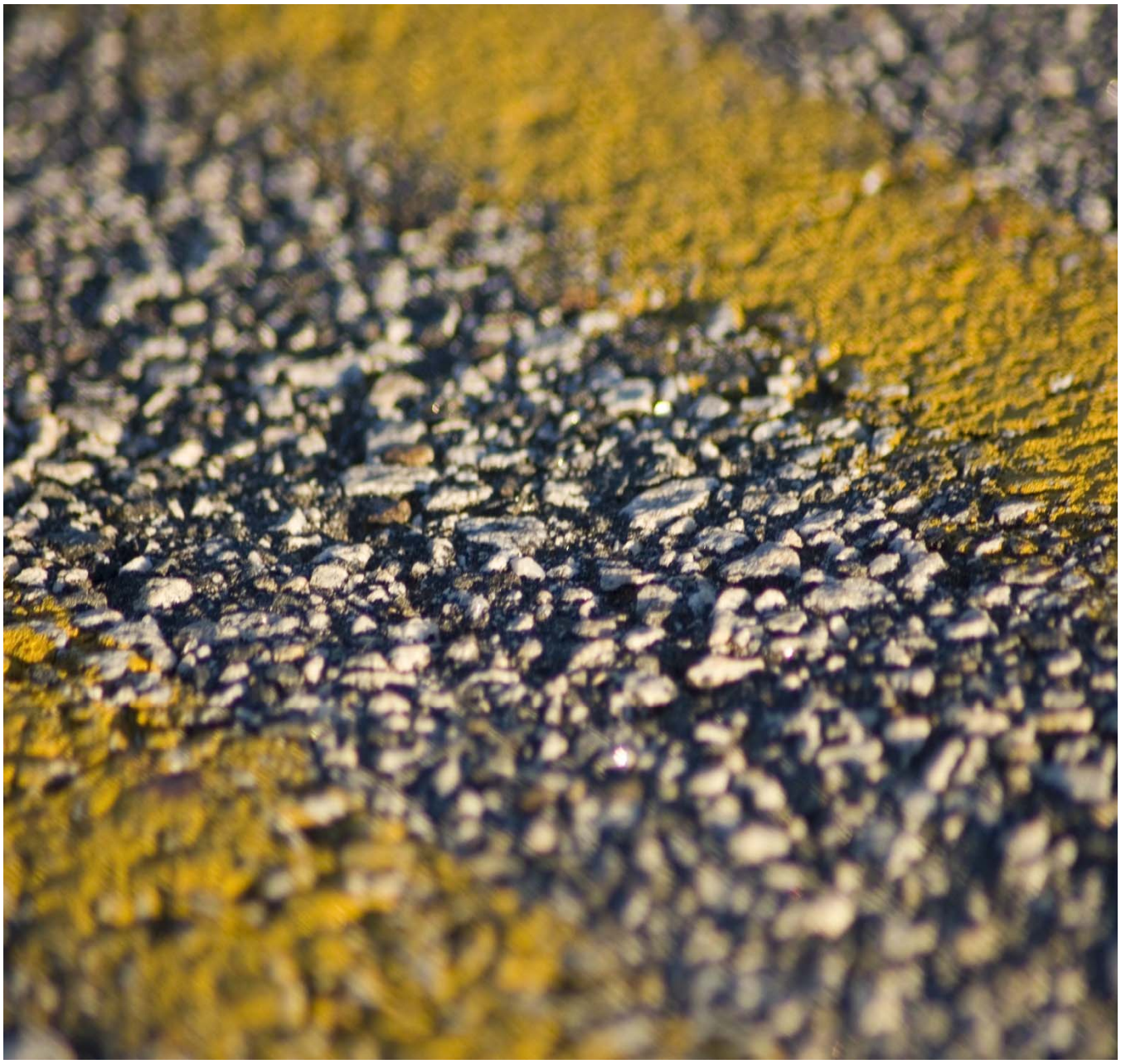

ROAD CONDITION REPORT
KALAMAZOO COUNTY

APRIL 2015

Prepared by the Kalamazoo Area Transportation Study | (269) 343-0766 | info@KATSmpo.org | www.KATSmpo.org

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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.

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. Sight 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 HMA 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 HMA 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 HMA 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.

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

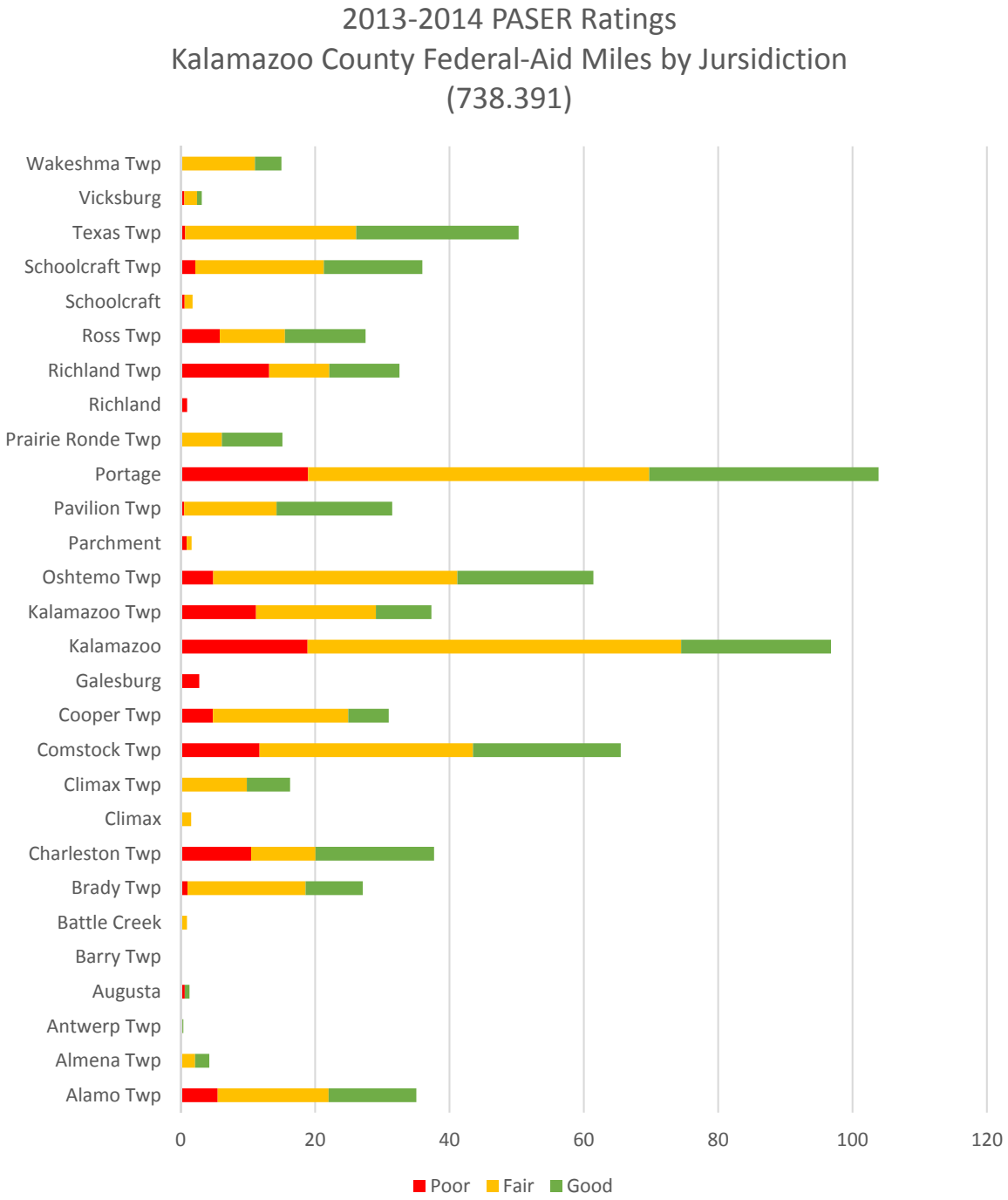
Capital Preventative Maintenance and Reconstructive Treatments

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 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.
- 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.

