Southwest Missouri Council of Governments Low Water Crossing Inventory and Prioritization-Dade, Dallas, and Polk Counties

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SUMMARY:

The Southwest Missouri Council of Governments (SMCOG) received Community Development Block Grant Disaster Supplemental funding through the Missouri Association of Councils of Governments in May 2016. Part of this grant included the inventory and action plan for low water crossings in Dade, Dallas, and Polk Counties. This inventory was conducted from August 2017 to January 2018. A table summarizing crossing condition by county is included. Planning and prioritization meetings were held with each county commission in January and February of 2018. As an outcome of these meetings, priority locations were established for each of the three counties. These priorities provide an action plan for replacement and improvements.

Structure Condition	Dade County	Dallas County	Polk County
Good	138	56	139
Fair	87	130	153
Poor	7	28	34

INTRODUCTION:

Multi-jurisdictional Hazard Mitigation Plans, local Emergency Operations Plans, and other local/regional prioritization efforts have identified various local planning needs that focus on infrastructure resilience and emergency preparedness. In many cases, these locally identified planning priorities have not received the resources necessary to undertake these important planning processes and further prepare communities for potential disaster events. One specific identified need is the repair and replacement of low water crossings.

Low water crossings are a common concern across the region. Every county has problem points and crossings that will flood during heavy, and in some cases light, rain events. These flooded crossings create a significant safety concern and hazard for residents. Additionally, the damage to these structures require repair and financial investment, which many counties do not have the capacity to absorb.

This report summarizes the six month inventory of all low water crossings in Dade, Dallas, and Polk counties. The inventory allowed SMCOG staff to recommend priority crossings to each county, and provide a substantial amount of data that may be updated and mapped as changes occur.

PROCESS:

The data collection process was conducted between August 2017 and January 2018. SMCOG partnered with associate member Trekk Engineering for access to an online platform titled Fulcrum,

which provided a user friendly field tool for data collection. Fulcrum has a mobile application that was downloaded onto a tablet and/or cell phone in order to collect data in the field. Trekk assisted in building a form and importing base maps that SMCOG staff had developed. The initial maps identified where streams and roads intersected, thus providing points for staff to stop and inventory. Additional points were added in the field if staff identified locations that had evidence of flooding, were marked as low water, or looked to be low lying areas that may flood. Each previously identified point was given a unique identifier, structure ID name.

Information collected in the field includes:

- Structure type
- Structure condition
- Structure length
- Structure width
- Number of culverts/pipes/vents
- Pipe condition
- Flooded now
- Evidence of flooding
- Field comments
- Photos

Each point was also given a status after inventoried. These include: Incomplete, Field Complete, No Structure, Need to Return, or MoDOT.

In some cases there was no structure and may have just been a low lying area, in those instances only relevant information was collected. Additionally, points on the MoDOT system were inventoried and staff tried to identify those with bridge numbers and note that information in the form. MoDOT structures may not be relevant for the counties, but SMCOG plans to share collected data with MoDOT as well.

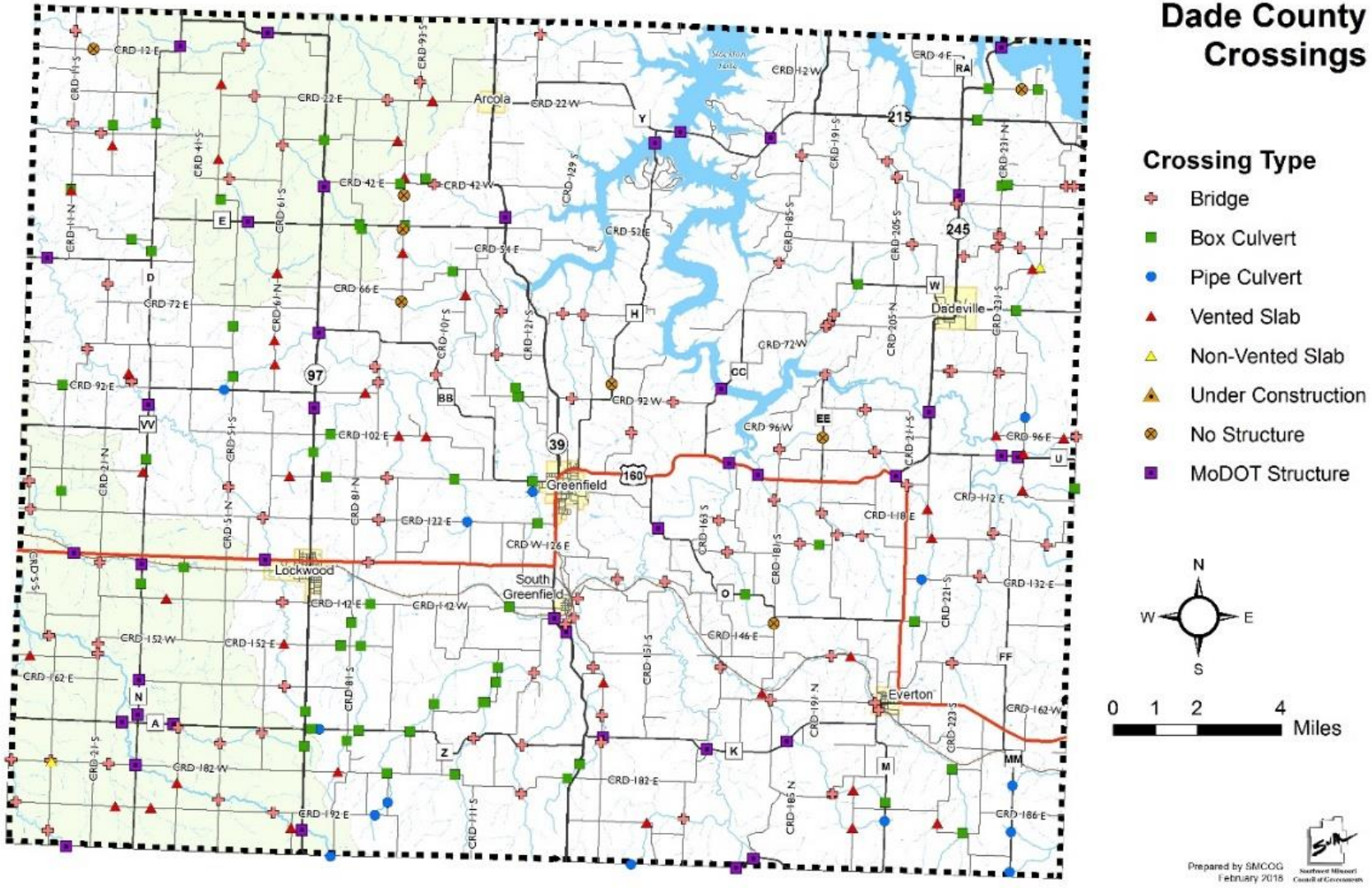
INVENTORY RESULTS:

