The 25 Most Environmentally Damaging Dirt Roads of Baldwin County, Alabama

A Report by the Baldwin County Environmental Advisory Board

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Executive Summary

Listed below, and in **Table 1** of the full report are, in the opinion of the Baldwin County Environmental Advisory Board Subcommittee, the 25 most environmentally damaging County maintained dirt roads in Baldwin County.

- Truck Trail 17
- Brady Road
- Linholm Road
- River Road
- Griggers Road
- Goat Cooper Road
- Peter Morris Road
- Barrineau Park Road
- Bretz Lane
- Malkoskie Road
- Hagendorfer Road
- Wolf Field Road
- County Road 26
- Spring Creek Drive
- Lipscomb Road
- Norris Lane
- Mannich Lane (S2)
- Mannich Lane (S4)
- Paul Cleverdon Road
- Sherman Road
- Nolte Creek Drive
- Kilcrease Road
- Holley Creek Road
- Sawmill Road
- Ewing Farm Road

With the exception of Truck Trail 17 and Brady Road, which standout above any of the other segments, the roads are listed in no particular order and no "ranking" is implied.

Introduction

This report was prepared by members of a sub-committee appointed by the Baldwin County Environmental Advisory Board (BCEAB) during its regularly scheduled meeting of August 19, 2009. The report was submitted to the full BCEAB during its March 23, 2010 meeting and is intended solely for use by the Baldwin County Commission (BCC) and Baldwin County Highway Department (BCHD). The intent of the effort was to update the original BCEAB report entitled *The 25 Most Environmentally Damaging Dirt Roads in Baldwin County* prepared by Jerome B. Knaebel (December 1998), although the process of elimination utilized in the original report was modified as described below. Utilizing the original report's listing of the 25 most environmentally damaging dirt roads, the County was able to focus Highway Department resources to implement improvements and reduce impacts to wetlands and waterways. Nineteen of the original 25 dirt roads have received some level of treatment. Those roads that only received a partial treatment were again included in this review.

It is intended that this report be utilized by the County, along with the various other socio-economic factors, to target its existing and future Highway Department resources to achieve the most public good and environmental benefit.

Background

Baldwin County is blessed with an abundance of natural resources, particularly wetland and water resources, and abundant rainfall (50-60 inches per year). However, it is also located in an area of the country with one of the highest "rainfall factors" (>600). This rainfall factor is a numeric expression of the amount of kinetic energy in the rainfall (e.g. rainfall intensity) and the higher the number the more erosive the rainfall events can be to exposed soil. Baldwin County soils are also fairly conducive to erosion, being generally low in clay and gravel content. This particular combination of natural environmental conditions means that exposed surface soils are highly susceptible to erosion, which results in significant quantities of sediment being delivered to area wetlands and waterways. As noted in the original report: "the soils of Baldwin County are consistently erosive and even slight grades cause the velocity of runoff water to exceed the critical velocity of soil particles".

The potential environmental and socio-economic impacts associated with excessive sedimentation in wetlands and waterways are well documented and include loss of habitat, channel modification, flooding, and various water quality issues (turbidity, swimability, etc.). Several stream segments in Baldwin County have been placed on Alabama's 303(d)[1] list by the Alabama Department of Environmental Management (ADEM) due to impacts associated with sediment loading.

The public road system in Baldwin County currently includes 369 named dirt road segments totaling about 270 linear miles. The average County dirt road segment length is approximately ¾ of a mile with a range of 0.04 miles to 6.78 miles (note that segment length is often defined by maintenance area or commission district line, for example Brady Road is actually 10.18 miles but is listed in two segments). Only about 16% (60) of theses roads are greater than one mile in length. Each mile of dirt road translates into roughly 3.5 acres of exposed soils that can easily be eroded and washed into nearby wetlands and streams. At the time of this survey, the County maintained dirt roads were distributed over the county as follows:

[1] The 303(d) list is a listing of waterbodies, promulgated by ADEM and EPA pursuant to section 303(d) of the Federal Water Pollution Control Act, that are not meeting applicable state water quality standards.

Maintenance Area 100	**103 road segments**	**83.30 miles**
Maintenance Area 200	**92 road segments**	**75.95 miles**
Maintenance Area 300	**174 road segments**	**110.49 miles**

It should be noted that there are likely just as many private dirt roads within the County that are currently not under County maintenance and were not part of this review. Undoubtedly, some of these private dirt roads are having environmental impacts similar to or greater than those reviewed in this report.

