



ROAD CONDITION REPORT FOR BARRY COUNTY

2016

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Executive Summary

The Kalamazoo Area Transportation Study assisted in the data collection of road inventory for Barry County in 2015 and 2016. 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 Barry County, there are:

- **408 miles of Federal-aid roads.** This includes roads that are maintained by the Michigan Department of Transportation, the Barry County Road Commission, and the cities and villages within the county. Of the 407 Federal-Aid miles in Barry County, there are:
- **118 miles of Trunkline roadways.** These roadways are maintained by the Michigan Department of Transportation.

This report compiles ratings records for the last two years and compares the results with those from 2010 through 2016 to analyze the condition of the federal aid road system in Barry County.

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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.

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 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

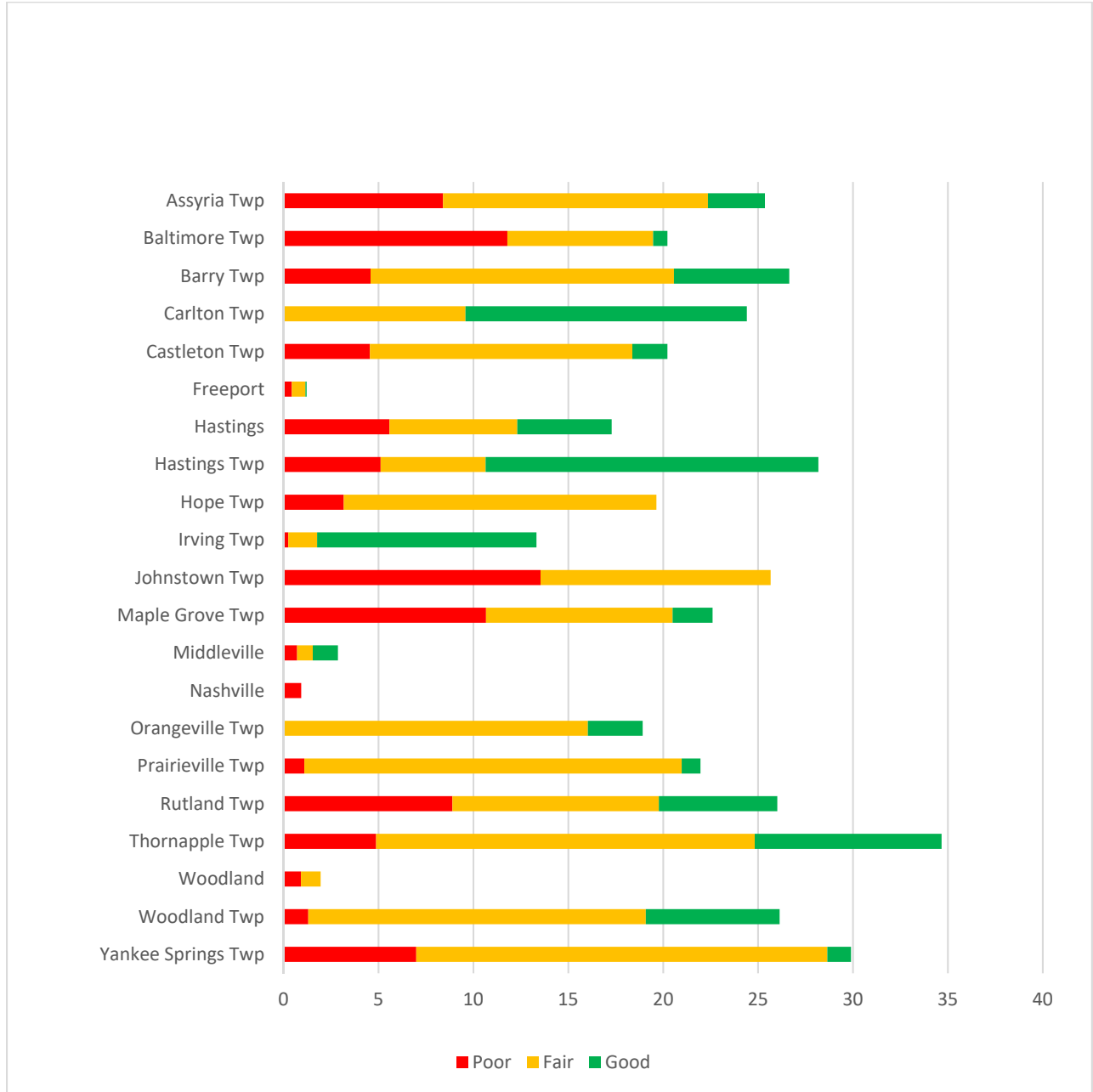
Table 2 details historical cost, lifespan, and rating of pavement treatment types that have been used in Barry County. These treatments range from the minimal (overband crack filling) to major construction. As noted these treatments and costs are historical; as new technologies emerge and become adopted some of them may be amended or superseded. The following list provides a brief overview of each treatment:

- Overband Crack Filling is used on cracks that are up to 1” wide, and are moving or unmoving. The process is done by pouring hot rubber material into and over cracks to seal them from water intrusion.
- Fog Seals provide a thin asphalt coating over existing pavement. This treatment seals aggregate in place, and prevents water permeation and oxidation of the asphalt binder.
- Non-Structural Overlays do not contribute to a pavement’s structural capacity. These treatments use thin layers of asphalt (1/2- 1 ½ inches) applied on top of existing pavement, with or without milling prior to placement. They improve surface ride quality and drainage, and help seal the surface from water permeation and oxidation.
- Chip Seals consist of a thin layer of emulsified asphalt applied to the road surface, which is topped with an aggregate usually consisting of crushed stone or slag. The treatment seals the underlying asphalt from water permeation and oxidation, and provides a renewed, high friction driving surface.
- 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 roadway structure, including the base and subbase, with new material. It is used only when there is no salvage value to any of the existing components.

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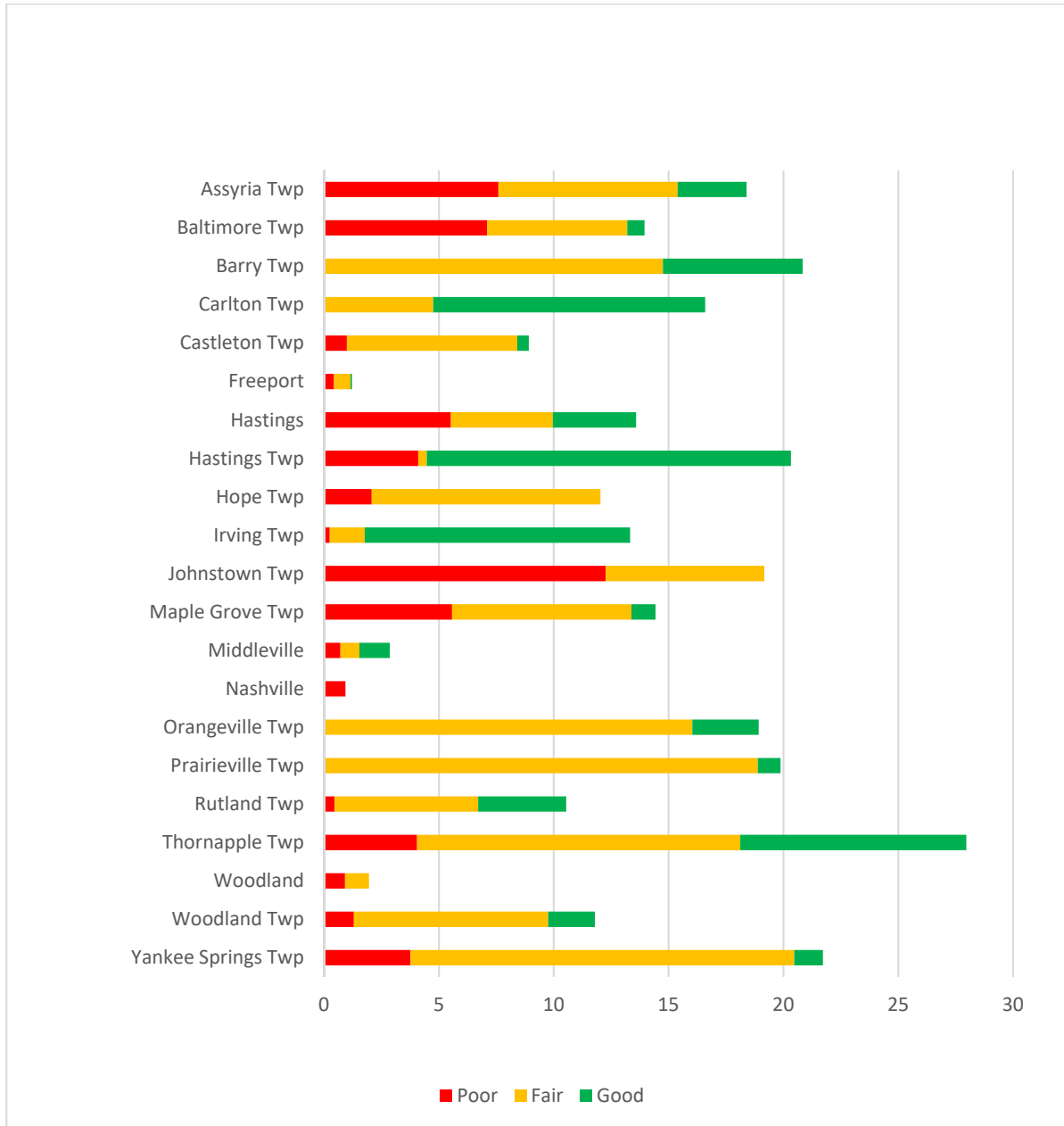
Summary of 2015 and 2016 Ratings