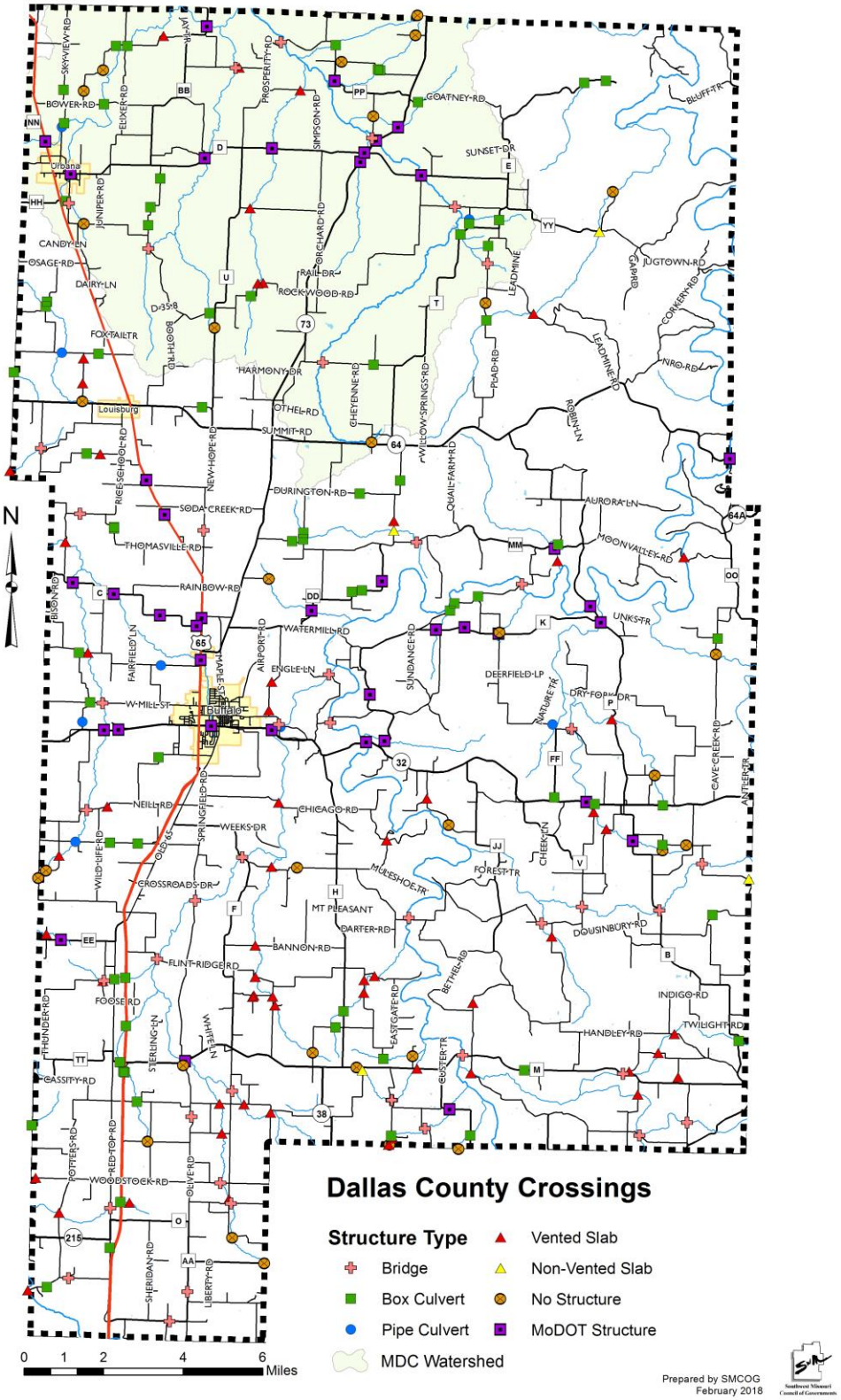
Overall, 960 of points were assessed and data collected. A summary of structure type and structure condition is shown in Tables 1 and 2.

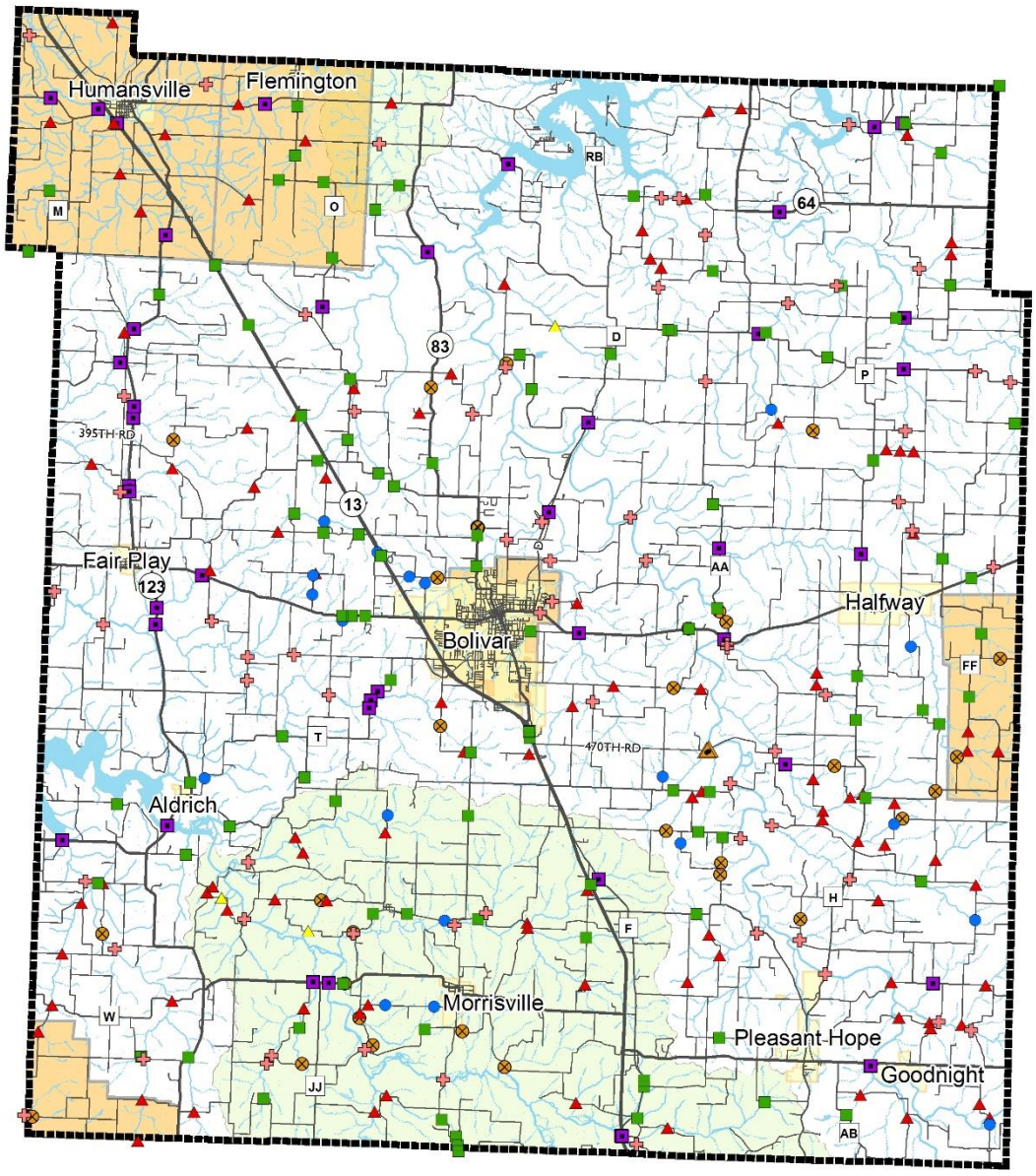
Table 1. Structure Types by County			
Structure Type	**Dade**	**Dallas**	**Polk**
Span Bridge	78	17	19
Pier Bridge	18	23	39
Low Water Pier Bridge	8	2	8
Box Culvert	63	71	101
Pipe Culvert	14	8	20
Vented Slab	41	59	105
Non-Vented Slab	2	4	3
No Structure Crossing	8	31	31
Under Construction	1	1	2
MoDOT Structure	39	39	43

