

ROAD CONDITION REPORT



Calhoun COUNTY

APRIL 2015

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Executive Summary

The Kalamazoo Area Transportation Study assisted in the data collection of road inventory for Calhoun County in 2013 and 2014. The data collection efforts took place on Federal-Aid roads in the county. Since 2011 the Transportation Asset Management Council PASER data collection has changed what constitutes a “federal-aid eligible” road. This change excludes some Rural Minor Collectors that were rated during previous years.

According to 23 USC 101, “Federal-aid eligible” roads are “highways on the Federal-aid highway systems and all other public roads not classified as local roads or rural minor collectors.”

Within Calhoun County, there are:

- **701 miles of Federal-aid roads.** This includes roads that are maintained by the Michigan Department of Transportation, the Calhoun County Road Commission, and the cities and villages within the county. Of the 701 Federal-Aid miles in Calhoun County, there are:
 - 322 miles of Major Collectors**
 - 323 Miles of Minor Arterials**
- **288 miles of Trunkline roadways.** These roadways are maintained by the Michigan Department of Transportation.

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What is Asset Management?

“An ongoing process of maintaining, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment.”

- Act 499 of the Public Acts of 2002.

The State of Michigan defines asset management as “an ongoing process of maintaining, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment.” Asset management consists of a set of business principles and practices used to meet the goals of good ownership and effective, responsible management. The process allows transportation agencies to monitor the current condition of all federal aid eligible pavements, while also taking an inventory of potential preventative measures, to ensure the quality of the roads in the future. Implementation of asset management principles requires a shift from “Worst First” system management to one that considers the long range view of how the system functions.

Principles of Asset Management

Asset management follows five core principles. They are:

- **Performance-Based**-Allows policy objectives to be broken down into daily operations decisions and strategic maintenance decisions.
- **Decisions Based on Quality Information**-Accurate information regarding the inventory, condition, and available funding of any of the assets involved.
- **Policy-Driven**-Resource allocation decisions that are based on well-defined performance goals and objectives. Alternatives are examined, and often level of service, system conditions, and community goals are reflected.
- **Analysis of Mix of Fixes, Options and Tradeoffs**-A system-wide assessment is made to determine the most valuable alternatives to invest in current and future system performance.
- **Monitoring to Provide Clear Accountability and Feedback**-The system needs to be consistently monitored to ensure that the chosen investments are meeting the predetermined goals and policy objectives.

All agencies currently apply some form of these principles, and for that reason, existing principles can be easily built upon in order to implement a successful asset management plan.



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Benefits of Asset Management

Asset management provides public agencies with a better understanding of the relationship between cost and performance. This understanding allows for better management, which is often directly reflected in the improvement of performance. In addition to the overall improvement of an agency's performance, there are many benefits of implementing asset management principles and practices. These benefits include:

- Improved service to customers;
- Improved cost-effectiveness and use of available resources;
- Improved communication with elected officials and the public about level of service vs. cost of service; and
- Improved credibility and accountability for decision-making process and results.

In order to gain these benefits, an agency must evaluate its current business practices, establish where significant improvements can be made, and develop a plan to institute changes.

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PASER Rating Scale

PASER (Pavement Surface Evaluation and Rating) is a simple “windshield” survey of road surface quality, which was developed by the University of Wisconsin-Madison to be used as the state’s standard road rating system. The system uses manuals that provide visual aids for identifying different types, and the extent of, various defects that may be visually present in any given section of road. These defects are compared to a ten point PASER scale to determine their quality. On the PASER rating scale, one represents a failed road, and ten, a new road. The time that it takes a road to cycle from excellent to poor on the PASER scale is largely dependent on traffic volume and construction quality.

Using the PASER rating scale on paved surfaces within a county aids in predicting deterioration rates of surfaces. This information is important in order to create a plan of maintenance and replacement that is both efficient and cost effective.

PASER Categories

When surveying a paved surface for defects, there are four main categories to keep in mind. These categories are:

- **Surface Defects-** These include raveling (minimal aggregate on pavement surface), flushing (excess aggregate on pavement surface), or polishing (worn down aggregate on pavement surface)
- **Surface Deformation-** Includes rutting of wheel paths and pavement distortion
- **Cracks-** Can be transverse, longitudinal, Reflection, slippage, alligator, and block cracks
- **Patches and Potholes-** Patches are when previous damage has been filled by new asphalt patch material, and potholes are surface damage caused by traffic, fatigue, and poor drainage.

How Data is Collected

Data is collected by three person teams that consist of one MDOT employee, one member of the local road agency, and one member from the regional planning agency. Together, this team is responsible for evaluating pavement and recording information about each road, using a laptop and a GPS receiver. This information includes the type of road (surface type), the number of lanes, and the road condition (PASER Rating).

Treatments

Applying a rating system like PASER to a paved network of roads allows for an efficient way to inventory and evaluate transportation assets. These evaluations can then be used to create a prioritized arrangement of projects, and select from any of the treatment alternatives. Effective management of pavement keeps the condition of the road ahead of rapid deterioration with treatments that are lower cost.

There are a number of treatment options that directly correlate to the PASER score of a paved surface. The better the road is rated, the less treatment it requires. For example, roads with a PASER rating 8-10 only require routine maintenance through scheduled activities like sweeping, drainage clearing, shoulder clearing/grading, and crack seal/slurry coat to prevent water infiltration. 5-7 rated roads require capital preventative maintenance. If a road is rated 1-4 on the PASER scale, then it requires some form of structural improvement. If the roadway deteriorates past a 4 on the PASER scale, capital preventative maintenance methods of treatment are not viable.

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The following table illustrates PASER ratings for asphalt pavements, which constitute the majority of roads in Barry County.

Table 1

Rating	Visible Distress	General Treatment & Conditions
10 Good	None	New Construction
9 Good	None	Recent Overlay
8 Good	No longitudinal cracks except reflection of paving joints. Occasional transverse cracks, widely spaced (40' or greater). All cracks sealed or tight (open less than 1/4").	Recent sealcoat or new cold mix. Little or no maintenance required.
7 Fair	Very slight or no raveling, surface shows some traffic wear. Longitudinal cracks (open 1/4") due to reflection or paving joints. Transverse cracks (open 1/4") spaced 10' or more apart, little or slight crack raveling. No patching or very few patches in excellent condition.	First signs of aging. Maintain with routine crack filling.
6 Fair	Slight raveling (loss of fines) and traffic wear. Longitudinal cracks (open 1/4"- 1/2"), some spaced less than 10'. First sign of block cracking. Slight to moderate flushing or polishing. Occasional patching in good condition.	Shows signs of aging. Sound structural condition. Could extend life with sealcoat.
5 Fair	Moderate to severe raveling (loss of fine and coarse aggregate). Longitudinal and transverse cracks (open 1/2") show first signs of slight raveling and secondary cracks. First signs of longitudinal cracks near pavement edge. Block cracking up to 50% of surface. Extensive to severe flushing or polishing. Some patching or edge wedging in good condition.	Surface aging. Sound structural condition. Needs sealcoat or thin non-structural overlay (less than 2")
4 Poor	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Block cracking (over 50% of surface). Patching in fair condition. Slight rutting or distortions (1/2" deep or less)	Significant aging and first signs of need for strengthening. Would benefit from a structural overlay (2" or more).
3 Poor	Closely spaced longitudinal and transverse cracks often showing raveling and crack erosion. Severe block cracking. Some alligator cracking (less than 25% of surface). Patches in fair to poor condition. Moderate rutting or distortion (1" or 2" deep). Occasional potholes.	Needs patching and repair prior to major overlay. Milling and removal of deterioration extends the life of overlay.
2 Poor	Alligator cracking (over 25% of surface). Severe distortions (over 2" deep) Extensive patching in poor condition. Potholes.	Severe deterioration. Needs reconstruction with extensive base repair. Pulverization of old pavement is effective
1 Poor	Severe distress with extensive loss of surface integrity	Failed. Needs total reconstruction.

