BLAIR COUNTY ROAD-STREAM CROSSING ASSESSMENT

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Funding Provided by the National Fish and Wildlife Foundation

Western Pennsylvania Conservancy
water, land, life.

Background

In 2017, the Western Pennsylvania Conservancy (WPC) received funding from the National Fish and Wildlife Foundation (NFWF) to complete an assessment of road-stream crossings in Blair County (Figure 1). The purpose of this assessment was to survey culverts and bridges in order to determine aquatic organism passage (AOP) issues. Stream connectivity is important for all aquatic species, but especially important for salmonid species in a number of ways, including access to thermal refuge, access to important spawning habitat, and for eliminating genetic isolation of populations. However, poor design of culverts and bridges (road-stream intersections) can negatively affect stream connectivity. Culverts can act as barriers to fish passage in a number of ways. A culvert can be perched above the stream bed, causing fish to have to jump large heights. Aquatic organisms have varying levels of mobility and passable culverts are essential for a connected ecosystem. High current velocities in culverts can make it impossible for organisms to move through them. Water depth within the culvert can be too shallow, or may not provide resting areas for organisms that are migrating upstream. In fact, properly designed and installed culverts also benefit other aquatic species that are less mobile than trout including mussels, amphibians, reptiles and macroinvertebrates. Poorly designed and/or installed culverts also pose problems for stormwater runoff, infrastructure maintenance, and public safety in the event of flooding. Often, an undersized culvert creates a blowout effect downstream, increasing water velocities and streambank erosion. A plugged culvert that cannot pass debris also acts as a dam during high water events, exacerbating flooding and becoming a public safety hazard.

Blair County has more than 2,400 mapped road-stream crossings throughout the county. In order to prioritize areas where surveys would take place, we started with a map of Blair County that included road-stream crossings overlaid with wild trout streams and dirt and gravel roads. We then met with the Blair County Conservation District (BCCD) to get their local knowledge of the county and further prioritized areas based on their criteria.

Using the North Atlantic Aquatic Connectivity Cooperative (NAACC) protocol, WPC surveyed 260 road-stream crossings in Blair County (Figure 1). Four staff members from BCCD were trained in using the NAACC protocol and received their certification to be observers. Additionally, WPC staff spoke at a meeting for the Intergovernmental Stormwater Committee, where a presentation was given about the importance of properly sizing culverts.

Methods

NAACC is a network of individuals from universities, conservation organizations, and state and federal natural resource and transportation departments focused on improving aquatic connectivity across a thirteen-state region, from Maine to West Virginia. NAACC has developed common protocols and training for assessing road-stream crossings (culverts and bridges) and developed a regional database for this field data. The information collected can be used to identify high priority bridges and culverts for upgrade and replacement.

All field survey data was collected using the NAACC Stream Crossing Survey Data Form Instruction Guide (Jackson & Abbott 2016). Data was collected on a Microsoft Surface Pro tablet and uploaded into the NAACC online database. All data was checked for quality assurance by WPC's L1 Coordinator. Upon entry into the database, all crossings are automatically scored using two scoring systems (Jackson & Abbott 2016). All data was then exported to ArcGIS, and maps were generated for each township.

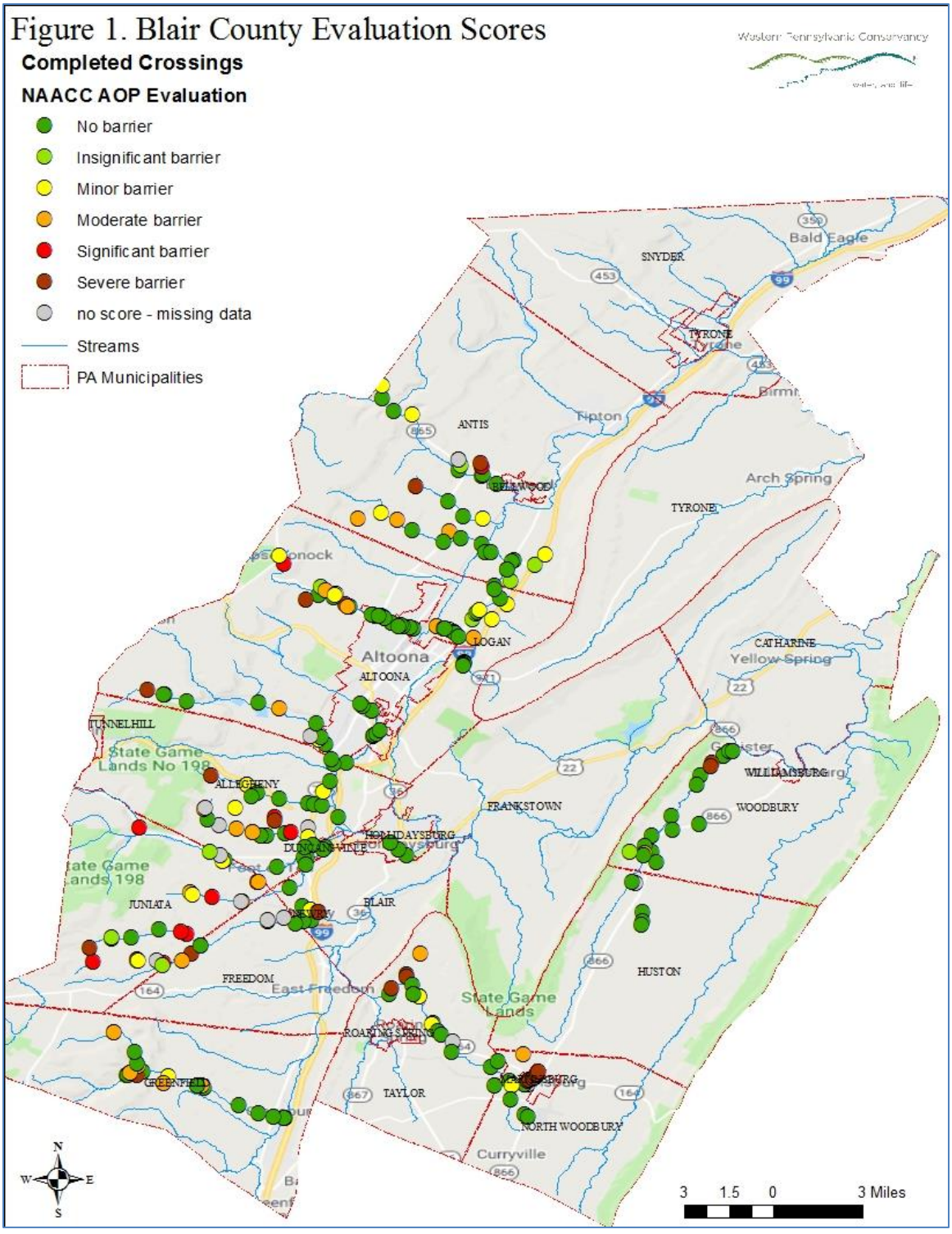


Figure 1 shows the AOP score for all of the crossings that were assessed through this project.

Assessment Results

WPC and BCCD surveyed 260 culverts throughout Blair County in 2018 (Figure 1). Overall, 26 culverts are considered to be severe barriers, 11 culverts are considered to be significant barriers, and 23 are considered to be moderate barriers (Table 1). Individual reports for each township are in Appendix 1.

Table 1. Aquatic Organism Passage (AOP) scores for the 260 crossings assessed in Blair County.

Evaluation Score	Number of Structures	Percent of Total
No Barrier	148	56.9%
Insignificant Barrier	12	4.6%
Minor Barrier	27	10.4%
Moderate Barrier	23	8.8%
Significant Barrier	11	4.2%
Severe Barrier	26	10.0%
No Score*	13	5.0%
Total	260	100.0%

*No Score crossings are those that were only partially assessed due to the crossing being inaccessible. For example, crossings where the outlet or inlet were inaccessible due to being on private property were not fully assessed; therefore, no score can be given.

Conclusion

Blair County has more than 2,400 mapped road-stream crossings. A total of 260 NAACC crossings were assessed in Blair County in 2018 (Figure 1). WPC staff documented numerous barriers to aquatic species passage in Blair County as a result of this project. We have identified a wide range of fish passage structures including round culverts, open bottom arch culverts, box culverts, and bridges. Structure material types included plastic, concrete, metal, and a combination of materials such as metal and concrete. Several structures with multiple pipes were also measured. Condition of the structures also varied greatly with new structures and some extremely old and decrepit crossings identified. Results downloaded from the NAACC database of these structures revealed that the majority of crossings surveyed in the county pose no barrier to aquatic organism passage (Table 1). This is due to the large number of bridges throughout the county. Crossings that should be prioritized for replacement include those crossings with significant or severe barrier scores. These types of crossings accounted for 14.2% of all crossings surveyed (Table 1).

Through this project, we were able to survey less than 11% of all of the ***mapped*** crossings in the county. It is recommended that more survey work be completed in the county.

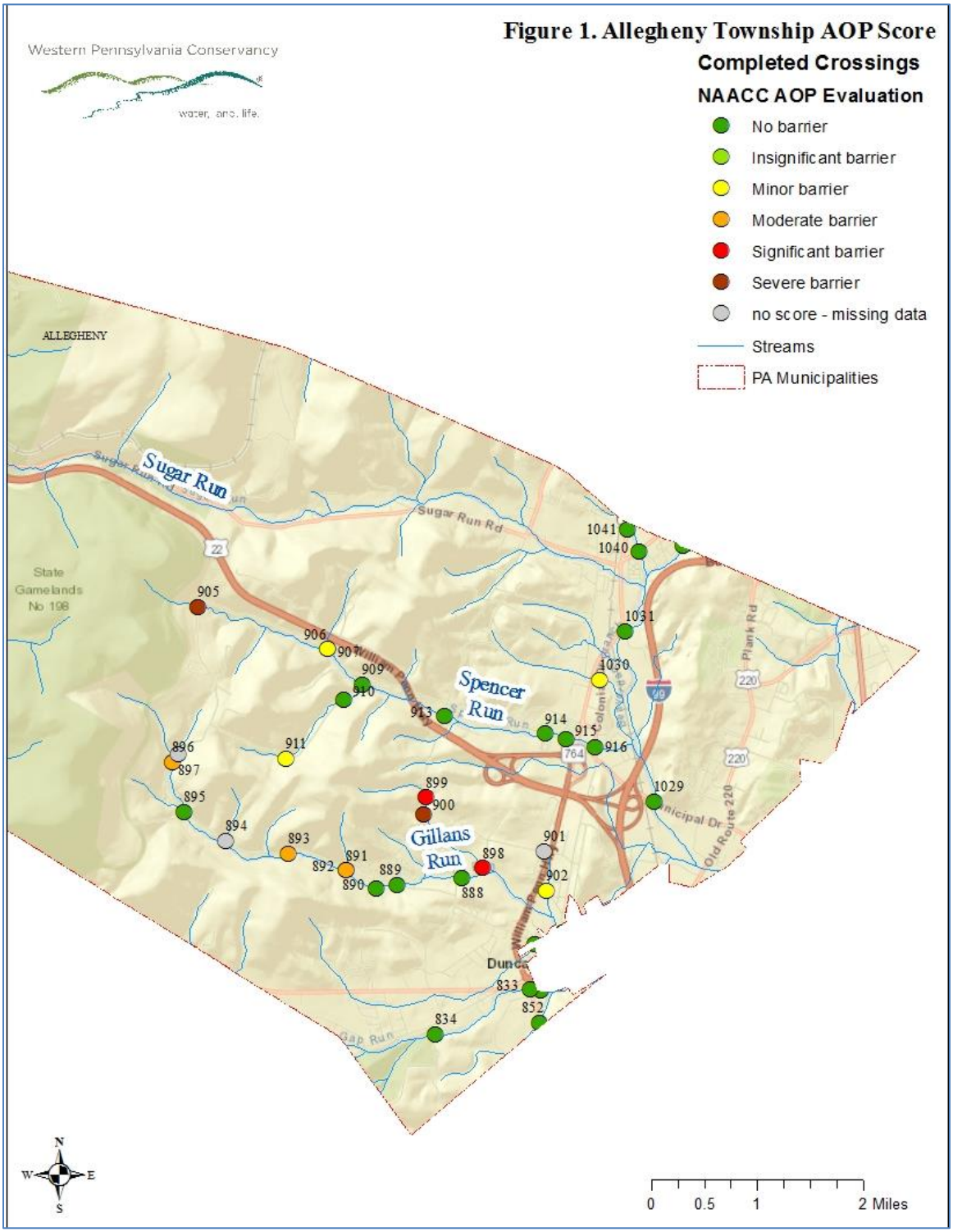
References

Jackson, S. and A. Abbott. 2016. NAACC Stream Crossing Survey Data Form Instruction Guide. Version 1.2. 31pp.

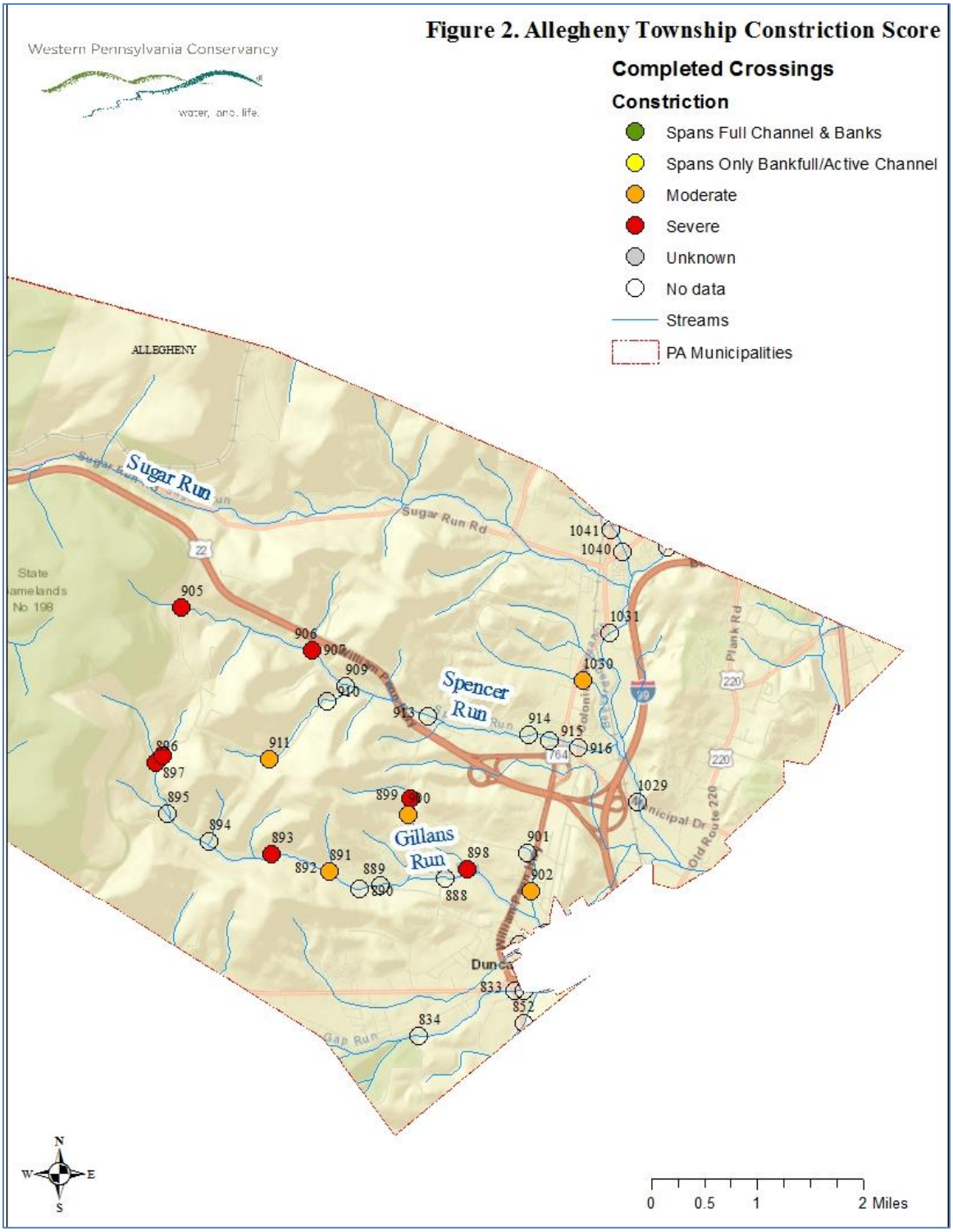
APPENDIX 1

Allegheny Township

In Allegheny Township, 31 road-stream crossings were surveyed. Based upon NAACC assessment data, two of these crossings (900 & 905) were considered severe aquatic organism passage (AOP) barriers, and two crossings (898 & 899) were considered significant AOP barriers (Figure 1).



