

FEDERAL AID ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

2021

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ROAD CONDITION REPORT FOR KALAMAZOO COUNTY

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Executive Summary

The Kalamazoo Area Transportation Study assisted in the data collection of road inventory for Kalamazoo County in 2021. 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 Kalamazoo County, there are:

- **737 miles of Federal-aid roads.** This includes roads that are maintained by the Michigan Department of Transportation, the Road Commission of Kalamazoo County, and the cities and villages within the county.
- **184 miles of Trunkline roadways** maintained by the Michigan Department of Transportation
- **399 miles of County roads** maintained by the Road Commission of Kalamazoo County
- **154 miles of City streets** maintained by the incorporated cities and villages in the county

Traditionally, federal aid ratings have been completed over two years, roughly half of each county one year, the remainder the next. Due to restrictions imposed in response to the onset of the COVID 19 pandemic, no federal aid ratings were completed in 2020. To bring the schedule back in line, the entire federal aid system in Kalamazoo County was rated in 2021. This report takes the results of those ratings and compares them with those from 2010 through 2019 to analyze the current status and discern any condition trends of the federal aid road system in 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.

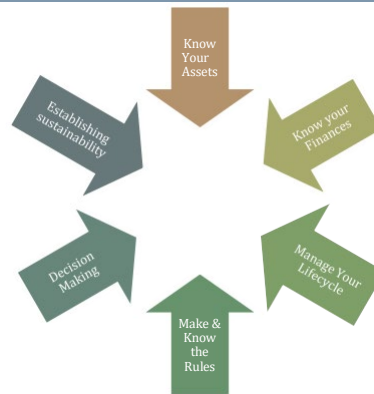
Principles of Asset Management

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 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 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 good to poor on the PASER scale is largely dependent on traffic volume and construction quality.

Regularly recording and charting the PASER rating 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 the 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, reflective, slippage, alligator, and block cracks
- **Patches and Potholes-** Patches are when previous damage has been filled by new 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 segment using a laptop and a GPS receiver. This information includes the road surface type, number of lanes, and condition (PASER rating). Each segment of federal aid road in the county must be rated at least every two years. In most counties, half of the county is collected every other year.

Treatments

Applying a rating system like PASER to a paved network of roads allows for an efficient way to inventory and evaluate those 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 intensive the 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 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.

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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 up to one year old
9 Good	None	Recent Overlay or newly constructed more than 1 year ago
8 Good	Few if any longitudinal cracks and then only on paving joints. Occasional transverse cracks, widely spaced (40' or greater). All cracks sealed or tight	Recent sealcoat on pavement over a year old or new cold mix. Little or no maintenance required.
7 Fair	Very slight or no raveling, surface shows some traffic wear. Transverse cracks open less than 1/4", spaced 10' to 40' apart, little or no crack erosion. Few if any patches in good condition.	First signs of aging. Maintain with routine crack filling.
6 Fair	Slight raveling, polishing or flushing. Transvers cracks, open 1/4"-1/2", spaced six to ten feet apart. First sign of block cracking - blocks are large and stable. Occasional patching in good condition.	Shows signs of aging. Sound structural condition. Could extend life with sealcoat.
5 Fair	Moderate to severe raveling. Longitudinal and transverse cracks open greater than 1/2". Secondary cracking. First signs of longitudinal cracks near pavement edge. Moderate block cracking (1' - 5' blocks). 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.

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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	\$20,000	\$4,000
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 historical cost, lifespan, and rating of pavement treatment types that have been used in Kalamazoo County. These treatments range from the minimal (overband crack filling) to major construction. As noted, these treatments and costs are historical; they may not reflect the most recent bids, and 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 (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 to prevent 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 1/2 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

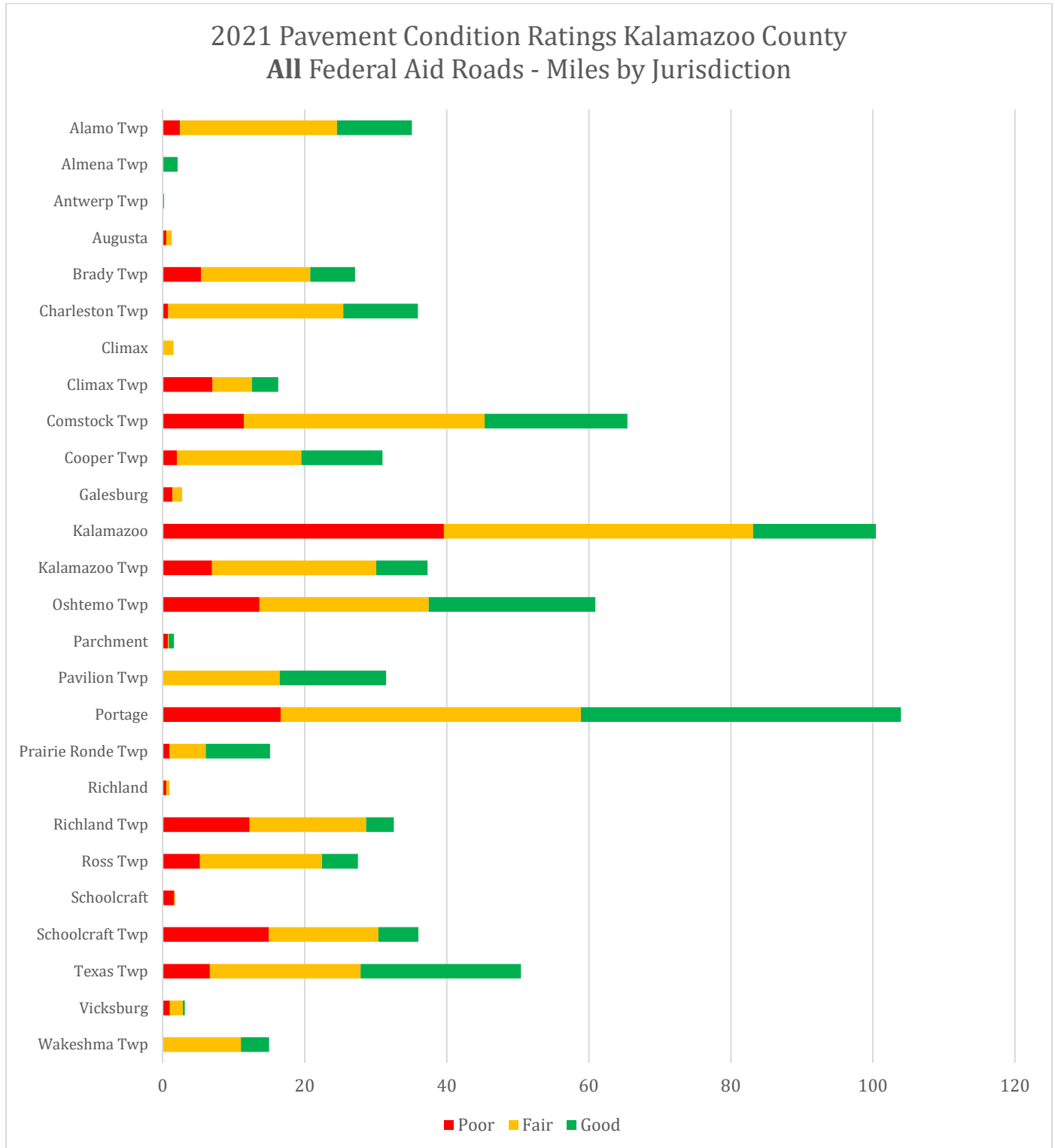
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expensive to place than microsurfacing.

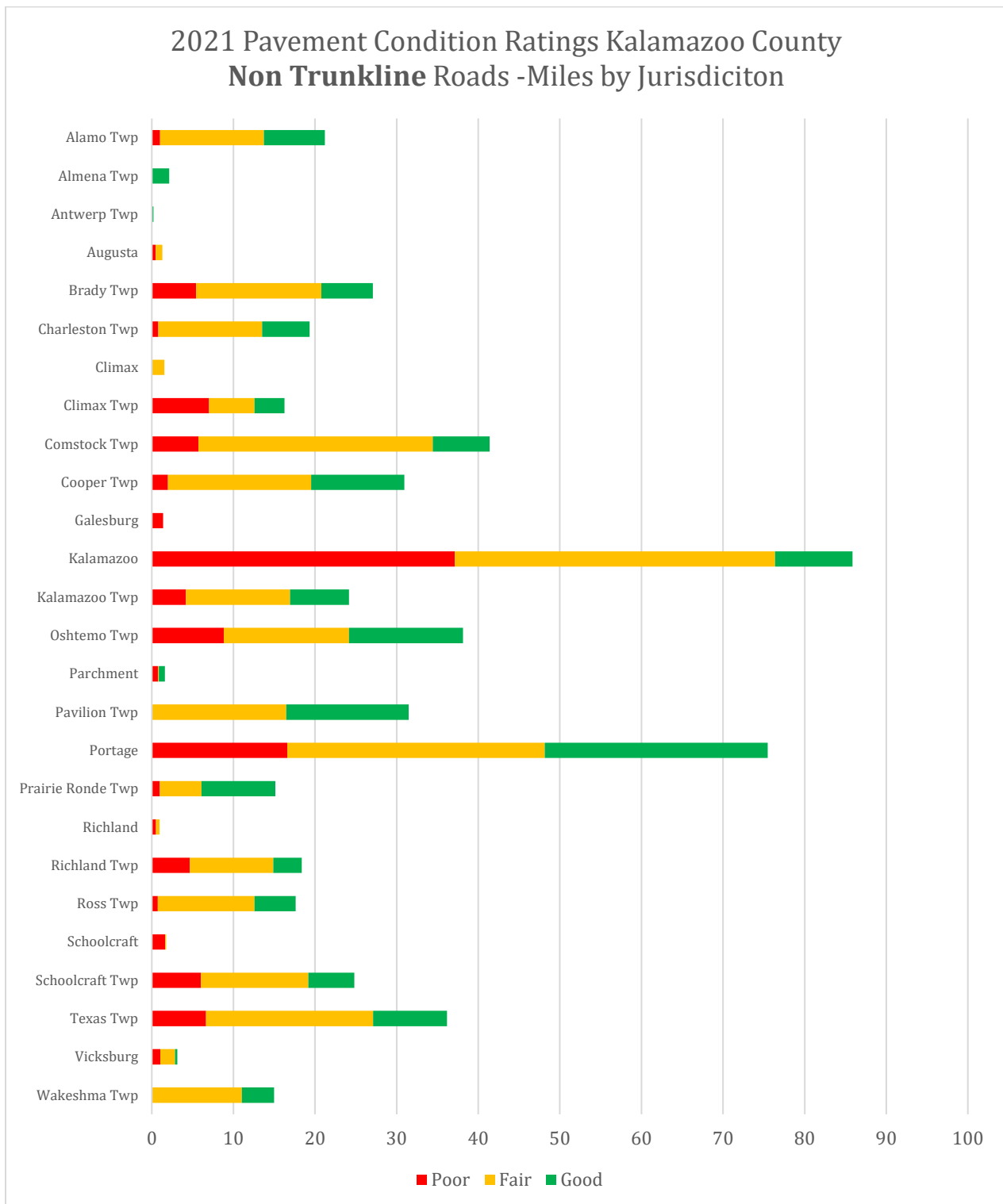
- Hot In-Place Asphalt Recycling heats up existing pavement to soften the binder. The heated material is then removed and mixed with additional virgin asphalt binder and used to repave the roadway.
- Full-Depth Reconstruction is the replacement of the entire roadway structure, including the base and subbase, with new material. It is used only when there is no salvage value to any of the existing components.

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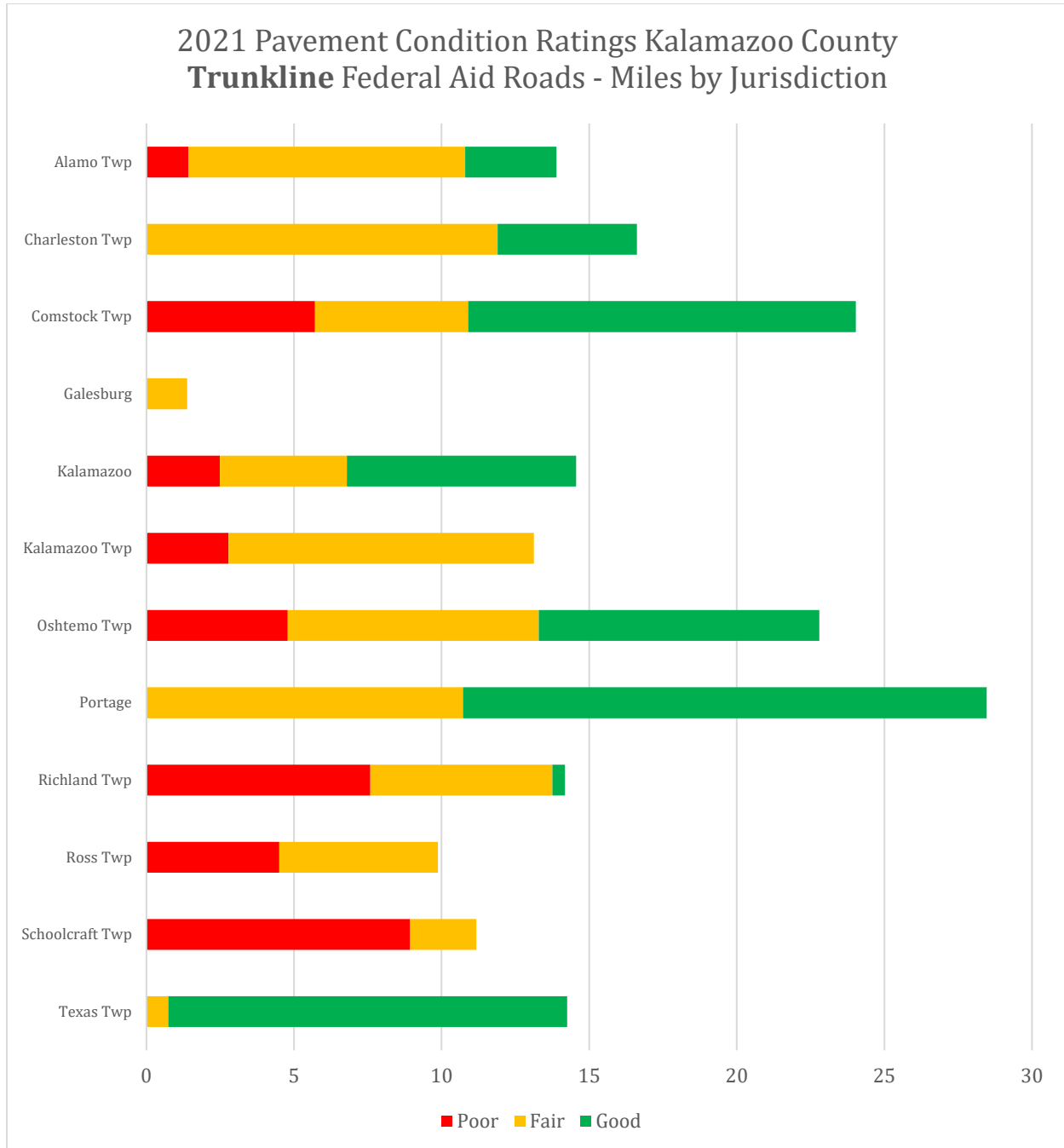
Summary of 2021 Ratings