2015/2016 PASER Ratings Barry County **All** Federal-Aid Miles by Jurisdiction



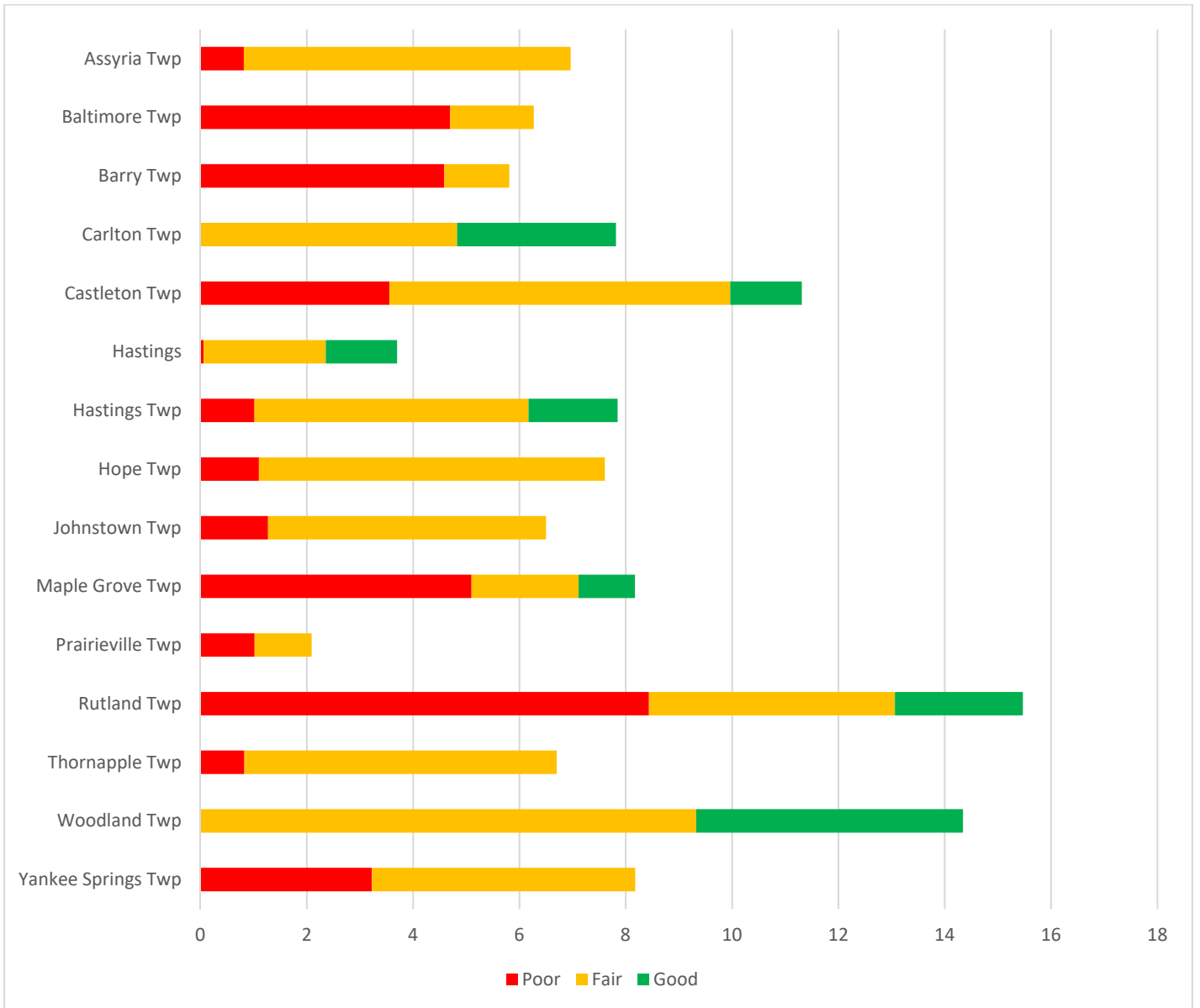
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2015/2016 PASER Ratings Barry County **Non-Trunkline** Federal-Aid Miles



