

ROAD CONDITION REPORT KALAMAZOO COUNTY

MAY 2014

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Executive Summary

The Kalamazoo Area Transportation Study (KATS) assists in the data collection of road inventory for 'federal-aid' roads in Kalamazoo County. The data collection efforts take place on Federal-Aid roads in the county. Since 2011 the Transportation Asset Management Council PASER data collection has changed what it constitutes as a 'federal-aid' 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."

This Road Condition Report contains both road agency/local government road surface condition rating summaries and specific breakdowns from 2008 - 2013 for all federal-aid roads in the County.

ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

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 Kalamazoo 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	Estimated Cost per Mile	Average Cost per Additional Year
Hot Mix Asphalt Crack Treatment	2	6 to 8	\$10,000	\$5,000
Fog Seal Coat	4	5 to 7	\$5,000	\$1,250
One Course Non-Structural HMA Overlay	7	5 to 6	\$60,000	\$8,571
Milling and One Course Non-Structural HMA Overlay	8	4 to 5	\$75,000	\$9,375
Single Course Chip Seal	6	5 to 7	\$15,000	\$2,500
Double Course Chip Seal	7.5	5 to 7	\$25,000	\$3,333
Single Course MicroSurface	5	4 to 6	\$65,000	\$13,000
Ultra-Thin HMA Overlay	8.5	4 to 6	\$30,000	\$3,529
Full-Depth Reconstruction	30	1 to 2	\$1,500,000	\$50,000

Capital Preventative Maintenance and Reconstructive Treatments

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

- Hot Mix Asphalt (HMA) Crack Treatments are the standard fix for working cracks on an asphalt surface. These cracks are blown out and sealed flush with a rubberized sealant.
- Fog Seals provide a thin asphalt coating over existing pavement. This treatment seals aggregate in place while preventing rutting, and water permeation.
- Non-Structural HMA 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 emulsion to be applied to the road surface, which is then topped with a coarse aggregate.
- Microsurfacing is a fast setting application of polymer-modified cold-mix material. A very thin layer of the material is applied to the paved surface, and traffic is able to resume within hour of the microsurfacing.

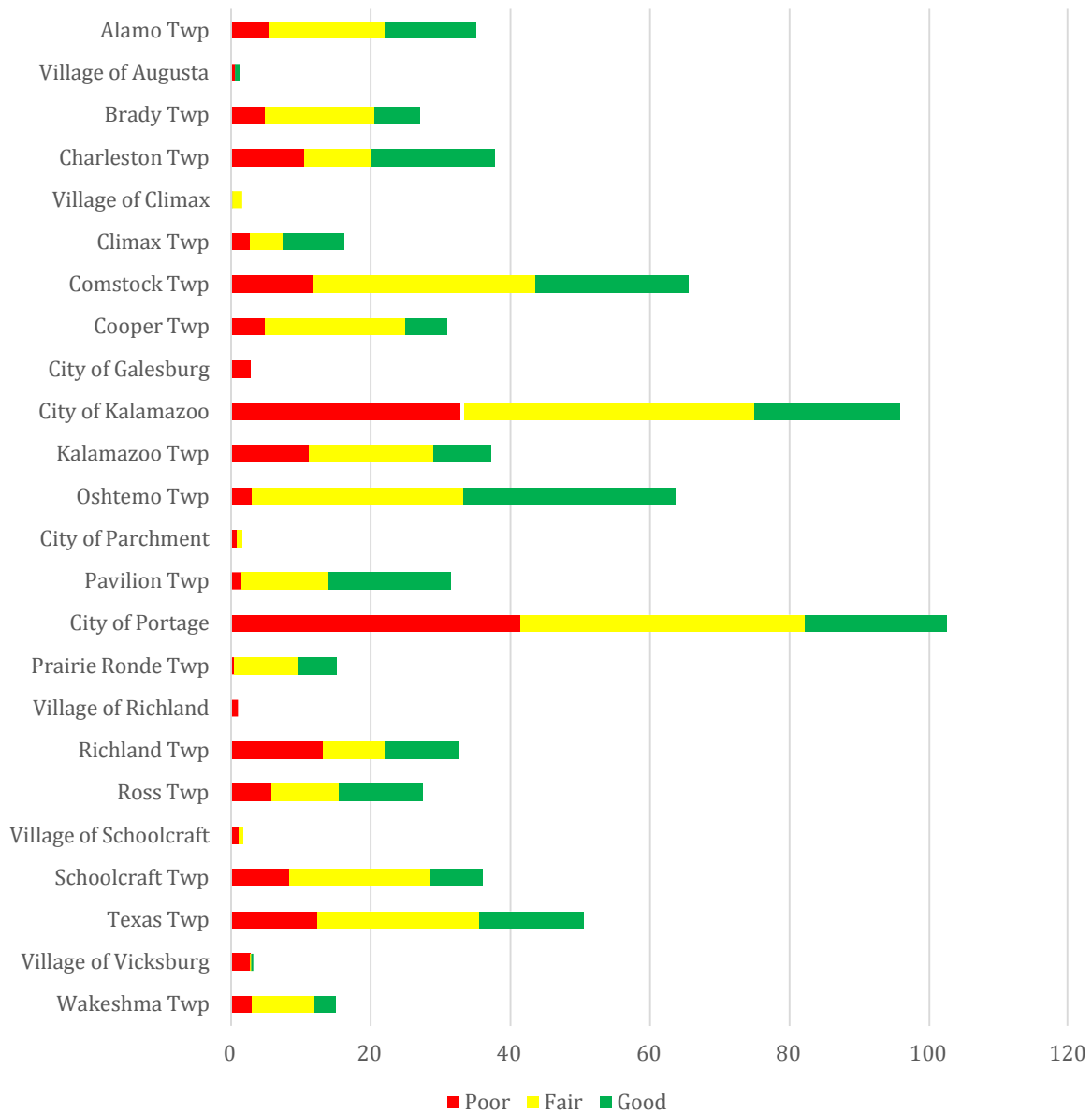
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- An Ultra-Thin HMA Overlay is applied using conventional HMA methods, this type of overlay is thinner than traditional overlays, but generally more expensive and require more time.
- Full-Depth Reconstruction is the replacement of the entire paved 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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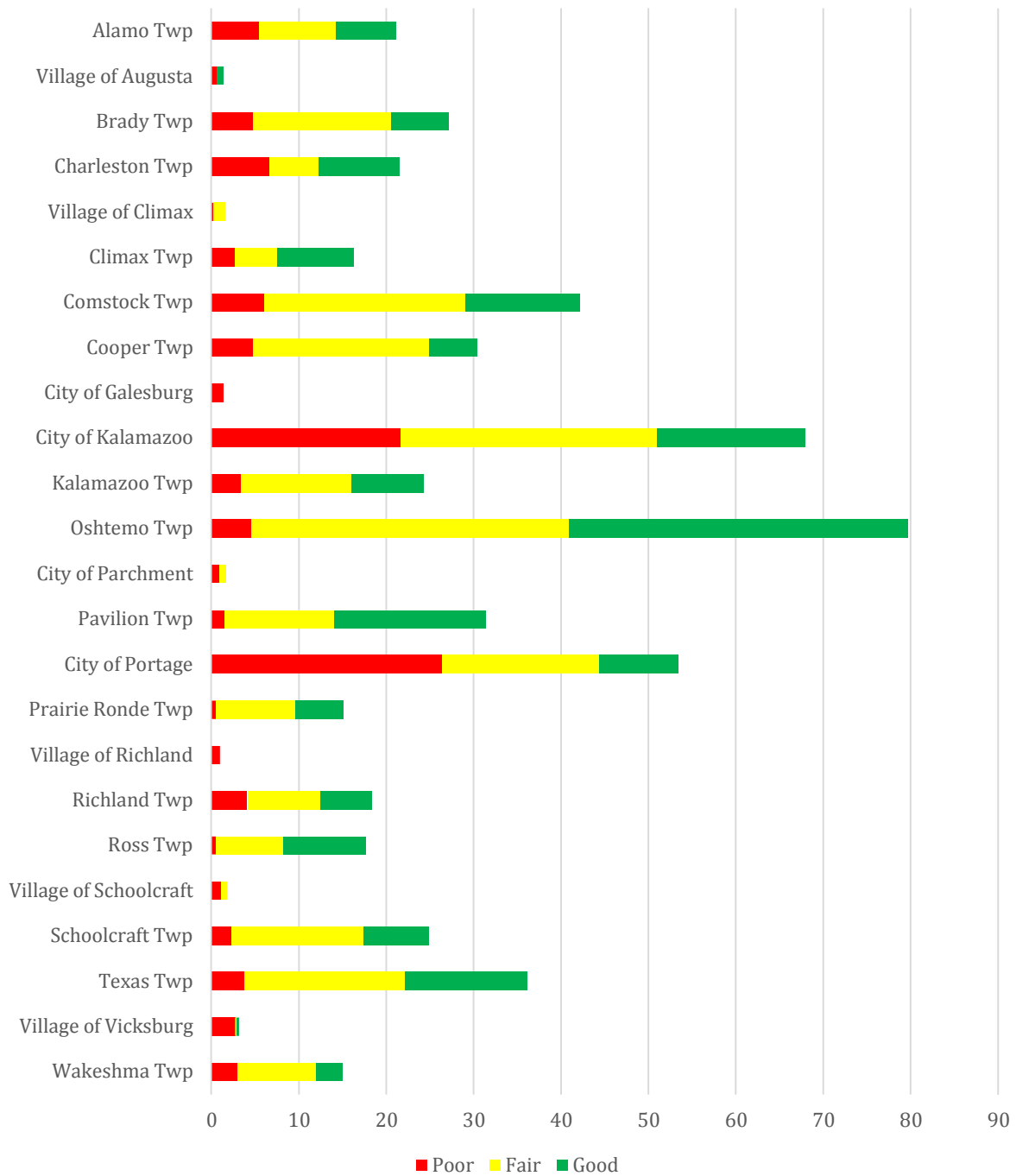
Summary of 2012 and 2013 Ratings

2012-2013 PASER Ratings
Kalamazoo County Federal-Aid Miles by Jurisdiction
(733.9 Miles)



