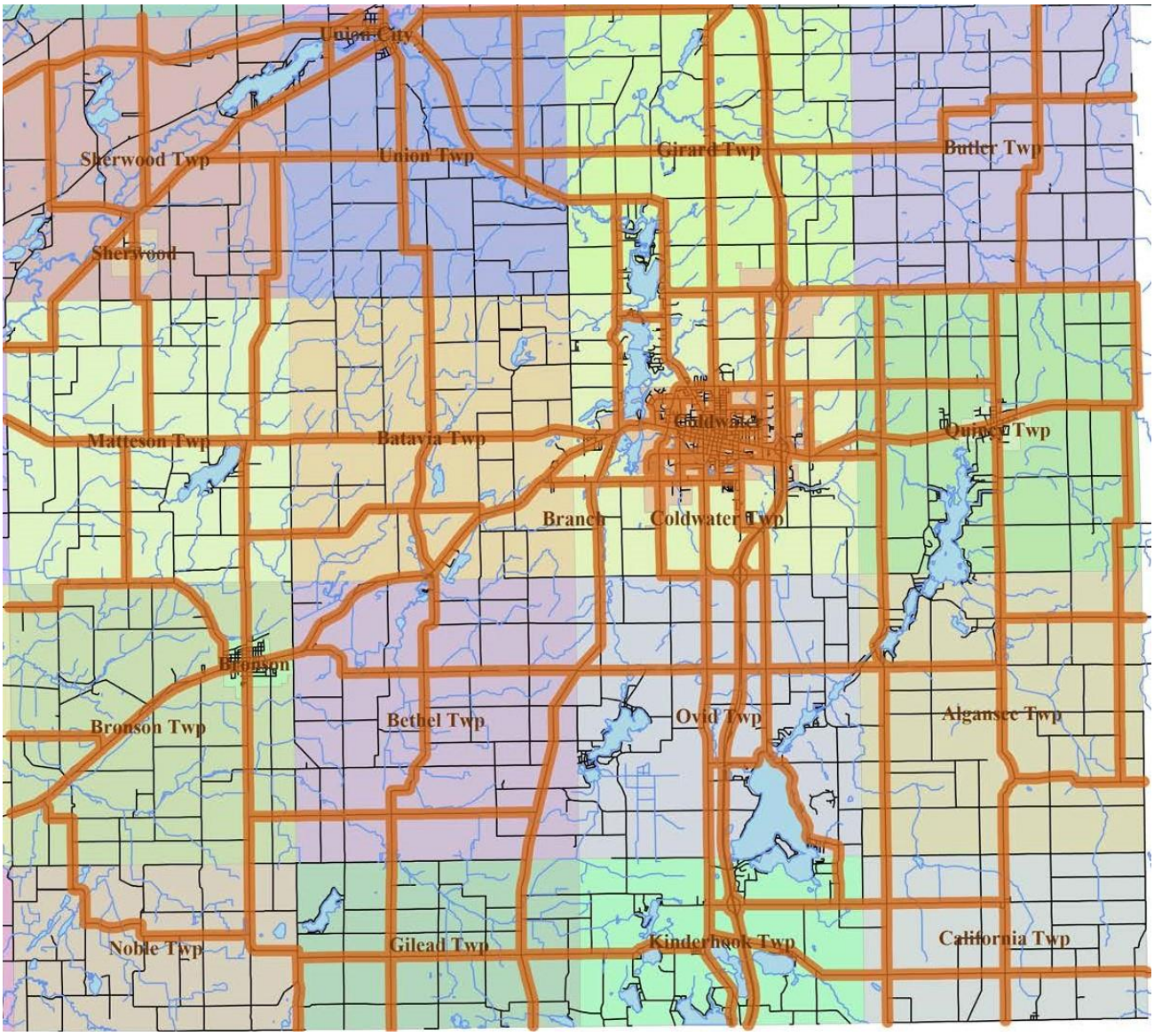



# FEDERAL AID ROAD CONDITION REPORT FOR BRANCH COUNTY

2023

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

# TABLE OF CONTENTS

## Contents



## Tables



## PASER Maps

# Executive Summary

The Kalamazoo Area Transportation Study assisted in the data collection of road inventory for Branch County in 2022. 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:

- **443 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 442 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

- **31 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 the 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 start bringing the schedule back in line with the historical breakdown, the entire federal aid system in Branch County was rated in 2021. In 2022 the rating effort was generally expended in those areas traditionally done in even-numbered years with some minor changes to increase efficiency. Those federal aid roads not rated in 2022 were done in 2023 to complete the two-year rating cycle. This report takes the results of the most recent ratings for the entire county federal aid system and compares them with those from 2011 on to analyze the current status and discern any trends.

# 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.


## 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 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 several 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.

# 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 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' blcoks). 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. |

**Capital Preventative Maintenance and Reconstructive Treatments**

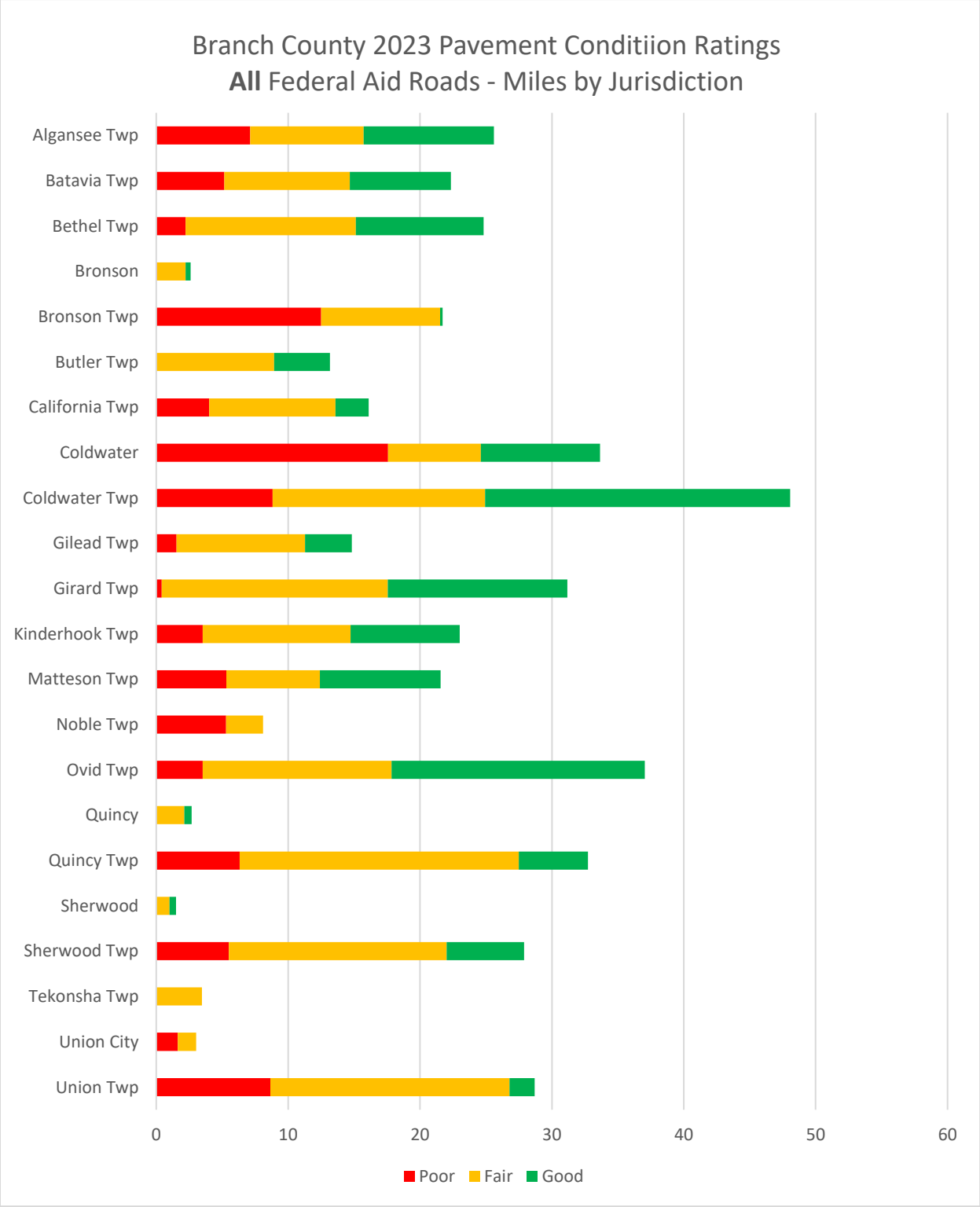
Table 2

| Treatment | Life Extension (Average Years) | PASER Rating | Cost per Mile | Average Cost per Additional Year |
|---|---|---|---|---|
| Overband Crack Filling | 4 | 6 to 7 | $10,000 | $1,750 |
| One Course Non-Structural Overlay | 7 | 5 to 6 | $140,000 | $8,571 |
| Milling and One Course Non-Structural Overlay | 8 | 4 to 5 | $160,000 | $13,000 |
| Single Course Chip Seal | 6 | 5 to 7 | $20,000 | $2,500 |
| Double Course Chip Seal | 7.5 | 5 to 7 | $45,000 | $3,333 |
| Single Course MicroSurface | 5 | 4 to 6 | $22,500 | $4,500 |
| Hot In-Place Recycling | 15 | 4 to 6 | $175,000 | $11,667 |
| Structural Crush/Shape | 20 | 3 to 5 | $500,000 | $10,000 |
| Full-Depth Reconstruction | 30 | 1 to 2 | $1,750,000 | $50,000 |

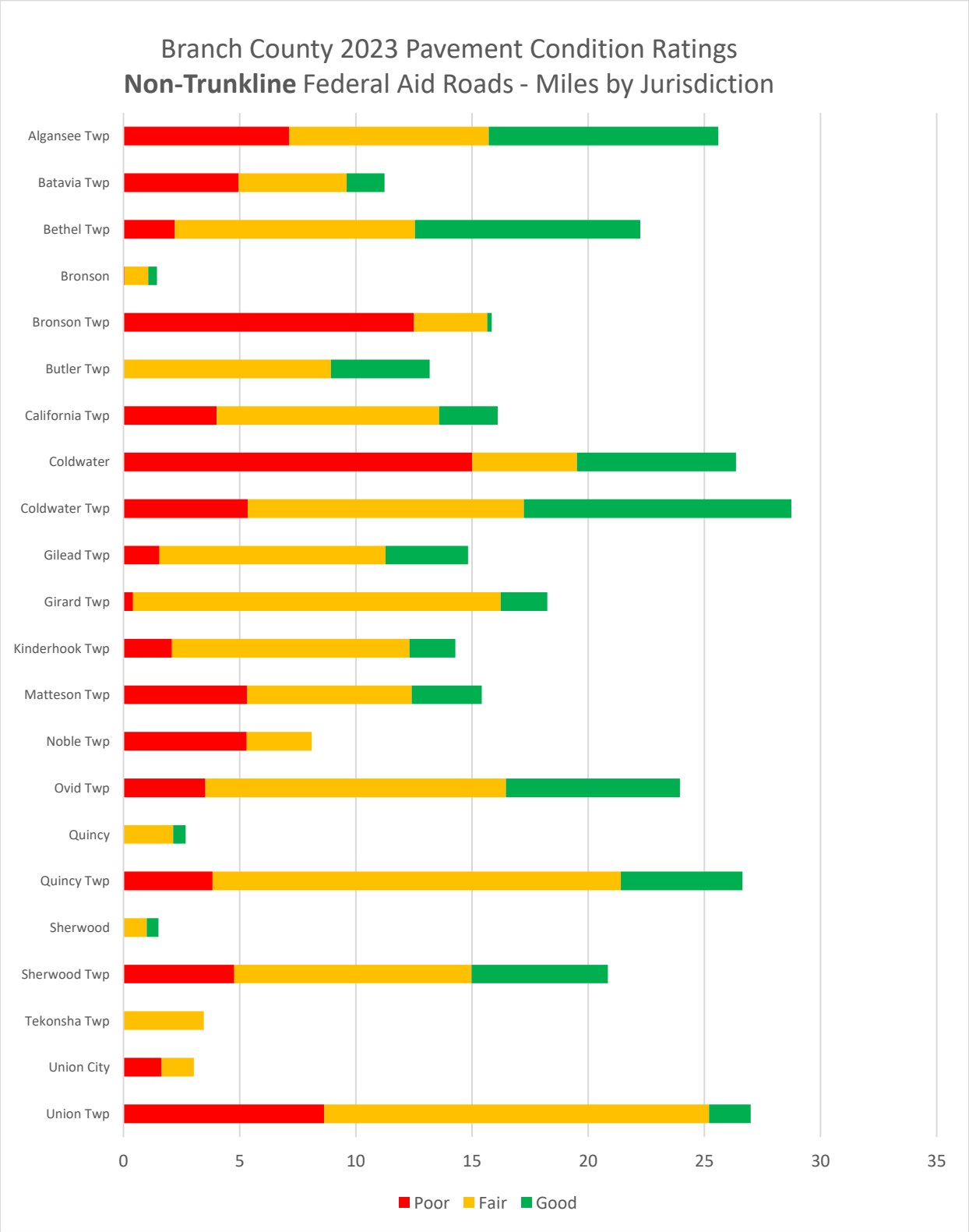
Table 2 details historical cost, lifespan, and rating of pavement treatment types that have been used in Branch County. These treatments range from the minimal (overband crack filling) to major construction. As noted, these treatments and costs are historical. The costs do not reflect recent steep inflation but adequately demonstrate the magnitude of differences between various treatment options. As new technologies emerge and become adopted some of the treatments 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.
- Non-Structural Overlays do not contribute to a pavement's structural capacity. These treatments use thin layers of asphalt (½ - 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.
- 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.
- Crush and shape is the process of using a pulverizing machine to reduce the existing asphalt surface to small pieces and mix them into the underlying base material. The resulting aggregate matrix is then regraded and compacted to form a new base course over which new asphalt leveling and surface courses can be placed.
- Full-Depth Reconstruction is the replacement of the entire roadway structure, including the base, with new material. It is used only when there is no salvage value to any of the existing components.