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Table 2

Treatment	Life Extension (Average Years)	PASER Rating	Cost per Mile	Average Cost per Additional Year
Overband Crack Filling	4	7 to 9	\$5,000	\$1,250
Fog Seal Coat	0	8	\$5,000	N/A
One Course Non-Structural Overlay	10	5 to 6	\$75,000	\$7,500
Milling and One Course Non-Structural Overlay	10	4 to 5	\$95,000	\$9,500
Single Course Chip Seal	7	6 to 7	\$23,000	\$3,286
Double Course Chip Seal	9	5 to 6	\$46,000	\$5,111
Structural Crush & Shape	25	2 to 3	\$200,000	\$8,000
Full-Depth Reconstruction	30	1 to 2	\$400,000	\$13,333

Capital Preventative Maintenance and Reconstructive Treatments

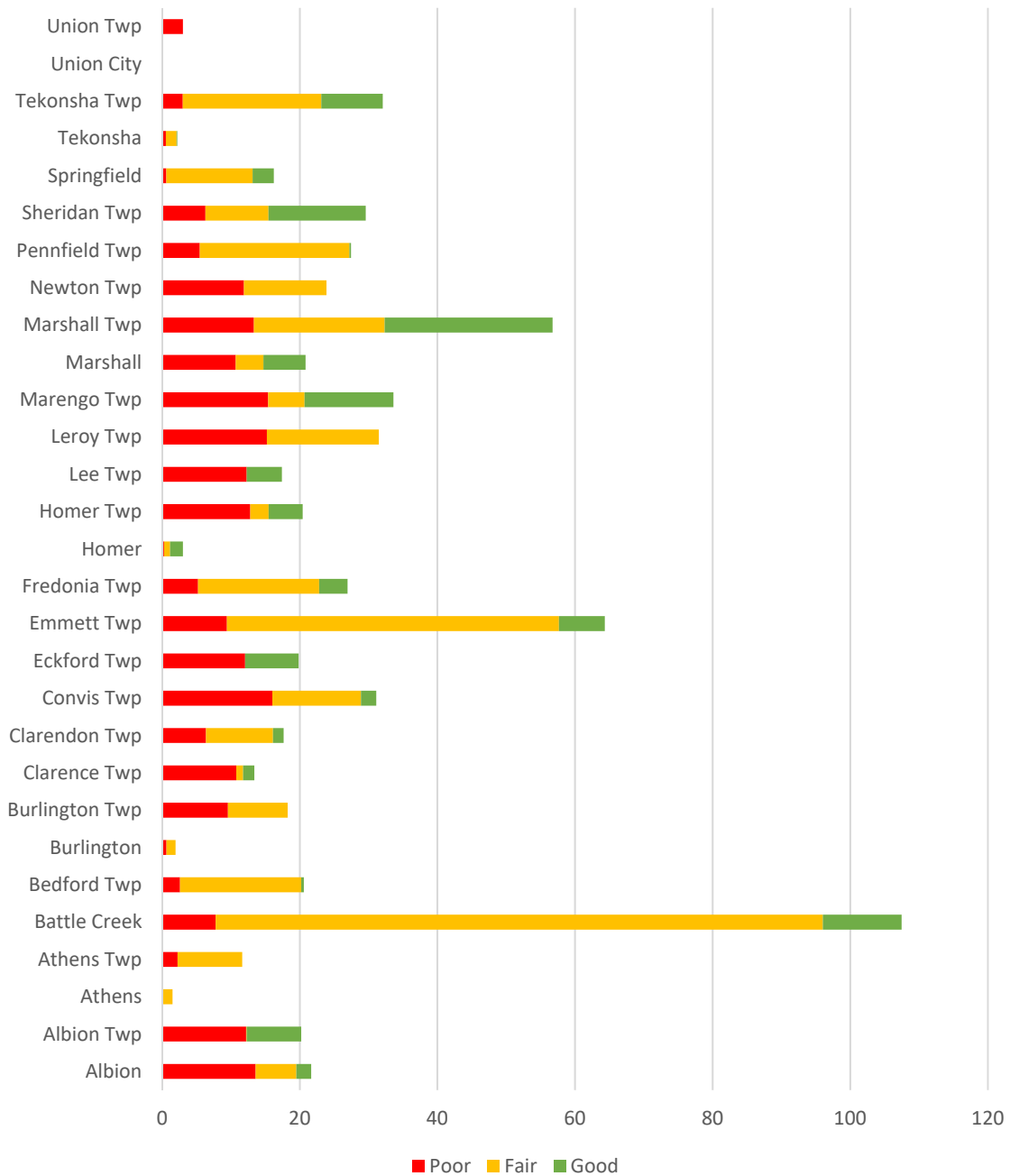
Table 2 details the expected cost, lifespan, and rating of each treatment type when applied to roads that need maintenance. These treatments range from the minimal (overband crack filling) to major construction. The following list provides a brief overview of when each treatment is used in Barry County. These treatments are suggested by PASER, and may not be appropriate fixes to every situation.

- Overband Crack Filling is used on cracks that are up to 1” wide, and are moving or unmoving. The process is done using hot poured rubber material.
- Fog Seals provide a thin asphalt coating over existing pavement. This treatment seals aggregate in place while preventing rutting, and water permeation.
- Non-Structural Overlays do not contribute to a pavement’s structural capacity. These treatments require thin layers of asphalt (1/2- 1 ½ inches) to be smoothed on top of existing pavement. Applying this treatment to roads improves surface quality and drainage.
- Chip Seals require a thin application of asphalt applied to the road surface, which is topped with a coarse aggregate.
- Structural Crush and Shape recycles pavement by pulverizing existing material (including base and sub-base) and blending it with a new binding agent. The new mix is then used to repave the same road.
- Full-Depth Reconstruction is the replacement of the entire paved surface including the base and sub-base. The old materials are discarded and all new materials are used in the reconstruction. This process is not done unless there is no good road left to salvage.

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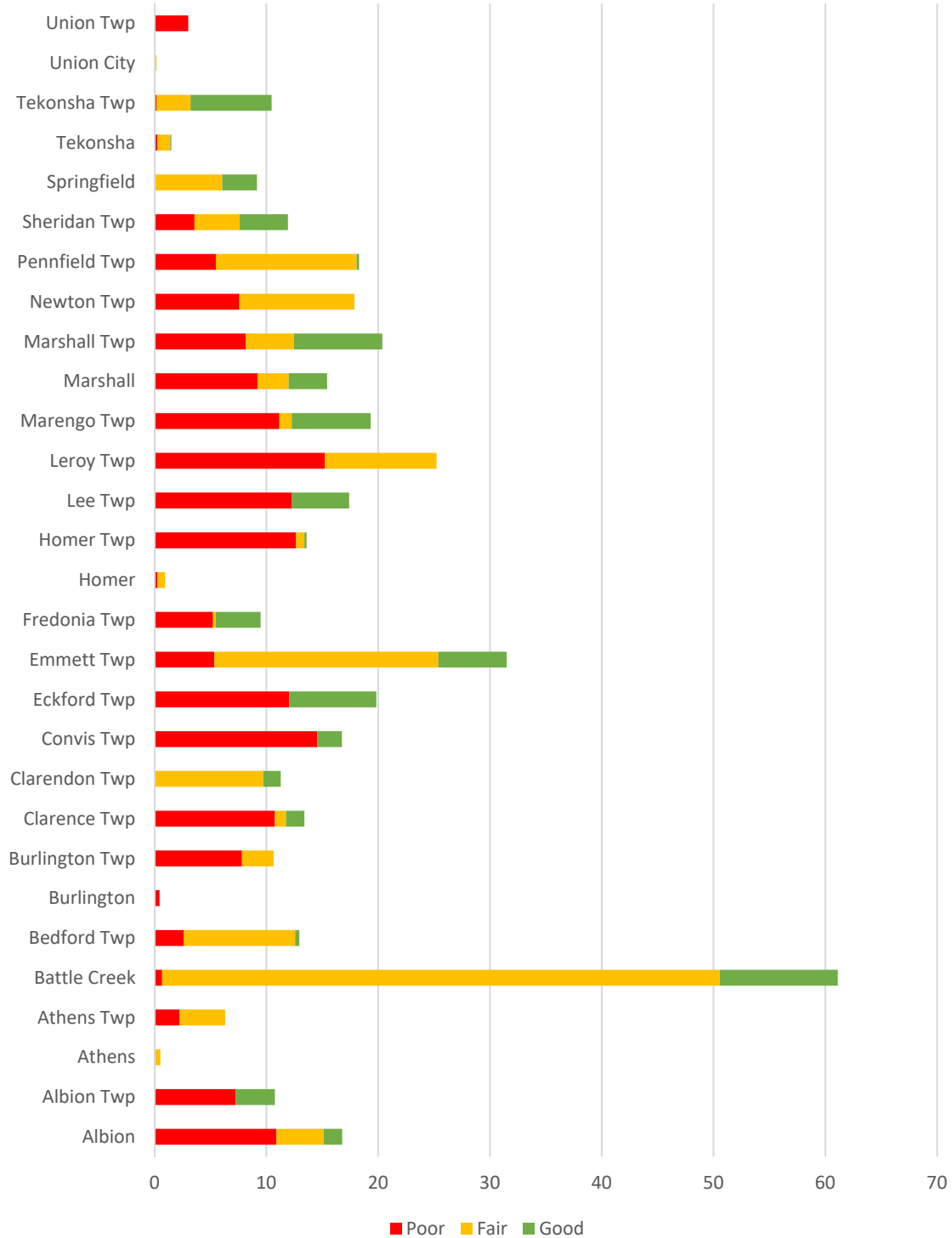
Summary of 2013 and 2014 Ratings