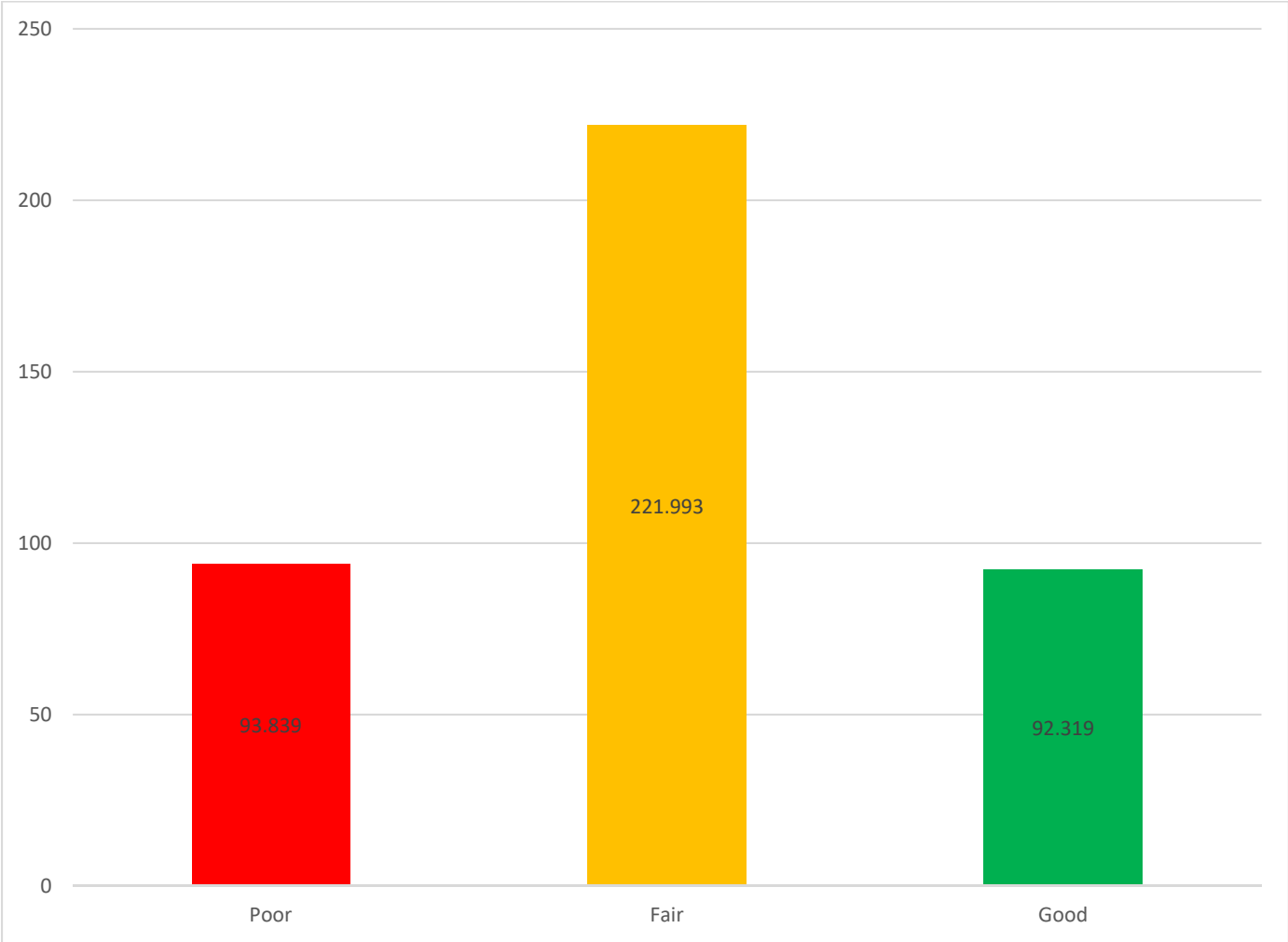
ROAD CONDITION REPORT FOR BARRY COUNTY

2015/2016 PASER Ratings Barry County **Trunkline** Federal-Aid Miles



ROAD CONDITION REPORT FOR BARRY COUNTY

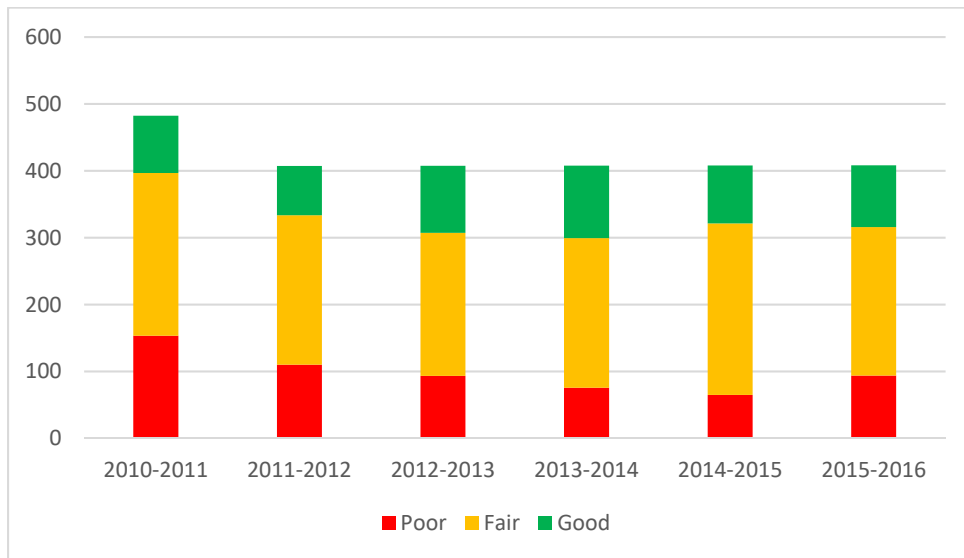
2015-2016 Barry Countywide PASER Ratings



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Historical Data Collection

2010-2016 PASER Road Condition Ratings
Barry County Federal-Aid Roads

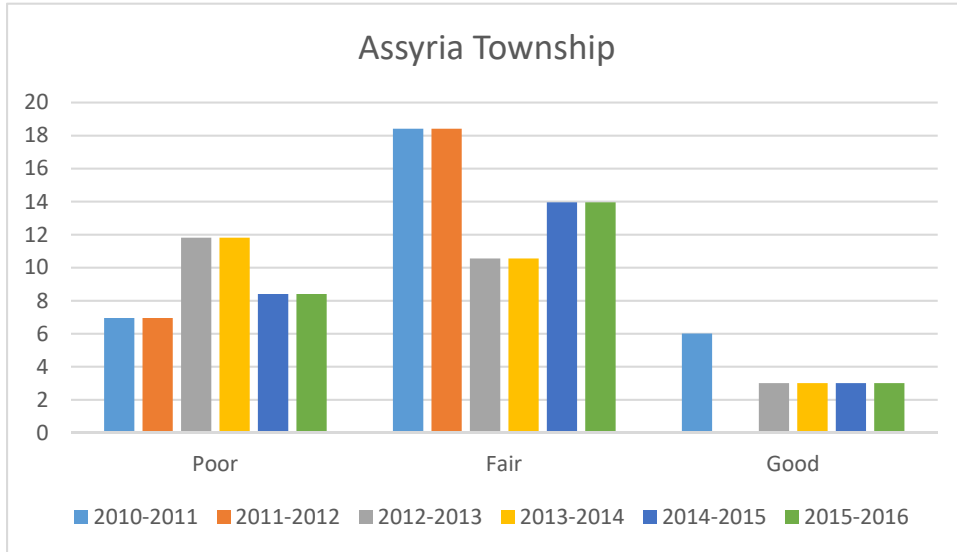


The chart above reflects the progression of Barry County’s federal-aid roads as recorded biennially over a seven-year period. From 2010 to 2015, there was a steady decrease in roads rated as being in Poor condition. That trend has been reversed with a significant increase in Poor rated roads for the 2015–2016 period. The mileage of roads rated Good increased from 2010 to 2014 then decreased significantly in the 2014–2015 rating period. From 2015–2016 there was a very slight increase, though there are still fewer Good rated roads than in the 2013-2014 period. For 2015-2016 the mileage of Fair rated roads showed a noticeable decrease from the previous period. Although it is likely that some of that change is reflected in the increase in Good road mileage, it would appear that the majority of the decrease was from Fair roads deteriorating to Poor. Despite the decrease, the Fair category still constitutes a little over half of Federal Aid roads in Barry County.

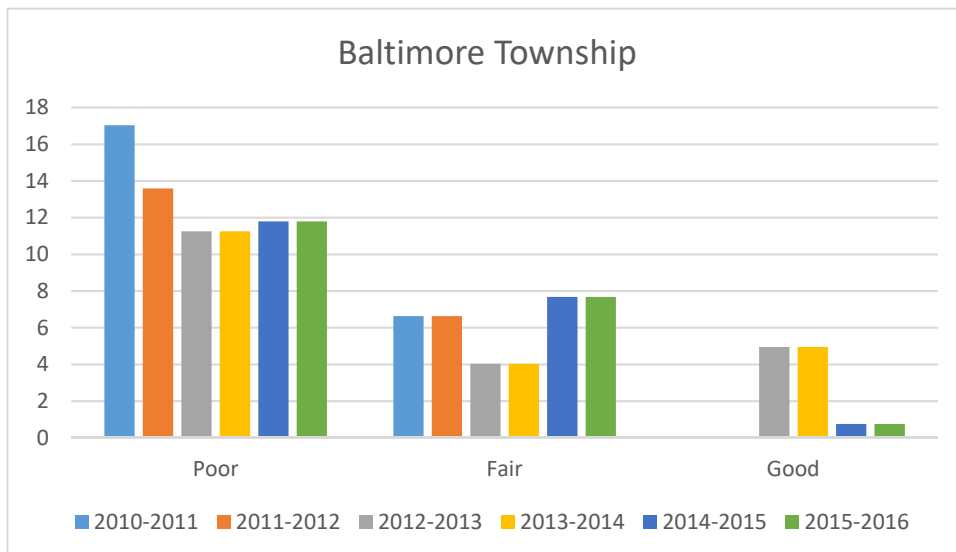
When looking at township breakdowns from 2015/2016 on the following pages of this document, it can be seen that in most jurisdictions the majority of roads are Fair, with Poor and Good roads alternating the predominance of the remainder depending upon the jurisdiction. This is a change from the recent past when “Good” rated roads were consistently the smallest component of Federal Aid miles in Barry County.

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2010-2016 PASER Road Condition Ratings Assyria Township (25.36 miles)

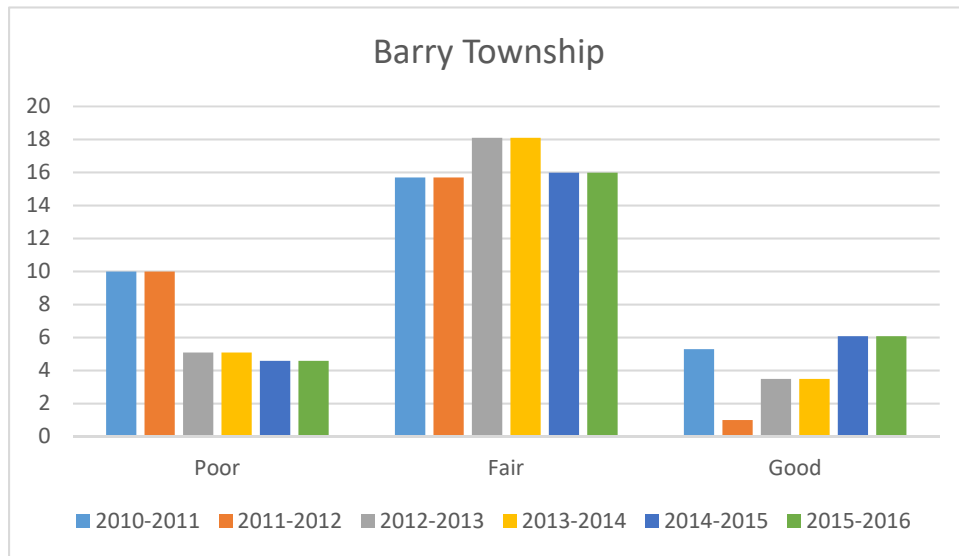


2010-2016 PASER Road Condition Ratings Baltimore Township (20.23 miles)

