



FEDERAL AID ROAD CONDITION REPORT FOR BRANCH COUNTY

2018

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ROAD CONDITION REPORT FOR BRANCH COUNTY

TABLE OF CONTENTS

Contents

What is Asset Management?	4
PASER Rating System	6
Summary of 2017 and 2018 Ratings	10
Federal Aid Conditions History and Trends	15
Pavement Condition Summary	26
Contact Information	32

Tables

Table 1: PASER Rating Scale	7
Table 2: Treatment Options	8

PASER Maps

Branch County	29 - 30
City of Coldwater	31

ROAD CONDITION REPORT FOR BRANCH COUNTY

Executive Summary

The Kalamazoo Area Transportation Study assisted in the data collection of road inventory for Branch County in 2017 and 2018. The data collection efforts took place on Federal-Aid roads in the county. 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 Branch County, there are:

- **442 miles of Federal-aid roads.** This includes roads that are maintained by the Michigan Department of Transportation, the Branch County Road Commission, and the cities and villages within the county. Of the 436 Federal-Aid miles in Branch County, there are:
- **103 miles of Trunkline roads** maintained by the Michigan Department of Transportation.
- **309 miles of County roads** maintained by the Branch County Road Commission
- **30 miles of City streets** maintained by the incorporated cities and villages in the county

This report compiles ratings records for the last two years and compares the results with those from 2010 through 2018 to analyze the condition of the federal aid road system in Branch County.

ROAD CONDITION REPORT FOR BRANCH 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.



ROAD CONDITION REPORT FOR BRANCH COUNTY

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.

ROAD CONDITION REPORT FOR BRANCH COUNTY

PASER Rating System

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 types and extents of various defects that may be visually present in any given section of road. This information is used to assign values from the ten point PASER scale to rate their condition. 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.

Regularly recording and charting the PASER rating scale over time on paved surfaces aids in predicting deterioration rates of surfaces. This information is important to the creation of 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 (loss of aggregate from pavement surface), flushing (excess asphalt binder on pavement surface), or polishing (worn down and smoothed aggregate on pavement surface)
- **Surface Deformation-** Includes rutting of wheel paths and pavement distortion
- **Cracks-** Can be transverse, longitudinal, reflection, slippage, alligator, or block cracks
- **Patches and Potholes-** Patches are when previous damage has been filled by new asphalt patch material, and potholes are isolated 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 road surface type, number of lanes, and 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. Roads rated 5-7 rated roads require capital preventative maintenance such as chip seal or non-structural overlay. If the roadway deteriorates past a 4 on the PASER scale, capital preventative maintenance methods of treatment are not effective. A road rated 1-4 on the PASER scale requires some form of structural improvement or full reconstruction.

ROAD CONDITION REPORT FOR BRANCH COUNTY

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

Table 1

Rating	Visible Distress	General Treatment & Conditions
10 Good	None	New Construction less than one year old
9 Good	None	Recent Overlay or recent reconstruction more than one year old
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 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.

ROAD CONDITION REPORT FOR BRANCH COUNTY

Capital Preventative Maintenance and Reconstructive Treatments

Table 2

Treatment	Life Extension (Average Years)	PASER Rating	Cost per Mile	Average Cost per Additional Year
Hot Mix Asphalt Crack Treatment	2	6 to 8	\$10,000	\$5,000
Overband Crack Filling	4	6 to 7	\$7,000	\$1,750
One Course Non-Structural Overlay	7	5 to 6	\$60,000	\$8,571
Milling and One Course Non-Structural Overlay	8	4 to 5	\$92,000	\$13,000
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	\$22,500	\$4,500
Multiple Course MicroSurface	7	4 to 6	\$41,000	\$6,000
Ultra-Thin HMA Overlay	8.5	4 to 6	\$63,000	\$7,875
Hot In-Place Recycling	15	4 to 6	\$175,000	\$11,667
Cold In-Place Recycling	20	3 to 5	\$200,000	\$10,000
Full-Depth Reconstruction	30	1 to 2	\$1,500,000	\$50,000

ROAD CONDITION REPORT FOR BRANCH COUNTY

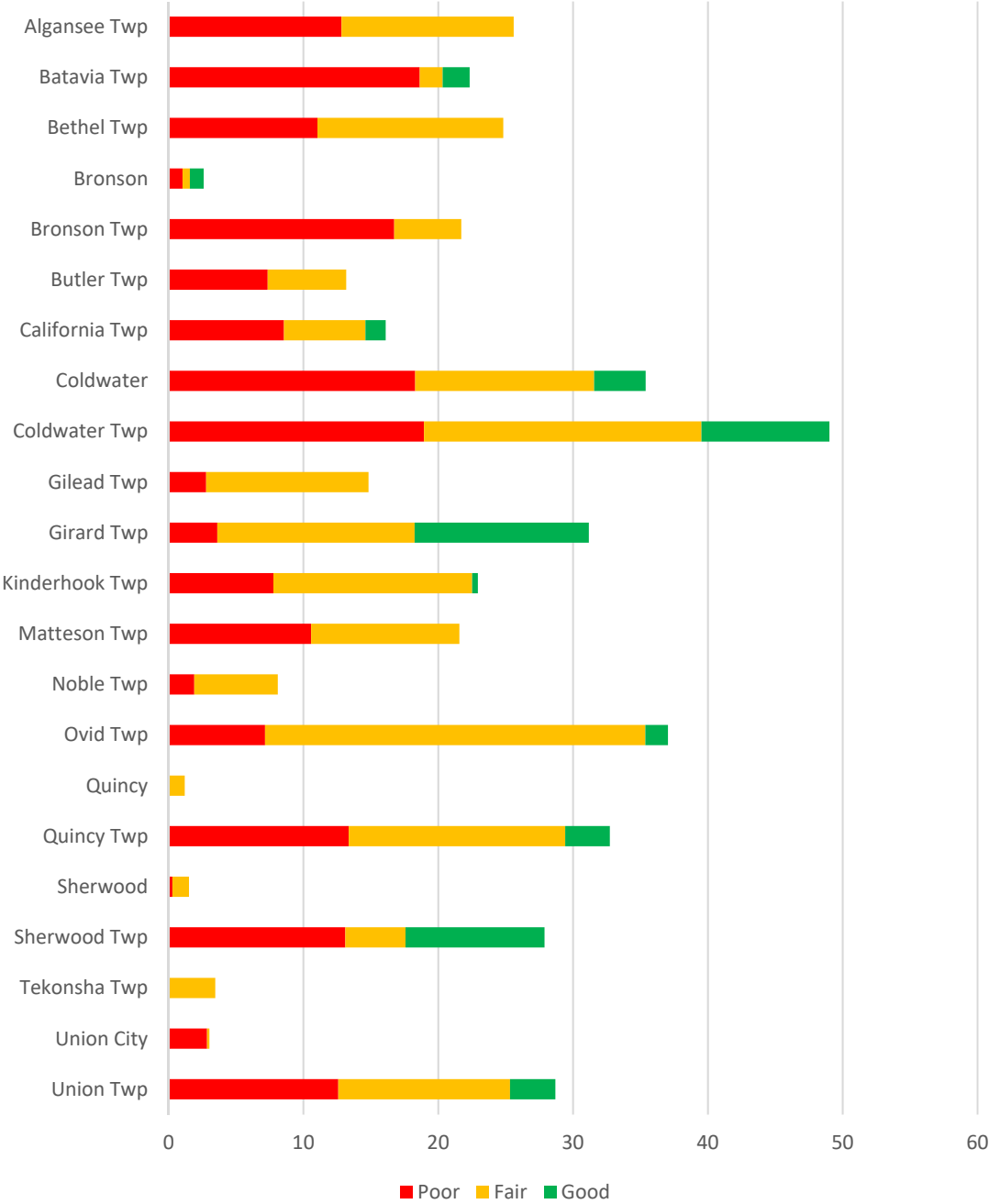
Table 2 details historical cost, lifespan, and rating of pavement treatment types that have been used in Branch County. These treatments range from the minimal (overband crack filling) to major construction. As noted these treatments and costs are historical; as new technologies emerge and become adopted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

- Hot Mix Asphalt Crack Treatment is a standard method of crack filling. It is primarily used on cracks caused by expanding or contracting asphalt that has lost flexibility over time. It is accomplished by cleaning dirt and debris from cracks and placing hot asphalt material seal them from water intrusion.
- 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.
- 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.
- Microsurfacing is a very thin application of cold mixture of emulsified asphalt and aggregate. Additives can be included to alter the final properties of the binder and/or decrease curing time to allow earlier opening of the treated roadway to traffic. The treatment seals the underlying pavement from water permeation and oxidation and provides a renewed high-friction driving surface. It can also be used to fill in pavement ruts, restoring an even driving surface.
- Ultra-Thin Hot Mix Asphalt Overlays are similar to microsurfacing, but utilize hot asphalt binder. They are typically more expensive to place than microsurfacing.
- Hot In-Place Asphalt Recycling heats up existing pavement to soften the binder. The heated material is then removed and mixed with additional virgin asphalt binder and used to repave the roadway.
- Cold In-Place Recycling does not involve the use of heat. Instead, the surface is pulverized and mixed with an asphalt emulsion and 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.