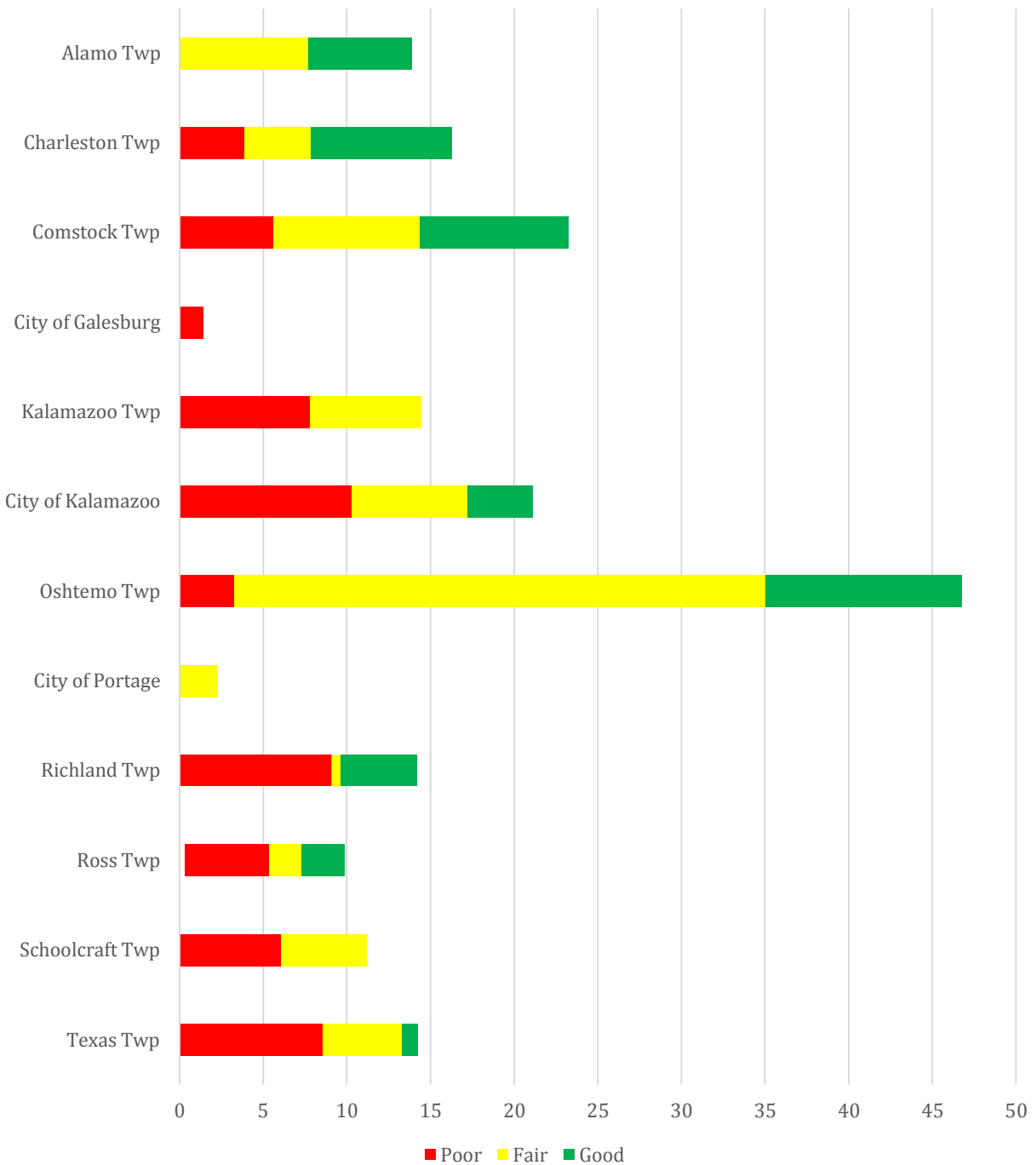
ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

2012/2013 PASER Scores Kalamazoo County Non-Trunkline Federal-Aid Miles (554.3 Miles)



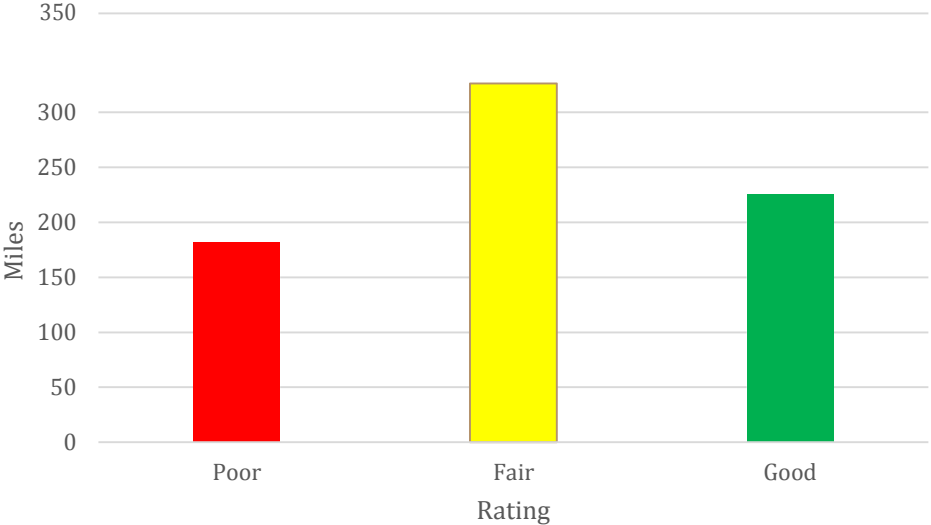
ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

2012-2013 PASER Scores
 Kalamazoo County Trunkline Miles of Federal-Aid Road
 (188.9 Miles)



ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

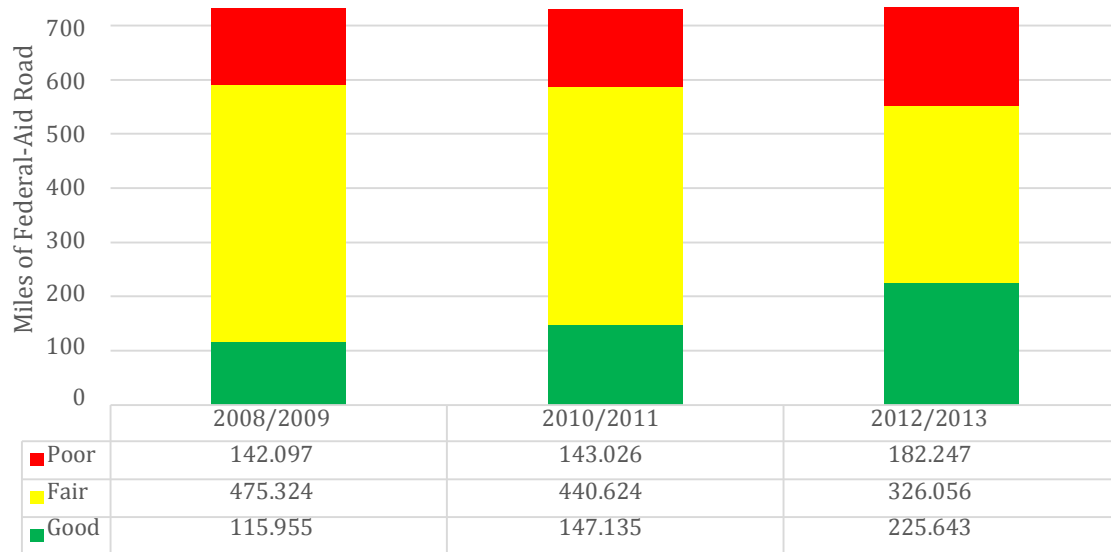
Kalamazoo Countywide PASER Ratings
2012-2013
(733.9 Miles)



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Historical Data Collection

2008-2013 PASER Road Condition Ratings
Kalamazoo County Federal-Aid Roads

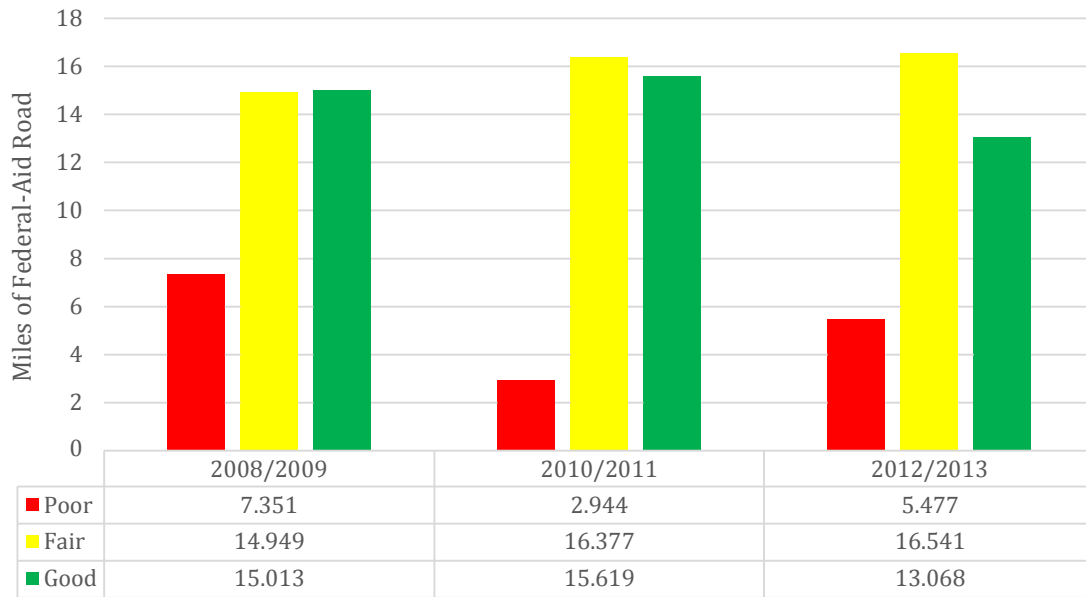


The chart above reflects the progression of Kalamazoo County’s federal-aid roads over a six year period. From 2008 to 2013, there has been an increase in roads that are rated as being in “Poor” condition, and the number of “Good” road miles have also increased substantially overall. Road miles rated with a PASER score of 8-10 (Good) showed an increase of approximately 31 miles between 2008/2009-2010/2011, with that number continuing to increase significantly by almost 80 miles in 2012/2013, resulting in about a 110 mile increase over the course of six years.

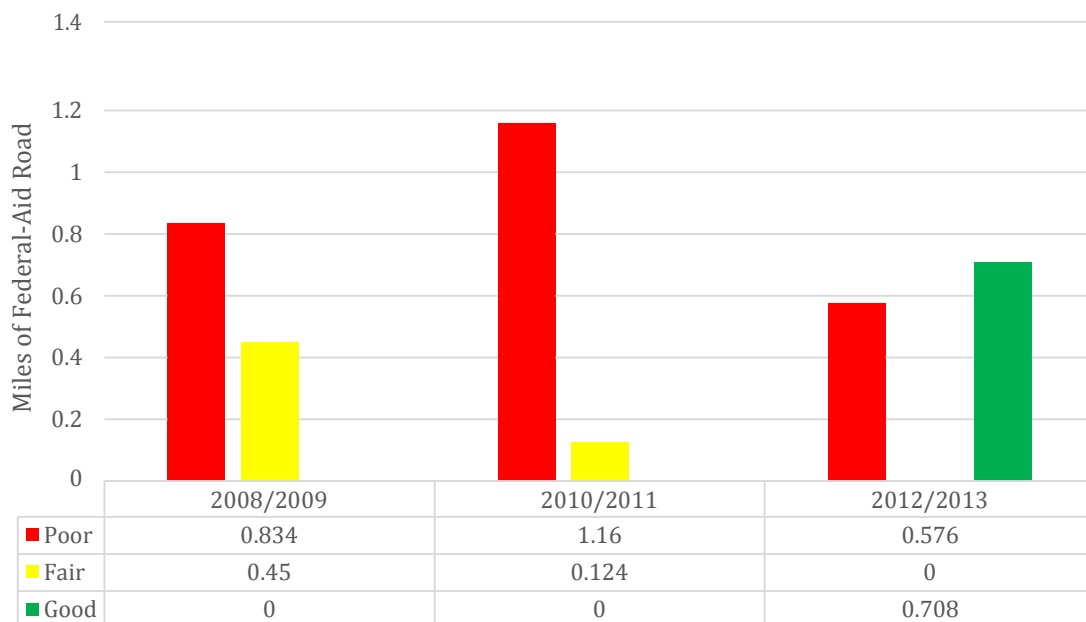
When looking at township breakdowns from 2012/2013 on the previous three pages of this document, it is apparent that in most jurisdictions, the majority of roads are Fair and Poor, with Good roads rated 8-10 constituting a smaller percentage of the total miles. This is the case for all roads, including federal-aid trunkline and non-trunkline in Kalamazoo County.