The constriction score assesses how the width of the crossing compares to the width of the natural stream channel. Road-stream crossings that have severe constriction scores are more likely to have erosion problems above and/or below the crossing. Figure 2 shows constriction scores for assessed crossings in Allegheny Township. Seven crossings show severe constriction scores, which increases the potential of erosion and sedimentation around those crossings.



Recommendations

A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings in Allegheny Township that are recommended for replacement

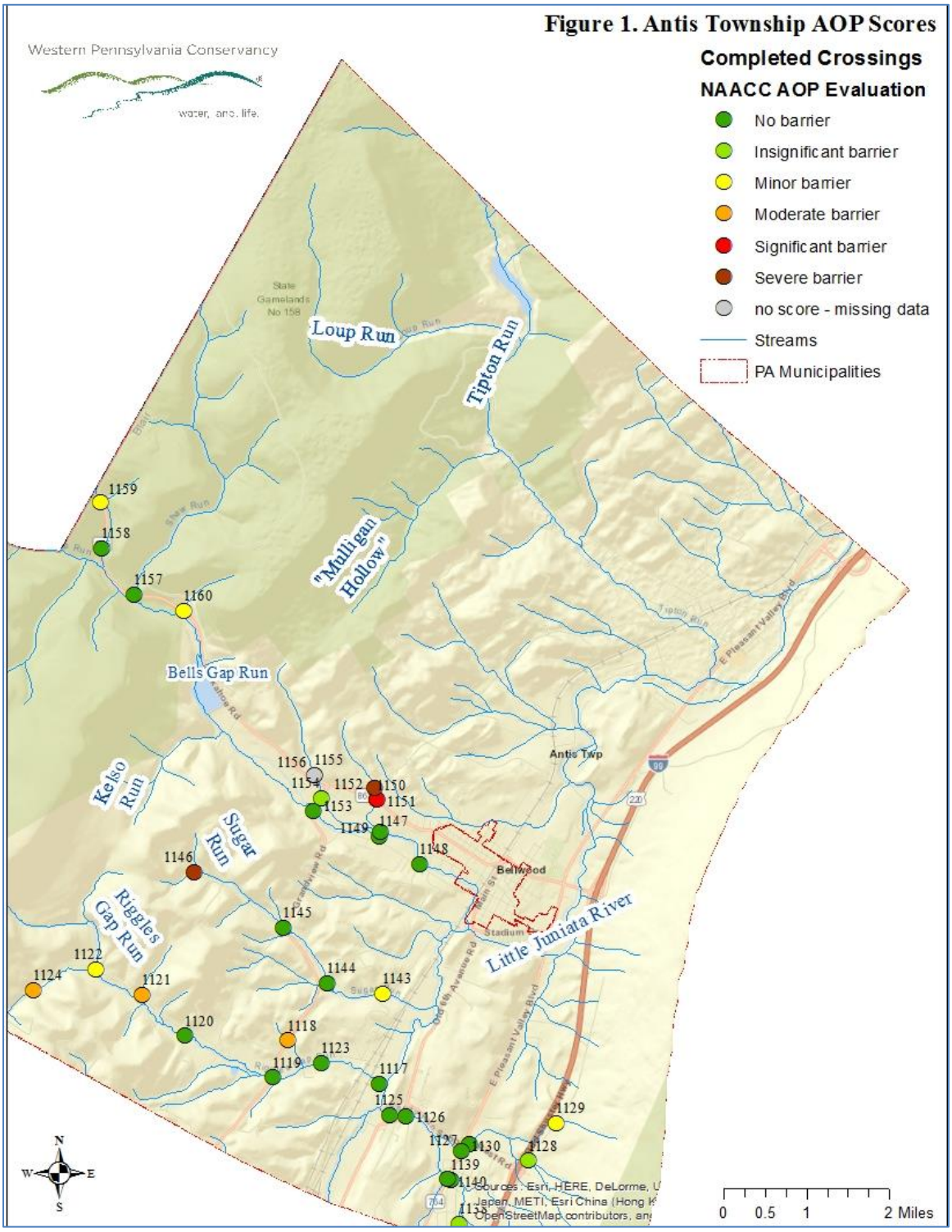
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
893 - Maple Hollow Road		X	
896 - Maple Hollow Road		X	
897 - Maple Hollow Road		X	
898 - Mill Road	X	X	
899 - Mill Road	X	X	
900 - Mill Road	X		
905 - Bear Wallow Road *(Photo 1)*	X	X	
906 - Carson Valley Road		X	

Photos

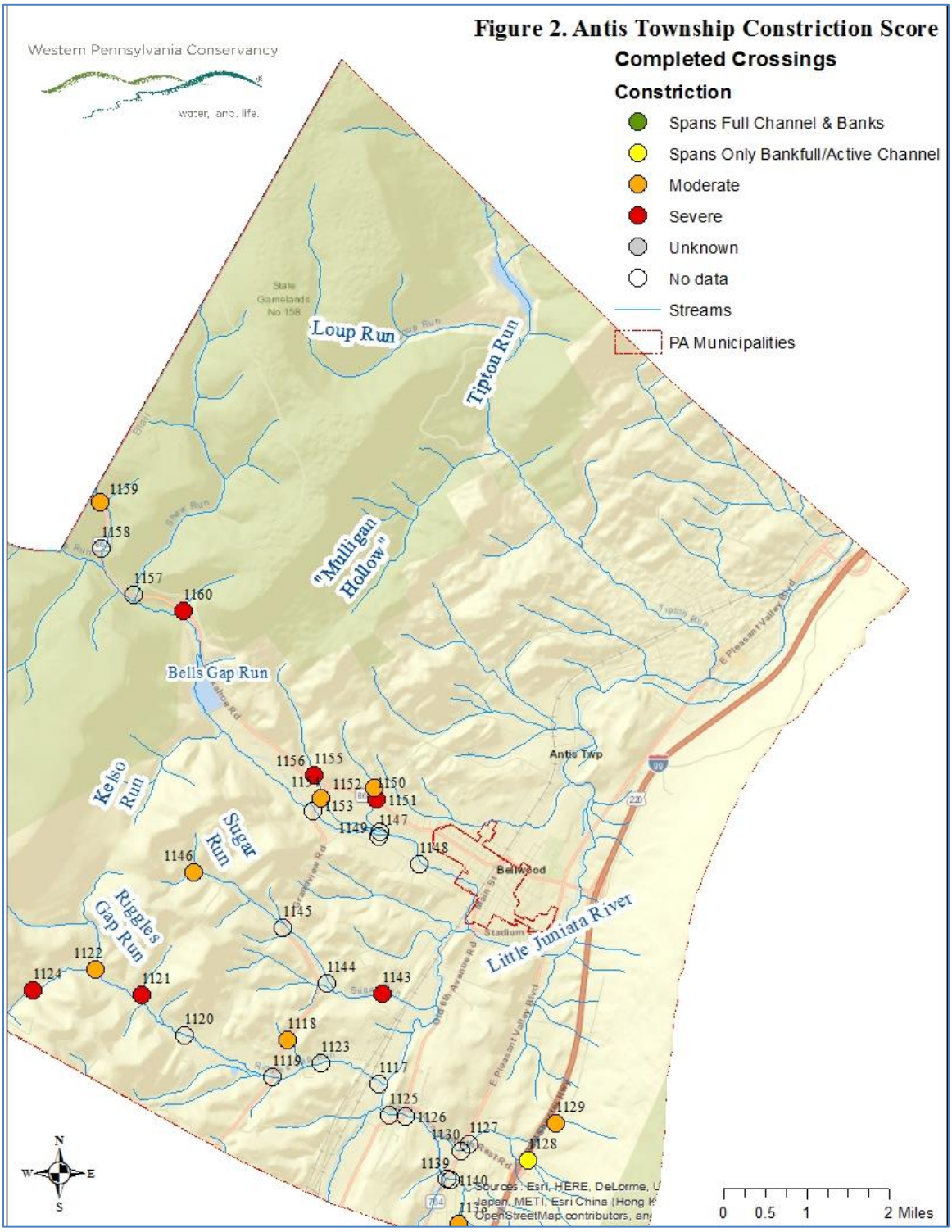
Photo 1: Crossing 905 on Bear Wallow Road. This crossing is severely constricted and is a severe AOP barrier.

Antis Township

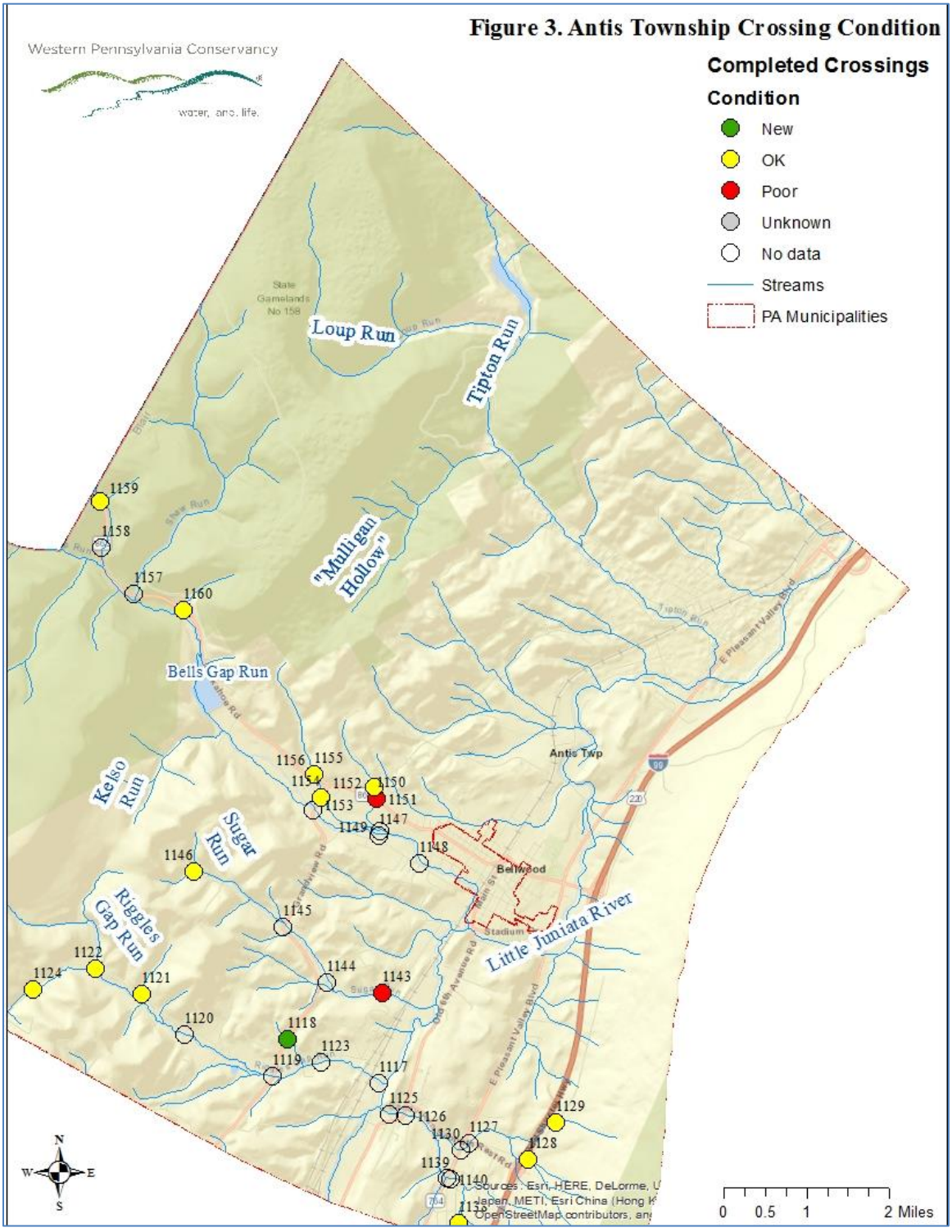
In Antis Township, 35 road-stream crossings were surveyed. Based upon NAACC assessment data, two of these crossings (1146 & 1152) were considered severe aquatic organism passage (AOP) barriers, and one crossing (1151) was considered a significant AOP barrier (Figure 1).



The constriction score assesses how the width of the crossing compares to the width of the natural stream channel. Road-stream crossings that have severe constriction scores are more likely to have erosion problems above and/or below the crossing. Figure 2 shows constriction scores for assessed crossings in Antis Township. Six crossings show severe constriction scores, which increases the potential of erosion and sedimentation around those crossings.



Crossing condition takes into account very old crossing pipes that are either rusting, collapsing, or eroding the road surface. Two crossings (1143 & 1152) in the township had poor crossing conditions (Figure 3). Crossing 1143 had a culvert pipe where the entire bottom was rusted away. Kerbaugh Road on the inlet side was also starting to collapse. Crossing 1151 had a culvert pipe that was broken halfway through the crossing and at the outlet end of the crossing. Additionally, there was a large amount of erosion at the inlet of the pipe that was almost reaching Tuckahoe Road.



Recommendations

A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings in Antis Township that are recommended for replacement

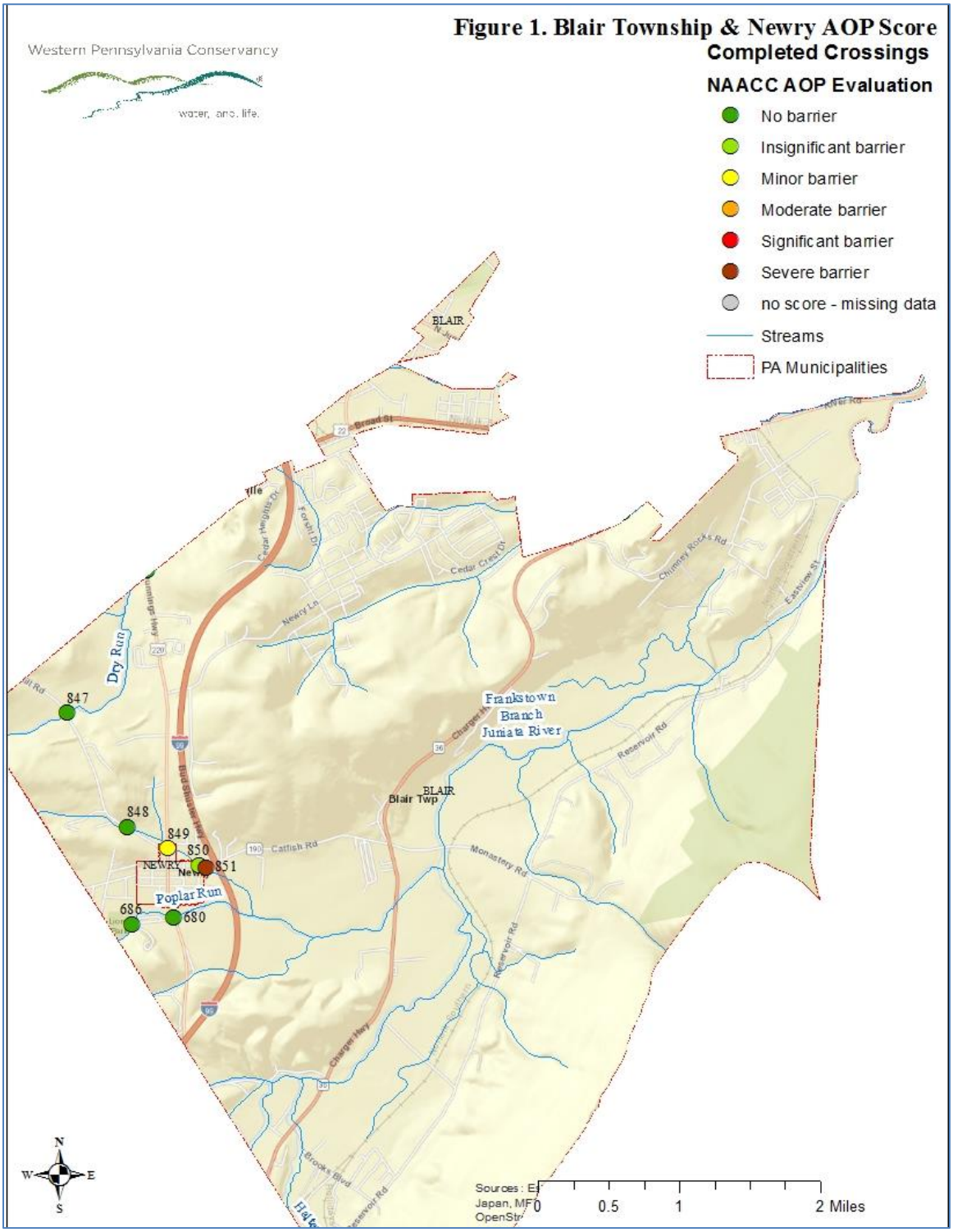
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
1121 - Riggles Gap Road		X	
1124 - Riggles Gap Road		X	
1143 - Kerbaugh Road		X	X
1146 - Hollen Road *(Photo 1)*	X		
1150 - Tuckahoe road	X		
1152 - Bel Tip Road	X	X	X
1155 - Igou Road		X	
1160 - Tuckahoe Road		X	

