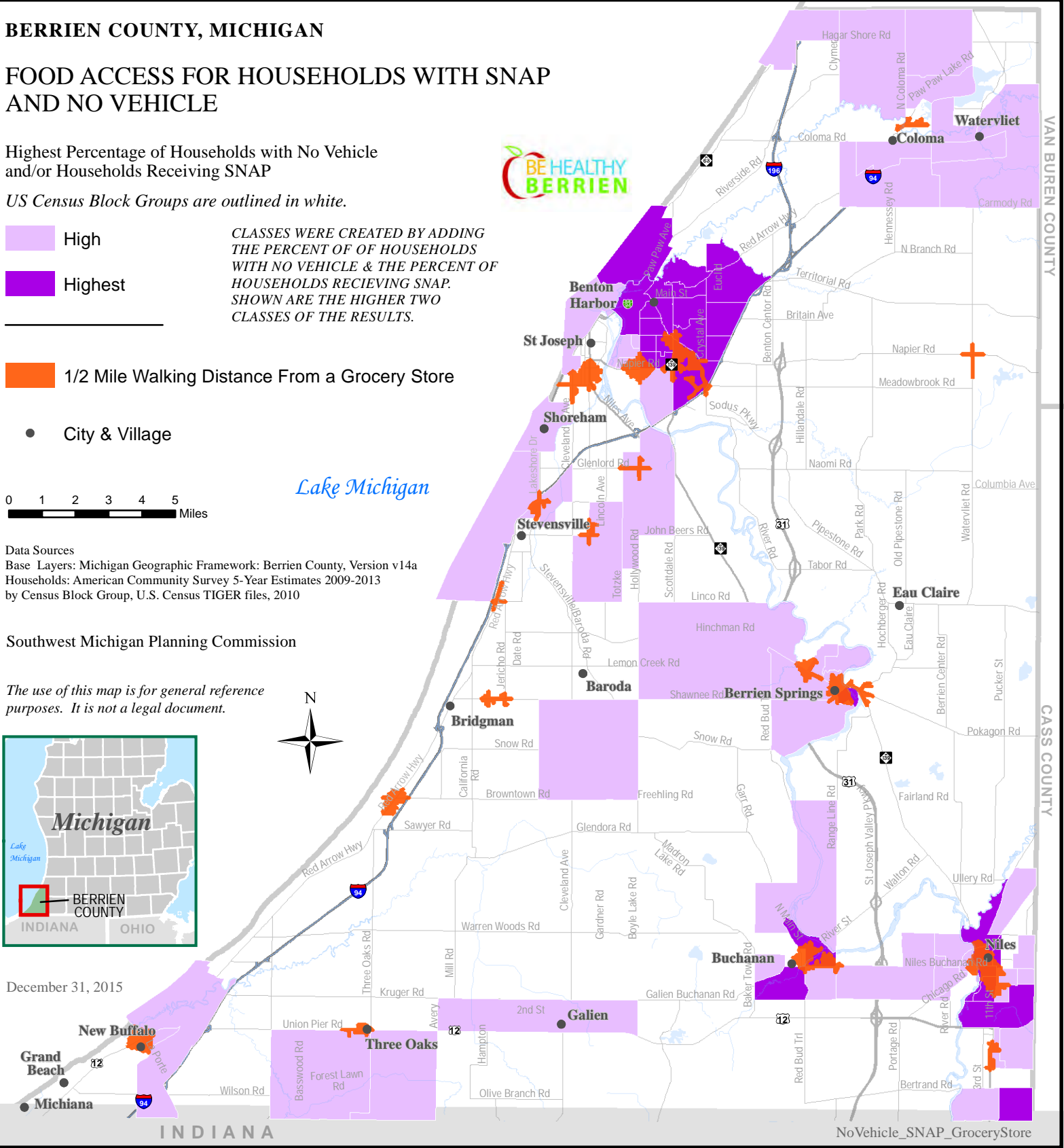
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December 31, 2015

Grand Beach  
 Michiana

INDIANA



NoVehicle\_SNAP\_GroceryStore

### 3. Thematic Approach: Access to Physical Activity

Improving access to places for recreation increases physical activity levels. Access is strongly associated with higher levels of physical activity and lower obesity rates, particularly among adolescents. The following maps identify physical activity resources and community members' access to these places. Gaps exist in the population-dense communities that are not in close proximity or do not have walking access to places for physical activity.

- *Walking Access to Parks and Recreational Areas - page 52*

This map identifies pedestrian access to parks and recreational facilities including small neighborhood parks and playgrounds, medium parks and athletic fields, larger parks, and linear trails. Walking route buffers surround each park/recreational area, in various distances, according to the size of the park. A buffer of one-quarter mile surrounds small neighborhood parks and playgrounds, indicated in pink. A buffer of one-half mile surrounds medium parks and athletic fields, indicated in teal. A buffer of one mile surrounds larger parks, indicated in green. And a buffer of one mile surrounds linear trails, indicated in yellow. Each buffer distance is a standard distance used by planners as a reasonable walking distance to these destinations. Walking distances are created by referencing a road layer (with major highways removed), to calculate a walking distance (along the roads) from the recreational facility. The distances do not account for roads that are not pedestrian friendly due to factors such as high speeds, and lack of either shoulders or sidewalks. Mapping walking access to park and recreational facilities allows us to determine how many residents live within walking distance to these facilities, as well as how many and where residents live without walkable access.

- *Youth walking access to park and recreational areas - page 53*

This map identifies census blocks where the highest percentages of 5-17 year olds live, indicated in shades of purple. This information is then overlaid with pedestrian access to park and recreational facilities. Pedestrian access is defined with various distances, depending on the size of the park/recreational area. The distances are indicated in different colors, with one-quarter mile indicated in pink, one-half mile indicated in teal, one mile to large parks in green, and one mile to linear trails in yellow. Youth access to places for physical activity is very strongly associated with the higher levels of physical activity participation as well as lower body weight. Youth are most likely to access these community resources by walking or biking. This map allows us to identify youth populations who do not have walking access to park and recreational facilities. These youth are less likely to have adequate physical activity.