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2008-2013 PASER Road Condition Ratings
Alamo Township
(35.086 Miles)

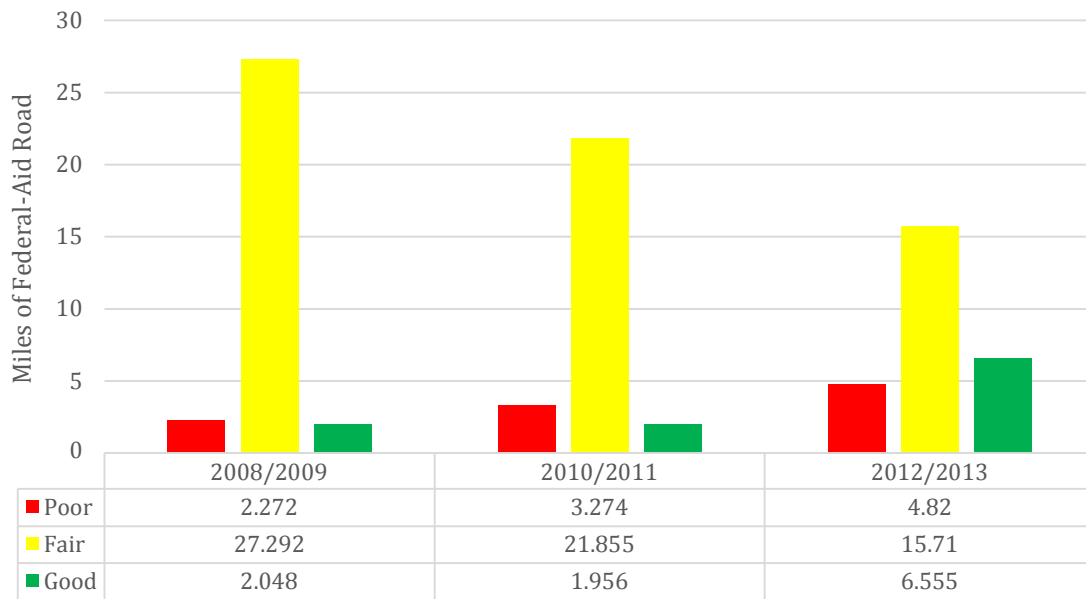


2008-2013 PASER Road Condition Ratings
Village of Augusta
(1.284 Miles)

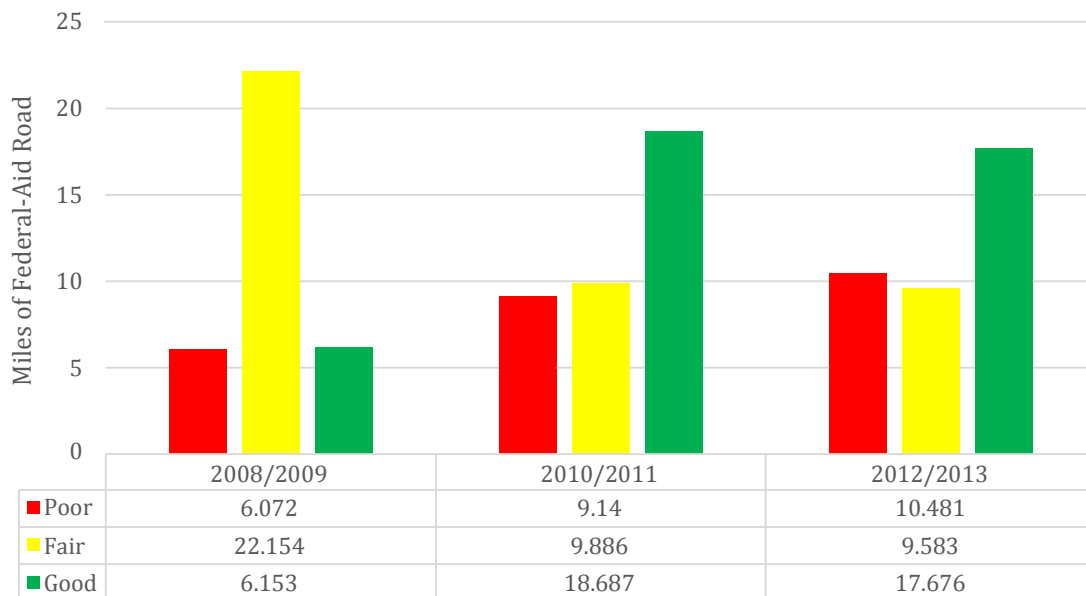


ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

2008-2013 PASER Road Condition Ratings
Brady Township
(27.085 Miles)

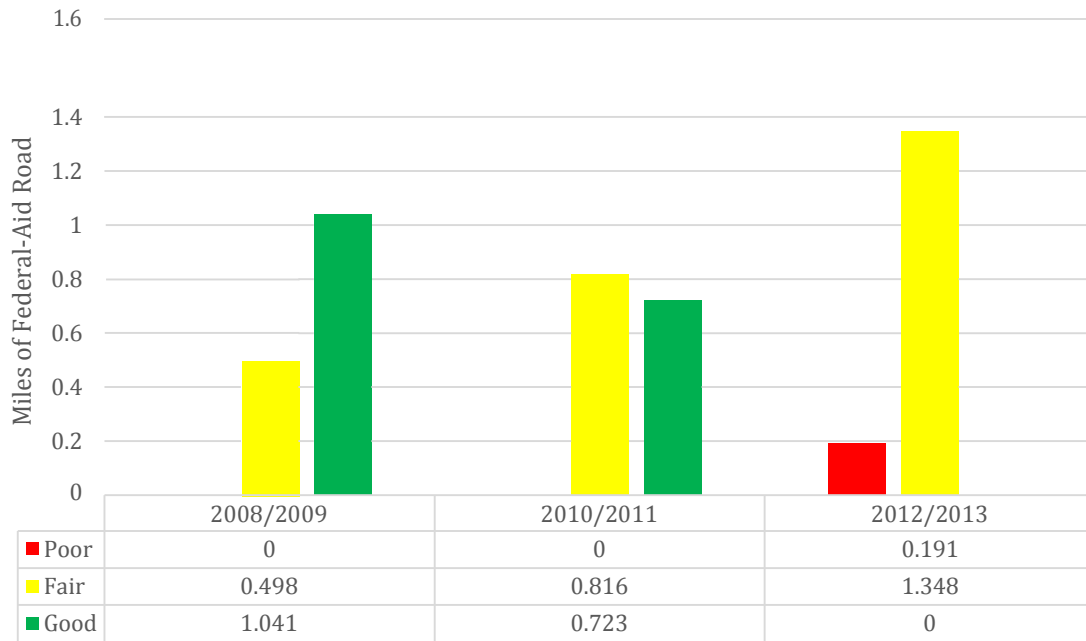


2008-2013 PASER Road Condition Ratings
Charleston Township
(37.74 Miles)

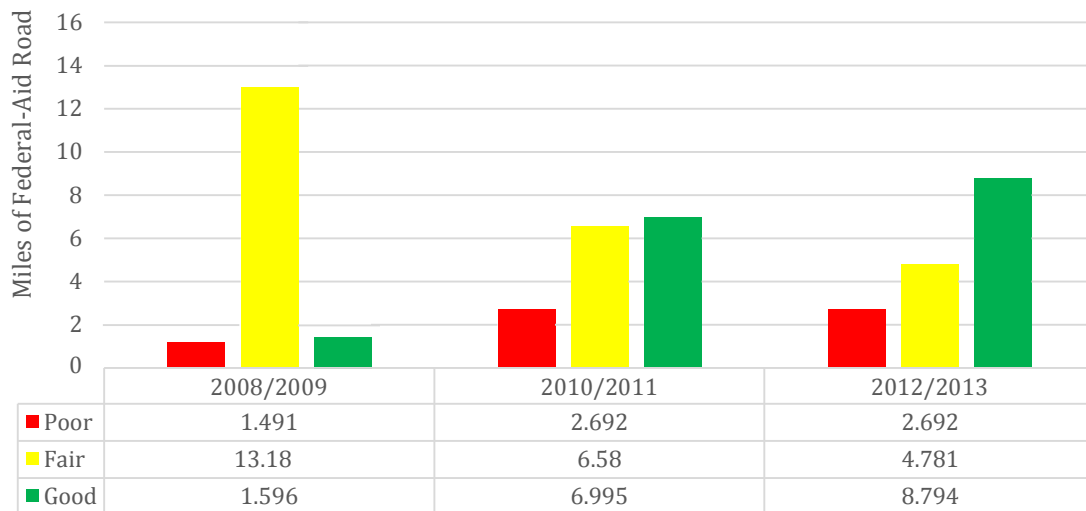


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2008-2013 PASER Road Condition Ratings Village of Climax (1.539 Miles)

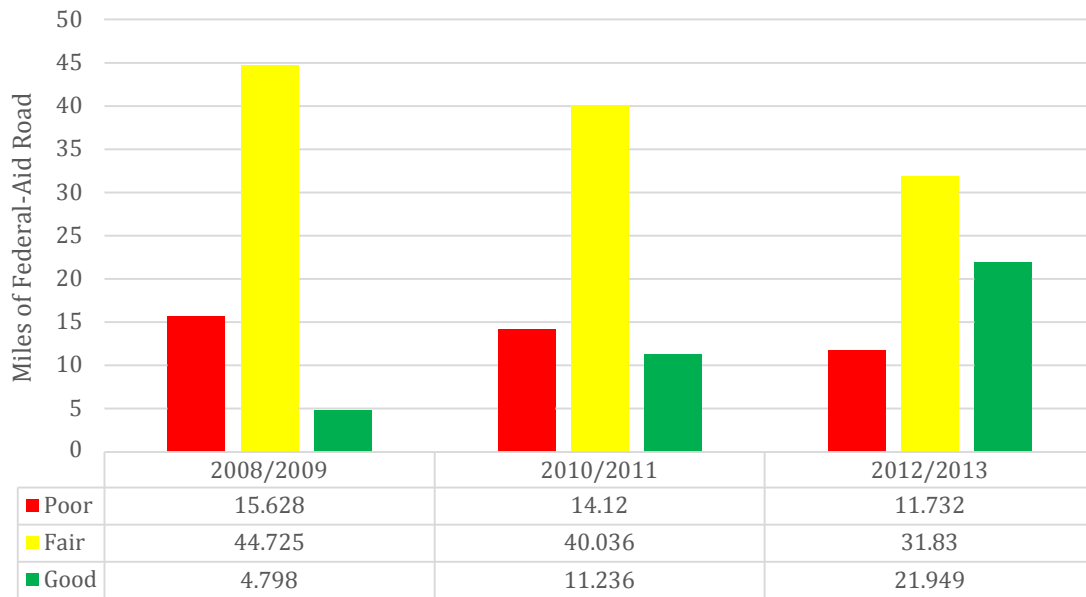


2008-2013 PASER Road Condition Ratings Climax Township (16.267 Miles)