Photos

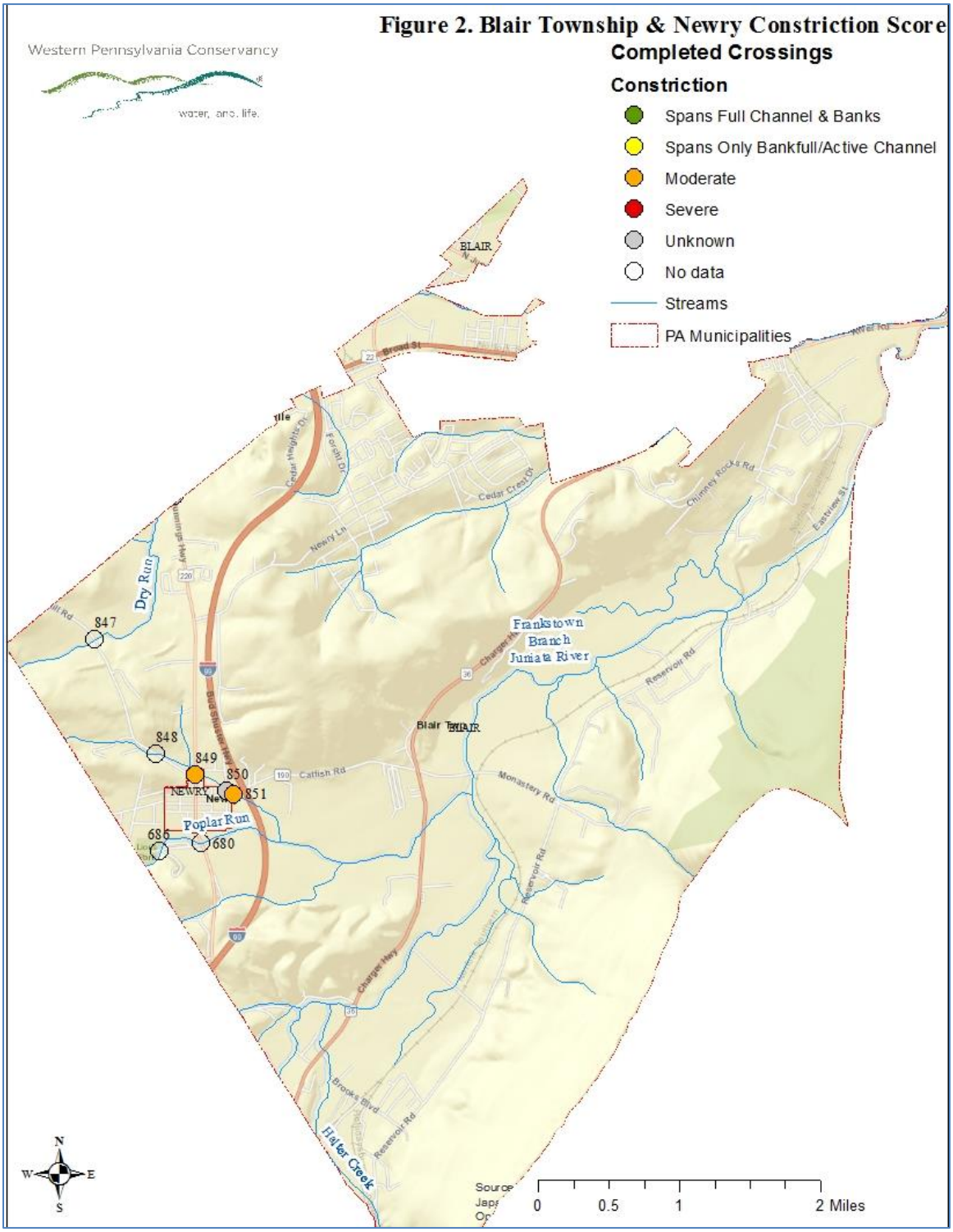
Photo 1: Crossing 1146 on Hollen Road. This crossing is a severe AOP barrier.

Blair Township and the Borough of Newry

In Blair Township and Newry Borough, nine road-stream crossings were surveyed. Two of the mapped crossings were not actual crossings, but map errors. They have been removed from the database. Based upon NAACC assessment data, one crossing (851) was considered to be a severe aquatic organism passage (AOP) barrier (Figure 1).



The constriction score assesses how the width of the crossing compares to the width of the natural stream channel. Road-stream crossings that have severe constriction scores are more likely to have erosion problems above and/or below the crossing. Figure 2 shows constriction scores for assessed crossings in Blair Township and Newry. No crossings had severe constriction scores.



Recommendations

A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings in Newry that are recommended for replacement.

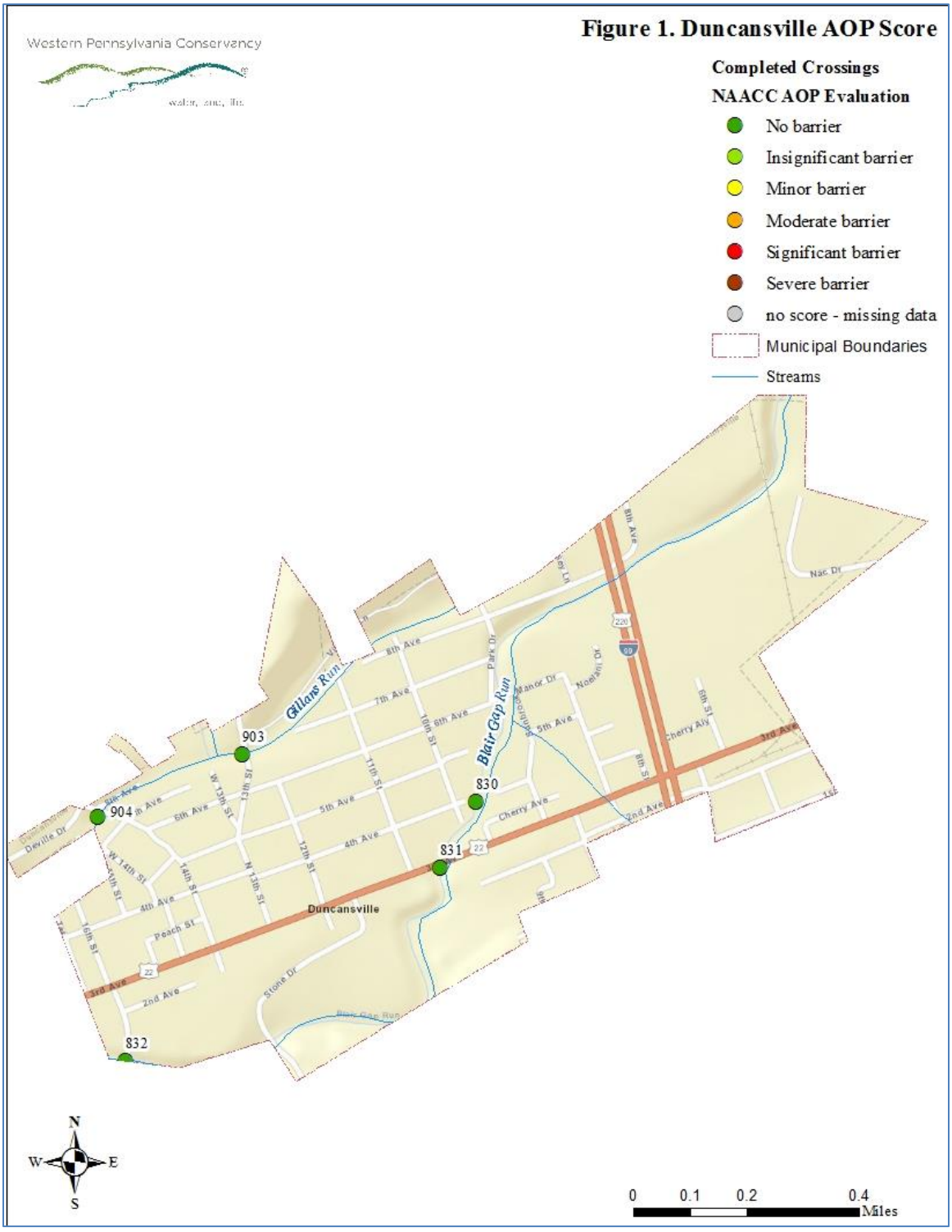
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
851 - Shamrock Lane *(Photo 1)*	X		

Photos

Photo 1: Crossing 851 on Shamrock Lane. The outlet of the box culvert causes it to be a severe AOP barrier.

Duncansville Borough

In Duncansville Borough, five road-stream crossings were surveyed. Based upon NAACC assessment data, all of these crossing posed no barrier to aquatic organism passage (Figure 1).



Recommendations

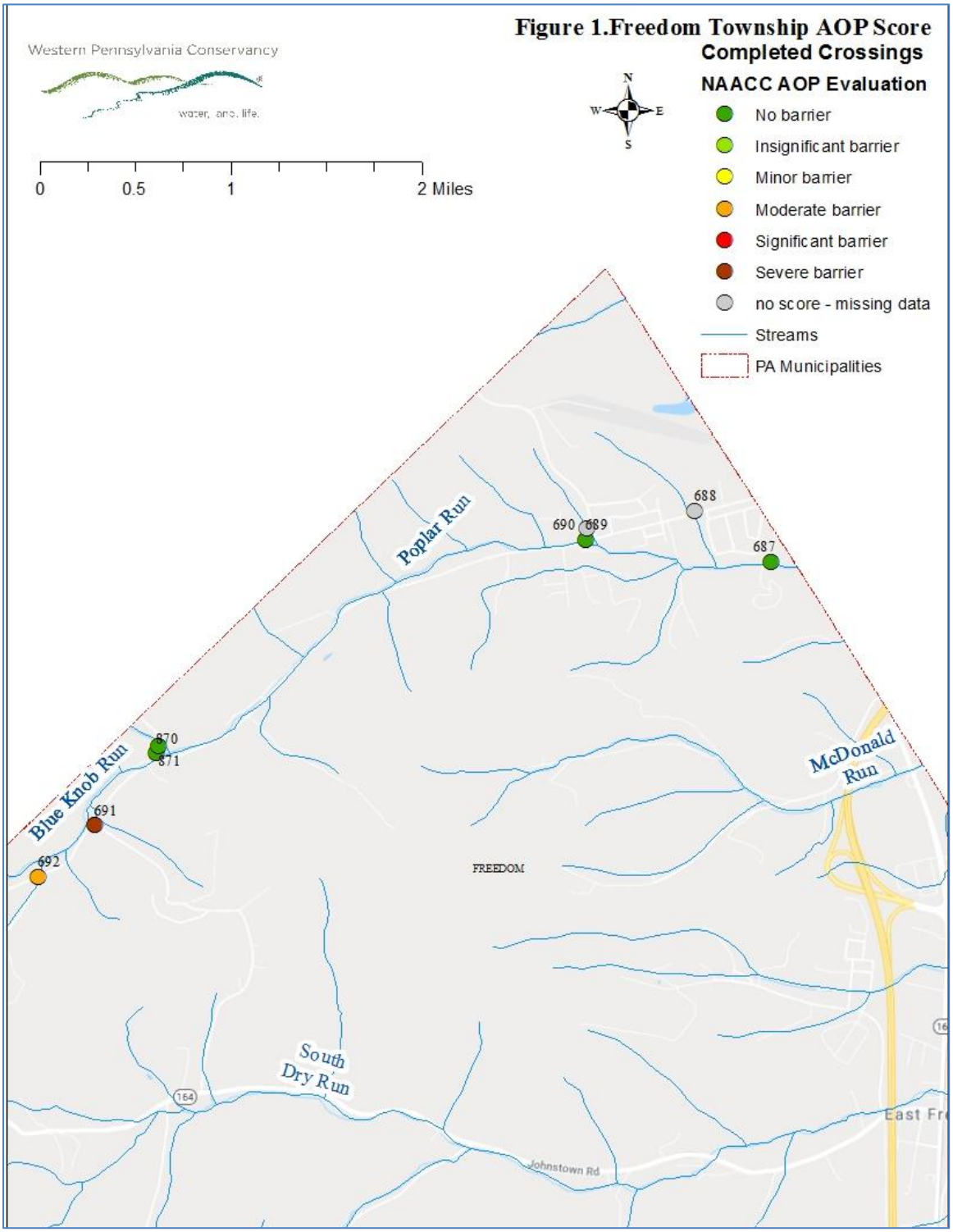
A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings in Duncansville Borough that are recommended for replacement.

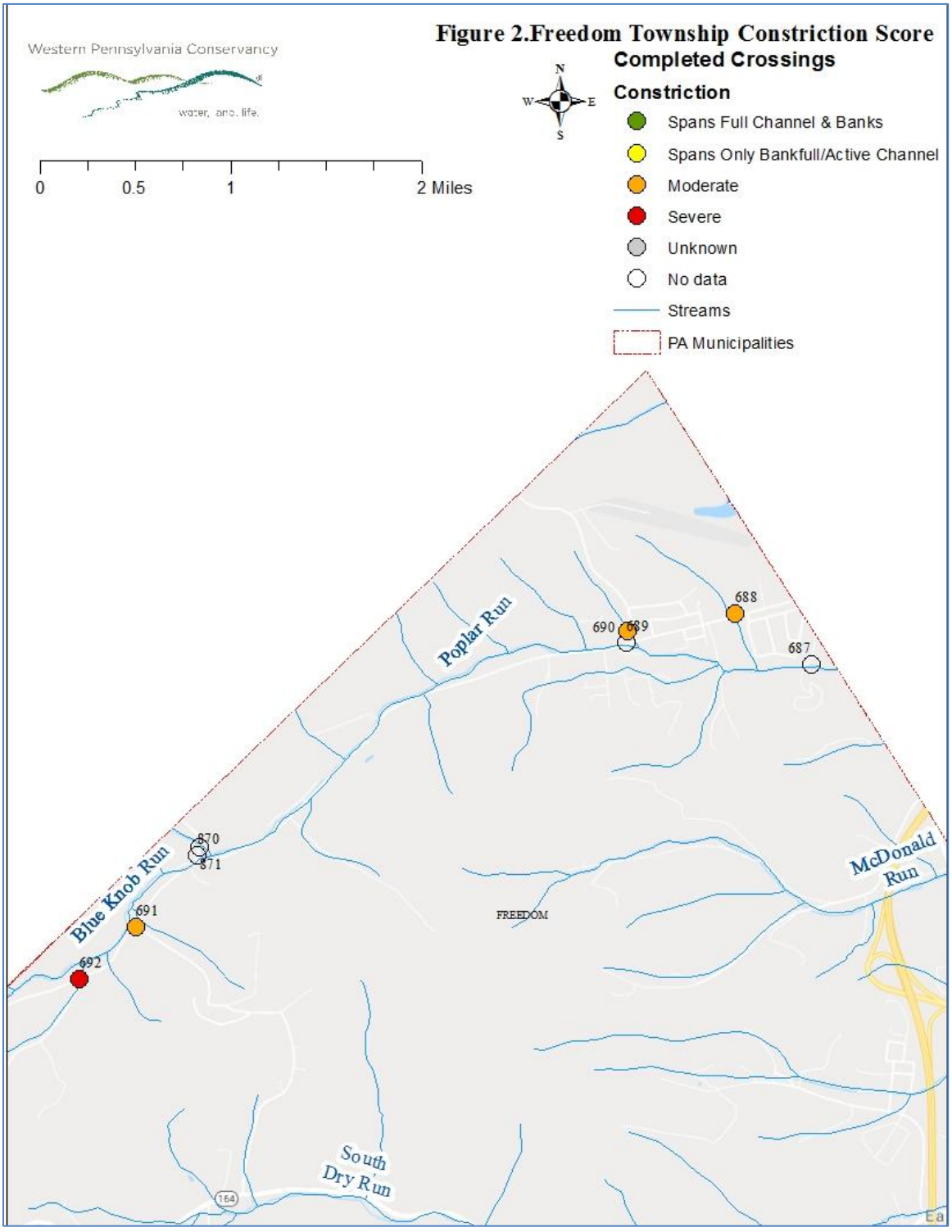
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
There are no crossings that have issues in any of the categories.			