- *Population Density Near Schools Open For Community Fitness After Hours - page 54*

This map identifies population size by census block, indicated in shades of green. This information is then overlaid with the location of k-12 school buildings. Those buildings that are open after hours for community fitness are indicated as a purple square. Those buildings that are not open after hours are indicated as a grey square. Orchards mall, which is located at Napier and Pipestone, is open for indoor walking and is also indicated with a purple square.

- *Walking Access to Non-Motorized Trails (Bicycling and Walking Paths) - page 55*

This map identifies pedestrian access to non-motorized trails (walking and bicycling paths). A one-mile walking route buffer, indicated in orange, surrounds each of these non-motorized trails. One mile is a standard distance used by planners as a reasonable walking distance to a key destination. The distances do not account for roads that are not pedestrian friendly due to factors such as high speeds, and lack of either shoulders or sidewalks. Non-motorized trails are defined as having the following characteristics: greater than 6-feet wide, separated from the road, one-half mile long and linear. This data, when combined with population data, tells us that only 20 percent of Berrien County residents live within a walkable distance from a non-motorized trail. This number can be increased through expanding non-motorized trail routes and creating more regional connections and local routes.

# BERRIEN COUNTY, MICHIGAN

## ACCESS TO RECREATIONAL FACILITIES

### Walking Distance\* from Recreational Facilities

#### TYPES\*\*

- 0.25 mile from Smaller Parks & Playgrounds
- 0.50 mile from Medium Parks & Athletic Fields
- 1.0 mile from Larger Parks
- 1.0 mile from Linear Trails

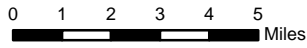
\*Walking Distances are created by referencing a road layer (with major highways removed), to calculate a walking distance (along the roads) from the recreational facility. The distances do not factor in roads that are not pedestrian friendly due to factors such as high speeds, lack of either shoulders or sidewalks.

\*\*The different types of recreational facilities are grouped according to their capacity to attract people to the facility. The groupings were based on research that shows, both size and the number of assets at a facility, dictates the distance people will be willing to walk to a facility.

35% of Berrien County Residence live within a walkable\* distance\*\* from a recreational facility.



County



Data Sources  
Base Layers: Michigan Geographic Framework: Berrien County, Version v14a

Southwest Michigan Planning Commission

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



December 31, 2015

Grand Beach  
Michiana  
New Buffalo  
Three Oaks

INDIANA

Park\_Access



# BERRIEN COUNTY, MICHIGAN

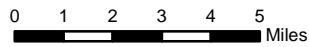
## YOUTH ACCESS TO RECREATION

### Walking Distance from Recreational Facilities TYPES

- 0.25 mile from Smaller Parks & Playgrounds
- 0.50 mile from Medium Parks & Athletic Fields
- 1.0 mile from Larger Parks
- 1.0 mile from Linear Trails

### Highest Percentage of Populations 5 - 17 Years old by Census Block Group

- 18% - 30%
  - 31% - 40%
- PERCENT OF POPULATION  
5-17 YEARS OLD (2014)**  
 Nationally: 16.9%  
 Michigan: 16.6%  
 Berrien County: 17.0%



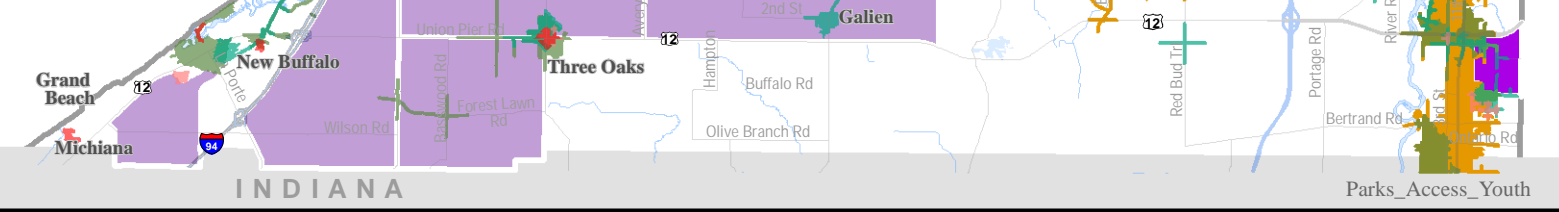
Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a

Southwest Michigan Planning Commission

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December 31, 2015



# BERRIEN COUNTY, MICHIGAN

## WALKING TO WELLNESS

### SCHOOLS & BUILDINGS OPEN AFTER HOURS



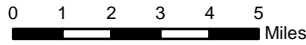
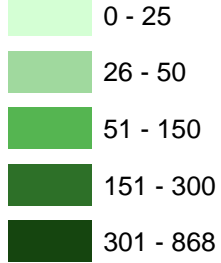
■ Building Open After Hours

■ Other Schools (not open)

*Orchards Mall located at Napier and Pipestone is open after hours.*

*All other locations are school buildings.*

### Population by Census Block



● City & Village

#### Data Sources

Base Layers: Michigan Geographic Framework: Berrien County, Version v14a

Schools & Buildings: Southwest Michigan Planning Commission, 2015

Population: U.S. Census Bureau, Decennial 2010

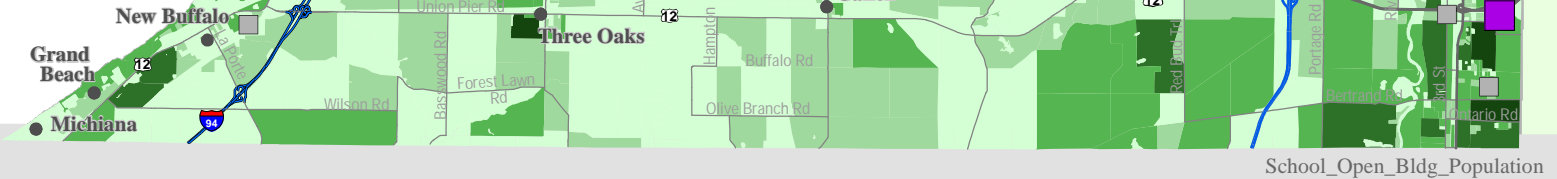
#### Southwest Michigan Planning Commission

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Lake Michigan

January 05, 2016



School\_Open\_Bldg\_Population

# BERRIEN COUNTY, MICHIGAN

## NON- MOTORIZED TRAIL ACCESS



1-mile Walking Distance\* from an Access Point\*\* to a Non-motor Trail\*\*\*

20% of Berrien County Residence live within a \*walkable distance from a non-motor trail. The distance does not factor in roads that are not pedestrian friendly, such as roads having no sidewalks or shoulders.