2013/2014 PASER Ratings
Calhoun County Federal-Aid Miles by Jurisdiction



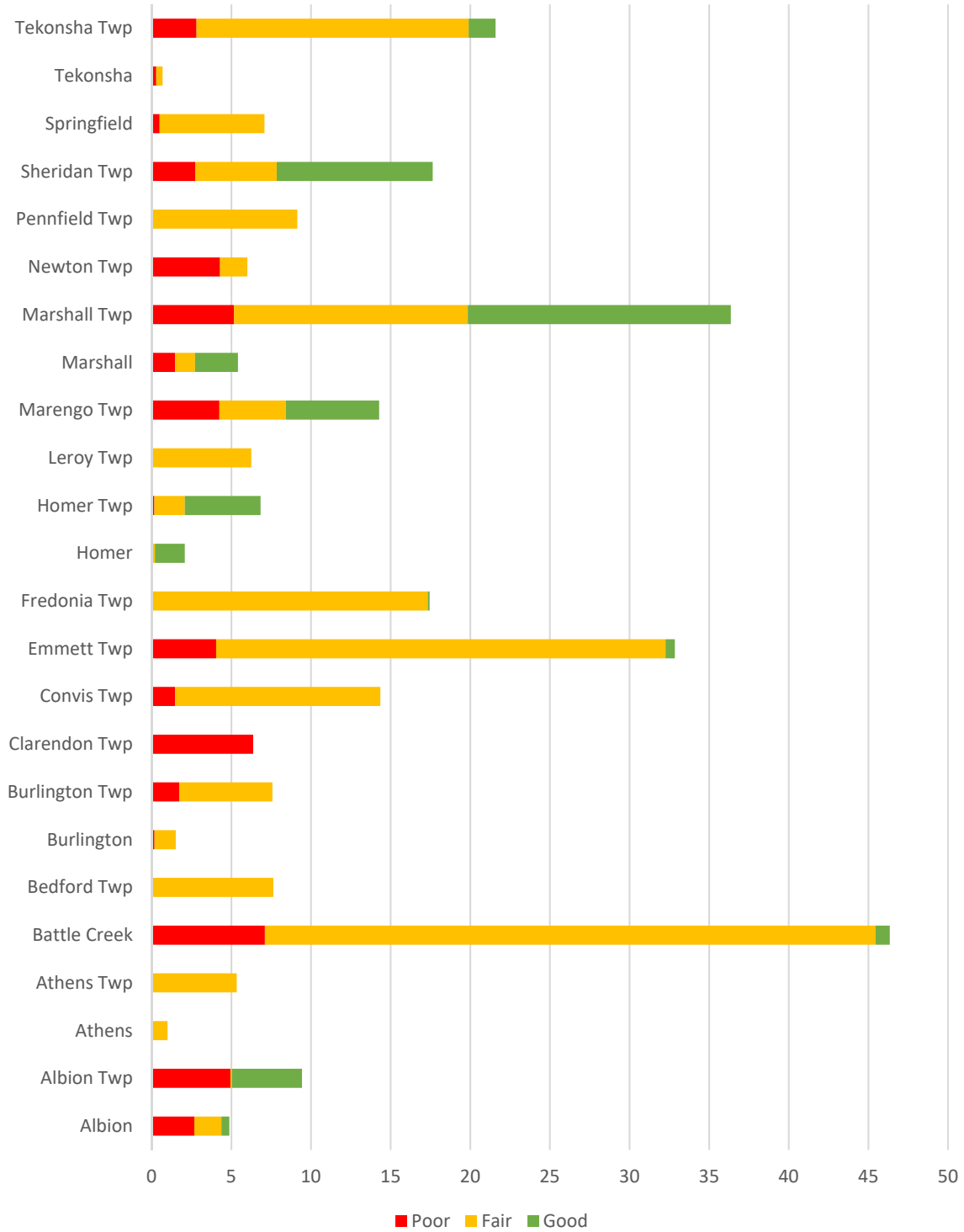
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2013/2014 PASER Ratings Calhoun County Non-Trunkline Federal-Aid Miles



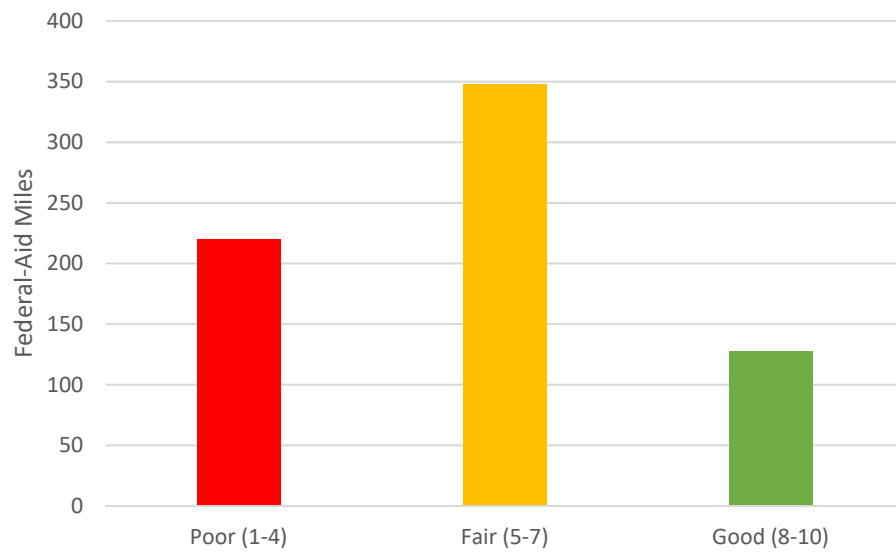
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2013/2014 PASER Ratings Calhoun County Federal-Aid Trunkline Miles



ROAD CONDITION REPORT FOR CALHOUN COUNTY

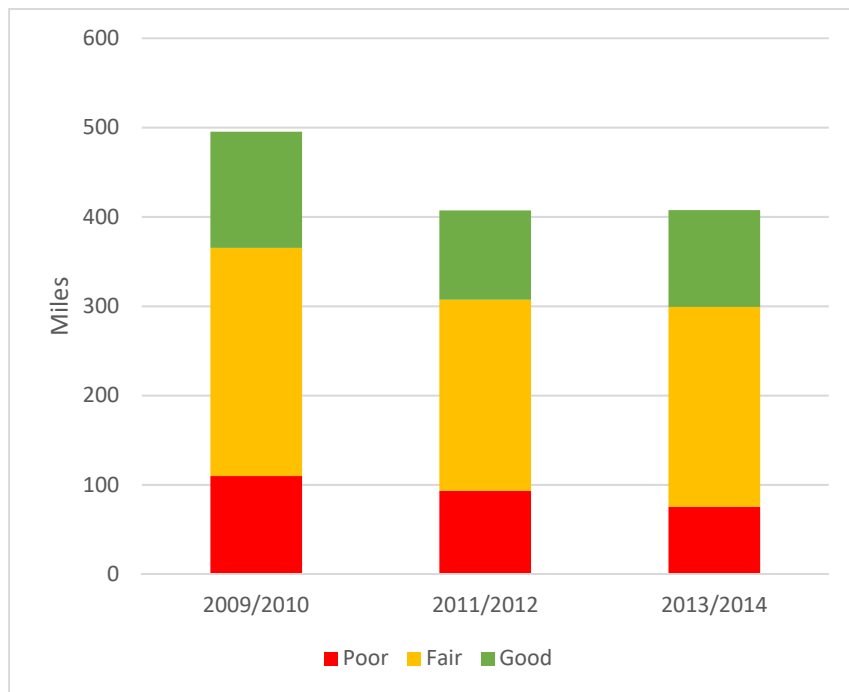
Calhoun Countywide PASER Ratings 2013-2014



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Historical Data Collection

2009-2014 PASER Road Condition Ratings
Calhoun County Federal-Aid Roads

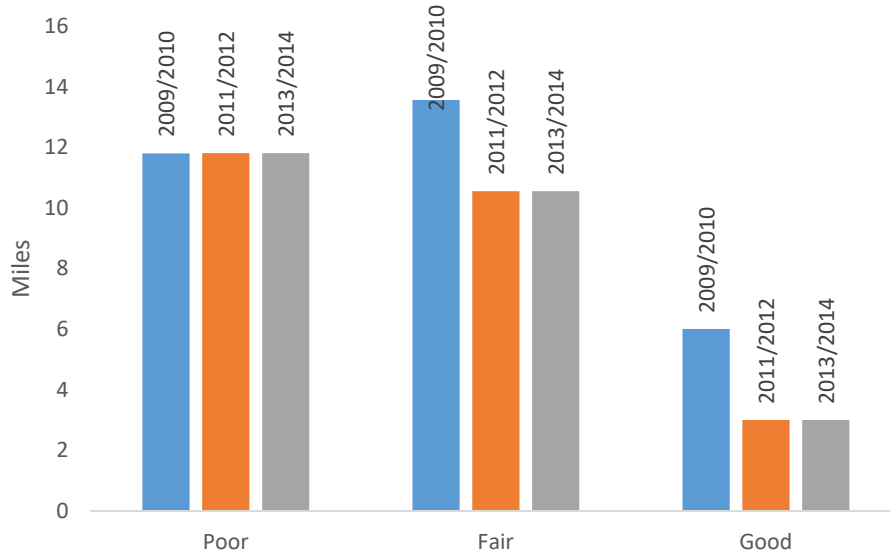


The chart above reflects the progression of Barry County's federal-aid roads over a five year period. From 2009 to 2014, there has been a slight decrease in roads that are rated as being in "Fair" and "Poor" conditions, while the number of "Good" road miles has decreased substantially overall. Road miles rated with a PASER score of 8-10 (Good) showed a small increase of 8.38 miles between 2011/2012-2013/2014, with that number decreasing significantly by 34.571 miles from 2013/2014, resulting in a 27.074 mile depreciation over the course of five years. This significant change in the 2011/2012 rating years highlights a known data inconsistency, bringing comparisons to those rating years into question. For a historical context, it would be best to compare 2009/2010 to 2013/2014.

