WARREN COUNTY
ROAD CONDITIONS
2017

WARREN COUNTY DEPARTMENT OF PUBLIC WORKS

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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

The Warren County Department of Public Works (DPW) is responsible for maintaining safe operating conditions of the County-owned transportation network. Although the County system includes many modes of transport, the highway network, with approximately 247 miles of paved roads requires the largest investment in terms of labor, materials and equipment.

In order to assure the welfare of the traveling public, DPW engineers and highway crews constantly monitor and maintain the many elements of the transportation system. However, the primary focus of the DPW highway monitoring and maintenance activities is the roadway surface. Because of the significant cost, limited functional life expectancy and direct effect on safe vehicle operations, the road surface is arguably the most important component of the travel network.

During the spring/summer of 2017, the DPW engineering staff again conducted road evaluations of the entire County roadway system using visual inspection methods in accordance with the New York State Department of Transportation (NYSDOT) guidelines. This report details the existing surface conditions and conditions of county routes anticipated to have improvements completed in 2017, provides a comparison of 2017 conditions with the previous years' conditions (2015-2016), the proposed rehabilitation/reconstruction programs based on the findings, and discusses various road maintenance strategies and associated costs.

A review of current conditions indicates that current (2017 budget year) funding levels (3.18 million) for road rehabilitation and maintenance have increased good road conditions and improved roads in poor condition compared to 2016 conditions. To continue to make progress toward established DPW goals comparable funding will be needed in the 2018 budget year.

2. STUDY BACKGROUND

2.1 Road Evaluation Methodology

DPW engineering staff conducted road surface evaluations for the entire County system in accordance with the NYSDOT visual assessment guidelines. Surface condition ratings were determined based on the visual inspections of pavement distress in the form of scaling, cracking, settlements and heaves, wheel path rutting, and raveling. The ratings scale ranges from one to ten, where one (1) represents an impassable condition and ten (10) represents a "like new" condition. The surface ratings can be categorized from Excellent to Poor using the following correlation:

- Excellent- surface rating of 10
- Good- surface rating of 8 or 9
- Fair- surface rating of 6 or 7
- Poor- surface rating of 5 or below

Typically, pavement surfaces with condition ratings of six (6) or above are considered satisfactory requiring routine annual maintenance activities to prolong service life. Surface ratings of five (5) or four (4) indicate the road is significantly distressed and in need of rehabilitation. Rating of three (3) or less are designated to roadways with severely deteriorated surface conditions that may pose a risk to motorists. Roads in this condition will likely require full-depth reconstruction. Table 2-1 shows the road surface ratings based on distress frequency and severity that were used in the evaluations.

As a supplement to the criteria detailed in Table 2-1, DPW engineers used photographic scales in the field. The photographic scales depict several roadway surfaces for each rating point and aid engineers to determine the appropriate surface rating objectively. The photographic scales along with a matrix developed by NYSDOT for determination of surface condition rating were used to assign surface condition ratings to county roads.

2.2 Roadway Network

The County-owned network of roadways consists of 246.09 miles (501.85 lane miles) of bituminous asphalt pavement and 0.81 miles (1.62 lane miles) of concrete pavement. Table 2-2 shows the total miles of County-owned roads by municipal subdivisions.

Table 2-1
Surface Rating Based on Frequency and Severity Descriptions

Frequency		Severity								
		None	Slight	Minor	Moderate	Moderate to Severe	Severe	Very Severe	Travel is Impaired	Impassable
No distress is present. A single random defect per 0.10 mile is allowed.	None	10 / 9	9	-	-	-	-	-	-	-
Most of the pavement is free of distress. One or two cracks or distresses are visible for the next 0.10 mile.	Infrequent	-	8	8	8	7	7	-	-	-
Much of the pavement is free of cracking. Large blocks of distress-free pavement are present.	Infrequent to Occasional	-	8	7	7	7	6	6	-	-
Much (< 1/2) to most (> 1/2) of the pavement is cracked. Uncracked or undistressed blocks of pavement range from 20-30 ft per lane to 12 ft per lane.	Occasional to Frequent	-	7	7	6	6	5	5	-	-
Nearly all of the pavement is cracked. Uncracked or undistressed blocks of pavement are 12 ft square or less.	Frequent	-	7	6	6	5	4	3	2	1
Mostly cracked. Cracks or distress are continuous and spaced only a few feet apart.	Very Frequent	-	6	6	5	5	4	3	2	1