\*\*Access points were approximated where the trail crosses roads which differs from a trailhead where parking is available.

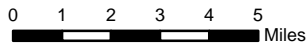
\*\*\*Non-motor Trails are defined as, greater than 6-ft wide, separated from the road, 1/2 mile long and linear in characteristics.

Non-motorized Trail

Trail Head

City & Village

County



### Data Sources

Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Non-Motor Trail: Southwest Michigan Planning Commission, 2015

### Southwest Michigan Planning Commission

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December 31, 2015

Grand Beach  
 New Buffalo  
 Michiana

INDIANA

NonMotor\_Access

#### 4. Thematic Approach: Active Transportation

Active transportation is any self-propelled, human-powered mode of transportation, such as walking or bicycling. 8.4 percent of Berrien County residents do not have a vehicle, and rely on active transportation and public transportation options. By making walking and biking safe and convenient, we can make it much easier for people to build routine physical activity into their daily lives while decreasing transportation burdens. The following maps identify populations most in need of active transportation options and the communities where potential non-motorized travel routes are more likely to be created.

- *Households without a vehicle in areas without public transit - page 58*

This map identifies households with no vehicle within census blocks that do not have any public transit services. The area without public transit service is indicated in white with a red outline. The census blocks with the highest level of households without a vehicle are indicated in purple. The populations within these census blocks are likely to benefit the most from implementing active transportation infrastructure, such as sidewalks, bicycle lanes or paths.

- *Youth living in households without a vehicle in areas without public transit - page 59*

This map identifies the highest percentage of youth populations, age 5-17 years, and/or households with no vehicle within census blocks that do not have any public transit services. The area without public transit service is indicated in white with a red outline. The census blocks with the highest percentage of youth populations and/or the highest percentage of households without a vehicle are indicated in purple. Youths and households without a vehicle have a great need for alternative transportation options, since most are not able to drive themselves to key destinations, such as school, work, recreation, grocery stores, or healthcare centers. When public transportation is not an option, these populations rely on active transportation options. This map identifies the populations with more transportation burdens and areas more likely to implement active transportation infrastructure changes and interventions.

- *Seniors living in households without a vehicle in areas without public transit - page 60*

This map identifies the highest percentage of senior populations, age 65 years and older, and/or households with no vehicle within census blocks that do not have any public transit services. The area without public transit service is indicated in white with a red outline. The census blocks with the highest percentage of senior populations and/or the highest percentage of households without a vehicle are indicated in purple. These populations also experience a higher transportation burden have an increased need for alternative transportation options within their neighborhoods.

- *Seniors living in households in areas without public transit - page 61*

This map identifies highest percentage of senior populations, age 65 years and older in census blocks without any public transit services. The area without public transit service is indicated in white with a red outline. The census blocks with the highest percentage of senior populations are indicated in purple. These populations also experience a higher transportation burden and thus have an increased need for alternative transportation options within their neighborhoods.

- *High Priority potential non-motorized travel routes and communities - page 62*


This map identifies municipalities that share the recreational plan goals of non-motorized facilities upgrades or development, indicated in gold. This information is overlaid with non-motorized transportation route opportunities for development. Regional route opportunities are indicated with a green buffer. Local route opportunities are indicated with a yellow buffer. By comparing the best non-motorized route opportunities with the municipalities that have indicated an interest in non-motorized route development, we can advocate for high-impact routes within in neighboring communities and inform neighboring municipalities about the role they could play in regional connectedness.

**BERRIEN COUNTY, MICHIGAN**

**HOUSEHOLDS WITH NO VEHICLE OR PUBLIC TRANSIT**

**HOUSEHOLDS WITH NO VEHICLE & URBAN AREA WITHOUT TRANSIT SERVICE**

*Census Block Group is outlined in white.*

 10% - 30%

PERCENT HOUSEHOLDS WITH NO VEHICLE  
 Nationally: 9.1%  
 Michigan: 7.8%  
 Berrien County: 8.4%

 Urban Area Without Transit Service

• City & Village



0 0.5 1 1.5 2 2.5 3 Miles

Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Households: American Community Survey 5-Year Estimates 2009-2013,  
 by Census Block Groups, U.S. Census TIGER files, 2010