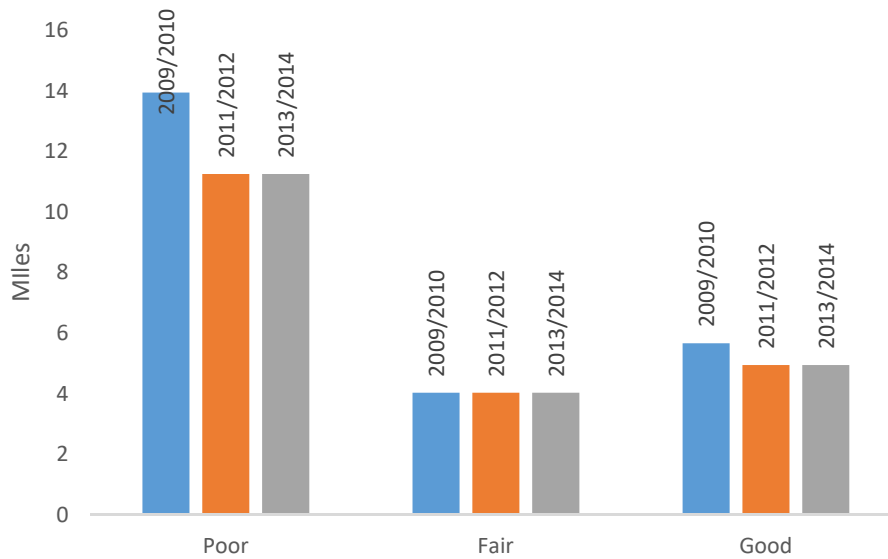
When looking at township breakdowns from 2013/2014 on the previous three pages of this document, it is apparent that in each jurisdiction the majority of roads are Fair and Poor, with Good roads rated 8-10 constituting very little overall. This is the case for all roads, including federal-aid trunkline, and non-trunkline in Barry County.

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2009-2014 PASER Road Condition Ratings
Assyria Township
(25.361 miles)



2009-2014 PASER Road Condition Ratings
Baltimore Township
(20.224 miles)

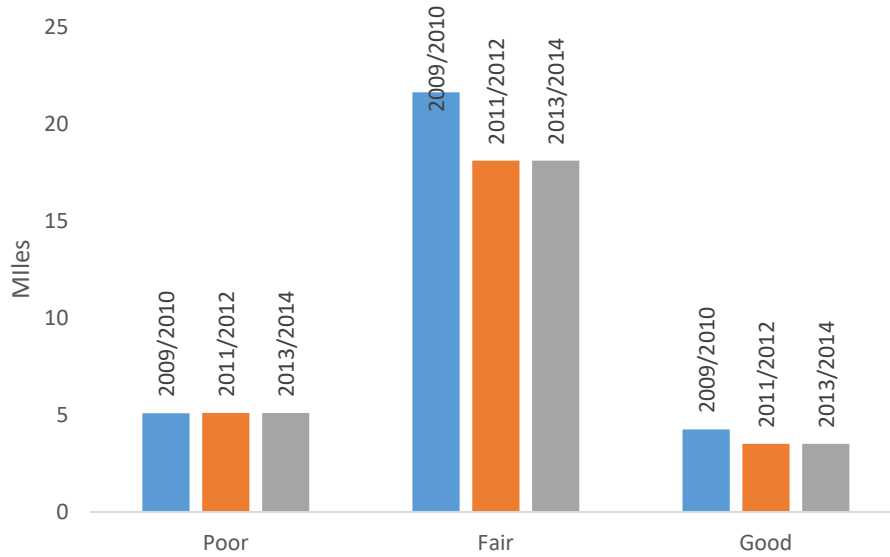


ROAD CONDITION REPORT FOR CALHOUN COUNTY

2009-2014 PASER Road Condition Ratings

Barry Township

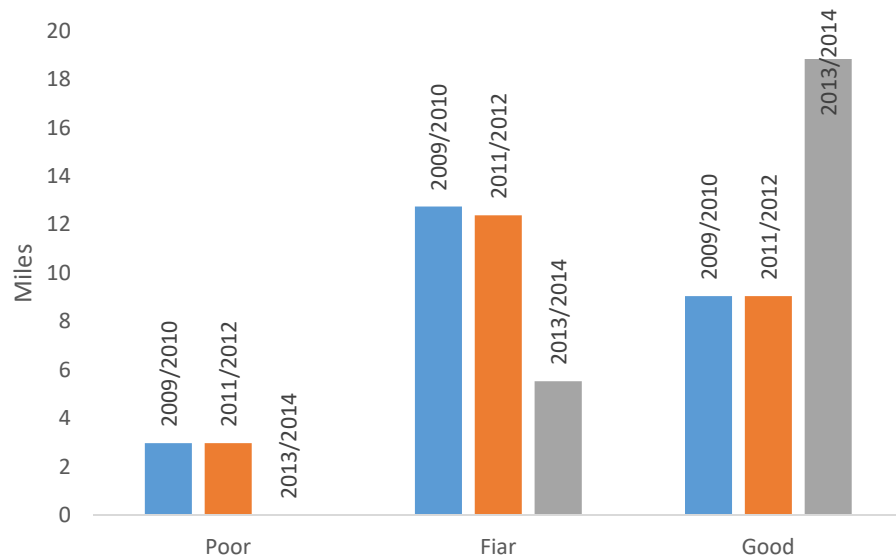
(26.679 miles)



2009-2014 PASER Road Condition Ratings

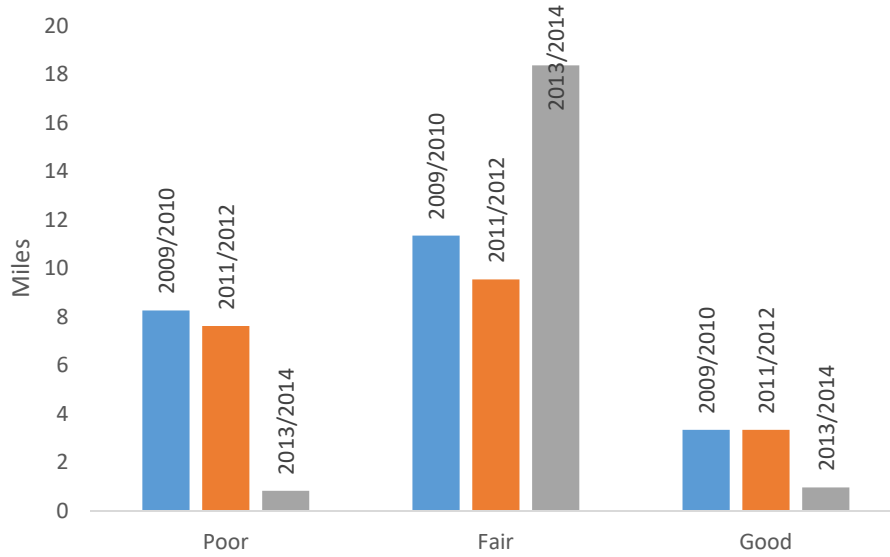
Carlton Township

(24.41 miles)