ROAD CONDITION REPORT FOR BRANCH COUNTY

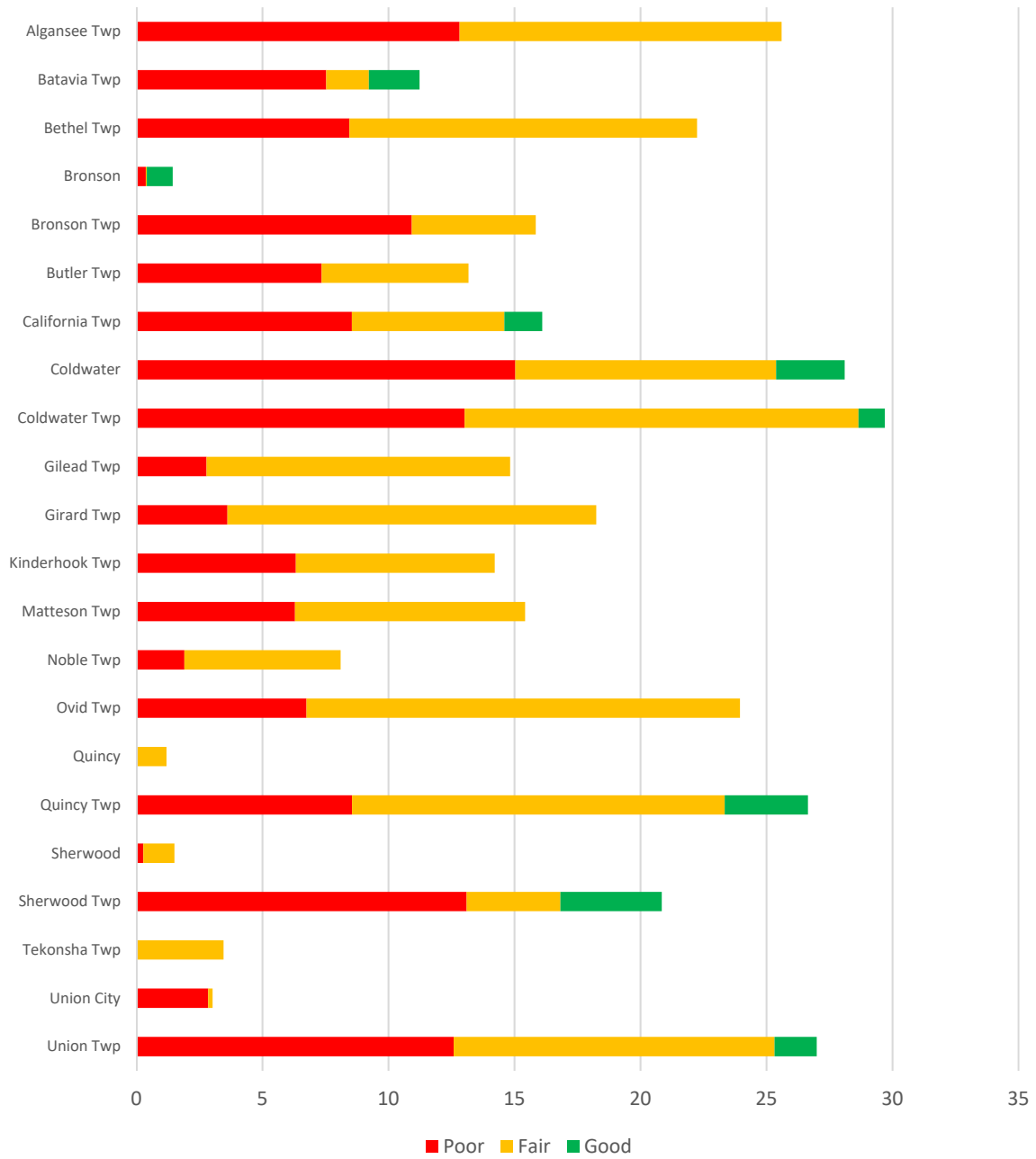
Summary of 2017 and 2018 Ratings

2017/2018 PASER Ratings
Branch County **All** Federal-Aid Miles by Jurisdiction



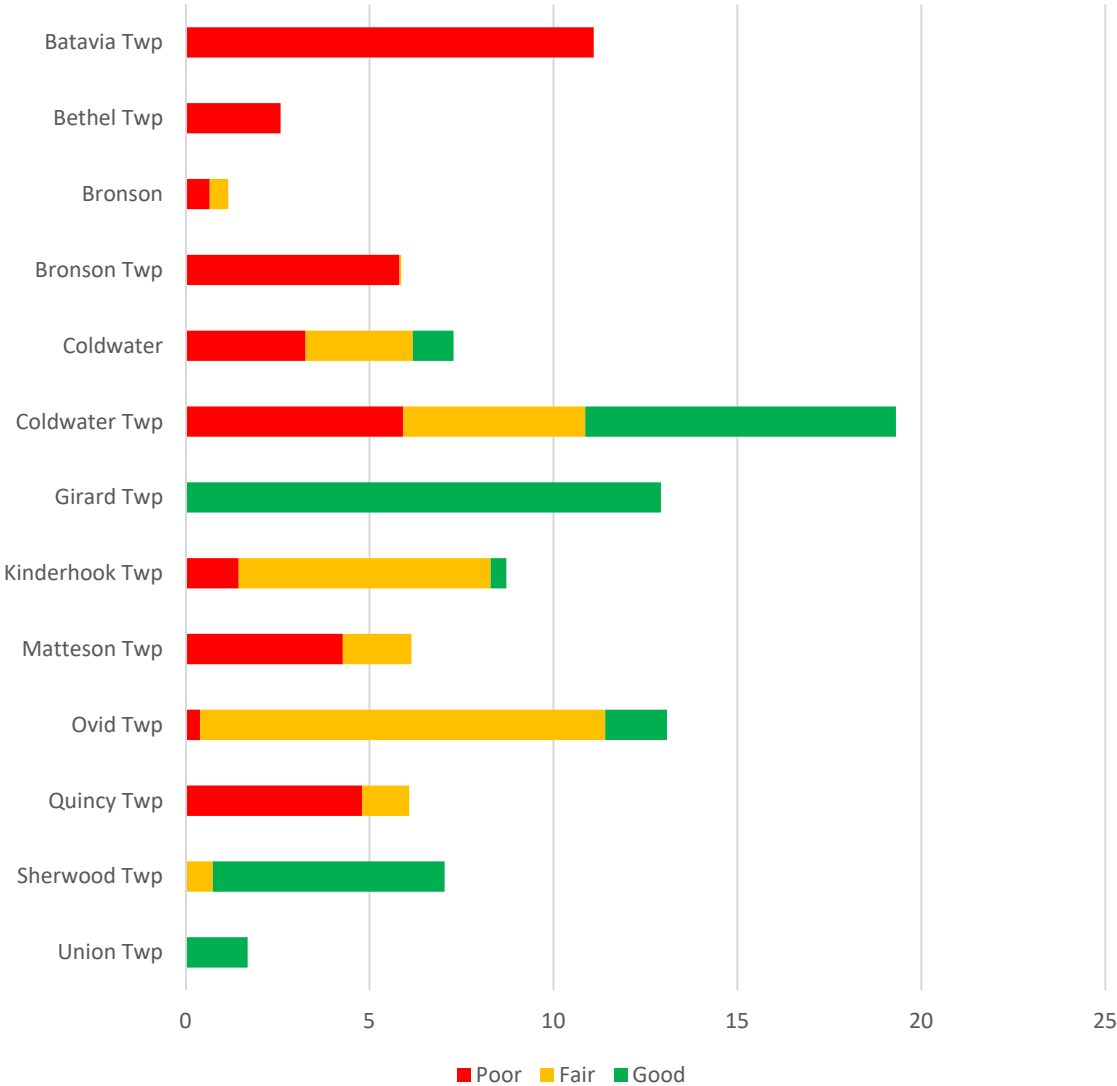
ROAD CONDITION REPORT FOR BRANCH COUNTY

2017/2018 PASER Ratings Branch County **Non-Trunkline** Federal-Aid Miles



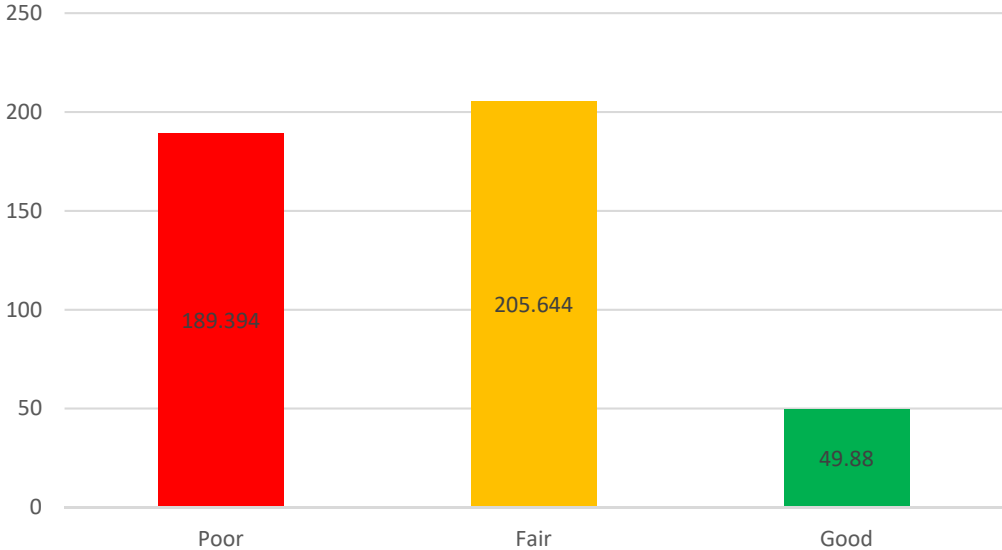
ROAD CONDITION REPORT FOR BRANCH COUNTY

2016/2017 PASER Road Ratings Branch County **Trunkline** Federal-Aid Miles

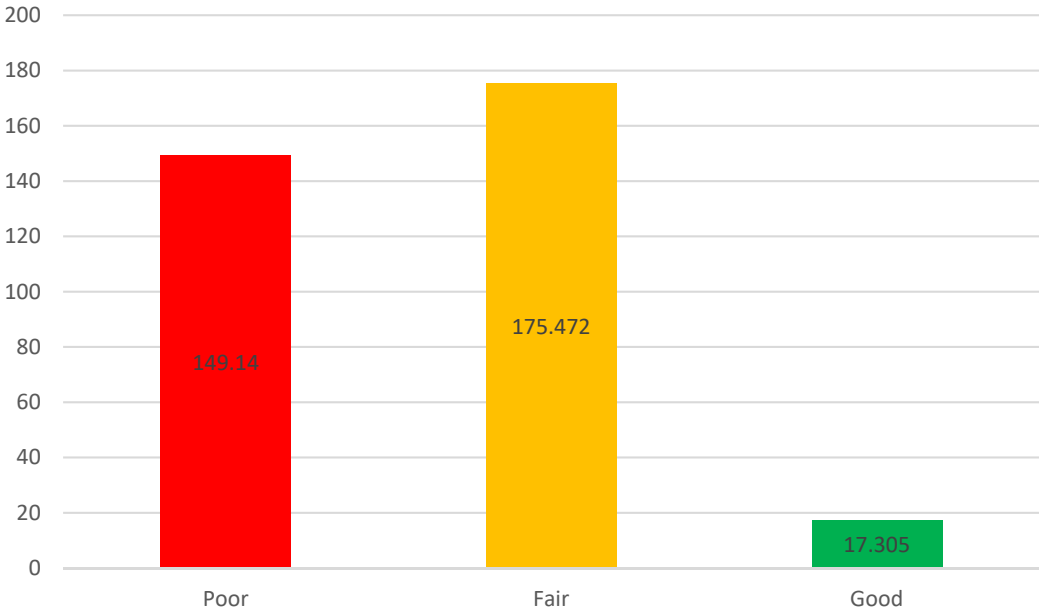


ROAD CONDITION REPORT FOR BRANCH COUNTY

2017-2018 Branch Countywide PASER Conditions

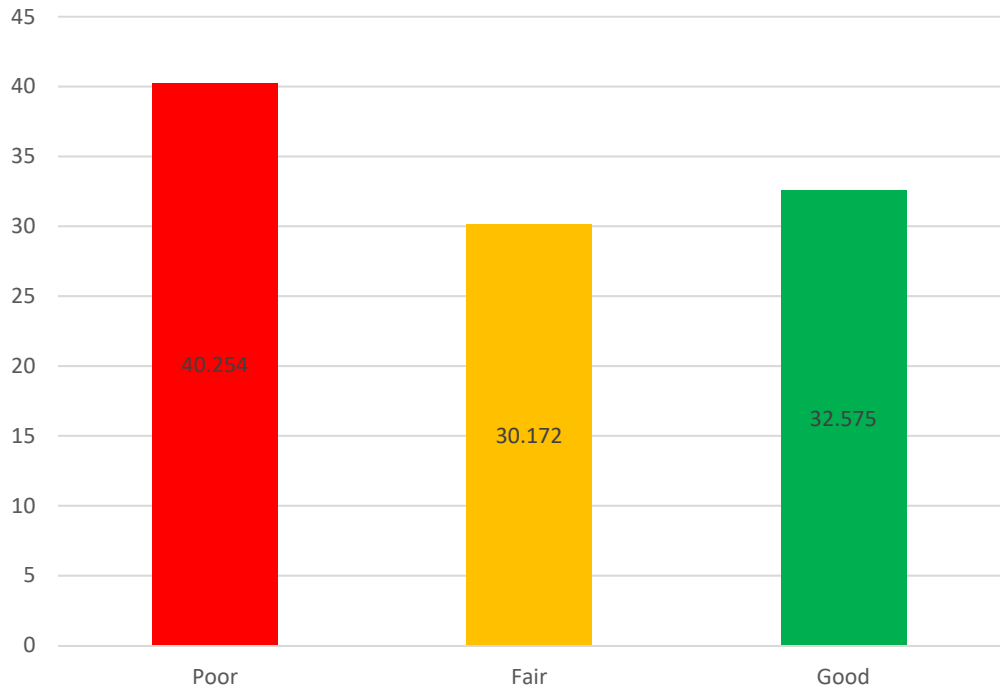


2017-2018 Branch County Non-Trunkline PASER Conditions



ROAD CONDITION REPORT FOR BRANCH COUNTY

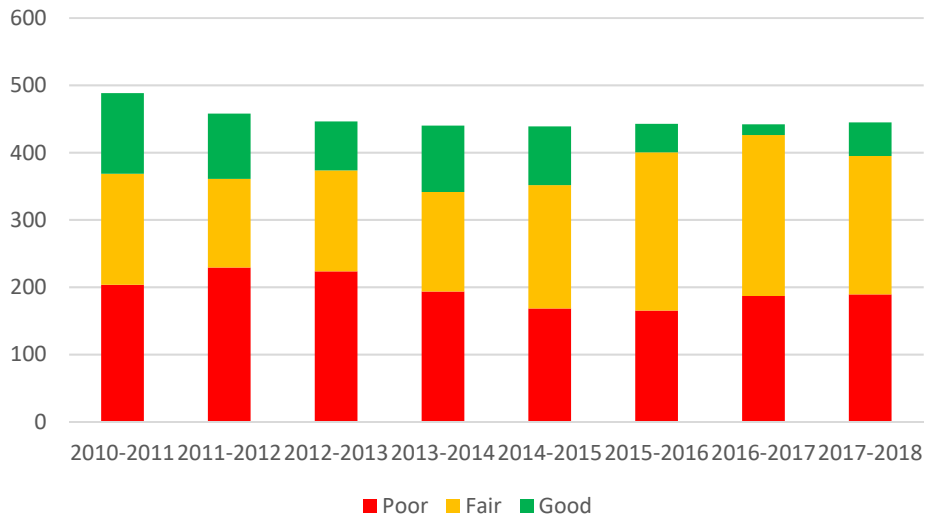
2017-2018 Branch County Trunkline PASER Conditions



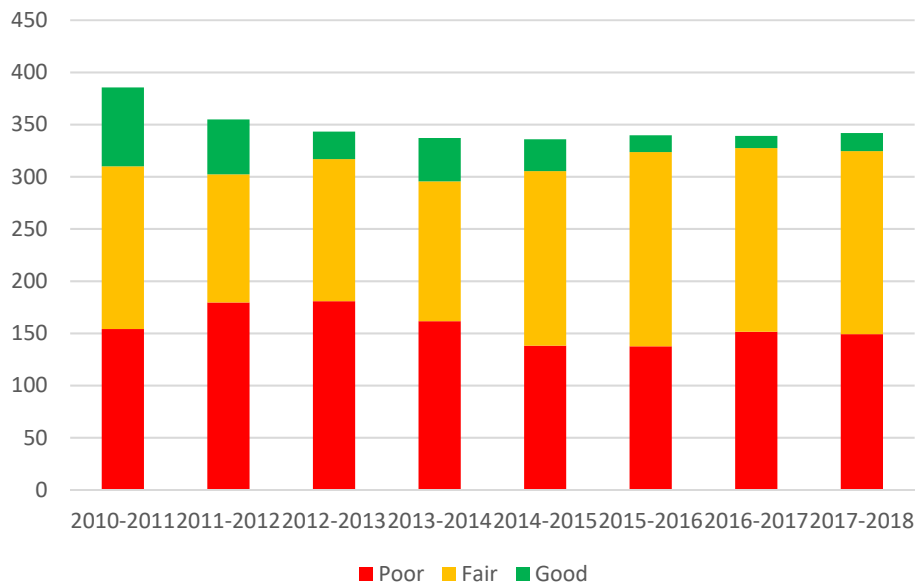
ROAD CONDITION REPORT FOR BRANCH COUNTY

Federal Aid Conditions History and Trends

2010-2018 PASER Road Condition Ratings
Branch County Federal Aid Roads

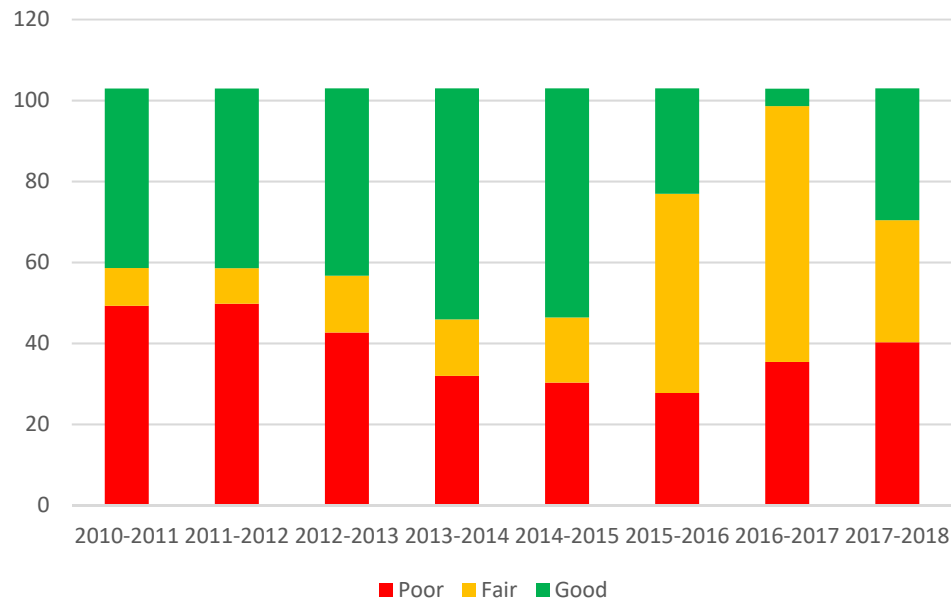


2010-2018 PASER Road Condition Ratings
Branch County Non-Trunkline Federal Aid Roads