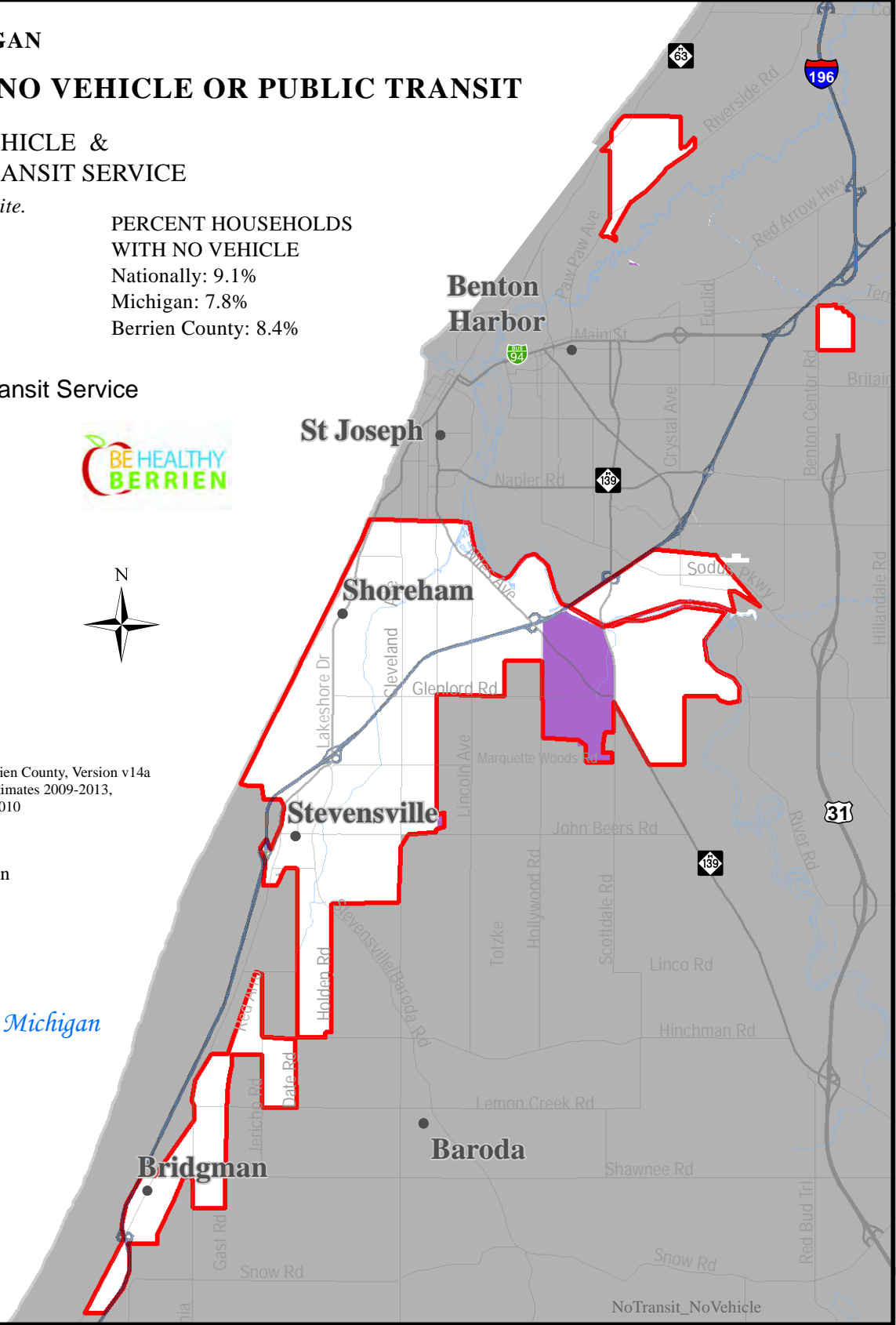
Southwest Michigan Planning Commission

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Lake Michigan

December 31, 2015



NoTransit\_NoVehicle



# BERRIEN COUNTY, MICHIGAN

## YOUTH WITH NO VEHICLE OR PUBLIC TRANSIT

### HIGHEST PERCENTAGE OF POPULATIONS 5 TO 17 YEARS OLD AND/OR HOUSEHOLDS WITH NO VEHICLE

Census Block Group are outlined in white.

 High

CLASSES WERE CREATED BY ADDING THE PERCENT OF POPULATION 5 TO 17 YEARS OLD & PERCENT OF HOUSEHOLDS WITH NO VEHICLE

 Urban Area Without Transit Service

0 0.5 1 1.5 2 2.5 3 Miles



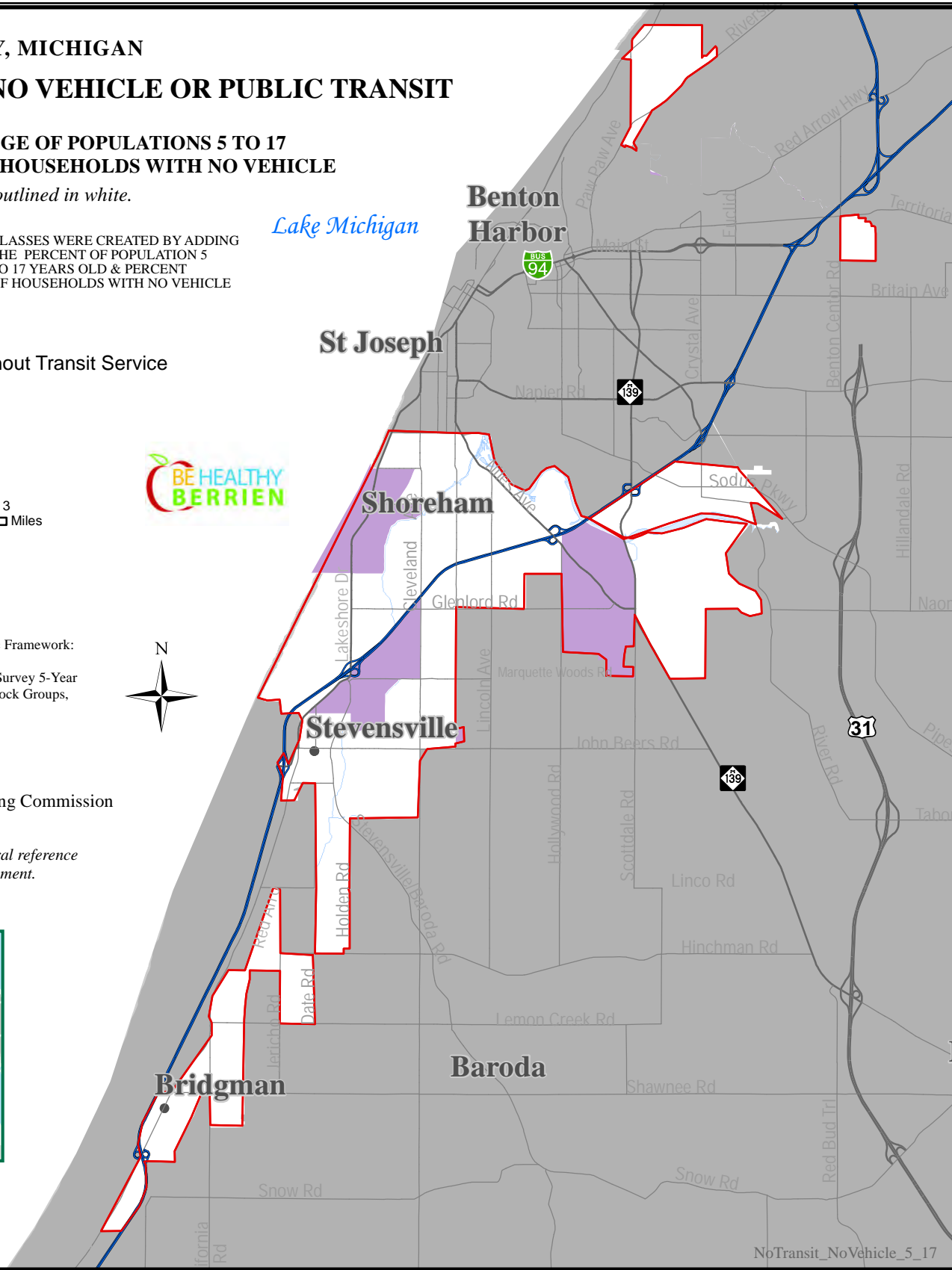
Data Sources  
Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
Population: American Community Survey 5-Year Estimates 2009-2013, by Census Block Groups, U.S. Census TIGER files, 2010