Review Process

Since some degree of environmental impact is associated with any dirt road, the process of determining the "25 most environmentally damaging" is essentially a process of elimination. Focusing primarily on sediment impacts to wetlands and waterways, there are a number of physical factors that influence sediment delivery from dirt roads, such as proximity to the wetland or waterway, surface soil type of the road, slope steepness and length, vegetative cover, and drainage. During the preparation of the original report, Mr. Knaebel manually retrieved approximately 26 months worth of various data from the BCHD maintenance files. Information on the number of times the road segment was bladed, the number of cubic yards of dirt placed on the road, and the average annual cost per mile for maintenance and repair work were all tallied. Arbitrary limits were applied to the data set and the list narrowed to a manageable number (69 segments) for site visits. The final list and ranking of the 25 dirt roads was then based on Mr. Knaebel's on-site observations and professional experience. Although this approach was sound, due to the difficulty in obtaining the same information, lack of documentation of the original "criteria" applied, changes in the County's road identification system, and the availability of the County Geographic Information System (GIS) the authors modified the process of elimination and ranking methodology.

It was learned that the BCHD staff had previously undertaken an effort within each of the three designated Maintenance Areas (MA) to "rank" dirt roads based on several socio-economic factors including among others, "Number of Houses", "Drainage", "Surface Gravel Element", "Environmental Concerns" and "Maintenance Difficulty". Since this information was available in electronic format and easily manipulated, the authors requested that the information be sorted by the two most relevant factors for this effort: "Environmental Concerns" (primary sort criteria) and "Maintenance Difficulty" (secondary sort criteria). These two rankings, on a scale of 1 (best) to 10 (worst) were based on the opinion of the BCHD staff assigned to the respective areas considering similar factors used in the original report (e.g. costs, frequency of maintenance, discharges to waterways, etc.). The BCHD adheres to a County Policy to abide by all ADEM and Federal environmental regulations. Area Maintenance Supervisors maintain certification as an ADEM Qualified Credentialed Inspector (QCI) through ALDOT or Thompson Engineering QCI Courses. Also, the Engineering Field Staff are certified as QCIs.

The **first step** of the elimination process was to review the sorted BCHD ranking information. There were a total of 34 road segments with an "Environmental Concern" (EC) rank of 5 or higher, 55 road segments with a rank of 4 or higher, and 89 road segments with a rank of 3 or higher. Overall, no road segments were ranked as 9 or 10 for EC and ~69% were rated as 1. Reviewing the Maintenance Difficulty (MD) rankings it was found that only 3 road segments rated higher than 7 and only 12 were rated as 1. In order to mitigate for the inherent variability among the BCHD staff that provided the rankings, and account for the obvious skew of the EC ranking data, the authors

decided to use the sum of the EC and MD rankings, presuming that "maintenance difficulty" is primarily related to drainage and/or erosion issues. In order for a segment with a low (2) EC rating to be considered for further evaluation, the MD would have to be 3 or higher. Likewise, for a segment with a moderate EC rating (3) to be eliminated, the MD rating would have to be very low (1). In fact, there was good general correlation between the EC and MD rankings and only 10 segments with an EC ranking of 3 or 4 were omitted using an EC+MD cut-off of five. This was due to the lack of a MD ranking (presumed as 0); therefore these 10 segments were added back to the list so that all segments with EC rankings of 3 or greater were included. Using this methodology resulted in an initial "short list" of 209 road segments covering just over 206 miles.

The **second step** in the process was to review the eleven road segments from the original report that had received no treatment or only partial treatment (that were not on the initial list from step 1). This resulted in the addition of no new road segments to the "short list".

The **third step** in the process involved the elimination of road segments already scheduled for improvements in the County Paving Plan (2009-2011) and/or proposed for Coastal Impact Assistance Program (CIAP) in the 2007-2008 funding cycle. Road segment improvements proposed for the 2009-2010 CIAP funding cycle were left on or added to the review list. This step resulted in the elimination of 23 road segments covering approximately 28 miles and the addition of no road segments. This step brought the "short list" to 186 road segments totaling approximately 177 miles. It was noted that of the 29 road segments included in the County Paving Program for 2009-2011, only 11 have a BCHD "Environmental Concern" rank of 3 or higher. The 186 dirt road segments on this "short-list" are distributed over the county as follows:

Maintenance Area 100	56 road segments	63.44 miles
Maintenance Area 200	64 road segments	60.65 miles
Maintenance Area 300	66 road segments	53.64 miles