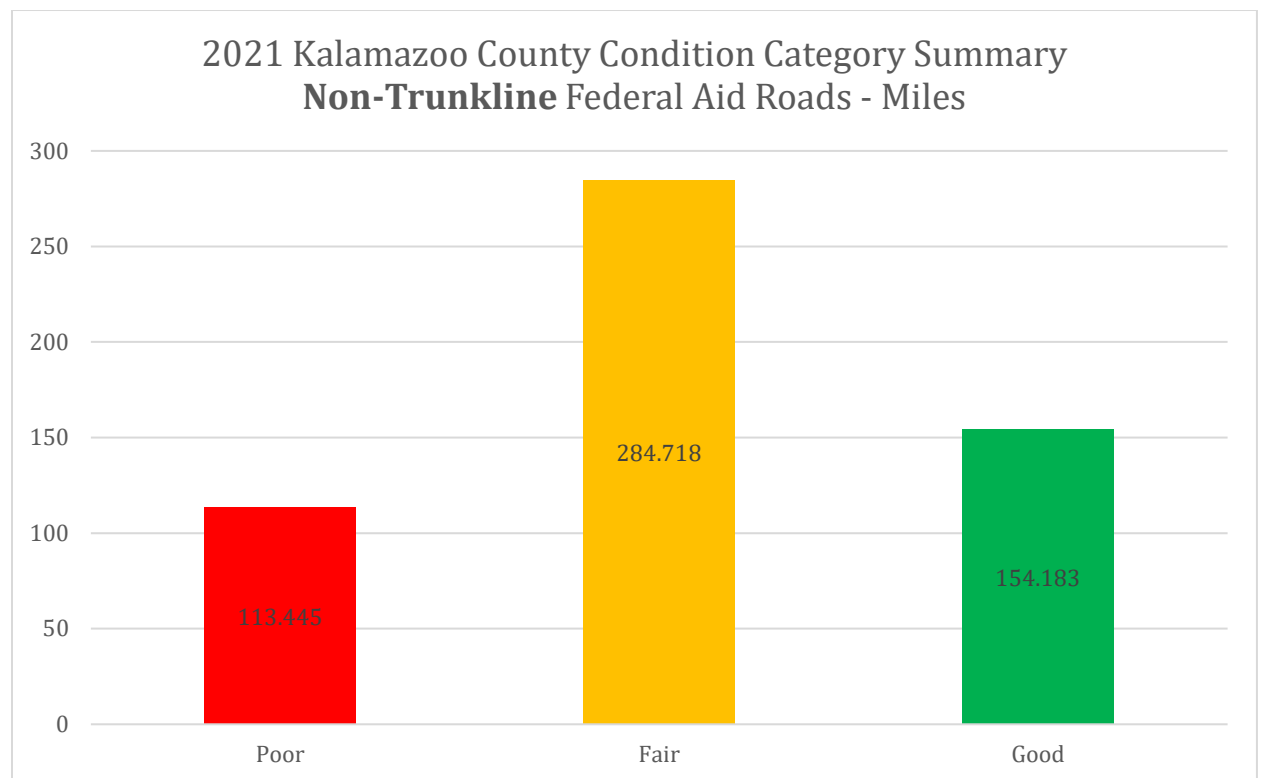
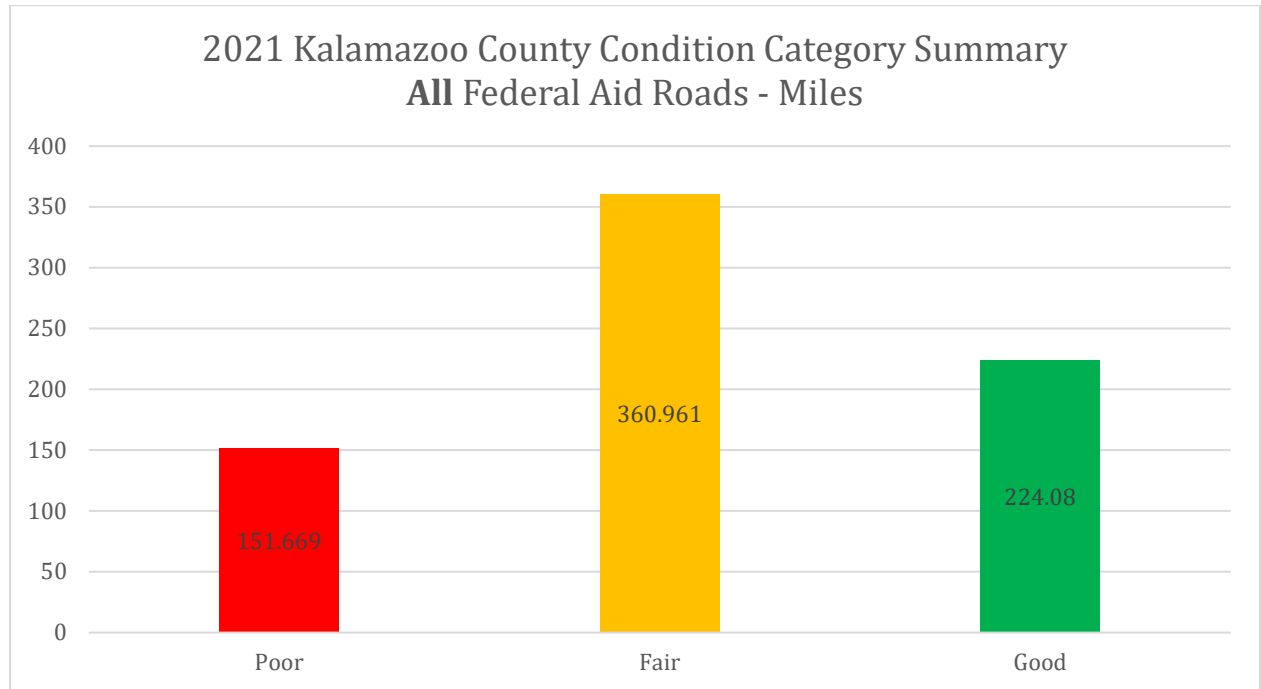
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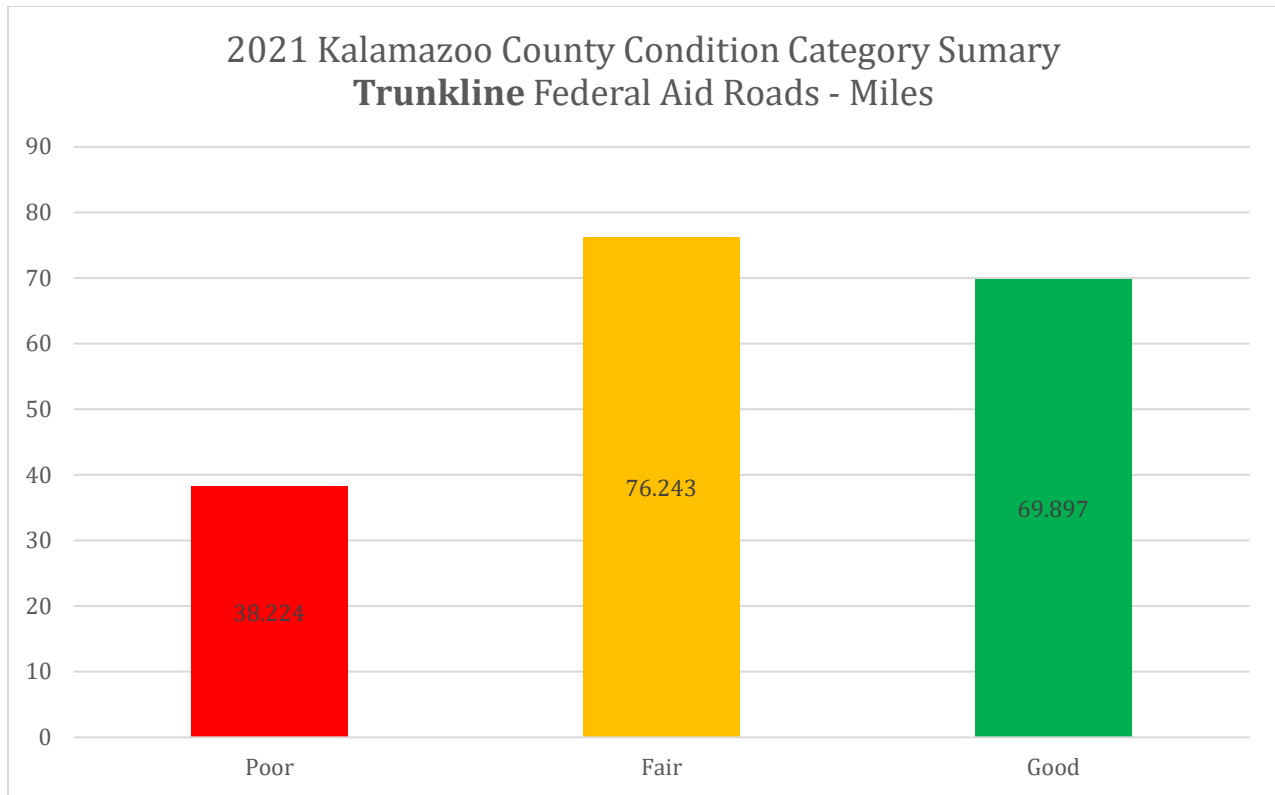
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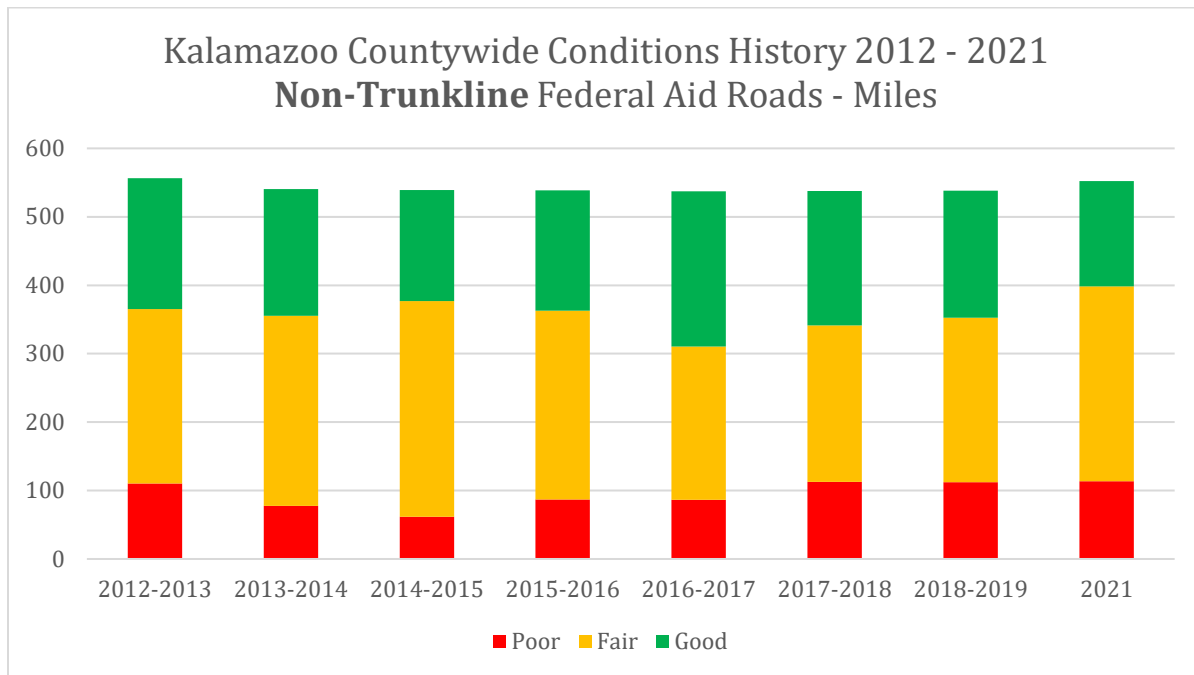
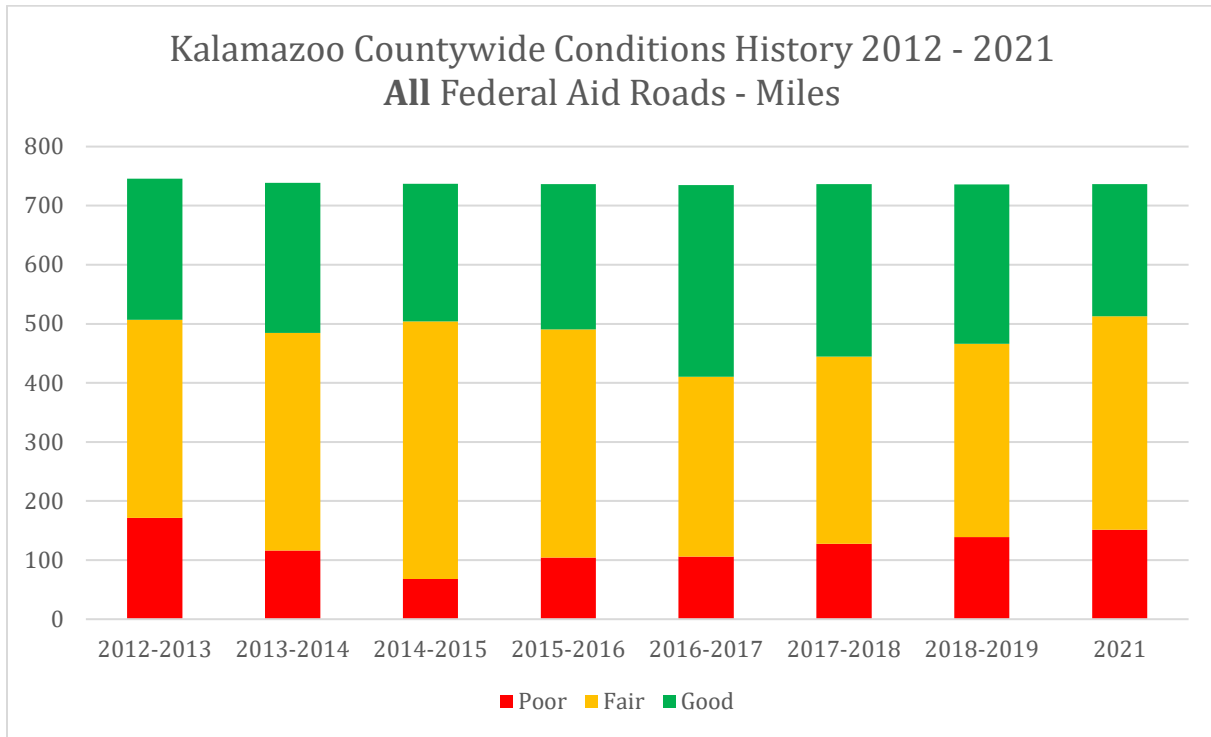