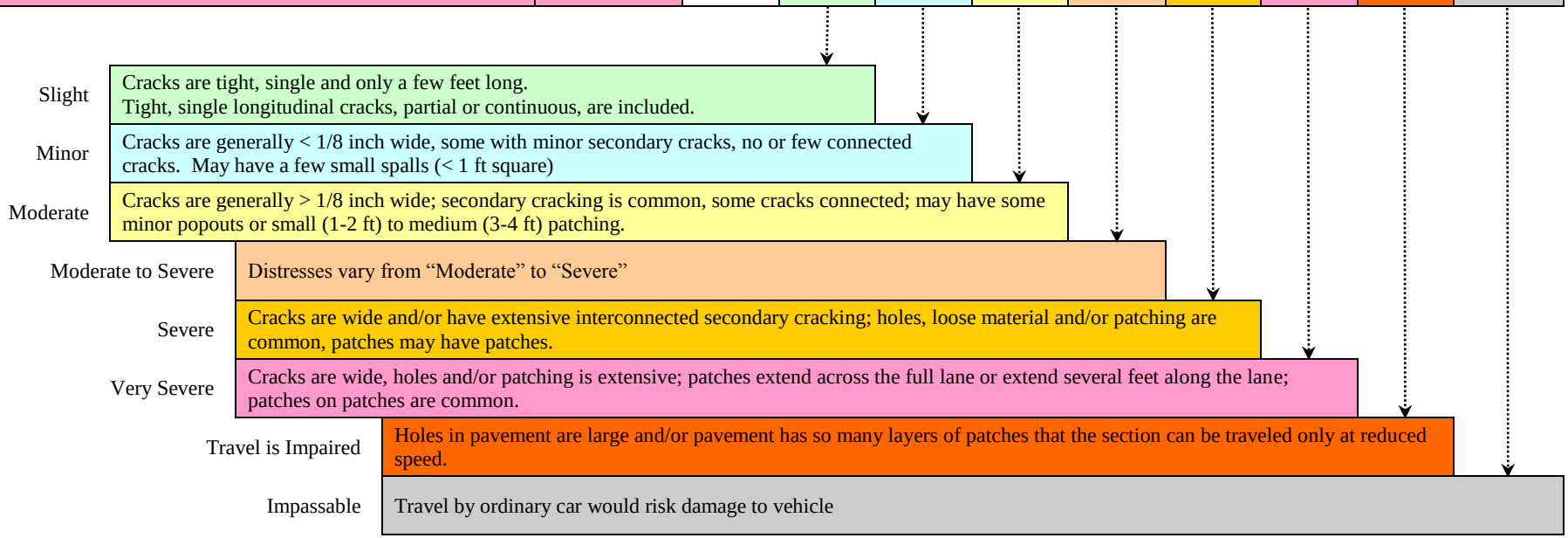


Table 2-2
Miles of County Road per Municipality

Municipality	Total Centerline Miles of County Road	Total Lane Miles of County Road
Town of Bolton	22.34	44.68
Town of Chester	30.87	61.47
Town of Hague	9.02	18.04
Town of Horicon	26.17	52.34
Town of Johnsburg	24.47	48.94
Town of Lake George	7.95	15.90
Town of Lake Luzerne	14.88	29.76
Town of Queensbury	39.17	86.83
Town of Stony Creek	21.72	43.44
Town of Thurman	26.53	53.06
Town of Warrensburg	23.19	46.38
Village of Lake George	0.59	2.36
	246.90	**503.47**

3. EXISTING ROAD CONDITIONS

DPW engineers resumed road surface evaluations in 2011 and have conducted them annually since. Many county roads have undergone rehabilitation or reconstruction since the original evaluation was conducted. The information contained in this report represents current condition assessments of the roadways and the ratings presented reflect anticipated 2017 road conditions at the end of construction season.