The **fourth step** was to utilize the County's existing Geographic Information Systems (GIS) mapping technology to overlay the 186 "short listed" road segments in relation to the wetlands, waterways, soils, land cover (aerial photography) and topography. The committee utilized Arcview© version 9.0 GIS to assess potential impacts to wetlands and streams that could occur, or have occurred, due to stormwater runoff from county maintained dirt roads. Factors significantly influencing erosion of dirt roads (i.e. slope length and steepness of road), drainage area, topography, soil types and proximity of potential stormwater discharges to streams and wetlands were the primary factors considered in this step. The data used in the evaluation process included the Baldwin County Soil Survey (1963), United States Geological Survey 7.5 minute survey Quadrangle Maps, Baldwin County LIDAR (2004), Natural Resource Conservation Service Aerial Photography (Dated: 2001 and 2007) Baldwin County Commission Aerial Photography (2009) and The Baldwin County Wetland Assessment (2003). During the GIS review the authors overlaid data layers to assess the potential for impacts and completed data forms for each segment. From these data layers the committee could take a "virtual aerial tour" of the road segment and evaluate the potential for environmental impacts. In some cases environmental impacts were actually discernable from the high resolution aerial photography. Each road segment was evaluated for the number of stream crossings, wetland crossings and proximity to wetlands and streams. A distance of 500 feet from the roadway to a wetland or stream and/or evidence of existing environmental impacts were used as the threshold for eliminating or retaining road segments for further evaluation. The committee performed the GIS evaluation on all 186 roadway segments on the "short-list" and sixty (60) roadway segments were retained for field evaluation.

The **fifth step** was to perform a field evaluation of each "short-listed" road segment (**Table 2** lists all 60 segments that were visited). Individual road segments were visited by the authors (usually all three of the subcommittee members) and evaluated for actual or potential environmental impacts. Areas of concern were logged on a "mile post" basis (using vehicle odometer) from a referenced starting point. Field investigations were conducted on 6 February 2010, 20 February 2010 and 12 March 2010. Included in this field evaluation were observations that could not be readily made from the existing GIS layers, such factors as: relative grade or steepness of the roadway; drainage discharge location(s); actual number of stream or wetland crossings; condition of cross-drains; sediment discharges impacting wetlands or waterways; and effectiveness of any previous or existing treatments. Field observations were noted for each segment and representative photographs were taken on segments that were candidates for the final list of 25. Road segments were then given a subjective relative rating of between 1 and 5 only as a means to keep track of the worst segments. This rating was based on each evaluator's opinion of the potential or actual environmental impacts (frequency and/or severity), and resulted in the final list of 25.

In addition to the 60 candidate segments, 11 segments that had been previously eliminated were visited as a quality control measure to verify the elimination process. Although a couple of the segments previously eliminated were found to have some environmental impact, most had little or none, and no segments would have reached the top 25, validating the elimination process.

Observations and Findings

Overall, the authors were pleasantly surprised by the lack of significant environmental impacts associated with most road segments visited. As expected, most impacted areas were where road segments actually cross streams or wetlands, or where "turn-outs" discharge directly to streams or wetland areas. A few road segments were so severely incised that they were actually no more than a large ditch or gulley that one could drive through, delivering stormwater runoff and significant (but unquantified) volumes of sediment down slope, often to wetlands or streams. Two of the field trips (February 6, 2010 and March 12, 2010) were conducted following significant rainfall where flooding conditions were observed on several low-lying road segments. The authors were encouraged by the noted absence of turbidity downstream of these flooded areas when undisturbed by traffic. This was probably related to low traffic and the materials that comprise the road surface. It was also noted that the County efforts to stabilize critical areas and provide surface treatment on several road segments were, for the most part, highly successful.


Photo 1: Example of previous ditch line treatment.


Photo 2: Example of previous road surface treatment.

The authors were less encouraged by the frequency of failed "turn-outs", the number of "turn-outs" discharging directly to streams and wetlands, ineffective cross drains (filled, submerged or complete absence), the vegetative clearing and placement of fill material without the use of temporary BMPs or permanent stabilization practices (although not required by regulation).

Photo 3: Example of failed "turn-out".

Photo 4: Example of fill placement without BMPs.

Photo 5: Lack of adequate outlet protection.

Photo 6: Wetland impacts due to sediment discharge.

Photo 7: Turbidity impacts.