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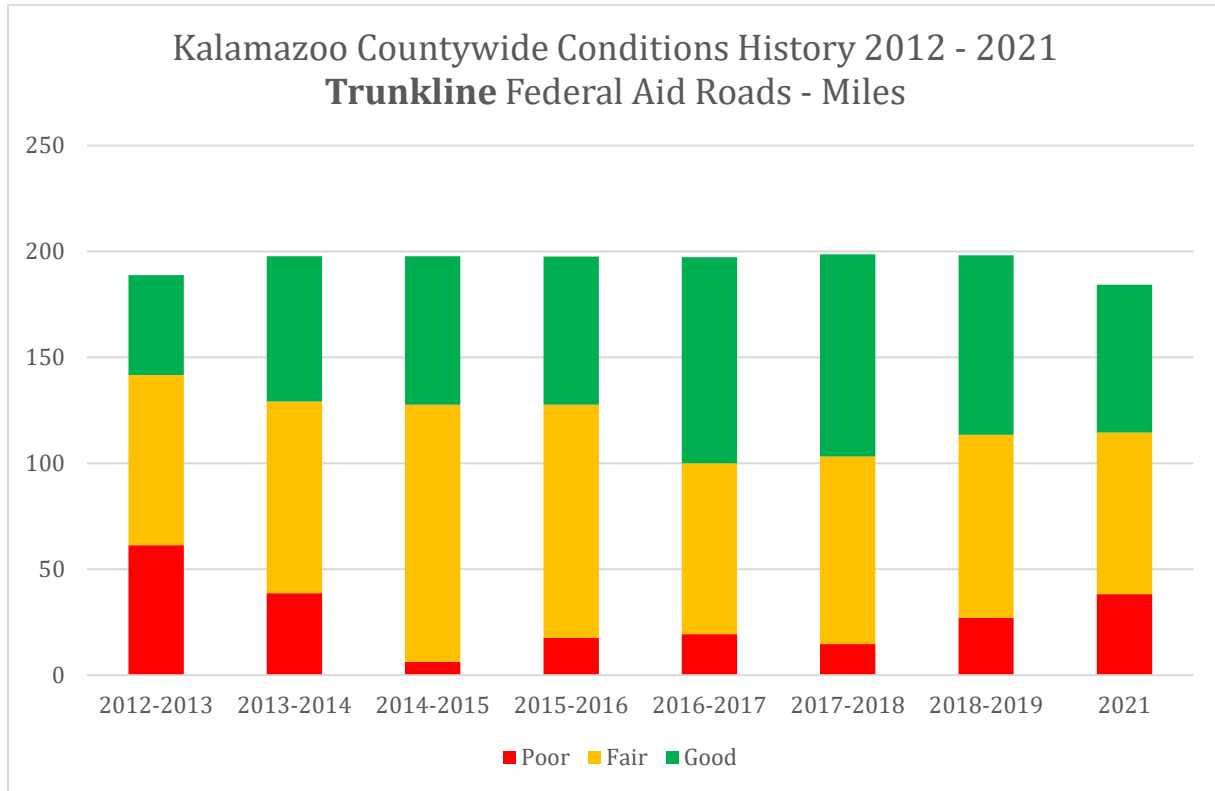


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Federal Aid Conditions History and Trends



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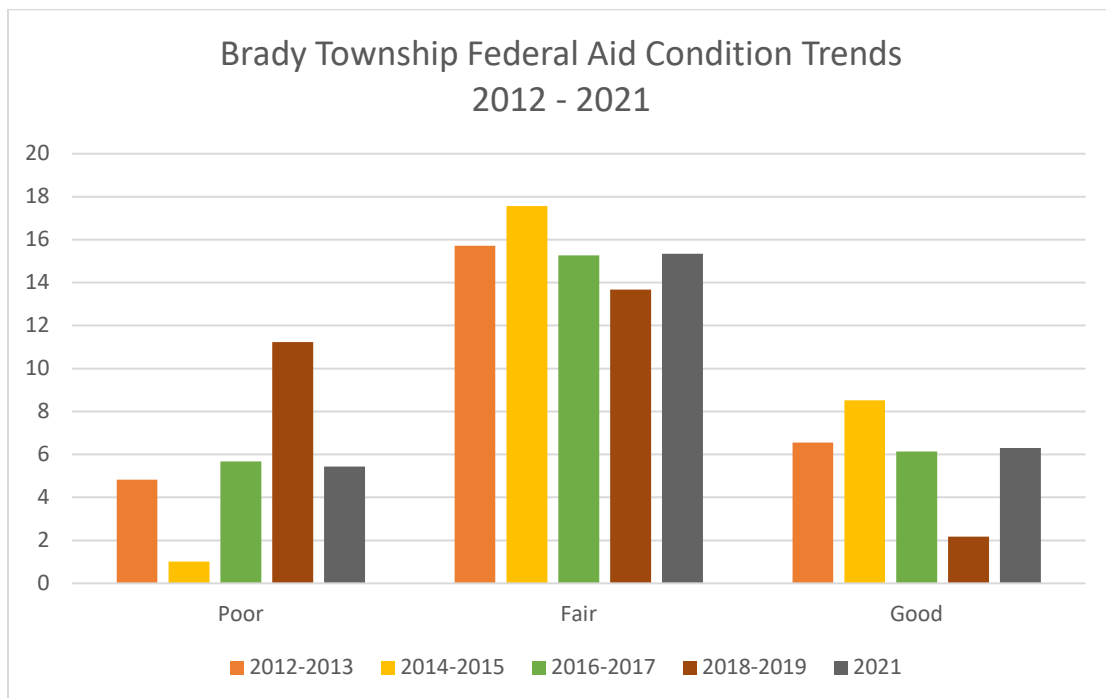
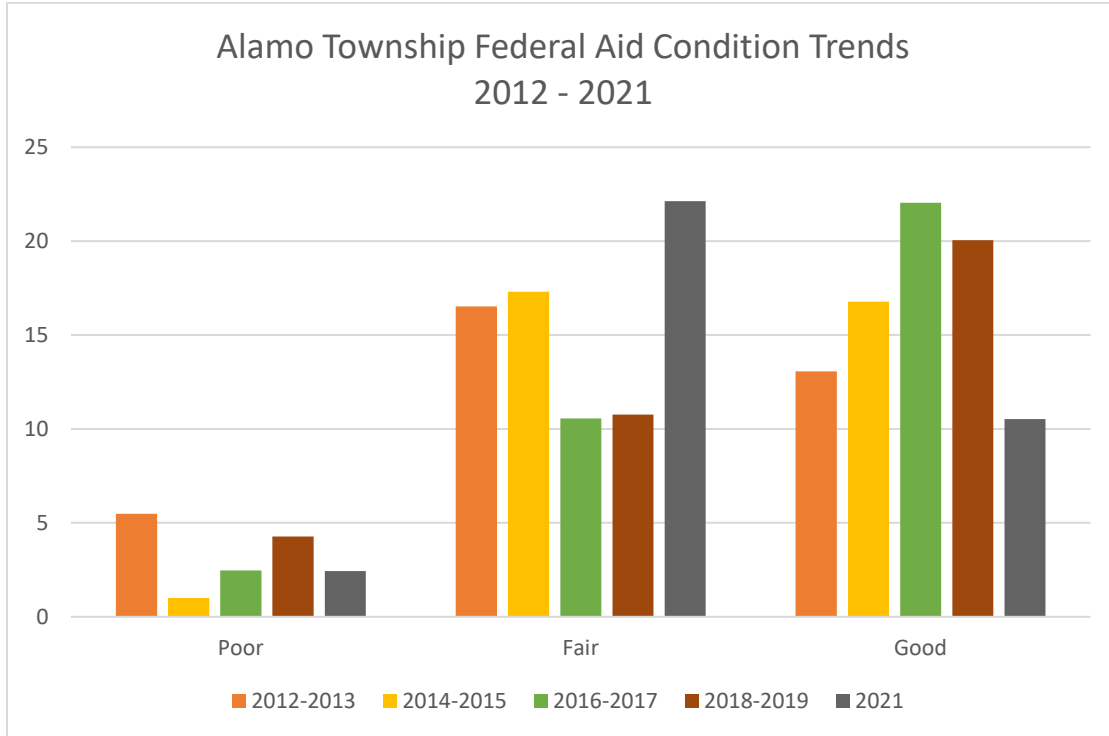


The charts above reflect the progression of Kalamazoo County’s federal-aid roads as-rated over a nine-year period. From 2012 to 2015, there was a steady decrease in the number of federal aid road miles that are rated as Poor. From 2015 to 2021 there has been a slight but steady increase. The increase in Poor rated road mileage for the 2017-2021 period was due almost entirely to trunkline roads. The quantity of Good rated road mileage has decreased each rating period since 2016-2017, while Fair rated mileage has increased correspondingly for the same periods.

When looking at city/township breakdowns from 2012 to 2021 on the following pages of this document, it is apparent that in most jurisdictions, the majority of federal aid roads are rated Fair and Good, with Poor rated roads constituting a smaller percentage of the total miles. The notable exception is the City of Kalamazoo, where Good rated roads constitute the smallest portion.

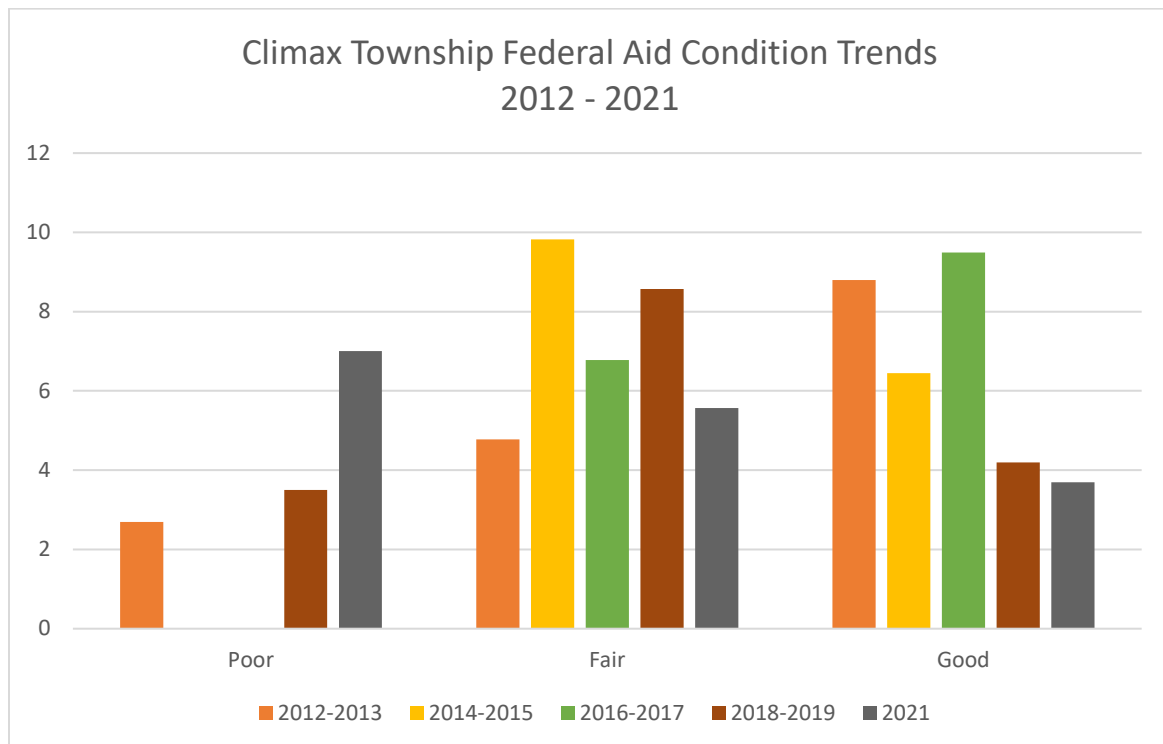
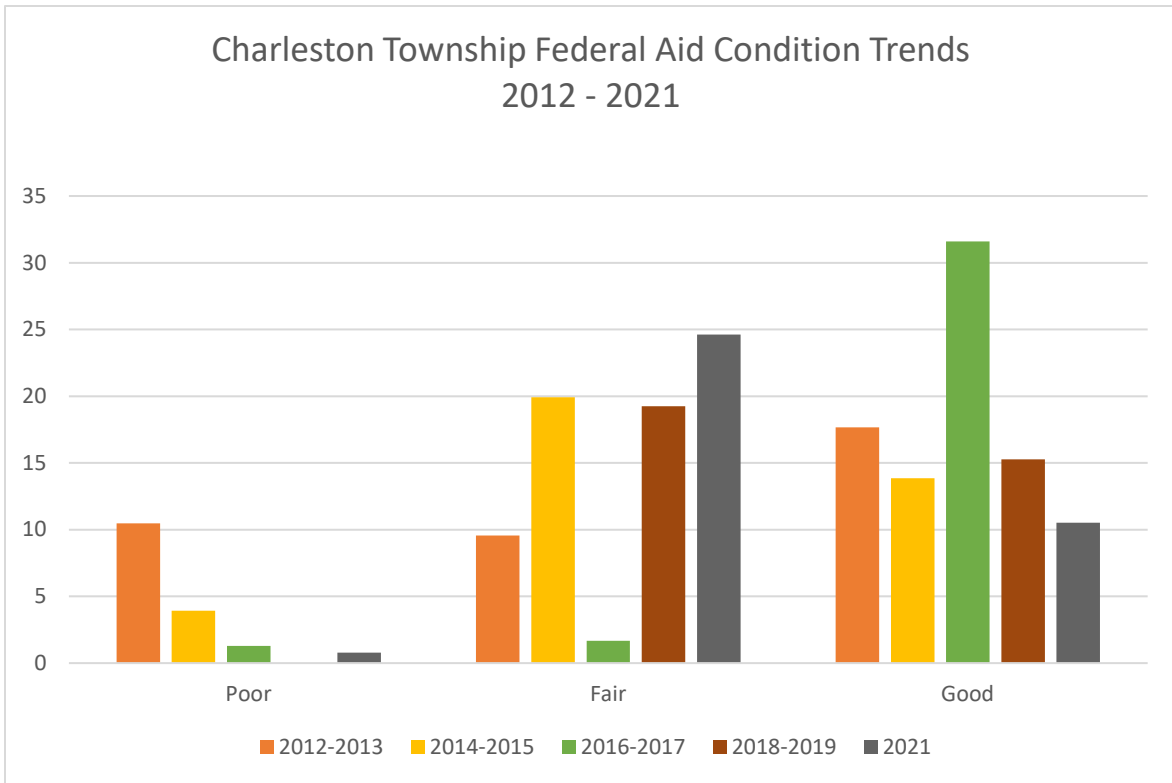
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2012-2021 Federal Aid Road Condition Trends