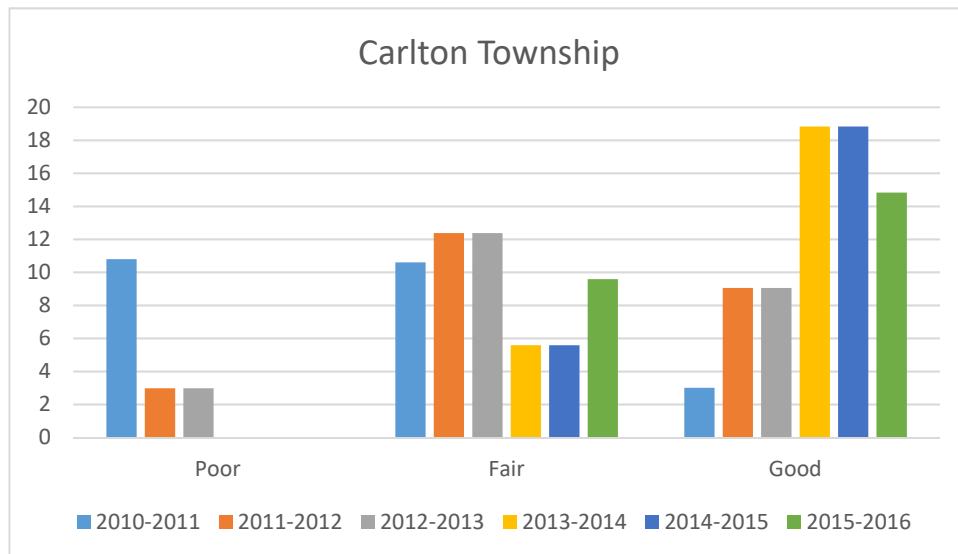


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2010-2016 PASER Road Condition Ratings Barry Township (26.65 miles)

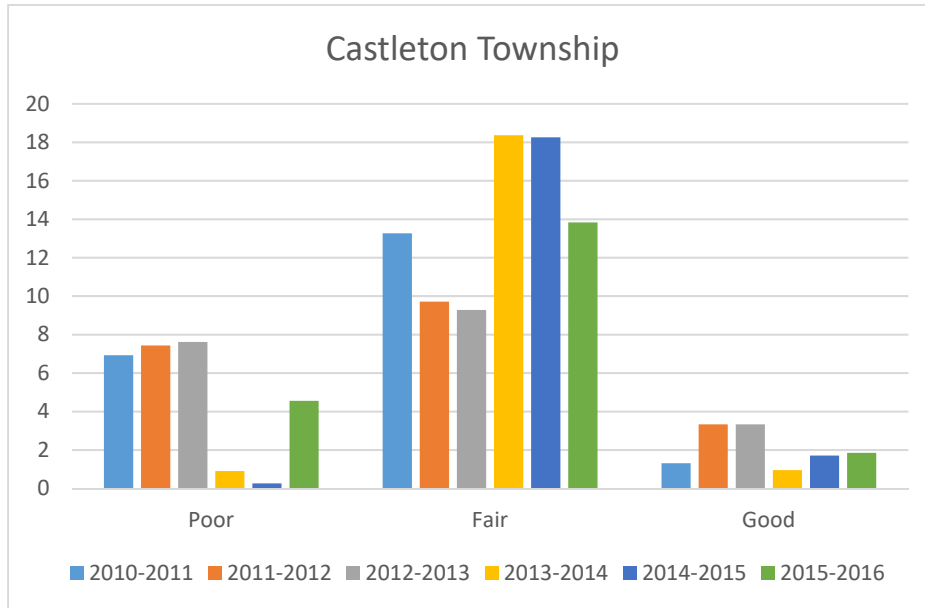


2010-2016 PASER Road Condition Ratings Carlton Township (24.41 miles)

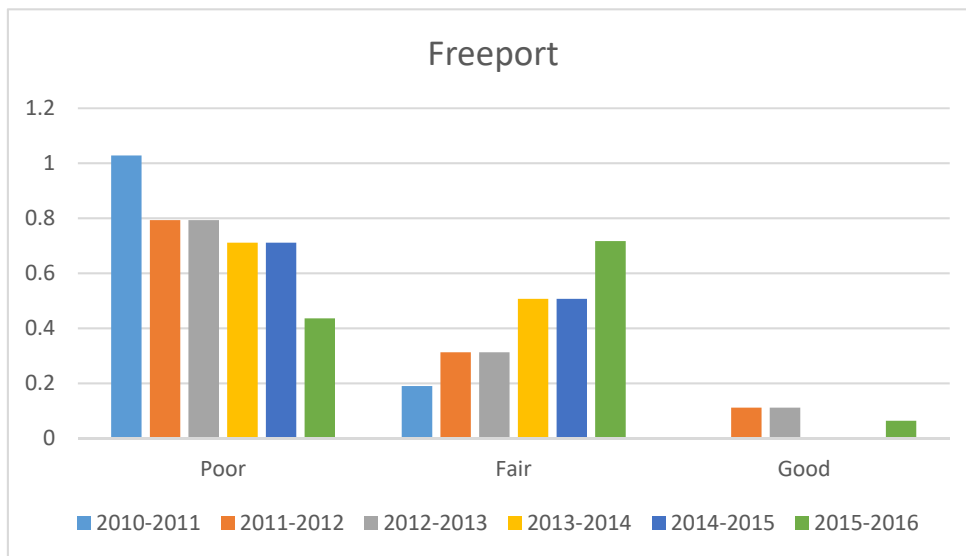


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2010-2016 PASER Road Condition Ratings
 Castleton Township
 (20.22 miles)

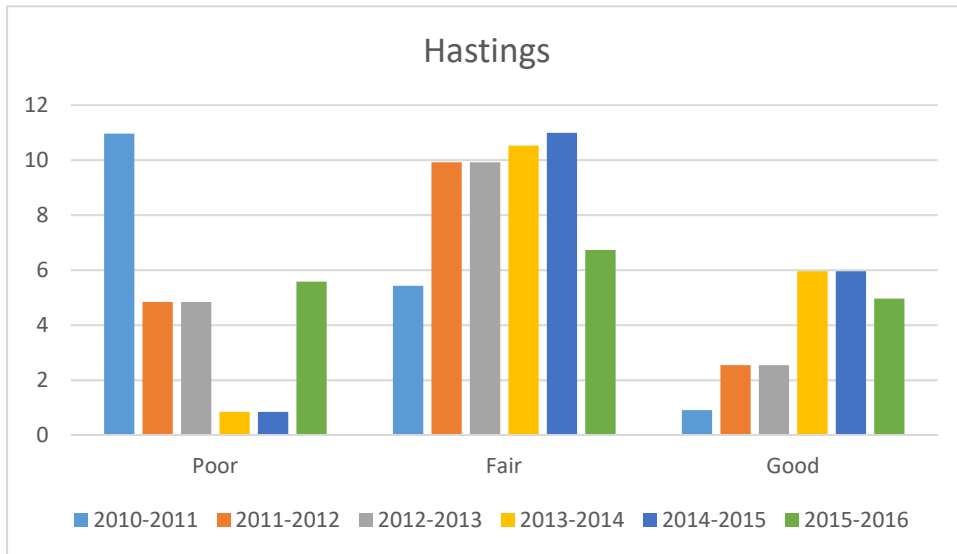


2010-2016 PASER Road Condition Ratings
 Freeport Township
 (1.22 miles)

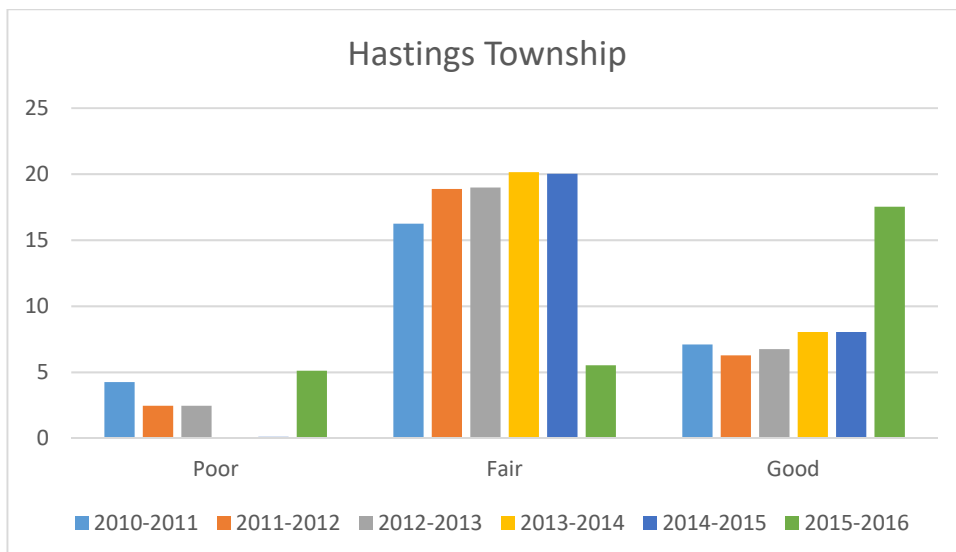


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2010-2016 PASER Road Condition Ratings City of Hastings
(17.29 miles)