ROAD CONDITION REPORT FOR BRANCH COUNTY

2010-2018 PASER Road Condition Ratings Branch County Trunkline Federal Aid Roads



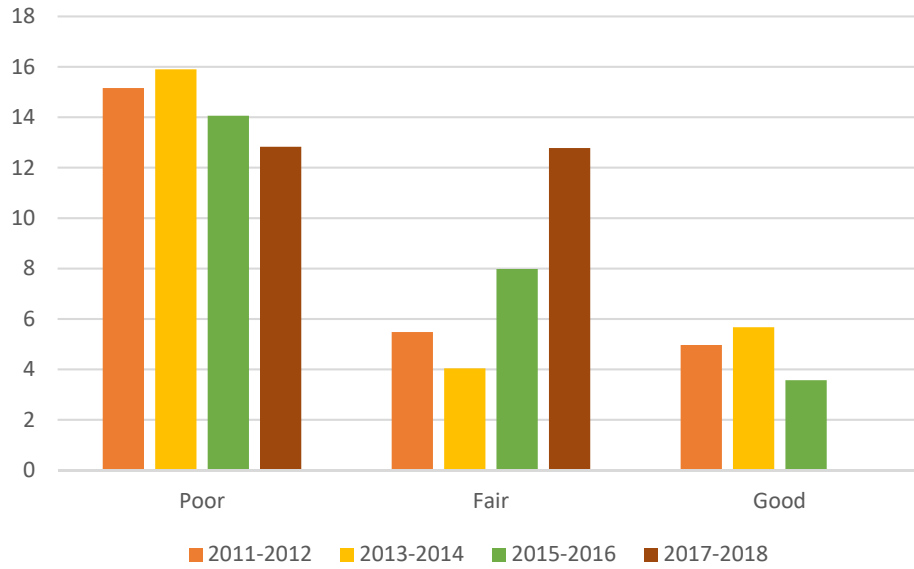
The charts above reflect the progression of the three PASER rating conditions for Branch County's federal-aid roads over an eight year period. After a steady decrease from 2012 to 2016, there has been a regular increase in the number of miles of Poor rated roads. The number of Fair rated miles decreased slightly from 2010 to 2012 then have increased slightly until 2017. The most recent rating period shows a slight decline. Good rated road mileage has decreased steadily from 2014 to 2017, with a slight increase for 2018. For the 2017-2018 period it would appear that the increase in Good rated roads was the result of preventive maintenance being done of Fair rated roads, as the mileage of Poor rated roads remained fairly steady from the previous rating period.

When looking at township breakdowns from 2017/2018 on the succeeding pages of this document, it is apparent that in most jurisdictions the mileage of Poor and Good rated federal aid roads have tended to decline while Fair rated mileage has generally increased.