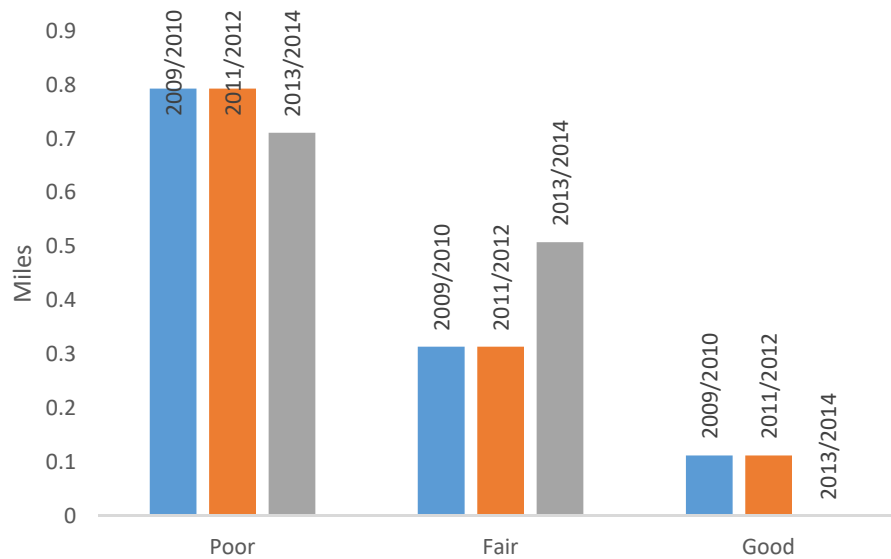


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2009-2014 PASER Road Condition Ratings
 Castleton Township
 (20.228 miles)

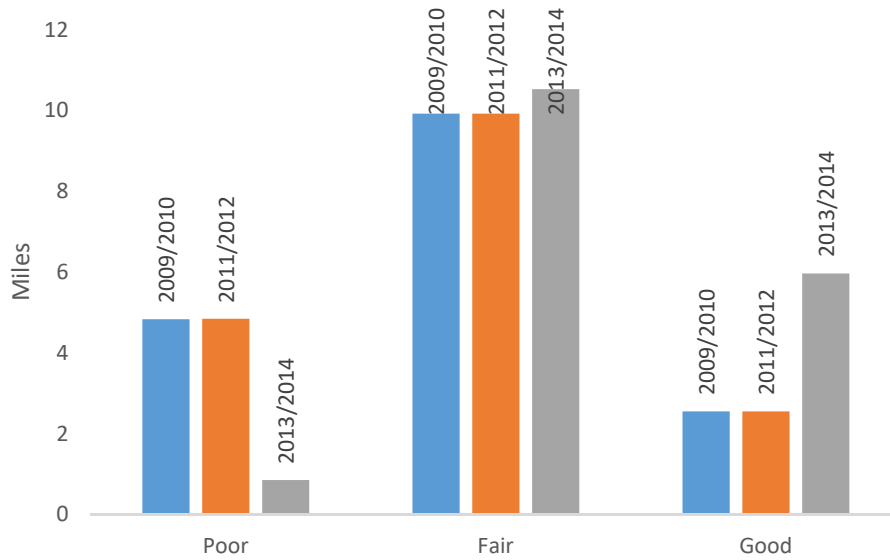


2009-2014 PASER Road Condition Ratings
 Freeport Township
 (1.219 miles)

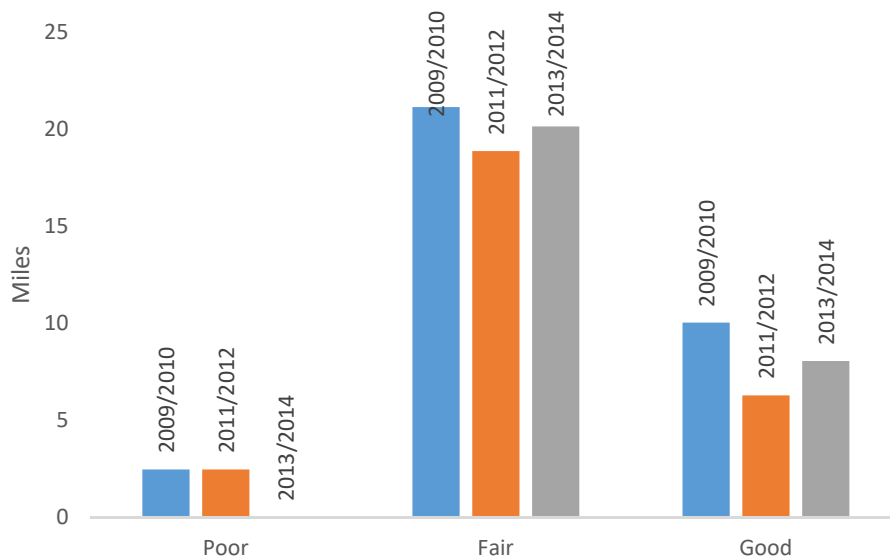


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2009-2014 PASER Road Condition Ratings
City of Hastings
(17.341 miles)

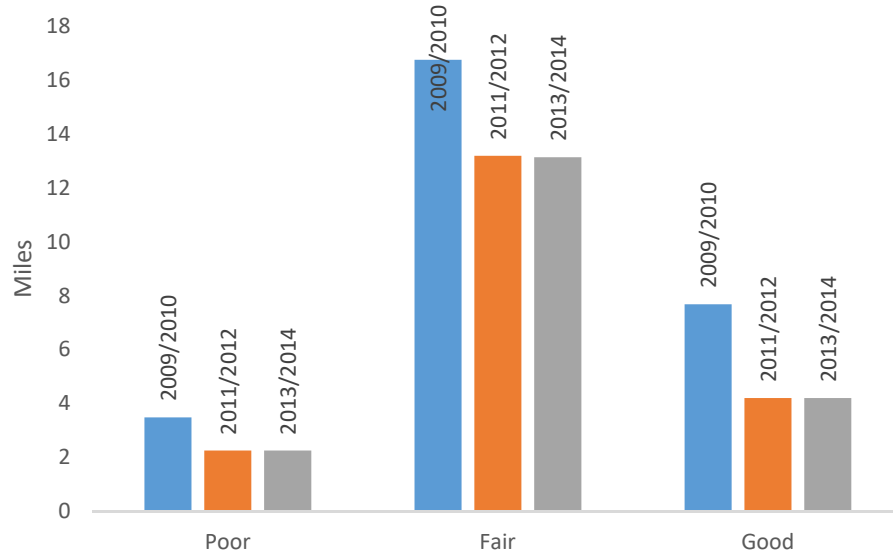


2009-2014 PASER Road Condition Ratings
Hastings Township
(28.231 miles)

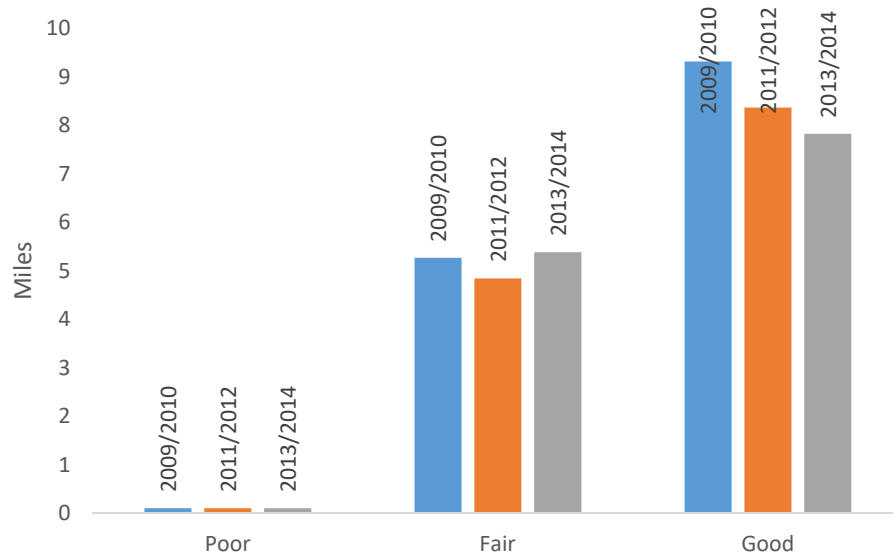


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2009-2014 PASER Road Condition Ratings Hope Township (19.645 miles)

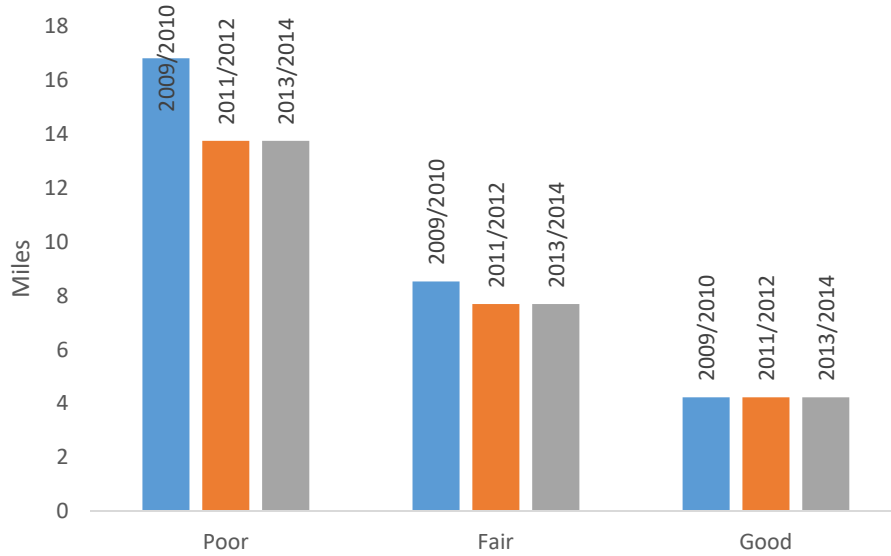


2009-2014 PASER Road Condition Ratings Irving Township (13.329 miles)