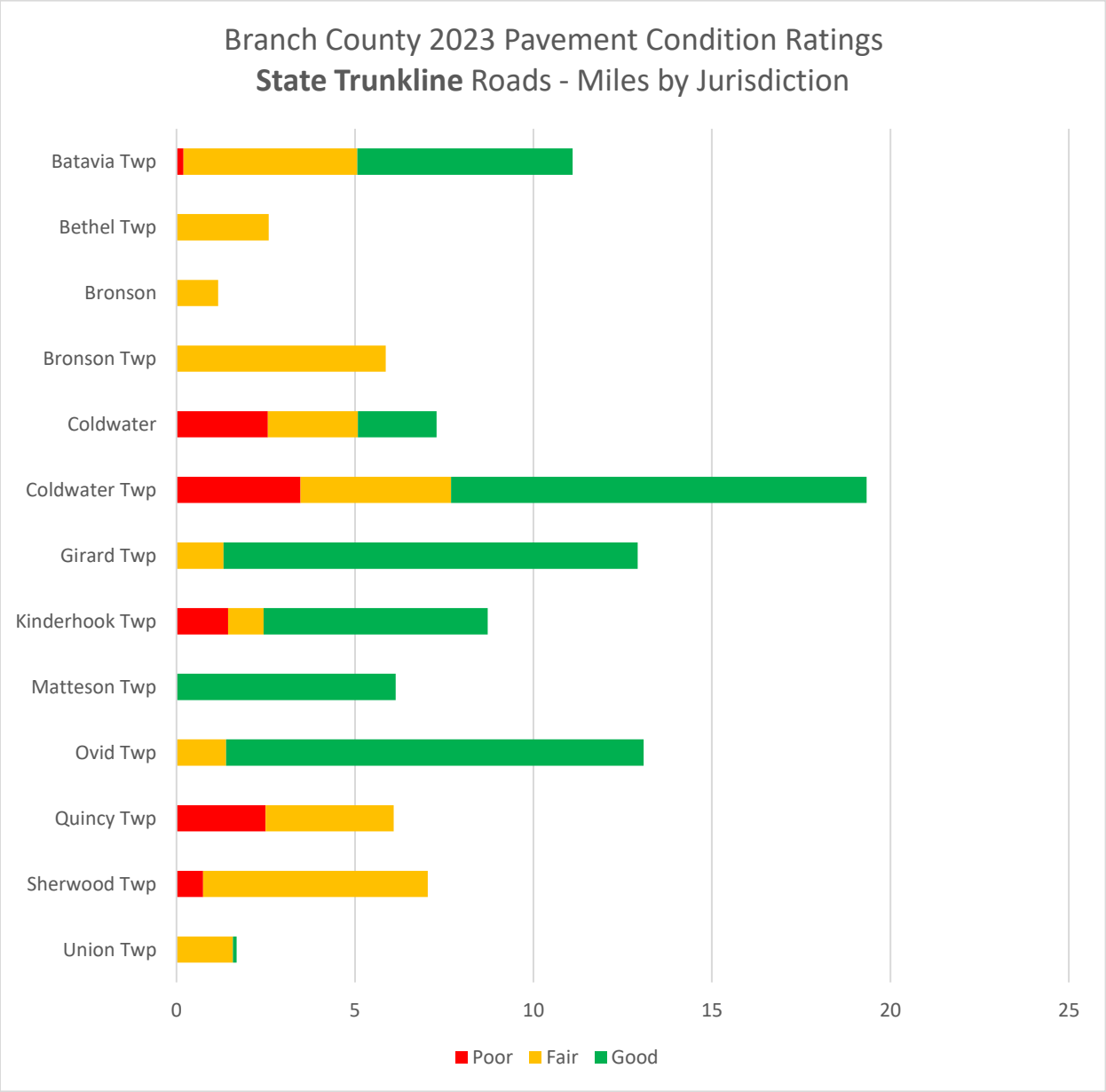
## Summary of 2023 Ratings

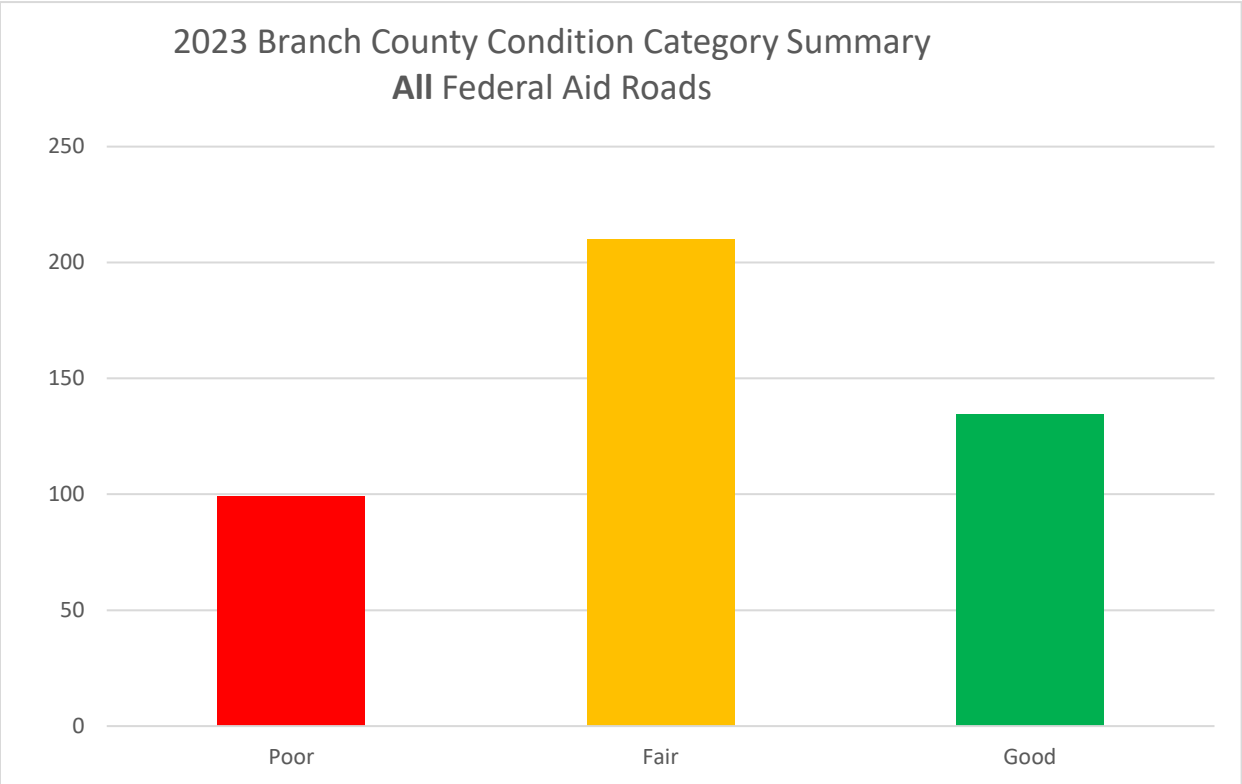


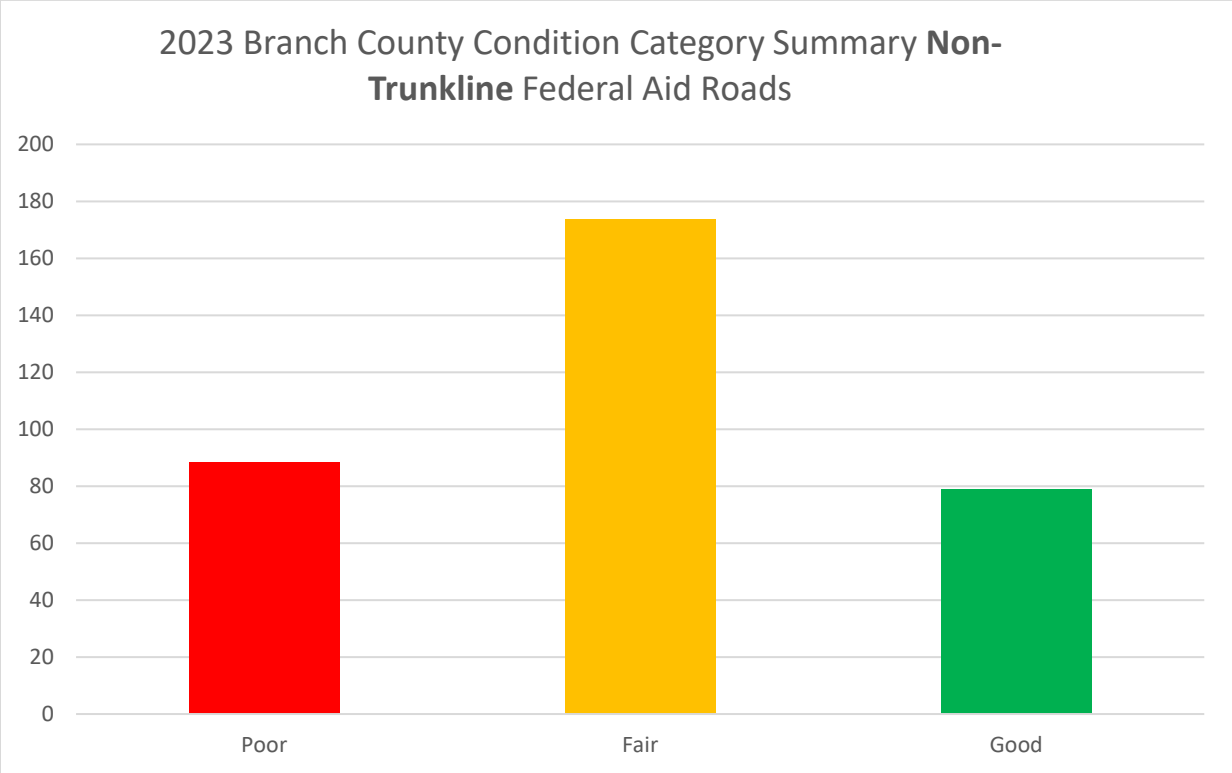
## Summary of 2023 Ratings

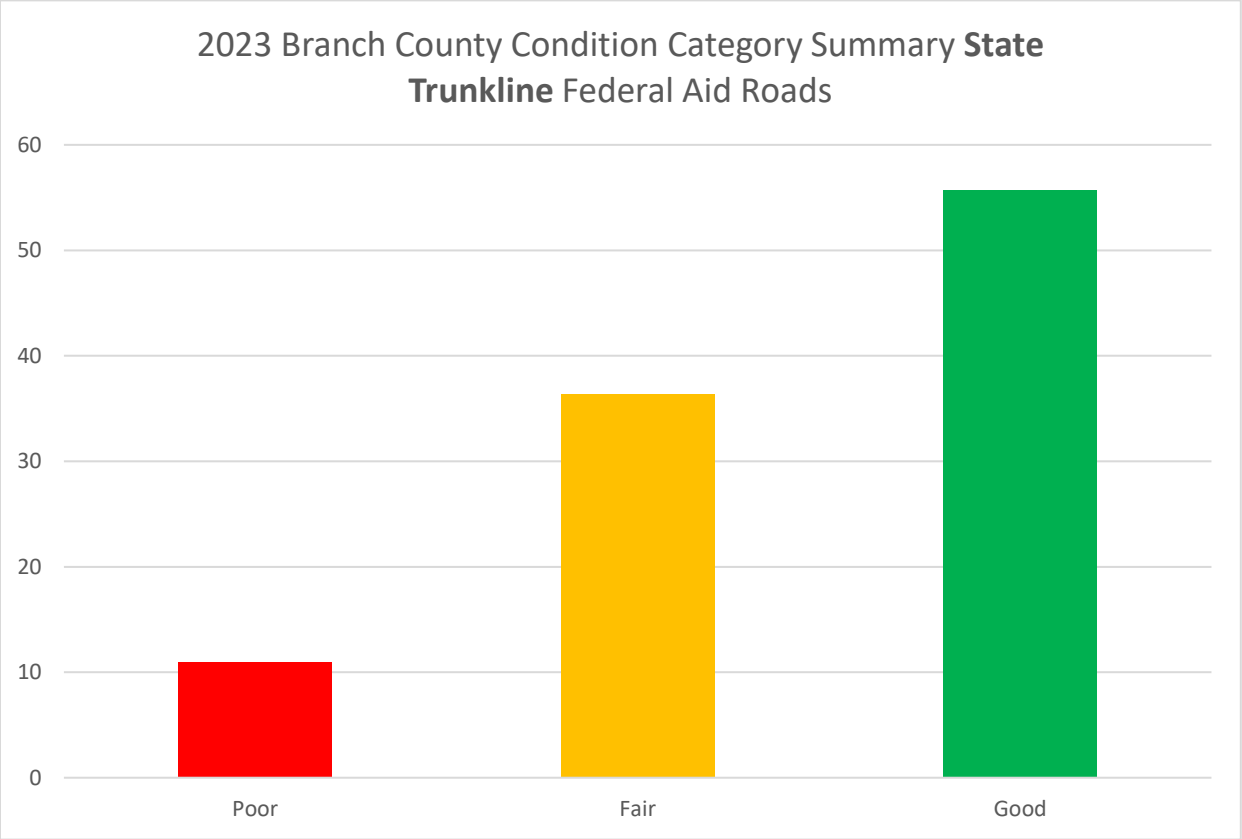


## Summary of 2023 Ratings

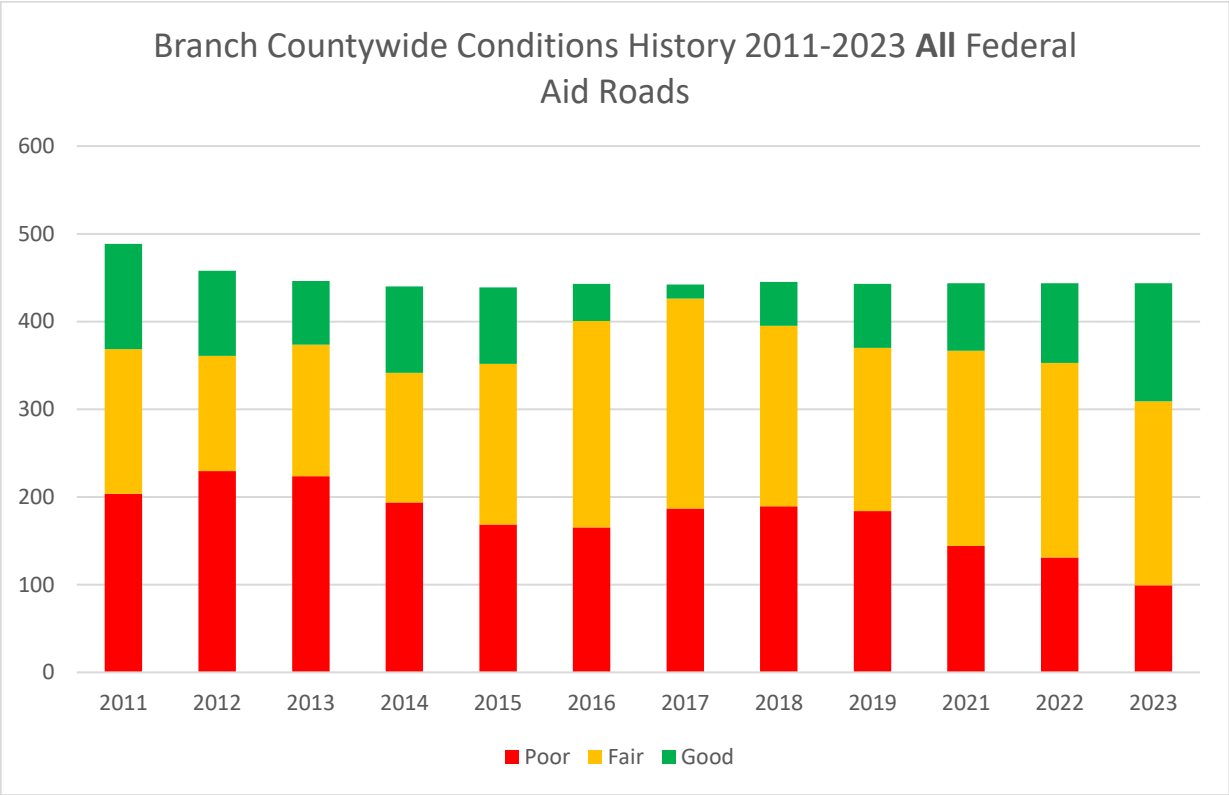


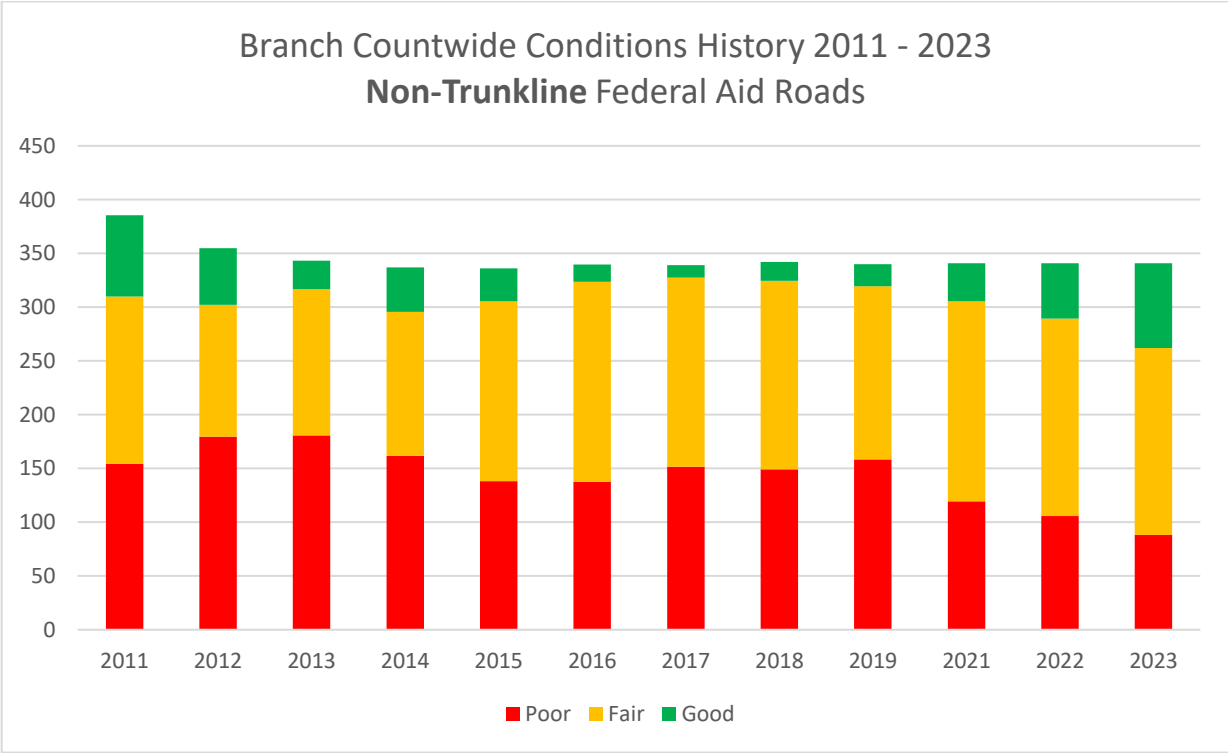

2023 Branch County Condition Category Summary
All Federal Aid Roads
250
200
150
100
50
0
Poor
Fair
Good


2023 Branch County Condition Category Summary Non-Trunkline Federal Aid Roads
200
180
160
140
120
100
80
60
40
20
0
Poor
Fair
Good