Freedom Township

In Freedom Township, six road-stream crossings were surveyed. Based upon NAACC assessment data, one of these crossings (691) was considered to be a severe aquatic organism passage (AOP) barrier (Figure 1).



The constriction score assesses how the width of the crossing compares to the width of the natural stream channel. Road-stream crossings that have severe constriction scores are more likely to have erosion problems above and/or below the crossing. Figure 2 shows constriction scores for assessed crossings in Freedom Township. One crossing shows a severe constriction score, which increases the potential of erosion and sedimentation around that crossing.



Recommendations

A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings in Freedom Township that are recommended for replacement.

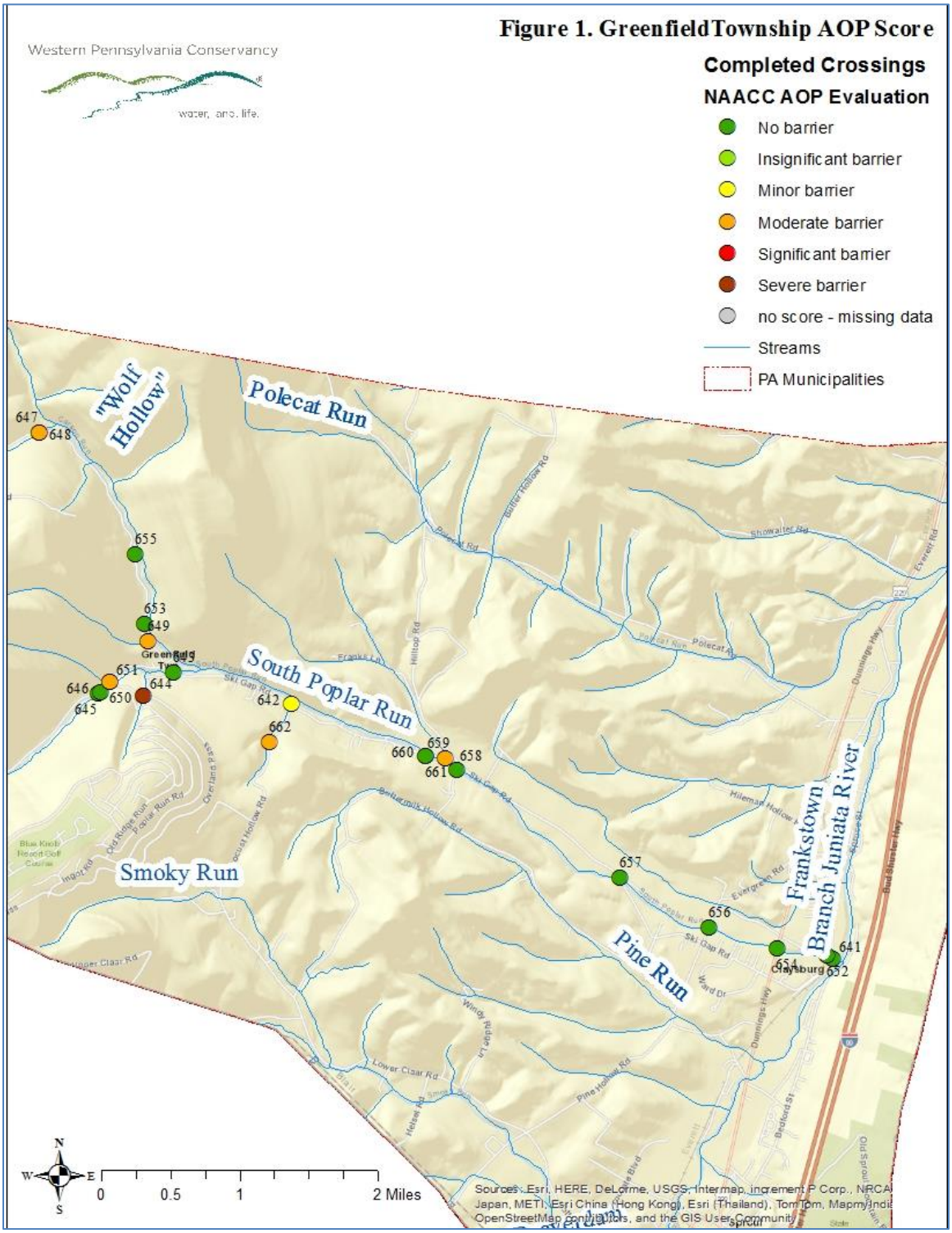
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
691 - Knob Run Road *(Photo 1)*	X		
692 - Knob Run Road		X	

Photos

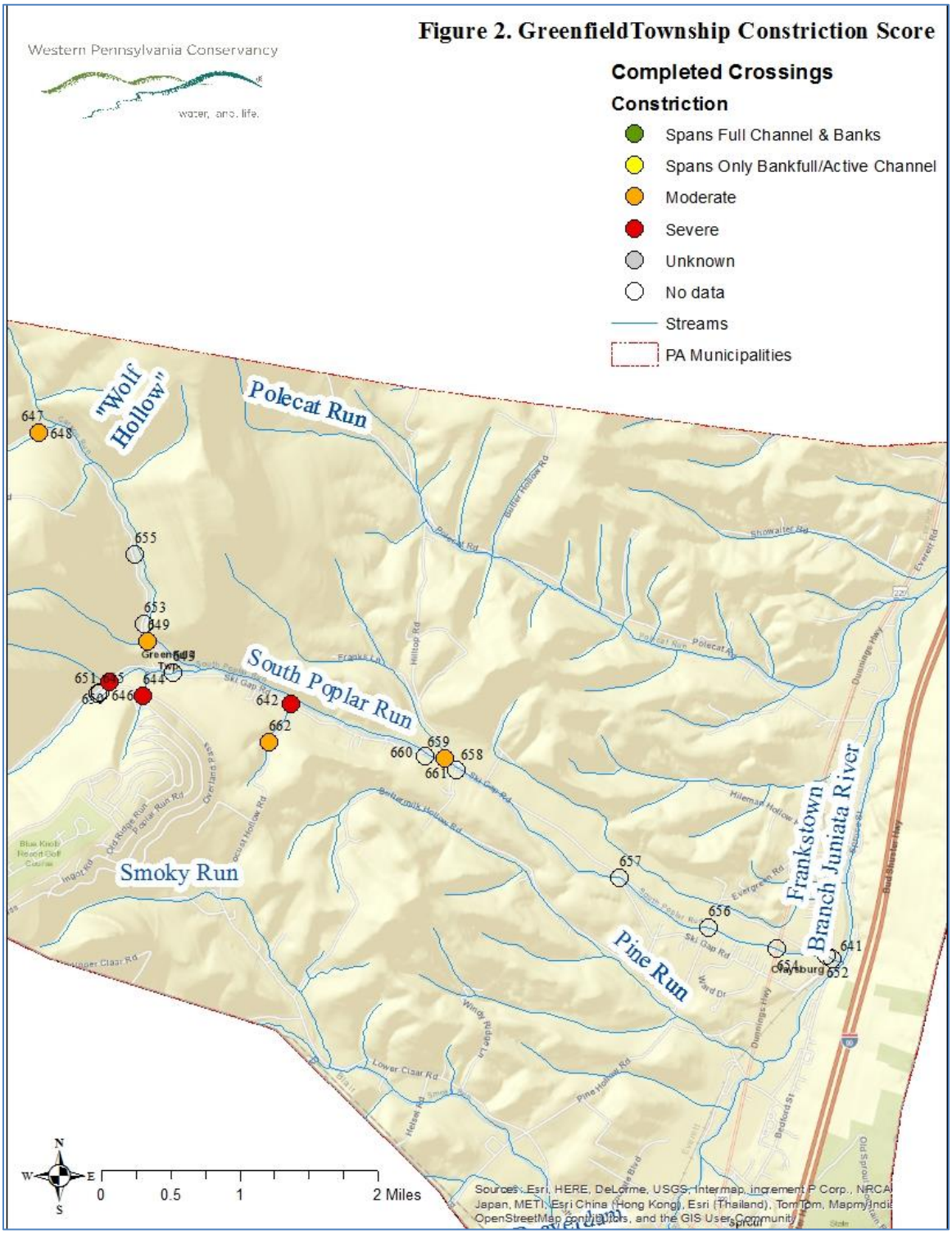
Photo 1: Crossing 691 on Knob Road has a perched outlet that causes a severe AOP barrier.

Greenfield Township

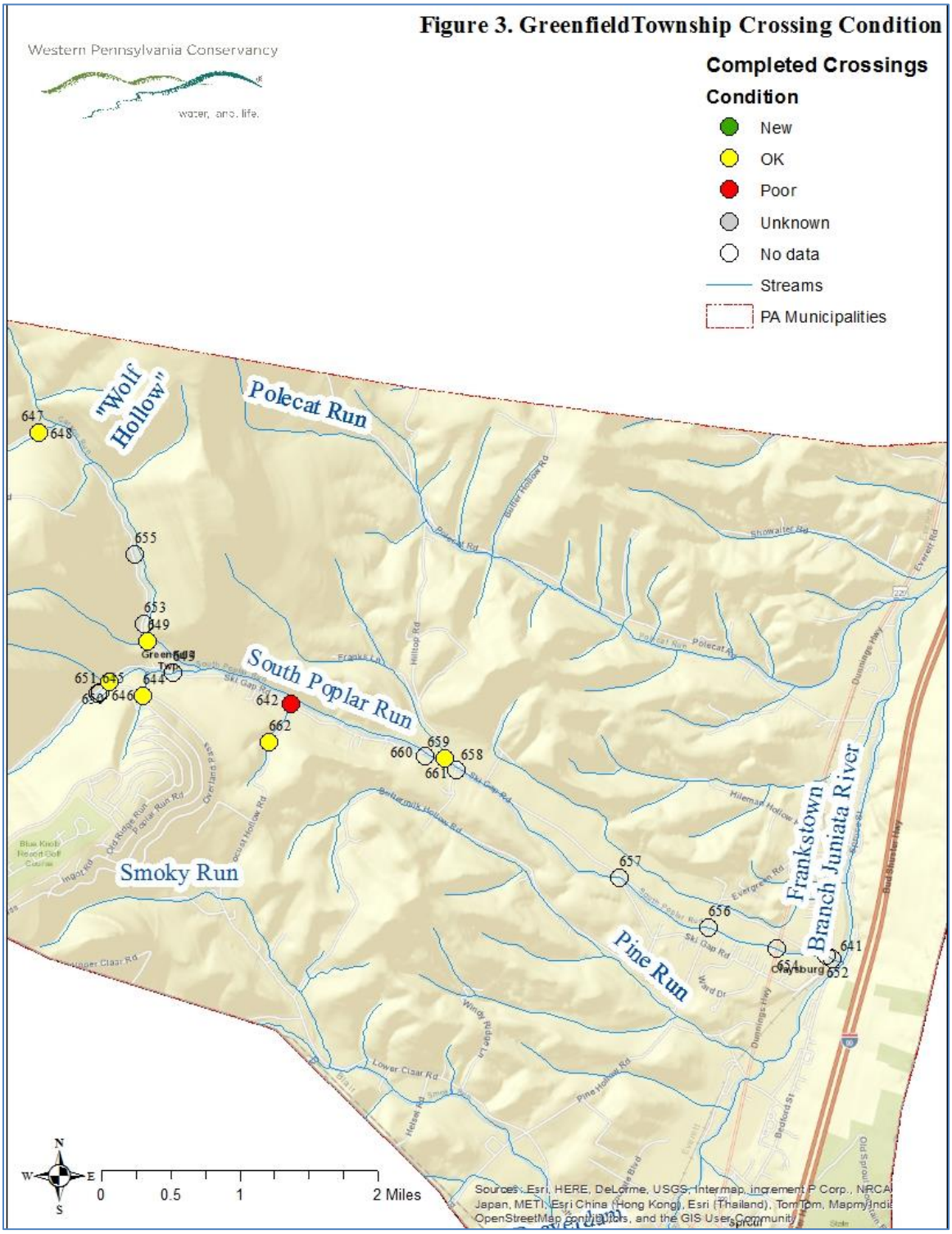
In Greenfield Township, 20 road-stream crossings were surveyed. Based upon NAACC assessment data, one of these crossings (644) was considered a severe aquatic organism passage (AOP) barriers (Figure 1).



The constriction score assesses how the width of the crossing compares to the width of the natural stream channel. Road-stream crossings that have severe constriction scores are more likely to have erosion problems above and/or below the crossing. Figure 2 shows constriction scores for assessed crossings in Greenfield Township. Three crossings show severe constriction scores, which increases the potential of erosion and sedimentation around those crossings.



Crossing condition takes into account very old crossing pipes that are either rusting, collapsing, or eroding the road surface. One crossing (642) in the township had poor crossing conditions (Figure 3).



Recommendations

A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings in Greenfield Township that are recommended for replacement.

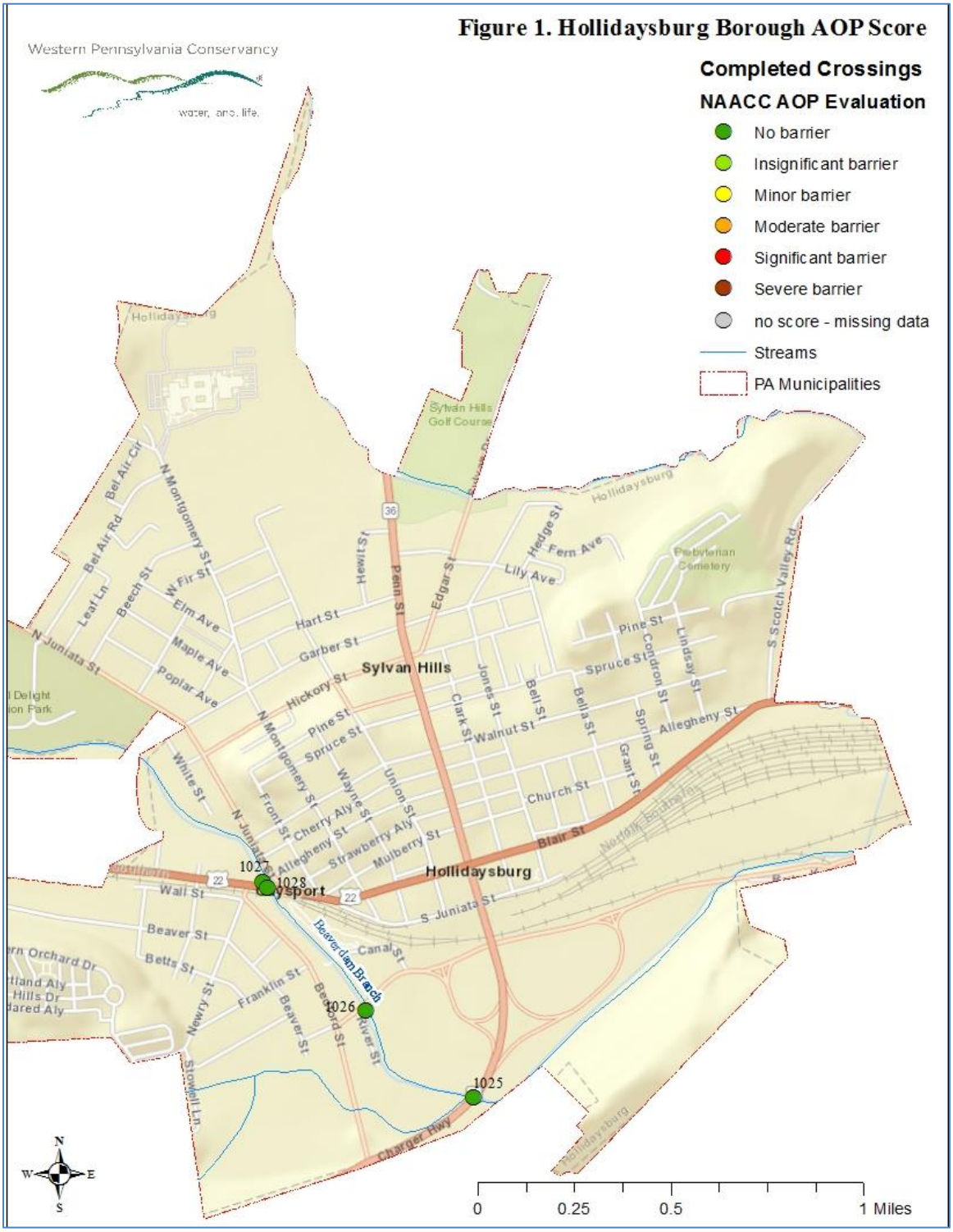
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
642 - Ski Gap Road		X	X
644 - Overland Pass *(Photo 1)*	X	X	
650 - Overland Pass		X	

Photos

Photo 1: Crossing 644 located on Overland Pass. The culvert is severely constricted and is a severe AOP barrier.