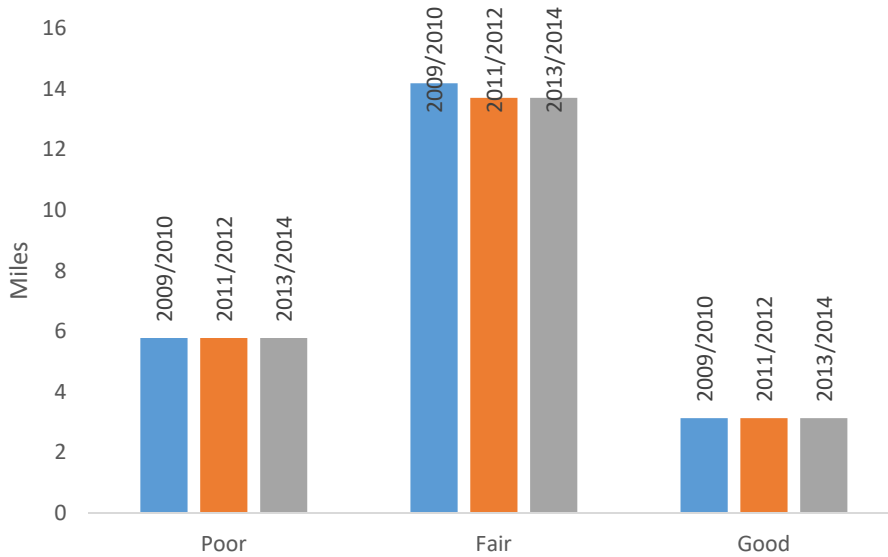


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2009-2014 PASER Road Condition Ratings
Johnstown Township
(25.668 miles)

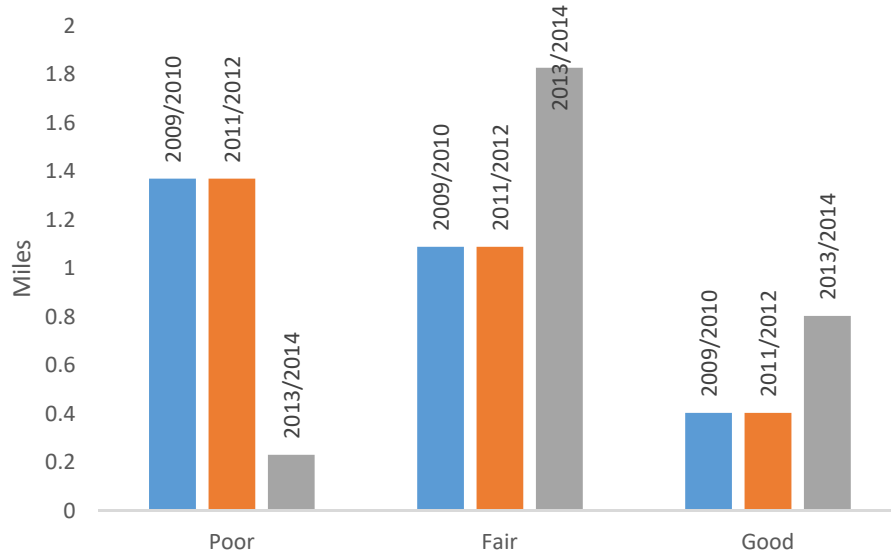


2009-2014 PASER Road Condition Ratings
Maple Grove Township
(22.605 miles)



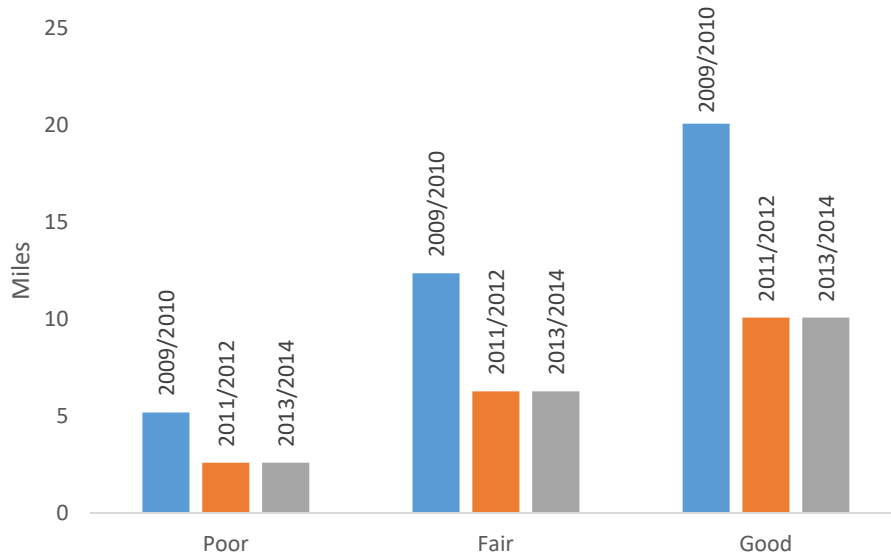
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2009-2014 PASER Road Condition Ratings Village of Middleville (2.863 miles)

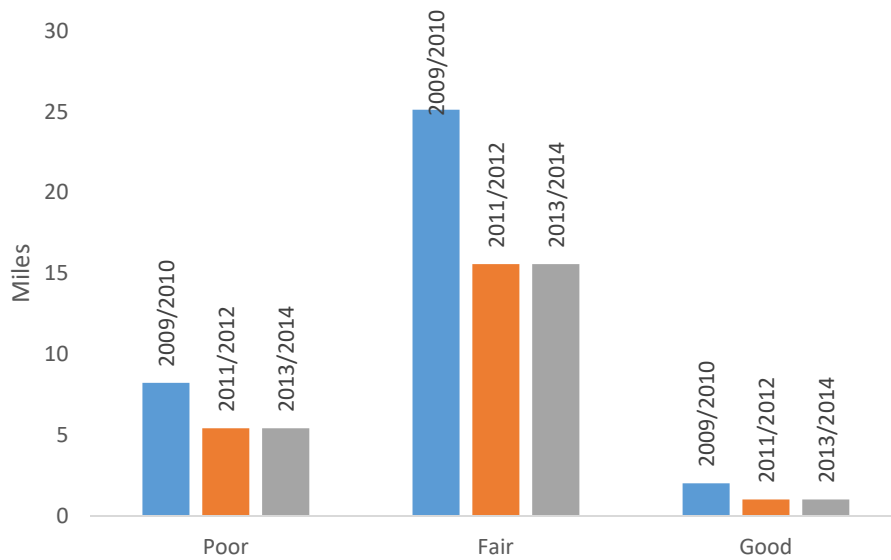


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2009-2014 PASER Road Condition Ratings
Orangeville Township
(18.942 miles)

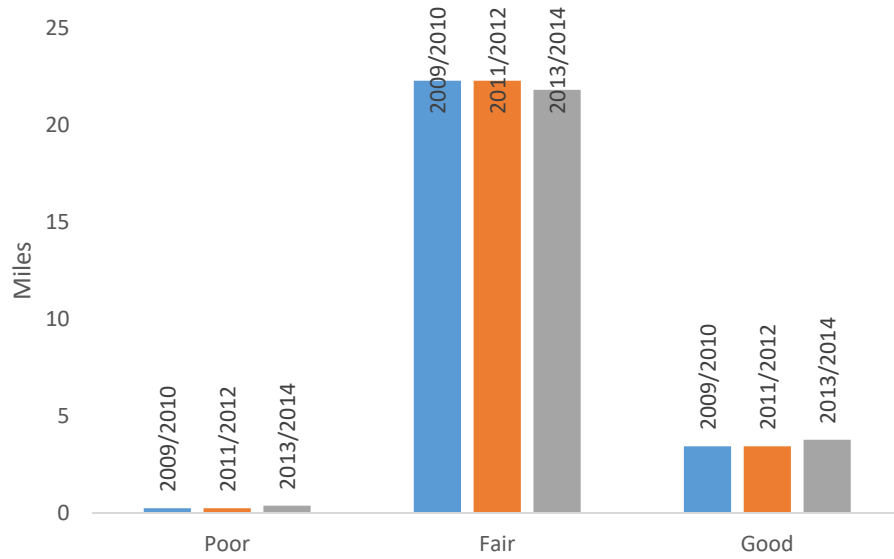


2009-2014 PASER Road Condition Ratings
Prairieville Township
(21.965 miles)