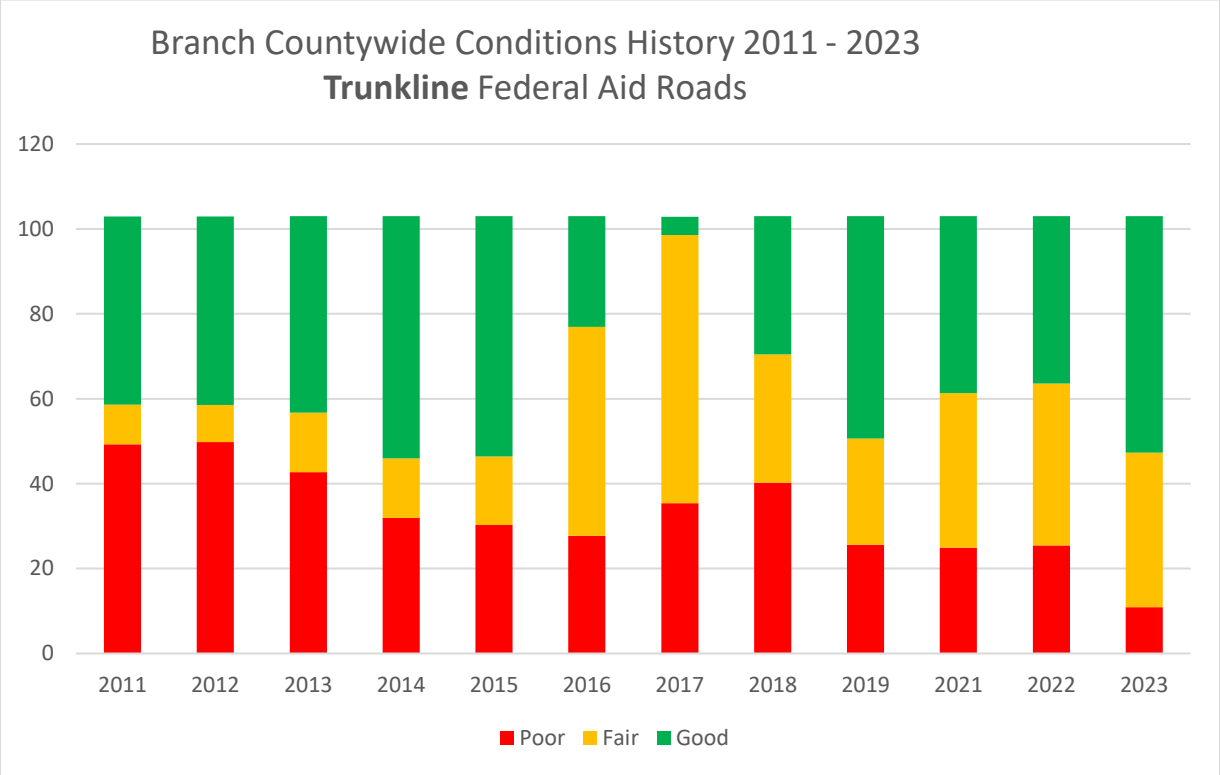

2023 Branch County Condition Category Summary **State Trunkline** Federal Aid Roads
60
50
40
30
20
10
0
Poor
Fair
Good

# Federal Aid Conditions History and Trends



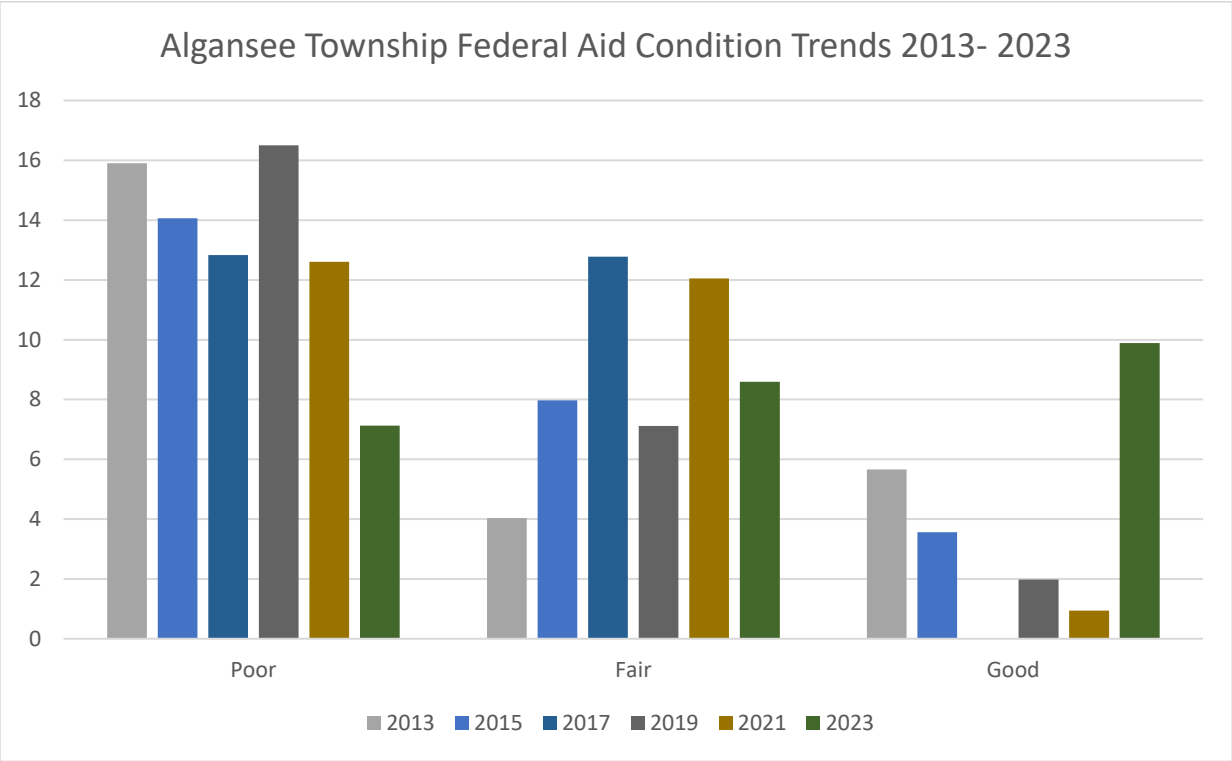
# ROAD CONDITION REPORT FOR BRANCH COUNTY

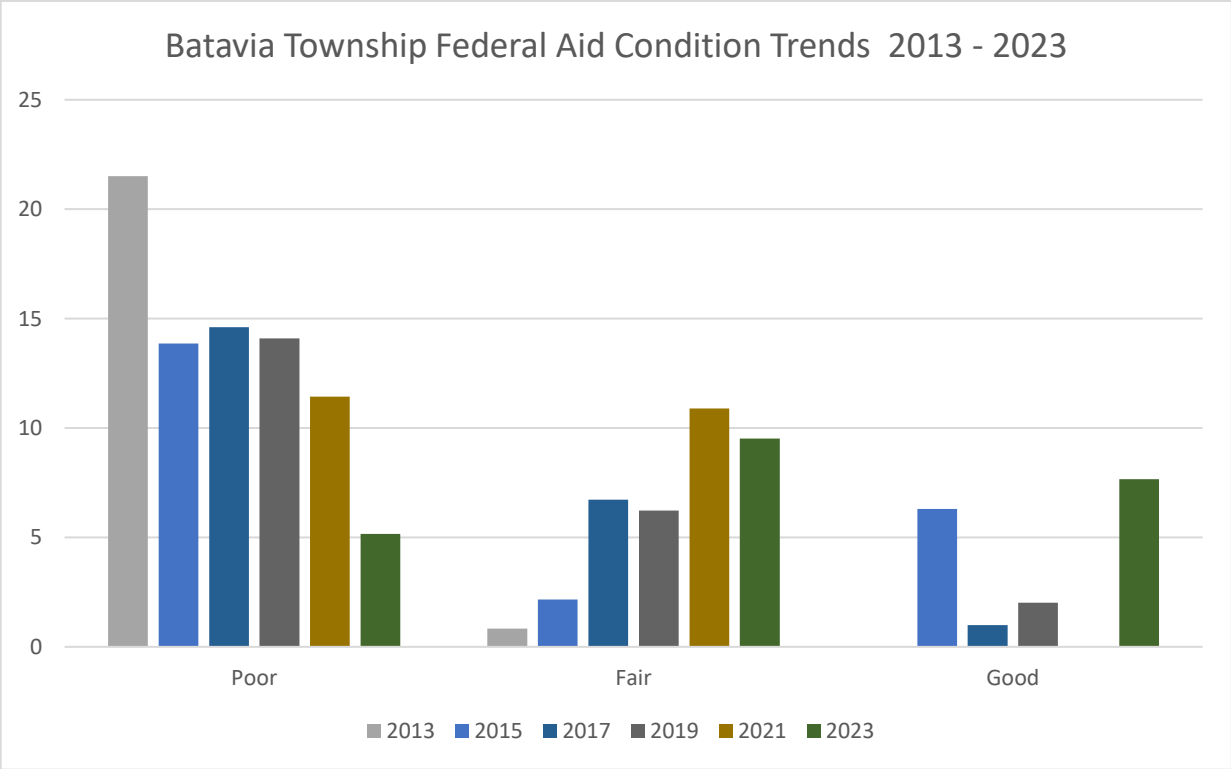



The charts above reflect the progression of the three PASER rating conditions for Branch County's federal-aid roads over an 12-year period. After a steady decrease from 2012 to 2016, there was a slight increase in the number of miles of Poor rated roads until 2019 when a general trend of decreasing began that continues. The mileage of Good rated roads has generally inversely mirrored the poor rated mileage. Fair rated miles decreased slightly each year from 2016 until 2021 when they increased. They have held relatively steady since. For 2023 it appears a sizeable number of previously poor rated roads were improved to Good, while Fair rated road mileage remained essentially steady. Increases in Good rated non-trunkline road mileage for 2022 and 2023 were mirrored by a corresponding decreases in Poor mileage. The overall decrease in Poor rated mileage for 2023 was aided by a large reduction in trunkline miles rated Poor.

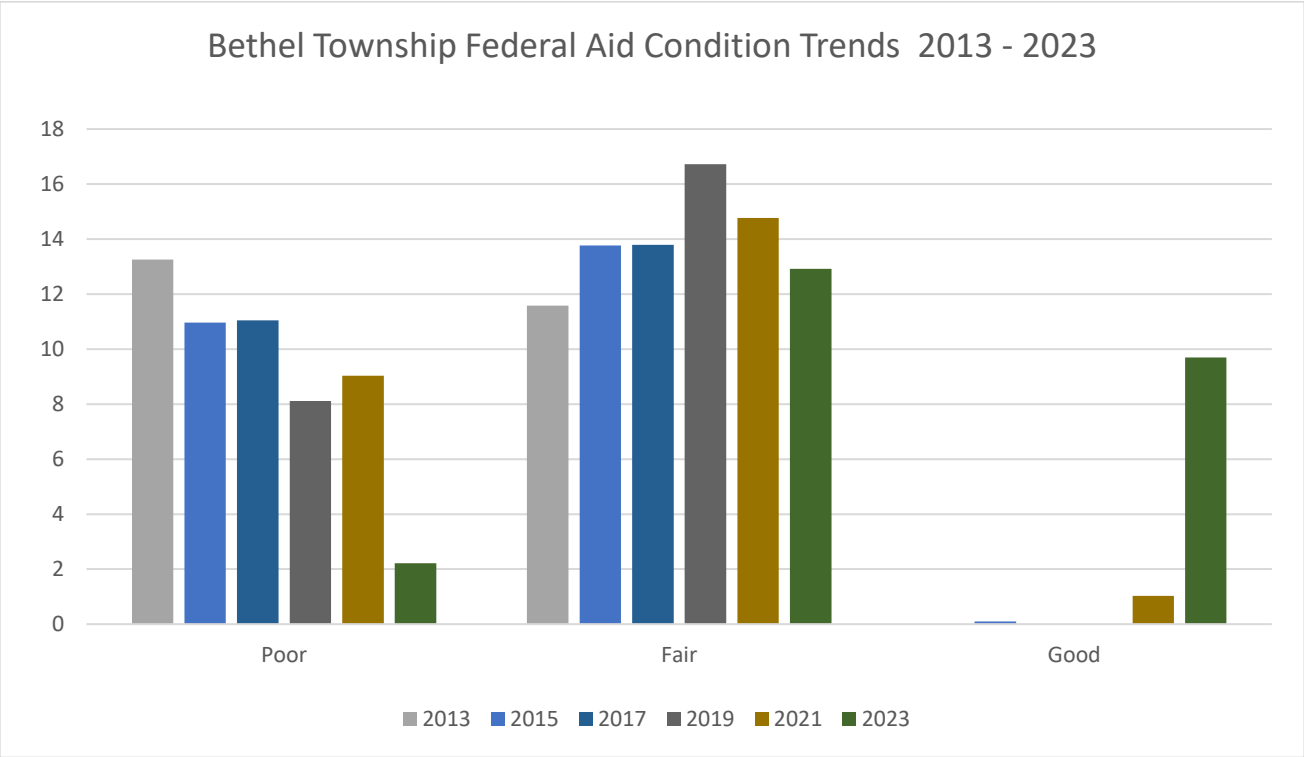
When looking at township breakdowns from 2023 on the succeeding pages, it can be seen that in most jurisdictions the mileage of Fair rated roads is highest with Poor and Good alternating for second-highest depending on location.