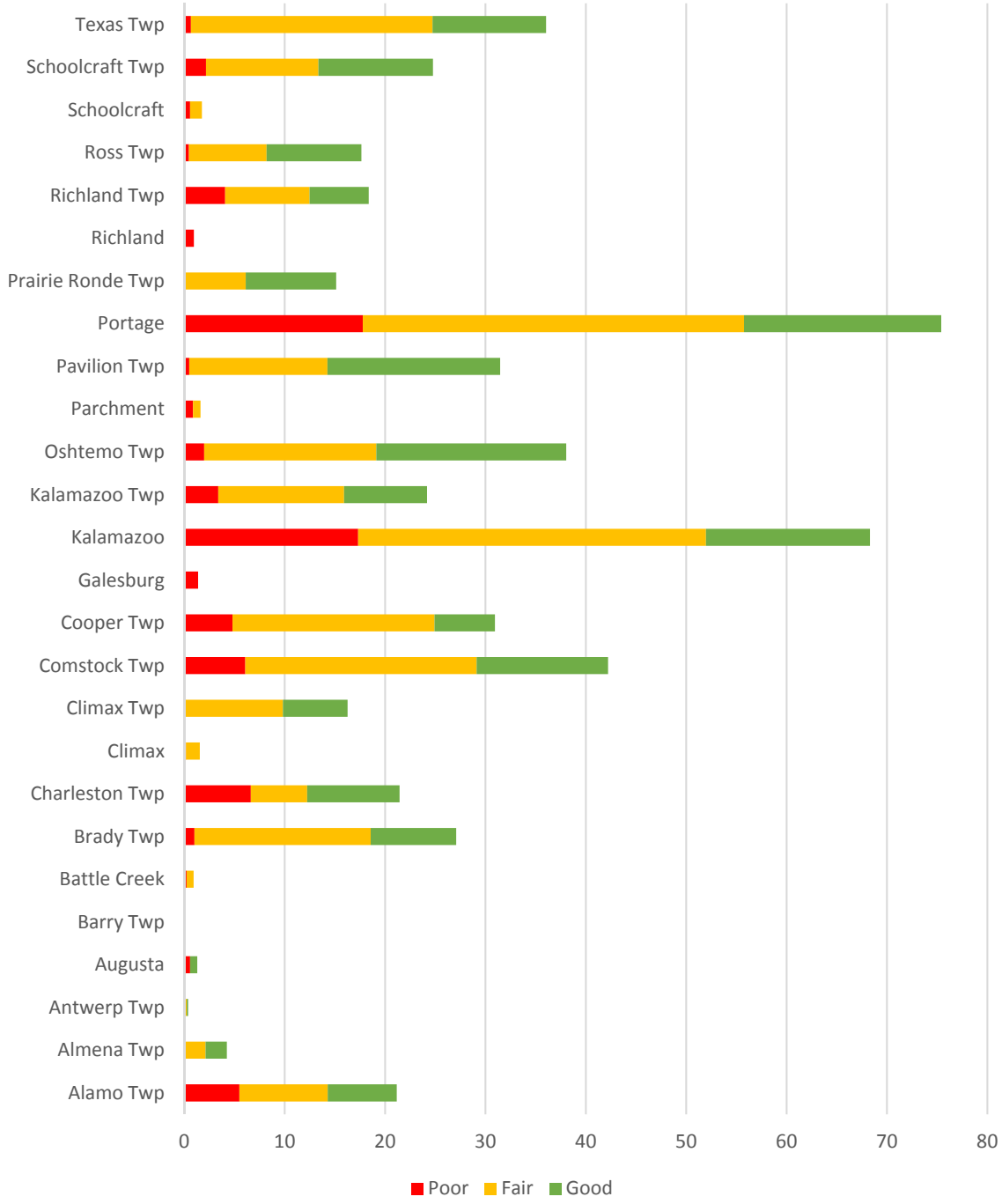
- Full-Depth Reconstruction is the replacement of the entire paved surface including the base and sub-base. The old materials are discarded and all new materials are used in the reconstruction. This process is not done unless there is no good road left to salvage.

Summary of 2013 and 2014 Ratings



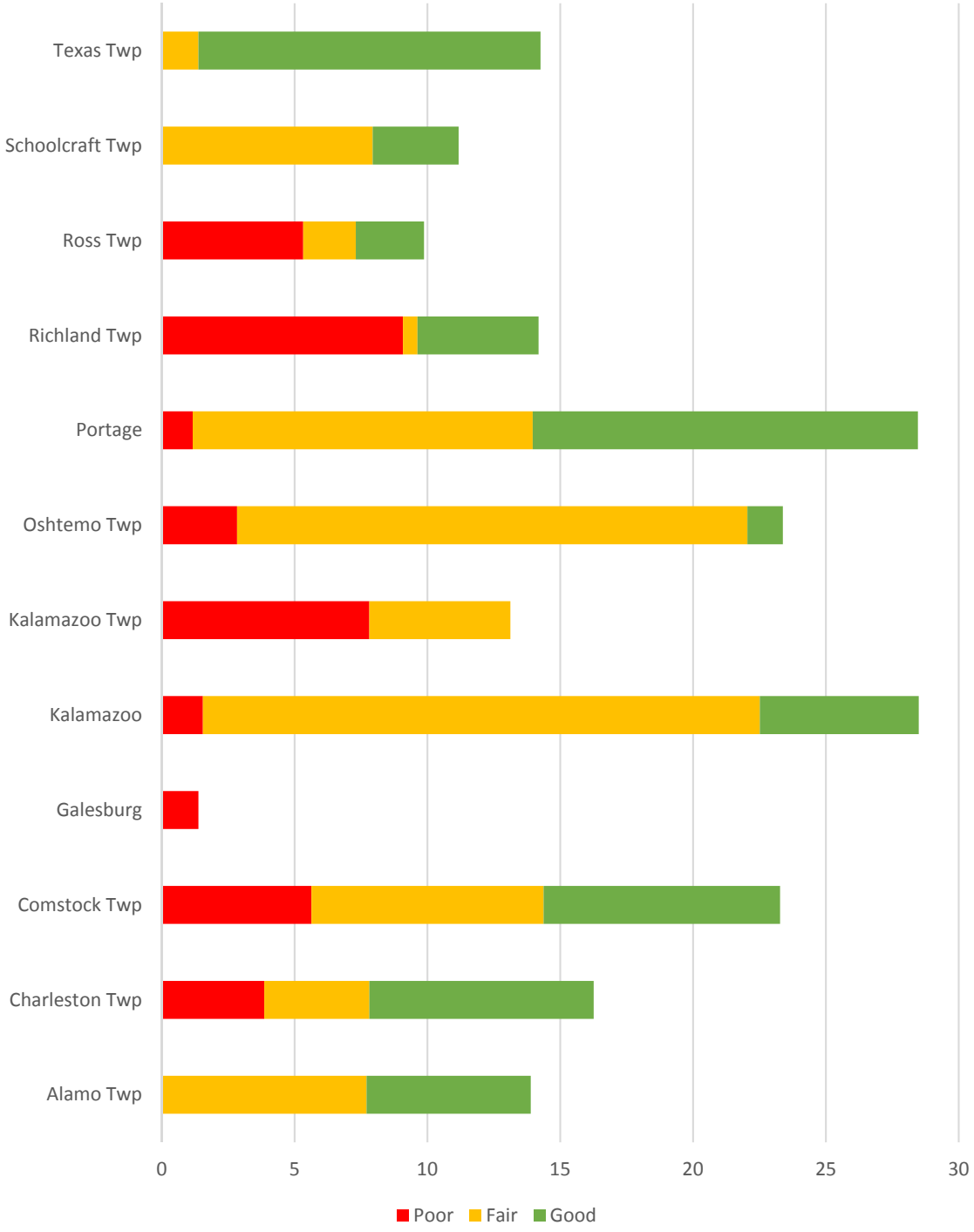
ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

2013-2014 PASER Ratings
Kalamazoo County Non-Trunkline Miles of Federal-Aid Roads
(540.633 Miles)