Table 2. Structure Condition by County			
Structure Condition	**Dade**	**Dallas**	**Polk**
Good	138	56	139
Fair	87	130	153
Poor	7	28	34

Maps of structure crossing types and condition are show below.


Dade County Crossings
Crossing Type
Bridge
Box Culvert
Pipe Culvert
Vented Slab
Non-Vented Slab
Under Construction
No Structure
MoDOT Structure
N
W
E
S
0 1 2 4
Miles
Arcola
Greenfield
Lockwood
South Greenfield
Dadeville
Everton
Prepared by SMCOG
February 2018


Dallas County Crossings
Structure Type
Bridge
Box Culvert
Pipe Culvert
MDC Watershed
Vented Slab
Non-Vented Slab
No Structure
MoDOT Structure
0 1 2 4 6 Miles
N
Prepared by SMCOG
February 2018
Urbana
Louisburg
Buffalo
SKYVIEW-RD
BOWER-RD
ELIXER-RD
JAY-TR
PROSPERITY-RD
SIMPSON-RD
COATNEY-RD
SUNSET-DR
BLUFF-TR
JUNIPER-RD
CANDY-LN
OSAGE-RD
DAIRY-LN
FOX-TAIL-TR
BOOTH-RD
ORCHARD-RD
RAIL-DR
ROCKWOOD-RD
LEADMINE
GAP-RD
JUGTOWN-RD
CORKERY-RD
NRO-RD
LEADMINE-RD
ROBIN-LN
HARMONY-DR
OTHEL-RD
SUMMIT-RD
CHEYENNE-RD
WILLOW-SPRINGS-RD
PLAD-RD
QUAIL-FARM-RD
RICE-SCHOOL-RD
NEW-HOPE-RD
DURINGTON-RD
SODA-CREEK-RD
THOMASVILLE-RD
AURORA-LN
MOONVALLEY-RD
RAINBOW-RD
BISON-RD
FAIRFIELD-LN
MAPLE-ST
AIRPORT-RD
WATERMILL-RD
ENGLE-LN
SUNDANCE-RD
DEERFIELD-LP
UNKS-TR
NATURE-TR
DRY-FORK-DR
W-MILL-ST
CAVE-CREEK-RD
ANTLER-TR
NEILL-RD
SPRINGFIELD-RD
WEEKS-DR
CHICAGO-RD
CHEEK-LN
WILD-LIFE-RD
OLD-65
CROSSROADS-DR
MULESHOE-TR
FOREST-TR
MT PLEASANT
DARTER-RD
DOUSINBURY-RD
BANNON-RD
FLINT-RIDGE-RD
BETHEL-RD
INDIGO-RD
FOOSE-RD
THUNDER-RD
STERLING-LN
WHITE-LN
EASTGATE-RD
HANDLEY-RD
TWILIGHT-RD
CUSTER-TR
CASSITY-RD
POTTERS-RD
RED-TOP-RD
WOODSTOCK-RD
OLIVE-RD
SHERIDAN-RD
LIBERTY-RD