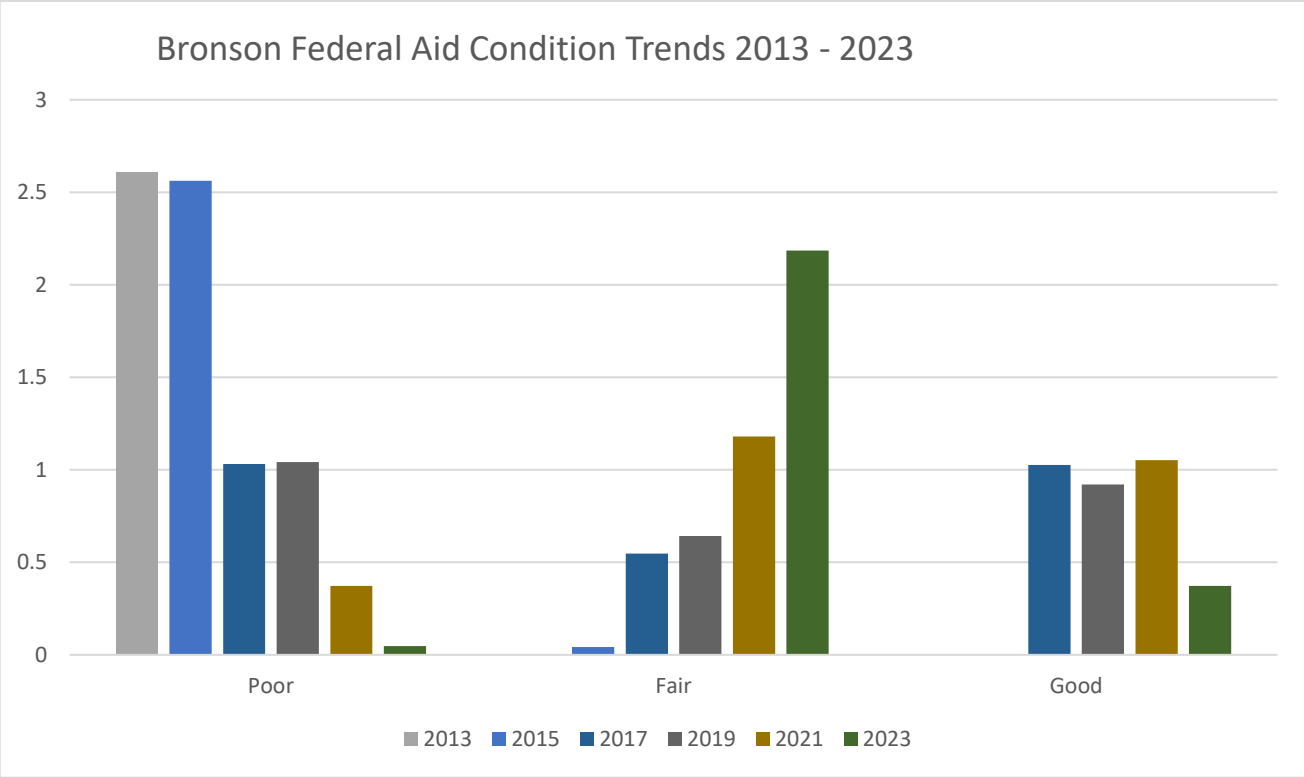
## 2013-2023 Federal Aid Road Condition Trends



## 2013-2023 Federal Aid Road Condition Trends



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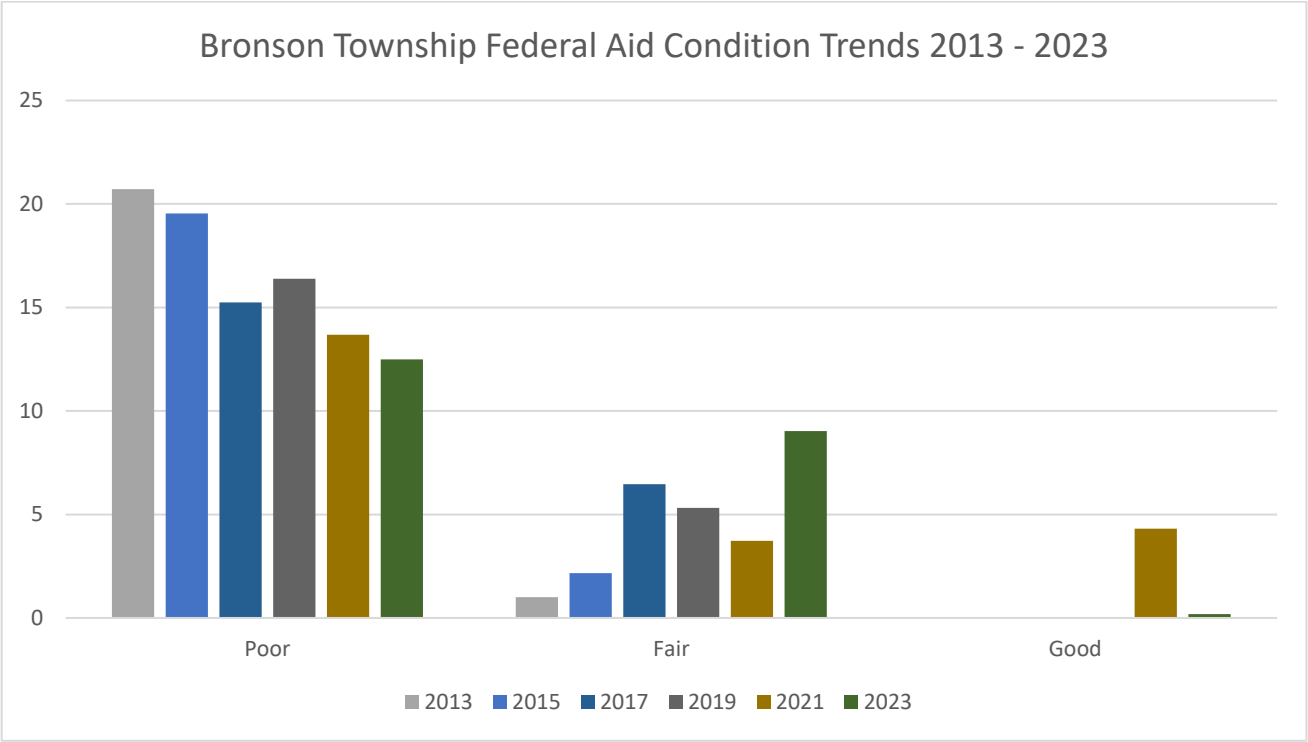


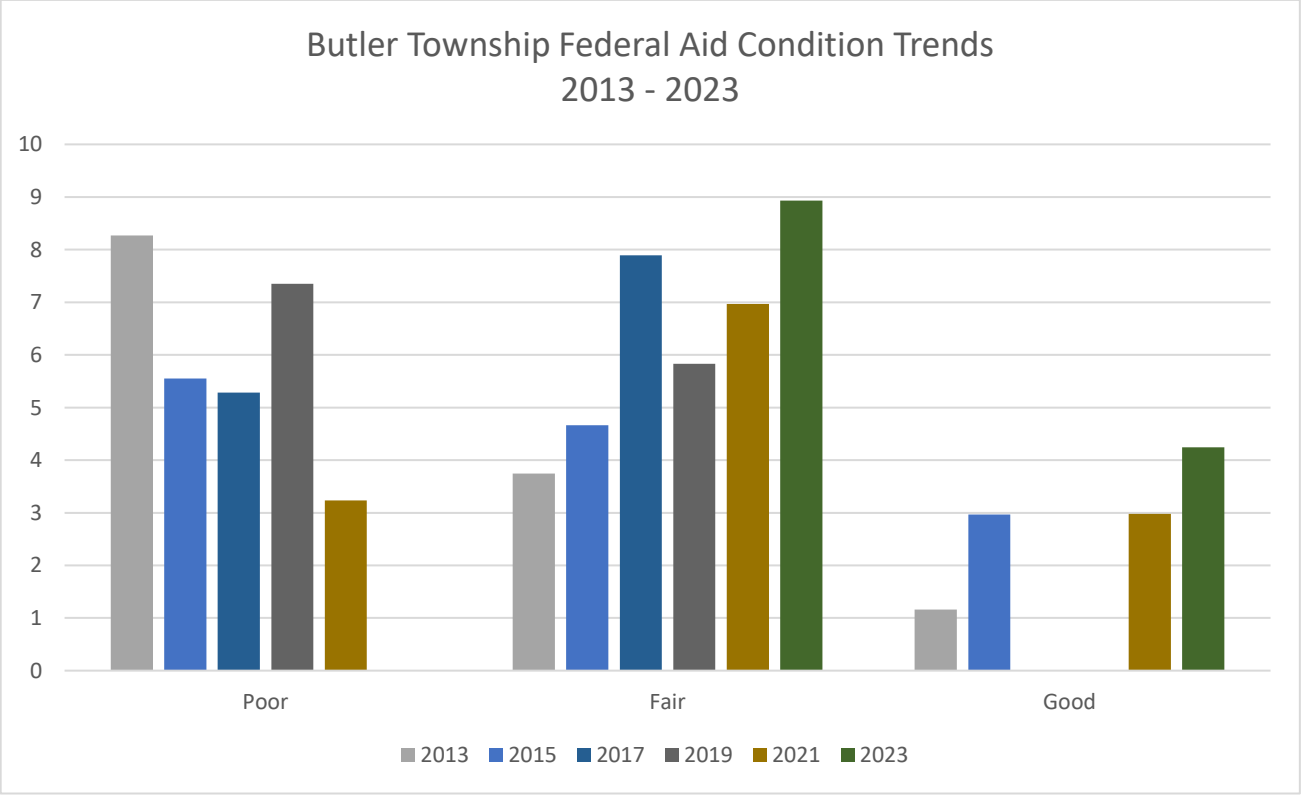

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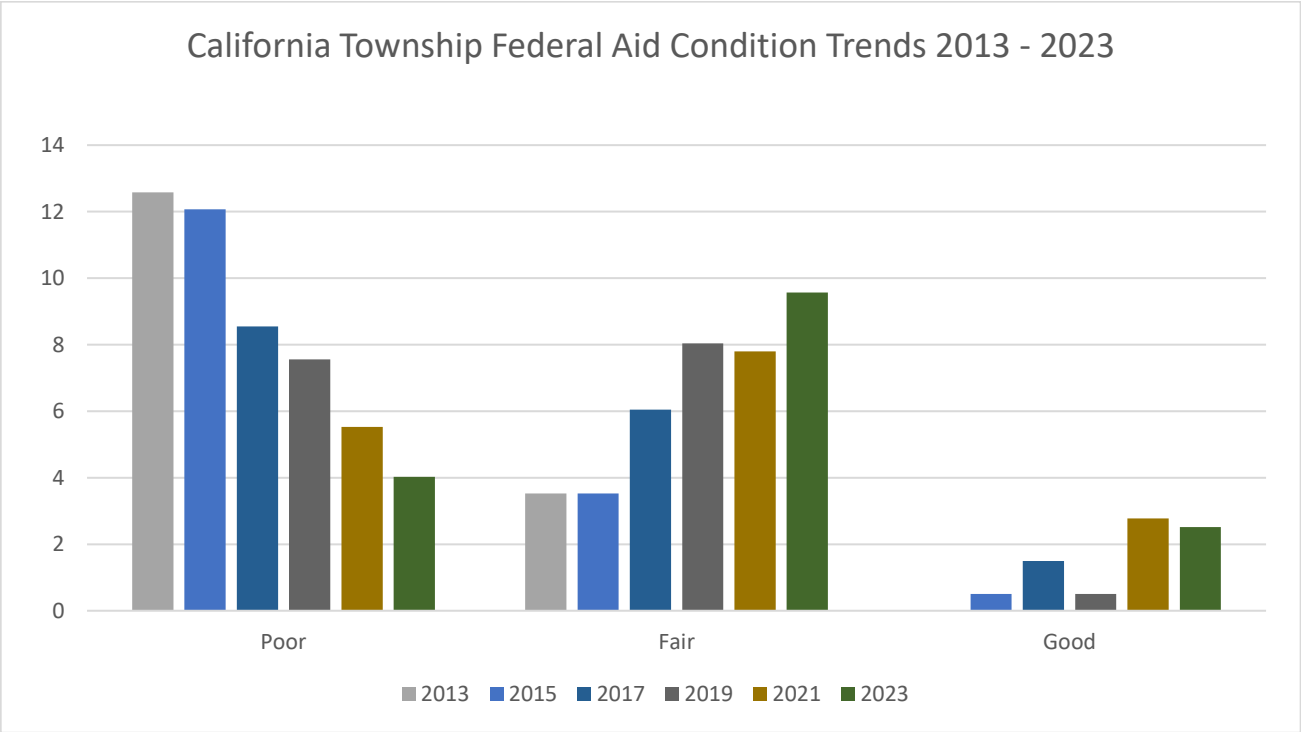


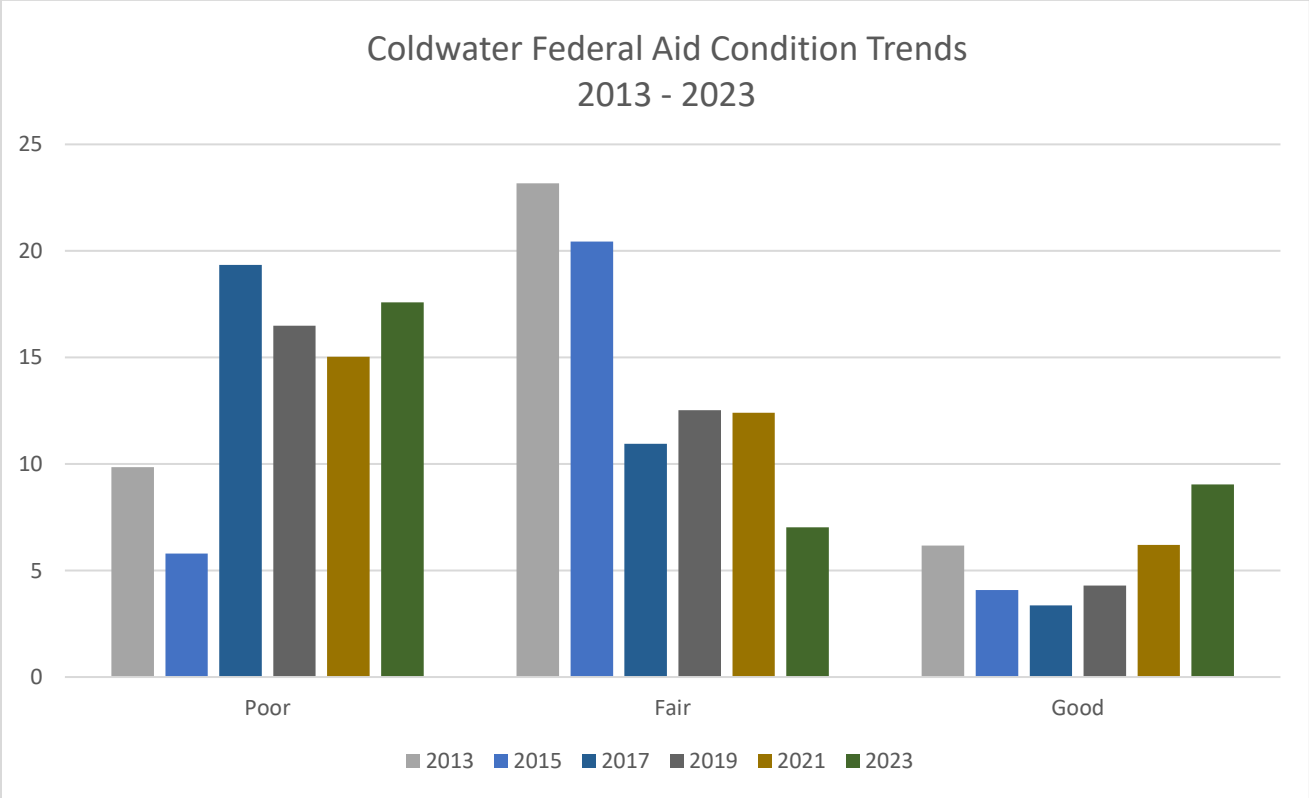

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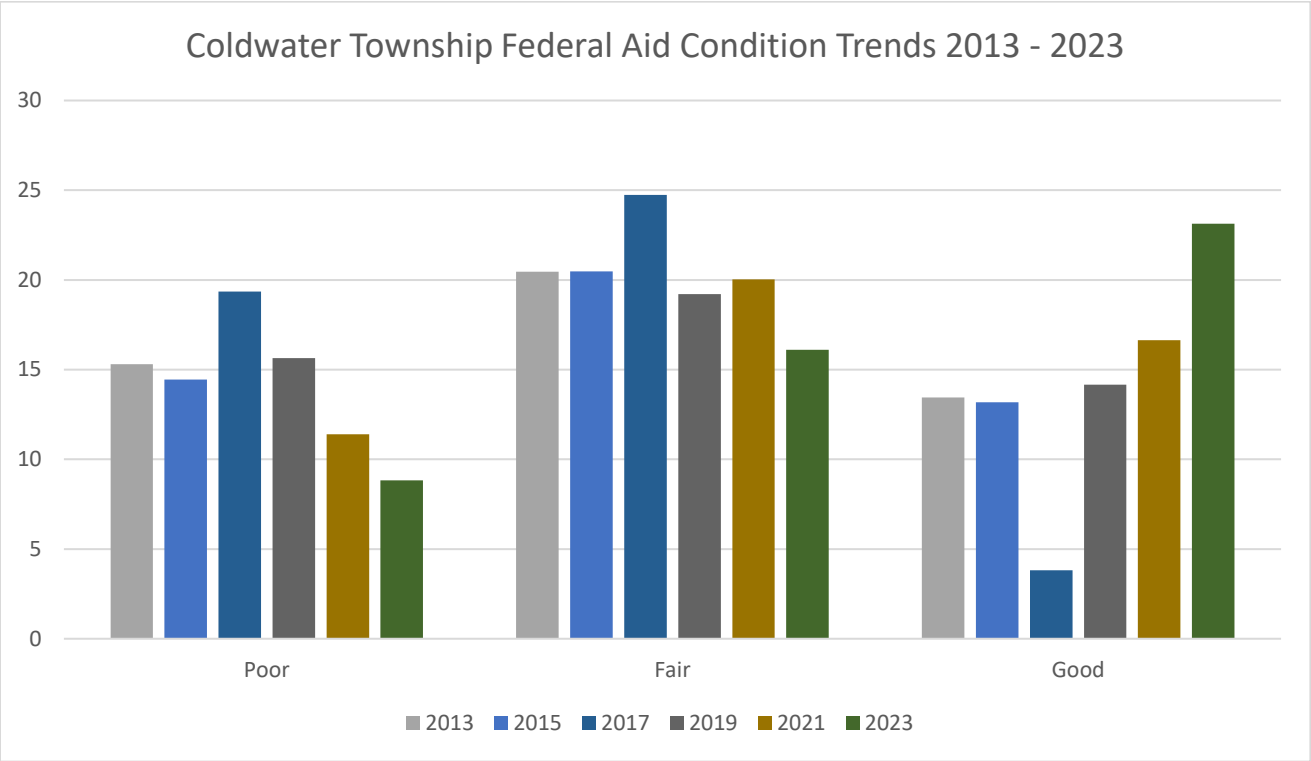