Hollidaysburg Borough

In Hollidaysburg Borough, four road-stream crossings were surveyed. Based upon NAACC assessment data, no crossings pose as a barrier to aquatic organism passage (Figure 1).



Recommendations

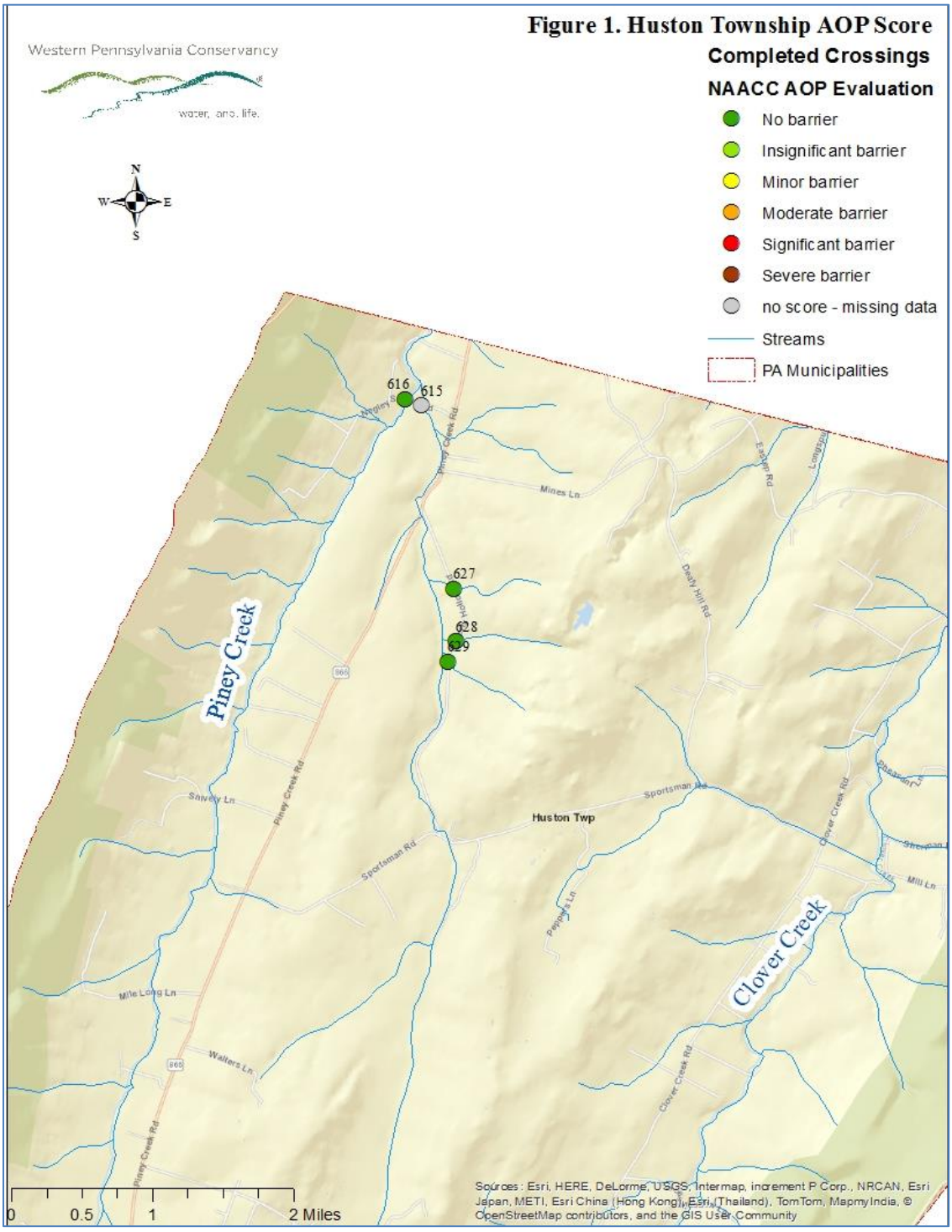
A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings in Hollidaysburg Borough that are recommended for replacement.

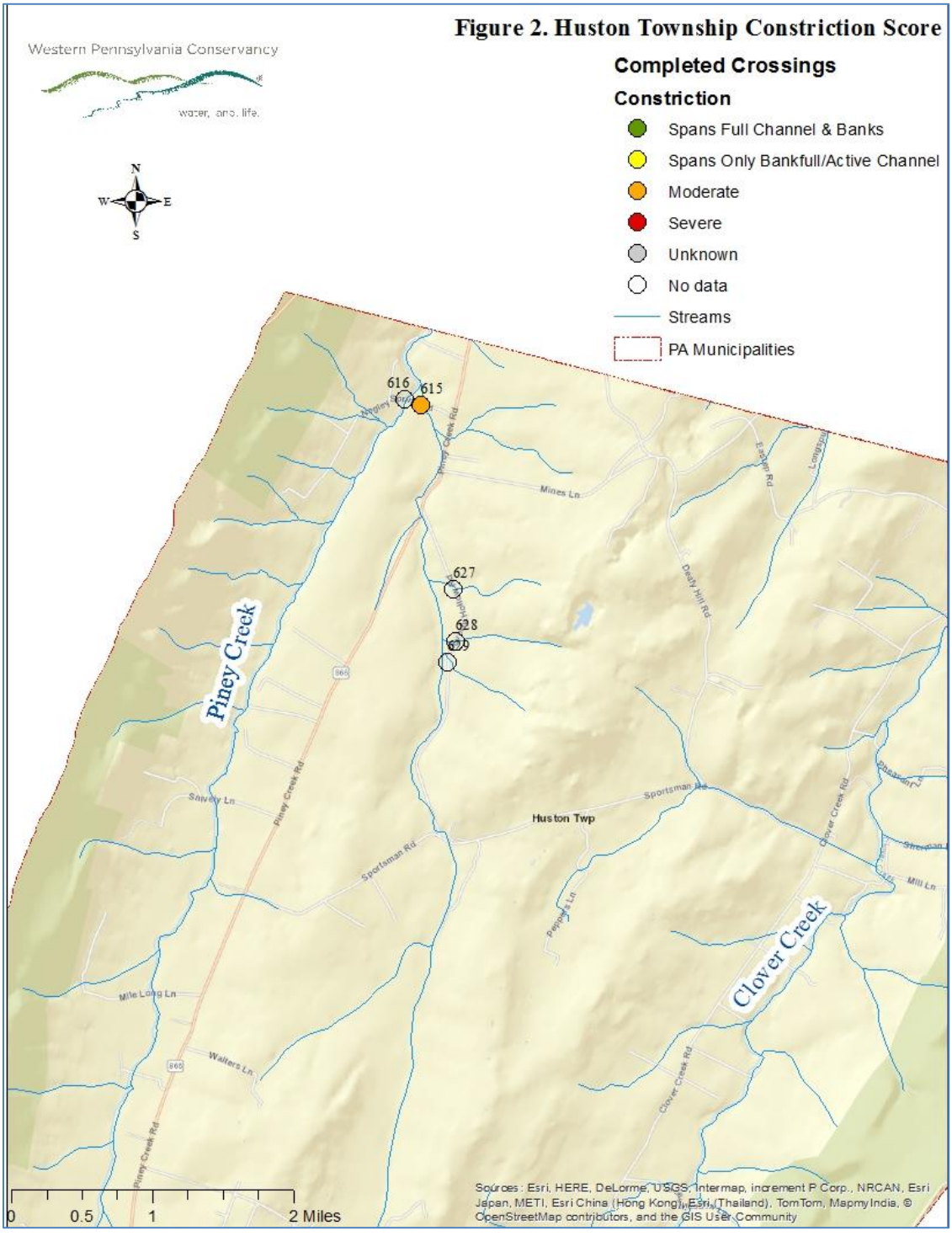
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
There are no crossings that have issues in any of the categories.			

Huston Township

In Huston Township, five road-stream crossings were surveyed. Based upon NAACC assessment data, none of these crossings act as an aquatic organism passage barrier (Figure 1).



The constriction score assesses how the width of the crossing compares to the width of the natural stream channel. Road-stream crossings that have severe constriction scores are more likely to have erosion problems above and/or below the crossing. Figure 2 shows constriction scores for assessed crossings in Huston Township. No crossings have a severe constriction score. Crossings shown in Figure 2 that have a "No data" score are bridges where constriction was not measured because the crossings are not considered AOP barriers.



Recommendations

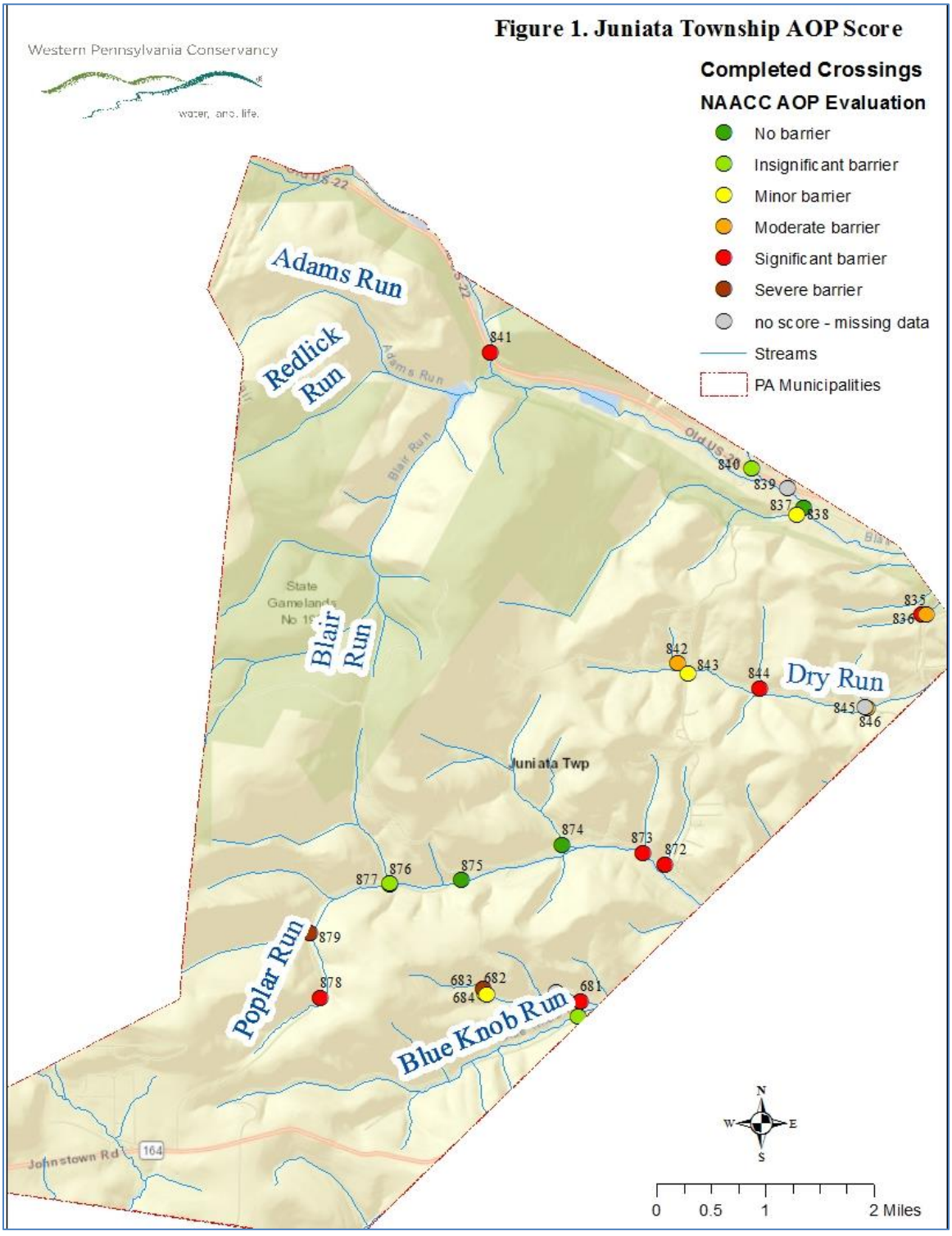
A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings in Huston Township that are recommended for replacement.

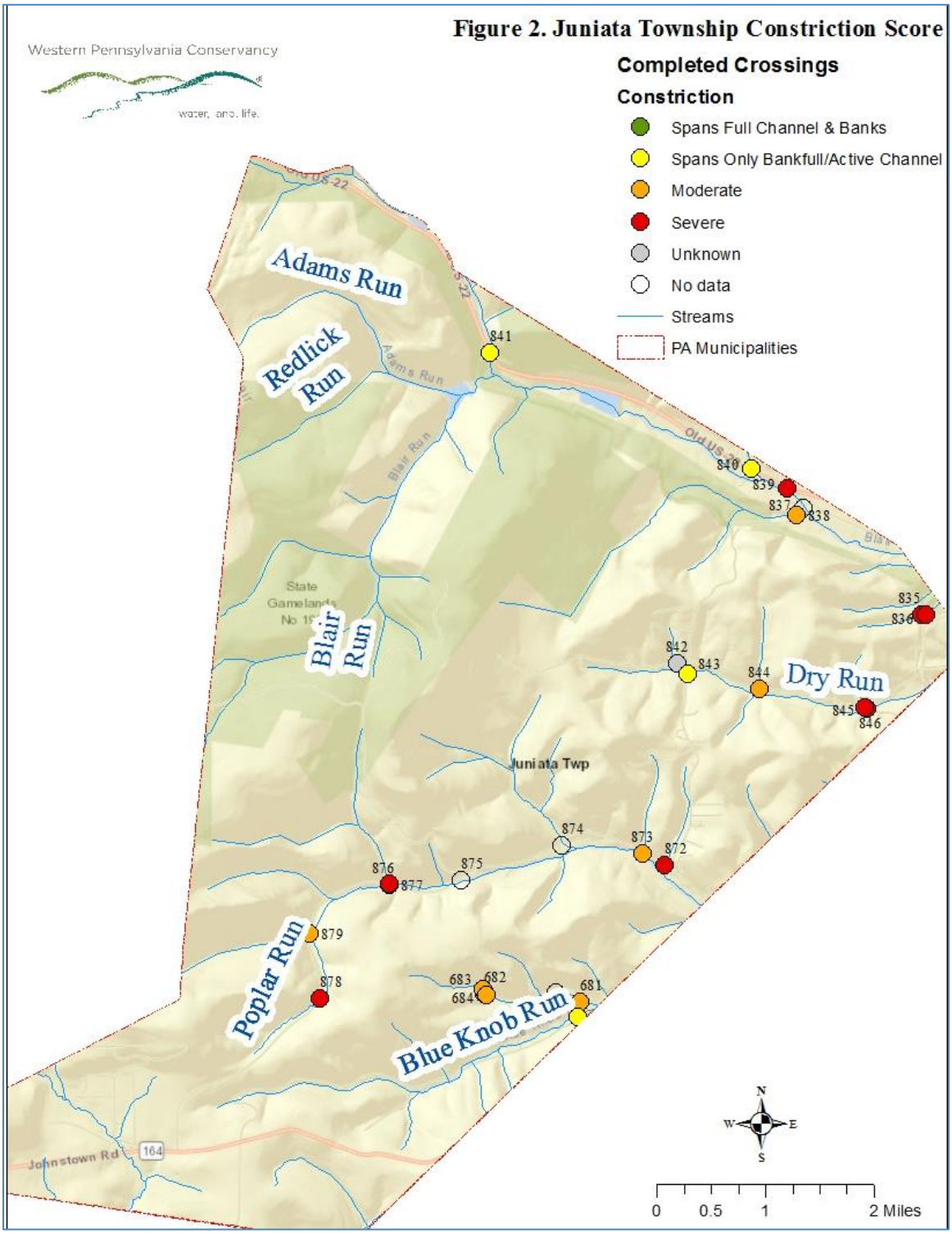
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
There are no crossings that have issues in any of the categories.			