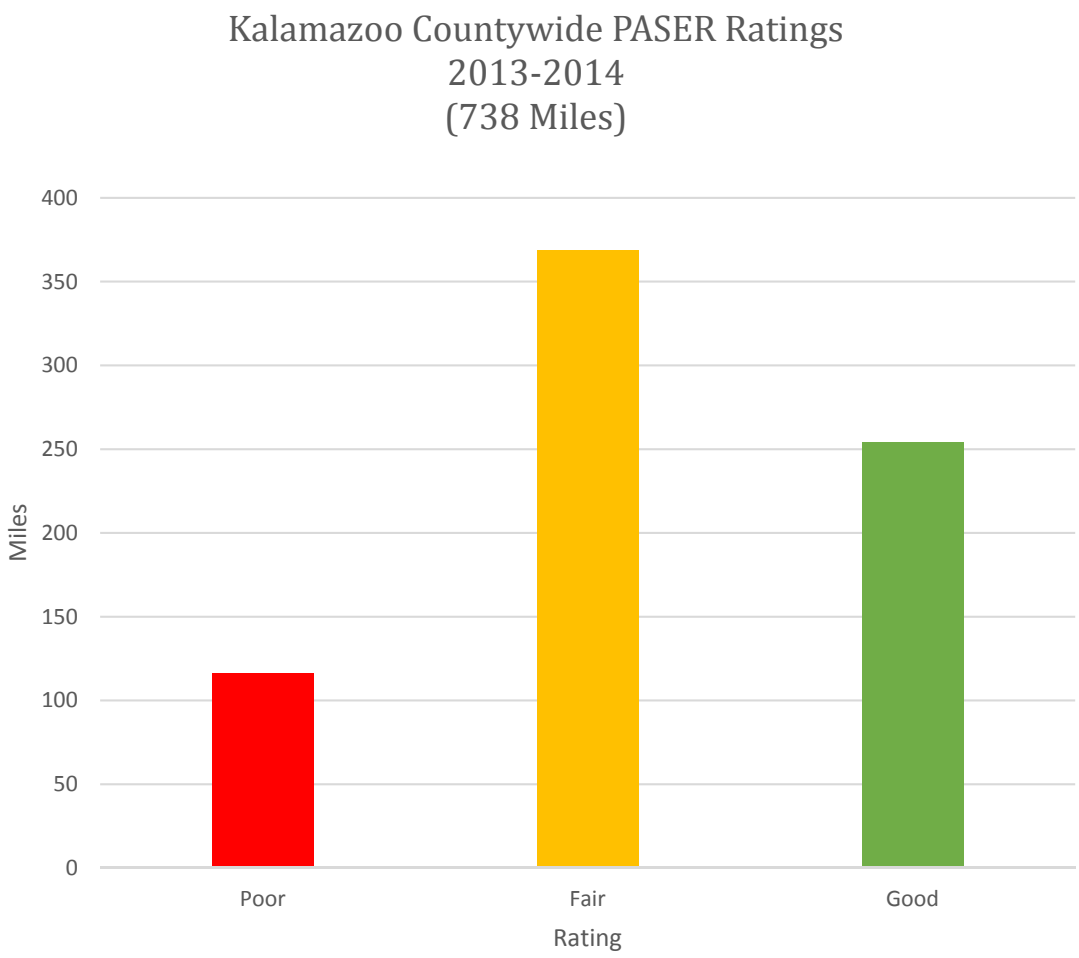


ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

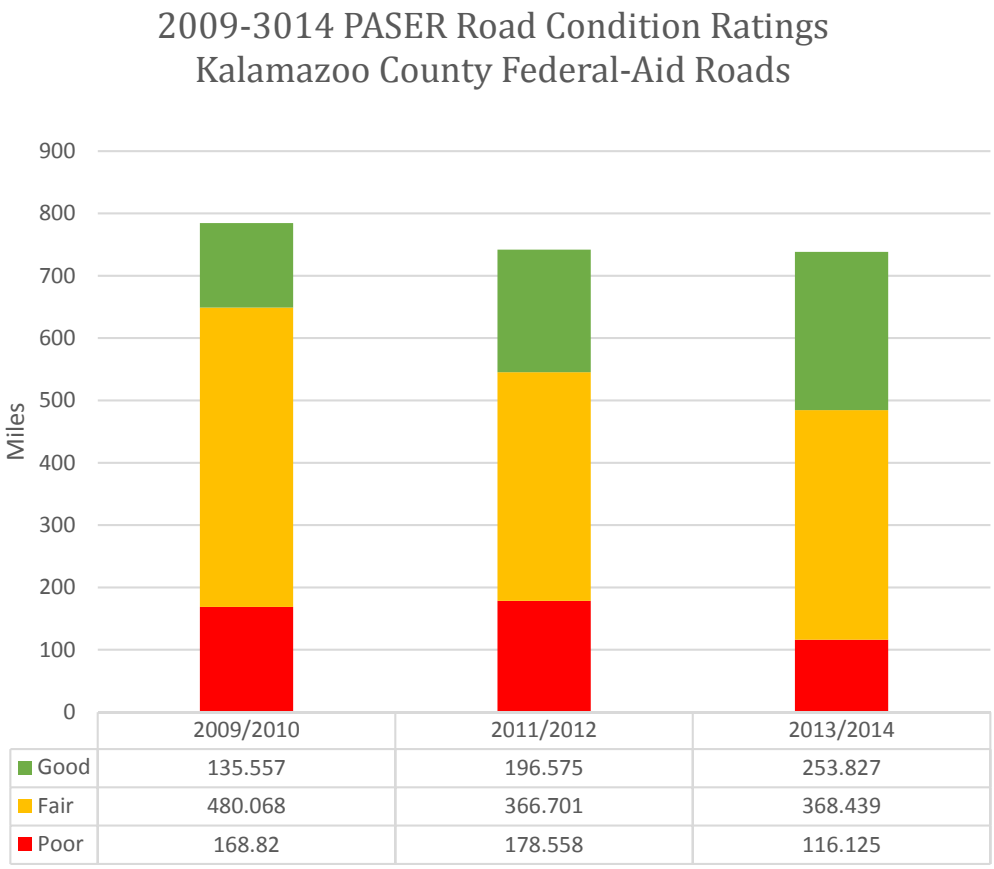
2013-2014 PASER Ratings
Kalamazoo County Trunkline Miles of Federal-Aid Roads
(197.758 Miles)



ROAD CONDITION REPORT FOR KALAMAZOO COUNTY



Historical Data Collection

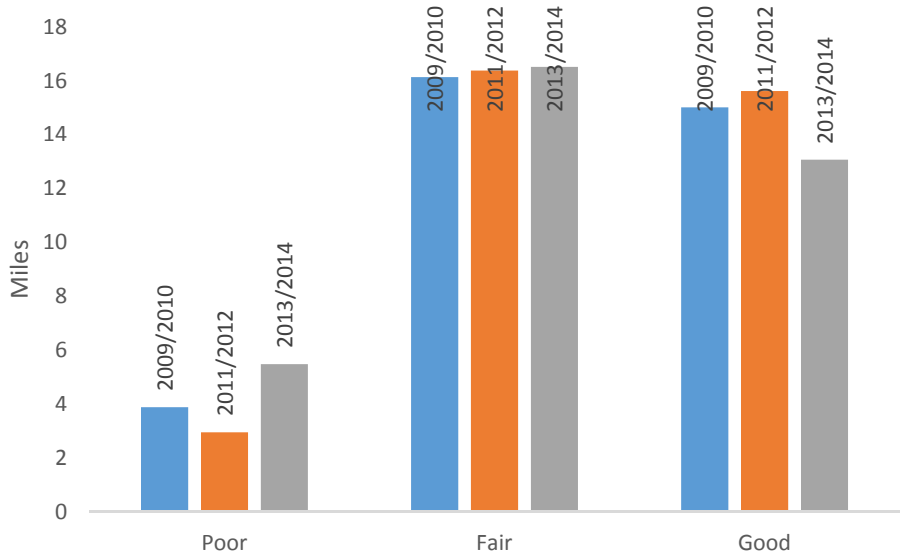


	2009/2010	2011/2012	2013/2014
Good	135.557	196.575	253.827
Fair	480.068	366.701	368.439
Poor	168.82	178.558	116.125

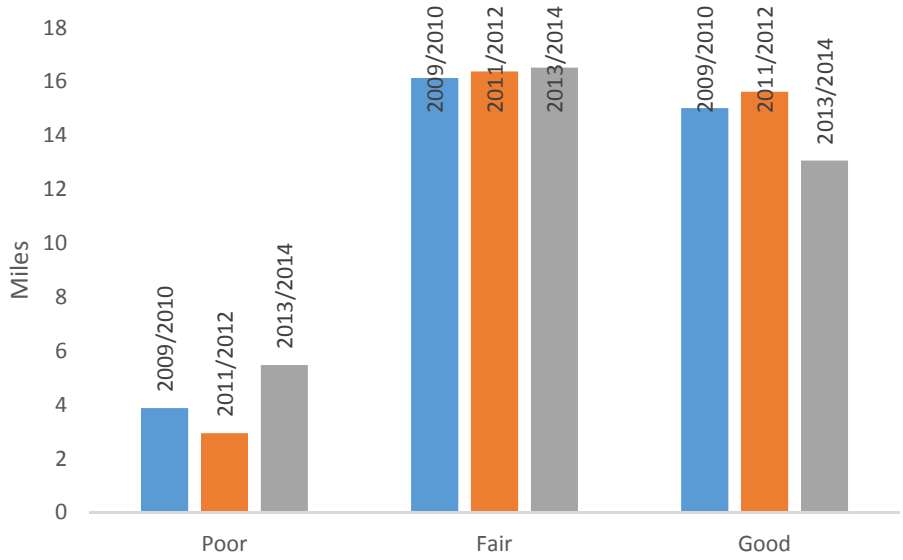
The chart above reflects the progression of Kalamazoo County's federal-aid roads as-rated over a six year period. From 2009 to 2014, there has been a decrease in roads that are rated as being in "Poor" condition and an increase in the number of miles rated "Good.". The number of "Fair" rated miles held steady over the last two year period after decreasing from the first to second two year period.