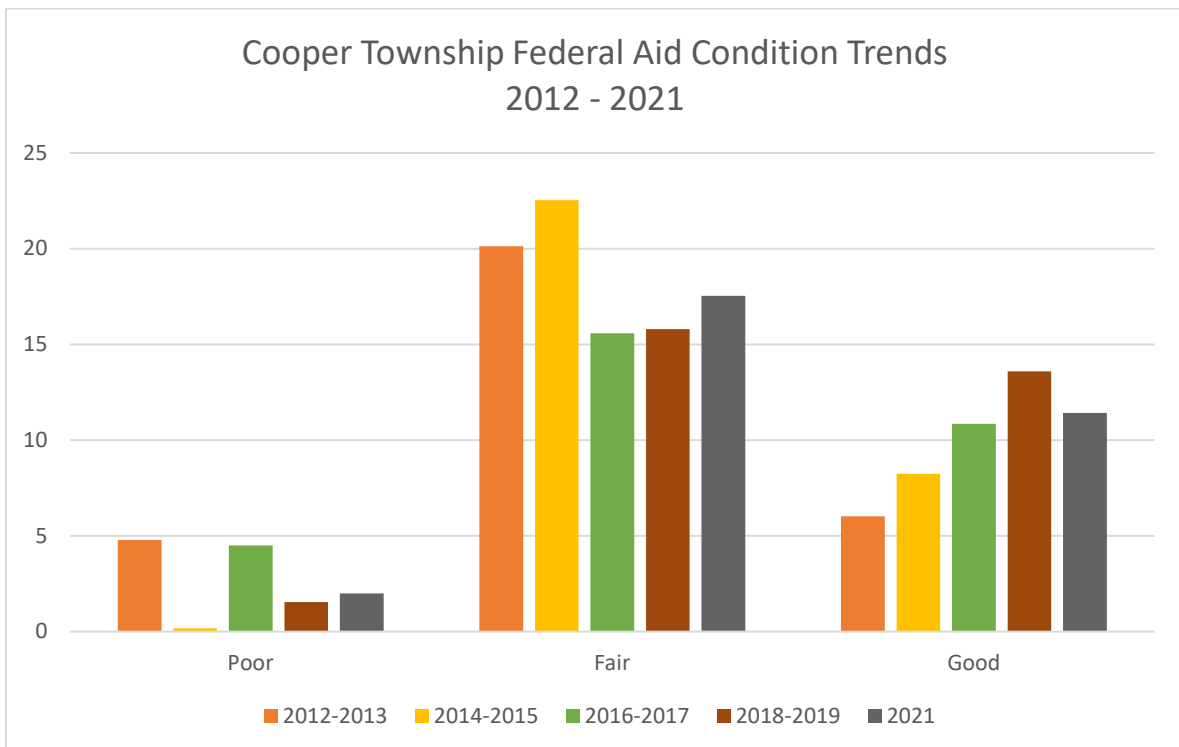
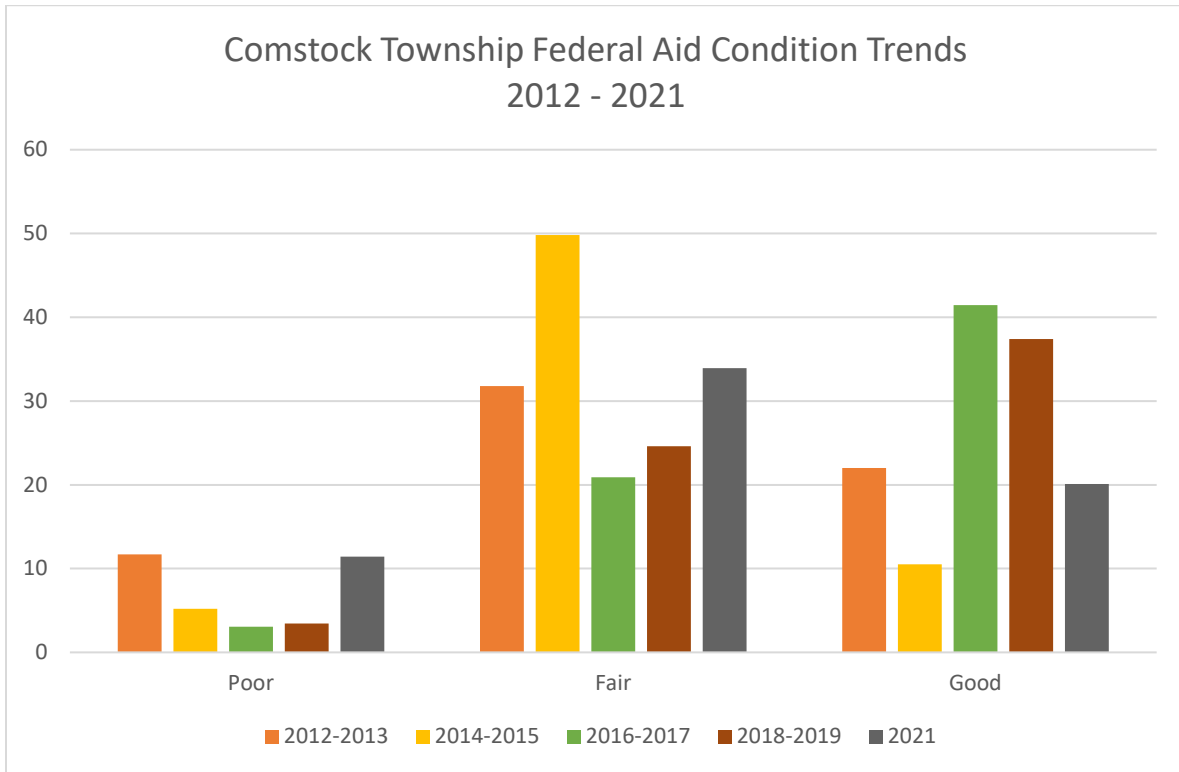
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2012-2021 Federal Aid Road Condition Trends



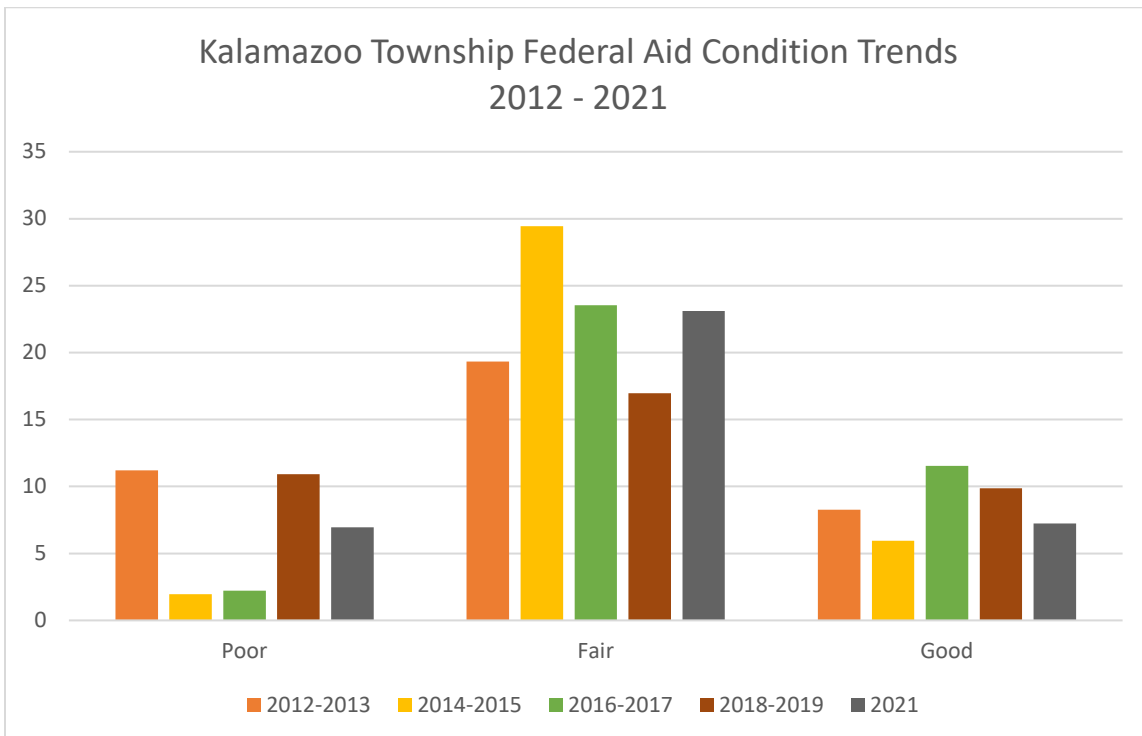
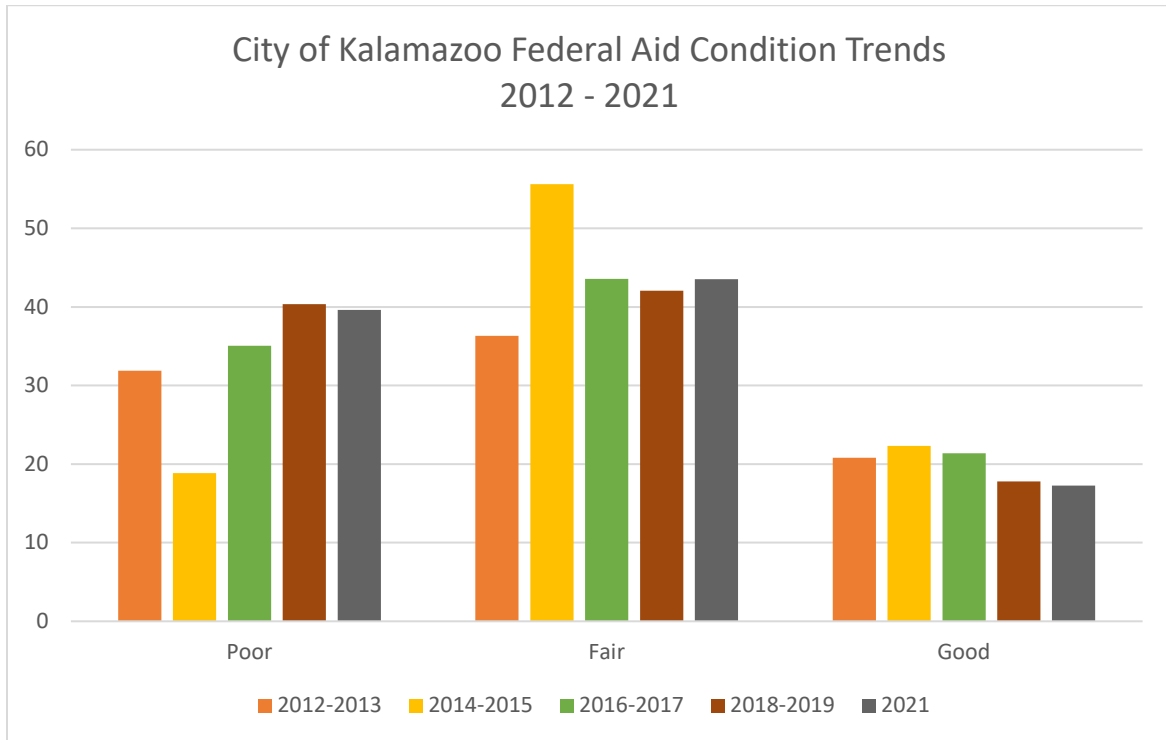
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2012-2021 Federal Aid Road Condition Trends