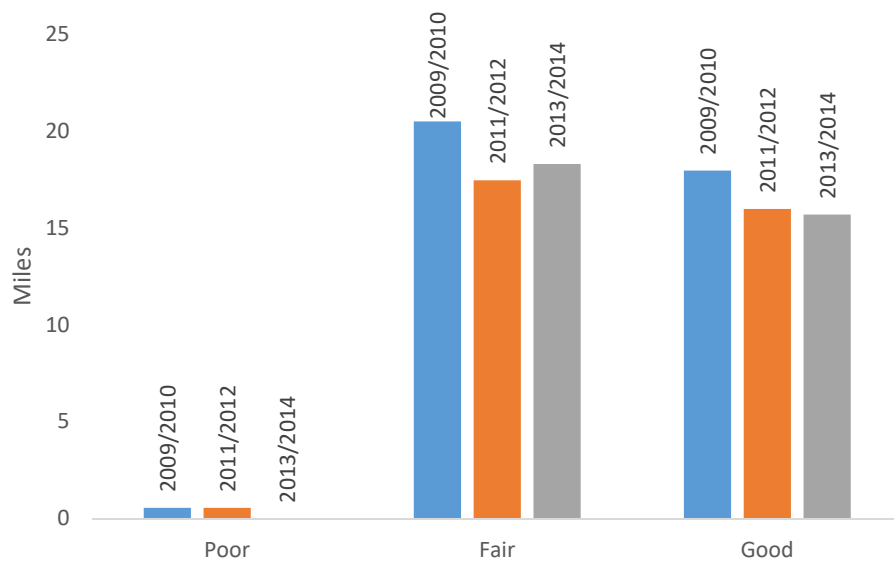


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2009-2014 PASER Road Condition Ratings
Rutland Township
(26.015 miles)

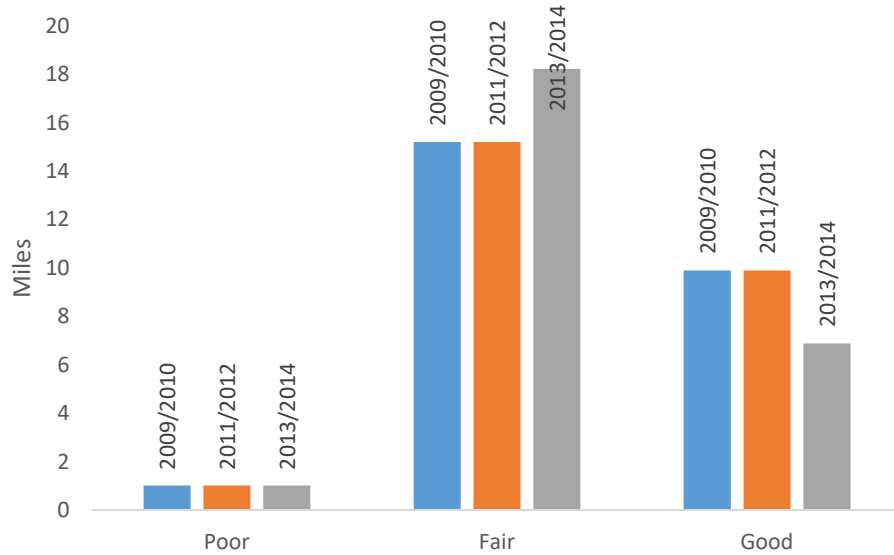


2009-2014 PASER Road Condition Ratings
Thornapple Township
(33.958 miles)

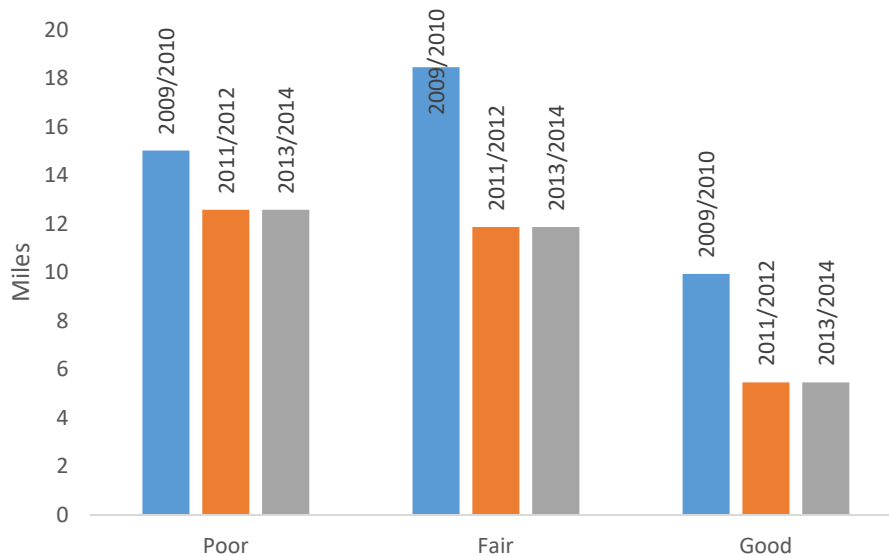


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2009-2014 PASER Road Condition Ratings
Woodland Township
(26.136 miles)



2009-2014 PASER Road Condition Ratings
Yankee Springs Township
(29.912 miles)



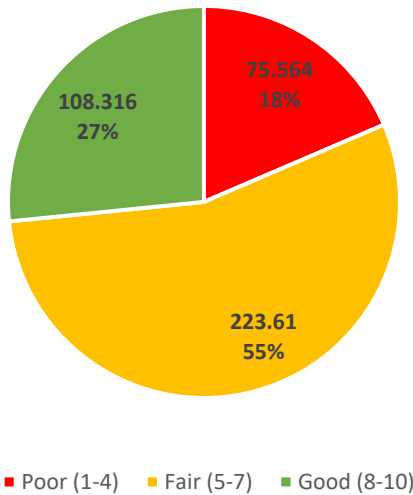
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Pavement Conditions

Of the 407 miles of federal-aid roads that were most recently rated (2013-2014), approximately 75 miles are rated as being in “Poor” condition, 223 miles rated “Fair”, and 108 miles “Good”. This distribution means that currently, over half of all federal-aid roads in Barry County are in fair condition (have a PASER score of 5-7). The chart below illustrates the percentage distribution of road ratings. When looking at this chart, it is evident that the amount of fair and good road miles must be maintained as much as possible.

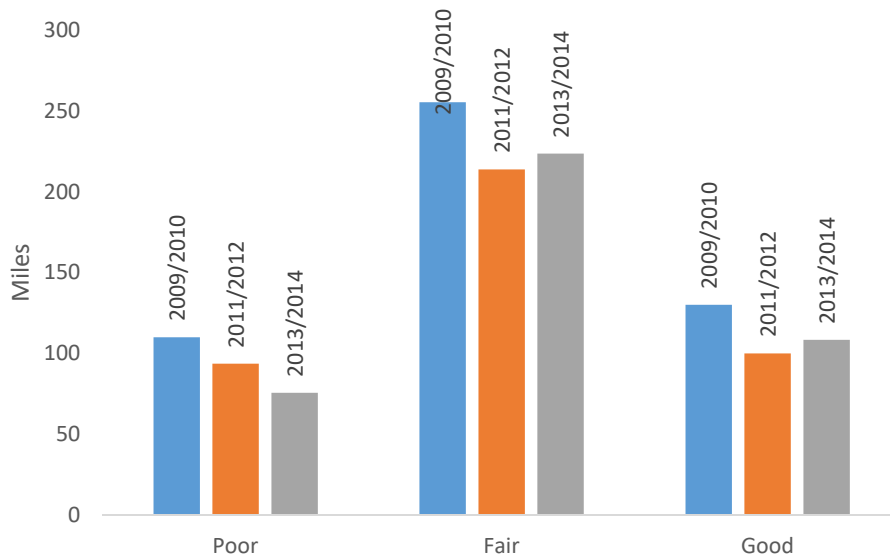
Through asset management strategies, the amount of poor road miles and the maintenance costs associated with structural improvements can be diminished.