When looking at city/township breakdowns from 2013/2014 on the following pages of this document, it is apparent that in most jurisdictions, the majority of federal aid roads are rated "Fair" and "Poor", with "Good" rated roads 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.

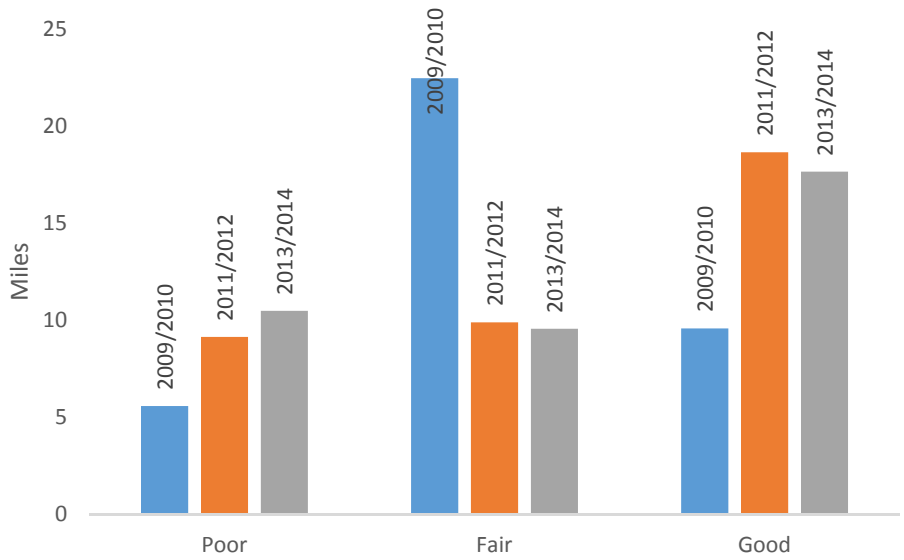
2009-2014 PASER Road Condition Ratings
Alamo Township
(35.06 Miles)



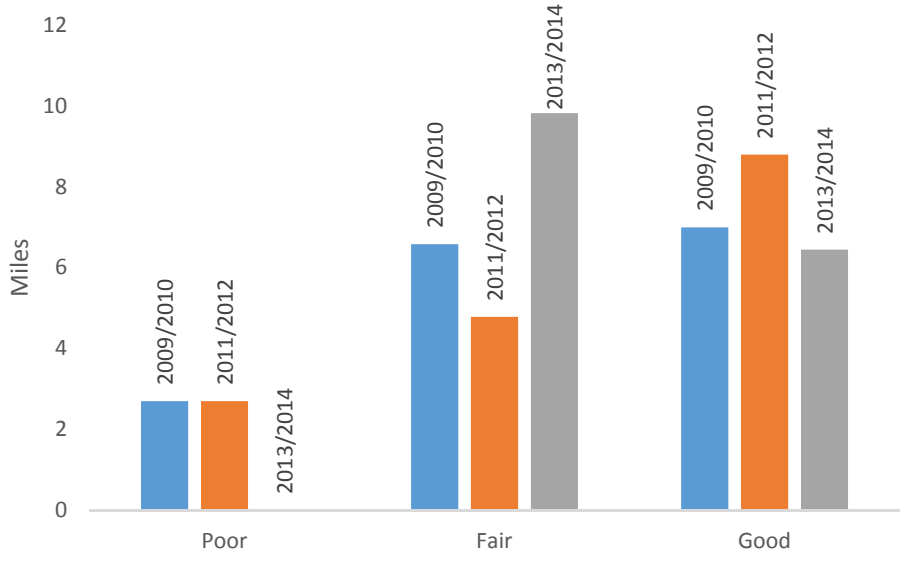
2009-2014 PASER Condition Ratings
Brady Township
(27.085 Miles)



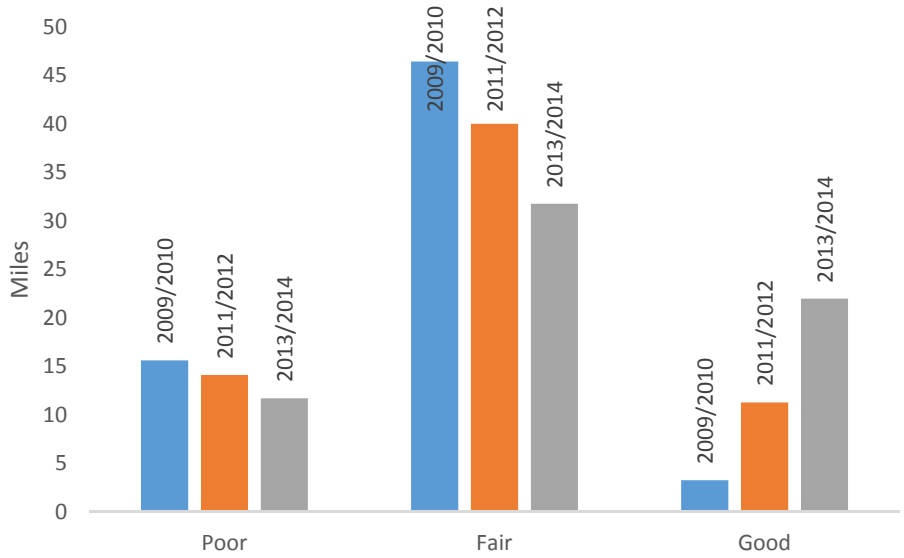
2009-2014 PASER Condition Ratings
Charleston Township
(37.729 Miles)



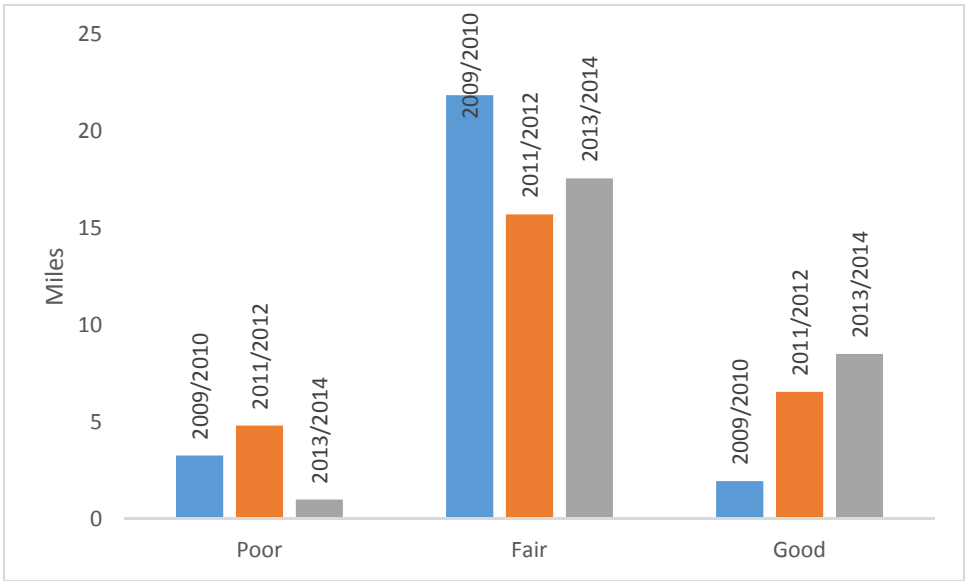
2009-2014 PASER Condition Ratings
Climax Township
(13.575 Miles)



2009-2014 PASER Condition Ratings
Comstock Township
(65.441 Miles)

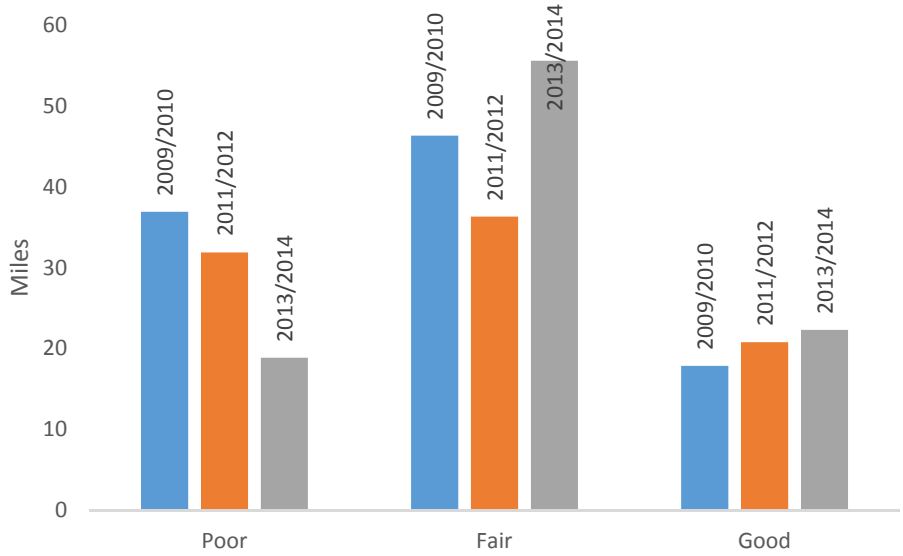


2009-2014 PASER Condition Ratings
Cooper Township
(30.944 Miles)