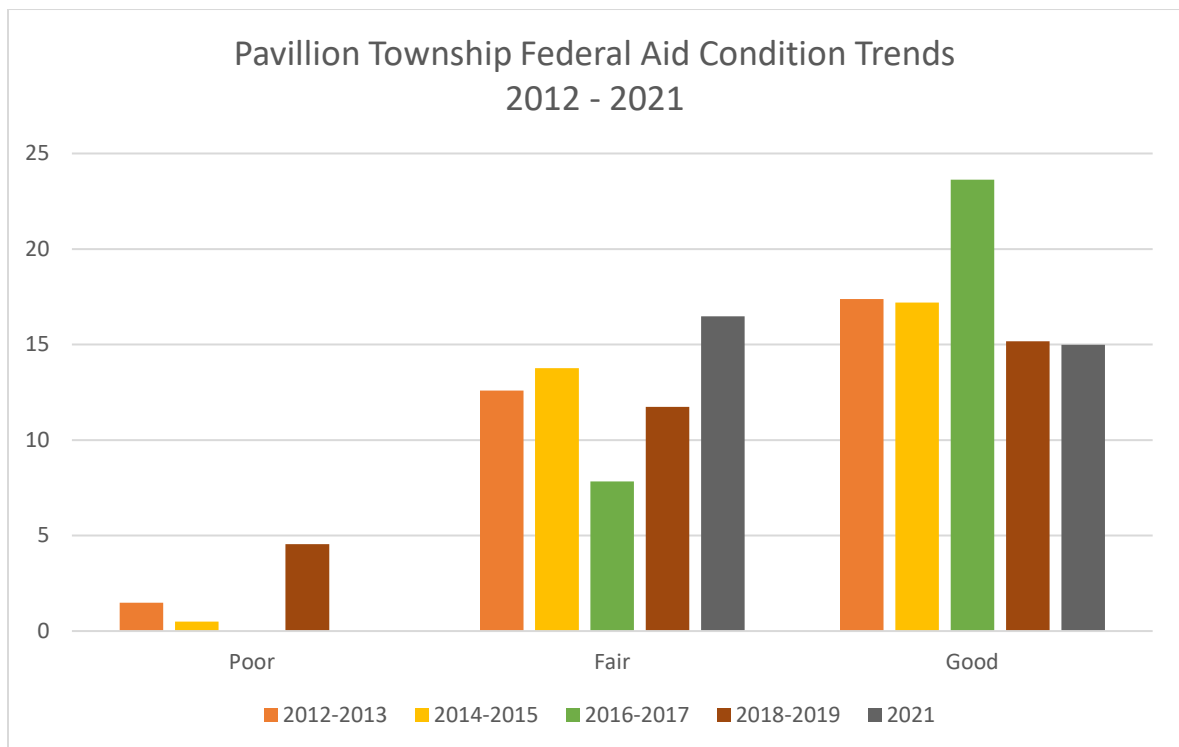
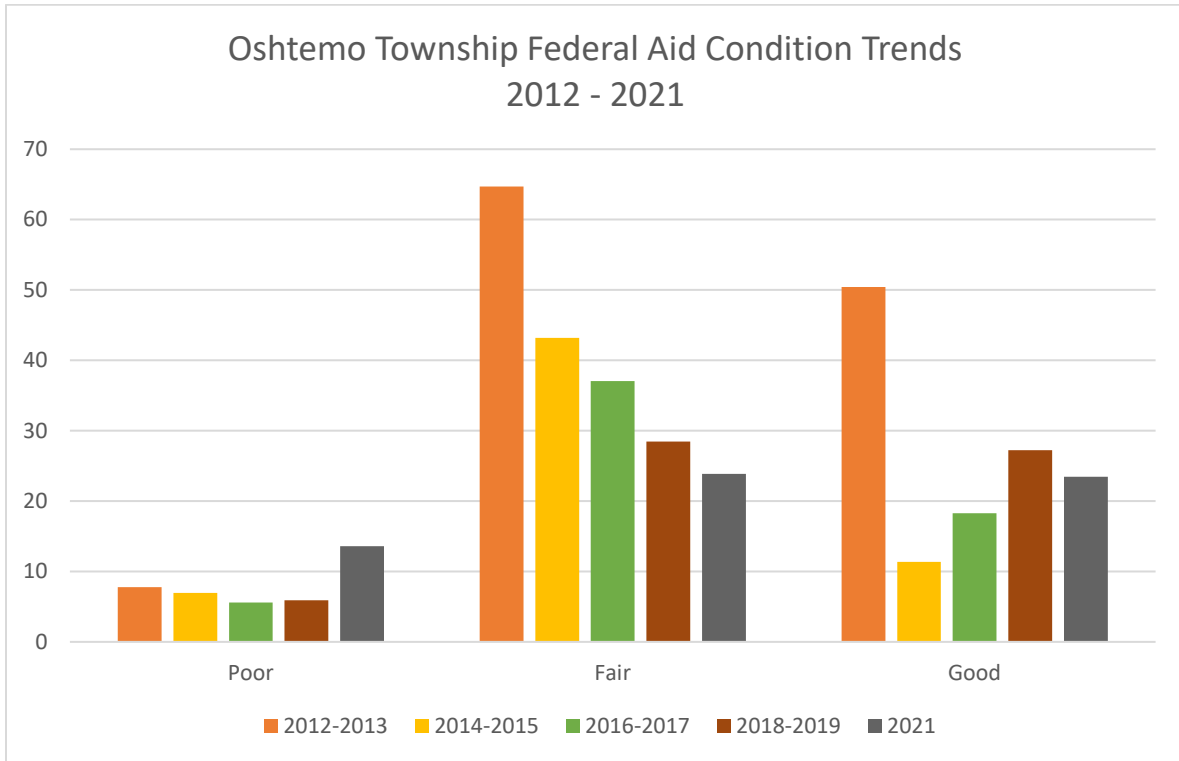
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2012-2021 Federal Aid Road Condition Trends



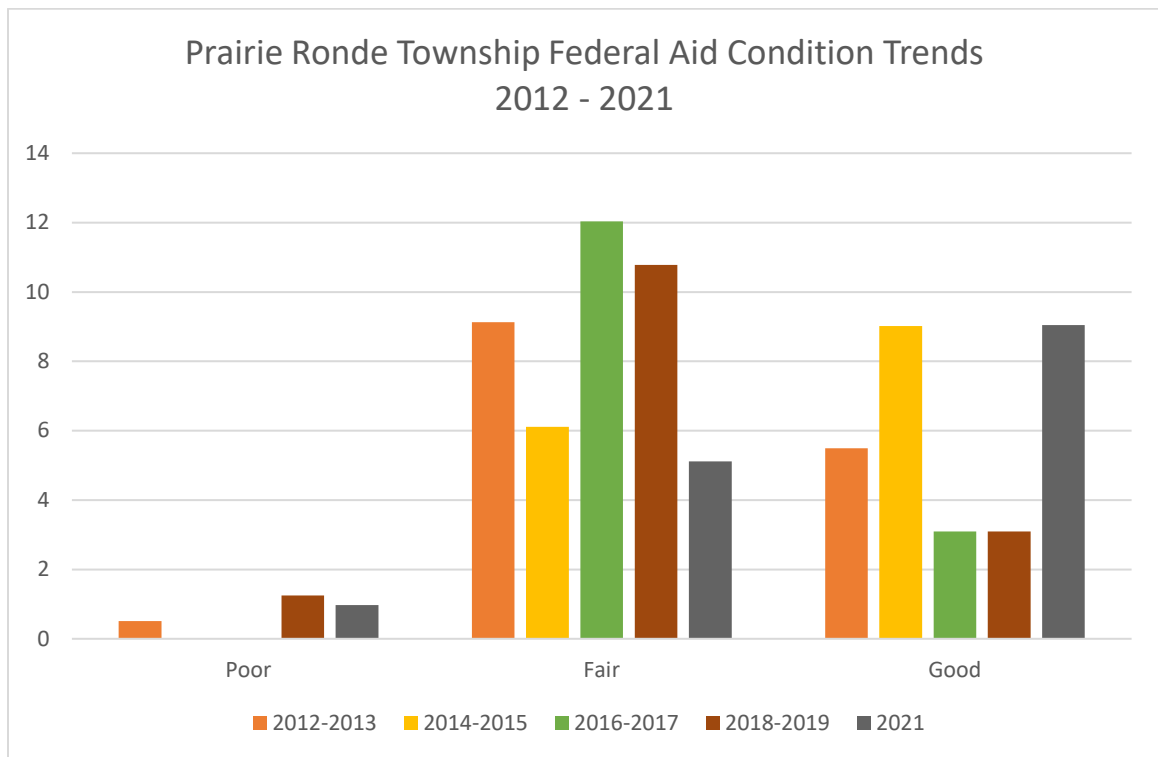
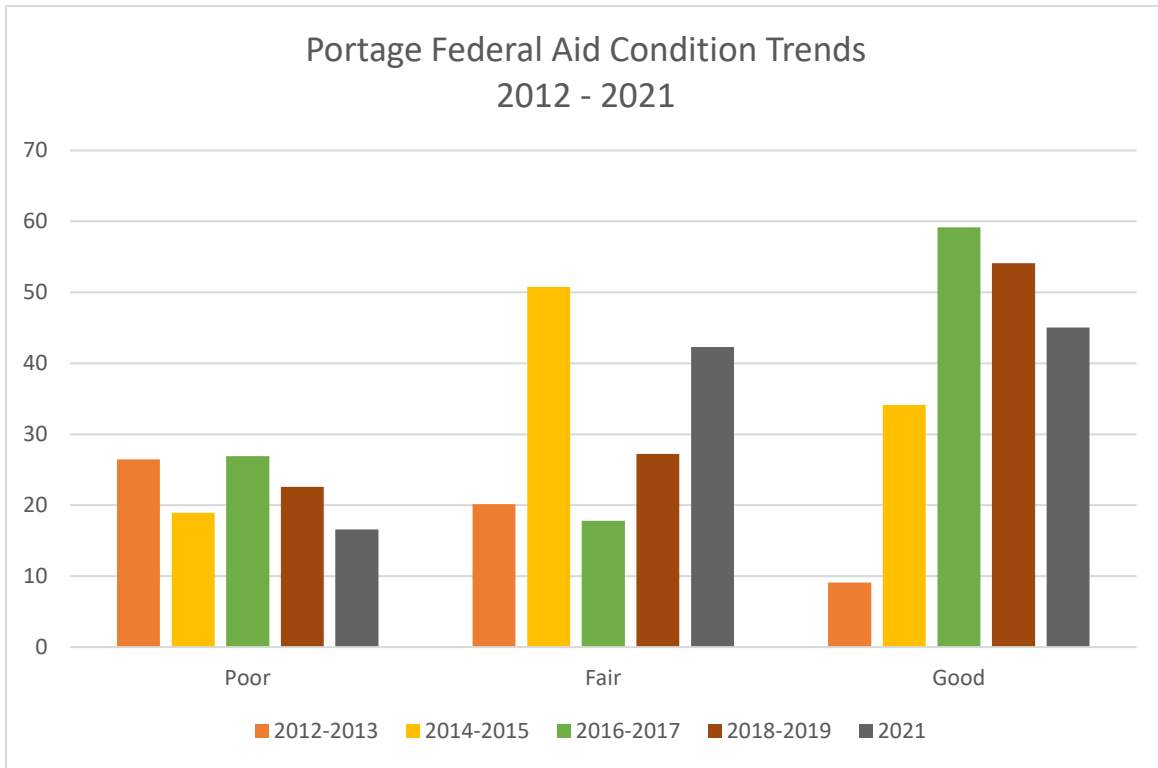
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2012-2021 Federal Aid Road Condition Trends