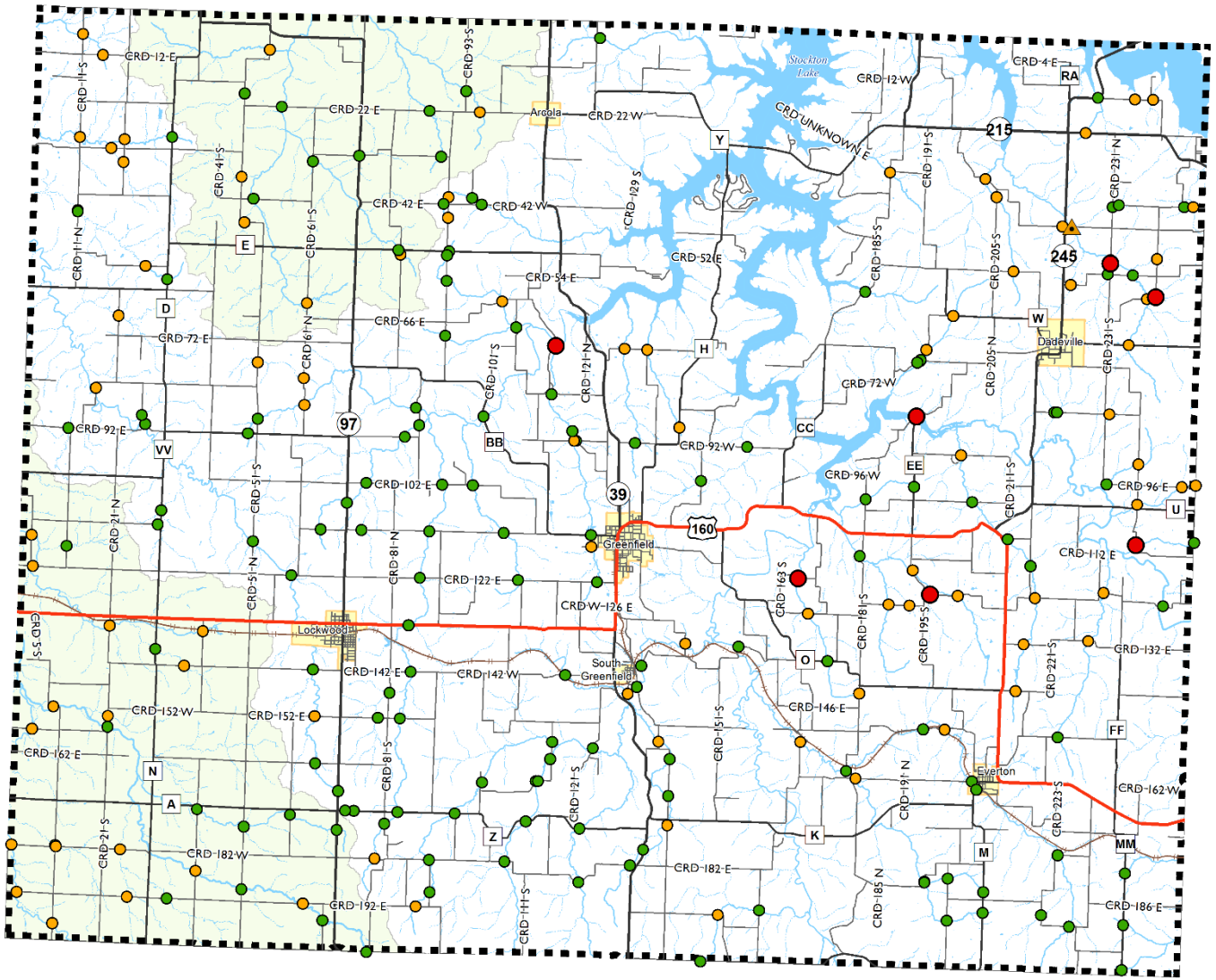
Polk County Crossings

Structure Type

- Bridge
- Box Culvert
- Pipe Culvert
- MoDOT Structure
- Special Road District
- MDC Watershed
- Vented Slab
- Non-Vented Slab
- No-Structure
- Under Construction

Southwest Missouri Council of Governments

Prepared by SMCOG
January 2018



Dade County Crossings

Structure Condition

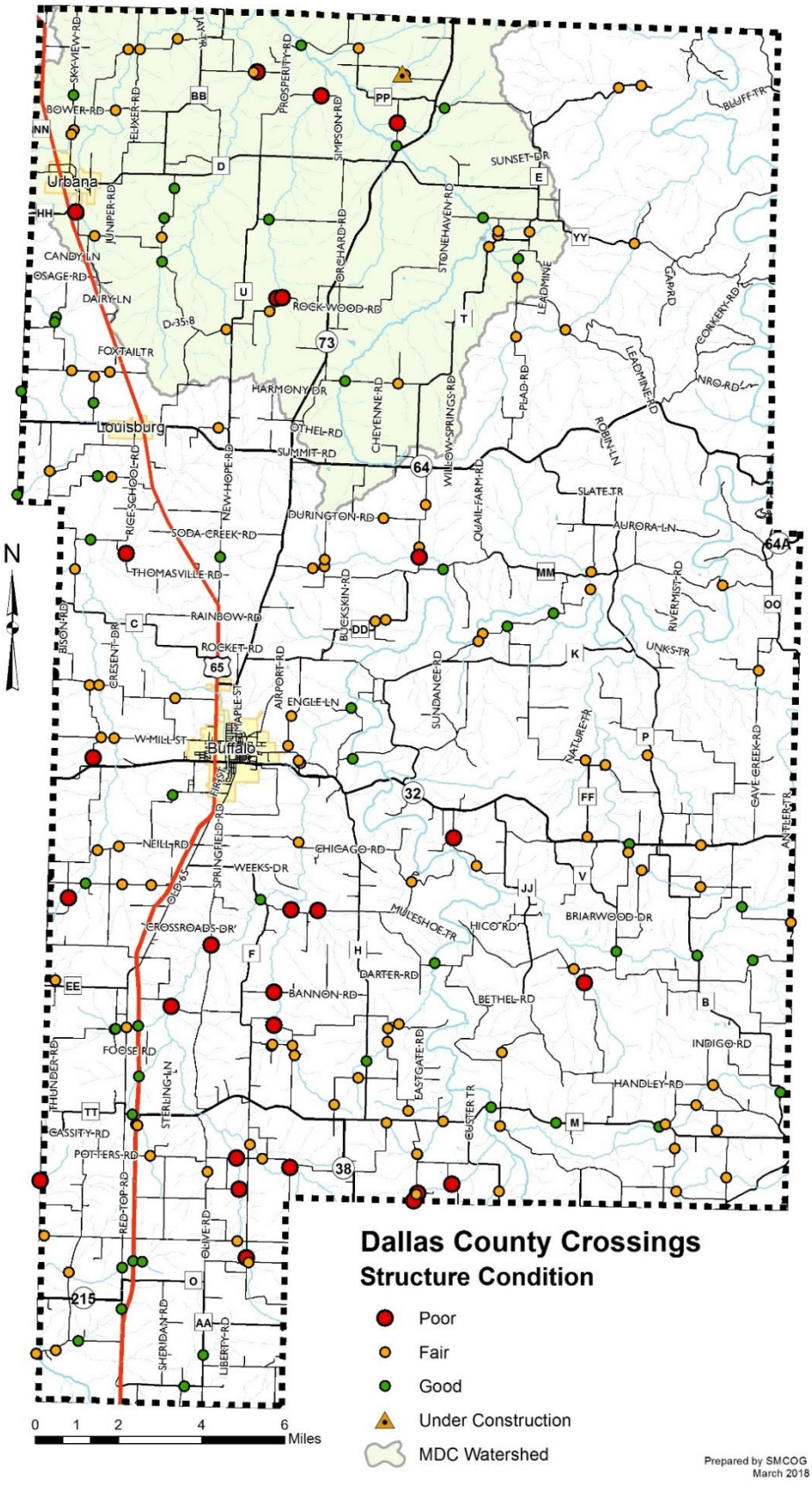
- Poor
- Fair
- Good
- Under Construction