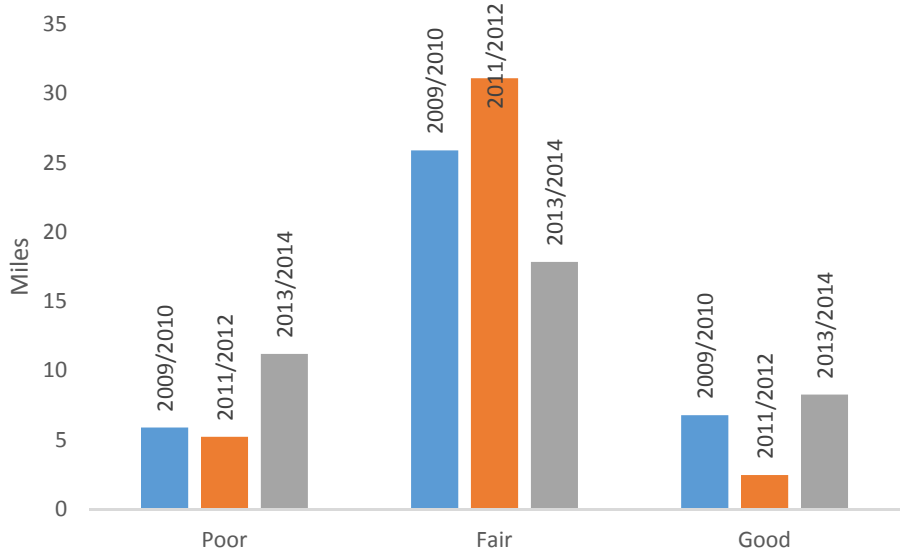


ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

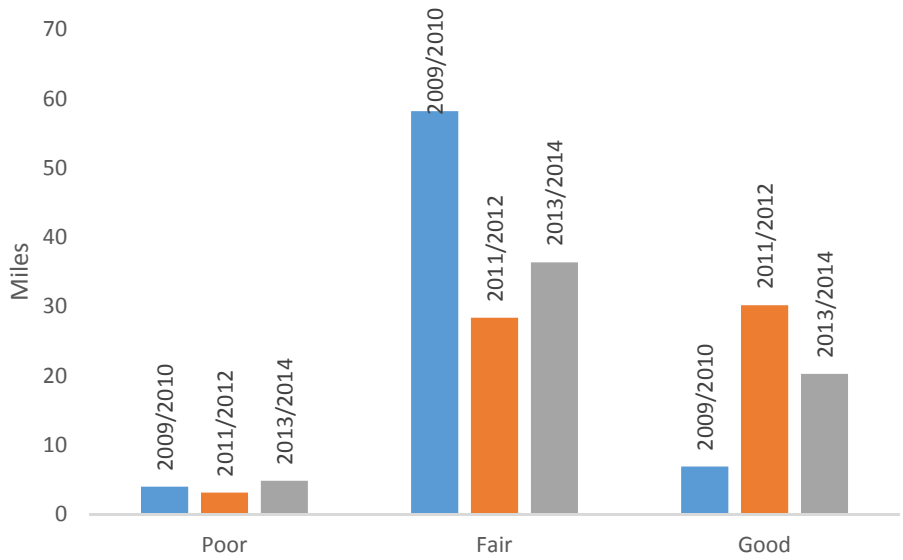
2009-2014 PASER Condition Ratings
City of Kalamazoo
(96.768 Miles)



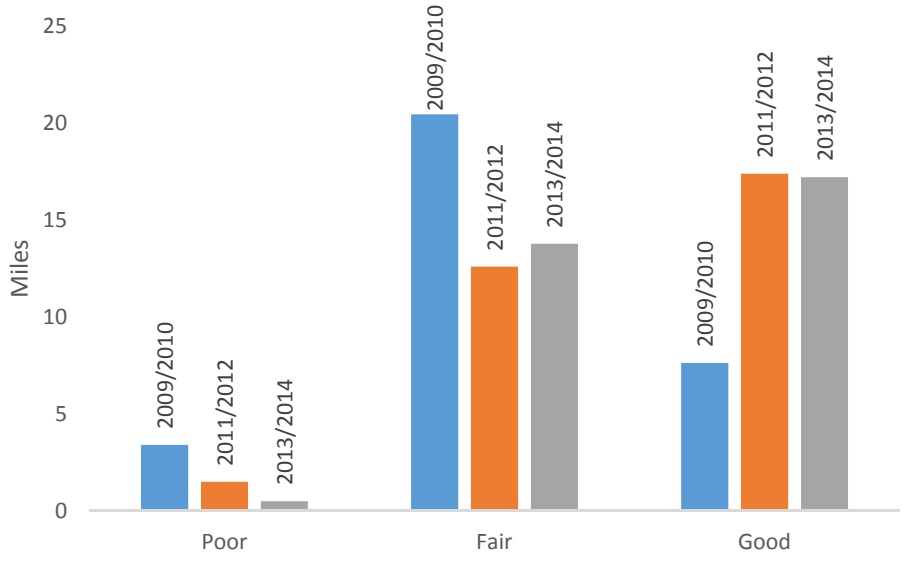
2009-2014 PASER Condition Ratings
Kalamazoo Township
(37.257 Miles)



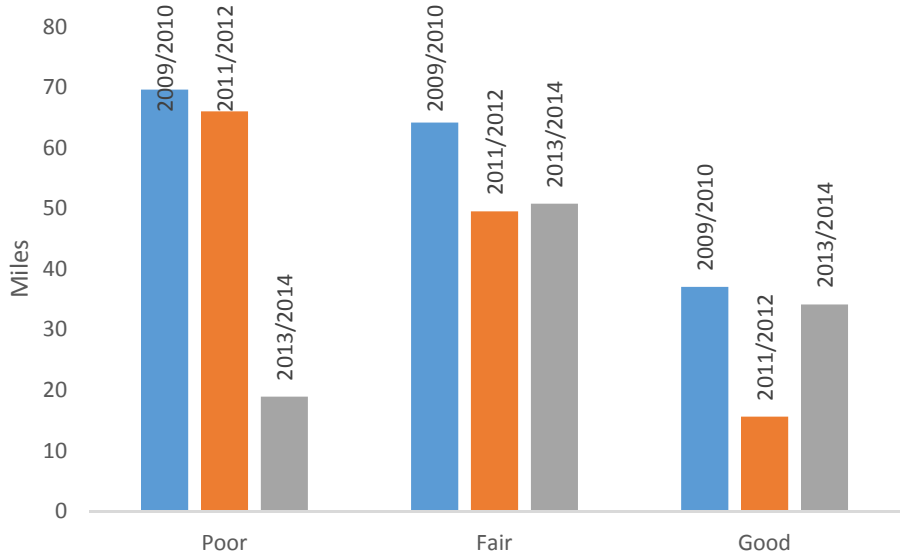
2009-2014 PASER Condition Ratings
Oshtemo Township
(63.54 Miles)



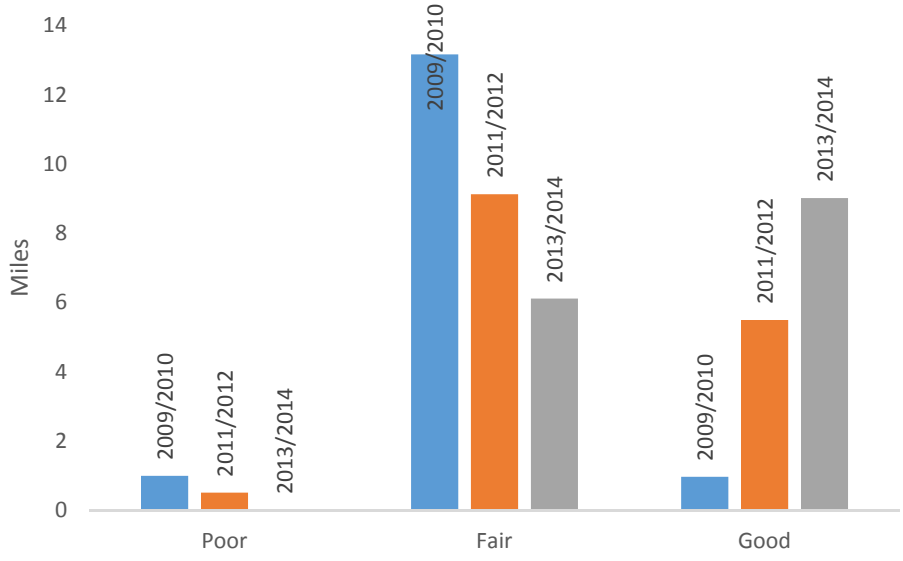
2009-2014 PASER Condition Ratings
Pavilion Township
(31.461 Miles)