Photo 8: Typical staining associated with turbid runoff.

Many culverts lacked adequate outlet protection on the down flow side to prevent scour and have contributed to the formation of gullies. Although there were few locations where elevated turbidity

was actually observed in adjacent waterways, in a number of locations there was a distinct discoloration or "staining" of vegetation in areas receiving runoff from the roadway. This is due to the nature (color) of the material used for road construction or repair and a typical indication that the stormwater runoff is excessively turbid during periods of discharge. The authors also noted a prevalence of non-native invasive species, particularly cogon grass and privet. Where significant growth of cogon grass occurred along the shoulder, sediment delivery was notably retarded, however this should not be considered a preferred erosion and sediment control management practice.

Summaries of the field observations for each of the 25 listed segments follow this narrative. In lieu of a "ranking" that implies a defensible rationale for placing one road segment ahead of another, the authors have developed this list with no particular relative rankings, with one or two worthy exceptions as noted. For each of the 25 road segments there is a general description, listing and location of problem areas, and general discussion. One or more representative photographs are usually included with each description.

Summary and Recommendations

Table 1 lists the final 25 road segments considered by the authors to be the most environmentally damaging. Obviously, based on the subjective nature of the review, other reviewers could logically and defensibly derive a different list. Undoubtedly, as noted in the original report, there are road segments in the County other than those listed that are causing, or contributing to, significant environmental impacts. This review represents the authors' best effort given the data and resources available.

The Baldwin County Commission and Baldwin County Highway Department have made significant progress in reducing, minimizing or eliminating the environmental impacts related to erosion and sedimentation from County maintained dirt roads over the past 10 years. During the course of the review, the authors visited several of the road treatments implemented since the original review. These treatments, with some exceptions, appear to have been effective but were often in need of maintenance.

The 25 road segments highlighted in this report total 55.56 miles in total length and are distributed throughout the County as follows:

Maintenance Area 100	**5 segments**	**19.4 miles**
Maintenance Area 200	**7 segments**	**21.1 miles**
Maintenance Area 300	**13 segments**	**15.1 miles**

Overall, County maintained dirt roads are fairly evenly distributed over two of three Maintenance Areas (100 and 200) but nearly 50% of all segments are located in MA 300. Likewise, segments with environmental concerns in MA 300 were notably higher, representing ~50% of the 25, but having the fewest actual miles. It is also evident that the County Highway Department's internal rating system may not always capture road segments causing or contributing to significant environmental impact. Although using the EC+MD score of 10 or higher would capture about 64% of the segments, the range was from 3 to 16 (out of a possible total of 20) and the road that rated the highest on the County list (Barrineau Park Road), although worthy, was not the worst segment in the opinion of the authors.

Based on this review, the authors make the following general recommendations:

- The County should not accept for maintenance dirt roads unless there is a clear public benefit, including the opportunity to correct a significant environmental problem.
- The County should be more diligent with the application of temporary or permanent best management practices (BMPs) during road repair.
- "Turn outs" should be located in areas that will not discharge directly to a wetland or stream, where possible, and maintenance of "turn-outs" should include the periodic removal of accumulated sediments particularly where they discharge near wetlands or steams.
- The County should avoid the use of "staining" fill material in proximity to wetlands and waterways.
- Outlet (and in some cases inlet) protection should be provided at stream crossings to provide roadway and culvert protection and energy dissipation to reduce erosion downstream.
- The County should consider using CIAP or other funding funding to conduct environmental restoration work in areas where significant stream and/or wetland impacts have occurred.
- The County should consider abandonment and restoration of certain road segments where the environmental impacts are significant and there is little or no use by the travelling public or where alternate routes are readily available.
- The County should reevaluate paving policy to allow low traffic roads to be paved that may not meet all current requirements for ROW width, existing culverts, etc.

A number of the "General Observations" stated in the original report (Knaebel, 1998) are still applicable today. The treatment measures to control erosion and sedimentation associated with dirt roads are as varied as the causes of the problems. However, one thing has been demonstrated, only treating one aspect of the problem instead of all contributing factors is sure to fail. Although asphalt is often considered the ultimate answer, it comes with its own environmental price – increased runoff volumes and velocities, additional "non-sediment" pollutant loading (oils, tire wear particles, etc.), and increased development – and the County should continue to explore treatment alternatives other than asphalt where appropriate. Environmental problems caused by dirt roads are not limited to Baldwin County and several entities across the country are developing innovative and economically feasible ways to address them (other than asphalt). Several technical publications from Penn State's Center for Dirt and Gravel Road Studies should be reviewed as examples.