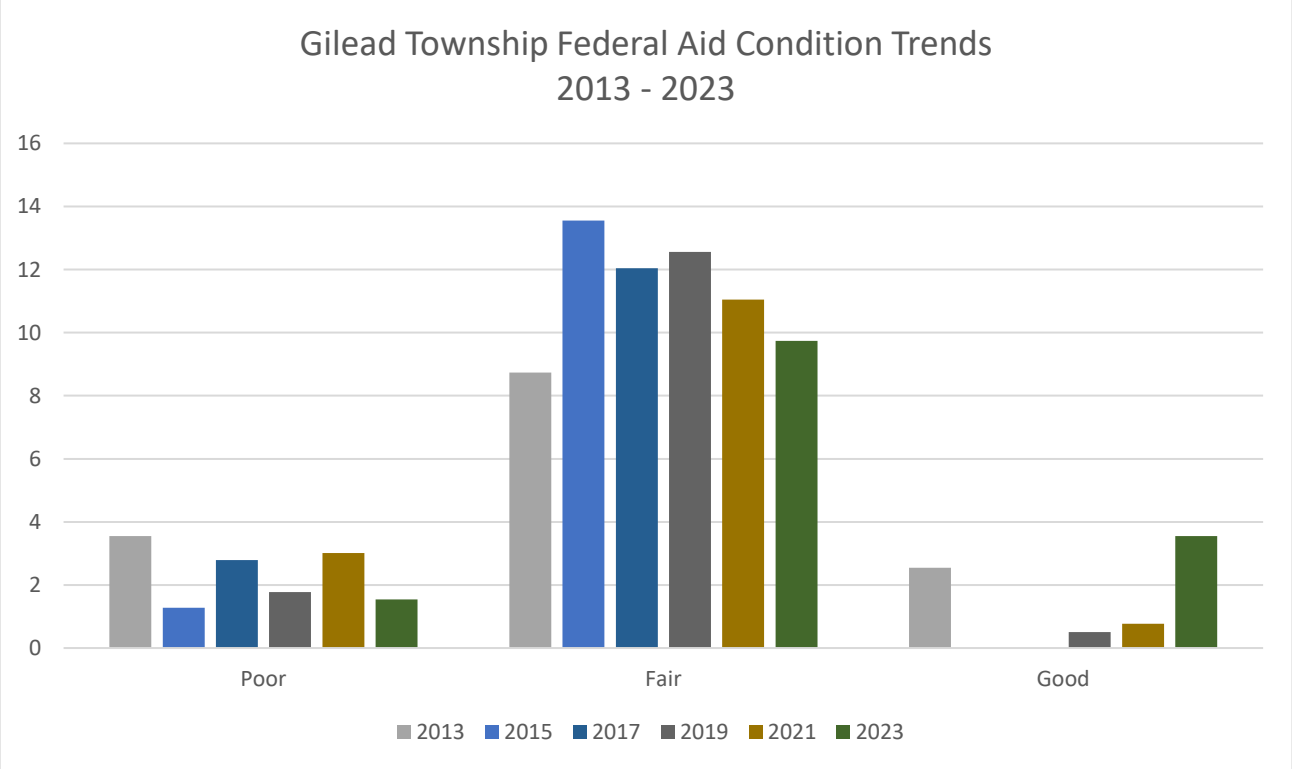

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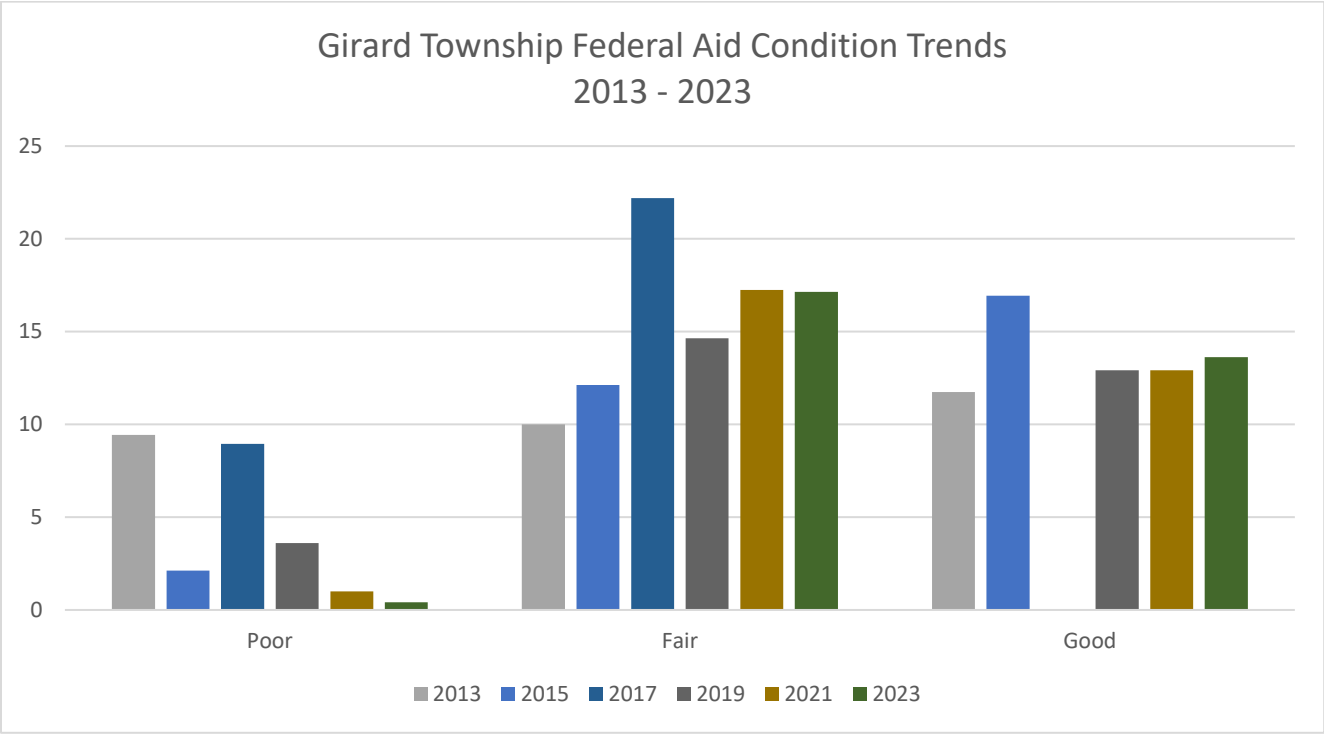


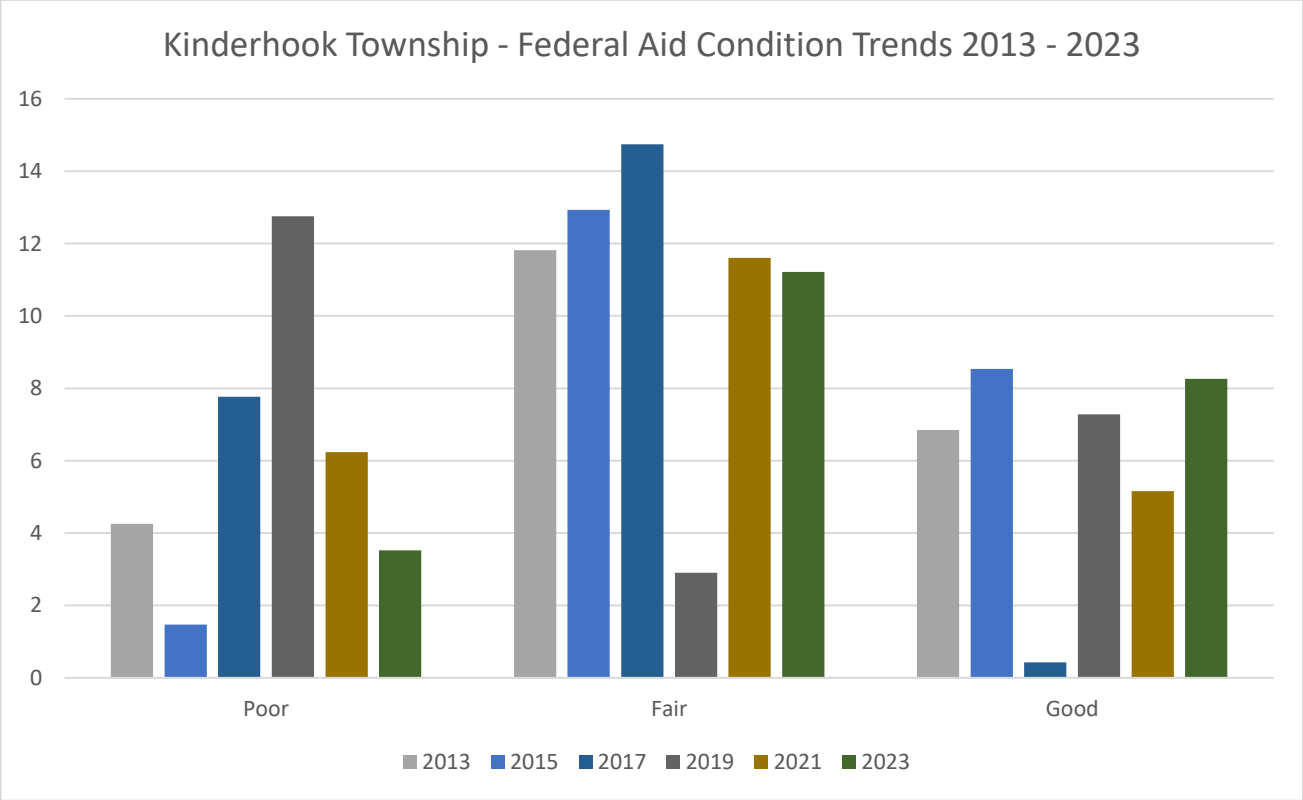

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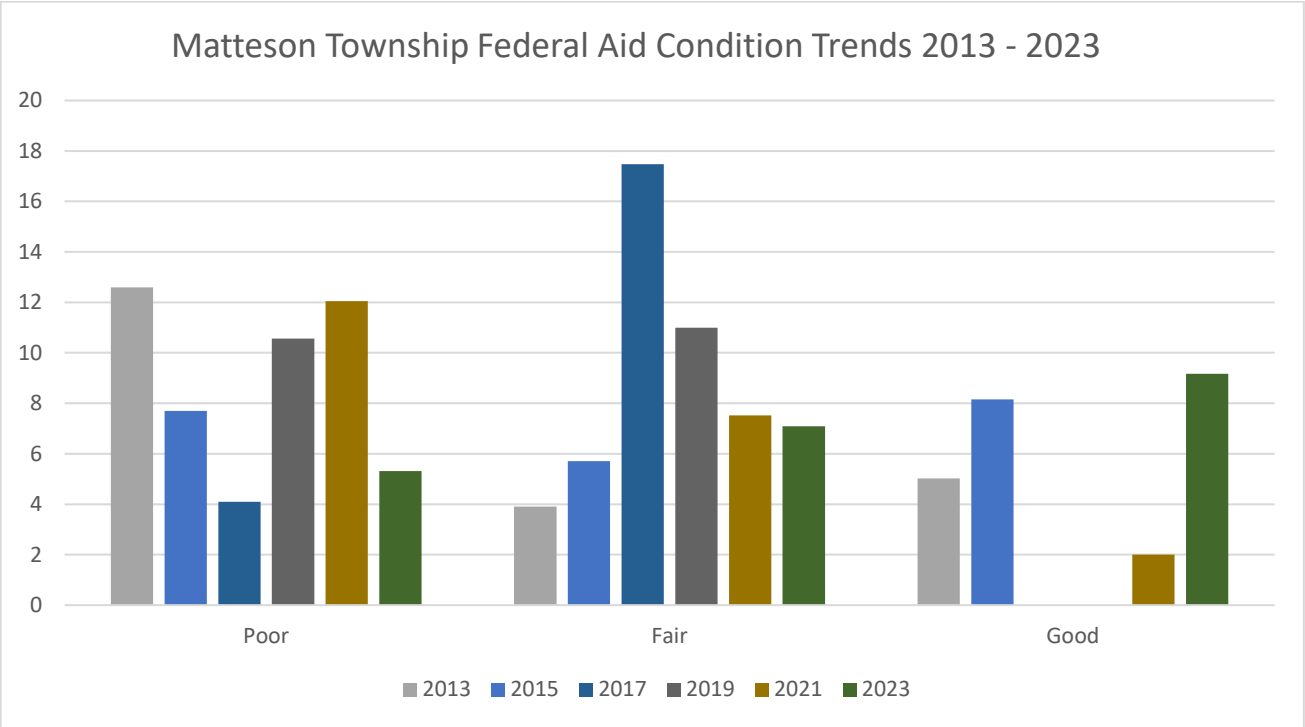