Southwest Michigan Planning Commission

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December 31, 2015



NoTransit\_NoVehicle\_5\_17

# BERRIEN COUNTY, MICHIGAN

## SENIORS & HOUSEHOLDS WITH NO TRANSIT OR NO VEHICLE

HIGHEST PERCENTAGE OF BOTH, POPULATIONS 65 YEARS AND OLDER, AND/OR HOUSEHOLDS WITH NO VEHICLE

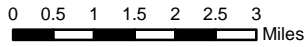


Census Block Group are outlined in white.

- High
- Highest

CLASSES WERE CREATED BY ADDING THE PERCENT OF POPULATION 65 YEARS OLD AND OLDER & PERCENT OF HOUSEHOLDS WITH NO VEHICLE. SHOWN ARE THE TWO HIGHER CLASSES

Urban Area Without Transit Service



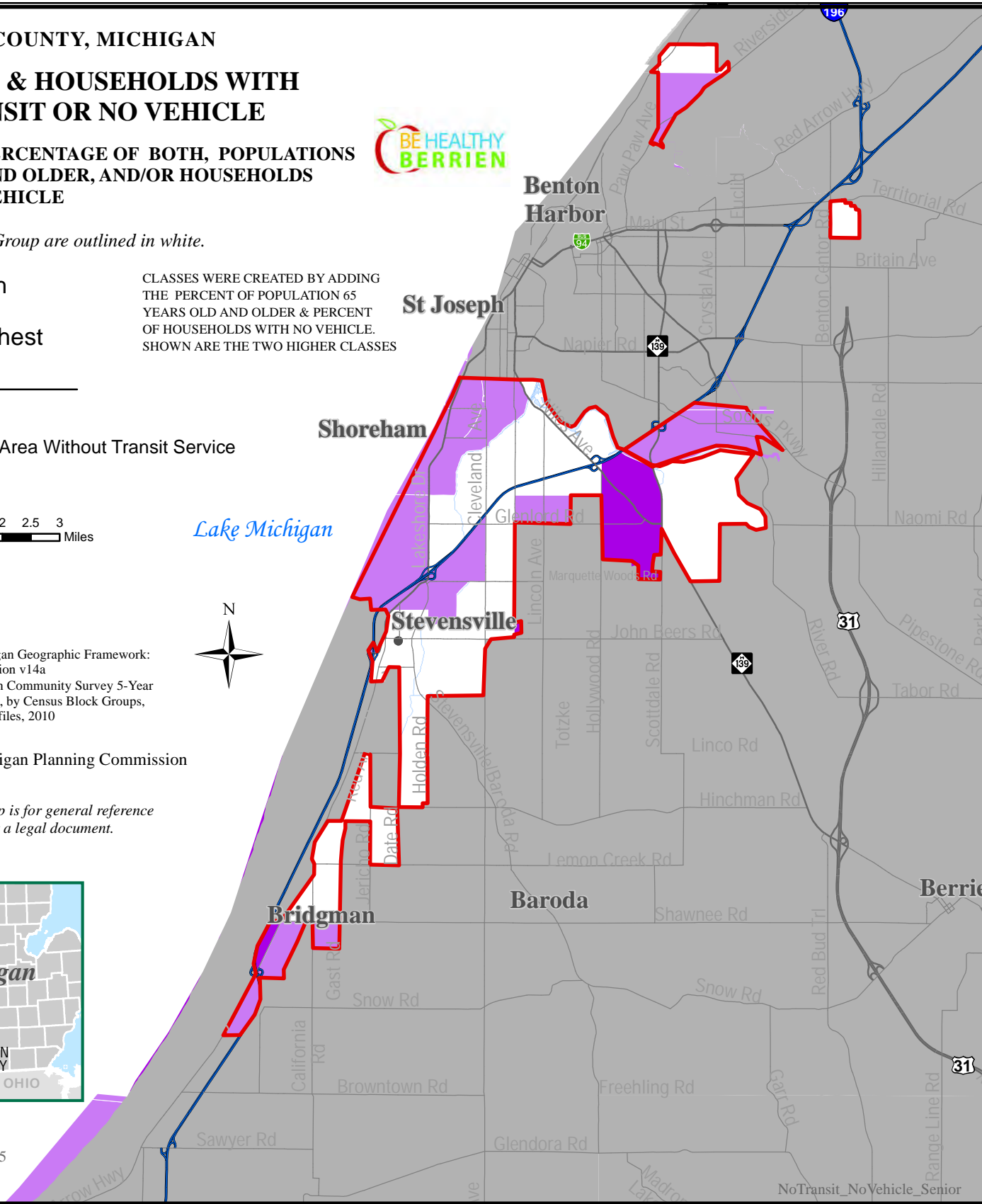
Data Sources  
Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
Population: American Community Survey 5-Year Estimates 2009-2013, by Census Block Groups, U.S. Census TIGER files, 2010

Southwest Michigan Planning Commission

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December 31, 2015



# BERRIEN COUNTY, MICHIGAN

## SENIORS WITH NO PUBLIC TRANSIT

HIGHEST PERCENT OF THE POPULATION  
65 YEARS OLD AND OLDER WITHIN URBAN  
AREA WITHOUT TRANSIT SERVICE

Census Block Group are outlined in white.