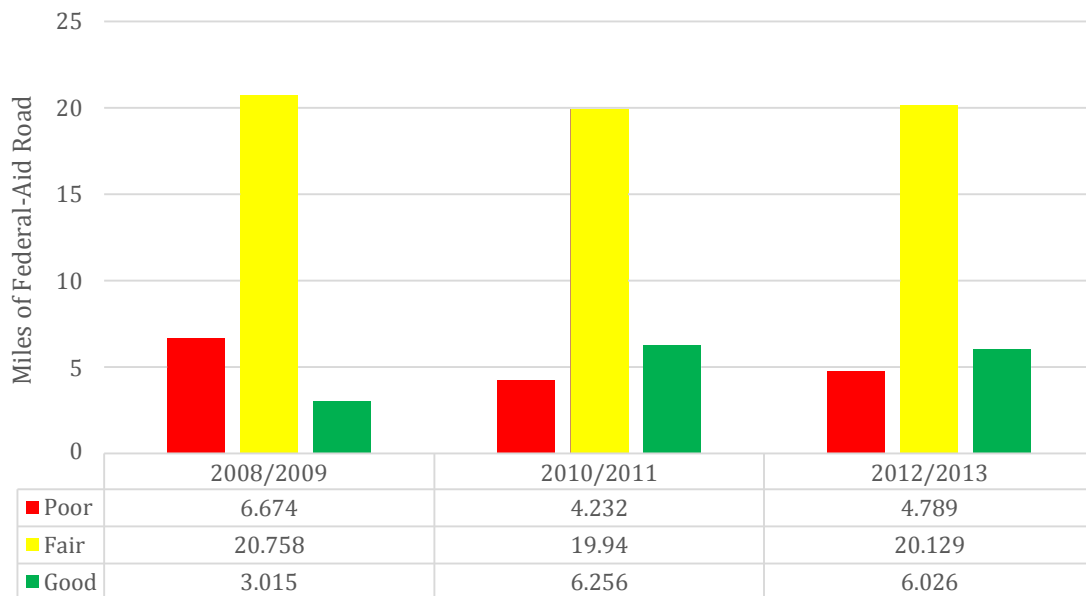


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2008-2013 PASER Road Condition Ratings Comstock Township (65.511 Miles)

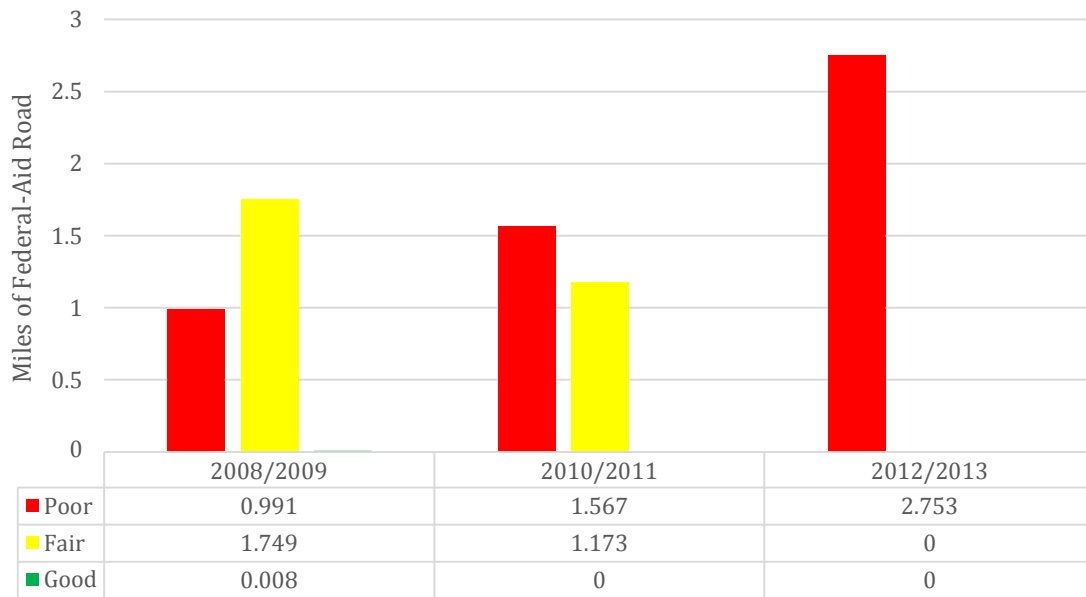


2008-2013 PASER Road Condition Ratings Cooper Township (30.944 Miles)

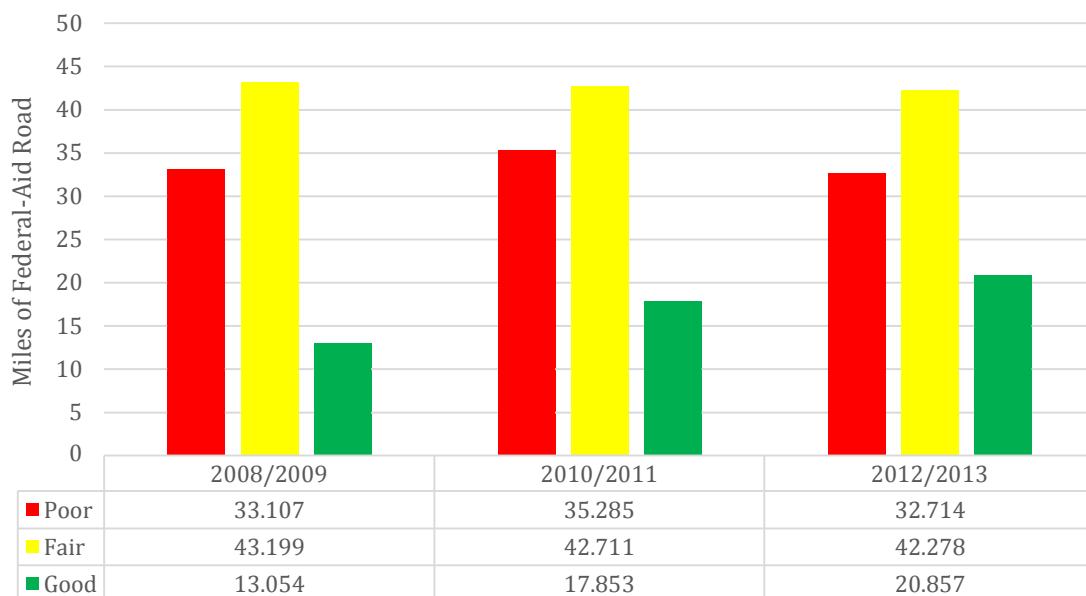


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2008-2013 PASER Road Condition Ratings
City of Galesburg
(2.753 Miles)

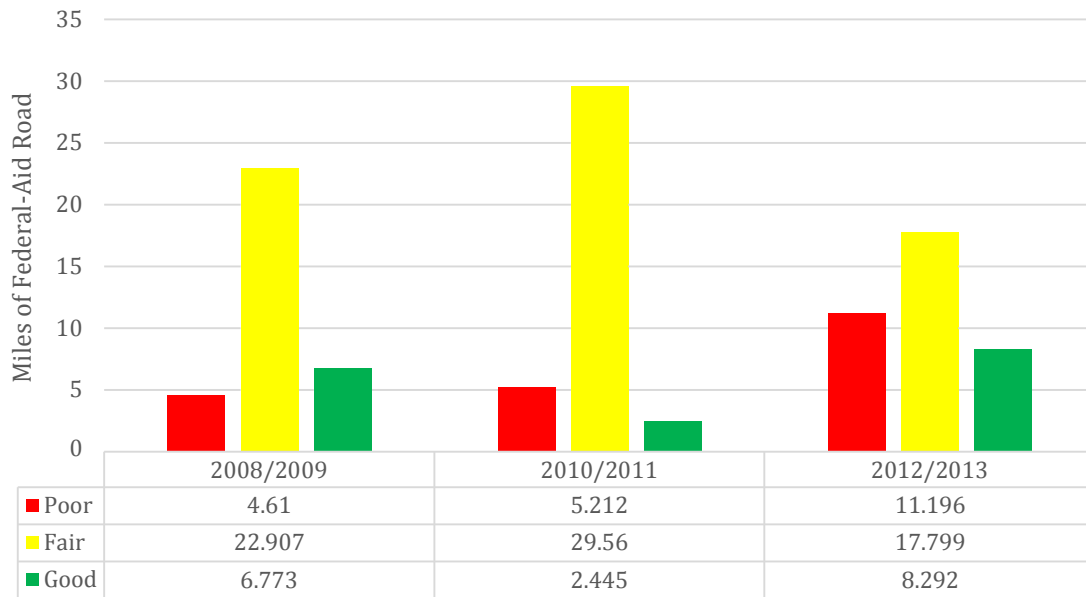


2008-2013 PASER Road Condition Ratings
City of Kalamazoo
(95.849 Miles)

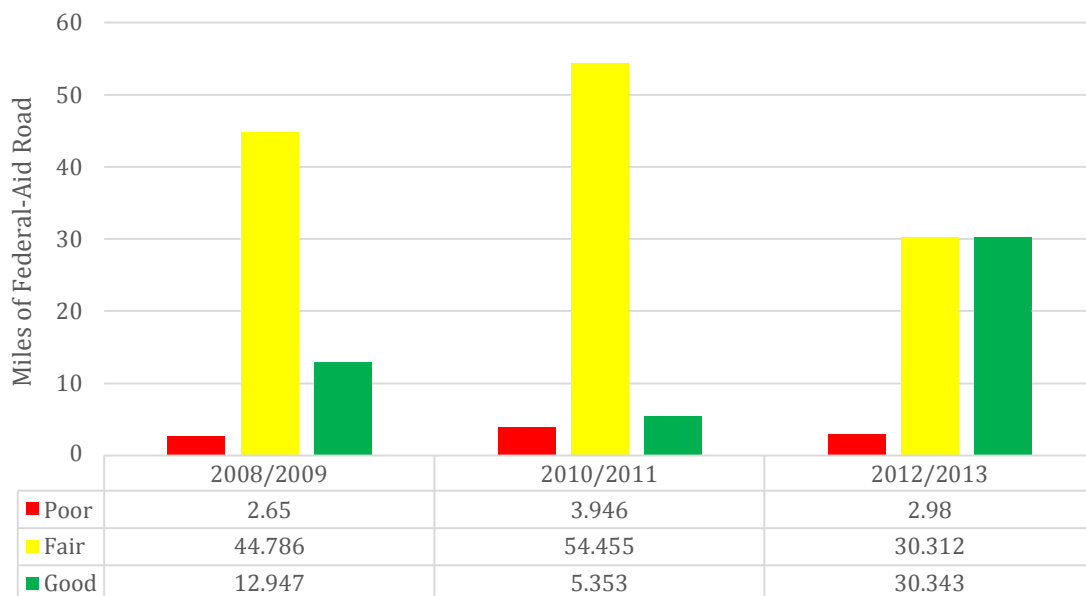


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2008-2013 PASER Road Condition Ratings
Kalamazoo Township
(37.287 Miles)