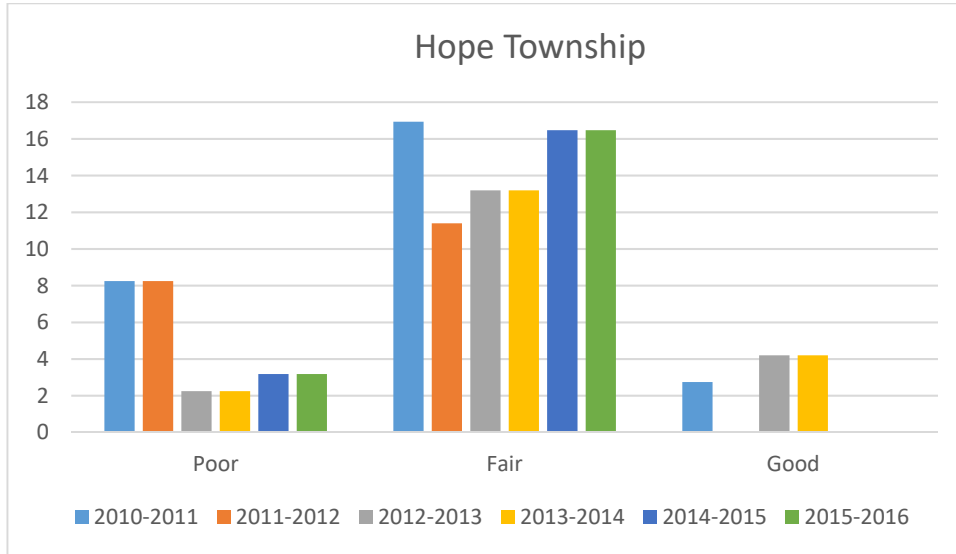


2010-2016 PASER Road Condition Ratings Hastings Township
(28.18 miles)

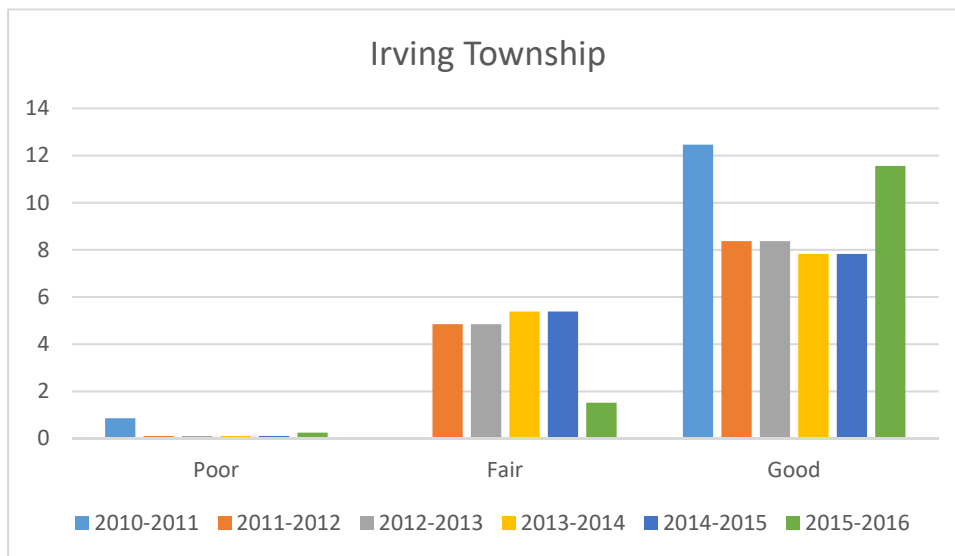


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2010-2016 PASER Road Condition Ratings Hope Township (19.64 miles)

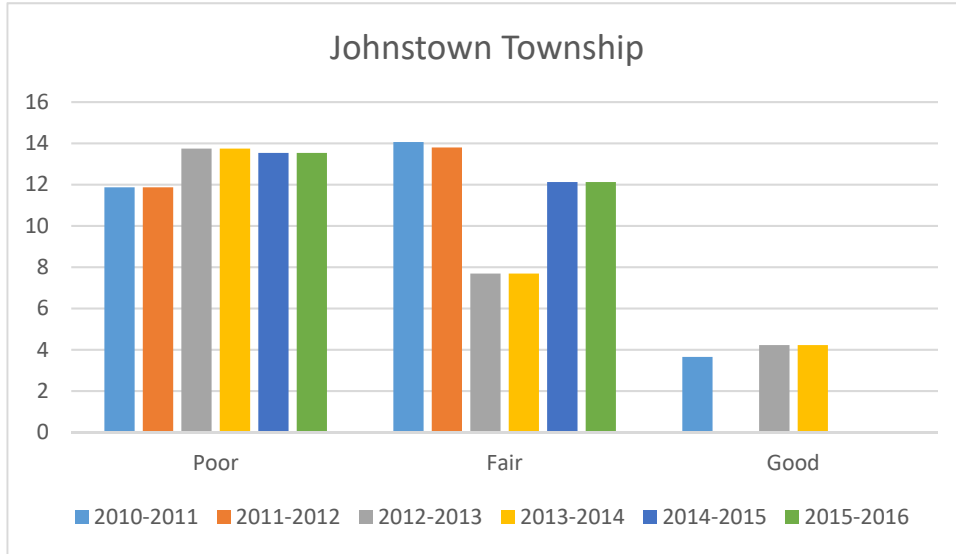


2010-2016 PASER Road Condition Ratings Irving Township (13.33 miles)

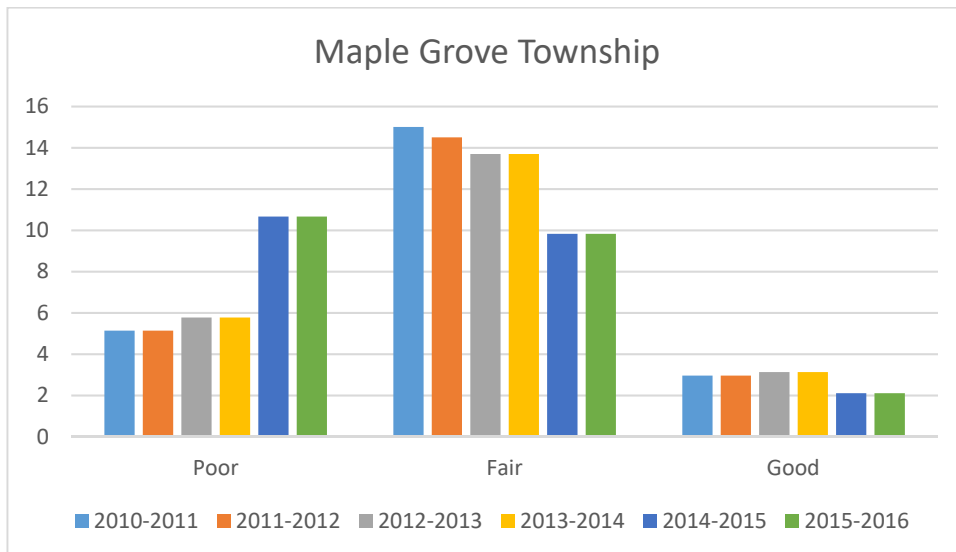


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2010-2016 PASER Road Condition Ratings
Johnstown Township
(25.67 miles)