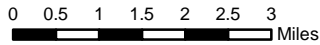


- 17% - 30%
- 30% - 51.6%

*PPERCENT OF POPULATION  
65 YEARS OLD AND OLDER (2014)*  
Nationally: 14.5%  
Michigan: 15.4%  
Berrien County: 16.6%

Urban Area Without Service

• City & Village



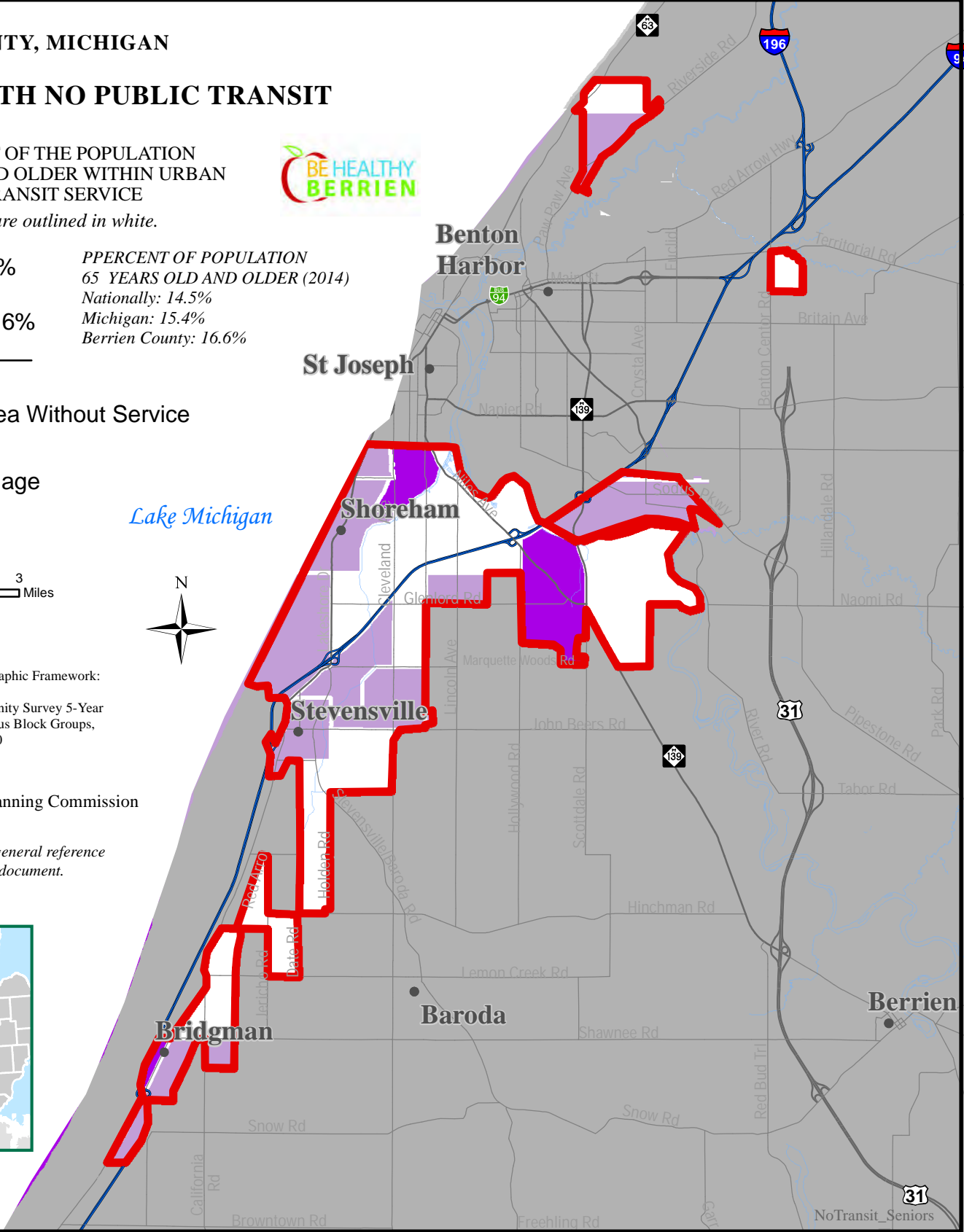
Data Sources  
Base Layers: Michigan Geographic Framework:  
Berrien County, Version v14a  
Population: American Community Survey 5-Year  
Estimates 2009-2013, by Census Block Groups,  
U.S. Census TIGER files, 2010

Southwest Michigan Planning Commission

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December 31, 2015



# BERRIEN COUNTY, MICHIGAN

## HIGH PRIORITY NON-MOTORIZED ROUTES AND COMMUNITIES



**----- Non-motorized Trail Opportunity**

Non-motorized Trails were created from a variety of sources included local master plans, public input meetings, and governmental bodies. The complete report, *Connecting Communities: A Regional Vision for Non-Motorized Transportation in Southwest Michigan* [http://www.swmpc.org/downloads/final\\_plan\\_1.pdf](http://www.swmpc.org/downloads/final_plan_1.pdf)

**Non-motorized Local Plan**

**Non-motorized Regional Plan**

Selected planned, non-motorized routes were buffered at a 1 mile to highlight Regional and Local connecting trails.