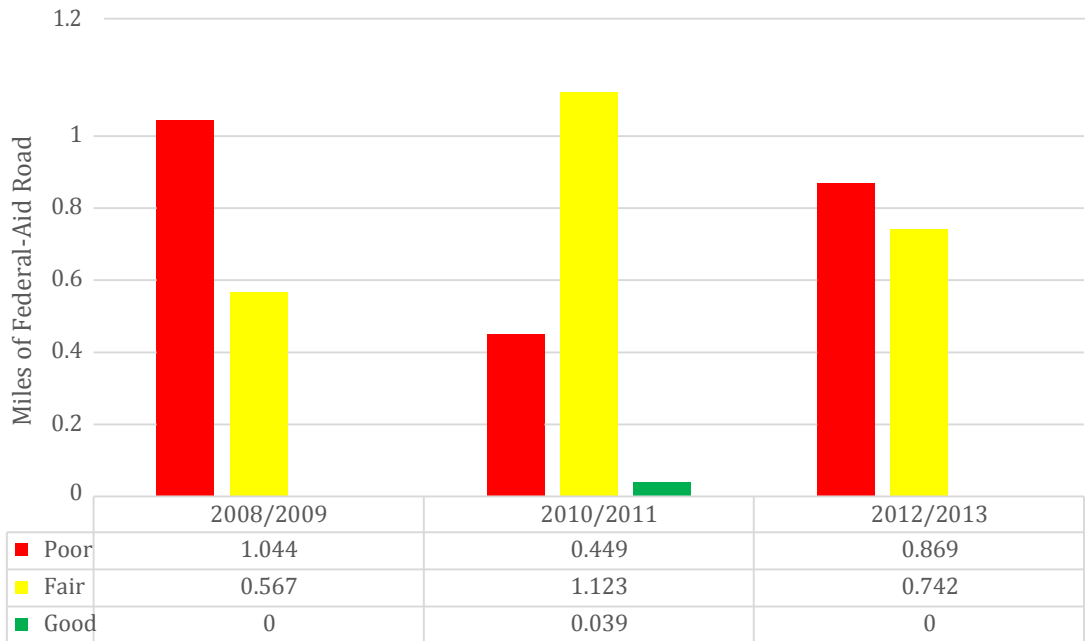


2008-2013 PASER Road Condition Ratings
Oshtemo Township
(63.635 Miles)

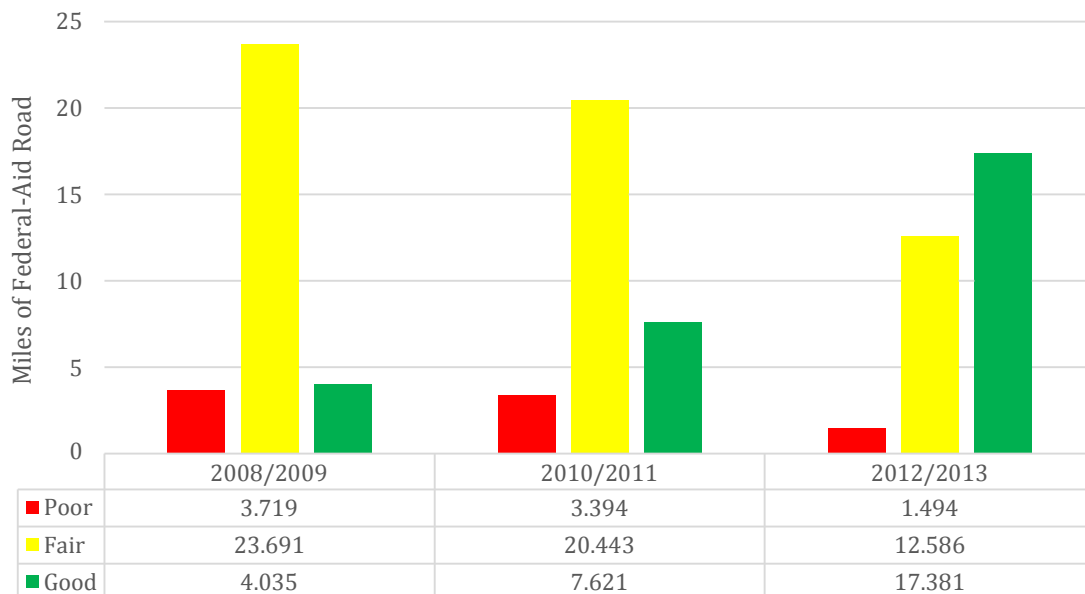


ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

2008-2013 PASER Road Condition Ratings
City of Parchment
(1.611 Miles)

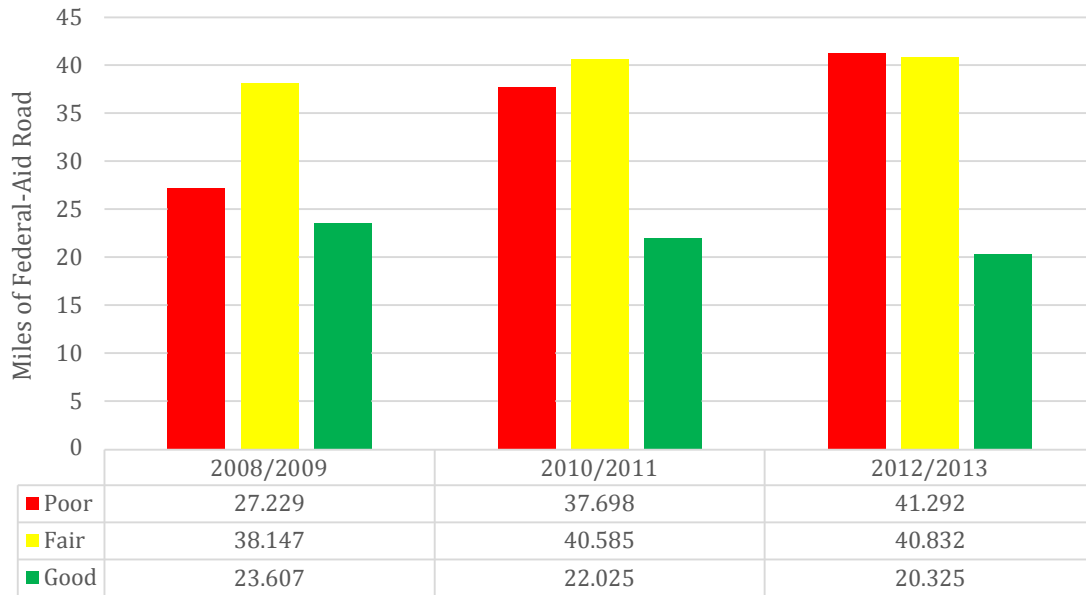


2008-2013 PASER Road Condition Ratings
Pavilion Township
(31.461 Miles)

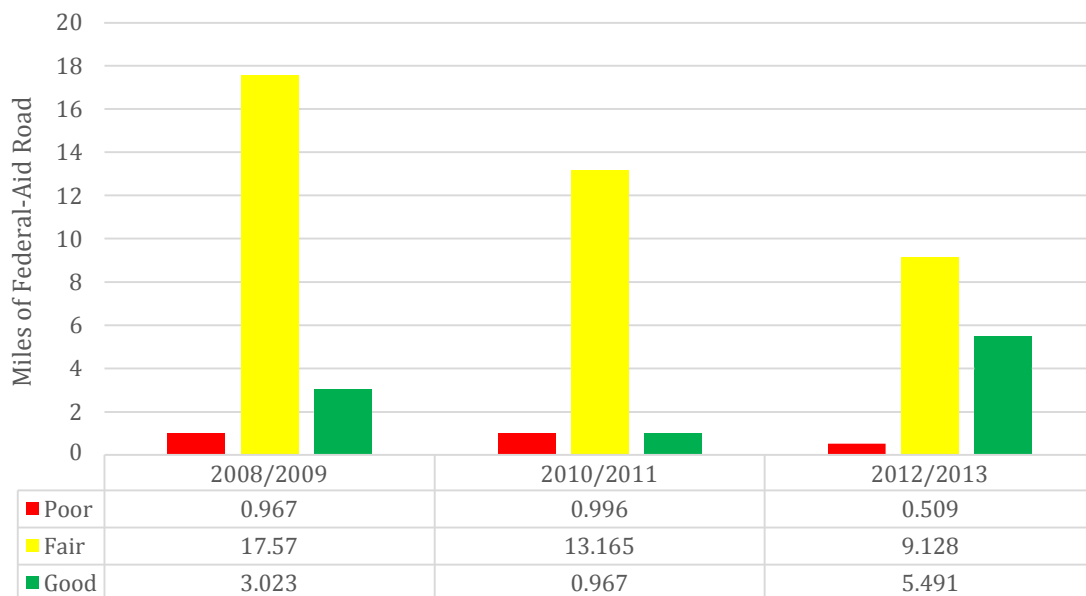


ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

2008-2013 PASER Road Condition Ratings City of Portage (102.449 Miles)

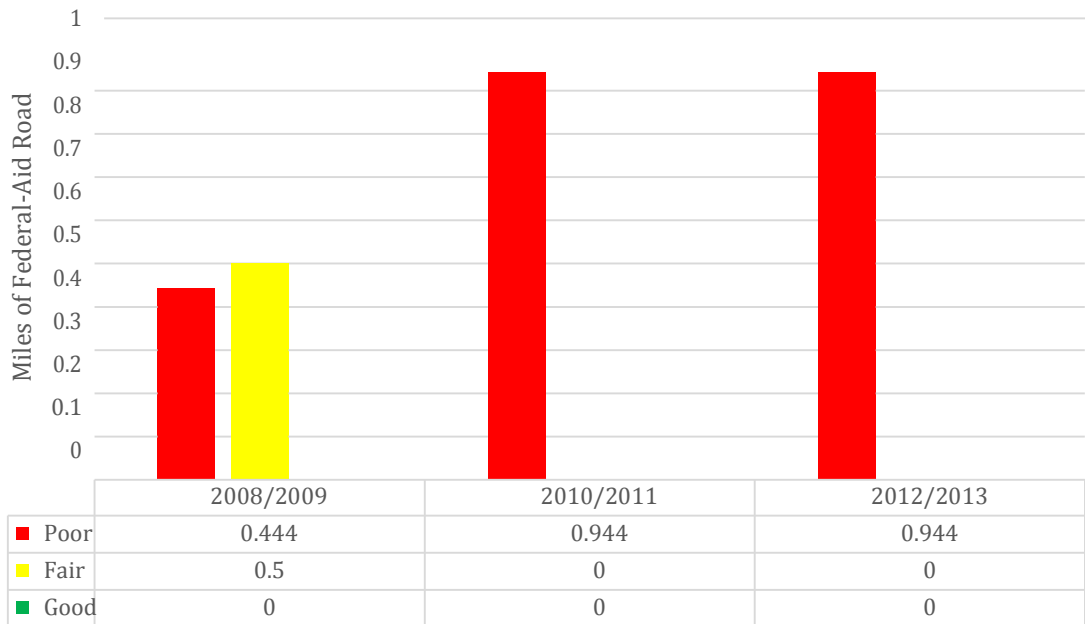


2008-2013 PASER Road Condition Ratings Prairie Ronde Township (15.128 Miles)