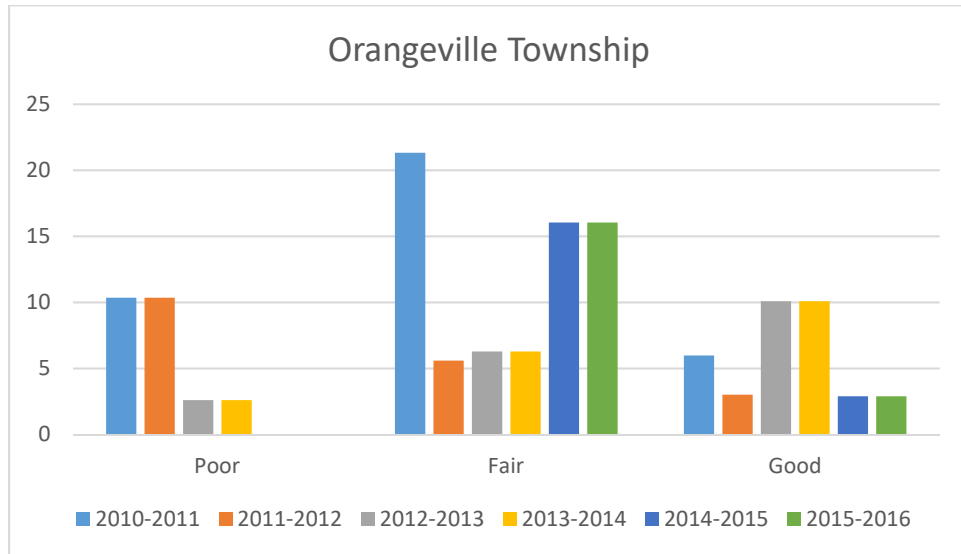


2010-2016 PASER Road Condition Ratings
Maple Grove Township
(22.61 miles)

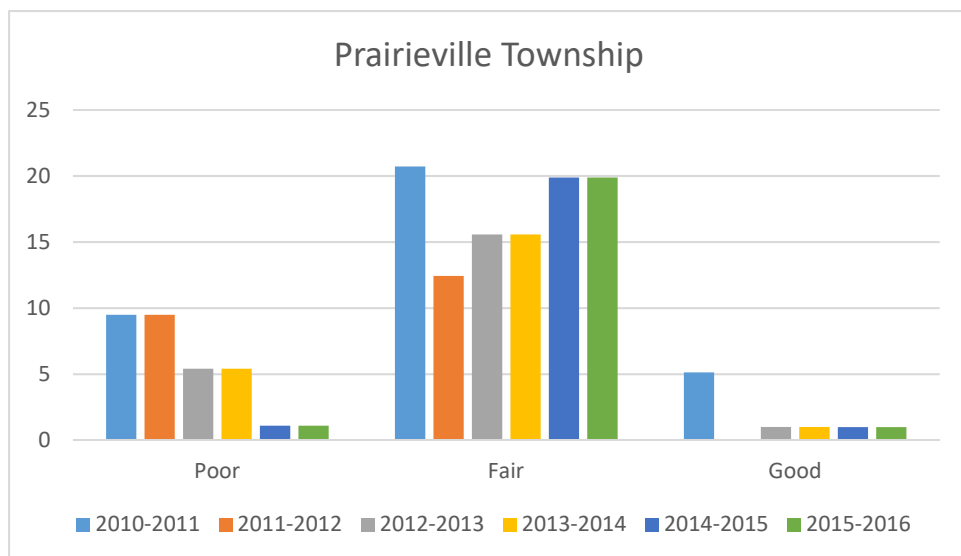


ROAD CONDITION REPORT FOR BARRY COUNTY

2010-2016 PASER Road Condition Ratings Orangeville Township (18.92 miles)

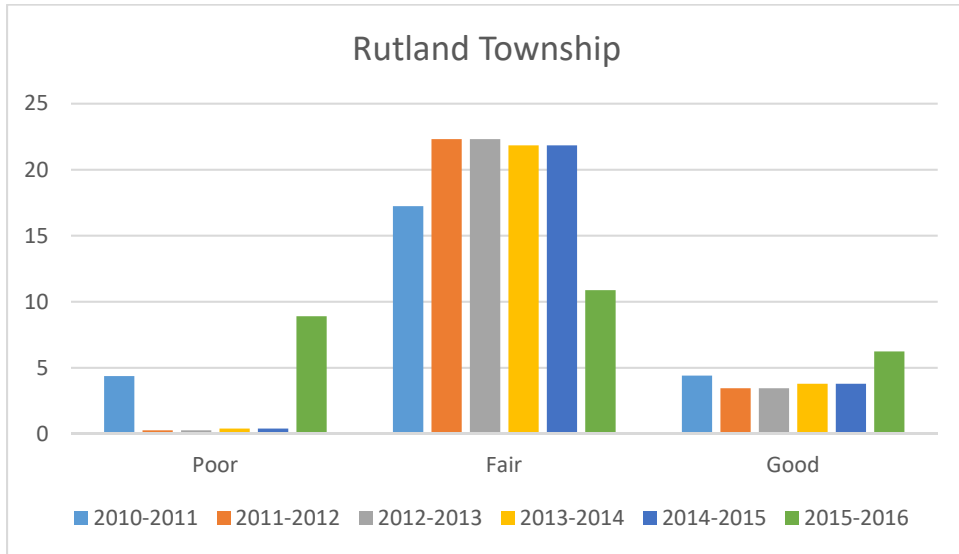


2010-2016 PASER Road Condition Ratings Prairieville Township (21.97 miles)

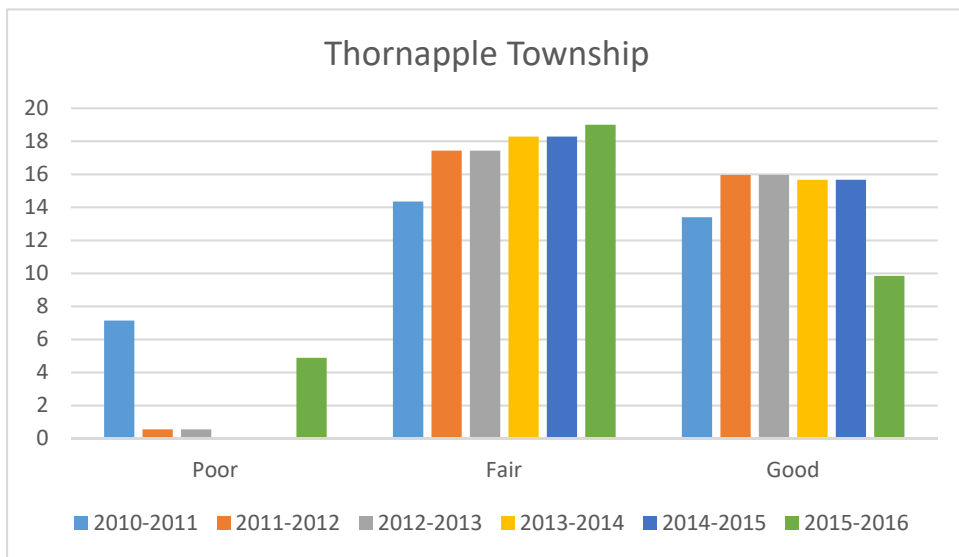


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2010-2016 PASER Road Condition Ratings Rutland Township (26.02 miles)

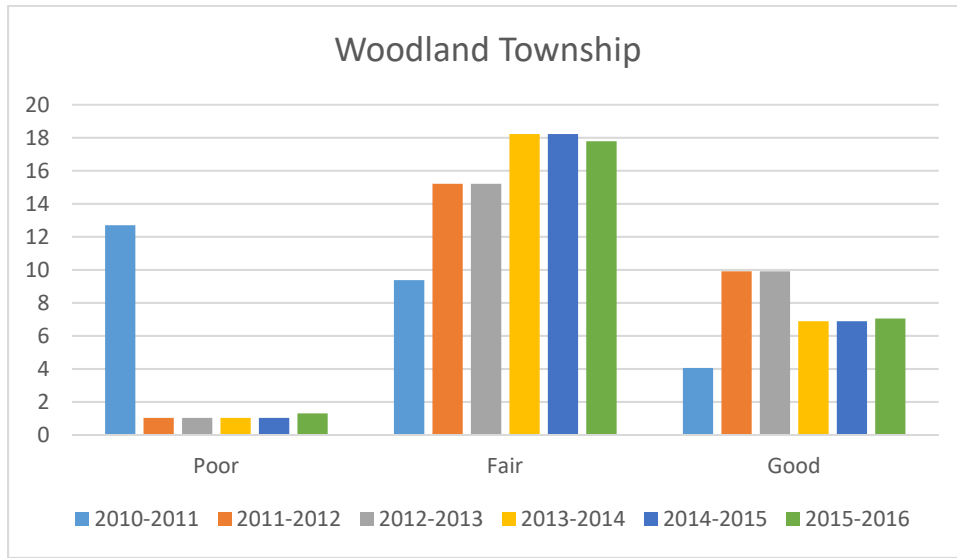


2010-2016 PASER Road Condition Ratings Thornapple Township (33.72 miles)