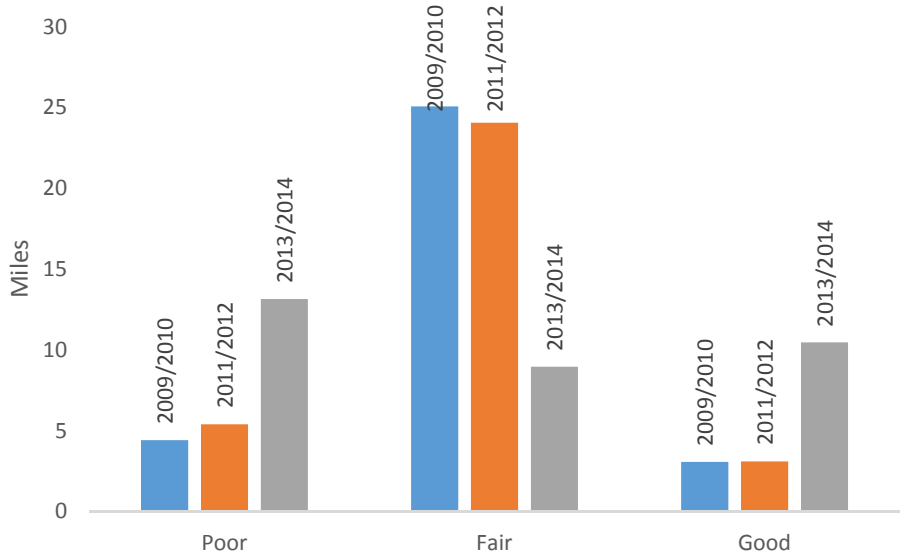
2009-2014 PASER Condition Ratings
City of Portage
(103.868 Miles)



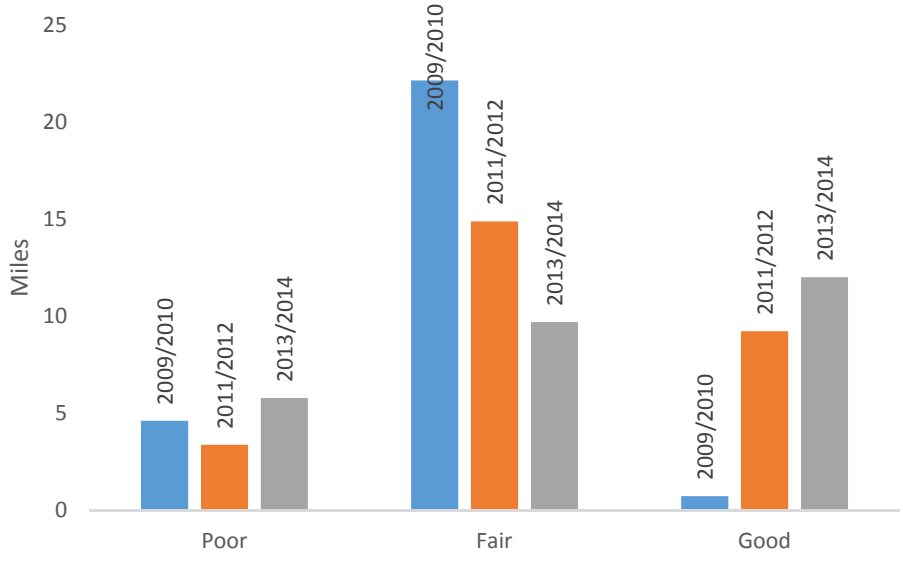
2009-2014 PASER Condition Ratings
Prairie Ronde Township
(15.128 Miles)



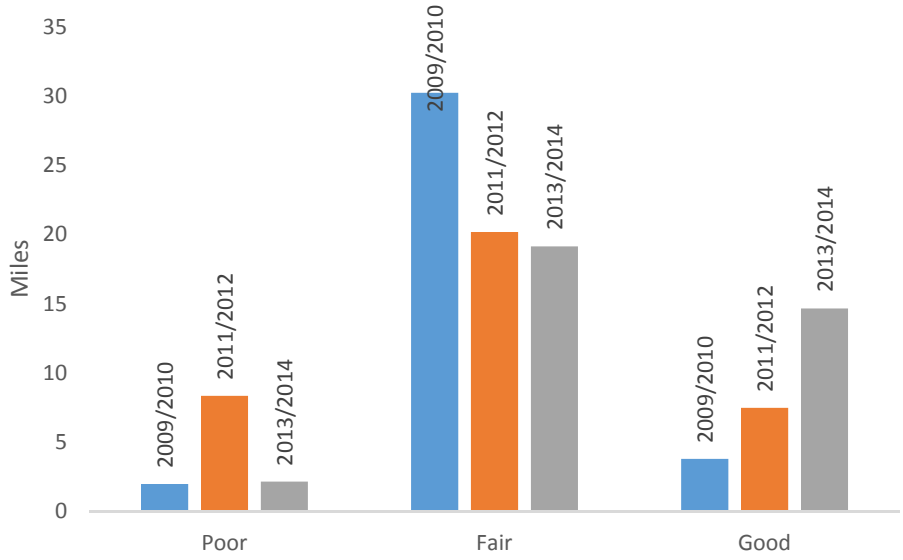
2009-2014 PASER Condition Ratings
Richland Township
(32.552 Miles)



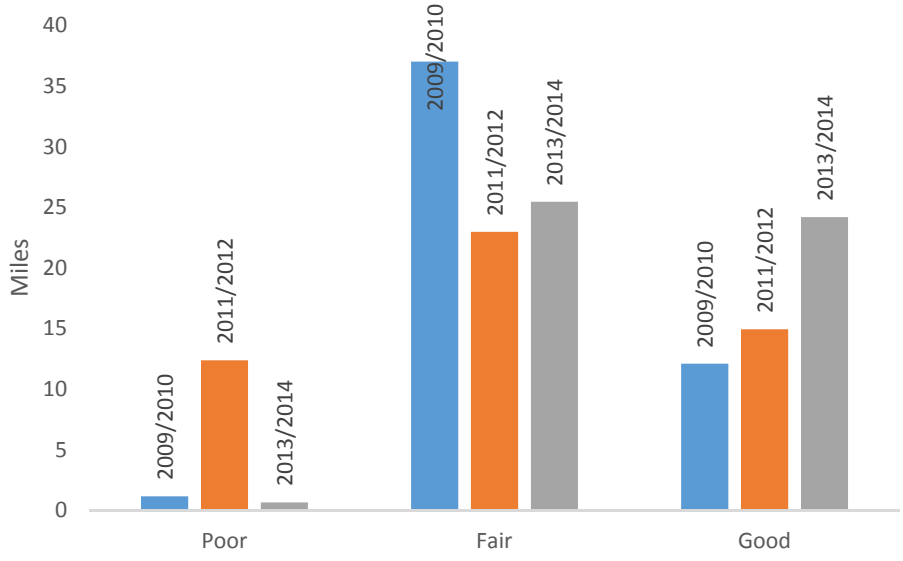
2009-2014 PASER Condition Ratings
Ross Township
(27.507 Miles)

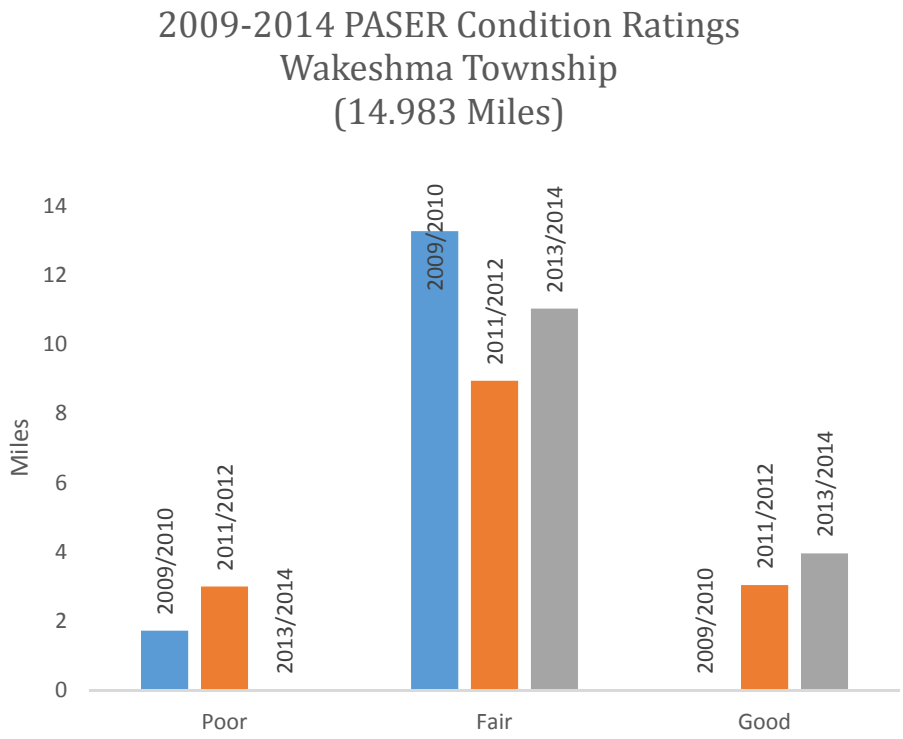


2009-2014 PASER Condition Ratings
Schoolcraft Township
(35.948 Miles)