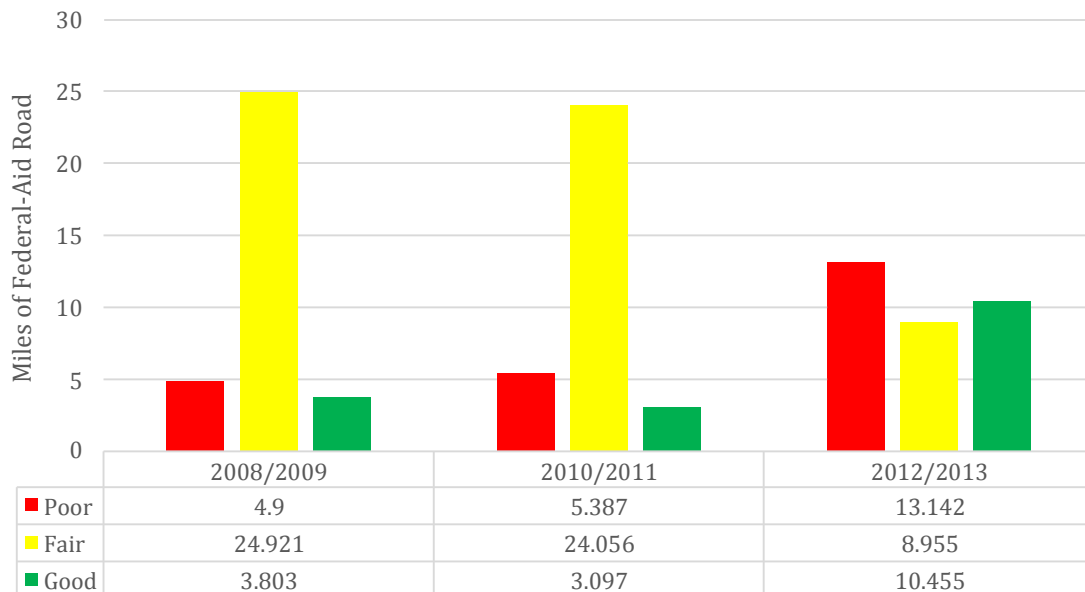


ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

2008-2013 PASER Road Condition Ratings
 Richland Village
 (0.944 Miles)

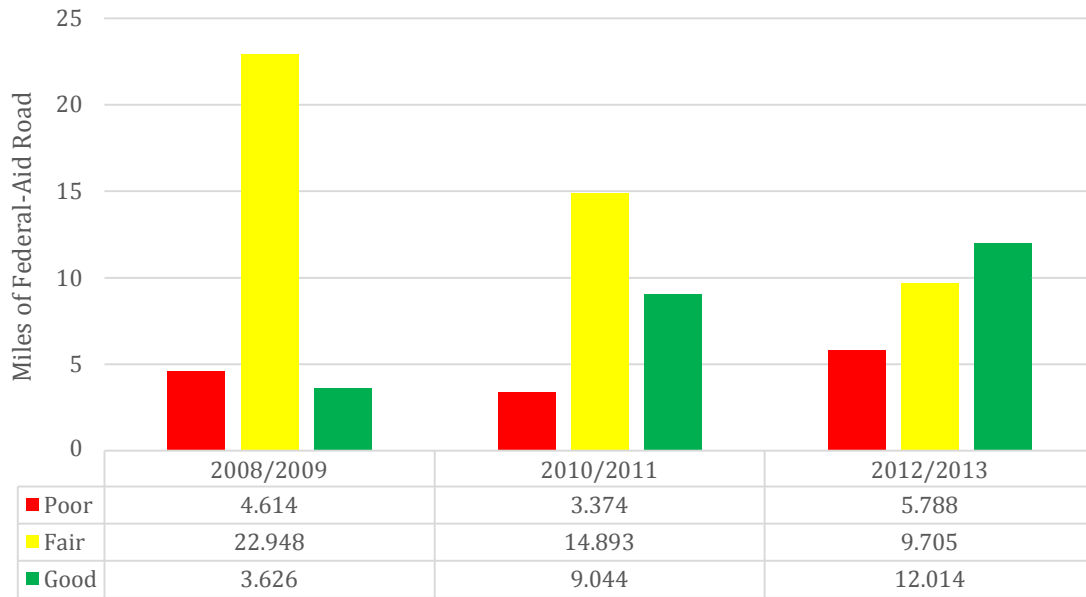


2008-2013 PASER Road Condition Ratings
 Richland Township
 (32.552 Miles)

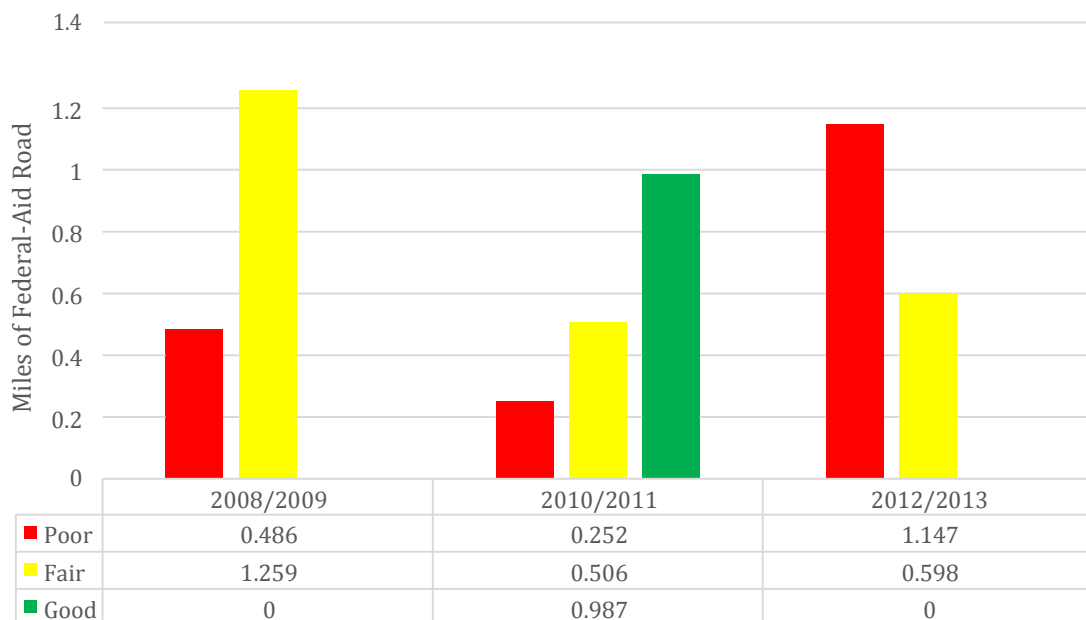


ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

2008-2013 PASER Road Condition Ratings Ross Township (27.507 Miles)

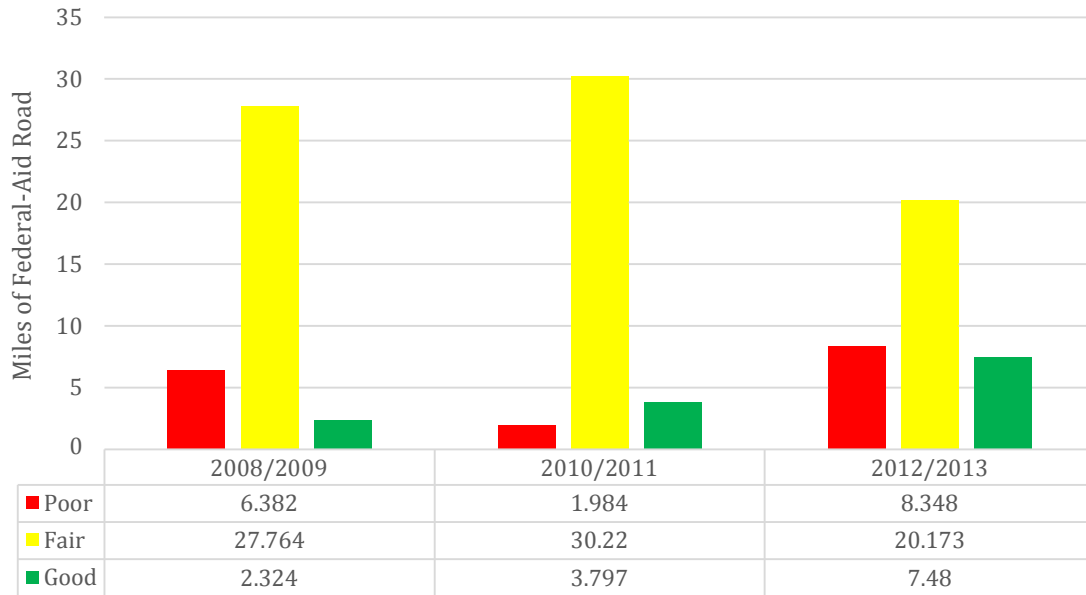


2008-2013 PASER Road Condition Ratings Village of Schoolcraft (1.745 Miles)

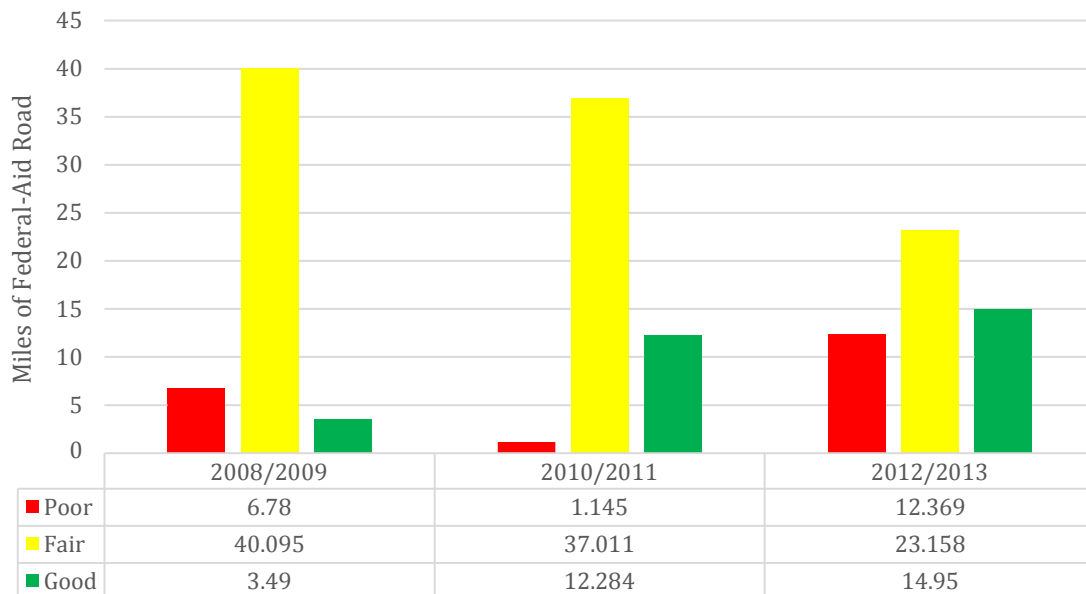


ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

2008-2013 PASER Road Condition Ratings
Schoolcraft Township
(36.001 Miles)