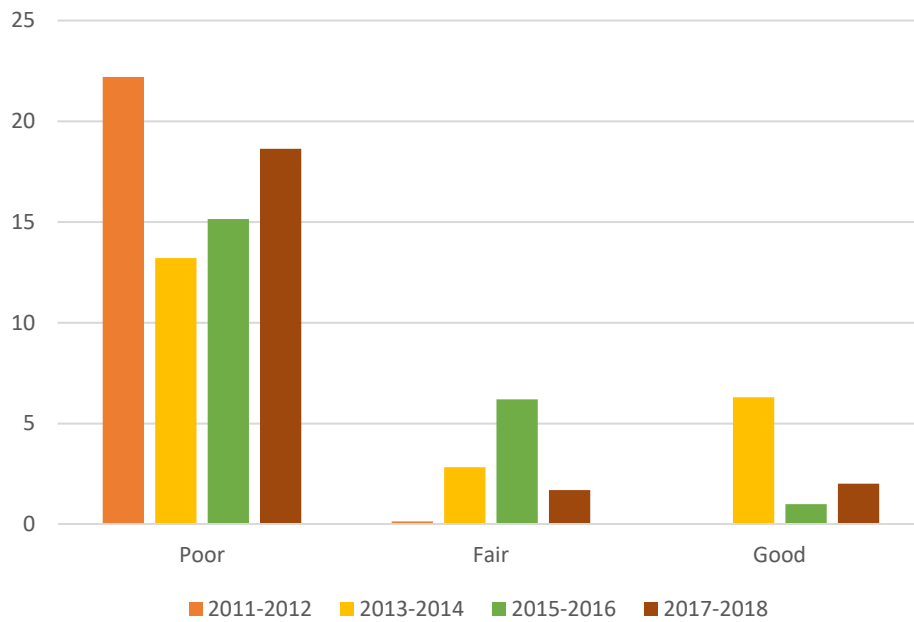
ROAD CONDITION REPORT FOR BRANCH COUNTY

2011-2018 Federal Aid Road Condition Trends

Algansee Township
(25.60 Miles)



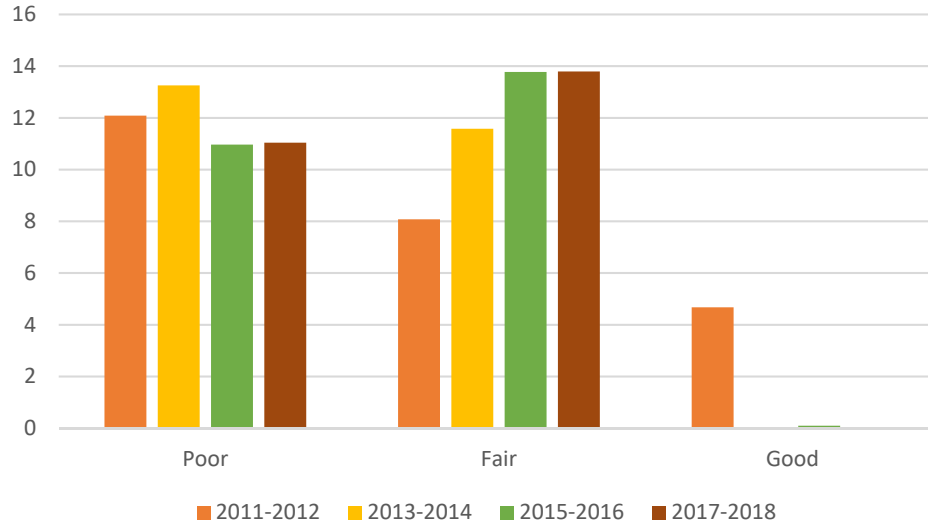
Batavia Township
(22.34 Miles)



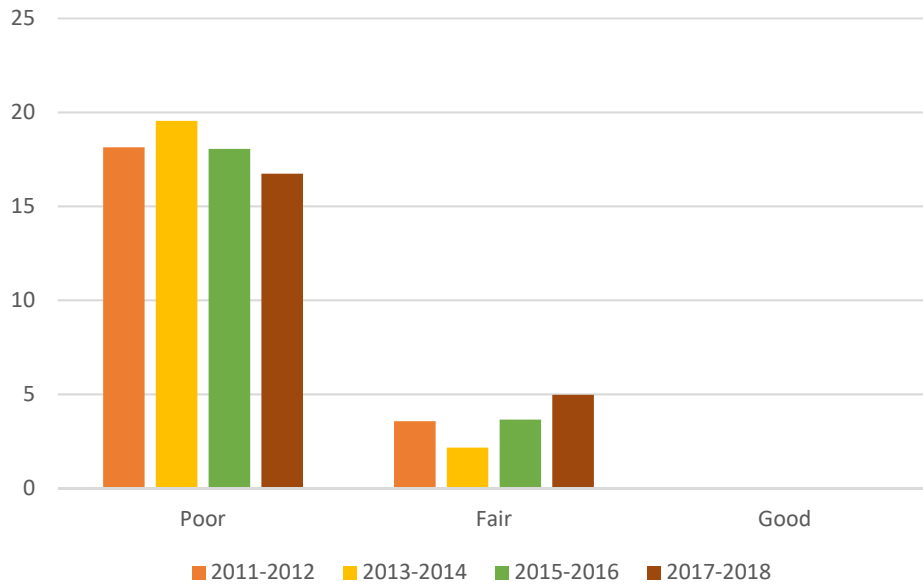
ROAD CONDITION REPORT FOR BRANCH COUNTY

2011-2018 Federal Aid Road Condition Trends

Bethel Township
(24.83 Miles)



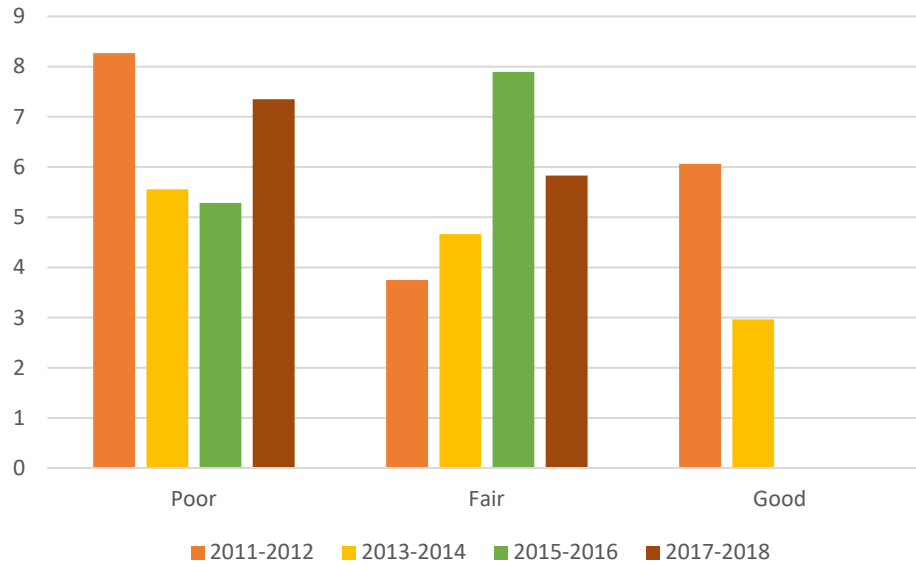
Bronson Township
(21.71 Miles)



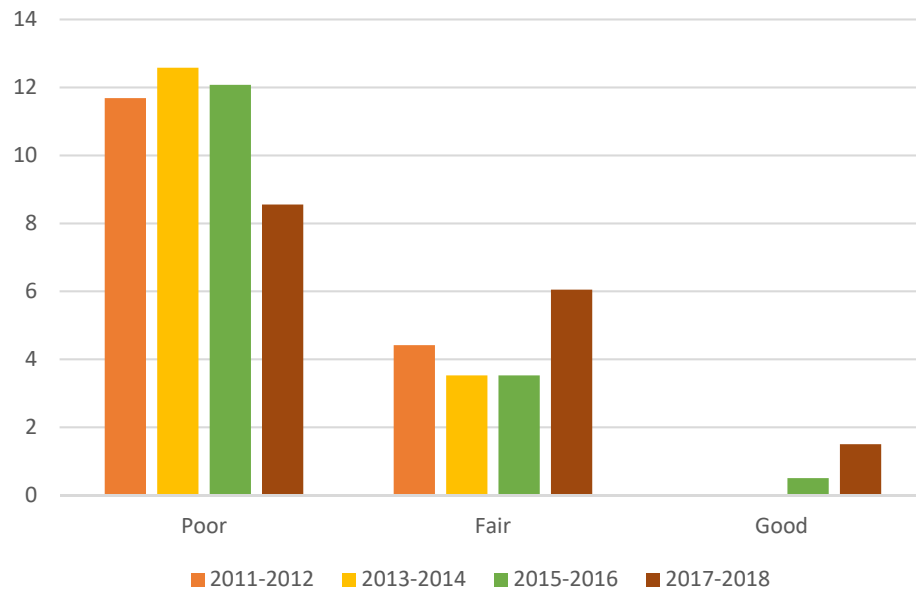
ROAD CONDITION REPORT FOR BRANCH COUNTY

2011-2018 Federal Aid Road Condition Trends

Butler Township
(13.18 Miles)

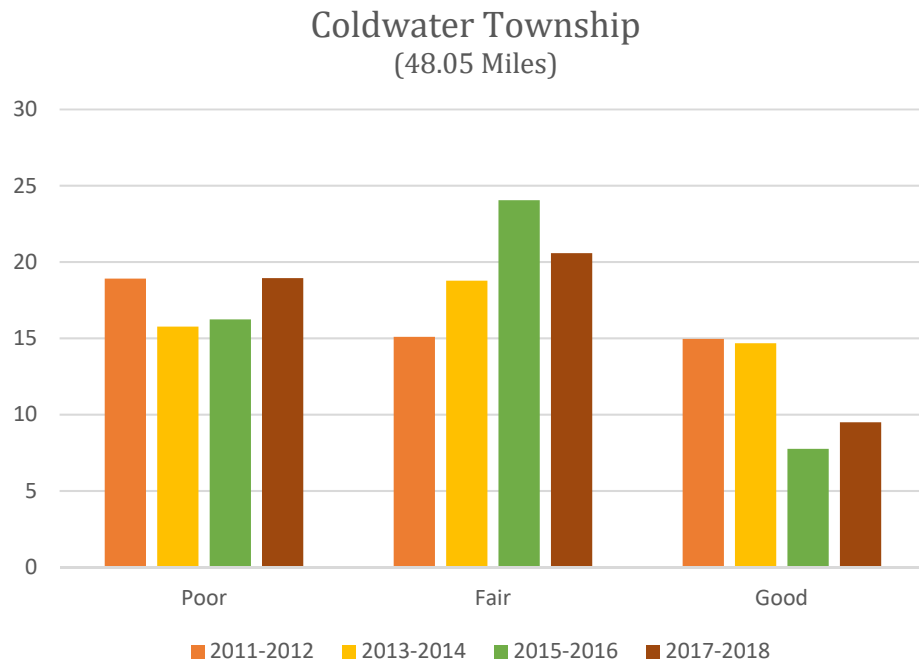
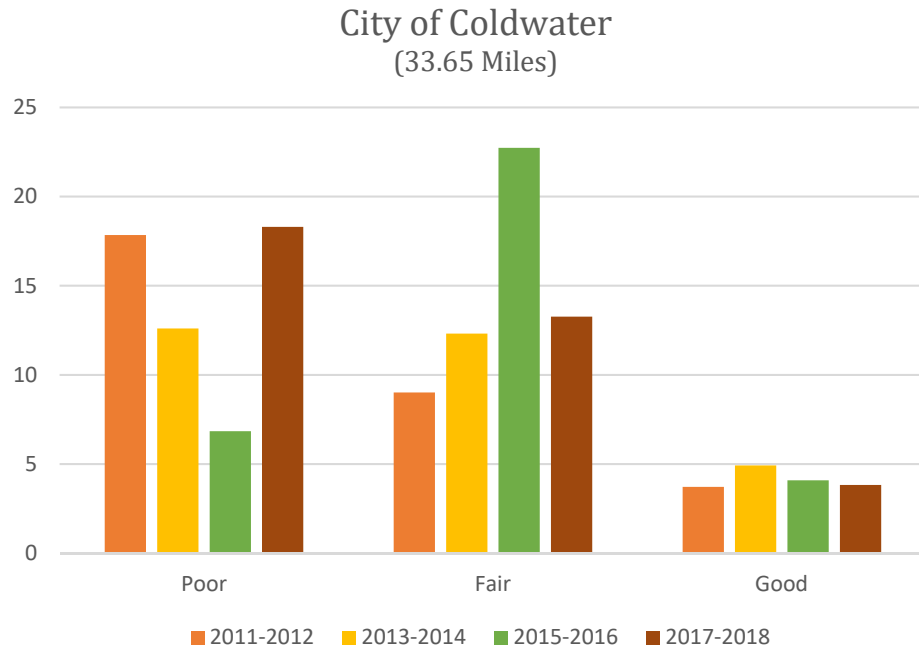