Juniata Township

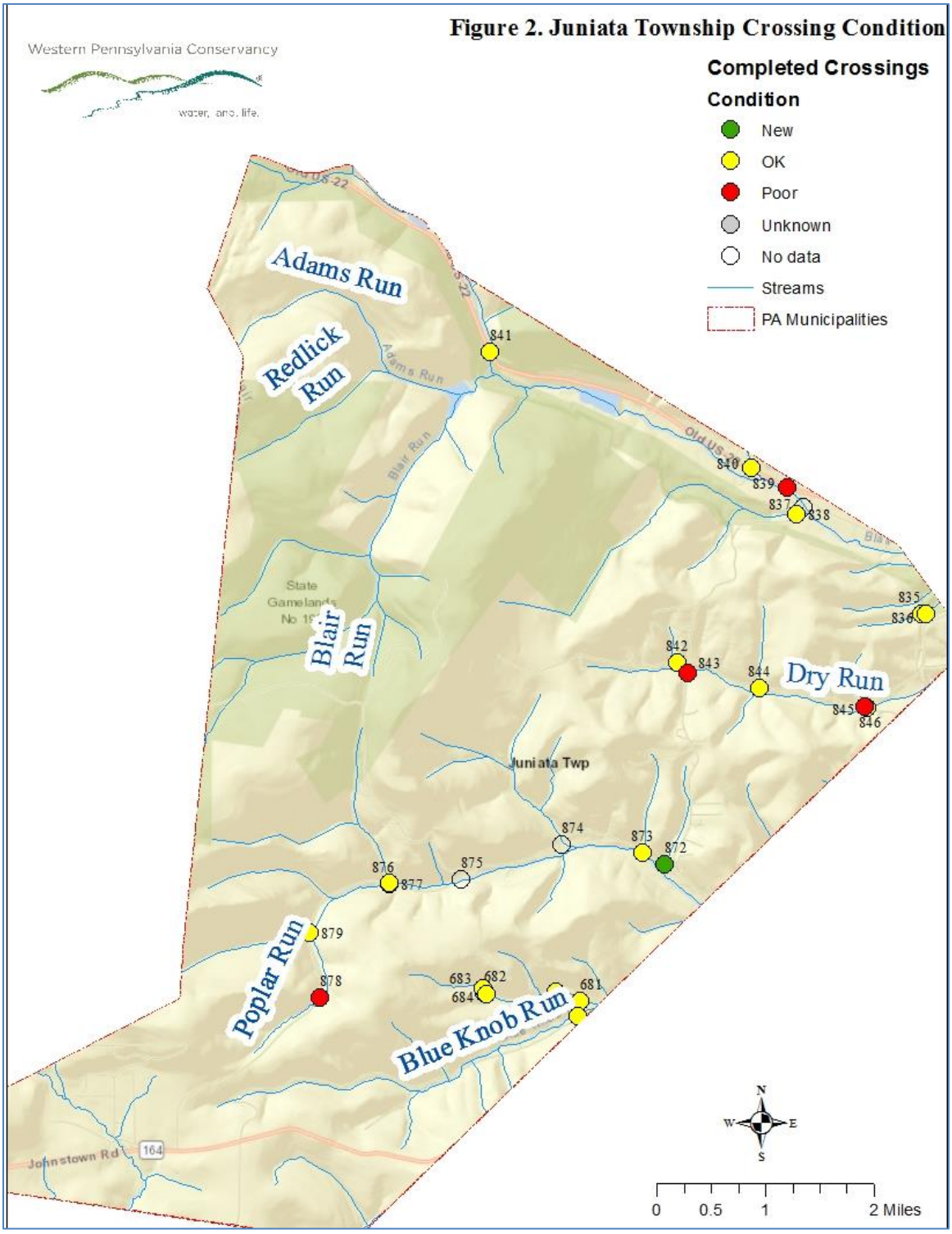
In Juniata Township, 26 road-stream crossings were surveyed. Based upon NAACC assessment data, two of these crossings (683 & 879) were considered severe aquatic organism passage (AOP) barriers and seven crossings (681, 872, 873, 878, 835, 841, & 844) were considered significant barriers (Figure 1).



The constriction score assesses how the width of the crossing compares to the width of the natural stream channel. Road-stream crossings that have severe constriction scores are more likely to have erosion problems above and/or below the crossing. Figure 2 shows constriction scores for assessed crossings in Juniata Township. Eight crossings show severe constriction scores, which increases the potential of erosion and sedimentation around those crossings.



Crossing condition takes into account very old crossing pipes that are either rusting, collapsing, or eroding the road surface. Four crossings (839, 843, 845 & 878) in the township had poor crossing conditions (Figure 3). Crossing 837 was completely collapsed. We could not see the outlet pipe, and the stream is diverted into a road ditch. Crossing 878 had a slightly deformed pipe with the bottom rusted away.



Recommendations

A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings recommended for replacement in Juniata Township.

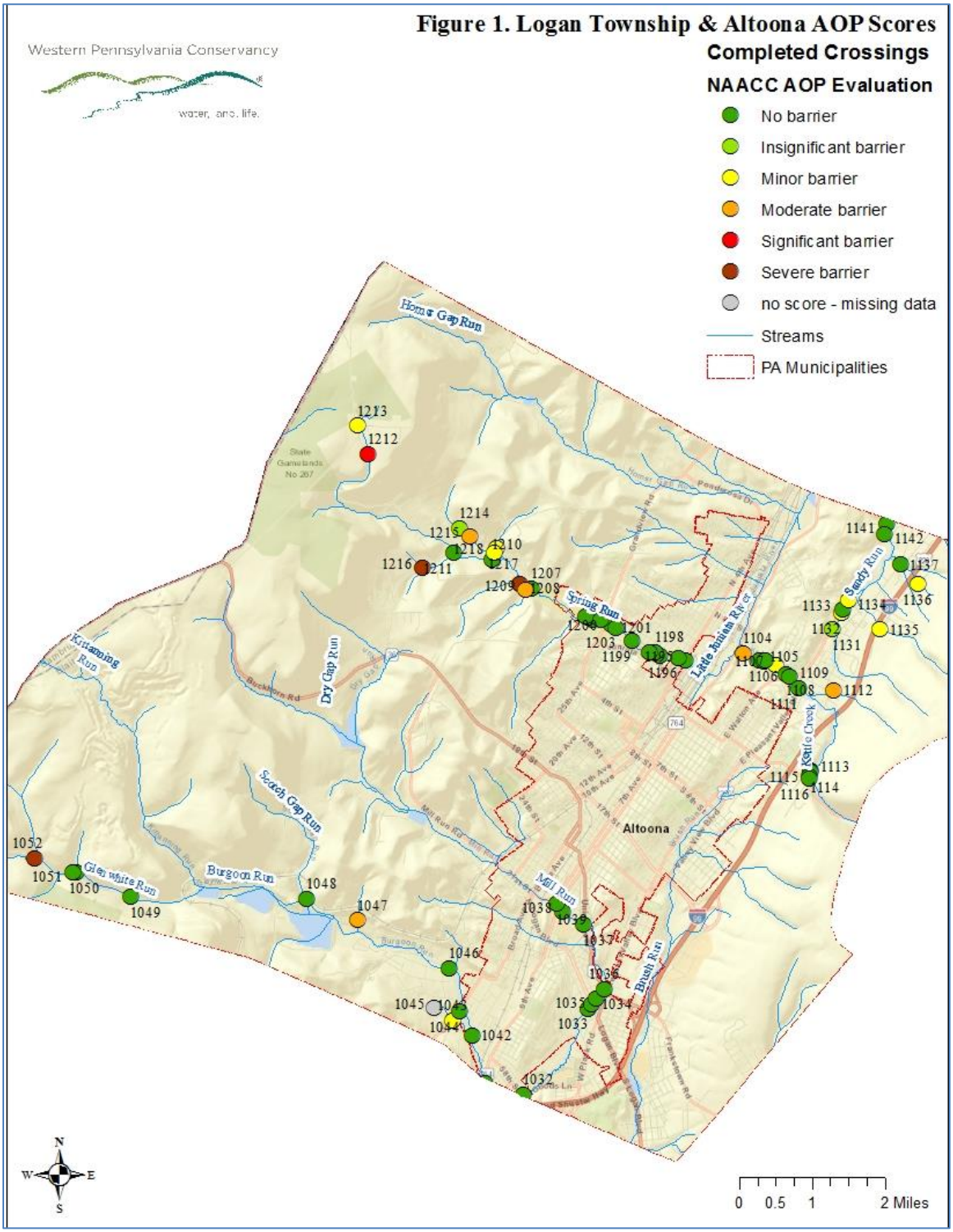
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
681 - Burket Hollow Road	X		
683 - Burket Hollow Road	X		
835 - 6 to 10 trail	X	X	
836 - 6 to 10 trail		X	
839 - Old US 22		X	X
841 - Old US 22	X		
843 - Valley Forge Road *(Photo 1)*			X
844 - Dry Run Road	X		
845 - Weaver Road		X	X
846 - Dry Run Road		X	
872 - Poplar Run Road	X	X	
873 - Poplar Run Road	X		
877 - Longenecker Road		X	
878 Poplar Run Road	X	X	X
879 - Poplar Run Road	X		

Photos

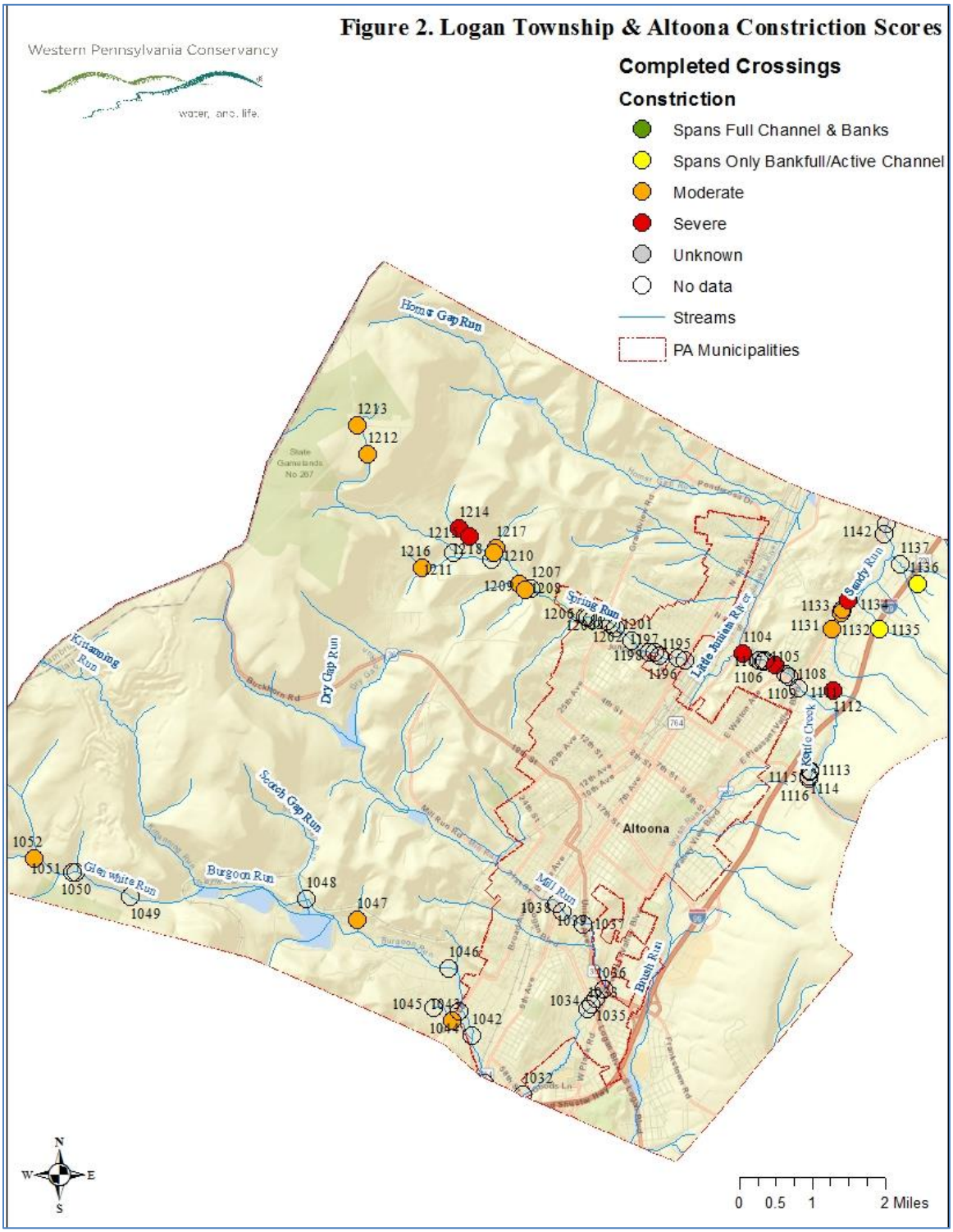
Photo 1: Crossing 843 on Valley Forge Road is in bad condition.