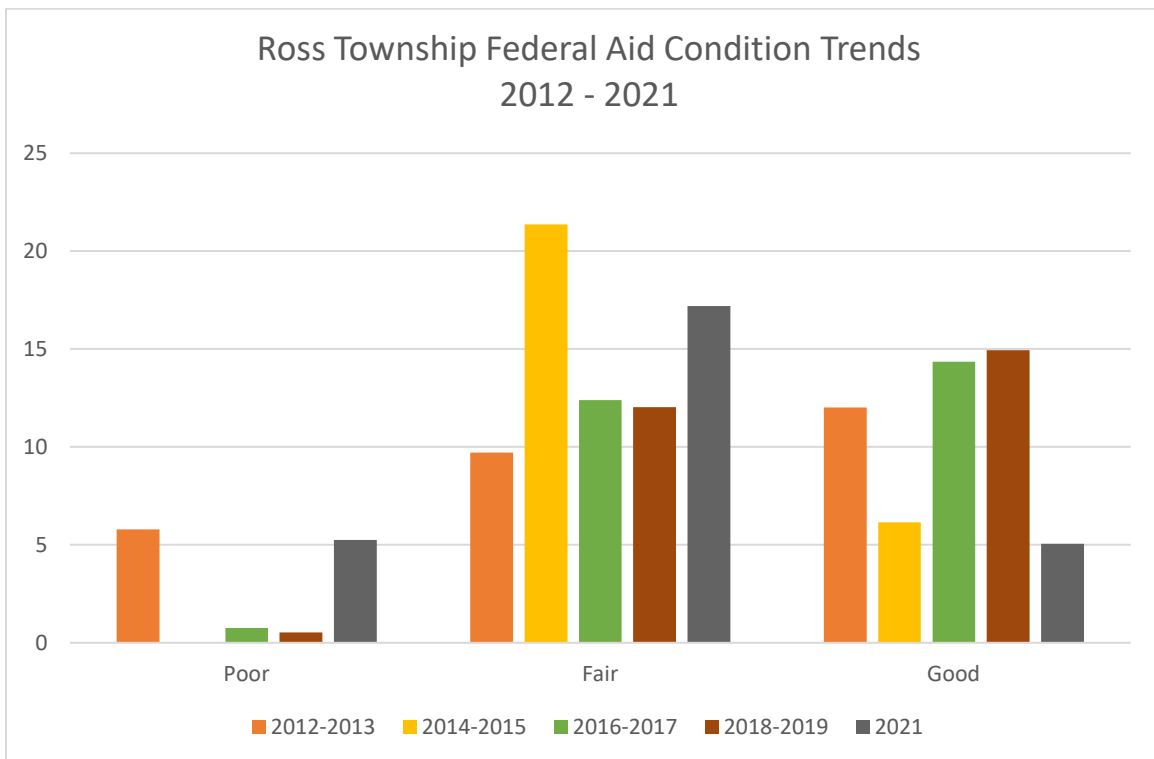
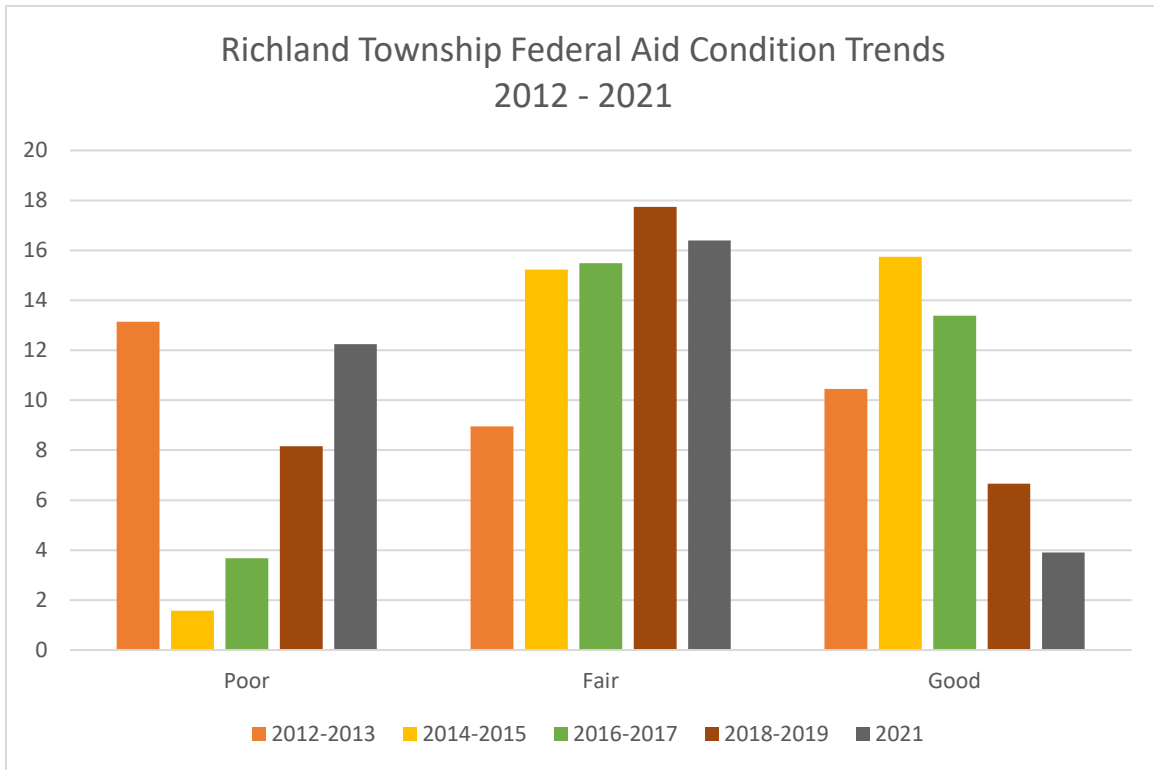
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2012-2021 Federal Aid Road Condition Trends



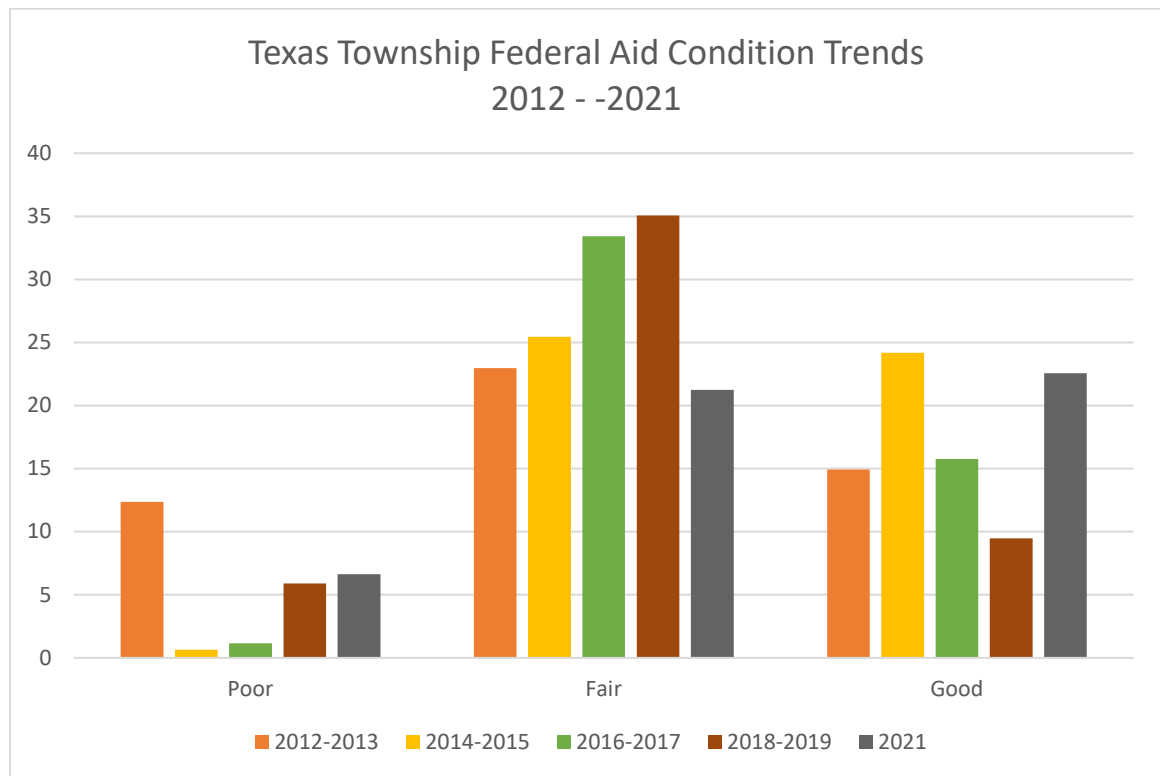
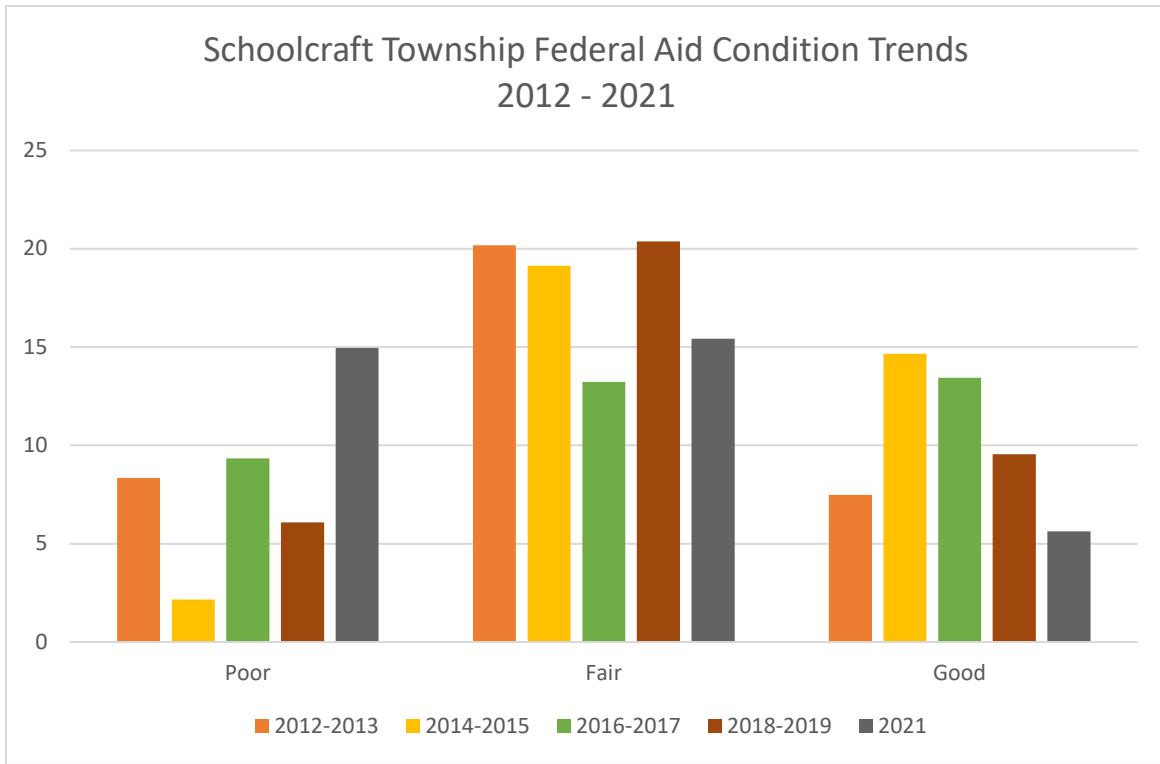
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2012-2021 Federal Aid Road Condition Trends



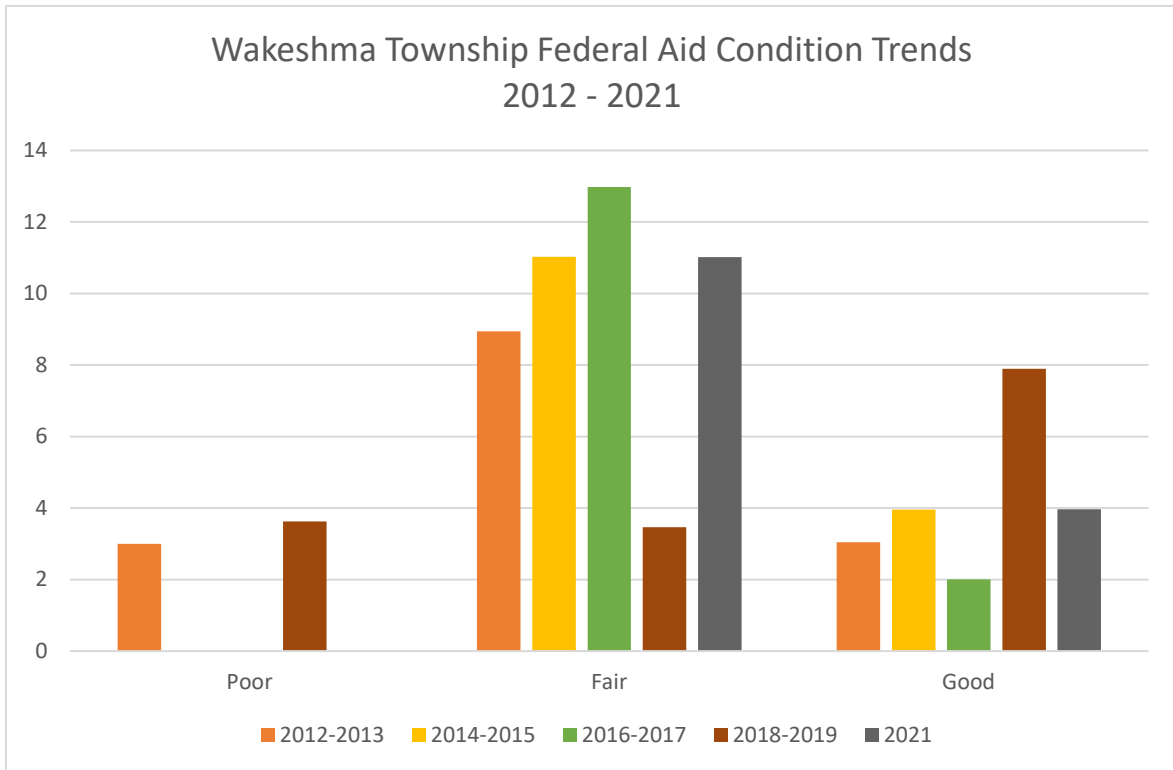
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2012-2021 Federal Aid Road Condition Trends