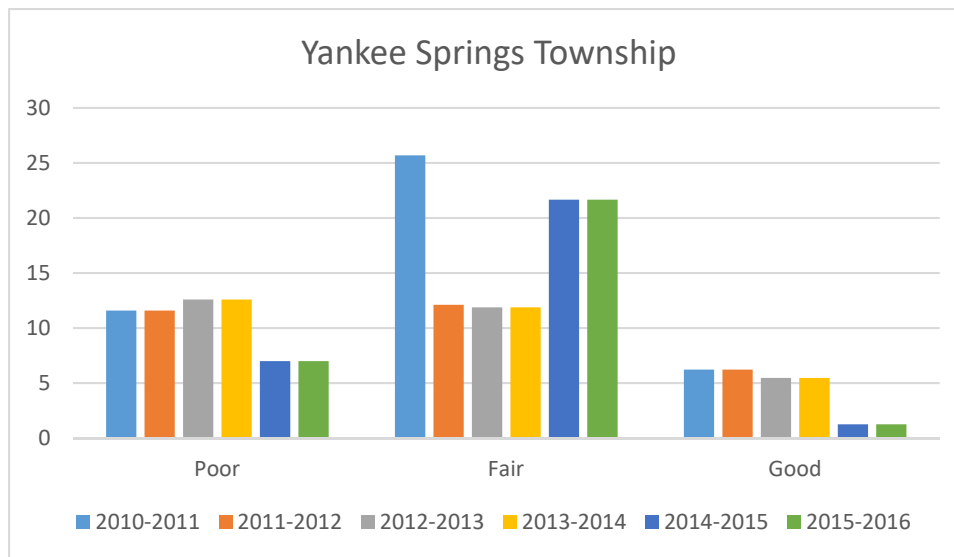


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2010-2016 PASER Road Condition Ratings Woodland Township
(26.14 miles)



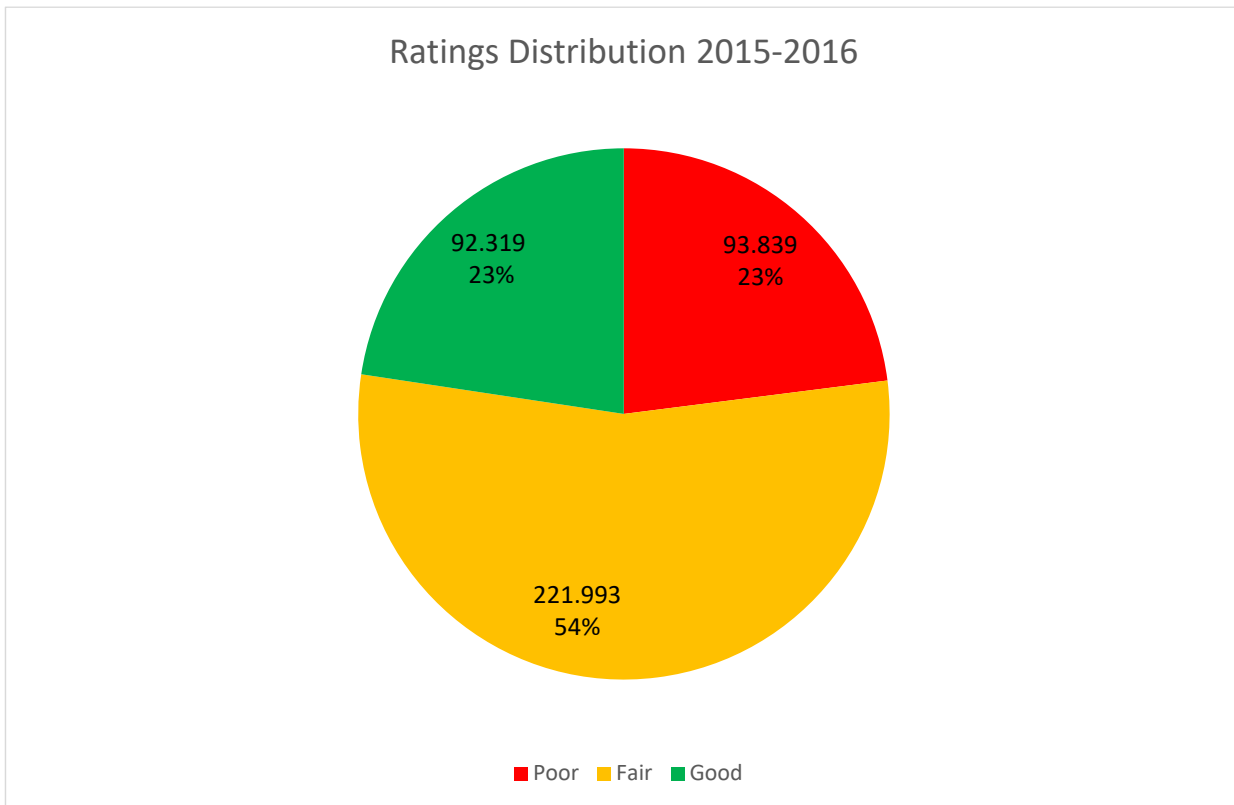
2010-2016 PASER Road Condition Ratings Yankee Springs Township
(29.90 miles)



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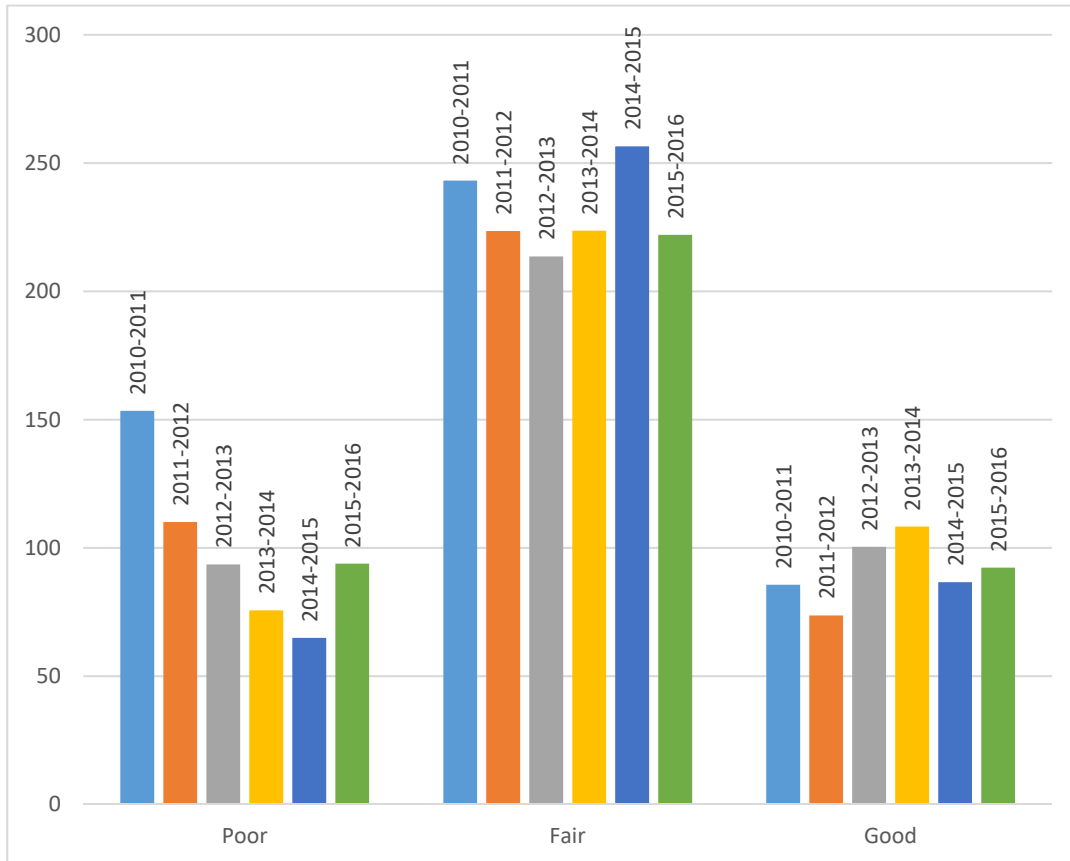
Pavement Conditions

Of the 408 miles of federal-aid roads that were most recently rated (2015-2016), approximately 94 miles are rated as being in “Poor” condition, 222 miles rated “Fair”, and 92 miles “Good”. This distribution means that currently over half of all federal-aid roads in Barry County are in Fair condition with the remainder almost evenly split between Good and Poor. The chart below illustrates the percentage distribution of road ratings for the most recent two-year period. When looking at this chart and the historical trends in previous charts, it is evident that the County’s road agencies should consider increasing their efforts on preservation to prevent more roads in Fair condition from deteriorating to Poor, though some reconstruction work is yet needed to further reduce the lowest rated mileage. Through proper asset management strategies, the amount of poor road miles and the maintenance costs associated with structural improvements can be diminished.