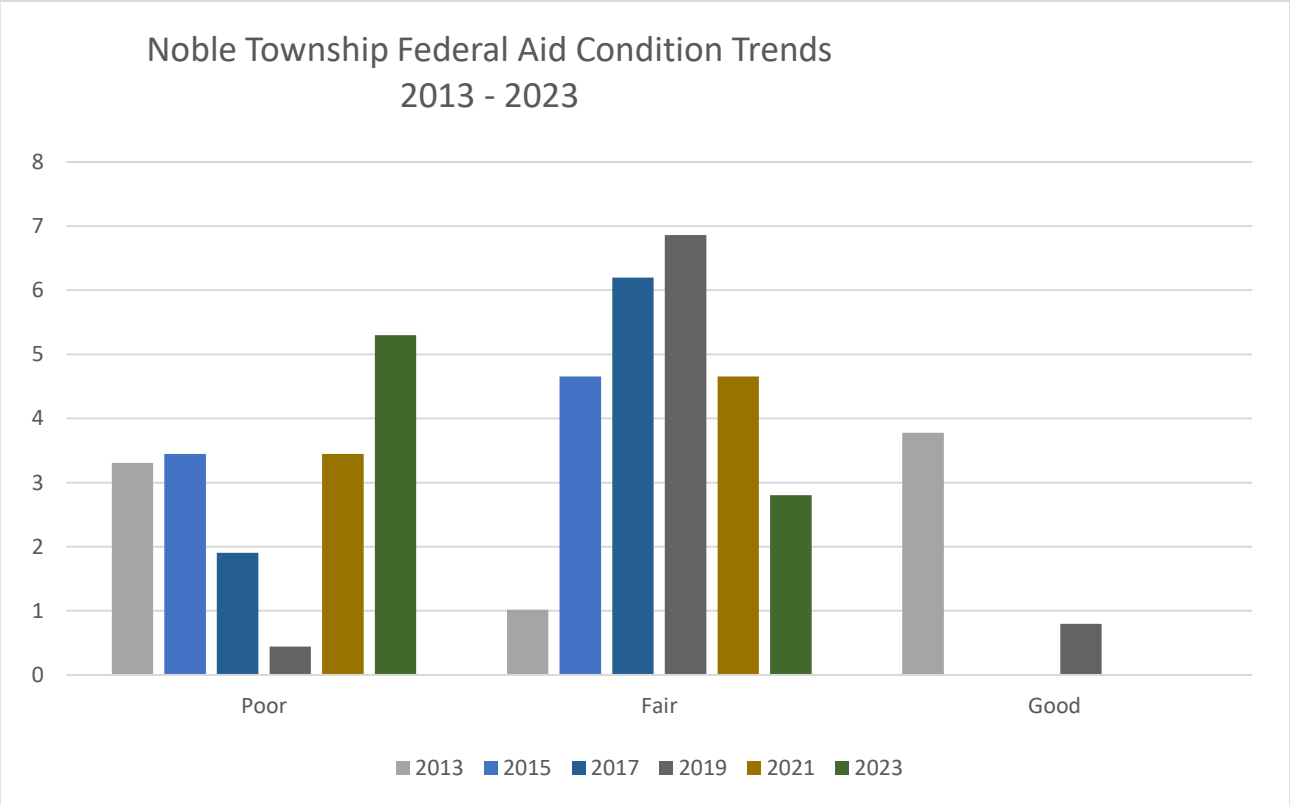

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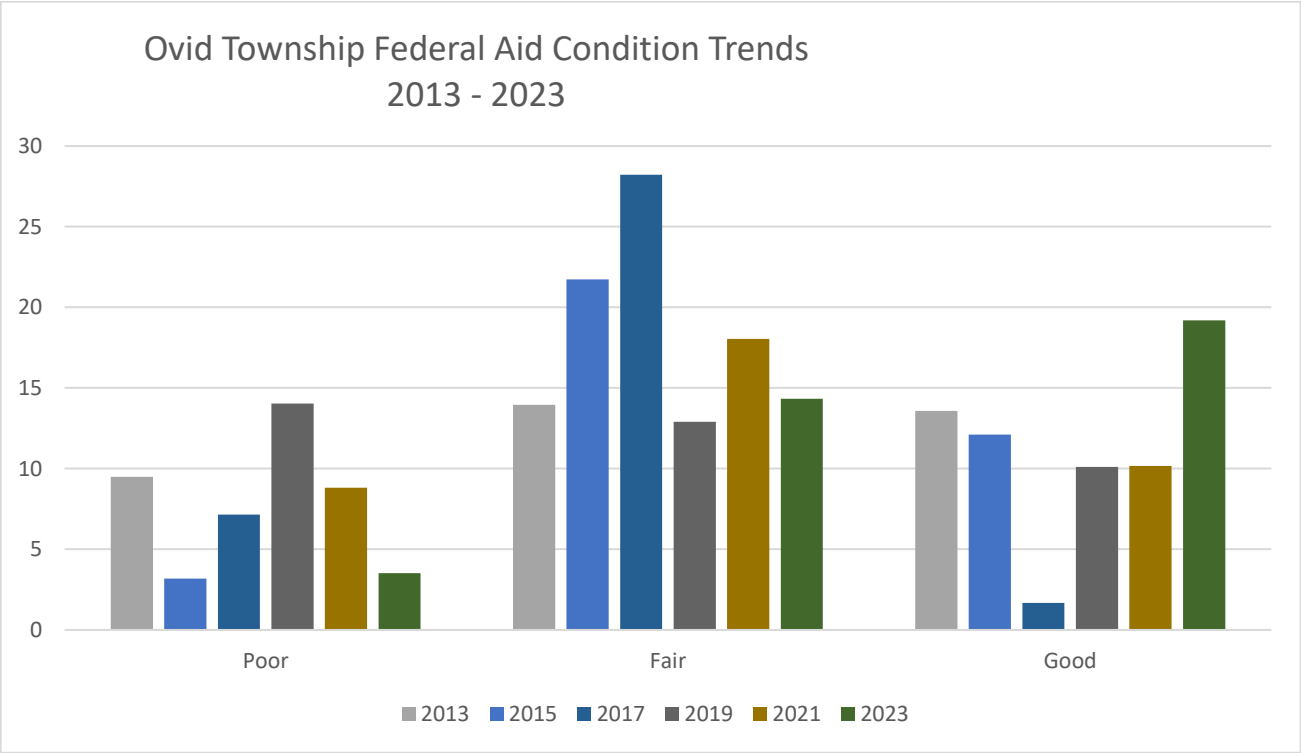


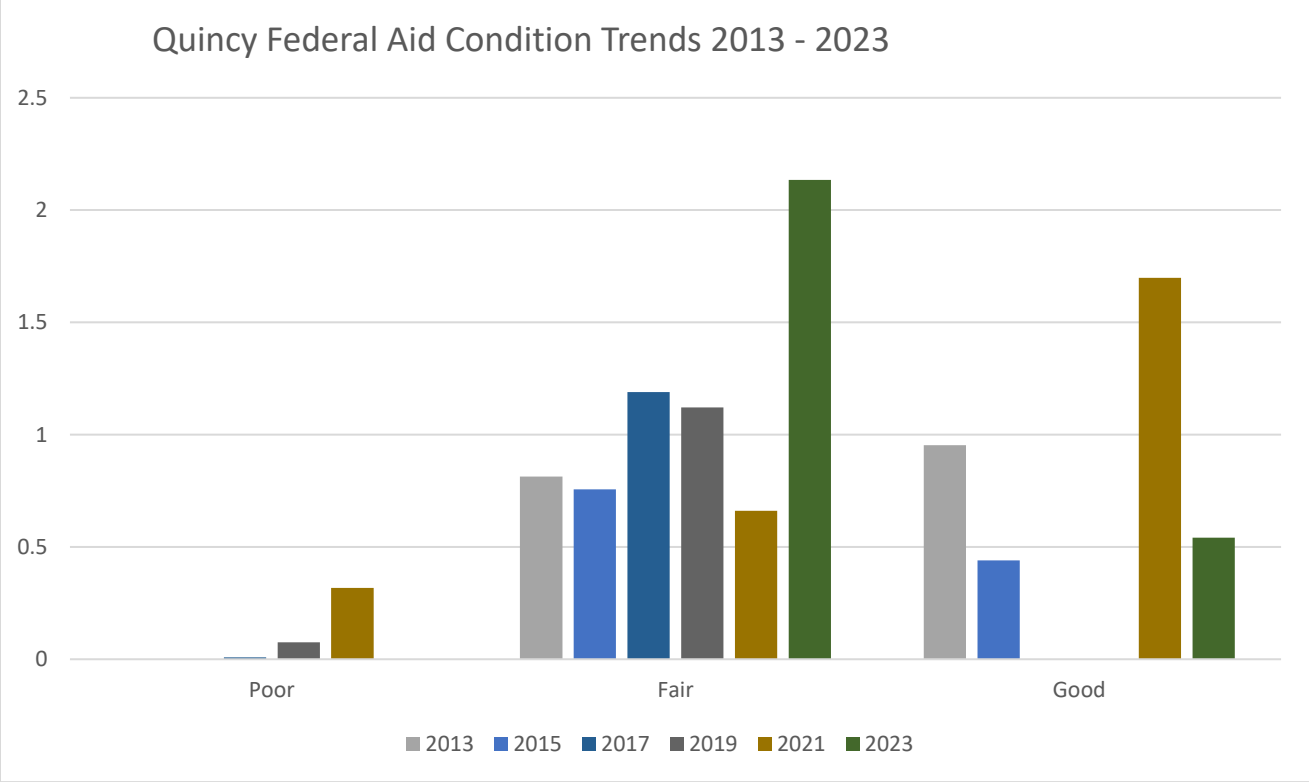

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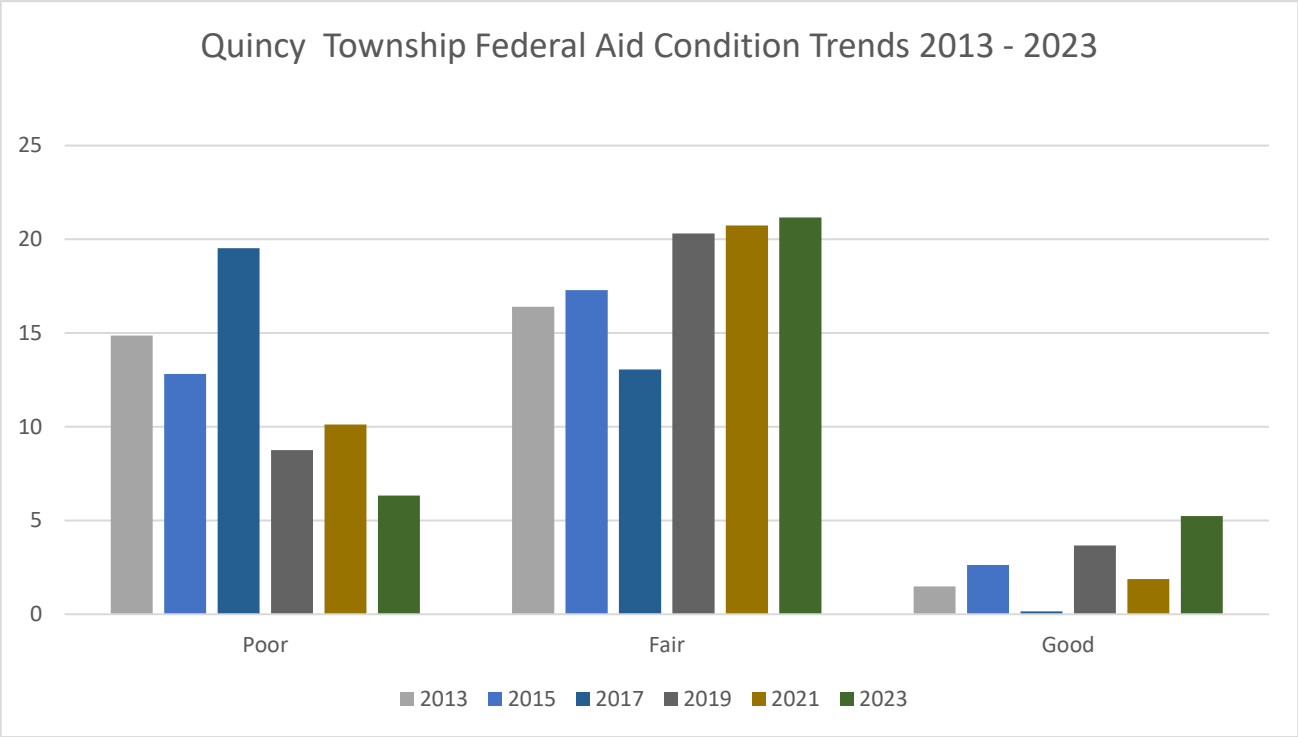


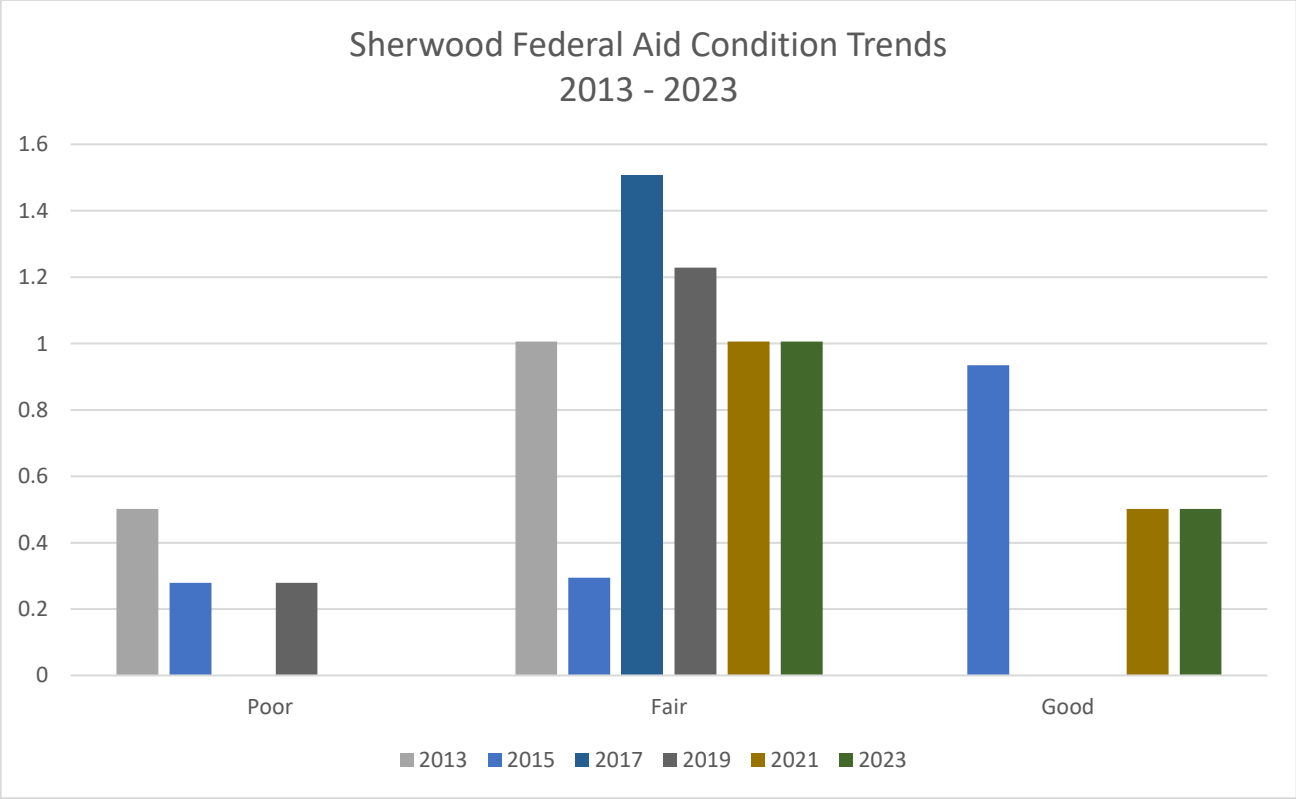

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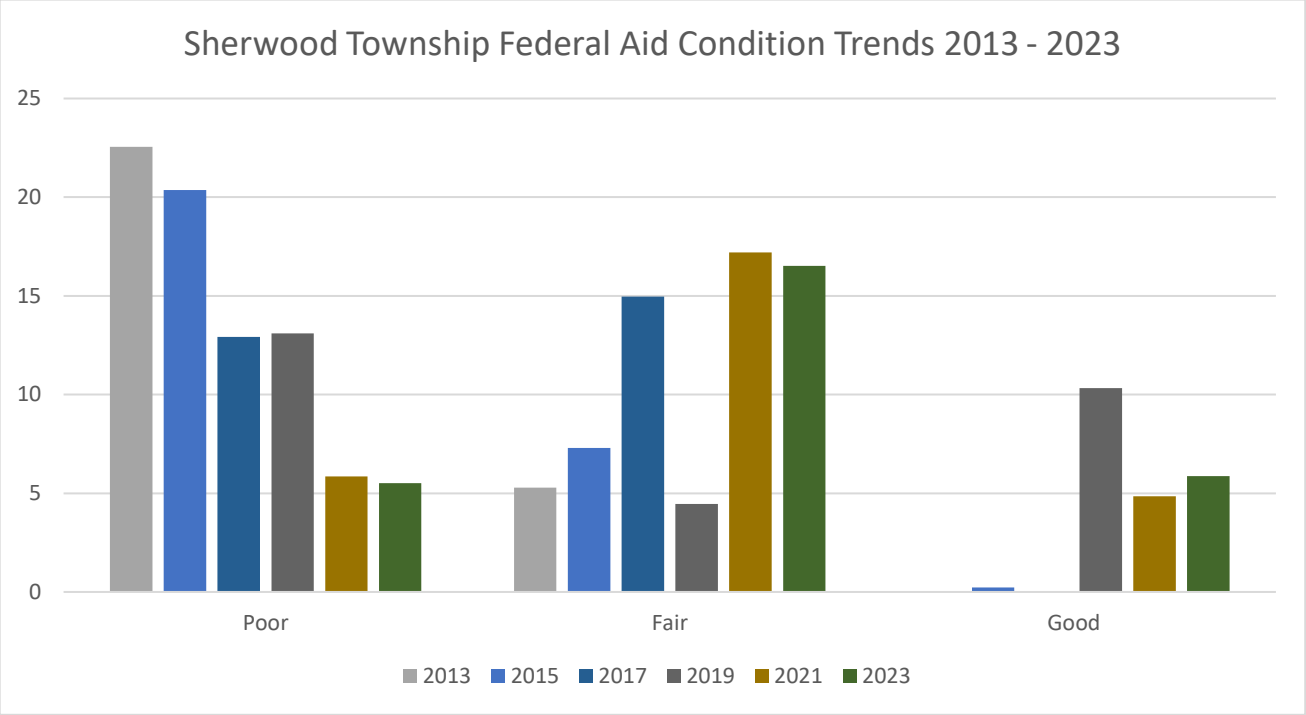