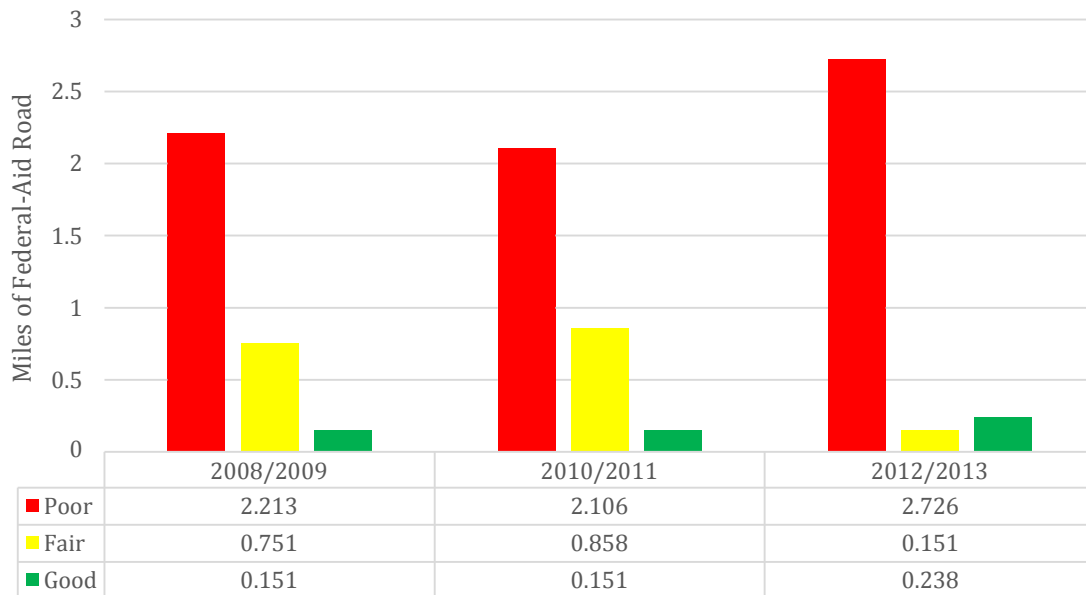


2008-2013 PASER Road Condition Ratings
Texas Township
(50.477 Miles)

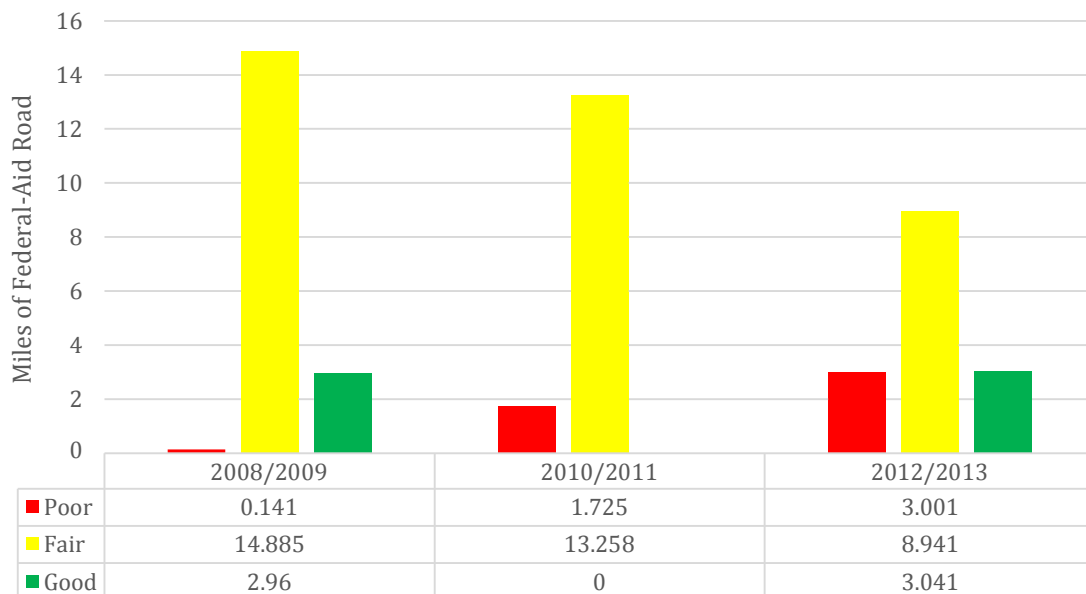


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2008-2013 PASER Road Condition Ratings
Village of Vicksburg
(3.115 Miles)



2008-2013 PASER Road Condition Ratings
Wakeshma Township
(14.983 Miles)



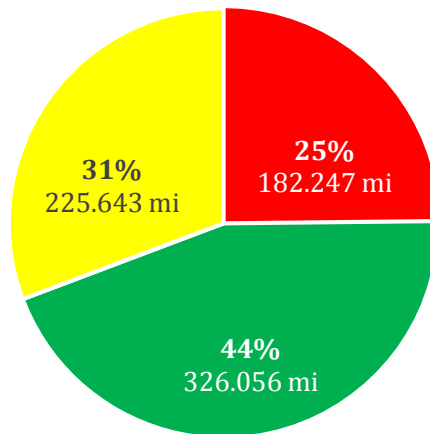
ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

Pavement Conditions

Of the 734 miles of federal-aid roads that were most recently rated (2012-2013), approximately 182 miles are rated as being in “Poor” condition, 326 miles rated “Fair”, and 226 miles “Good”. This distribution means that currently, nearly half of all federal-aid roads in Kalamazoo 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 best as possible.

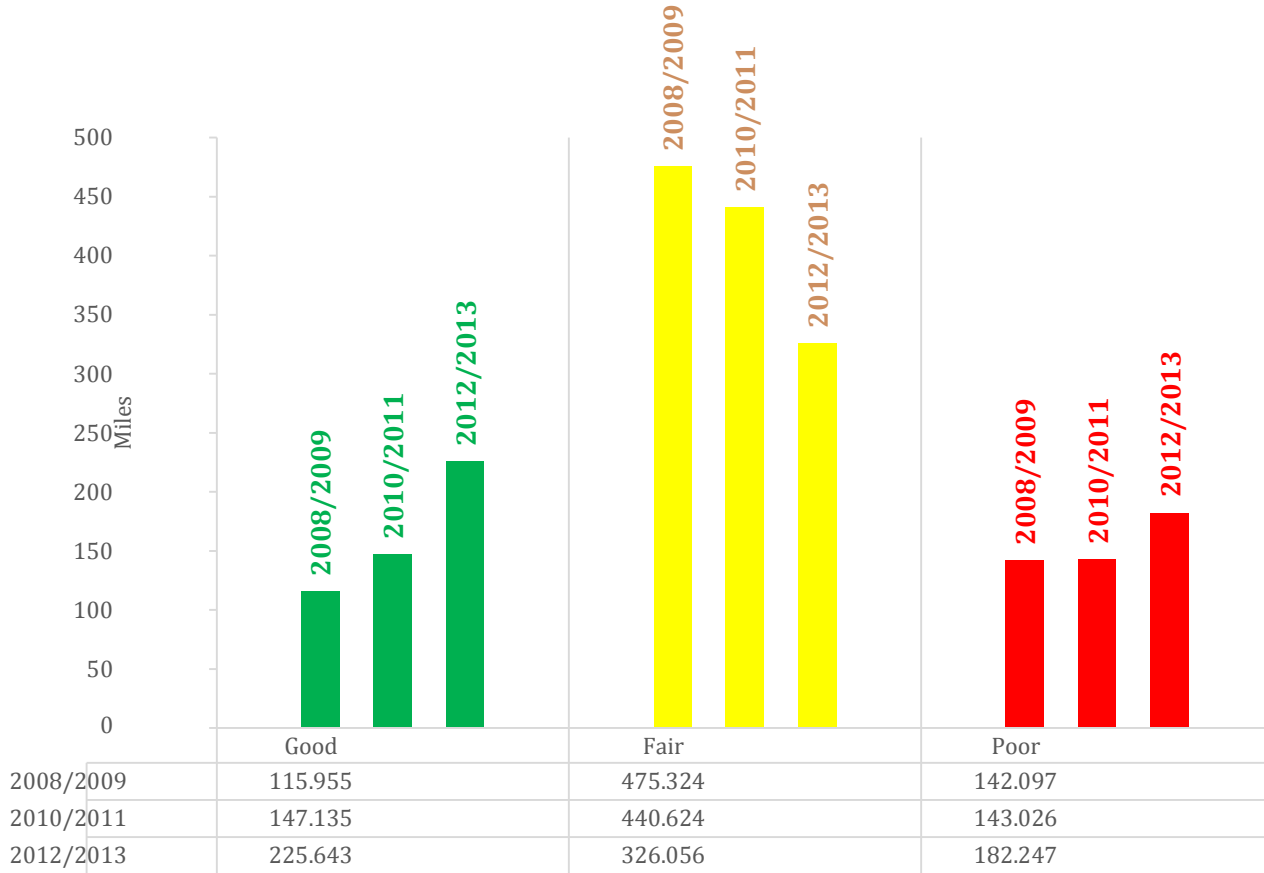
Through asset management strategies, the amount of Poor road miles and the maintenance costs associated with structural improvements can be diminished.

Road Ratings Distribution
2012-2013



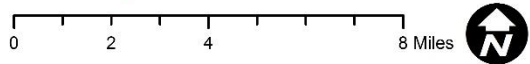
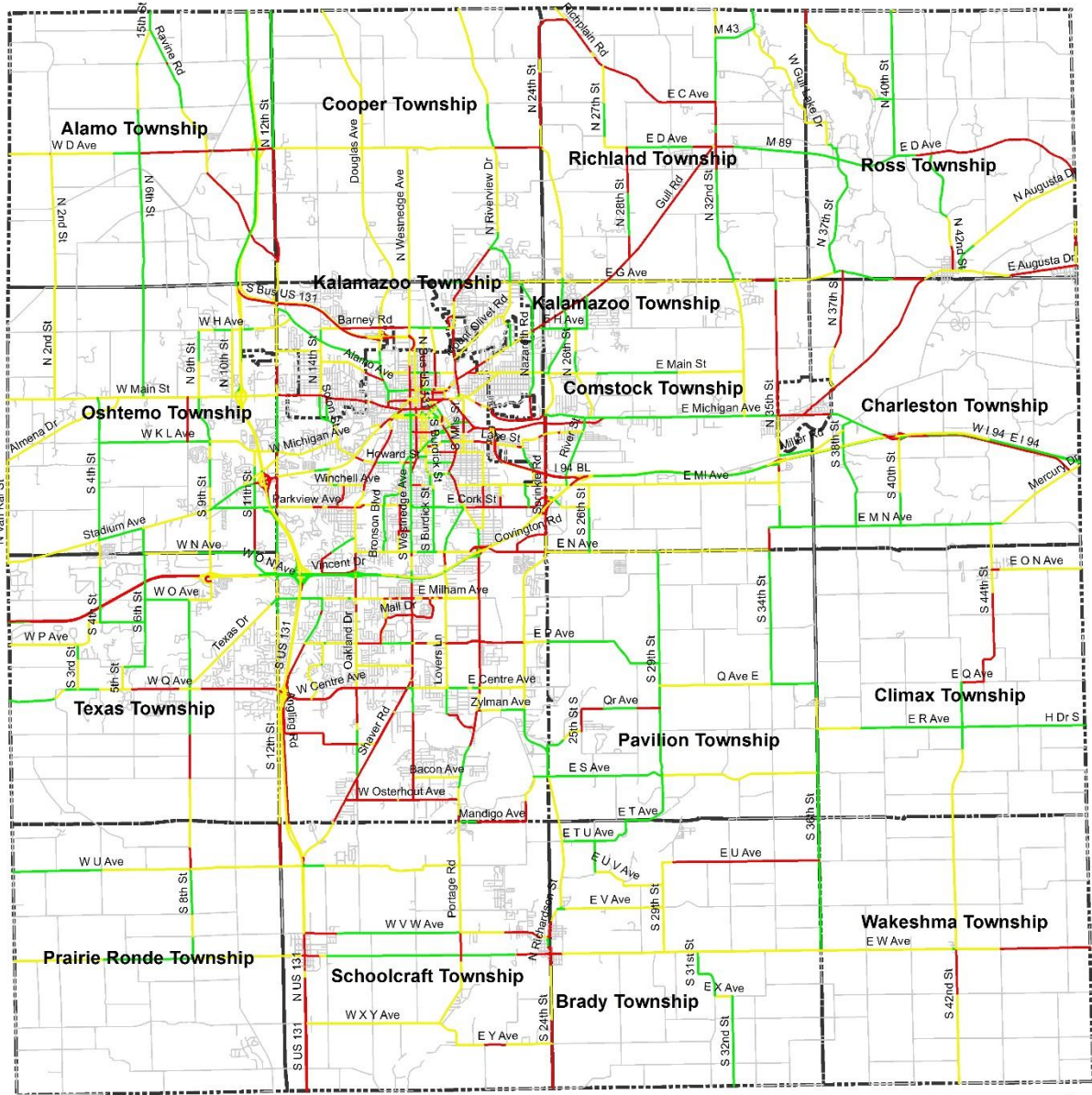
■ Poor ■ Fair ■ Good