**Municipalities that share the recreational plan goals of Non-motorized Facilities Upgrades Maintenance, or Development**

**Existing Non-motorized Trail**

0 1 2 3 4 5 Miles

Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 4 Ft Shoulders: Southwest Michigan Planning Commission, 2009  
 Non-Motor Trail: Southwest Michigan Planning Commission, 2013

Southwest Michigan Planning Commission

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December 31, 2015



## 5. Thematic Approach: Healthy k-12 schools

Health behaviors of adolescents who attend k-12 educational institutions are strongly influenced by the policies, practices, and environments of the school in which they are enrolled. Available data on k-12 policy/practices included whether or not the school has expressed interest in voluntary Michigan Team Nutrition standards and Safe Routes to Schools ® initiatives. Voluntary Michigan Team Nutrition standards focus on the important role of nutritious school meals, nutrition education, and how a health-promoting school environment plays a role in helping students learn to enjoy healthy eating and physical activity. There is strong evidence that Safe Routes to Schools programs increase the number of students walking or biking to school. Active travel to school is associated with healthier body composition and cardio fitness levels. The following maps identify k-12 schools within census blocks with higher social disparities that are most in need and more likely to implement Safe Routes to Schools programs or implement Michigan Team Nutrition practices.

- *Potential Safe Routes to Schools impact in areas with limited vehicle access - page 64*

This map identifies the highest percentage of households without a vehicle, identified in shades of purple, within municipalities that have Master Plan updates due within the next two years, indicated in grey. This information is then overlaid with the locations of schools who have registered with the Safe Routes to Schools Program, indicated as a green dot. Comparing census blocks with low vehicle access and the locations of schools interested in Safe Routes to Schools with municipalities that will be working on creating or updating their Master Plans within the next two years allows us to advocate for non-motorized transportation upgrades in the municipalities that are most in need and most likely to work on these kinds of goals within the next few years.

- *Potential Safe Routes to Schools impact in areas with high poverty rates - page 65*

This map identifies the highest percentage of households with income below the poverty rate, identified in shades of pink, within municipalities that have Master Plan updates due within the next two years, indicated in grey. This information is then overlaid with the locations of schools who have registered with the Safe Routes to Schools Program, indicated as a green dot. Comparing census blocks with high poverty levels and the locations of schools interested in Safe Routes to Schools with municipalities that will be working on creating or updating their Master Plans within the next two years allows us to advocate for non-motorized transportation upgrades in the municipalities that are most in need and most likely to work on these kinds of goals within the next few years.

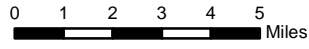
# BERRIEN COUNTY, MICHIGAN NO VEHICLE/ REGISTERED SCHOOLS FOR SAFE ROUTES TO SCHOOL/EXPIRING MASTER PLANS

HIGHEST PERCENTAGE OF  
HOUSEHOLDS WITH NO VEHICLE  
*Census Block Group is outlined in white.*

- 10.1% - 30.8% *PERCENT HOUSEHOLDS WITH NO VEHICLE*
- 30.9% - 51.4% *Nationally: 9.1%  
Michigan: 7.8%  
Berrien County: 8.4%*

- Schools that have registered with the Safe Routes to School Program
- Other Schools

Municipalities with Master Plans due within next two years



Lake Michigan

Data Sources  
Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
Households: American Community Survey 5-Year Estimates 2009-2013, by Census Block Groups, U.S. Census TIGER files, 2010