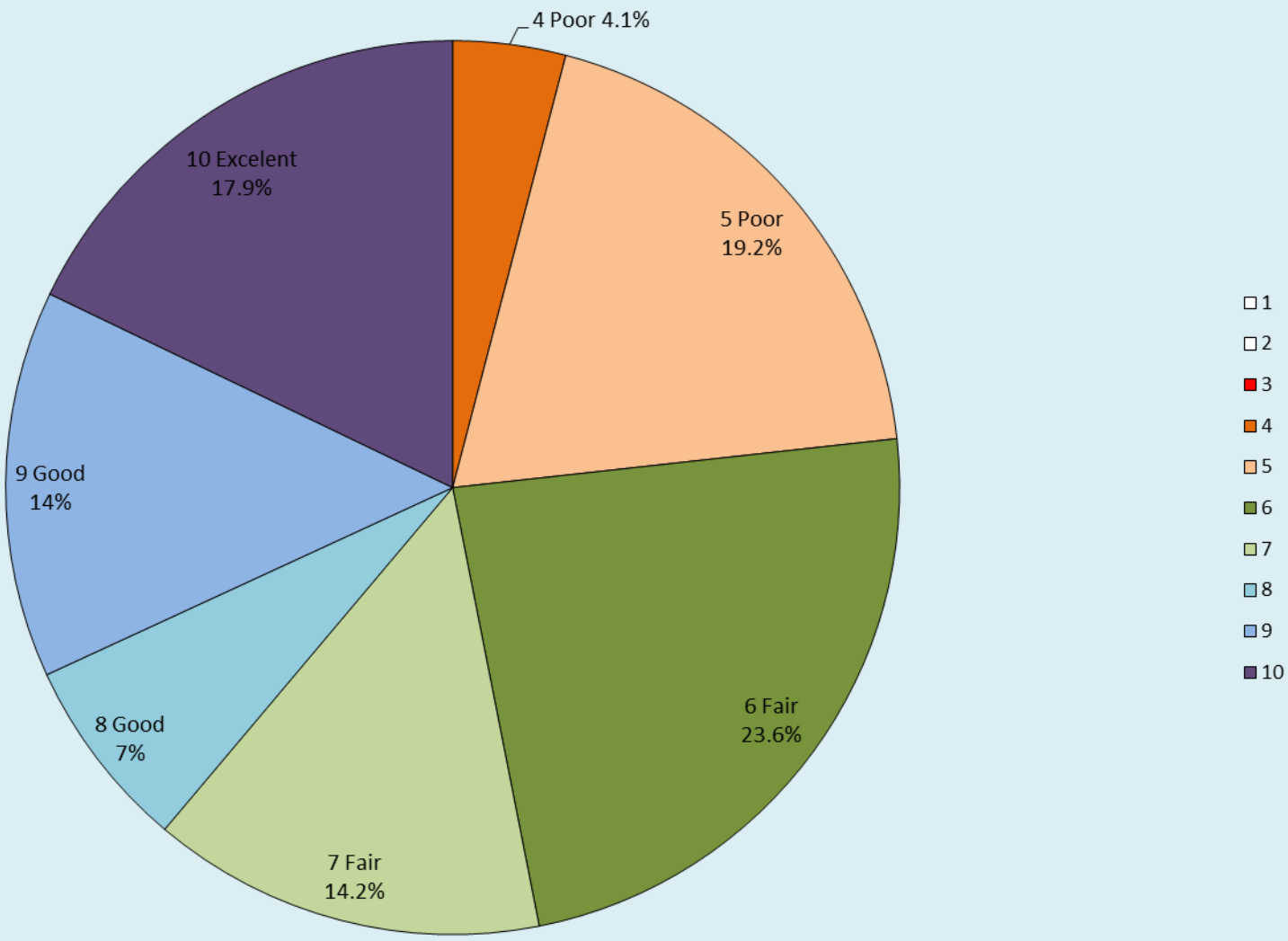
3.1 County Overview

Based on the findings from the 2017 county road evaluations, the following conditions were found:

- 0% of county roadways are in "Very Poor" Condition. (meeting the established goal of 0%)
- Approximately 23.3% of county roadways have "Poor" surface conditions.
- County roadways with "Fair" surface conditions represent 37.8% of county road miles.
- The remaining 38.9% of county roadways have "Good" or "Excellent" surface conditions

Figure 3-1 illustrates the road surface rating of county roads by percentage of total road miles.

Figure 3-1
2017 Warren County Road Conditions



3.2 Road Conditions in the Municipal Subdivisions

The county roadways 2017 conditions were also analyzed based on condition rating by percentage within the municipal subdivisions. By the conclusion of the 2017 construction season no town will have roads at condition rating 3, or Very Poor condition. Six of the eleven towns, have a small percentage of roads (16% or less) at condition rating 4, or Poor condition. The Towns of Thurman, Johnsburg, Chester and Lake Luzerne have the largest percentage (>30%) of county roadways considered to be in Poor condition (rating of 5 or less),

All Towns have over 50% of their roads in Fair or better condition. The Towns of Bolton, Hague, Horicon, Lake George, Queensbury, and Warrensburg have over 75% of their roads in Fair or better condition meeting or exceeding the established goals.