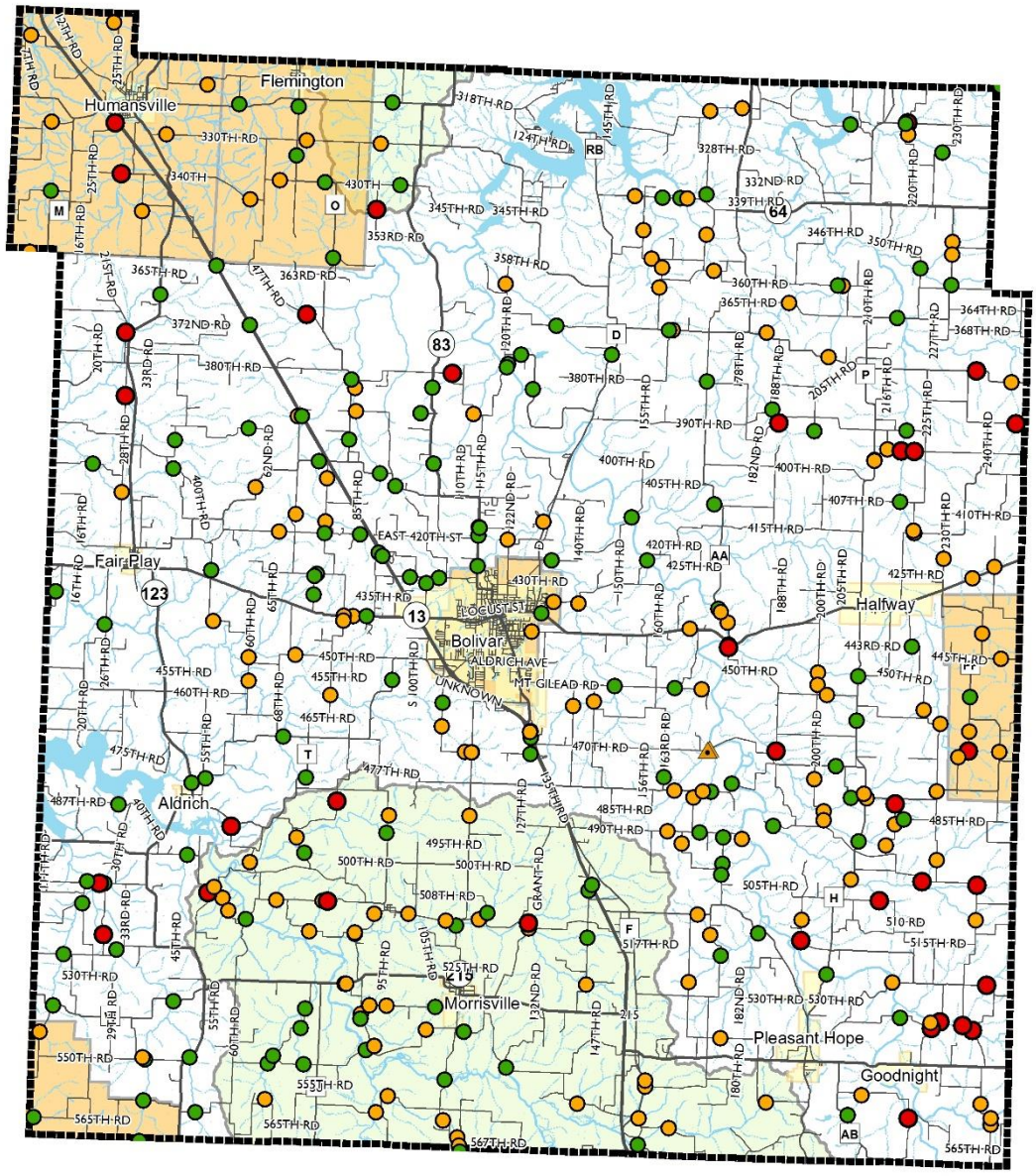
N
W E
S

0 1 2 4 Miles

Prepared by SMCOG
February 2018

Southwest Missouri Council of Governments


Urbana
Louisburg
Buffalo
N
Dallas County Crossings
Structure Condition
Poor
Fair
Good
Under Construction
MDC Watershed
0 1 2 4 6 Miles
Prepared by SMCOG
March 2018



Polk County Crossings

Structure Condition

- Poor
- Fair
- Good
- Under Construction
- Special Road District
- MDC Watershed

Southwest Missouri Council of Governments

Prepared by SMCOG
January 2018

PRIORITIES:

Priorities were developed based on six factors. These include:

- Condition
- Evidence of Flooding
- Distance from incorporated community
    - 1 mile = 20 points
    - 2 miles = 15 points
    - 3 miles = 10 points
    - 4 miles = 5 points
- Number of nearby structures
    - Within ¼ mile buffer
- Location within an MDC priority watershed
- Commissioner Priority

Each factor was given a numerical score that contributed to an overall priority score. The value for each condition was adjusted for each county in order to account for different environments (i.e. Dallas County has fewer incorporated communities than Polk County). Lower limits were set for the total points in order to get ten priority points for discussion with the counties. Additionally, during prioritization meetings with county commissioners, any structures determined by the county to be a high priority were added if not identified by SMCOG criteria.

Tables 3 through 5 show the priority conditions and points for each county.

Table 3. Dade County Summary															
Structure ID	**Structure Type**	**Condition**	**Length**	**Width**	**# of Pipes/ Culverts**	**Pipe Cond.**	**Flooded Now**	**Evidence of Flooding**	**Evidence of Flooding Comments**	**Field Comments**	**MDC Watershed**	**Distance From City/Village**	**Nearby Structures**	**Comm. Prior.**	**Priority Score**
Sons_Creek_1506	Low Water Pier Bridge	Poor (40 points)	75	15	0		No	No (0 points)			No	4 miles (5 points)	0	50	**95**
Sac_River_1468	Pier Bridge	Poor (40 points)	138	14	0		No	No (0 points)		Old, one lane	No	3 miles (10 points)	0	40	**90**
Dade_1184	Span Bridge	Poor (40 points)	20	16	0		No	No (0 points)		Old	No	4 miles (5 points)	0	40	**85**
Boggy_Branch_1178	Span Bridge	Poor (40 points)	50	14	0		No	No (0 points)		Crossing showing erosion and general age/ weathering	No	4 miles (5 points)	2	30	**77**
Coon_Creek_1238	Low Water Pier Bridge	Fair (10 points)	52	21	2	Fair	No	Yes (30 points)	Eroded banks		Yes (10 points)	>4 miles (0 points)	0	15	**65**