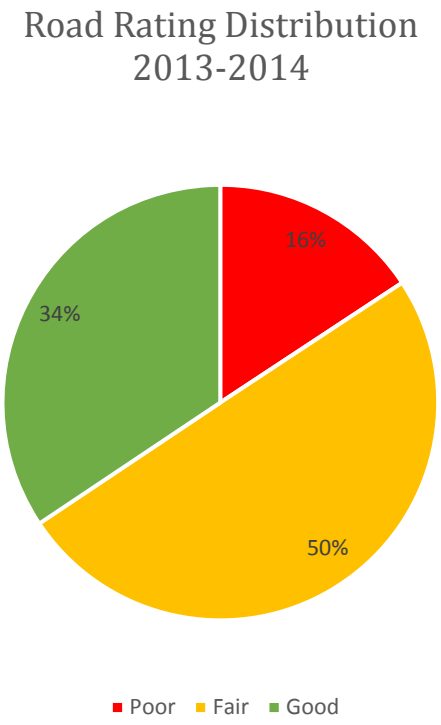
2009-2014 PASER Condition Ratings
Texas Township
(50.478 Miles)

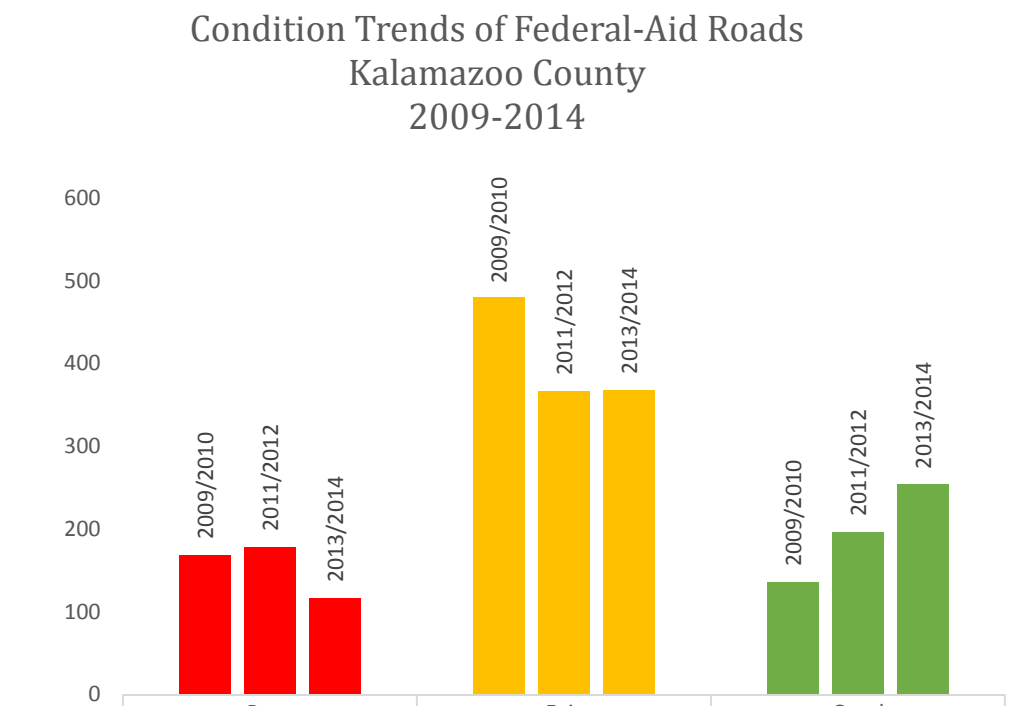



2009-2014 PASER Condition Ratings
Wakeshma Township
(14.983 Miles)
Miles
14
12
10
8
6
4
2
0
2009/2010
2011/2012
2013/2014
Poor
Fair
Good

Pavement Conditions

Of the 738 miles of federal-aid roads that were most recently rated (2013-2014), approximately 116 miles were rated as being in "Poor" condition, 368 miles "Fair", and 254 miles "Good." This distribution suggests that almost exactly 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. This gives a very good idea of how road maintenance money can best be used to enhance and maintain the overall quality of the road system in Kalamazoo County. Through asset management strategies and appropriate amount of funding, the amount of Poor road miles and the maintenance costs associated with structural improvements can be diminished.