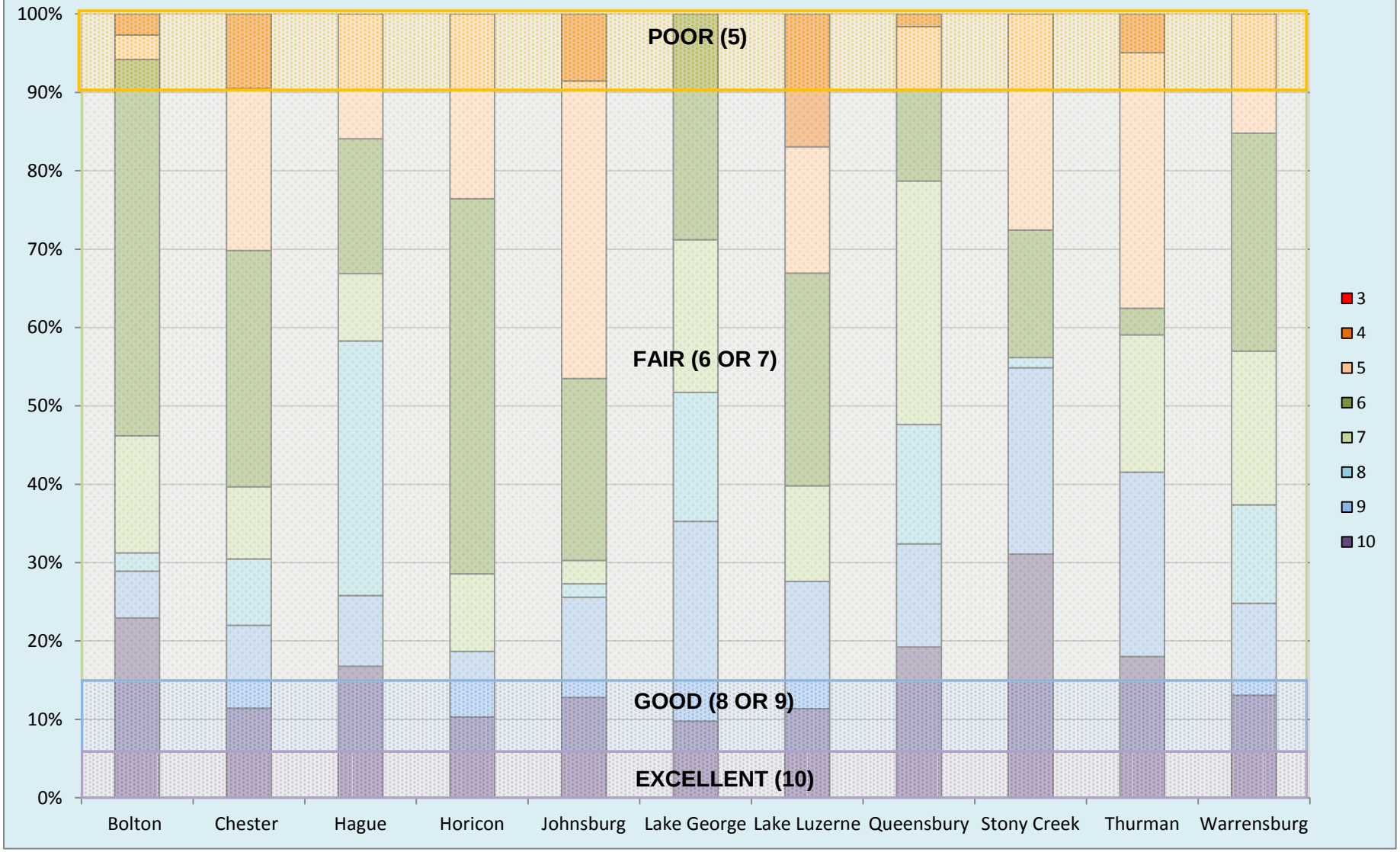
Figure 3-2 illustrates 2017 road conditions by municipal subdivision.

Comparisons of 2015-2017 road condition data by township is found in the appendix.

Shaded areas represent DPW goals

Figure 3-2

2017 Warren County Road Conditions



3.3 Road Conditions: 2015-2017

A review of previous year's road conditions was conducted to compare current conditions and determine condition trends and rate of improvement and/or deterioration of county roads. Based on this review, Table 3-1 was developed and represents the miles of county roads based on rating category recorded for the last three years.