Condition Trends of Federal-Aid Roads Kalamazoo County 2008-2013



The bar graph shown above illustrates the quality of roads in Kalamazoo County over the course of six years. Good and Fair roads require minimal maintenance which is less costly, and therefore these roads should be maintained whenever possible. The graph also shows that Kalamazoo County has maintained trends that occurred between 2008 and 2011. This is evident across all three ratings categories. Between 2008 and 2011, the number of Fair road miles decreased, while the amount of Poor roads increased. These trends continued into 2012 and 2013. Good road miles have increased significantly in 2012 and 2013 by over 78 miles, after exhibiting an increase in the previous four years. Focus should continue to be placed on maintaining roads in Fair and Good condition in order to decrease 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.



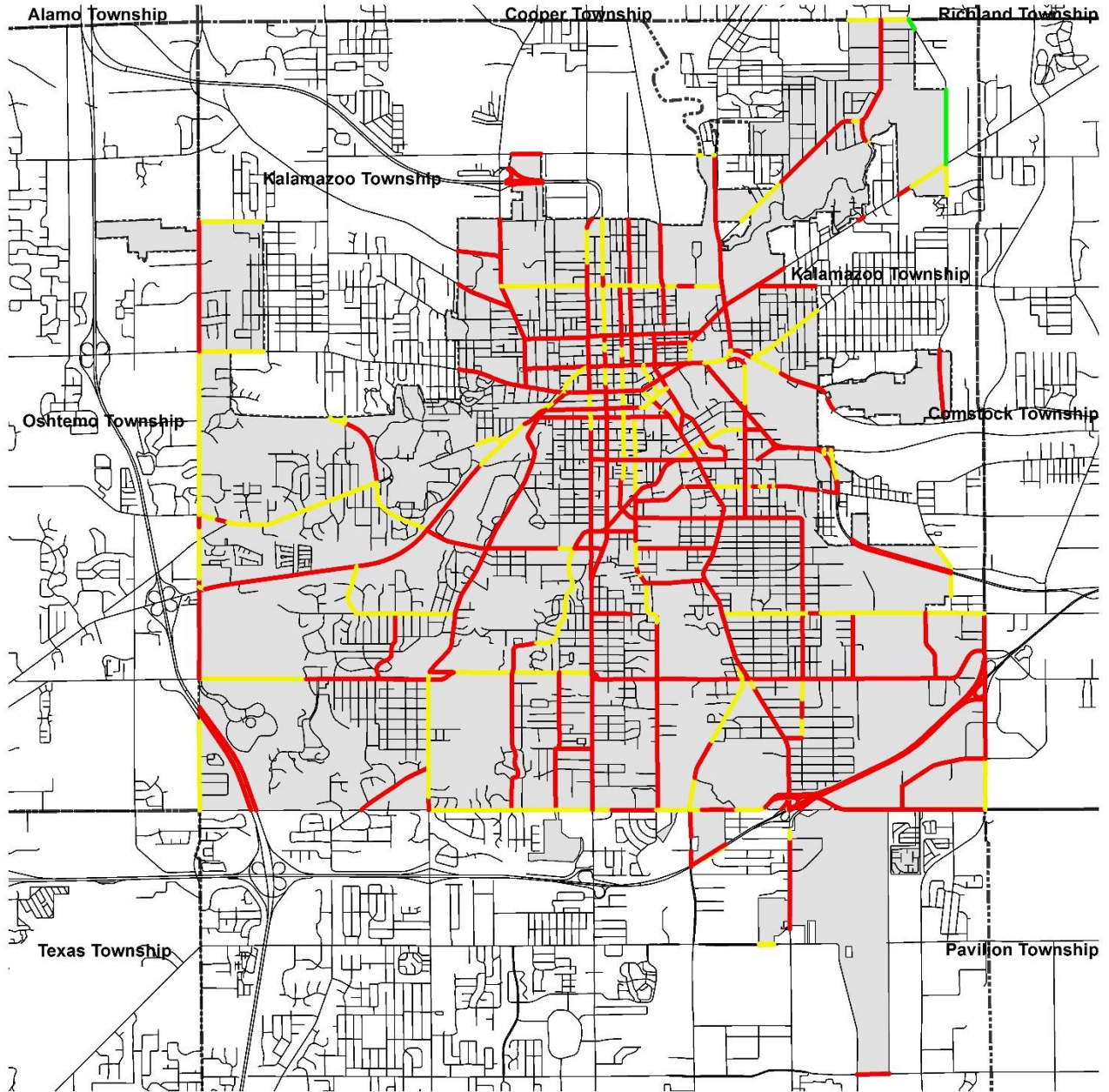
Kalamazoo County Federal-Aid Road Ratings 2012-2013

PASER Rating Scale

- 1 - 4 *Poor (Structural Improvements)*
- 5 - 7 *Fair (Capital Preventative Maintenance)*
- 8 - 10 *Good (Routine Maintenance)*

Source: MGF v. 12, KATS
April 2014

City of Kalamazoo Federal-Aid Road Ratings 2012-2013



0 0.5 1 2 Miles



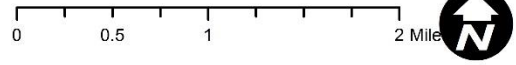
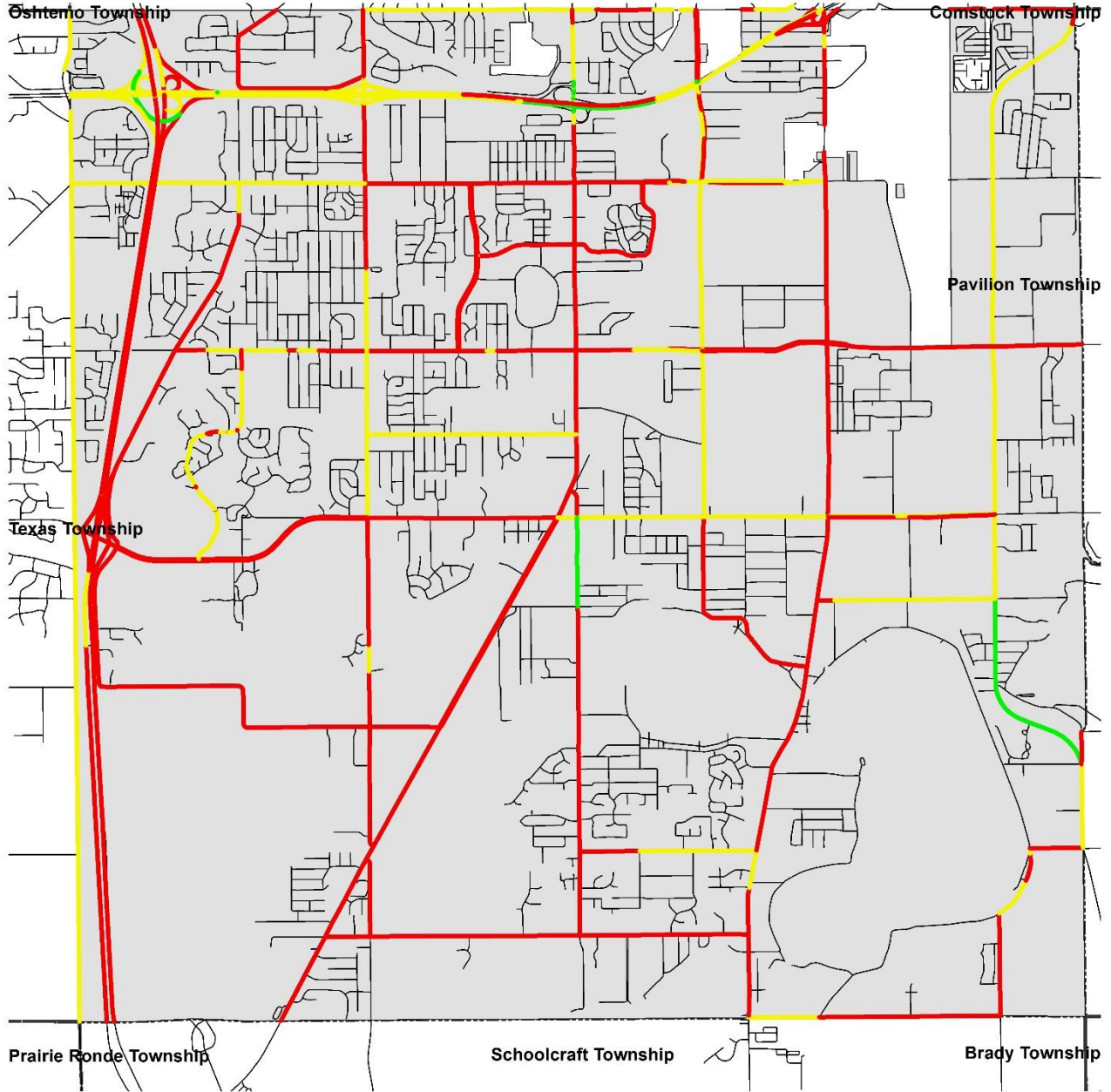
City of Kalamazoo

Current Surface Rating

- 1 - 4 Poor (Structural Improvement)
- 5 - 7 Fair (Capital Preventative Maintenance)
- 8 - 10 Good (Routine Maintenance)

Source: MGF v. 12, KATS
Roadsoft
April 2014

City of Portage Federal-Aid Road Ratings 2012-2013



Current Surface Rating

- 0 - 4 Poor (Structural Improvement)
- 5 - 7 Fair (Capital Preventative Maintenance)
- 8 - 10 Good (Routine Maintenance)

Source: MGF v. 12, KATS
Roadsoft
April 2014

Contact Information

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

- **Kalamazoo County Road Commission**
3801 E Kilgore Rd • Kalamazoo, Michigan • 49001
(269) 381-3171 • info@kcrc-roads.com
 - **Kalamazoo Area Transportation Study**
5220 Lovers Ln • Suite 110 • Portage, Michigan • 49002
(269) 343-0766 • info@katsmpo.org
 - **City of Kalamazoo**
415 E Stockbridge Ave • Kalamazoo, Michigan • 49001
(269) 337-8601 • jungd@kalamazoocity.org
 - **City of Portage**
7900 S Westnedge Ave • Portage, Michigan • 49024
(269) 329-4422 • barnesc@portagemigov
 - **Villages, Townships, and Cities not listed above**
Contact Kalamazoo Area Transportation Study for the contact information.
-