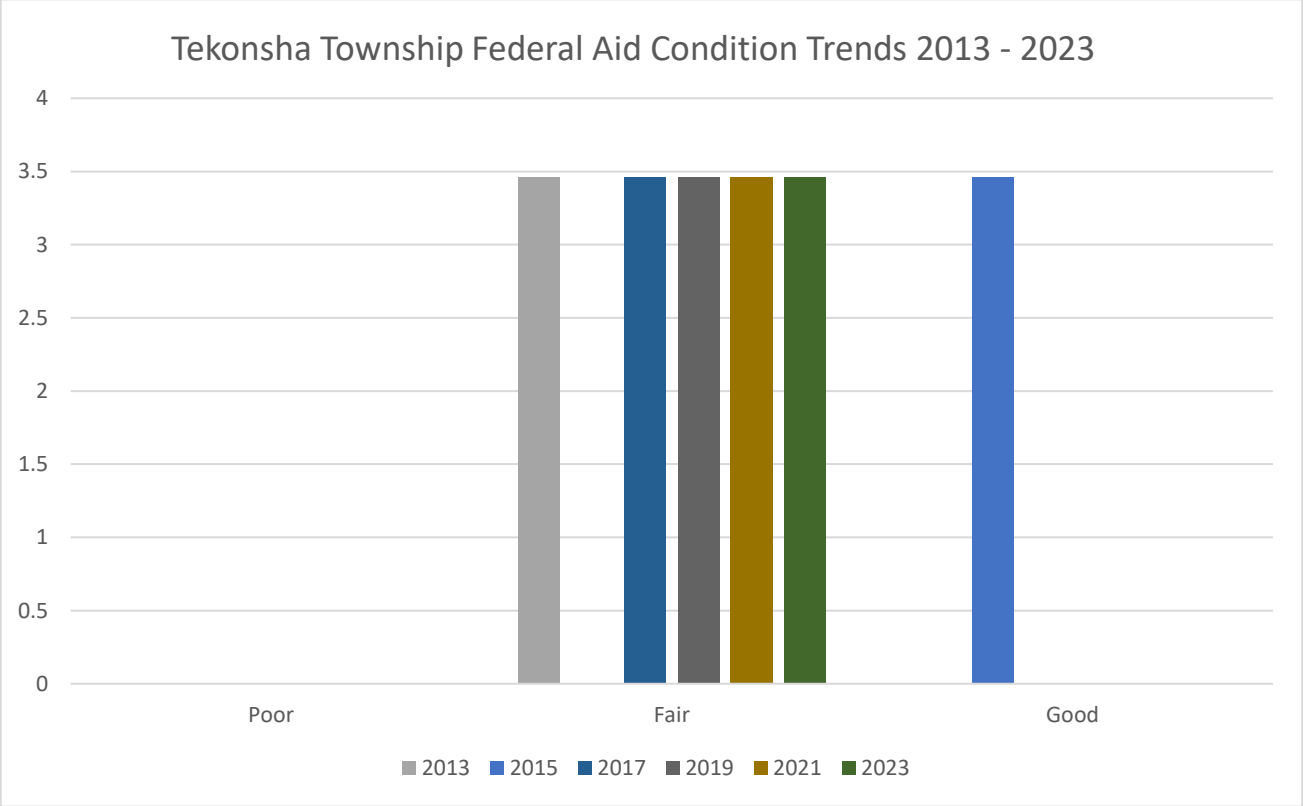

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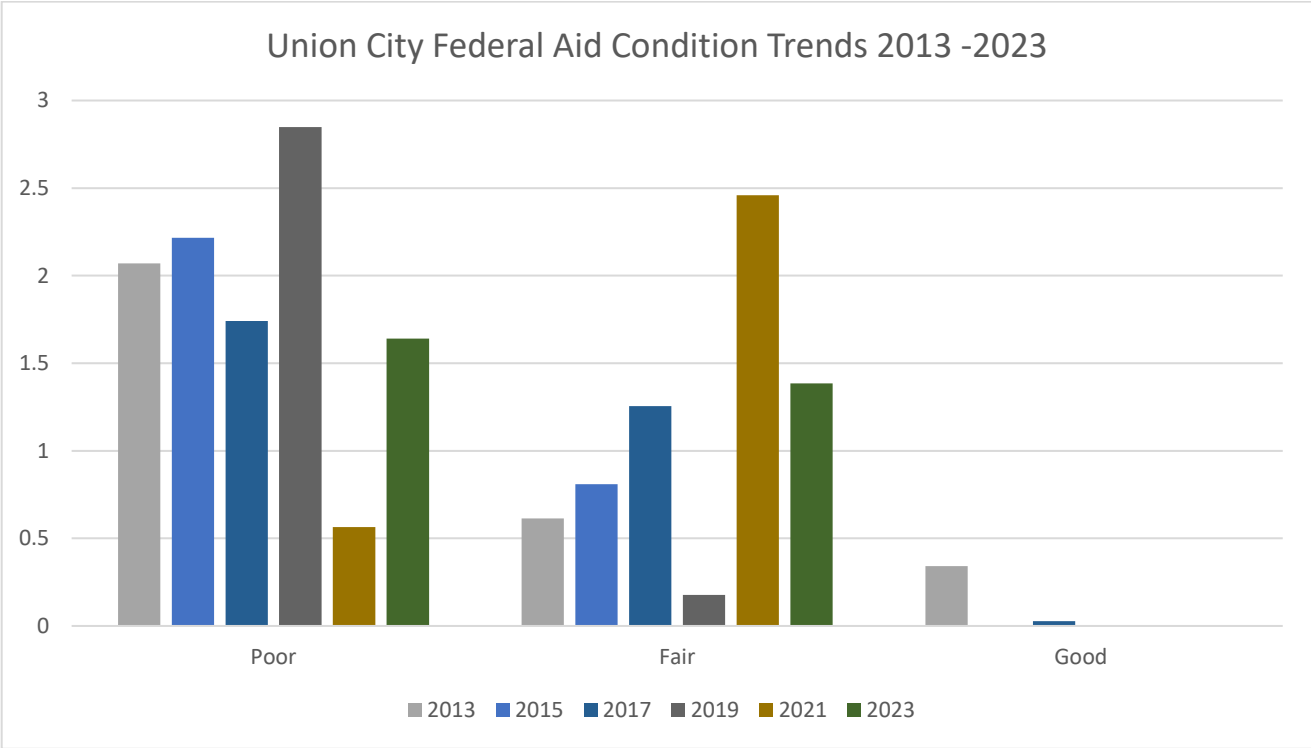
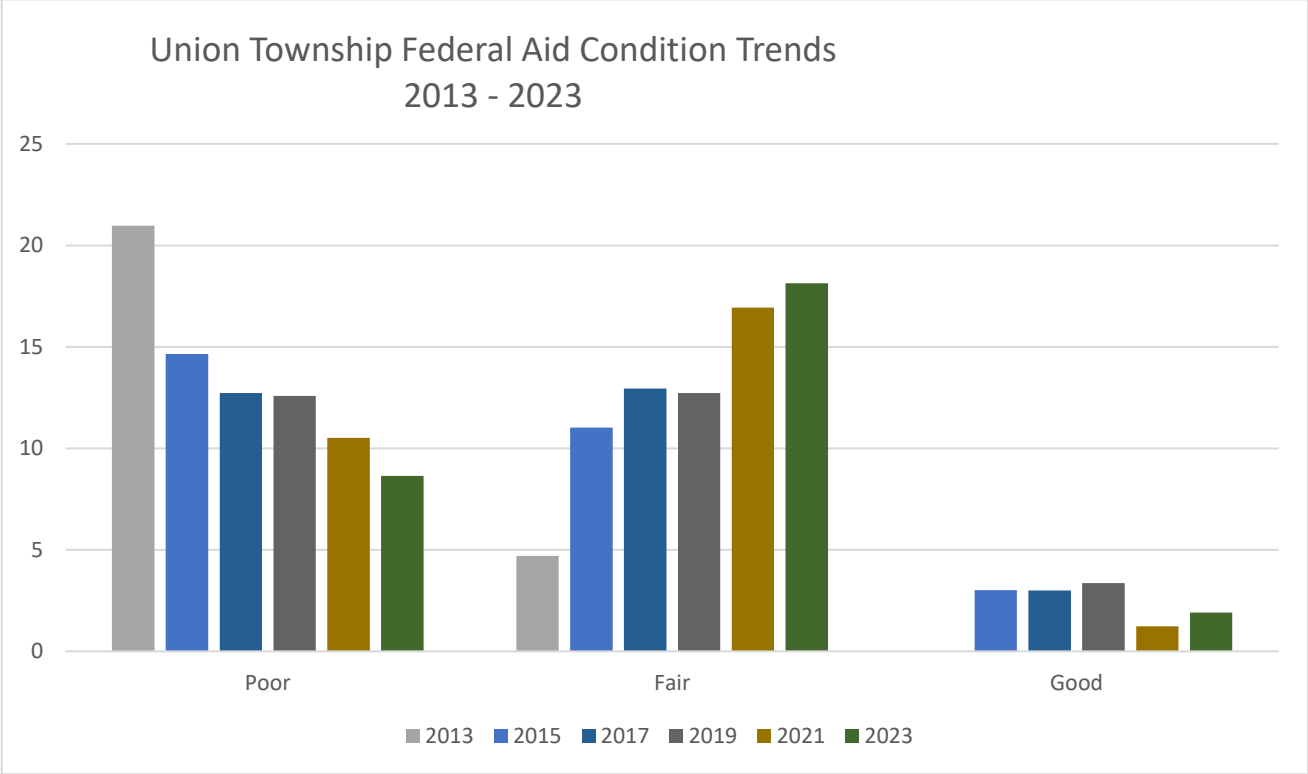
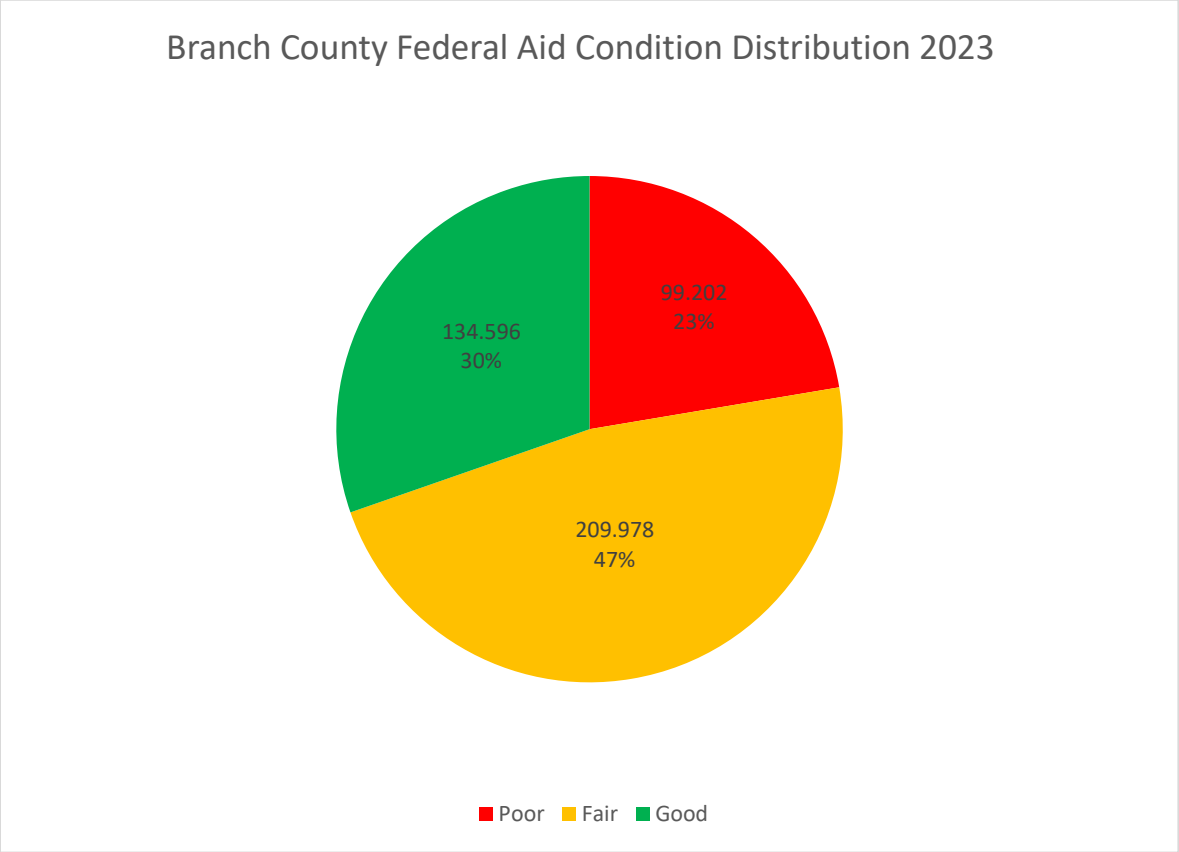