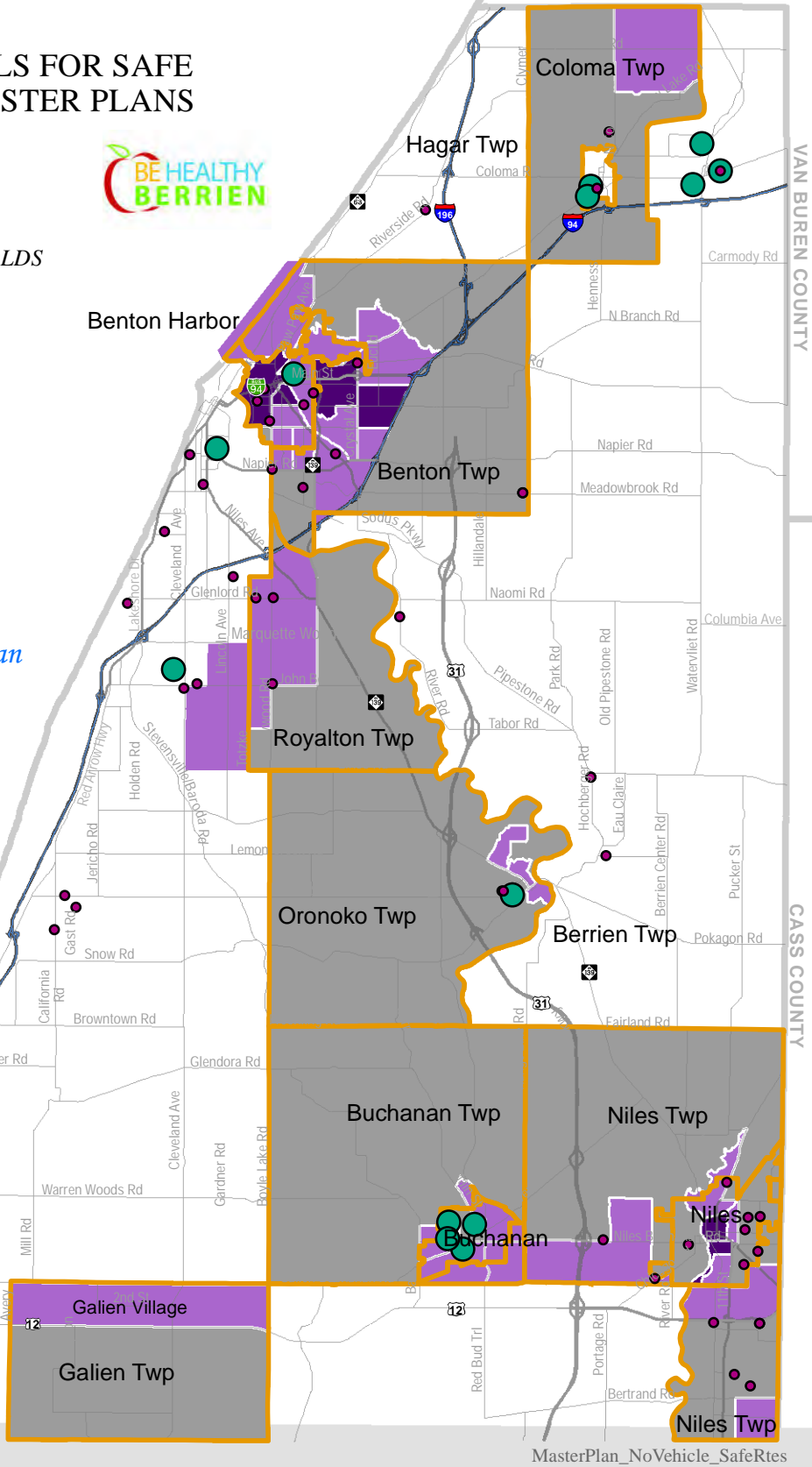
Southwest Michigan Planning Commission

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December 31, 2015

INDIANA



MasterPlan\_NoVehicle\_SafeRtes



# BERRIEN COUNTY, MICHIGAN

## POVERTY/SAFE ROUTES/EXPIRING MASTER PLANS

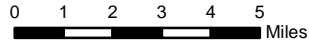
HIGHEST PERCENTAGE OF HOUSEHOLDS WITH INCOME BELOW THE POVERTY LEVEL

Census Block Group is outlined in white.

- 18% - 30%
- 30% - 46.4%

**PERCENT OF POPULATIONS BELOW POVERTY LEVEL**  
 Nationally: 15.4%  
 Michigan: 16.8%  
 Berrien County: 17.5%  
 Source: ACS 5-year 2009-2013

- Schools that have registered with the Safe Routes to School Program
- Other Schools
- Municipalities with Master Plans due within the next two years



Data Sources  
 Base Layers: Michigan Geographic Framework: Berrien County, Version v14a  
 Households: American Community Survey 5-Year Estimates 2009-2013, by Census Block Groups, U.S. Census TIGER files, 2010  
 Master Plans & Safe Routes: SWMPC 2015

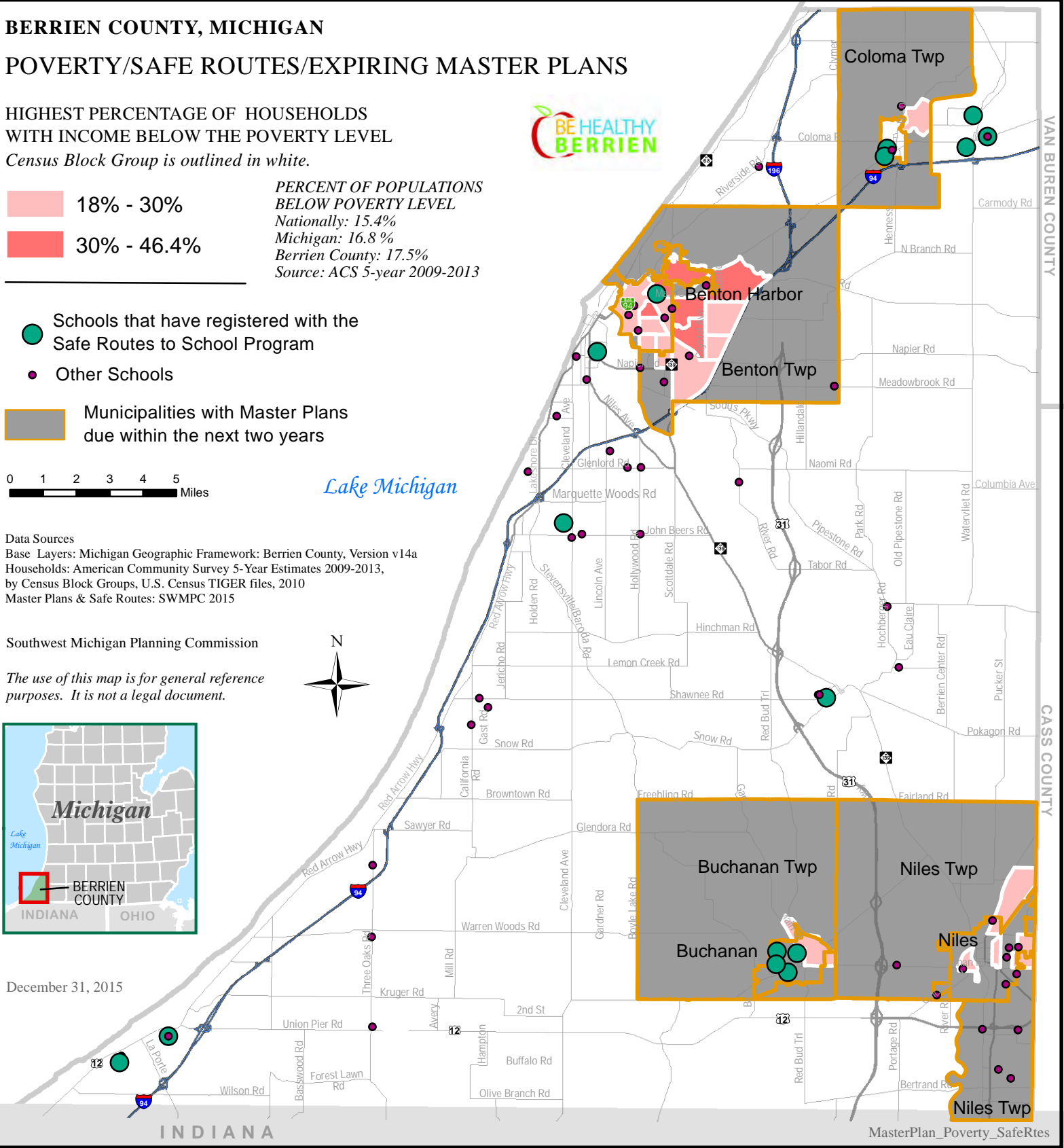
Southwest Michigan Planning Commission

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December 31, 2015

INDIANA



MasterPlan\_Poverty\_SafeRtes