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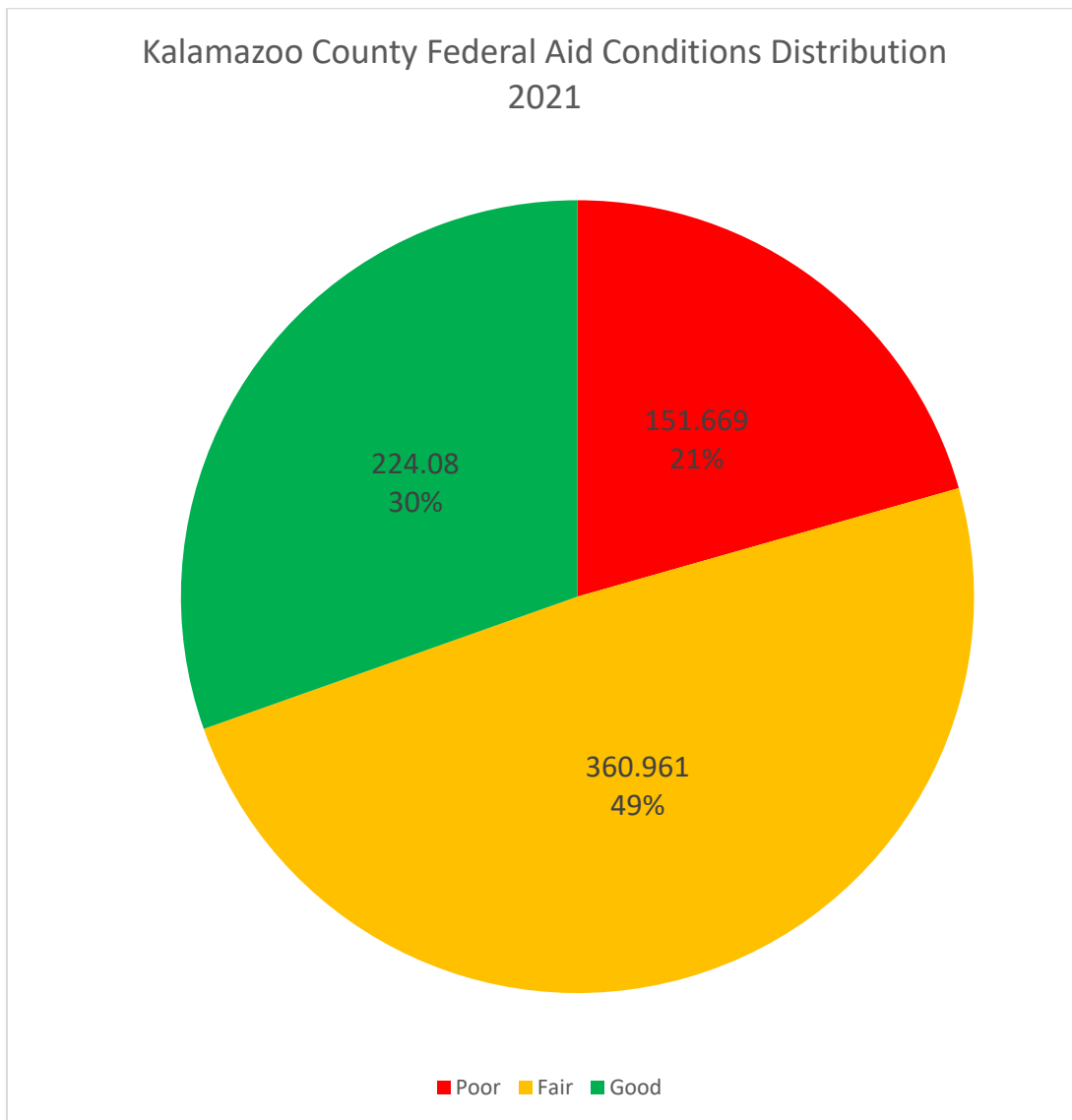
2012-2021 Federal Aid Road Condition Trends



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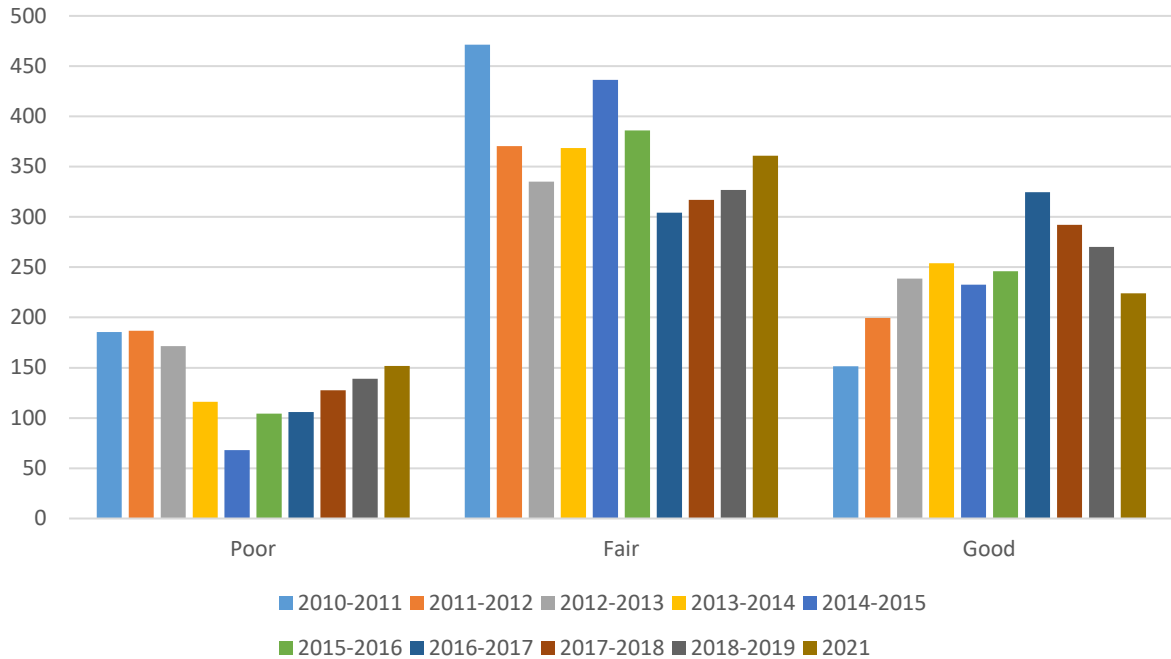
Pavement Condition Summary

Of the 737 miles of federal-aid roads that were rated in 2021, approximately 152 miles were rated as being in Poor condition, 321 miles Fair, and 224 miles Good. Thus, 79% of federal aid road miles in Kalamazoo County are rated Fair or Good.

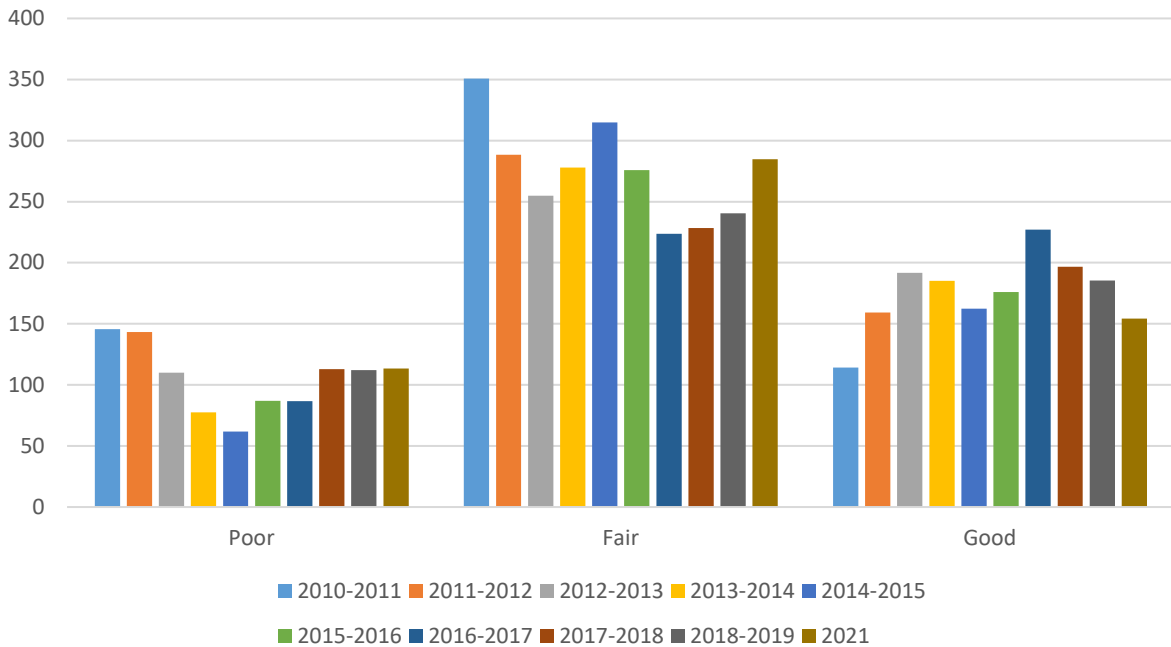


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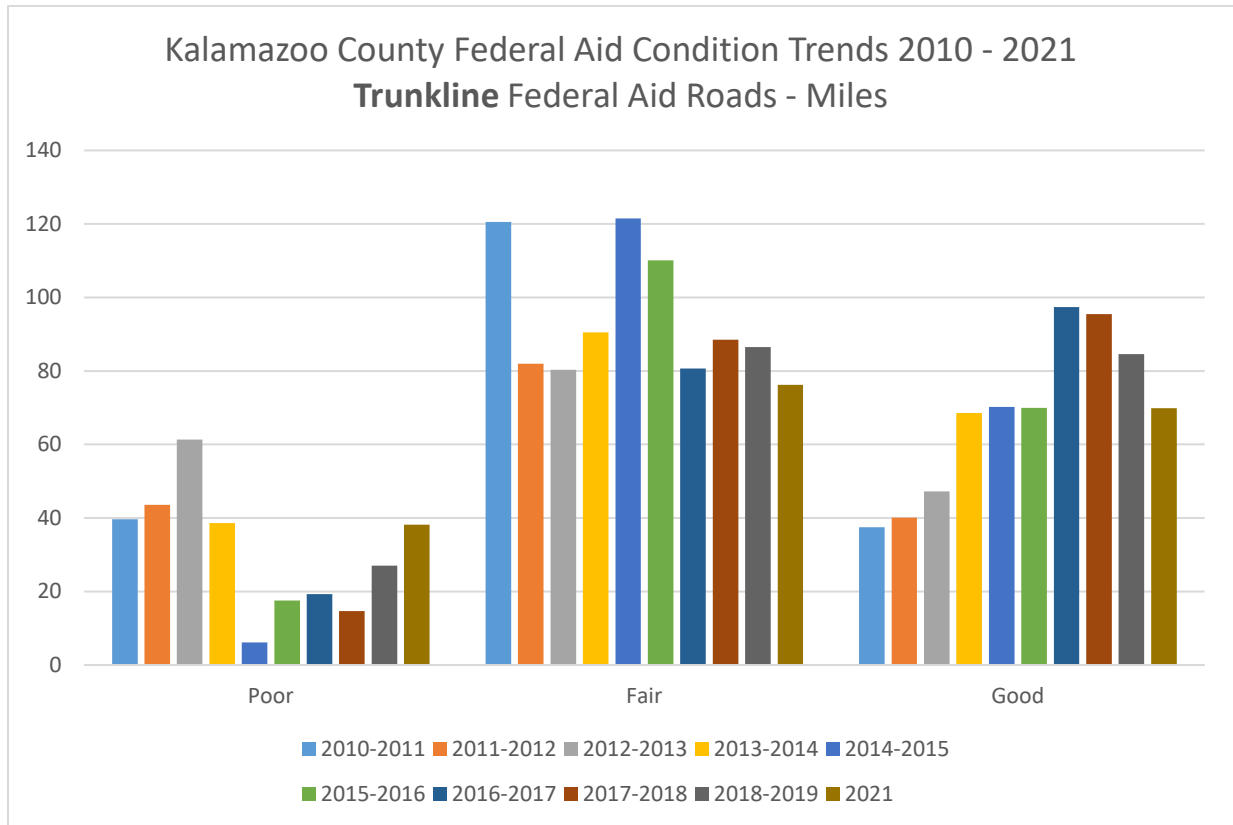
Kalamazoo County Federal Aid Condition Trends 2010-2021
All Federal Aid Roads - Miles



Kalamazoo County Federal Aid Condition Trends 2010 - 2021
Non-Trunkline Federal Aid Roads - Miles



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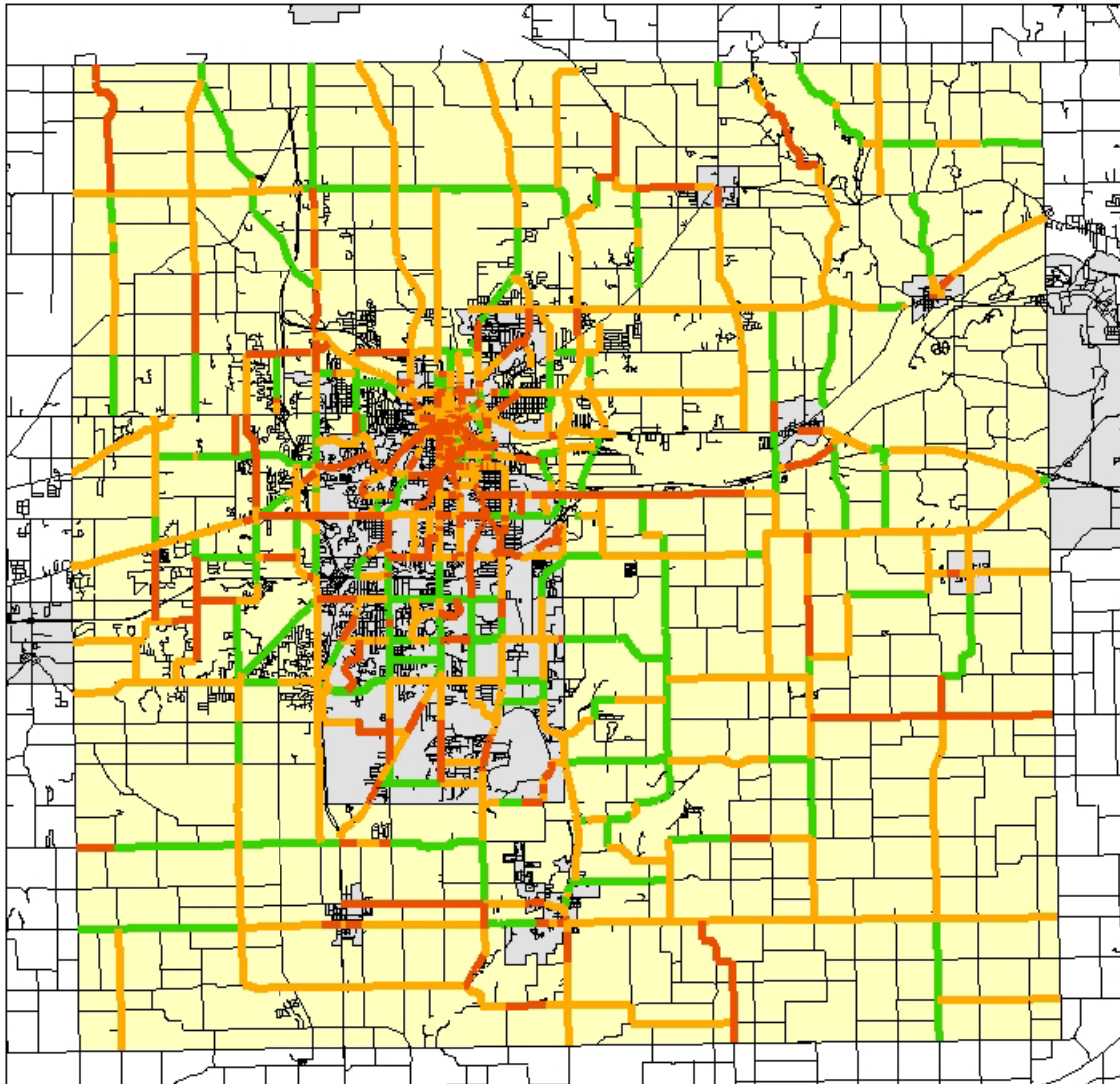


The bar graphs above show the Poor, Fair, and Good categories as rated for Federal Aid roads in Kalamazoo County since 2010. From these charts it appears that road agencies in Kalamazoo County have generally made good efforts at maintaining or increasing the quantity of Fair and Good rated road miles, however there has been a trend over the last five rating periods of slight increases in Poor rated mileage – due mainly to trunkline ratings. Kalamazoo County road agencies should continue to focus on maintaining roads in Fair and Good condition in order to keep the amount of Poor roads relatively low countywide. It is important for the road agencies in Kalamazoo County to administer capital preventative maintenance treatments that are less expensive before higher cost structural improvements become necessary.