Road Ratings Distribution
2013-2014



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Condition Trends of Federal-Aid Roads Barry County 2009-2014

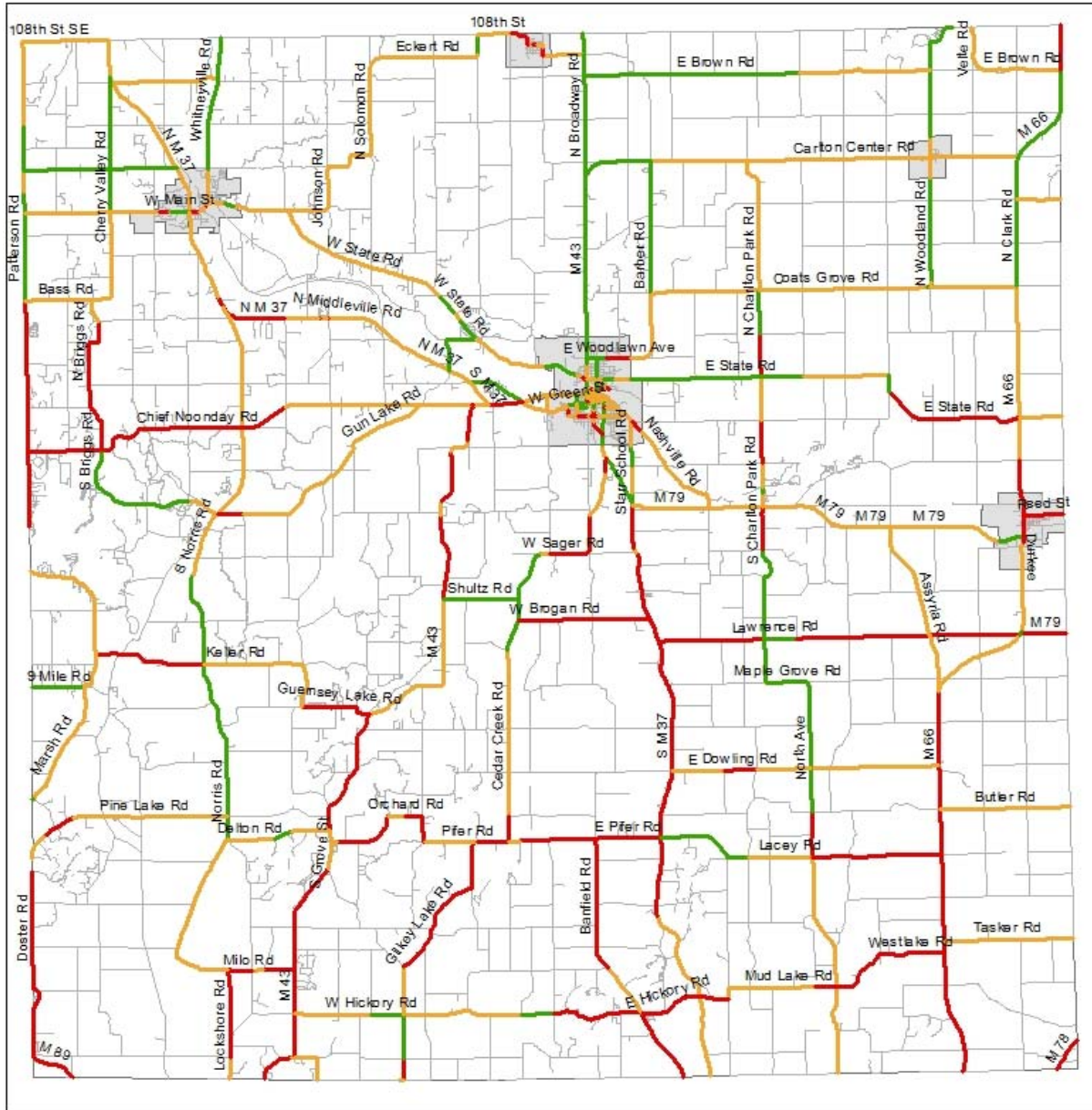


The bar graph shown above illustrates the quality of roads in Barry County over the course of six years. Good and fair roads require minimal maintenance which is less costly, and therefore these types of roads should be maintained whenever possible. The graph also shows that Barry County has made an effort in recent years to reverse trends that occurred between 2009 and 2012. This is evident across all three ratings categories. Between 2009 and 2012, the number of fair road miles decreased, unfortunately, so did the amount of good roads. Within the last two years, these trends have reversed. Good road miles have increased slightly in 2013/2014, after decreasing steadily for the previous four years. Focus should continue to be placed on maintaining roads in fair and good condition in order to continue decreasing the amount of poor roads countywide. It is important to administer capital preventative maintenance treatments that are less expensive before higher cost structural improvements become necessary.

Asset management is useful in helping to focus attention on good and fair pavements before they transition to poor roads that require structural improvements. Putting focus on fixing roads using asset management techniques will improve road networks overall, rather than using worst first strategies to maintain only a small percentage, while others get worse.

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Barry County Federal-Aid Road Ratings 2013-2014



PASER Rating Condition

- 1 - 4 (Poor)
- 5 - 7 (Fair)
- 8 - 10 (Good)

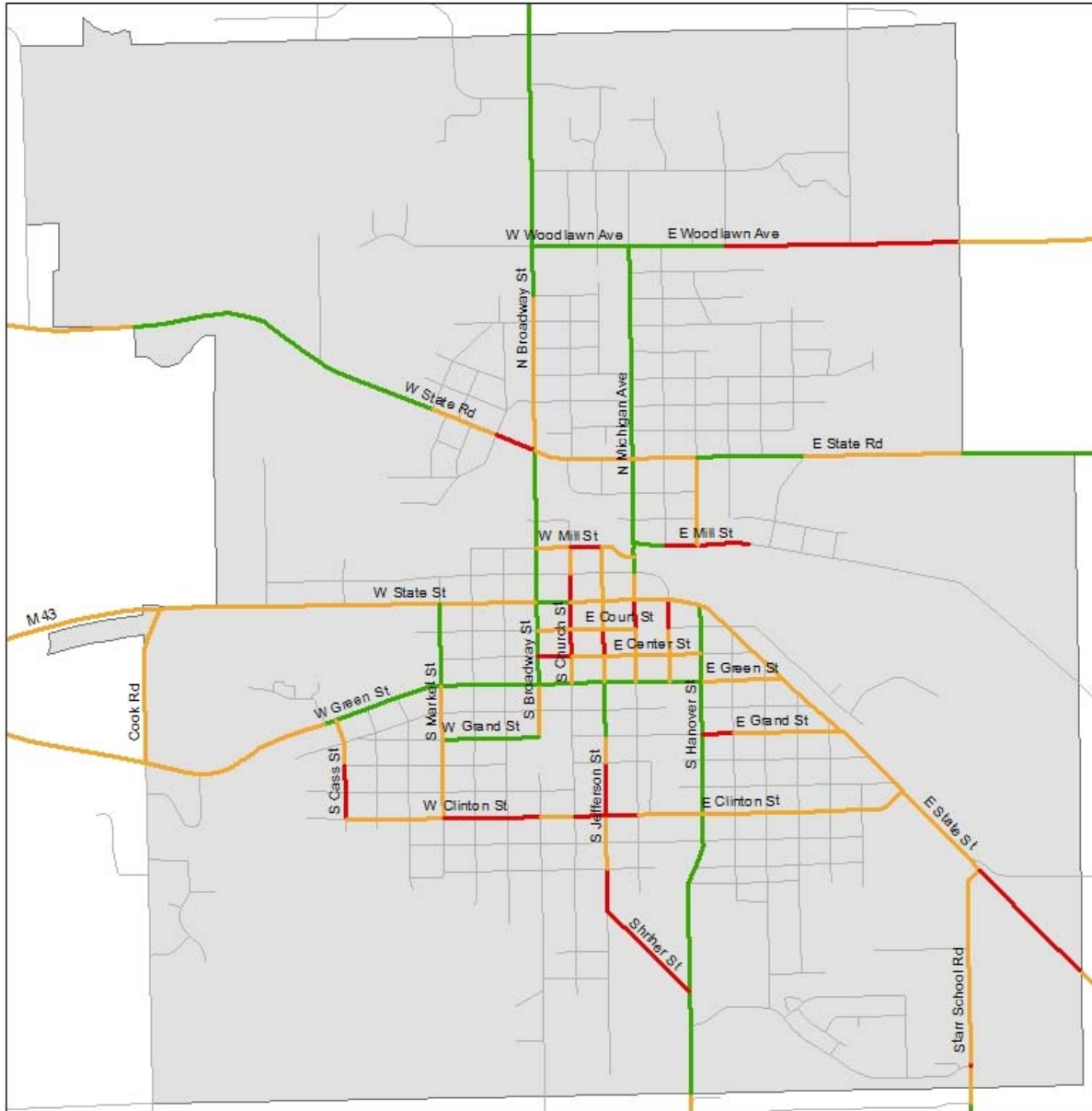


0 1.75 3.5 7 Miles



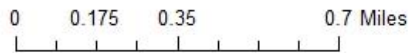
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City of Hastings Federal-Aid Road Ratings 2013-2014



PASER Rating Condition

- 1 - 4 (Poor)
- 5 - 7 (Fair)
- 8 - 10 (Good)



ROAD CONDITION REPORT FOR BARRY COUNTY

Contact Information

For more information regarding the Barry County Road Condition report, contact:

- **Barry County Road Commission**
1725 West M-43 Highway • Hastings, Michigan • 49058
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