California Township
(16.1 Miles)



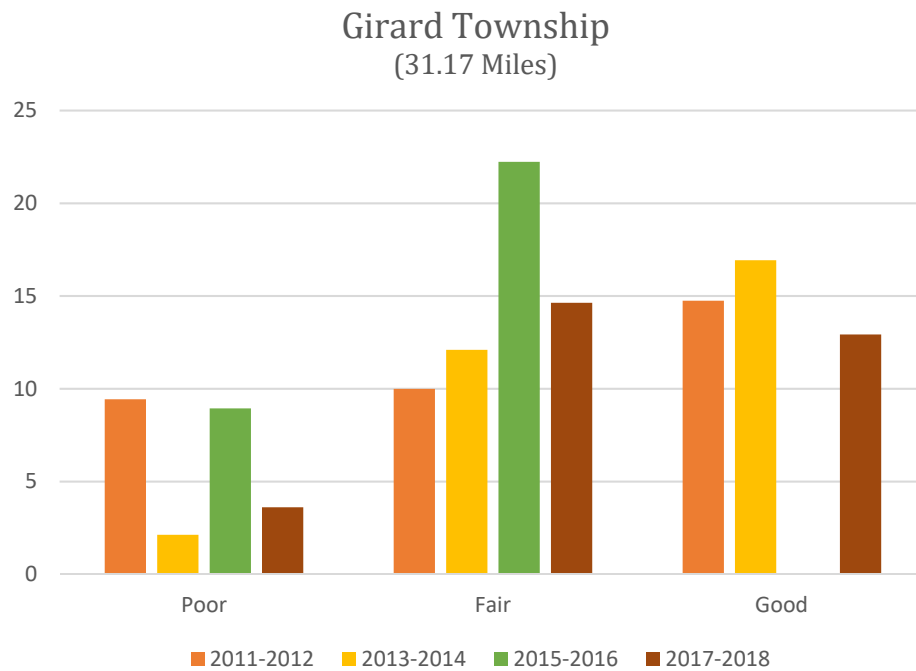
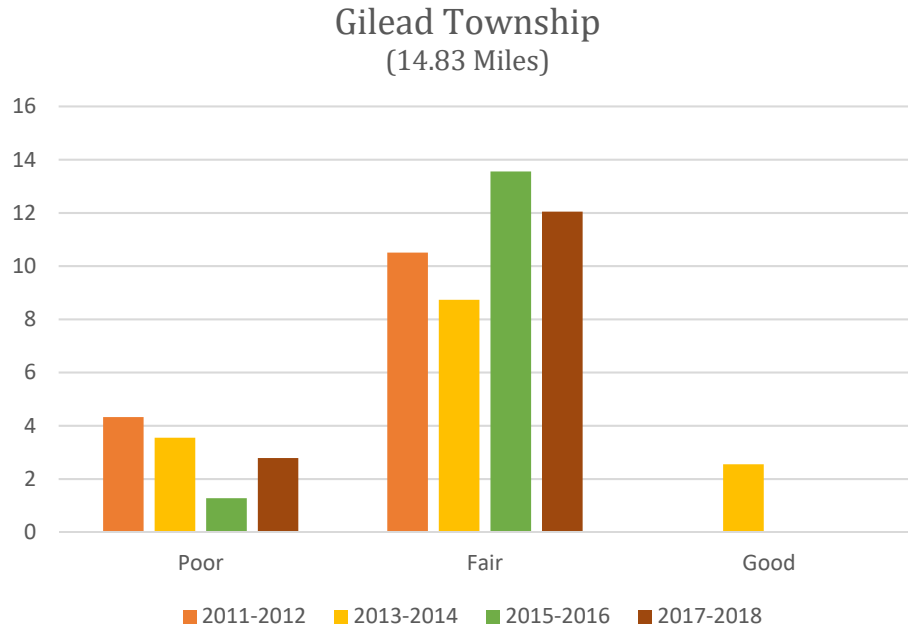
ROAD CONDITION REPORT FOR BRANCH COUNTY

2011-2018 Federal Aid Road Condition Trends



ROAD CONDITION REPORT FOR BRANCH COUNTY

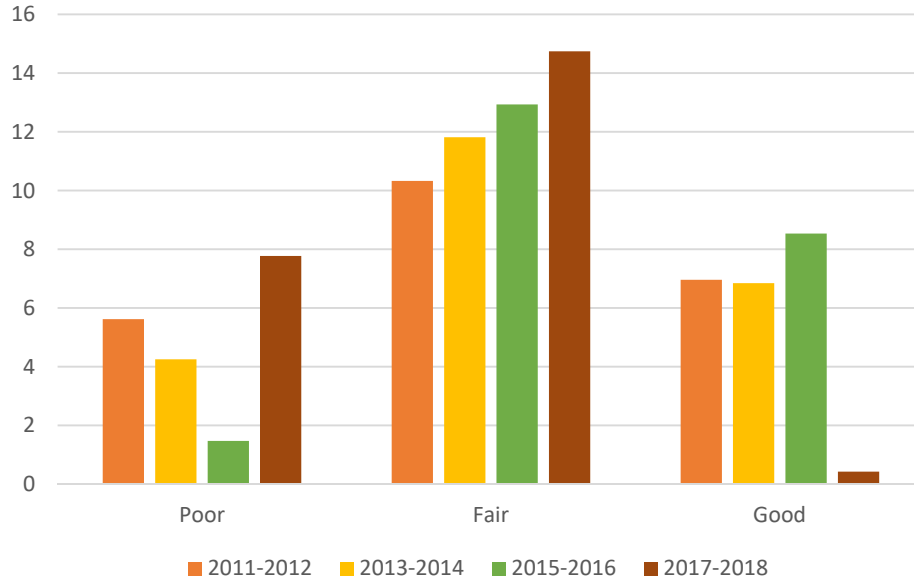
2011-2018 Federal Aid Road Condition Trends



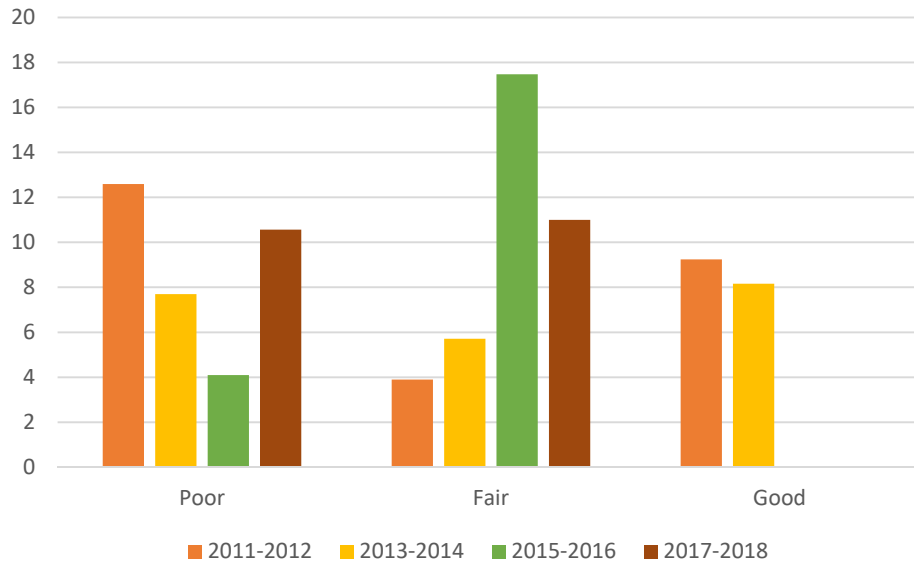
ROAD CONDITION REPORT FOR BRANCH COUNTY

2011-2018 Federal Aid Road Condition Trends

Kinderhook Township
(22.94 Miles)