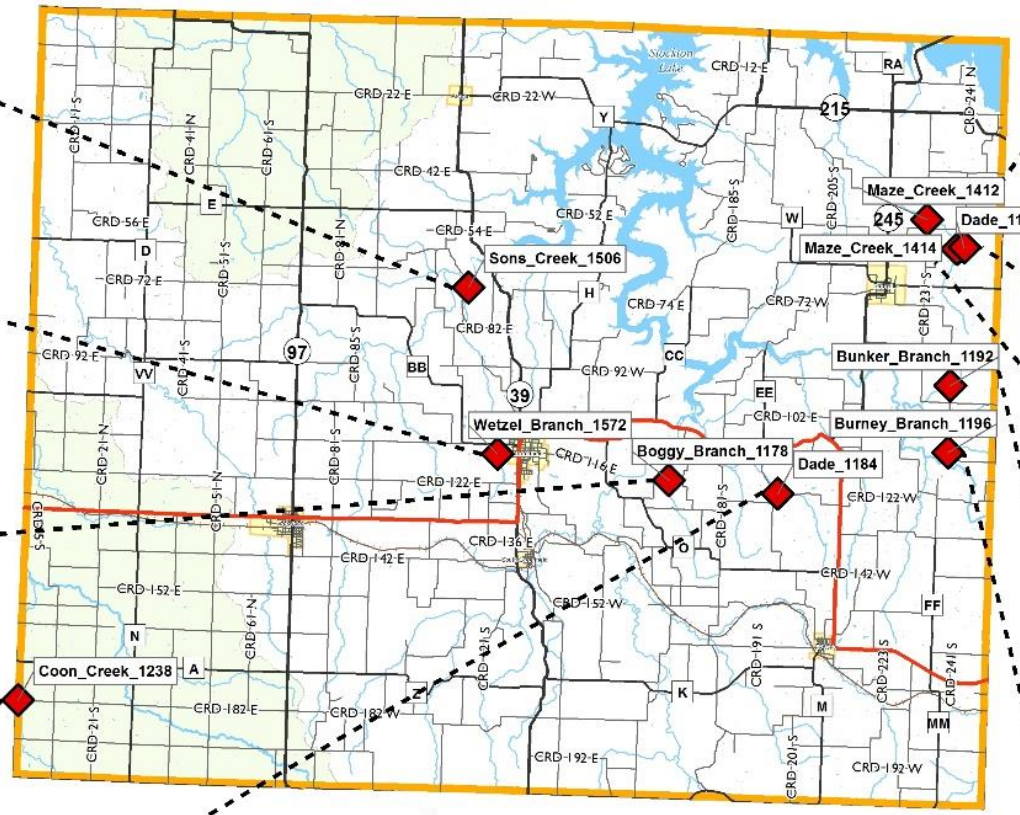
Table 3. Dade County Summary (cont'd)															
Structure ID	**Structure Type**	**Condition**	**Length**	**Width**	**# of Pipes/ Culverts**	**Pipe Cond.**	**Flooded Now**	**Evidence of Flooding**	**Evidence of Flooding Comments**	**Field Comments**	**MDC Watershed**	**Distance From City/Village**	**Nearby Structures**	**Comm. Prior.**	**Priority Score**
Burney_Branch_1196	Vented Slab	Poor (40 points)	42	15	1	Poor	No	No		Erosion to structure, sides crumbling	No	4 miles (5 points)	4	15	**64**
Maze_Creek_1412	Span Bridge	Poor (40 points)	28	18	0		No	No		Not in great shape but high above the water	No	2 miles (15 points)	3	0	**58**
Maze_Creek _1414	Vented Slab	Fair (10 points)	40	22	1	Poor	No	Yes (30 points)	Debris along bank	Pipe partially clogged	No	2 miles (15 points)	1	0	**56**
Wetzel_Branch_1572	Pipe Culvert	Fair (10 points)	30	16	1	Good	No	No			No	1 mile (20 points)	20	0	**50**
Dade_1140	Non-Vented Slab	Poor (40 points)	14	14	1	Fair	No	Yes (30 points)	Water currently over slab, would likely be impassible during heavy rain	Designed to have water flow over	No	2 miles (15 points)	1	-40	**46**

Table 4. Dallas County Summary															
Structure ID	**Structure Type**	**Condition**	**Length**	**Width**	**# of Pipes/ Culverts**	**Pipe Condition**	**Flooded Now**	**Evidence of Flooding**	**Evidence of Flooding Comments**	**Field Comments**	**MDC Watershed**	**Distance From City/Village**	**Nearby Structures**	**Comm. Prior.**	**Priority Score**
Dallas_441	Box Culvert	Poor (25 points)	52	12.5	3	Poor	No	No		Crossing has been repaired frequently after collapses	No	3 miles (10 points)	7	35	**77**
Judge_Creek_182	Vented Slab	Poor (25 points)	96	18	3	Poor	No	Yes (30 points)	Sand/rock deposits and debris suggest flooding	Rough crossing. Could definitely be replaced	Yes (10 points)	>4 miles (0 points)	6	0	**71**
Patterson_Branch_290	Vented Slab	Poor (25 points)	40	16	1	Poor	No	Yes (30 points)	Very low crossing with debris on banks	Poor crossing. Pipe on downstream side, but can't see on upstream	No	>4 miles (0 points)	15	0	**70**
Coatney_Branch_26	No-Structure Crossing with Culvert Pipe	Poor (25 points)	0	0	1	Fair	No	Yes (30 points)	Debris on the bank well above the crossing	Pipe slightly clogged. Water over crossing. Overall pretty rough crossing	Yes (10 points)	>4 miles (0 points)	5	0	**70**

Table 4. Dallas County Summary (cont'd)															
Structure ID	**Structure Type**	**Condition**	**Length**	**Width**	**# of Pipes/ Culverts**	**Pipe Condition**	**Flooded Now**	**Evidence of Flooding**	**Evidence of Flooding Comments**	**Field Comments**	**MDC Watershed**	**Distance From City/Village**	**Nearby Structures**	**Comm. Prior.**	**Priority Score**
Dallas_418	No-Structure Crossing with Culvert Pipe	Poor (25 points)	26	18	2	Fair	No	Yes (30 points)	Noticeable debris piled up	Some of the road appears washed out	No	4 miles (5 points)	8	0	**68**
Opossum_Creek_278	Vented Slab	Poor (25 points)	55	23	2	Poor	No	Yes (30 points)	Minor debris such as tree limbs and dirt on and around crossing	May need replacing soon	No	>4 miles (0 points)	11	0	**66**
Greasy_Creek_108	Low Water Pier Bridge	Poor (25 points)	75	19	2	Poor	No	Yes (30 points)	Debris on crossing, crossing erosion	Needs replacing	No	>4 miles (0 points)	8	0	**63**
East_Branch_Cahoochie_Creek_62	Box Culvert	Poor (25 points)	16	16	1	Poor	No	No		Part of the crossing is really messed up. See photo	Yes (10 points)	1 mile (20 points)	8	0	**63**
Ingalls_Creek_134	Pipe Culvert	Fair (0 points)	60.5	20.5	3	Fair	No	Yes (30 points)	Debris in pipes	Lots of debris build up	No	2 miles (15 points)	15	0	**60**
Dallas_443	Vented Slab	Fair (0 points)	38.5	30	1	Poor	No	yes (30 points)	A lot of limbs in pipe.		No	1 mile (20 points)	7	0	**57**

Table 5. Polk County Summary															
Structure ID	**Structure Type**	**Condition**	**Length**	**Width**	**# of Pipes/ Culverts**	**Pipe Condition**	**Flooded Now**	**Evidence of Flooding**	**Evidence of Flooding Comments**	**Field Comments**	**MDC Watershed**	**Distance From City/Village**	**Nearby Structures**	**Comm. Prior.**	**Priority Score**
Brush_Creek_552	Vented Slab	Poor (20 points)	98	20	3	Fair	No	Yes (20 points)	Eroded banks	Water flow	No (0 points)	1 mile (20 points)	20	0	**80**
Polk_1072	Vented Slab	Fair (5 points)	50	14	1	Fair	No	Yes (20 points)	Debris and general low laying area		Yes (20 points)	2 miles (15 points)	20	0	**80**
Little_Pomme_de_Terre_River_702	Vented Slab	Poor (20 points)	141	21	2	Poor	No	Yes (20 points)	Erosion, debris	Continuous water flow	No (0 points)	1 mile (20 points)	17	0	**77**
Polk_1016	Vented Slab	Poor (20 points)	63	25	3	Poor	No	Yes (20 points)	Debris blocking one side.		No (0 points)	1 mile (20 points)	8	0	**68**
Prater_Branch_814	Vented Slab	Poor (20 points)	90	14	1	Poor	No	Yes (20 points)	Eroded banks		No (0 points)	2 miles (15 points)	12	0	**67**