Logan Township and the City of Altoona

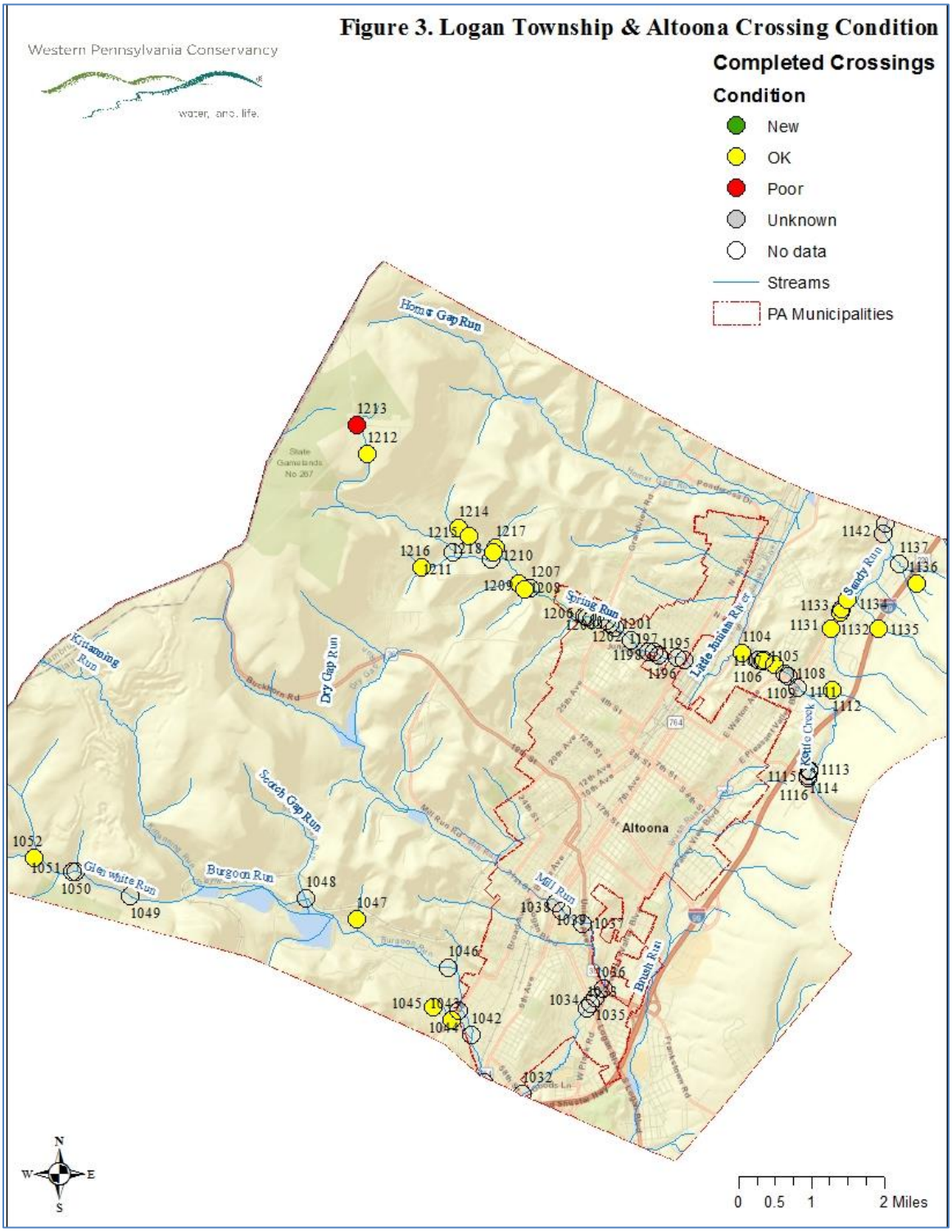
In Logan Township and Altoona, 64 road-stream crossings were surveyed. Based upon NAACC assessment data, three of these crossings (1052, 1208 & 1216) were considered to be severe aquatic organism passage (AOP) barriers and one of these crossings (1212) was considered to be a significant barrier to AOP (Figure 1).



The constriction score assesses how the width of the crossing compares to the width of the natural stream channel. Road-stream crossings that have severe constriction scores are more likely to have erosion problems above and/or below the crossing. Figure 2 shows constriction scores for assessed crossings in Logan Township and Altoona. Six crossings show severe constriction scores, which increases the potential of erosion and sedimentation around those crossings.



Another aspect of the NAACC protocol is to note crossings that are in poor condition. Logan Township had one crossing (1213) that was in poor condition (Figure 3).



Recommendations

A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table1. Road-stream crossings in Logan Township that are recommended for replacement.

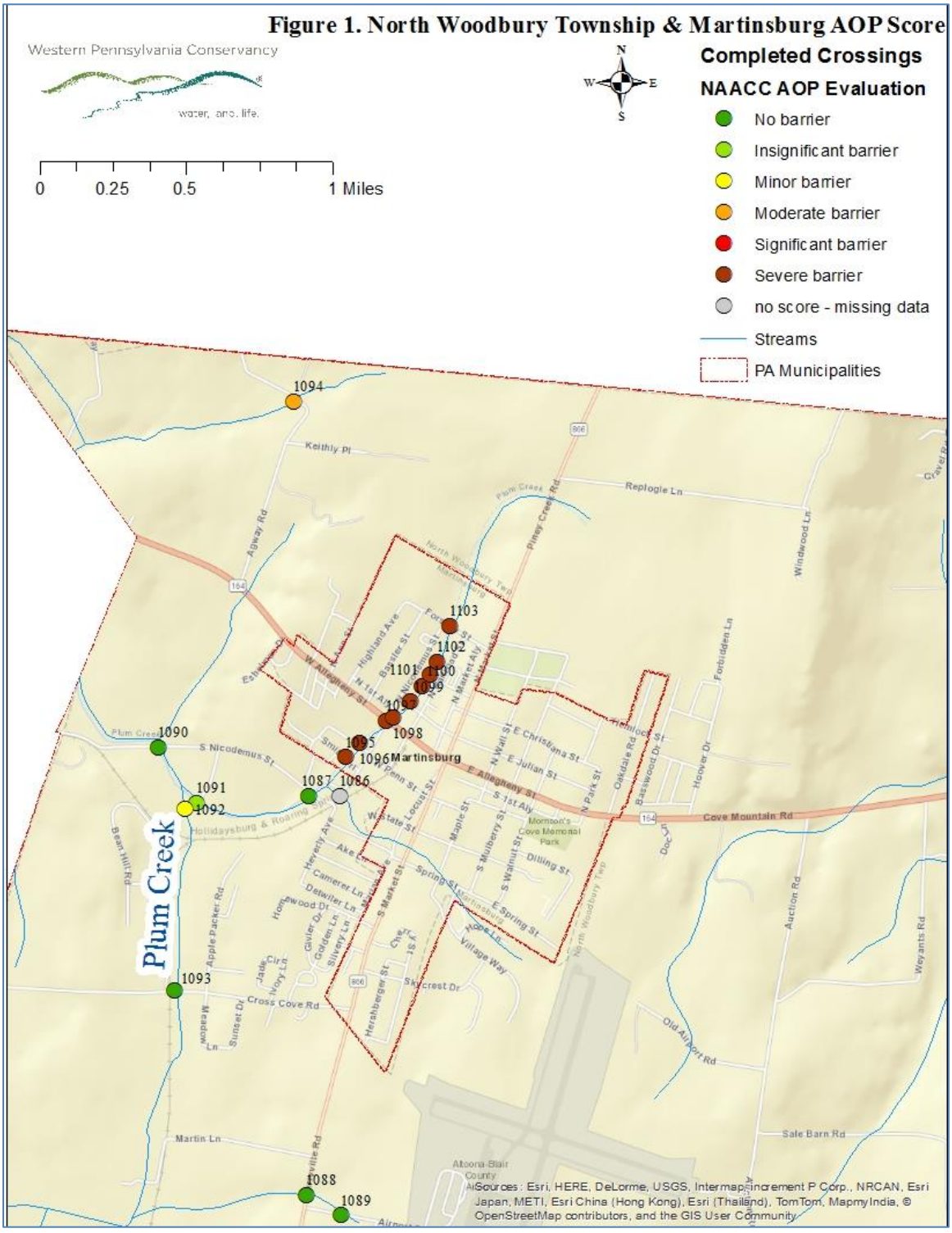
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
1052 - Veterans Memorial HWY	X		
1104 - E Third Avenue		X	
1107 - E Hamilton lane		X	
1112 - Rosehill Drive Ext		X	
1134 - Dartmouth Lane		X	
1208 - Juniata Gap Road	X		
1212 - Wopsy Road	X		
1213 - Lookout Avenue			X
1214 - Park Drive		X	
1215 - Logandale Drive		X	
1216 - Avalon Road *(Photo 1)*	X		

Photos

Photo 1: Crossing 1216 on Avalon Road is a severe AOP barrier.

North Woodbury Township and Martinsburg Borough

In North Woodbury Township and Martinsburg, 18 road-stream crossings were surveyed. Based upon NAACC assessment data, nine crossing in the Borough of Martinsburg were considered to be severe aquatic organism passage (AOP) barriers (Figure 1). This was due to the fact that all of the streams were piped underground. It was impossible to adequately assess these road stream crossings.



Recommendations

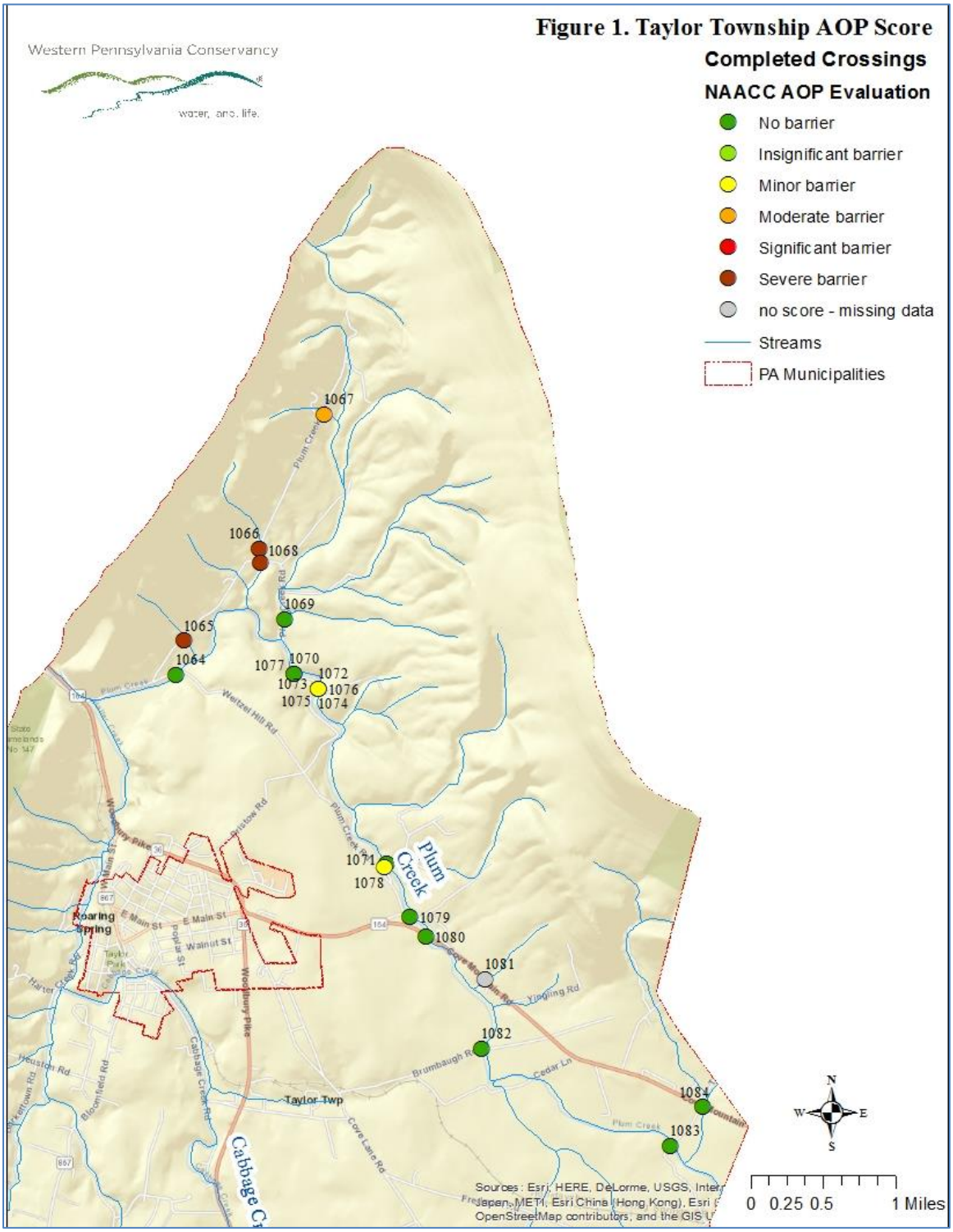
A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings in North Woodbury Township and Martinsburg Borough that are recommended for replacement.

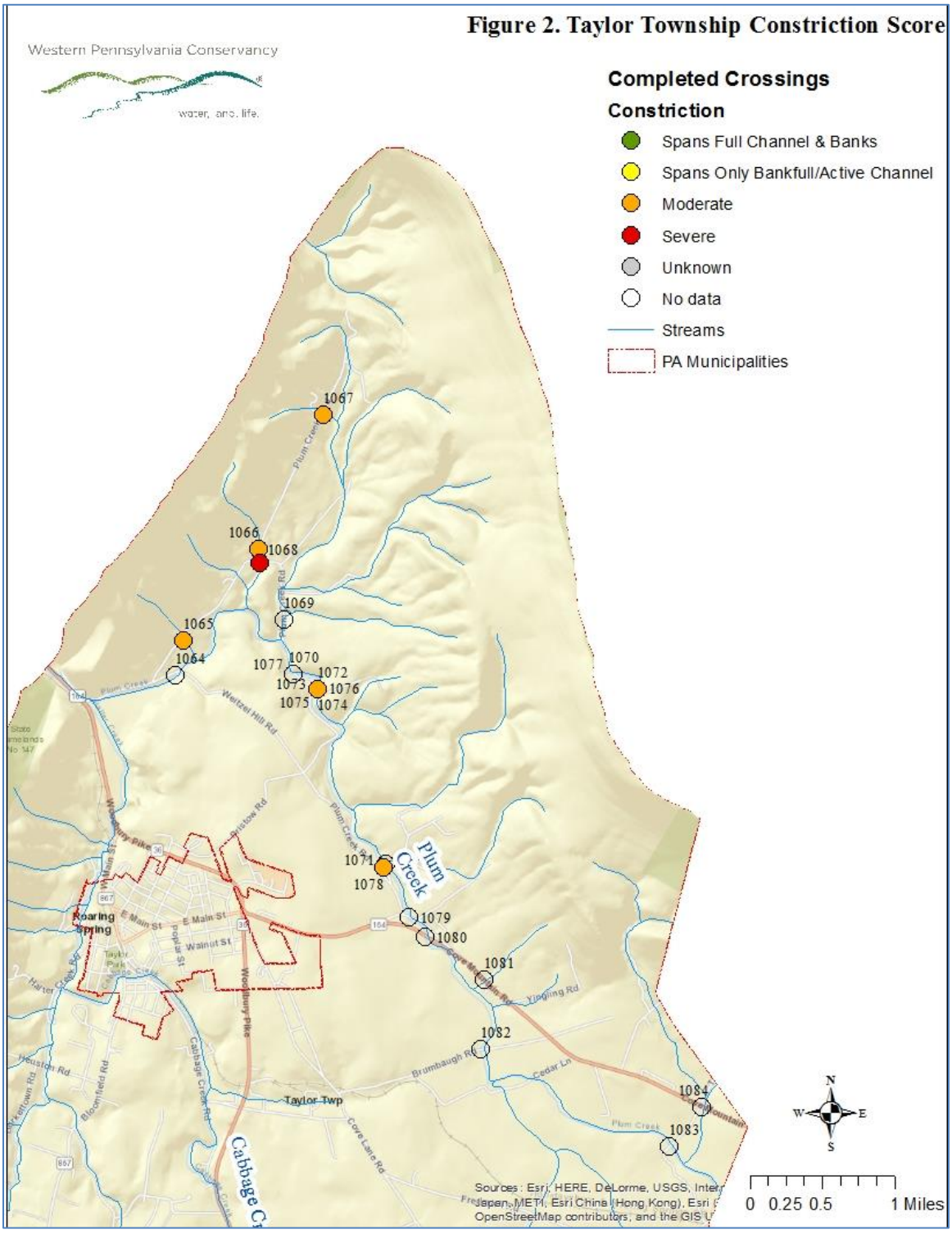
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
There are no crossings that have issues in any of the categories.			