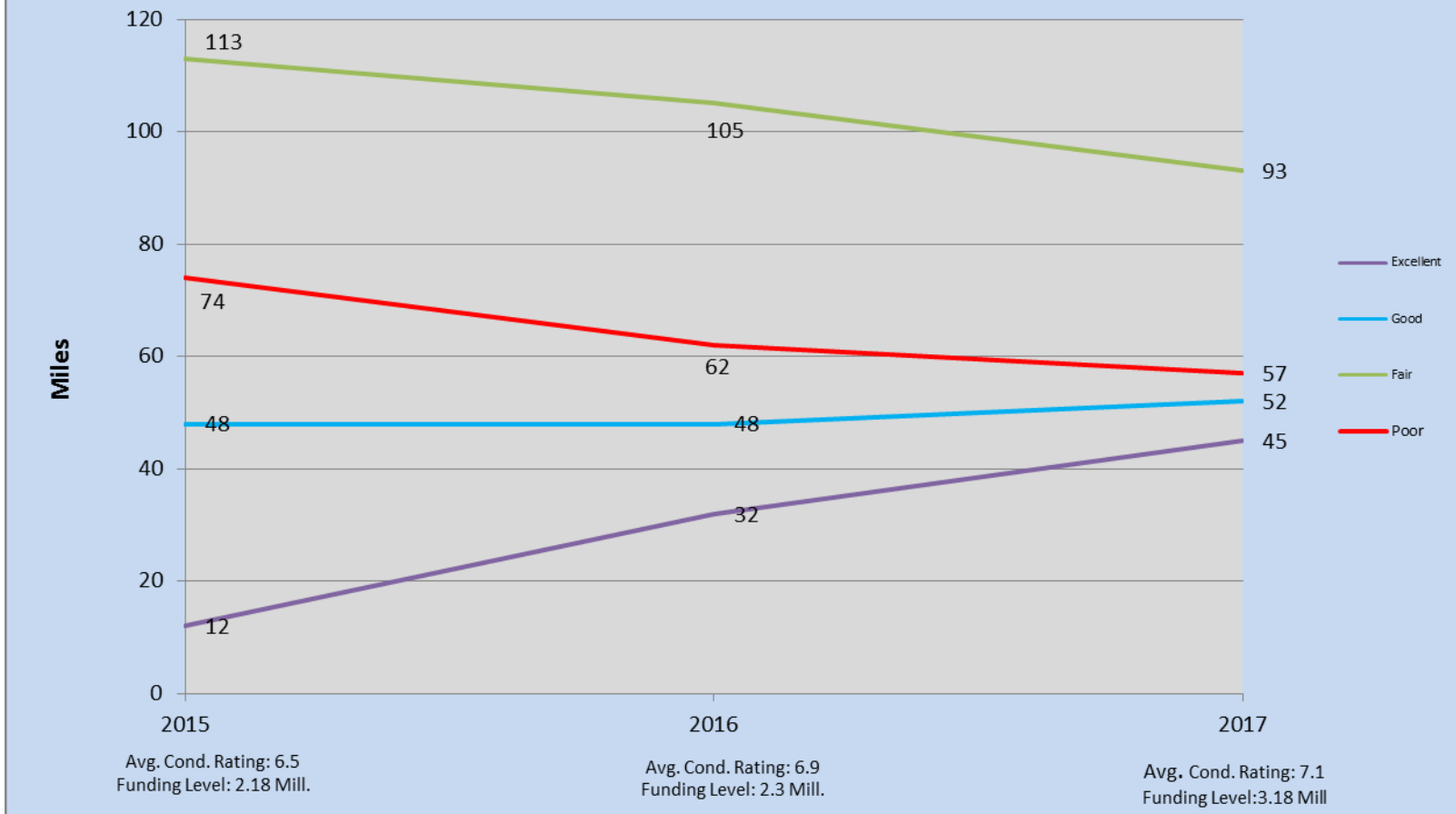
Table 3-1
County Road Condition Trends: 2015-2017

Rating Category	2015	2016	2017
Excellent	12 miles	32 miles	45 miles
Good	48 miles	48 miles	52 miles
Fair	113 miles	105 miles	93 miles
Poor	74 miles	62 miles	57 miles

As shown in Table 3-1, the trend for county roads indicates a gain (17 miles) for roads in Good or better condition and a loss (5 miles) in roads in Poor condition from 2016 to 2017. Roads in Fair condition experienced a drop (12 miles) from 2016 conditions. It is noted that the 2017 condition ratings included sections of roads anticipated to be completed within the year as having an Excellent surface condition.

Figure 3-3 provides a graphical representation of county road conditions from 2015 to 2017

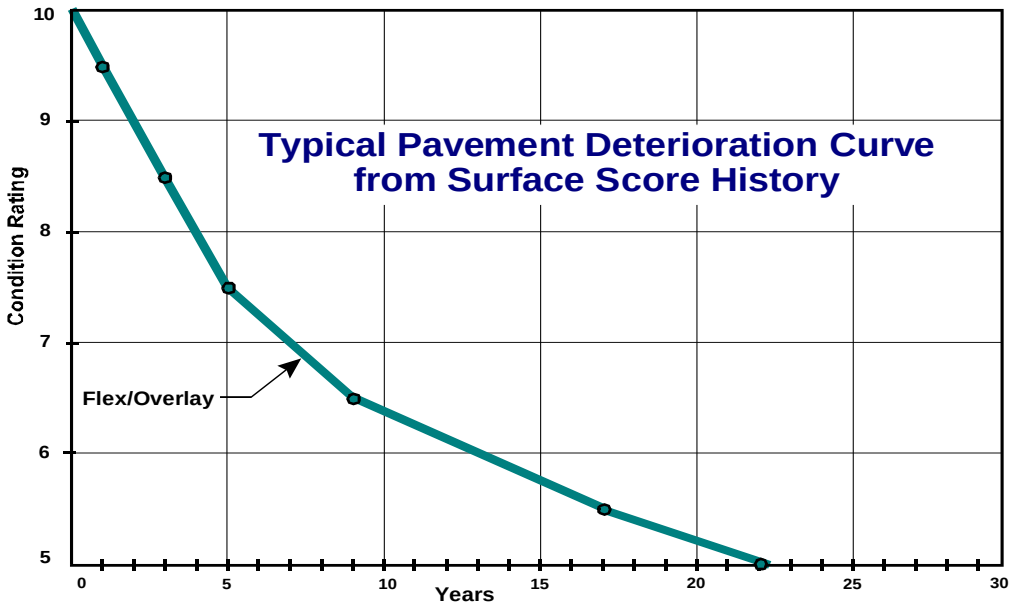
FIGURE 3-3 : 2015-2017 ROAD CONDITIONS



4. ROAD LIFE CYCLE

The road surface life cycle of an existing road, or period of time that a newly-paved road (surface rating 10) deteriorates to a condition requiring rehabilitation (surface rating 5 or below), is typically measured in decades, or years, depending on the level of rehabilitation (full reconstruction vs. overlay) and various factors such as weather conditions, subsurface soil type, drainage and preventative maintenance. Figure 4-1 is a graphic representation of flexible/overlaid pavement (asphalt) depicts the typical life cycle of asphalt pavement surface.