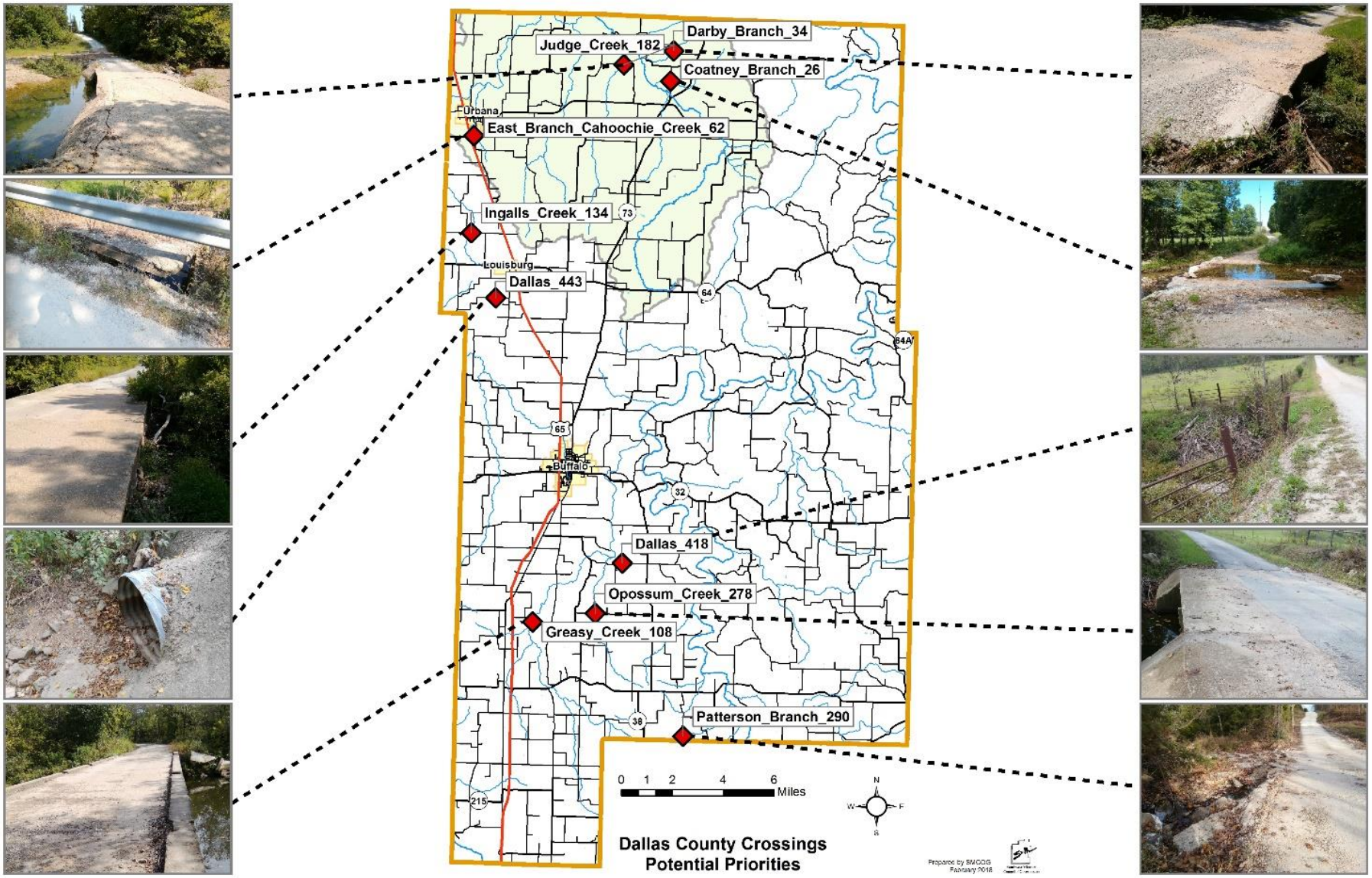
Table 5. Polk County Summary (cont'd)															
Structure ID	**Structure Type**	**Condition**	**Length**	**Width**	**# of Pipes/ Culverts**	**Pipe Condition**	**Flooded Now**	**Evidence of Flooding**	**Evidence of Flooding Comments**	**Field Comments**	**MDC Watershed**	**Distance From City/Village**	**Nearby Structures**	**Comm. Prior.**	**Priority Score**
Slagle_Creek_840	Vented Slab	Poor (20 points)	87	16	1	Fair	No	No (0 points)		Cracks on road surface	Yes (20 points)	3 miles (10 points)	16	0	**66**
Bear_Creek_500	Box Culvert	Fair (5 points)	30	20	1	Fair	No	No (0 points)			Yes (20 points)	1 mile (20 points)	20	0	**65**
Polk_1152	Vented Slab	Poor (20 points)	18	16	1	Poor	No	No (0 points)		Road eroded up to the edge of the slab	Yes (20 points)	3 miles (10 points)	12	0	**62**
Piper_Creek_766	Vented Slab	Fair (5 points)	60	16	2	Fair	No	Yes (20 points)		Continuous water flow	No (0 points)	1 mile (20 points)	6	10	**61**
Polk_1035	Low Water Pier Bridge	Poor (20 points)	43	14	2	Poor	No	No (0 points)		Narrow	No (0 points)	1 mile (20 points)	20	0	**60**