The maps on the following pages illustrate the location and condition of federal aid roads in Kalamazoo County.

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Kalamazoo County Non-Trunkline Federal Aid Road Conditions 2021



0 1.5 3 6 Miles

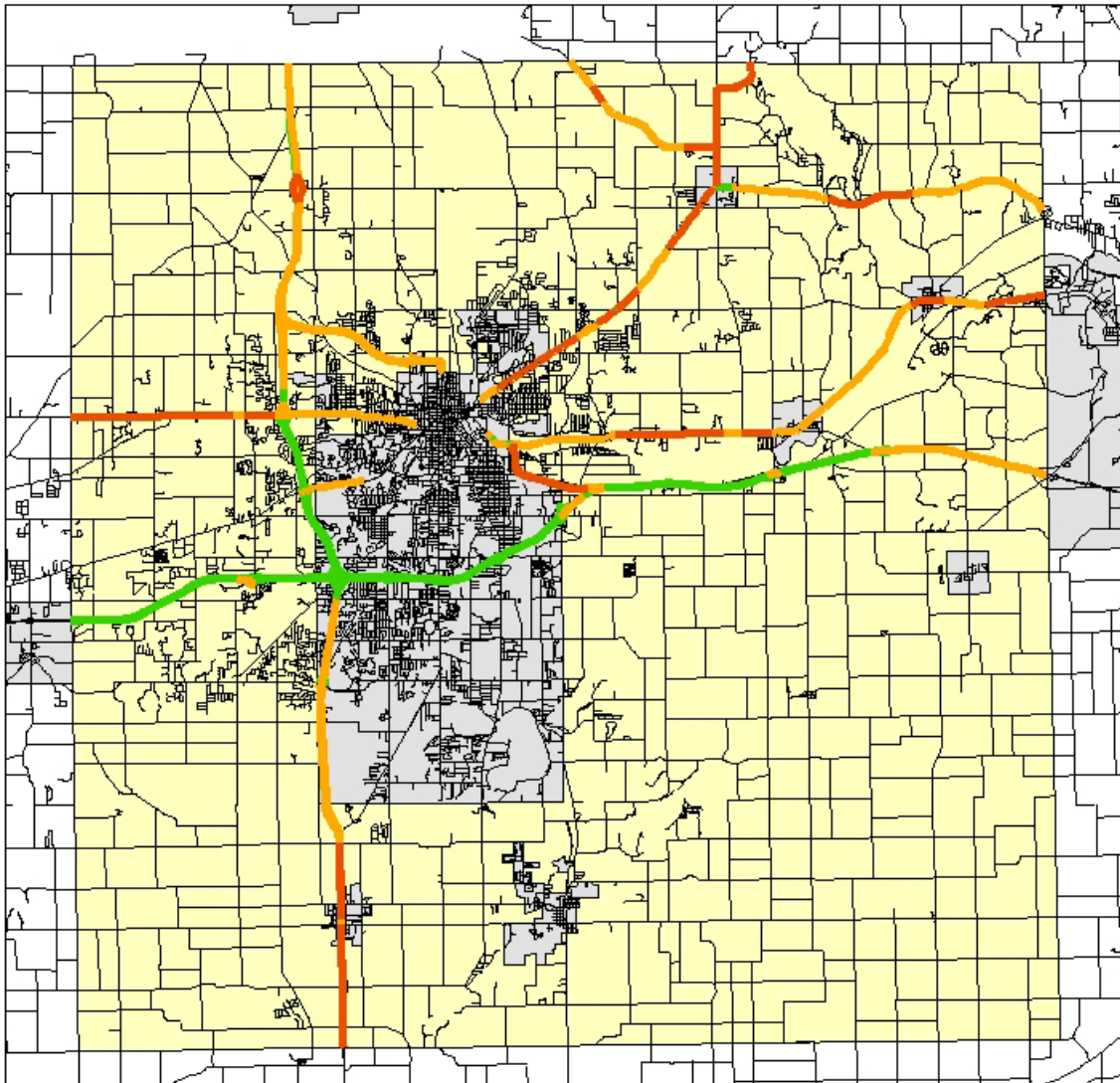
PASER Road Conditions

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



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Kalamazoo County Trunkline Federal Aid Road Conditions 2021



0 1.5 3 6 Miles

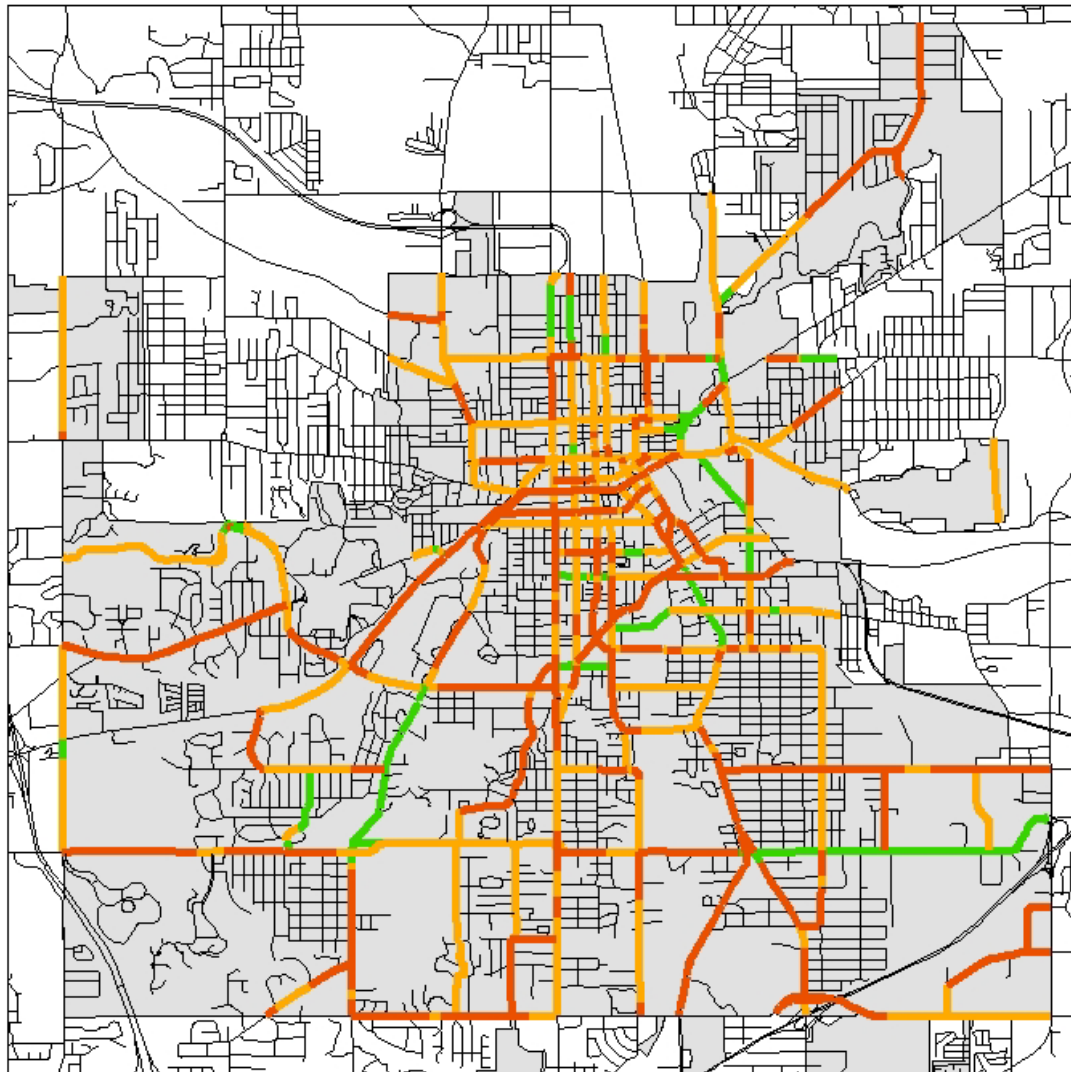
PASER Road Conditions

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



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City of Kalamazoo Federal Aid Road Conditions 2021



0 0.375 0.75 1.5
Miles

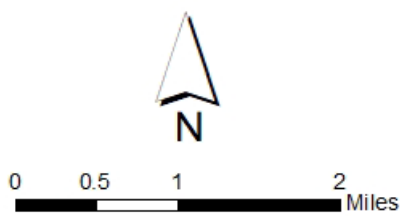
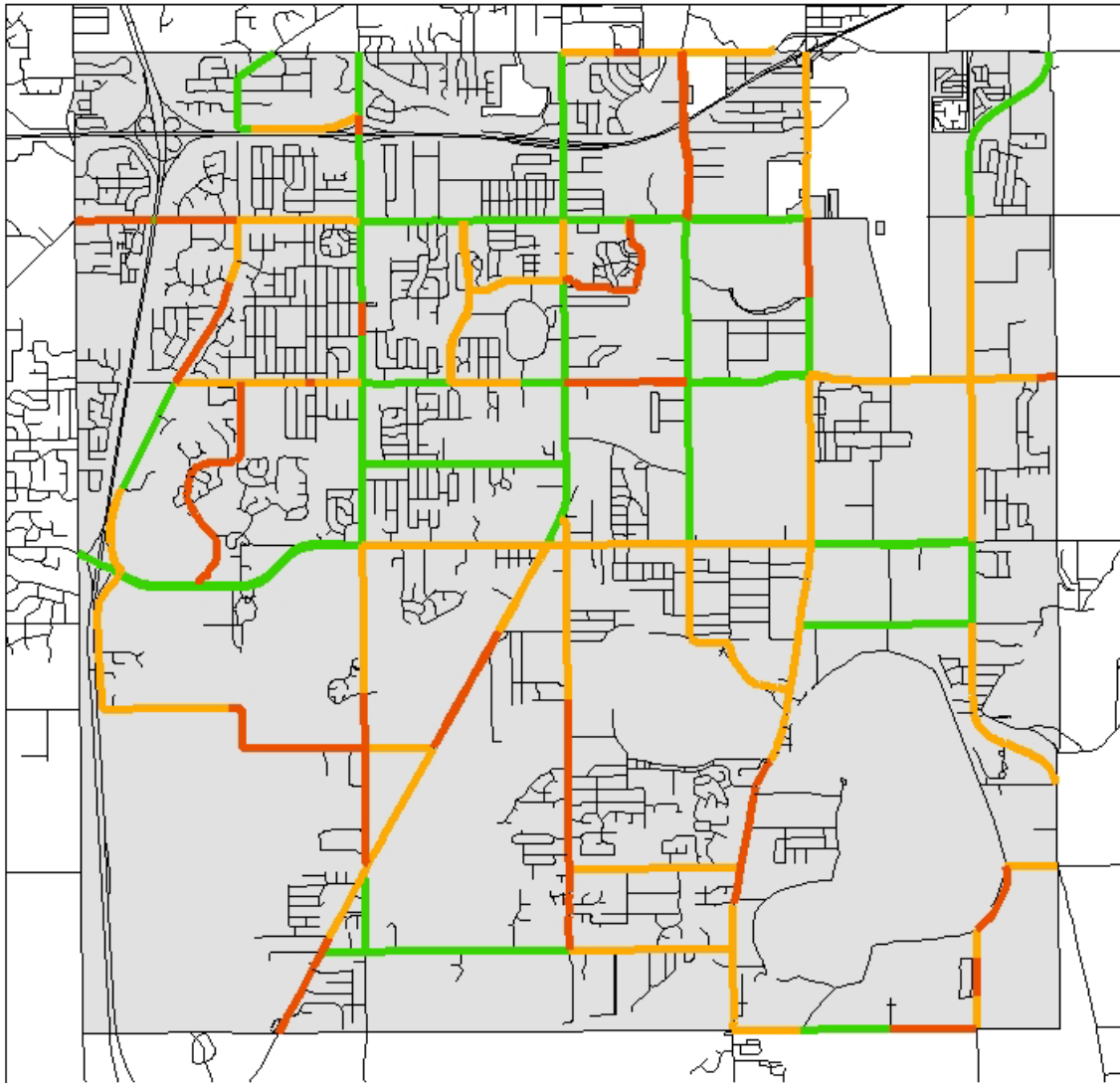
PASER Road Conditions

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



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City of Portage Federal Aid Road Conditions 2021



PASER Road Conditions

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



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Contact Information

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

- Road Commission of Kalamazoo County
3801 E Kilgore Rd • Kalamazoo, Michigan • 49001
(269) 381-3171 • info@kalamazoocountyroads.com
- City of Kalamazoo
415 E Stockbridge Ave • Kalamazoo, Michigan • 49001 (269) 337-8601 •
colpublicservices@kalamazoocity.org
- City of Portage
7900 S Westnedge Ave • Portage, Michigan • 49024
(269) 329-4422 • www.portagemi.gov
- For Villages, Townships, and Cities not listed above, contact Kalamazoo Area Transportation Study to get information.
- Kalamazoo Area Transportation Study
5220 Lovers Ln • Suite 110 • Portage, Michigan • 49002 (269)343-0766 •
info@katsmpo.org