Figure 4-1: Road Surface Life Cycle



Source: NYSDOT

As shown in Figure 4-1, typically an asphalt-paved surface will experience a significant loss to surface rating in the first 5 years. This is usually attributed to a lack of preventative maintenance, such as crack filling or patching, or other factors such as poor compaction or subsurface soil type. In 10 years, the typical road surface will fall below the 7 surface rating. Some type of rehabilitation, such as an overlay or intermittent milling and replacement, will be needed to regain a Good condition rating. Roads falling to a surface rating of 5 or less (20+ years) will require significant rehabilitation or reconstruction to regain a Good condition rating.

5. ROAD PRESERVATION PLAN

5.1 Road Condition Strategies and Goals

Several road preservation strategies were considered when developing a preservation plan for Warren County roads. Attempting to repair only roads in Poor condition, or a "Worst First" strategy, will result in repair of only small portions of these roadways due to resource and budgetary constraints, while roads in Good or Fair condition deteriorate to Fair or Poor condition. NYSDOT has developed a maintenance strategy that focuses on preventing road conditions falling below the Good threshold as a priority while developing long-term strategies for roads in Fair or Poor condition.

A staged approach was chosen to be implemented in order to maintain existing conditions of roads in Fair to Good condition, while over a period of years rehabilitating and reconstructing roads in Poor condition with the most immediate need. Therefore, goals were established by DPW engineers for county roads in order to ensure Warren County road conditions are at a minimum maintained, and improved where necessary.

5.2 Estimated Service Life and Repair Costs

Based on data from repairs completed on Warren County roads, the estimated service life of repairs have been developed. Estimated Service Life refers to the longevity of a repair made to a roadway before that repair will no longer be effective. For example, if a full-depth reclamation is performed, it is estimated that the repair will last for 20-25 years, or has an ESL of 20-25 years; while a roadway receiving a pavement overlay will have an ESL of 5-10 years before that repair is no longer effective, and a roadway receiving crack seal will have an ESL of 2-3 years, etc. Table 5-1 shows the type of repair needed, the estimated service life and the estimated cost per lineal mile of roadway.

Table 5-1
Estimated Service Life (ESL) and Repair Costs

Type of Repair	ESL (Yrs.)	Cost/ Lineal Mile
Preventative Maintenance (crack seal, patching, etc.)	2 to 3	$10,000-$20,000
Restoration (overlay, fog seal, slurry seal, etc.)	5 to 10	$50,000-$150,000
Resurface (hot/cold partial reclaim, mill and fill, etc.)	10 to 20	$150,000-$250,000
Reconstruction (full-depth reclaim, rebase, culverts, etc.)	20 to 25	$250,000-$350,000

As shown in Table 5-1, the type of repair and estimated service life increase with a significant associated cost increase.