Some general recommendations have been made here and additional recommendations may appear within the individual segment reviews, but precise prescriptions will require additional focused study and engineering on each segment which are beyond the scope of this review.

Table 1. 25 MOST ENVIRONMENTALLY DAMAGING DIRT ROADS

Road Segment Name	MA	Mileage	EC + MD Score
Truck Trail 17	200	5.6 miles	12
Brady Road (2 segments)	100	10.18 miles	13
Kilcrease Road	100	2.84 miles	6
Ewing Farm Road	100	0.5 miles	5
Sawmill Road	100	0.8 miles	5
Holly Creek Road	100	5.08 miles	10
River Road	200	1.5 miles	12
Linholm Road	200	3.93 miles	12
Griggers Road	200	2.42 miles	11
Peter Morris Road	200	3.45 miles	9
Barrineau Park Road	200	2.8 miles	16
Goat Cooper Road	200	1.4 miles	9
Bretz Lane	300	0.65 miles	14
Malkoskie Road	300	2.0 miles	9
Hagendorfer Road	300	1.75 miles	12
Wolf Field Road	300	1.0 mile	12
County Road 26	300	1.0 mile	7
Spring Creek Drive	300	0.57 miles	11
Lipscomb Road	300	0.87 miles	10
Norris Lane	300	2.02 miles	3
Mannich Lane (S4)	300	1.5 miles	12
Mannich Lane (S2)	300	0.5 miles	11
Paul Cleverdon Road	300	1.5 miles	8
Sherman Road	300	1.0 mile	11
Nolte Creek Drive	300	0.7 miles	12

NOTE: with the exception of Truck Trail 17 and Brady Road, which standout above any of the other segments, the roads are listed in no particular order and no “ranking” is implied.

Table 2. ALL 60 ROADS FIELD REVIEWED

Maintenance Area 100

1. Bryants Landing Road – 0.72 mi
2. Brady Road – 6.78 mi
3. Brady Road – 3.4 mi
4. Scranage Road – 4.75 mi
5. Holly Creek Road – 5.08 mi
6. Old Brady Road – 1.05 mi
7. M M Earle Lane – 0.64 mi
8. D'Olive Road – 1.28
9. Burnt Car Road – 1.81
10. T J Earle Road – 3.87 mi
11. Southfield Road – 0.72 mi
12. Couglan Road – 1.65 mi
13. Kilcrease Road – 2.84 mi
14. Ralph Gantt Road – 1.8 mi
15. Pat Haywood Road – 0.6 mi
16. Ewing Farm Road – 0.5 mi
17. Sawmill Road – 0.8 mi

Maintenance Area 200

1. Kingway Road – 0.23 mi
2. Barrineau Park Road – 2.8 mi
3. River Road – 1.5 mi
4. Fox Branch Road Ext – 0.52 mi
5. Linholm Road – 3.93 mi
6. Truck Trail 17 – 5.6 mi
7. Griggers Road – 2.42 mi
8. Goat Cooper Road – 1.4 mi
9. Three Mile Creek Road – 1.2 mi
10. Hinote Glass Road – 1.28 mi
11. JA Racine Road – 0.33 mi
12. Peter Morris Road – 3.45
13. Vaughn Road – 0.48 mi
14. Kendrick Road – 0.5 mi
15. Whispering Pines South – 0.35 mi
16. Cabinet Shop Road – 0.53 mi
17. Barnhill Farm Road – 0.47 mi
18. Dick Higbee Road – 2.5 mi

Maintenance Area 300

1. Baudin Lane – 0.76 mi
2. Bretz Lane – 0.65 mi
3. Nolte Creek Drive – 0.7 mi
4. John Bloch Road – 1.23 mi
5. James Road – 0.49 mi
6. Hagendorfer Road – 1.75 mi
7. Wolf Field Road – 1.0 mi
8. Mannich Lane – 1.5 mi
9. Spring Creek Drive – 0.57 mi
10. Sherman Road – 1.0 mi
11. Mannich Lane – 0.5 mi
12. Lipscomb Road – 0.87 mi
13. Woodhaven Dairy Road West – 0.8 mi
14. Malksokie Road – 2.0 mi
15. Etta Smith Road – 0.19 mi
16. South Rolling Green Drive – 0.53 mi
17. Paul Cleverdon Road – 1.5 mi
18. Miller Lane – 0.48 mi
19. County Road 26 – 1.0 mi
20. Russian Road – 1.53 mi
21. Beck Road – 1.23 mi
22. Hemmert Lane – 0.5 mi
23. Bayou Drive – 0.87 mi
24. Norris Lane – 2.02 mi
25. Newman Road – 0.36 mi