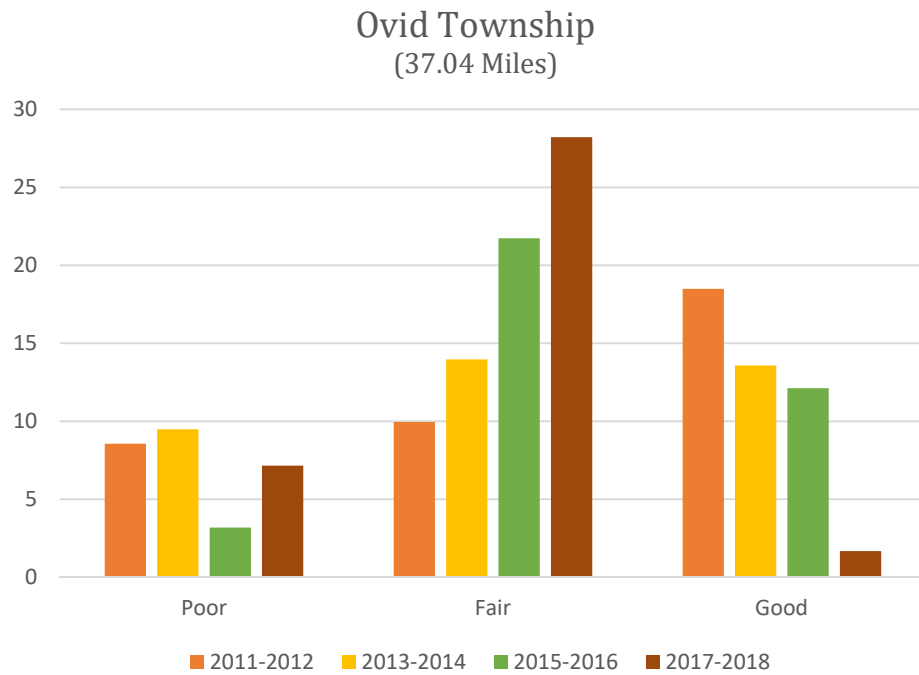
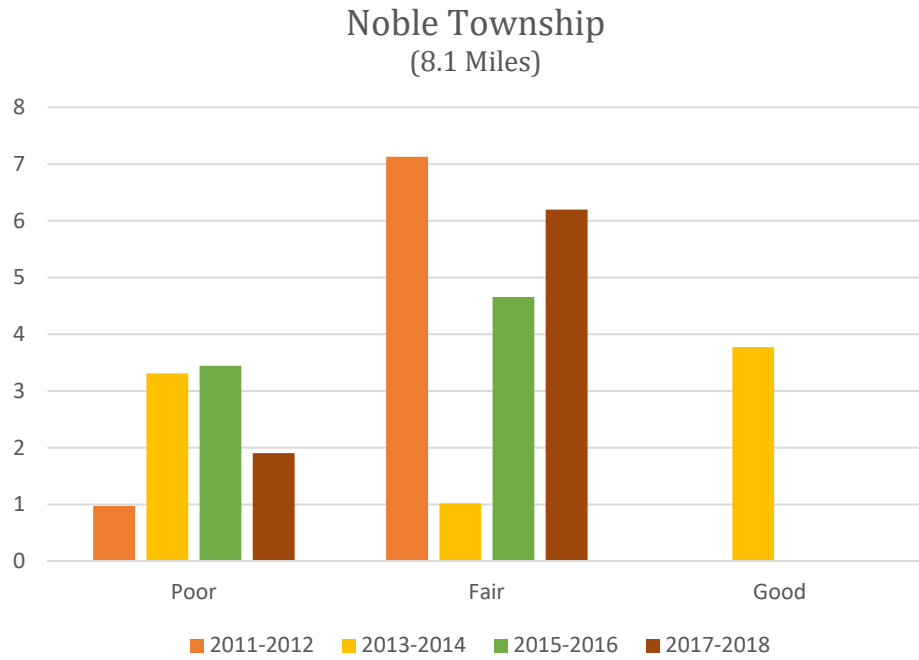


Matteson Township
(21.57 Miles)



ROAD CONDITION REPORT FOR BRANCH COUNTY

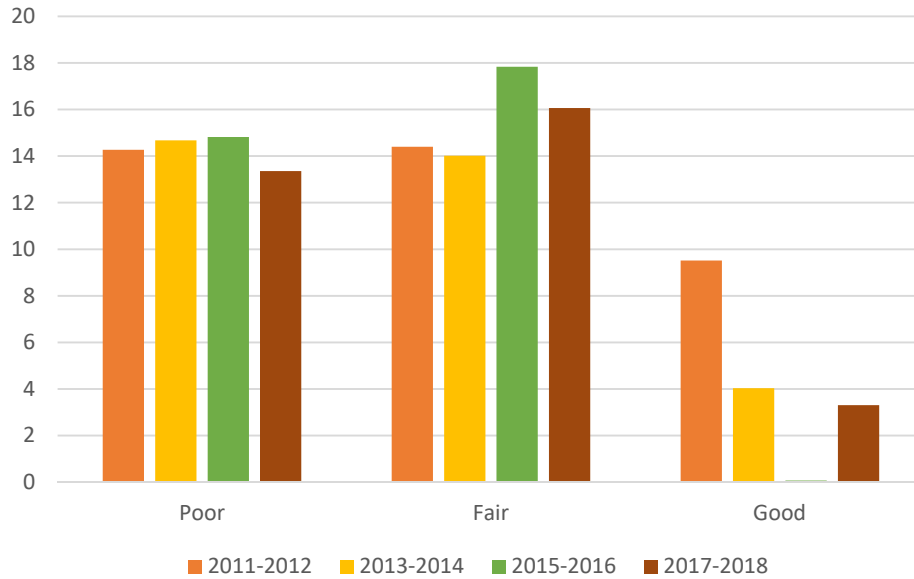
2011-2018 Federal Aid Road Condition Trends



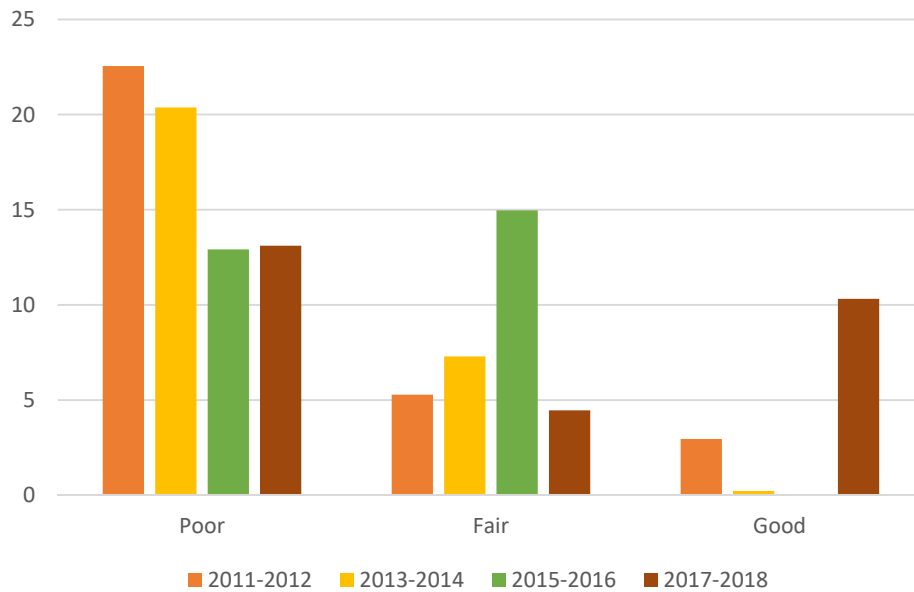
ROAD CONDITION REPORT FOR BRANCH COUNTY

2011-2018 Federal Aid Road Condition Trends

Quincy Township
(32.73 Miles)

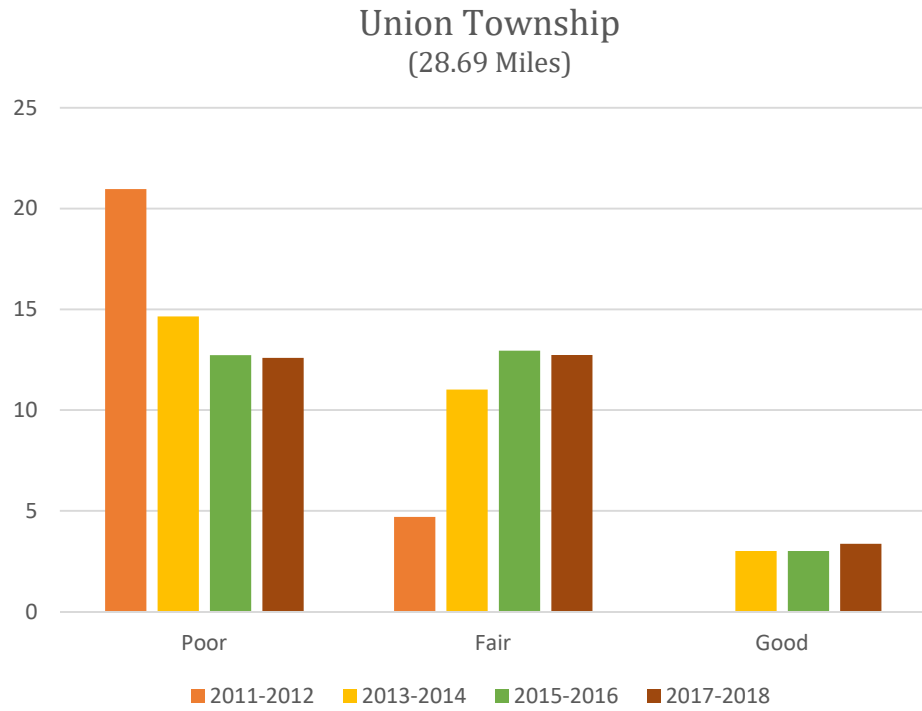


Sherwood Township
(27.89 Miles)