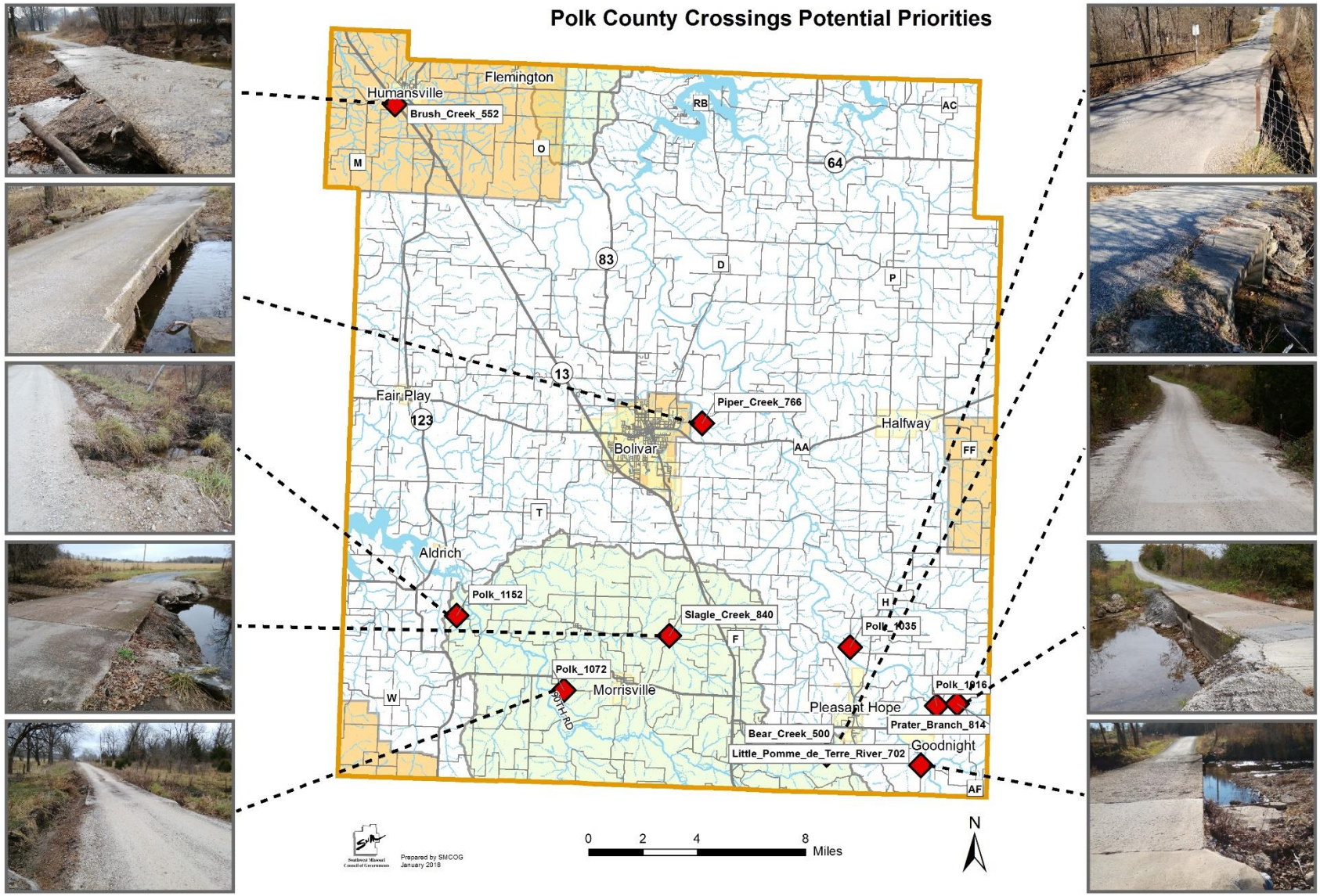


Dade County Crossings

Prepared by SMCOG
February 2018

Priorities:


Darby_Branch_34
Judge_Creek_182
Coatney_Branch_26
Urbana
East_Branch_Cahoochie_Creek_62
Ingalls_Creek_134
73
Louisburg
Dallas_443
64
64A
65
Buffalo
32
Dallas_418
Opossum_Creek_278
Greasy_Creek_108
38
Patterson_Branch_290
215
0 1 2 4 6
Miles
N
W
E
S
Dallas County Crossings
Potential Priorities
Prepared by SMCOG
February 2018


Polk County Crossings Potential Priorities
Flemington
Humansville
Brush_Creek_552
RB
AC
M
O
64
83
D
P
13
Fair Play
123
Piper_Creek_766
Halfway
Bolivar
AA
FF
T
Aldrich
Polk_1152
Slagle_Creek_840
H
Polk_1035
F
Polk_1072
Morrisville
W
90TH RD
Polk_1016
Pleasant Hope
Prater_Branch_814
Bear_Creek_500
Little_Pomme_de_Terre_River_702
Goodnight
AF
Prepared by SMCOG
January 2018
0 2 4 8
Miles
N

ACTION PLAN:

Each county has a determined top ten priority list that may be worked on for repairs and/or replacement. Counties may choose to work from the top scoring priority down. However, counties should look to repair or replace based on what makes the most sense financially and is relevant at any given time. For example, if a lower priority location or even a non-priority location were to flood and be severely damaged then that location should be repaired or replaced first.

Counties should ensure that any repairs or full replacements are done with resiliency in mind and not necessarily built back to the same standard as it was before. Often some small, perhaps minor investments, could provide substantial improvement that would make a structure more resilient to future flooding events.

Some potential funding sources may include:

- Hazard Mitigation Grant Program
- Pre-Disaster Mitigation
- Missouri Department of Conservation, Missouri Conservation Heritage Foundation – Stream Stewardship Trust Fund (in specific cases)
- FEMA Public Assistance – following emergency disaster declarations
- Local road and bridge funds

APPENDIX A: LOW WATER CROSSING INVENTORY GUIDE AND PROCEDURE

Recommended Materials:

- An easily portable device such as a Trimble, iPad, tablet, or another device capable of taking photos while out in the field. The device should also have a GPS that works offline so it can be synched later when connected.
- Generally the device is used to record data and take photos such as app on a tablet or Trimble.
- A portable measuring wheel.
- 2-4 traffic cones
- Bright orange vests or some type of clothing for visibility during field work for traffic.
- Printable maps of the counties with each crossing identified, all roads, and cities. This is for keeping track of which crossings have been inventoried if there is no way to keep track/mark off the individual crossings digitally on the portable device.

Proper field etiquette and accuracy

Upon arriving at the low water crossing:

- Pull over and turn on flashers
- Place traffic cones approximately 20 feet in front and behind vehicle.
- Measure the length and width of structure.
- Take a photo on the portable device in landscape orientation (two photos are recommended).
- Indicate what type of crossing the structure is and the condition of the structure and any pipes or box culverts. (See Bridge and Low Water Crossing Classifications Document for more information on types of crossings defined.)
- Complete other fields in form as necessary.

Evidence of flooding

Evidence of flooding includes debris scattered around, on top of the crossing, and or lodged inside the structure, watermarks above the low water crossing from recent floods, and debris wrapped around nearby fences, trees, and other objects above the structure that appear to have been carried by water.

When marking a LWC (Low Water Crossing) as flooded, ask: Is the water moving rapidly and is the depth of the water over six inches?

If yes, mark the crossing as flooded since it is a hazard to public safety.

If no, but there is substantial evidence of flooding then indicate as such in the appropriate fields.

Water over crossing, but no evidence of flooding, ask: Is there substantial water over the crossing/enough to cause problems for local residents who use the crossing, but no real evidence of flooding?

If yes, then indicate in the field comments and or mark the crossing as such that an issue exists and needs to be dealt with in the appropriate manner, but do NOT designate as flooded.