6. CONCLUSION

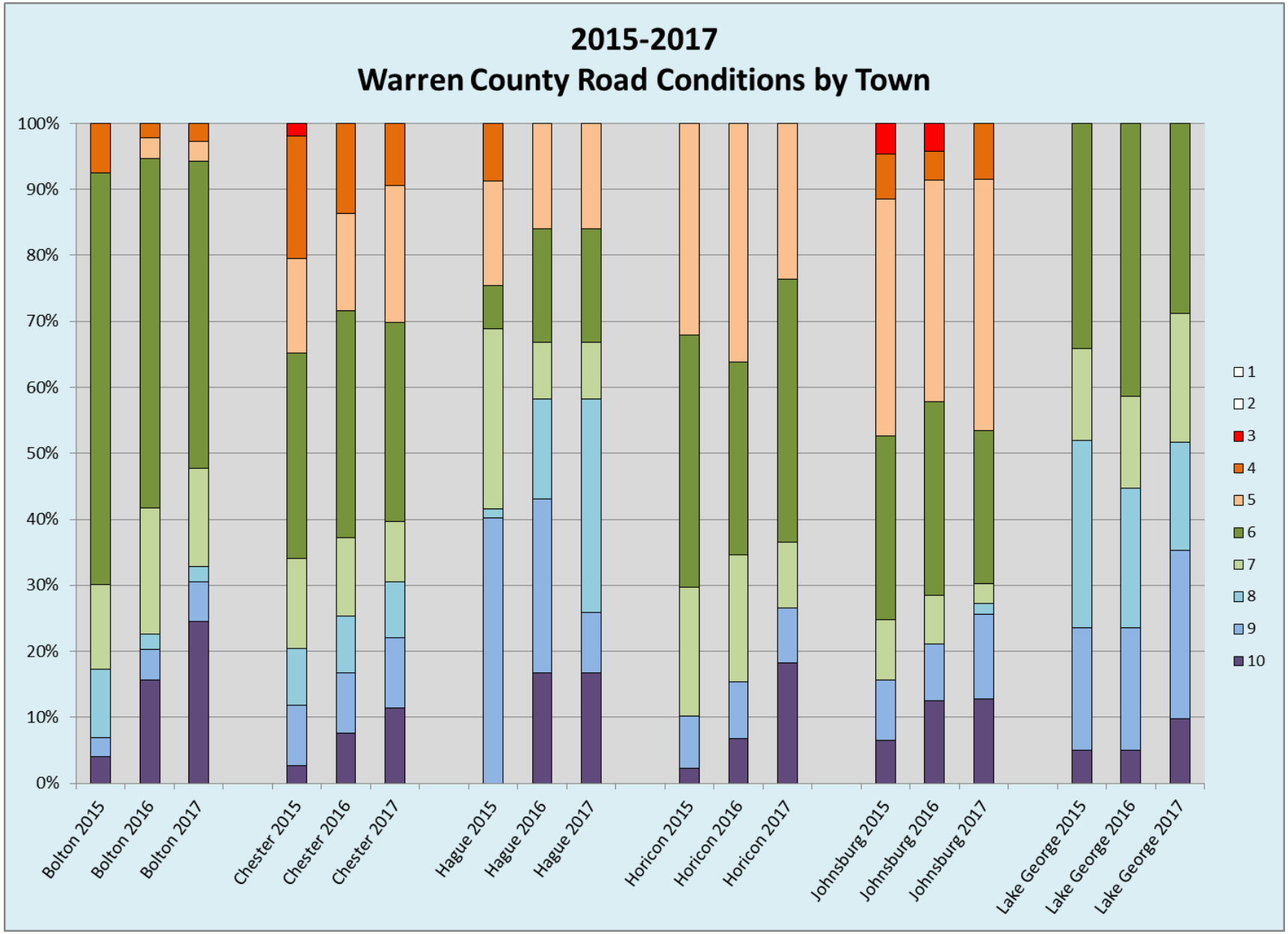
A review of existing road surface conditions of Warren County roads indicates that 61% are in Fair or Poor condition and are in need of repair. Future funding would have to be at the same level or greater than the 2017 budget to attempt maintaining existing conditions on Fair roads and slowly make progress towards the goal of 0% for Poor roads. The following page has a draft of the proposed 2018 county road budget providing 255 service life miles (SLM) at an approximate cost of $3.03 million.

Warren County Department of Public Works
2018 Highway Projects

DRAFT DATE: 7/20/2017

Road	CR#	Town	From	To	Length of	Type of Repair		Cost	ESL Miles
Valentine Pond Rd	55	Horicon	2017 Project	.6 miles North	0.60	Reconstruct/Resurface	$	160,000.00	12
Schroon River Rd	30	Chester	2017 Project	1.0 miles North to Boat Launch	1.00	Reconstruct/Resurface	$	217,000.00	20
Dartmouth Rd	76	Stony Creek	2017 Project	.4 miles East	0.40	Reconstruct/Resurface	$	110,000.00	8
13th Lake Rd	78	Johnsburg	Rt 28	Firehouse	1.00	Reconstruct/Resurface	$	145,000.00	20
High Street	4	Thurman	2016 Project	.8 miles West	0.80	Reconstruct/Resurface	$	213,000.00	16
Landon Hill Rd	68	Chester	2016 Project	.8 miles South	0.80	Reconstruct/Resurface	$	211,000.00	16
East Schroon River Rd	64	Horicon	CR 15	1.0 miles South	1.00	Restoration (Overlay)	$	110,000.00	10
Old Stage Rd	60	Lake Luzerne	Rebate north of Potash Rd	.8 miles South	0.80	Reconstruct/Resurface	$	211,000.00	16
South Johnsburg Rd	57	Johnsburg	Hudson St	.8 miles South	0.80	Reconstruct/Resurface	$	218,000.00	16
Atateka Rd	74	Chester	CR 8	.8 miles East	0.80	Reconstruct/Resurface	$	211,000.00	16
Warrensburg Rd	3	Stony Creek	2017 overlay project	2017 reconstruction project	1.50	Reconstruct/Resurface	$	220,000.00	30
						CHIPS and PAVE NY TOTAL	***$***	***2,026,000.00***	***180***
				Additional $1 Million					
Valley Rd	36	Thurman	CR 13	Parker Cross Rd	1.00	Reconstruct/Resurface	$	353,000.00	25
East Shore Dr (Adirondack)	15	Horicon	2017 Project	CR 55	1.40	Restoration (Overlay)	$	150,000.00	14
Glen Athol Rd	13	Thurman	2017 Project	1.5 miles North	1.50	Reconstruct/Resurface	$	420,000.00	30
Fourth Ave.	5	Warrensburg	Rt 9	CR 40	0.30	Reconstruct/Resurface	$	77,000.00	6
						Subtotal	***$***	***1,000,000.00***	**75**
						Total	**$3,026,000.00**		**255**