ROAD CONDITION REPORT FOR BRANCH COUNTY

2011-2018 Federal Aid Road Condition Trends

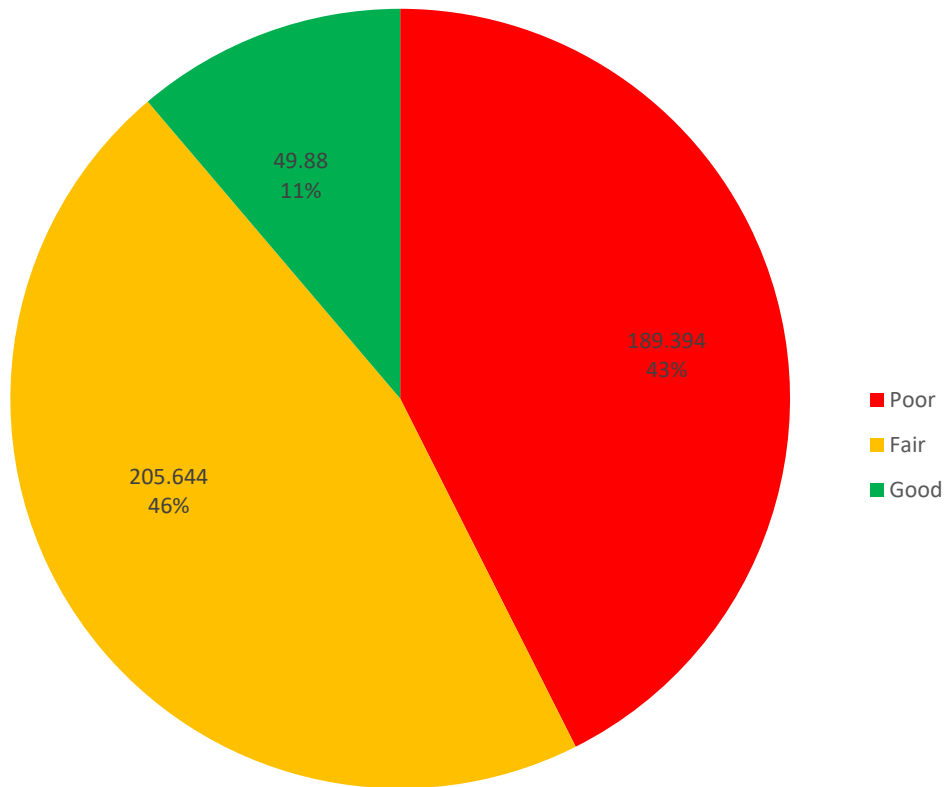


ROAD CONDITION REPORT FOR BRANCH COUNTY

Pavement Condition Summary

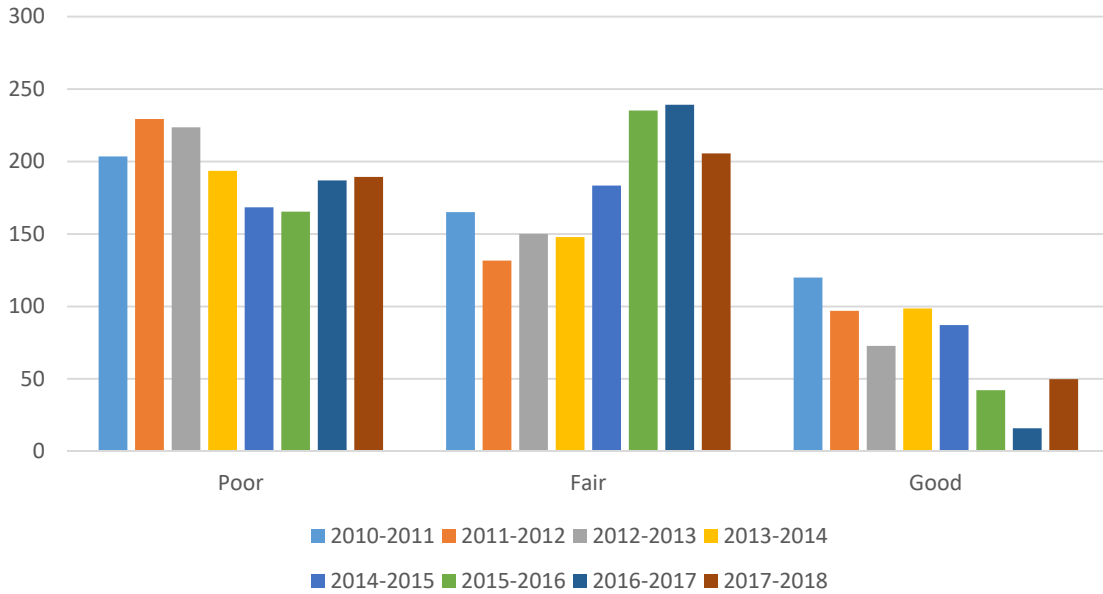
Of the 442 miles of federal-aid roads that were most recently rated (2017-2018), approximately 189 are rated as being in “Poor” condition, 206 rated “Fair”, and 50 “Good.” This distribution means that currently, just under 90% of Branch County Federal Aid roads are almost evenly split between Poor and Fair. The chart below illustrates the percentage distribution of road ratings.