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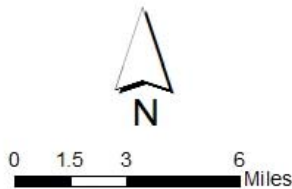
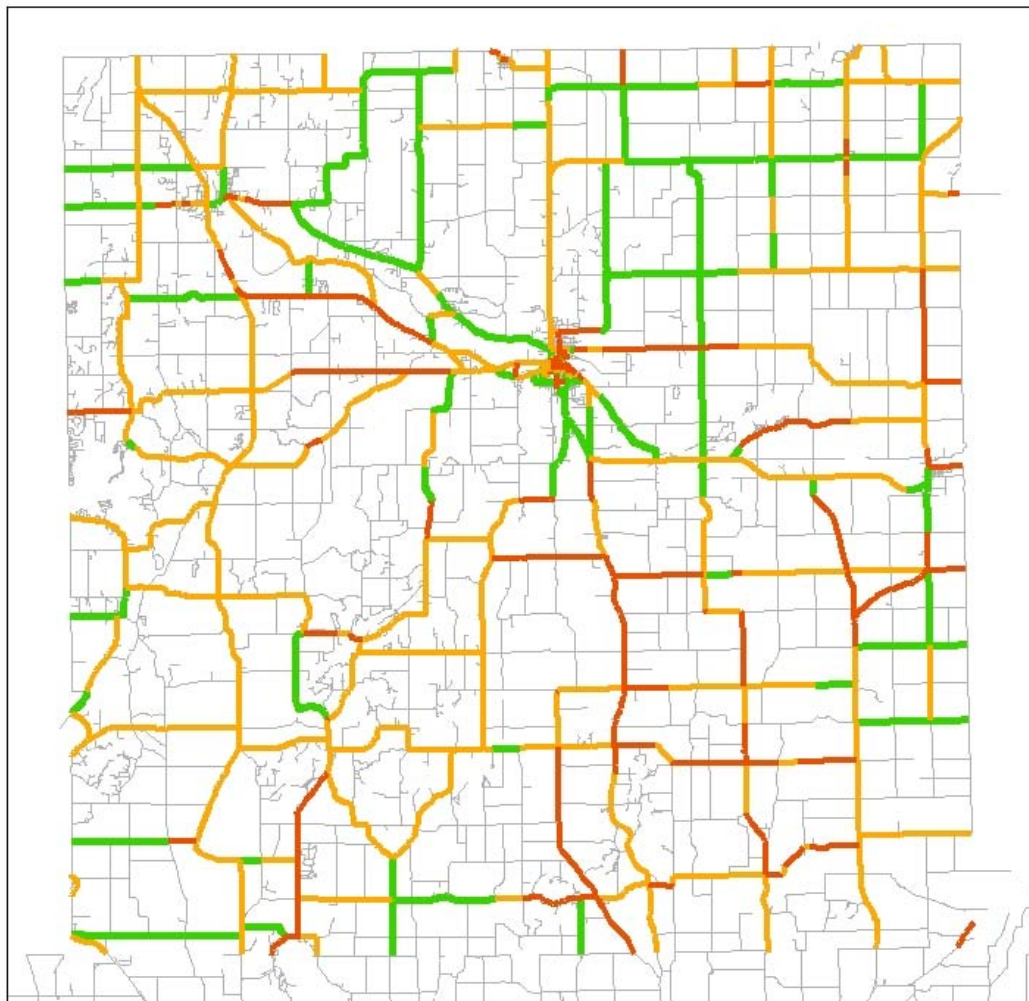
Condition Trends of Federal-Aid Roads Barry County 2010-2016



The bar graph shown above illustrates the quality of roads as recorded in Barry County over the course of seven 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 shows that road agencies in Barry County had made a steady progress in reducing the mileage of the worst rated roads until 2015/2016, when the number again increased. Between 2009 and 2012, the number of fair road miles decreased, with an increase from 2013 to 2015, and decreasing again in 2016. Good road mileage dipped in 2014/2015, after increasing steadily for the previous four years but increased slightly again 2015/2016. It would seem that fewer miles of Fair rated roads have been preserved over the past two years and some of those have, predictably, moved into the Poor PASER range. 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.

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Barry County Federal Aid Road Conditions 2015 - 2016

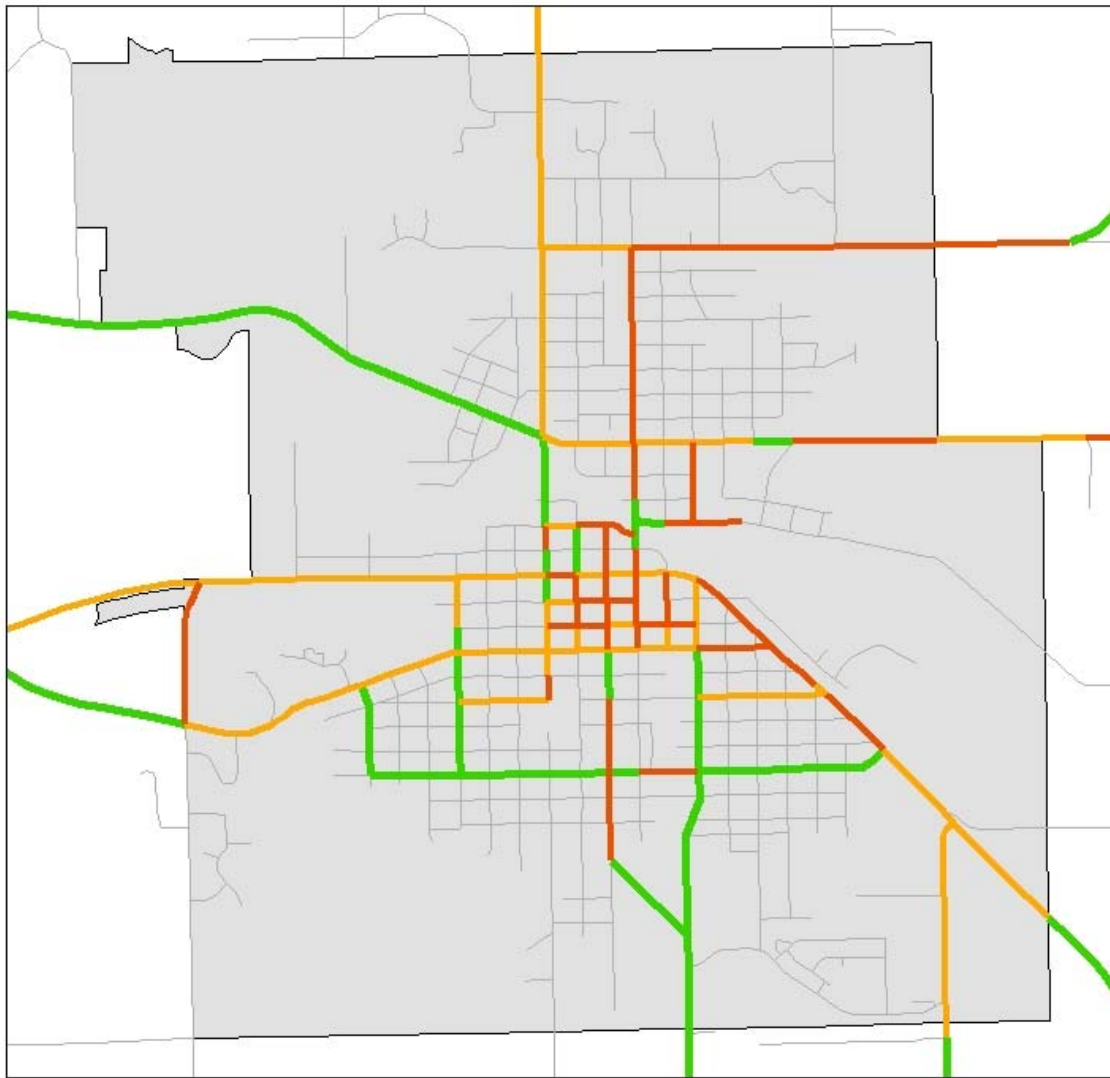


PASER Road Conditions

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

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City of Hastings Federal Aid Road Conditions 2015 - 2016



0 0.175 0.35 0.7 Miles

PASER Road Conditions

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

ROAD CONDITION REPORT FOR BARRY COUNTY

Contact Information

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

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