Appendix


2015-2017
Warren County Road Conditions by Town
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Bolton 2015
Bolton 2016
Bolton 2017
Chester 2015
Chester 2016
Chester 2017
Hague 2015
Hague 2016
Hague 2017
Horicon 2015
Horicon 2016
Horicon 2017
Johnsburg 2015
Johnsburg 2016
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Lake George 2015
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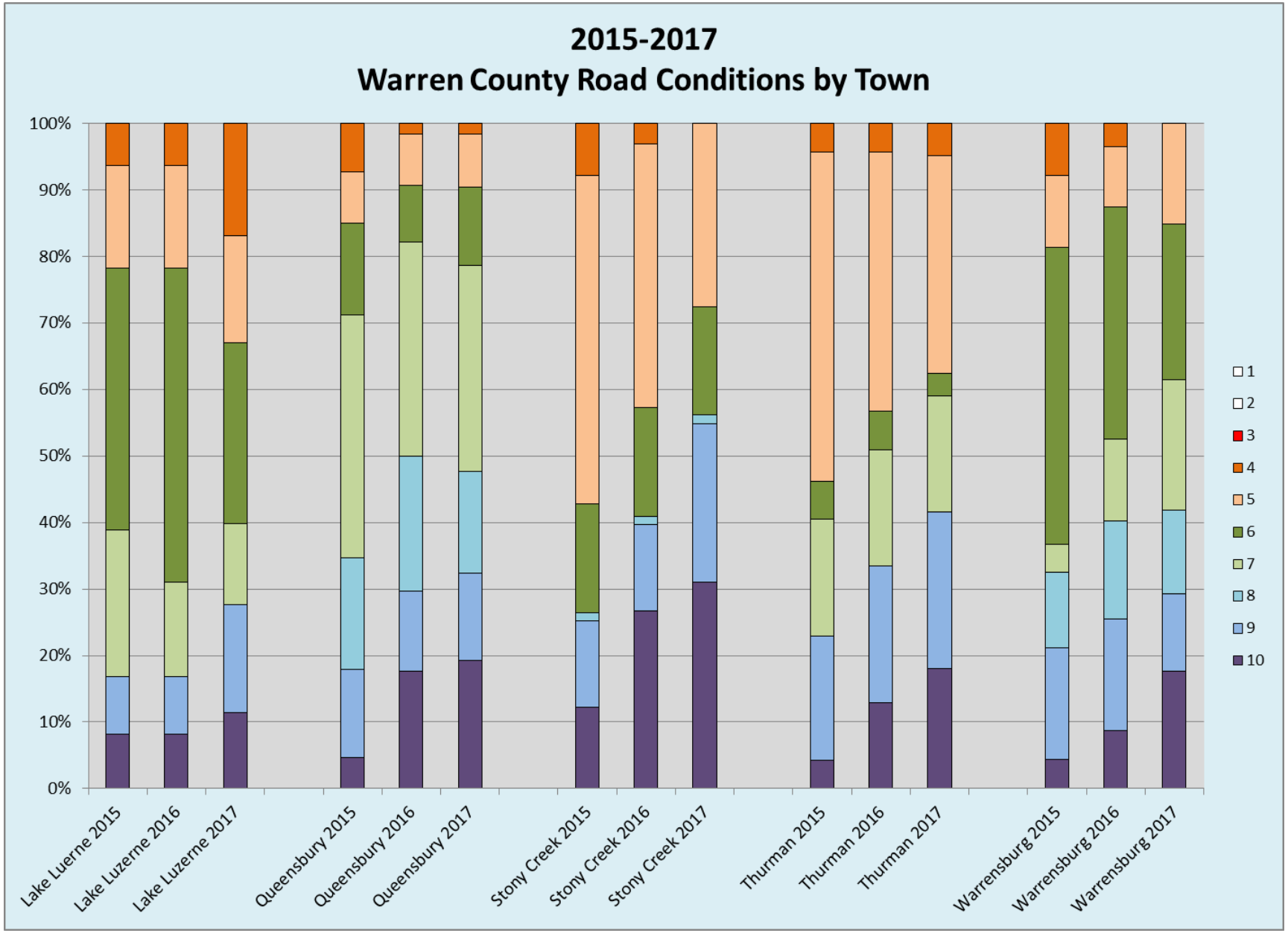
2015-2017
Warren County Road Conditions by Town
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Lake Luerne 2015
Lake Luzerne 2016
Lake Luzerne 2017
Queensbury 2015
Queensbury 2016
Queensbury 2017
Stony Creek 2015
Stony Creek 2016
Stony Creek 2017
Thurman 2015
Thurman 2016
Thurman 2017
Warrensburg 2015
Warrensburg 2016
Warrensburg 2017
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