Branch County Federal Aid Condition Distribution
2017-2018

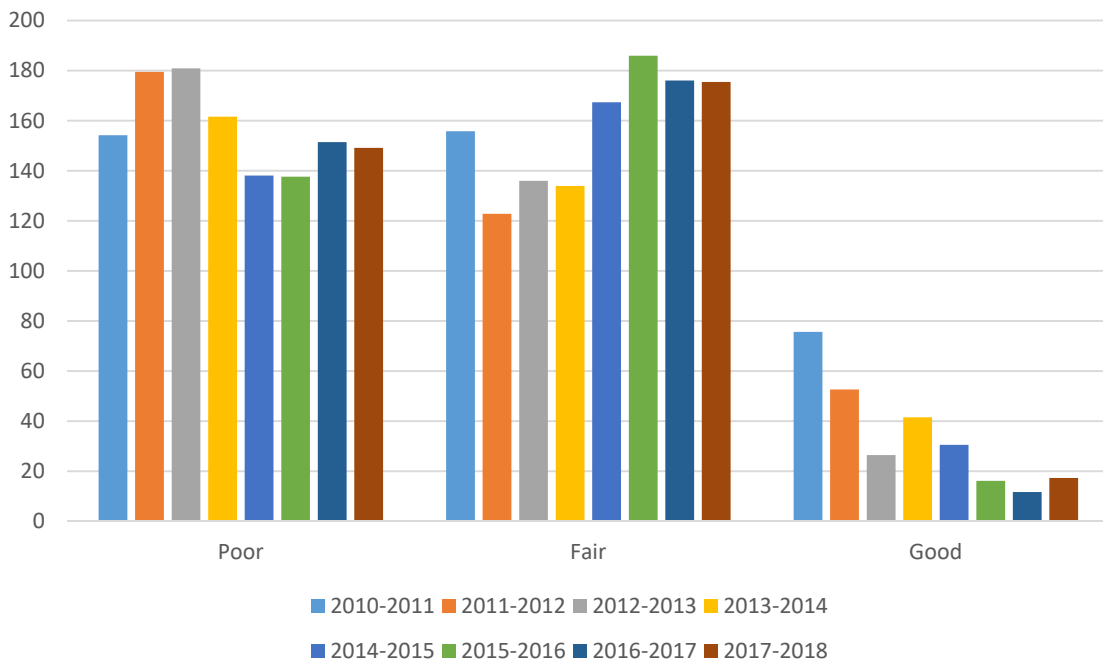


ROAD CONDITION REPORT FOR BRANCH COUNTY

Condition Trends of Federal-Aid Roads Branch County 2010-2018

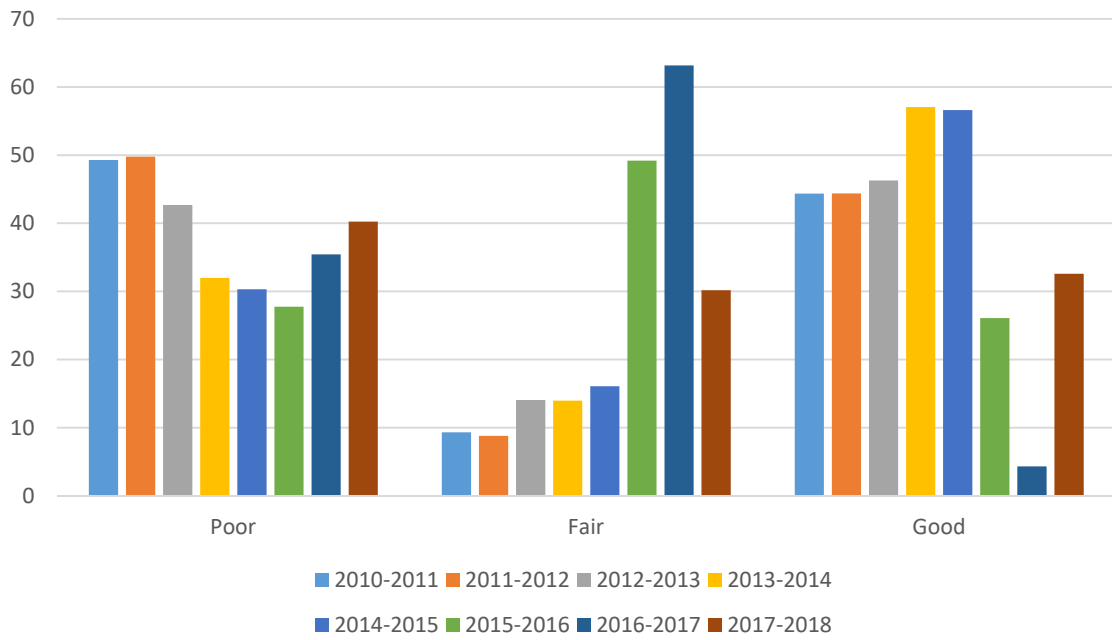


Condition Trends of Non-Trunkline Federal Aid Roads Branch County 2010-2018



ROAD CONDITION REPORT FOR BRANCH COUNTY

Condition Trends of Trunkline Federal Aid Roads Branch County 2010-2018

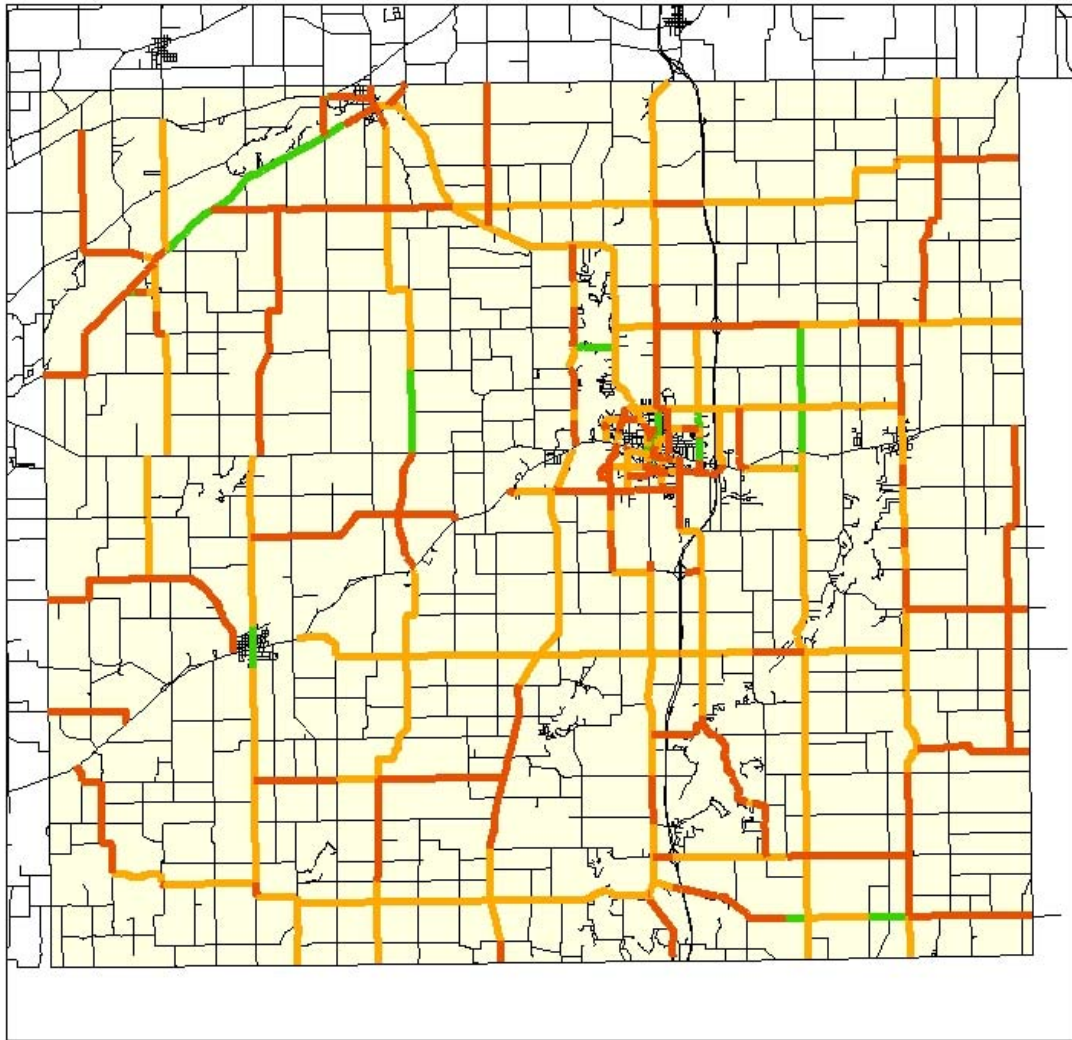


The bar graphs above illustrate the history of the rated quality of roads in Branch County over the course of eight years. It should be noted that due to slight discrepancies in total mileage reported from 2010 to 2013 in previous years, definite trends can only be inferred for the last five rating periods. Generally, though the amount of roads in good condition decreased until the most recent rating period, which shows an increase from the last, especially for trunkline roads. While in the past there did appear to be a trend of decrease in the mileage of Poor rated roads for both trunkline and non-trunkline, the latest trend is upward for both, though the increase overall is lower in the last rating period. The decrease in Fair rated roads along with the increase in Good rated roads could be indicative of more effort being put toward preventive maintenance. This would be consistent with the application of better asset management practice. If current funding levels remain unchanged, focus should continue to be placed on maintenance of roads in Fair and Good condition to minimize any increase in the number of Poor roads. This should be balanced by the county’s road agencies investing in replacement of the worst roads as funding permits in order to decrease the amount of Poor roads countywide so as to improve the overall state of their roads.

The following maps show the location and condition of federal aid roads in Branch County.

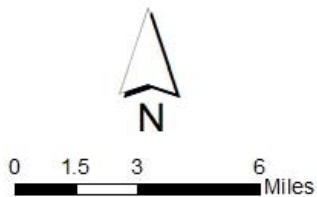
ROAD CONDITION REPORT FOR BRANCH COUNTY

Branch County Non-Trunkline Federal Aid Road Conditions 2017 - 2018



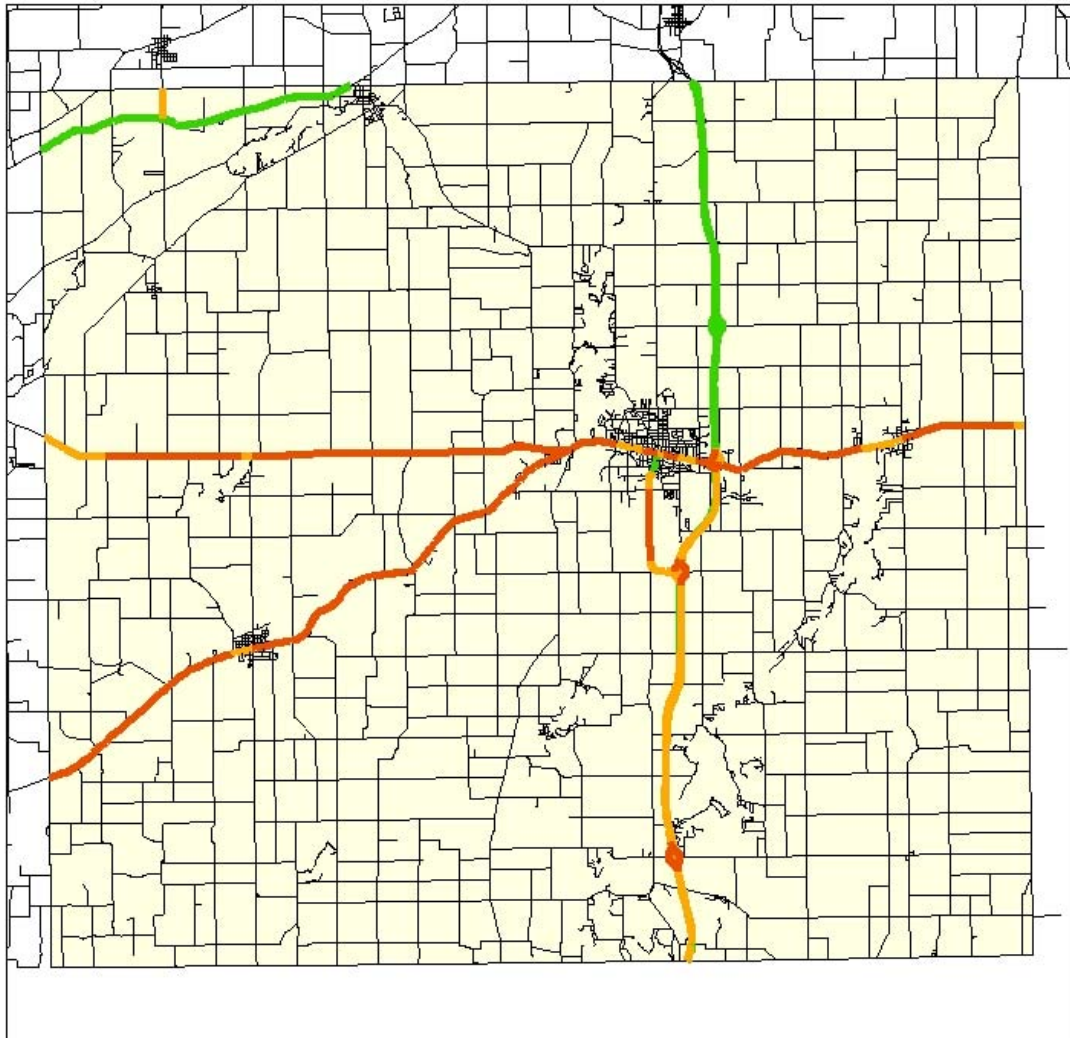
PASER Road Conditions

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



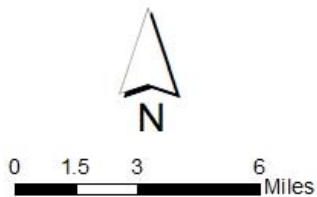
ROAD CONDITION REPORT FOR BRANCH COUNTY

Branch County State Trunkline Road Conditions 2017 - 2018



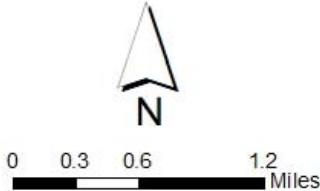
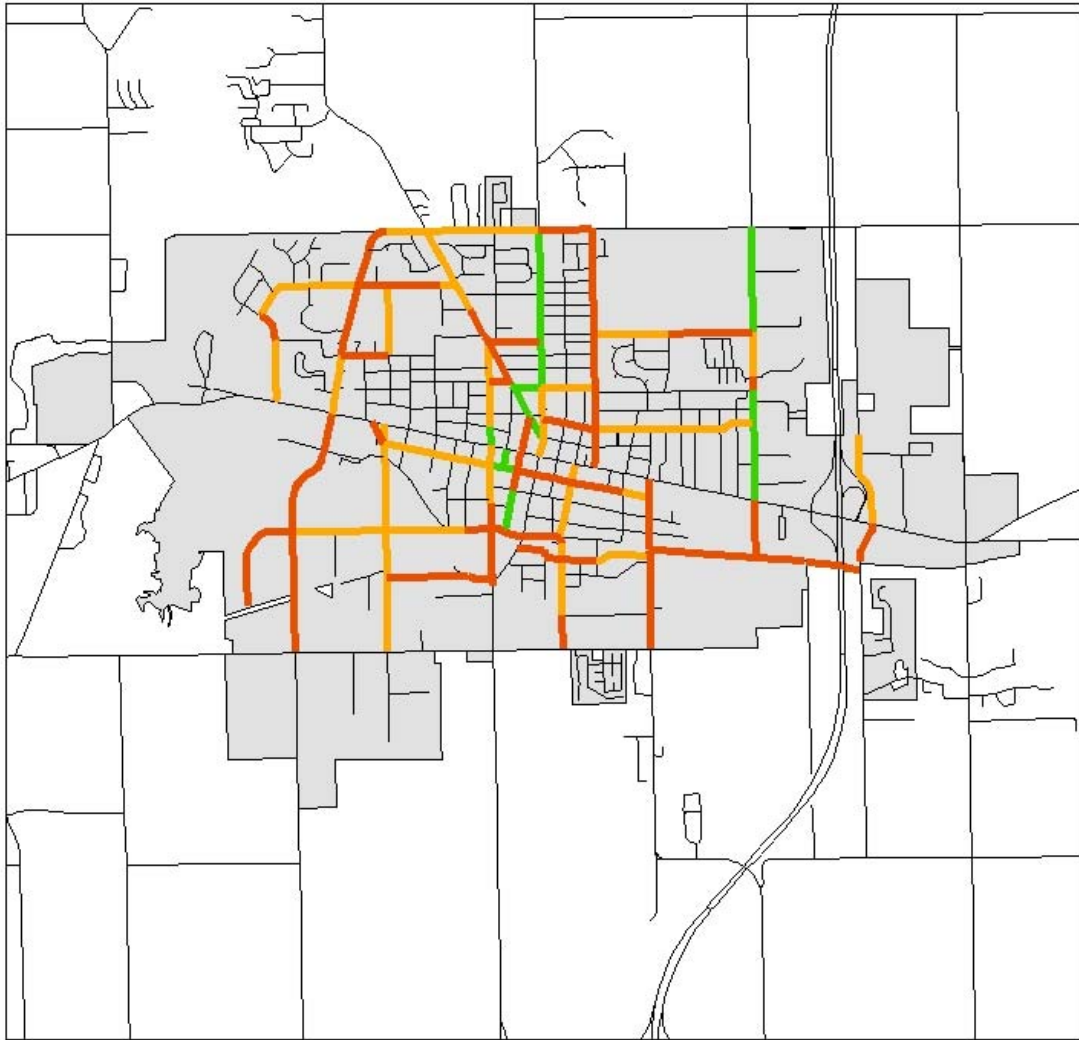
PASER Road Conditions

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



ROAD CONDITION REPORT FOR BRANCH COUNTY

City of Coldwater Federal Aid Road Conditions 2017 - 2018



PASER Road Conditions

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



ROAD CONDITION REPORT FOR BRANCH COUNTY

Contact Information

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

- **Branch County Road Commission**
23 East Garfield Avenue • Coldwater,
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