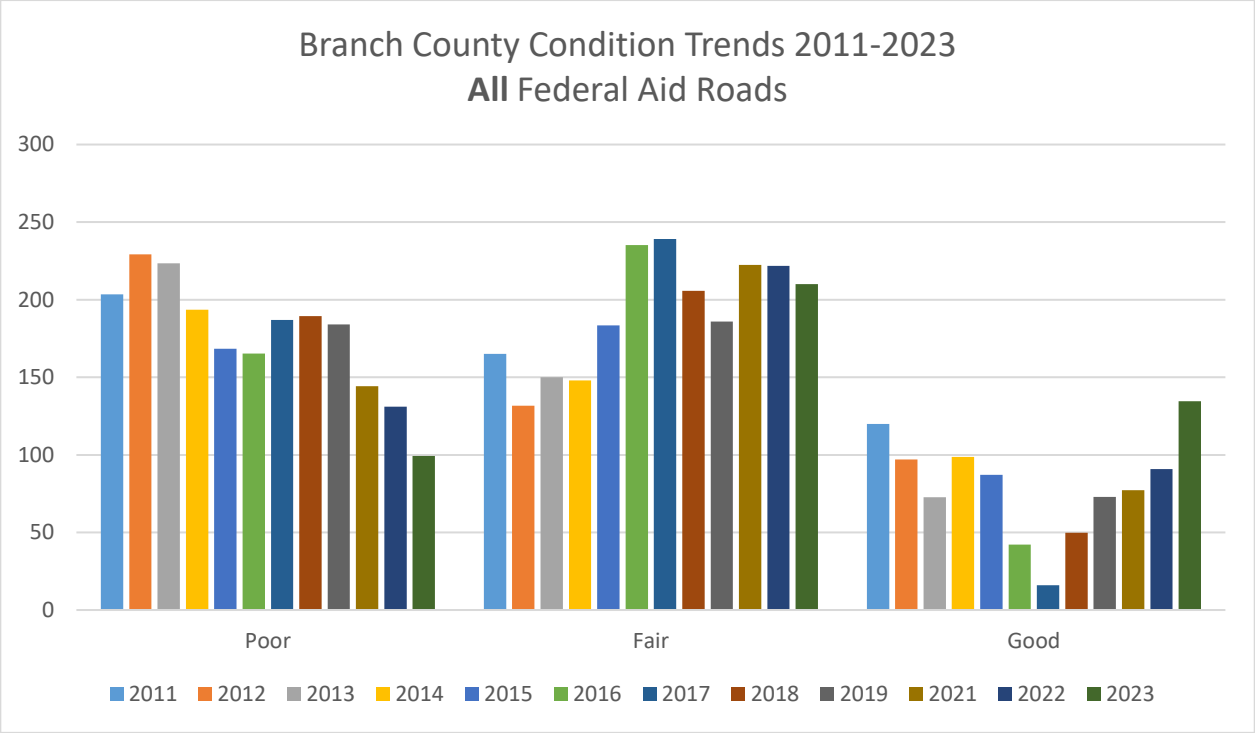



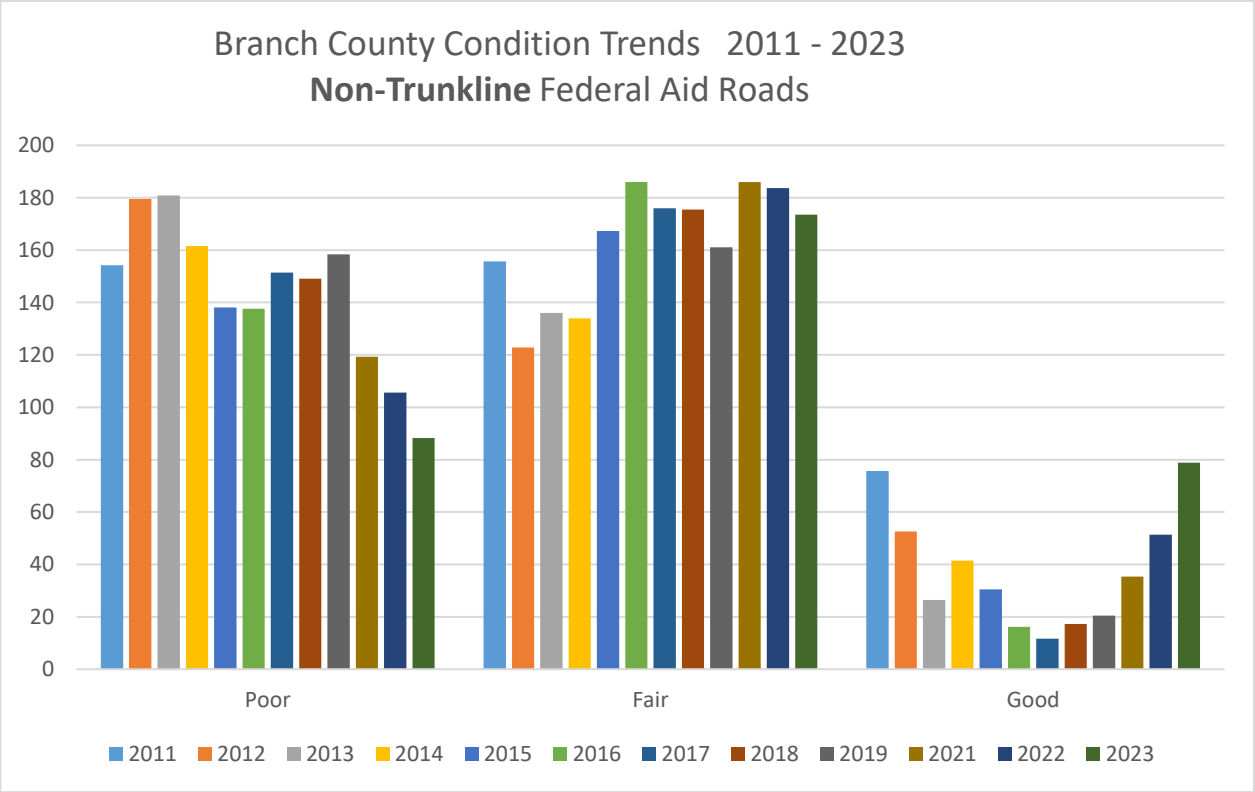
# Pavement Condition Summary

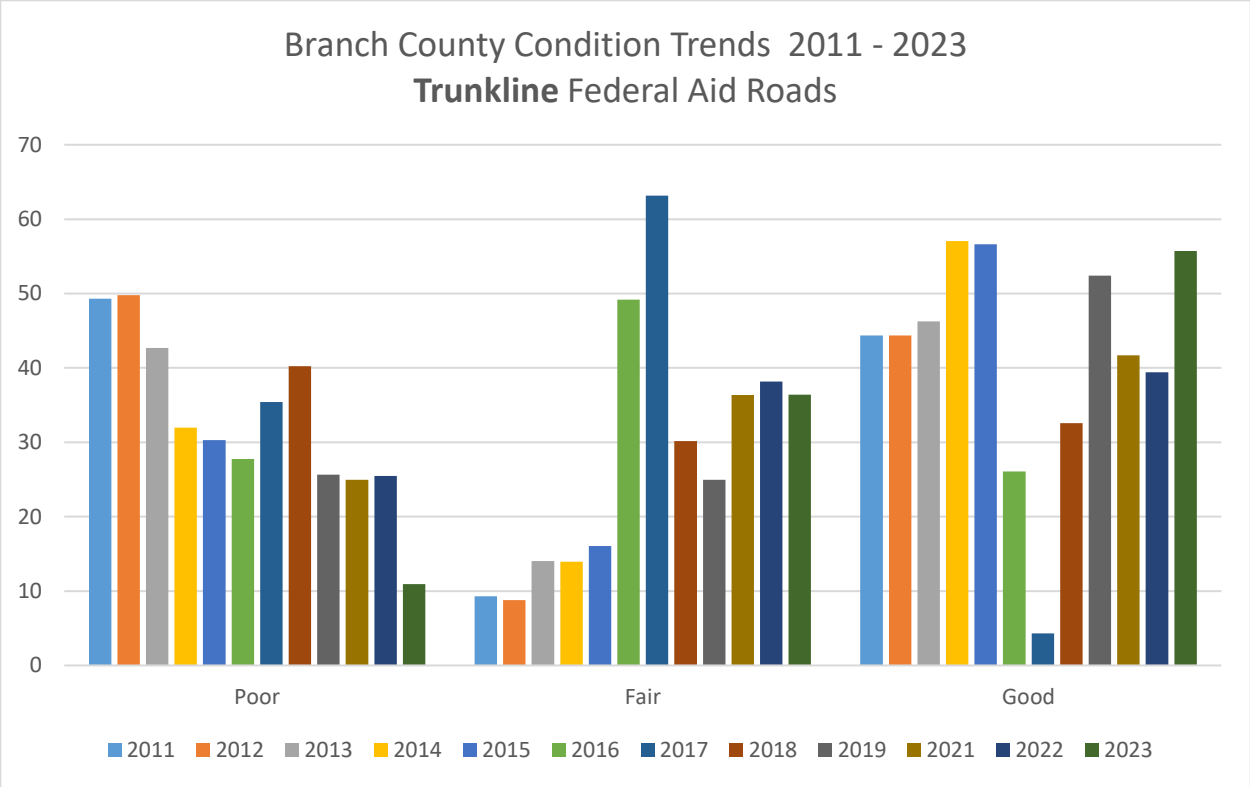
Of the 443 miles of federal-aid roads rated in 2022, approximately 99 are rated as being in "Poor" condition, 210 rated "Fair", and 134 "Good." This distribution means that currently, just under half of all federal aid roads in Branch County are rated Fair. The remaining half are split with the ratio of Good to Poor at about 3:2. The chart below illustrates the actual percentage distribution of road ratings.



## Condition Trends of Federal-Aid Roads



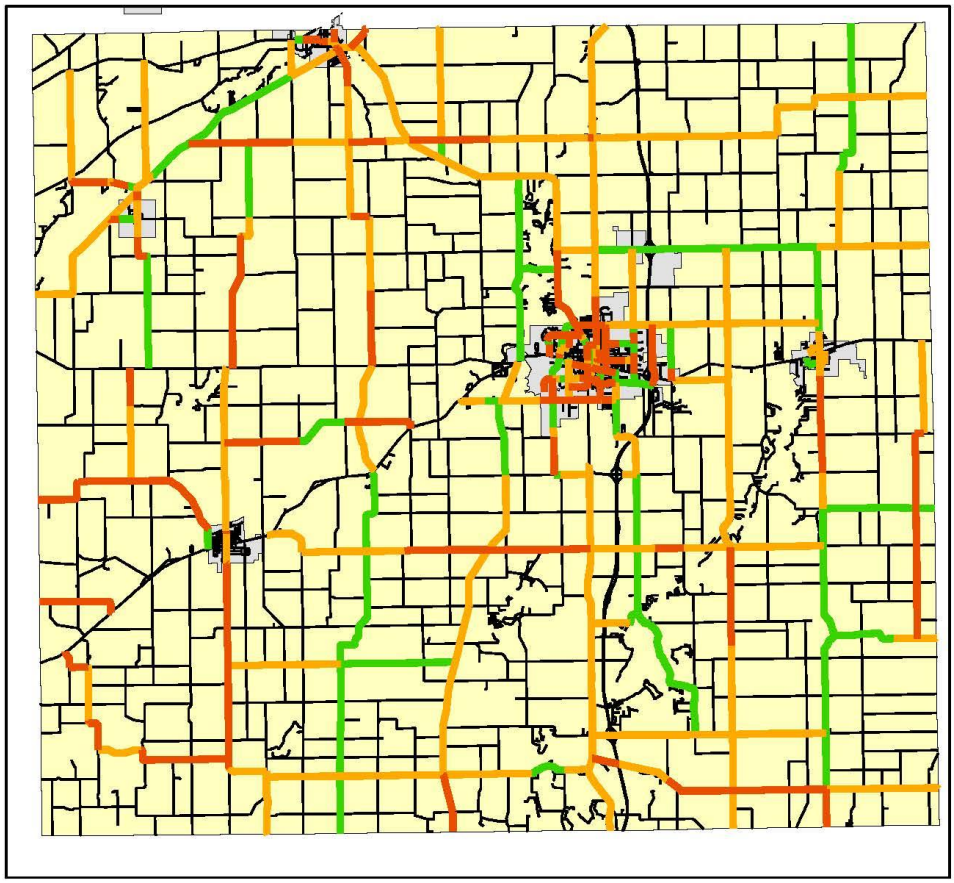






The bar graphs above illustrate the history of the rated quality of roads in Branch County over the course of 12 years. It should be noted that due to slight discrepancies in total mileage reported from 2010 to 2013 in previous years, definite trends can only be inferred for the last seven rating periods. Generally, though the amount of road mileage in Good condition decreased until the 2018 rating period. Mileage of Poor rated roads has been generally decreasing, while Fair rated mileage has been generally increasing. 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 road mileage countywide to improve the overall state of their roads.

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

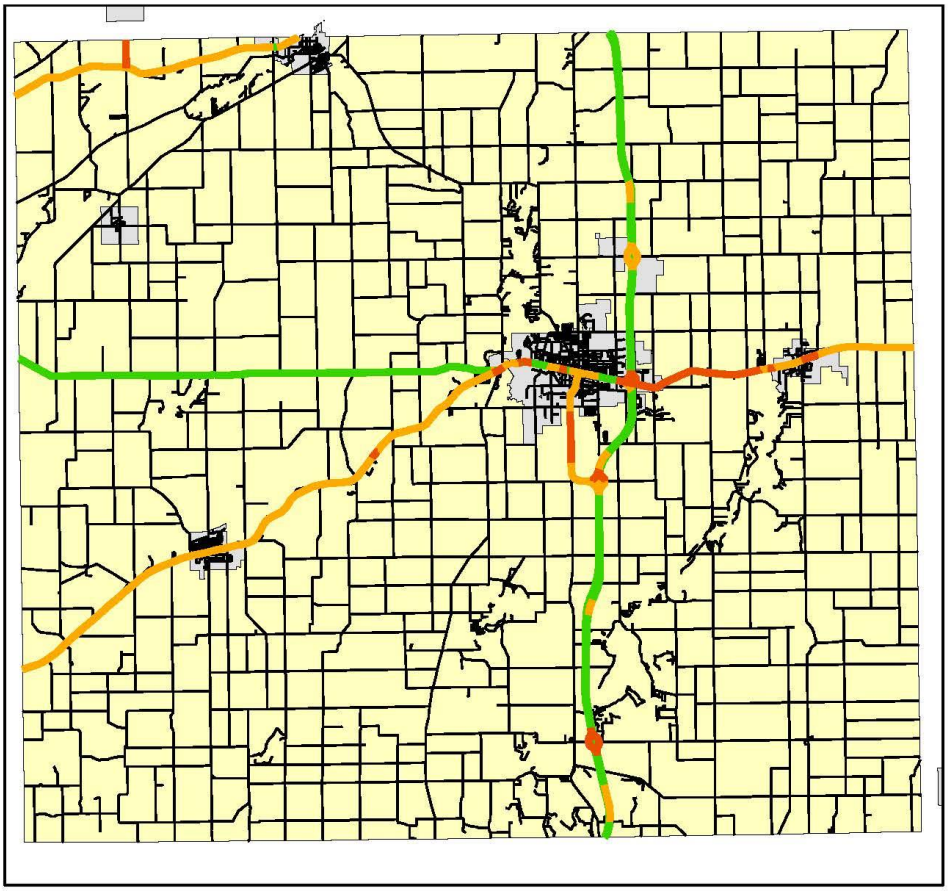
## Branch County Non-Trunkline Federal Aid Road Conditions 2023



**PASER Road Conditions**

- POOR
- FAIR
- GOOD

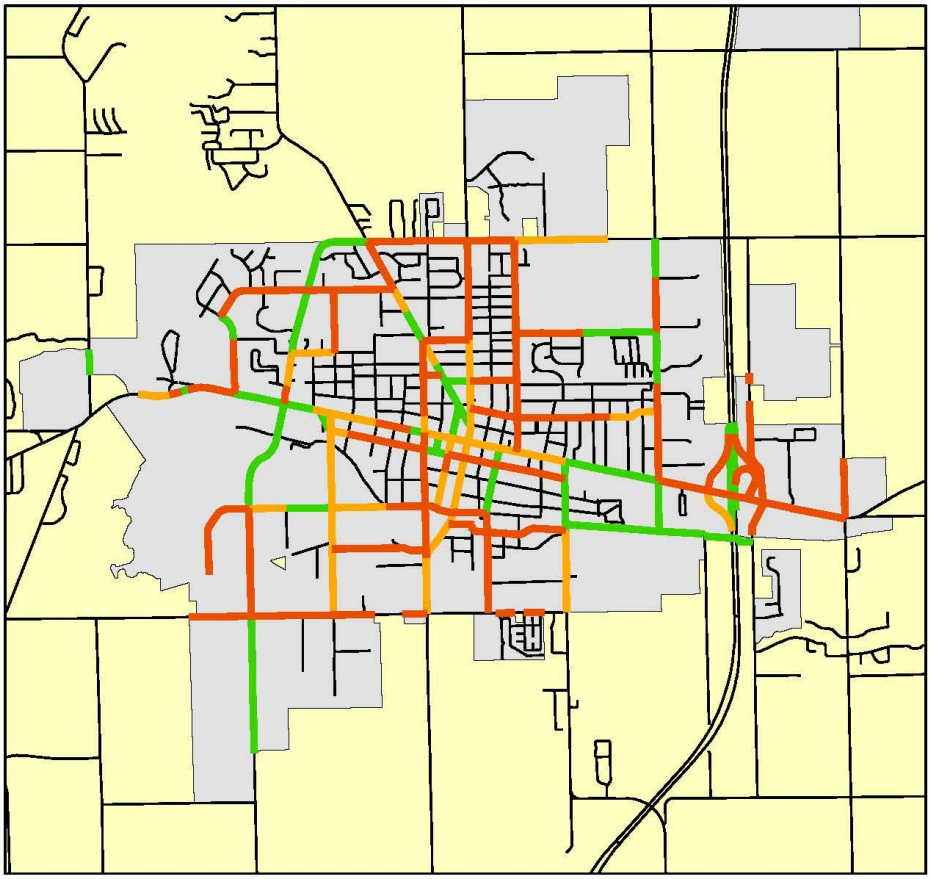
## Branch County Federal Aid Road Conditions
## 2022



**PASER Road Conditions**

- POOR
- FAIR
- GOOD

## Coldwater Federal Aid Road Conditions 2023



**PASER Road Conditions**

- POOR
- FAIR
- GOOD

# Contact Information

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

- **Branch County Road Commission**
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  Michigan • 49036 • (517) 278-2022

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  Michigan • 49002 • (269)343-0766 •
  info@katsmpo.org