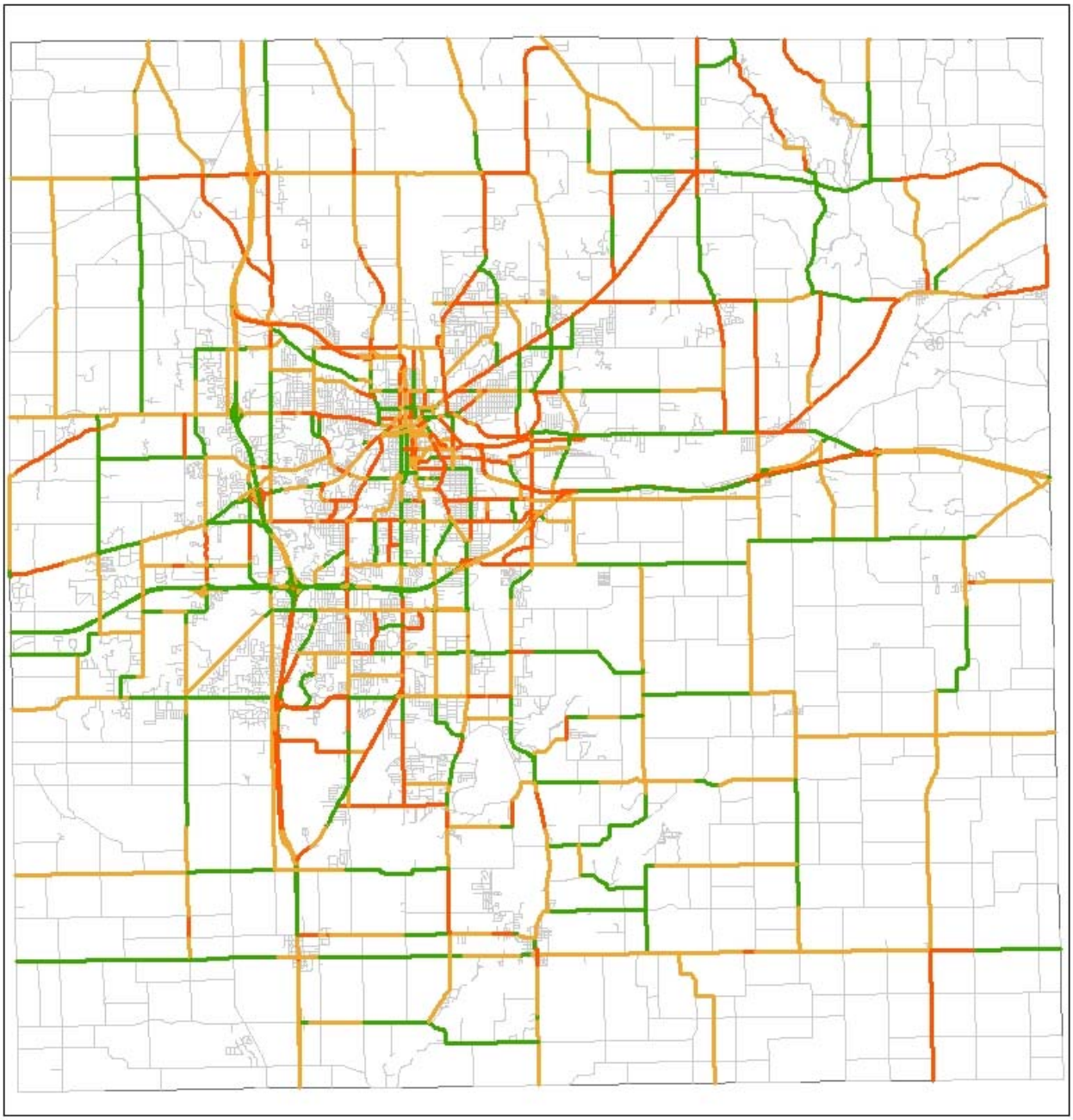




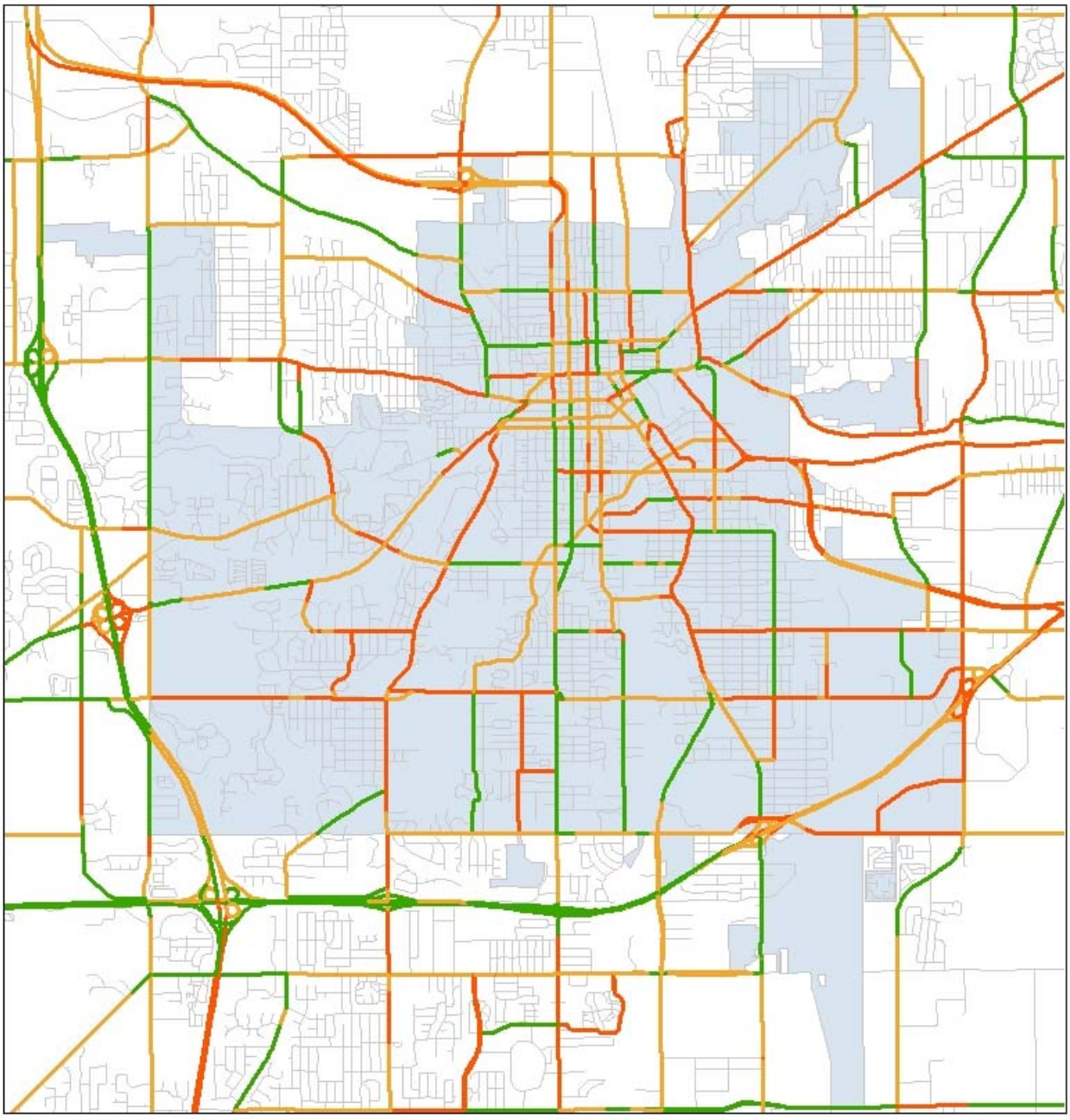
	Poor	Fair	Good
2009/2010	168.82	480.068	135.557
2011/2012	178.558	366.701	196.575
2013/2014	116.1125	368.439	253.827

The bar graph shown above shows the "Poor," "Fair" and "Good" categories for each of three two-year periods as rated over the course of six years. It illustrates, as noted earlier, the apparent trend of decreasing miles of roads rated "Poor" and a corresponding increase in roads rated "Good." Each responsible agency should see that the same roads are rated in each biennial period to ensure that every two year window looks on the federal aid system in its entirety. This will allow decision makers to best see accurate trends and forecast how much and where future road maintenance dollars should be spent. 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.

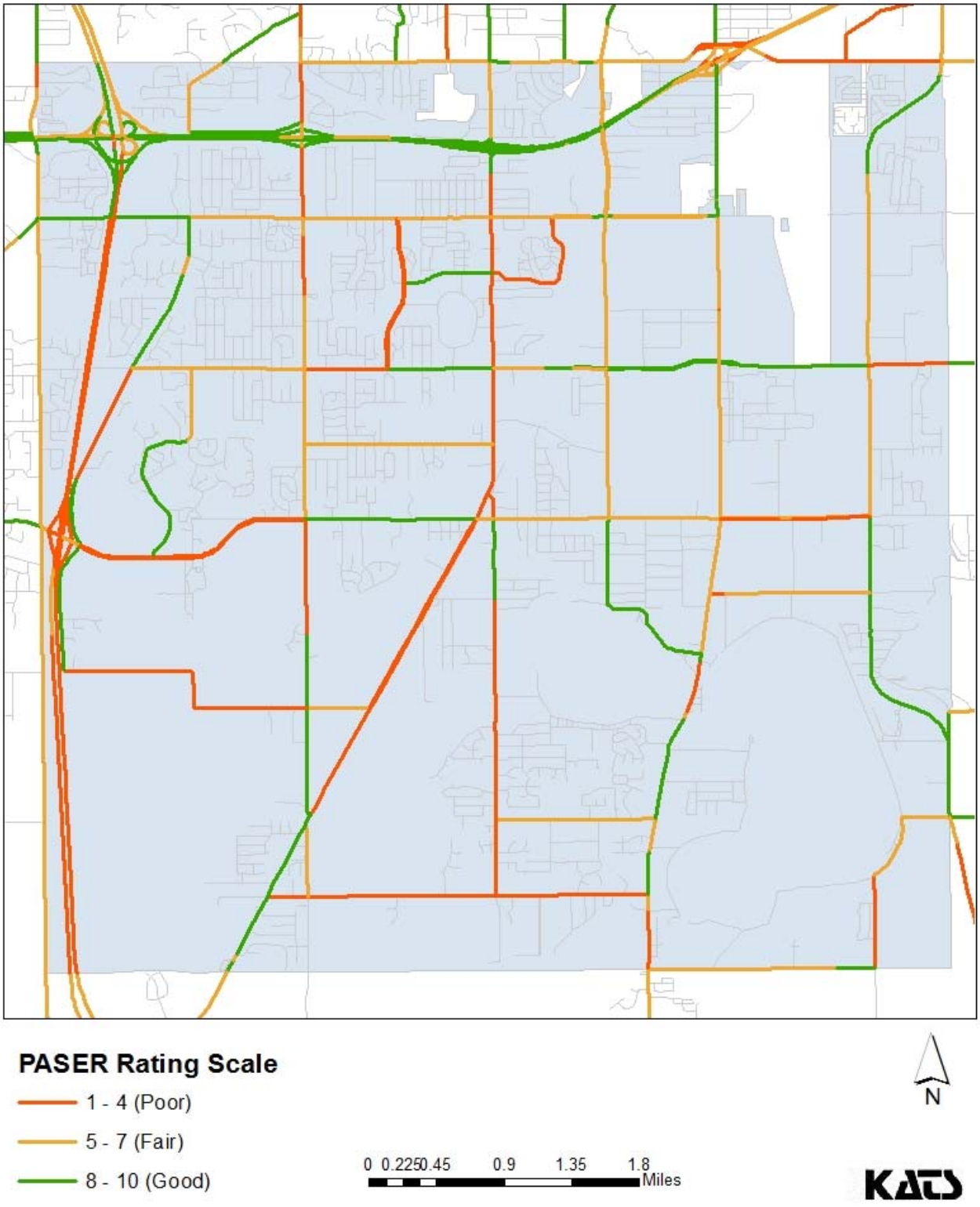
Kalamazoo County Federal-Aid Road Ratings 2013-2014



City of Kalamazoo Federal-Aid Road Ratings 2013-2014



City of Portage Federal-Aid Road Ratings 2013-2014



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@portagemi.gov

- Villages, Townships, and Cities not listed above
  Contact Kalamazoo Area Transportation Study for the
  contact information.