Taylor Township

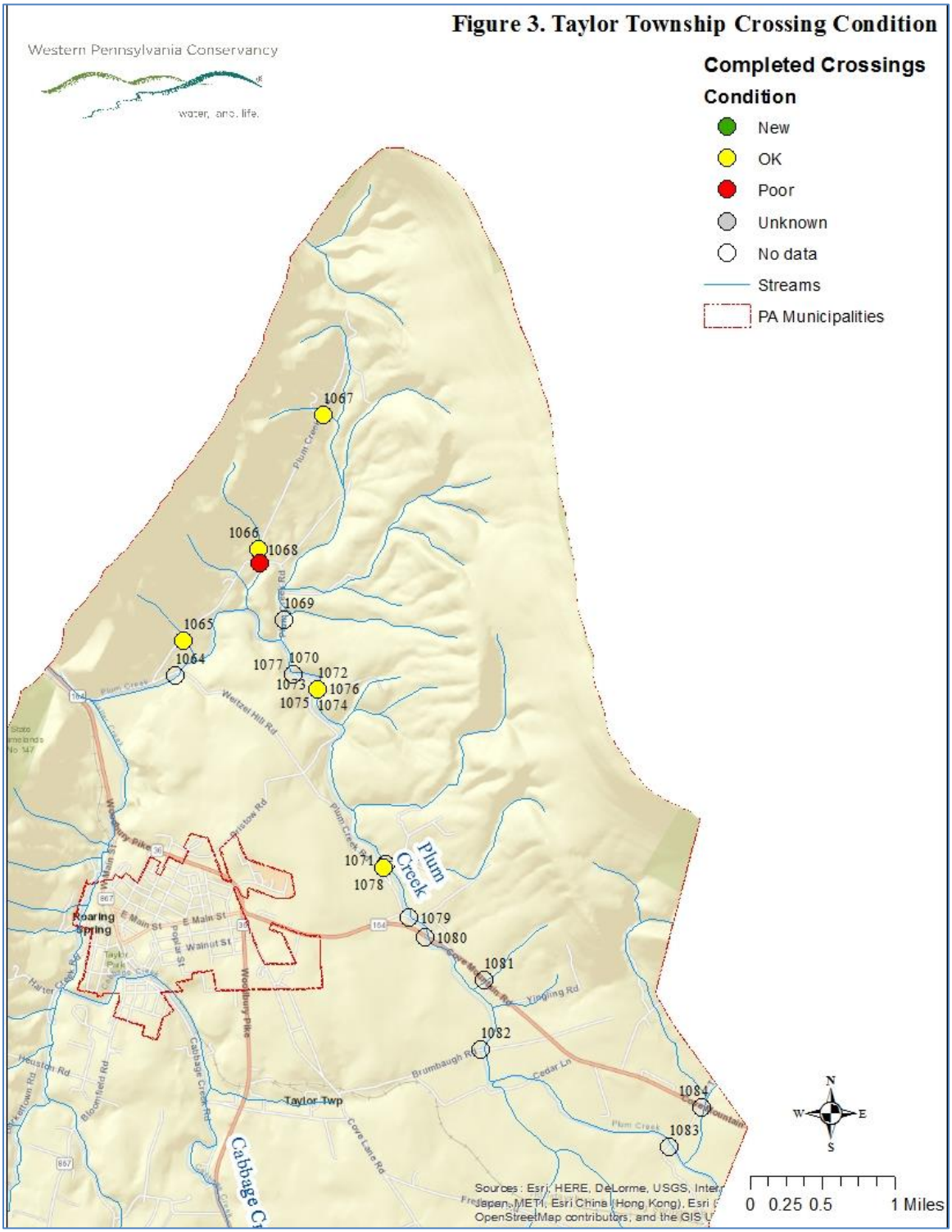
In Taylor Township, 18 road-stream crossings were surveyed. Based upon NAACC assessment data, three of these crossings (1065, 1066 &, 1068) were considered to be severe aquatic organism passage (AOP) barriers (Figure 1).



The constriction score assesses how the width of the crossing compares to the width of the natural stream channel. Road-stream crossings that have severe constriction scores are more likely to have erosion problems above and/or below the crossing. Figure 2 shows constriction scores for assessed crossings in Taylor Township. One crossing shows a severe constriction score, which increases the potential of erosion and sedimentation around those crossings.



Another aspect of the NAACC protocol is to note crossings that are in poor condition. Taylor Township had one crossing (1068) that was in poor condition (Figure 3).



Recommendations

A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings in Taylor Township that are recommended for replacement.

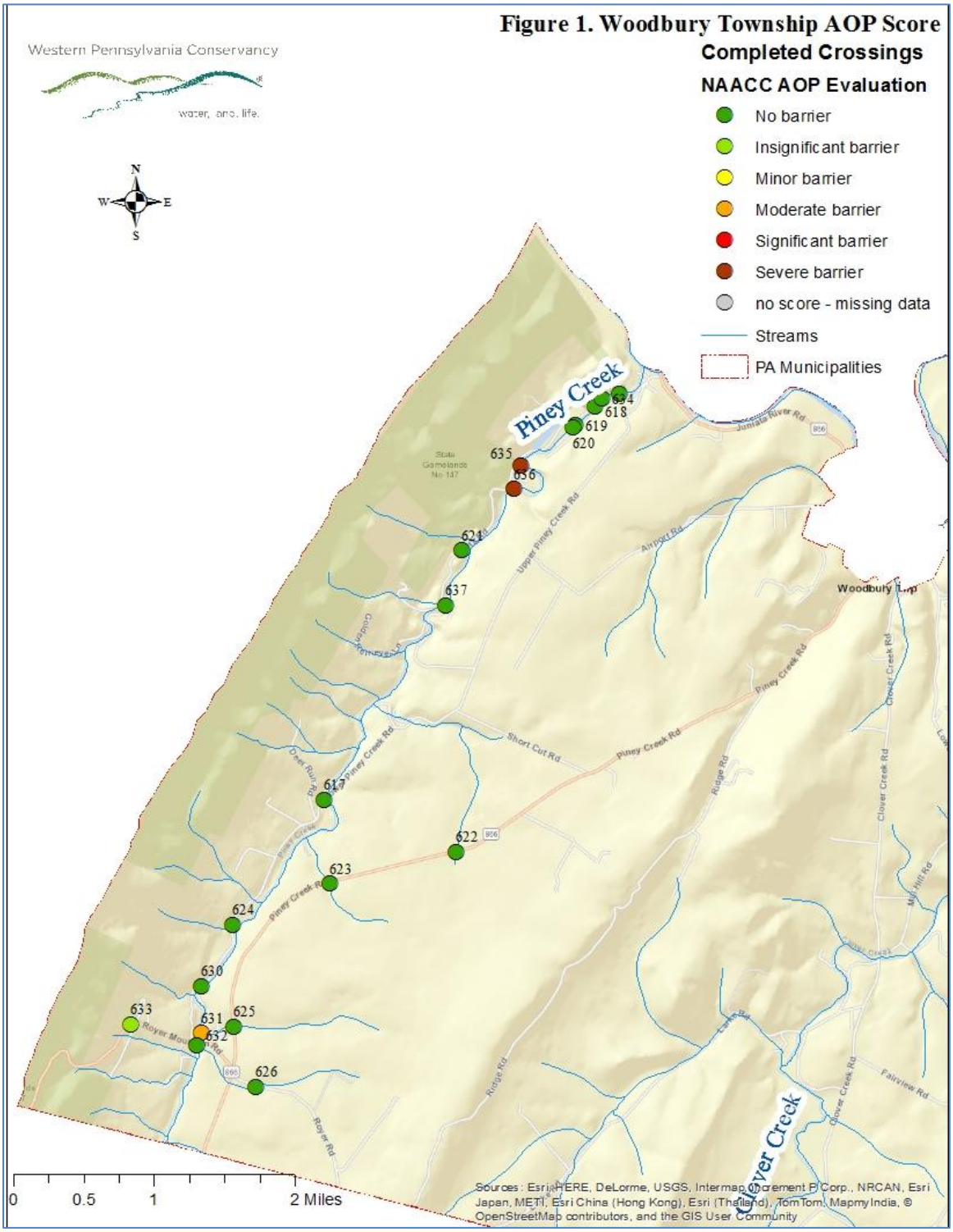
Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
1065 - Plum Creek Road	X		
1066 - Plum Creek BLVD	X		
1068 - Plum Creek Road *(Photo 1)*	X	X	X

Photos

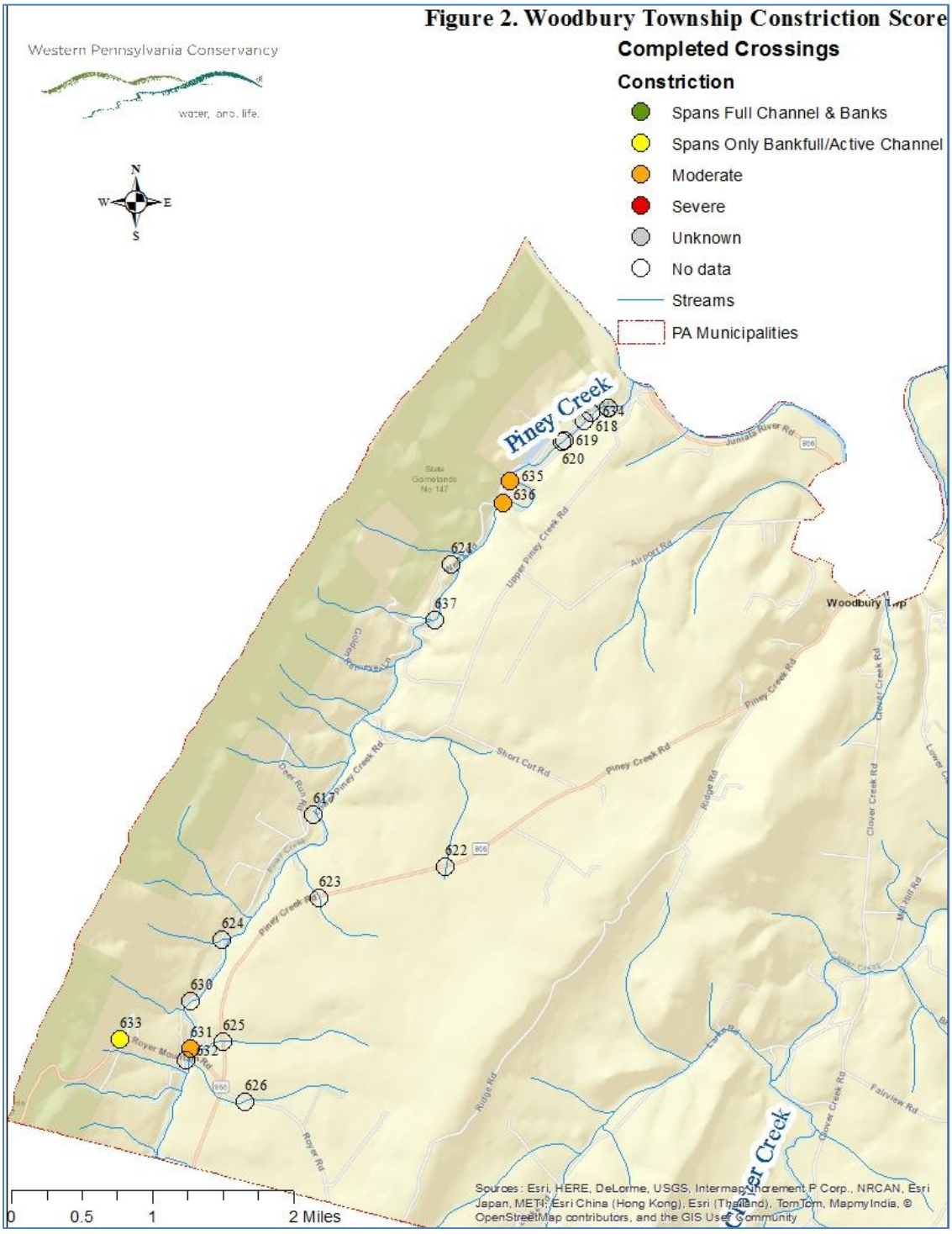
Photo 1: Crossing 1068 on Plum Creek Road. This crossing is almost completely filled with sediment and is a severe AOP barrier.

Woodbury Township

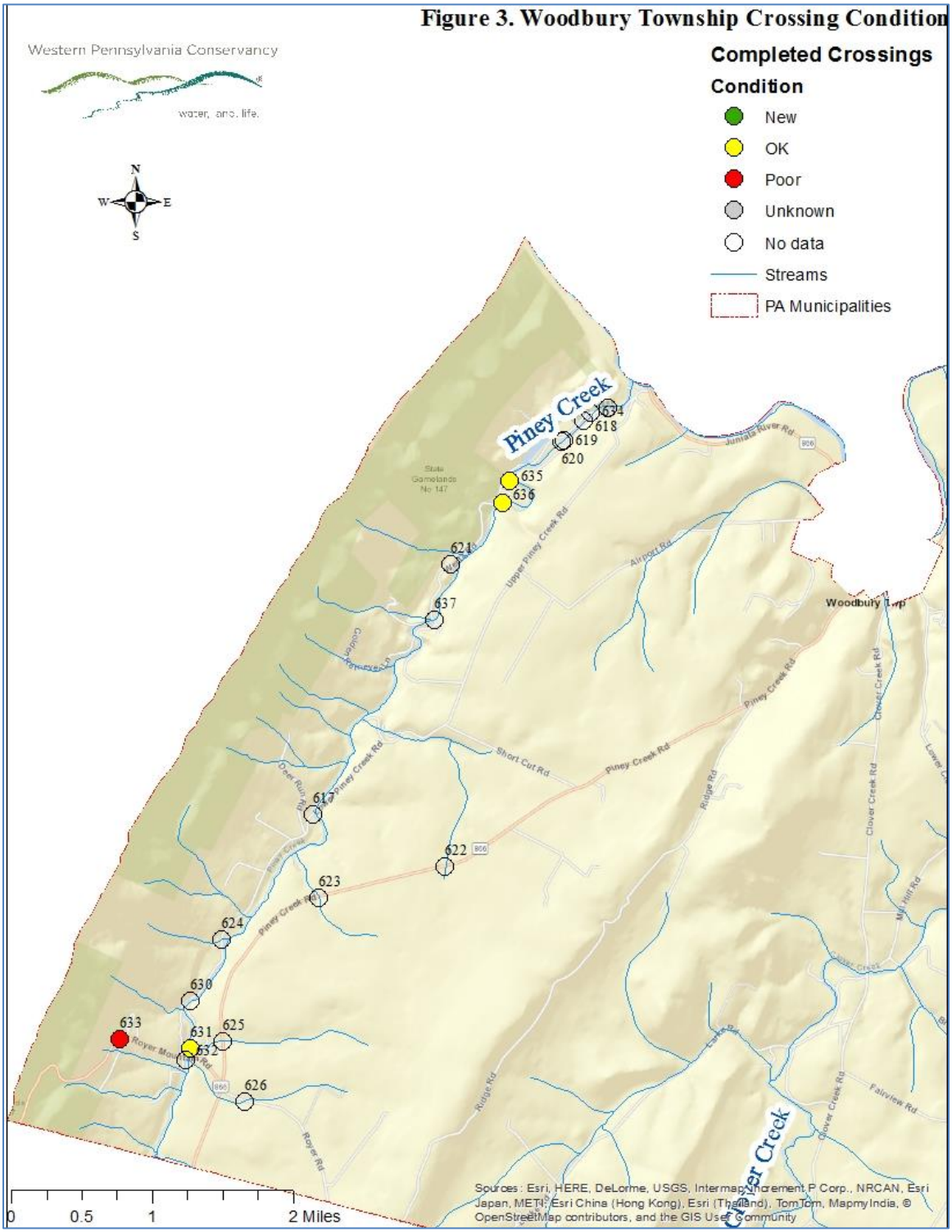
In Woodbury Township, 19 road-stream crossings were surveyed. Based upon NAACC assessment data, two of these crossings (635 & 636) were considered to be severe aquatic organism passage (AOP) barriers (Figure 1).



The constriction score assesses how the width of the crossing compares to the width of the natural stream channel. Road-stream crossings that have severe constriction scores are more likely to have erosion problems above and/or below the crossing. Figure 2 shows constriction scores for assessed crossings in Woodbury Township. No crossings show severe constriction scores. Crossings shown in Figure 2 that have a "No data" score are bridges where constriction was not measured because the crossings are not considered AOP barriers.



Another aspect of the NAACC protocol is to note crossings that are in poor condition. Woodbury Township had one crossing (633) that was in poor condition (Figure 3).



Recommendations

A NAACC evaluation of a crossing site yields information about existing barriers, constriction status, and the general condition of the crossing. When a crossing has severe or poor issues in any one of these categories, it is recommended that efforts be made to improve or replace the structure at that crossing point (Table 1). It is encouraged that crossing sites that have marks in more than one of these categories rank higher in priority for replacement.

Table 1. Road-stream crossings in Woodbury Township that are recommended for replacement.

Dark Blue cells indicate a rank in all three categories.	Medium Blue Cells indicate a rank in two categories.	*Light Blue Cells indicate a rank in one category.*	
Crossing Number	**AOP Evaluation: Severe & Significant Barriers**	**Constriction Condition: Severe**	**Crossing Condition: Poor**
633 - Royer Road			X
635 - Wertz Road *(Photo 1)*	X		
636 - Wertz Road	X		

Photos

Photo 1: Crossing 635 on Wertz Road. This crossing is located on a UNT to Piney Creek. It is a severe AOP barrier.