Road Name: Truck Trail 17 **Length:** 8.6 miles **Maintenance Area:** 200
EC + MD Score: 12 **Field Inspection Date:** February 6, 2010

General Description: Truck Trail 17 consists of 2.74 miles of paved surface (from County Road 49 eastward to Steelwood) and 8.6 miles of unimproved surface east of Steelwood to County Road 64 Extension. The road serves timber lands, agricultural, and a few residential properties on the east end. The road surface is primarily sandy clay with gravel treatment in several areas. Bridges are closed (out-of-service) over Reedy Creek and Hollinger Creek. The road crosses streams at least eight locations including Styx River, Reedy Creek, Flat Creek, Hollinger Creek, and Eightmile Creek. It also crosses numerous wetlands in various other locations. During the evaluation two sections of the road were impassible and could not be accessed.

Location of Problem Areas: (MP measured from end of pavement near Steelwood travelling east toward County Road 64 Extension. Since Truck Trail had to be accessed from 3 different directions, MP are approximate)

- MP 0.3 – Styx River crossing - turnouts funneling sediment into wetlands
- MP 0.9 – Wetland crossing with sediment channeled into wetlands
- MP 1.0 – UT Reedy Creek crossing with significant sediment in wetlands and turnouts funneling sediment into stream
- MP 1.4 – UT Reedy Creek crossing - sediment in stream at culvert, road washed into stream
- MP 1.8 and MP 3.0 – Wetland crossing with sediment impacts (ROAD IMPASSIBLE
- MP 3.2 – Reedy Creek crossing; BRIDGE OUT; turnouts, roadbed and ditches funneling sediment to stream
- MP 4.2 – Flat Creek crossing (3 culverts); significant sediment in wetlands & stream
- MP 4.7 and 5.4 - Wetland crossing with sediment plume in wetlands
- MP 5.5 – Hollinger Creek crossing; BRIDGE OUT; severe erosion at approaches
- MP 5.5 to 7.2 – ROAD NOT EVALUATED DUE TO IMPASSIBLE CONDITIONS
- MP 7.4 – Road surface eroded and deeply incised with ditch banks 4 to 6 foot high
- MP 7.7 – Wetland crossing with sediment impacts


Truck Trail 17 near MP 3.2 (06 February 2010).


Truck Trail 17 near MP 5.5 (06 February 2010).

Truck Trail 17 near MP 1.0 (06 February 2010).

Truck Trail 17 Styx River bridge MP 1.4 (06 February 2010).

Truck Trail 17 near MP 5.5 (06 February 2010).

Truck Trail 17 near MP 5.5 (06 February 2010).

Truck Trail 17 was the #1 environmentally damaging road in the earlier report, and conditions do not appear to have improved. The impacts from this one road are likely greater than the cumulative impacts from half the list of 25 road segments. Approximately 2 miles essentially appear to have been abandoned, significant gully erosion is occurring both in the roadway ditch lines at several locations. The inaccessible portion is probably as bad or worse. Suggestions would include closure to traffic, installation of long-term stormwater treatment, and restoration/vegetation from the end of pavement at Steelewood to Brady Road and from Brady Road east to approximately MP 7.6. Areas of significant sedimentation should be removed from streams and wetlands to prevent further migration downstream. Culverts need stabilization and energy dissipation at both ends to minimize road erosion and in downstream scour. The remnants of bridges are a potential safety hazard and are acting as a dam for debris within the streams. Slope approaches to the bridges are eroding considerably. Suggestions are abandonment of the roadway from the top of each slope. These areas would benefit from stabilization measures such as seeding and erosion control matting. On the eastern end of the roadway the agricultural areas have kept the road in fairly good condition. Regularly traveled areas that cross wetlands and streams would benefit from a surface treatment.

Road Name: River Road **Length:** 1.5 miles **Maintenance Area:** 200
EC + MD Score: 12 **Field Inspection Date:** February 6, 2010

General Description: The River Road runs west paralleling Styx River from its intersection with County Road 68 Extension to its terminus. The first 0.5-0.75 miles of the road lies within the floodplain of Styx River and appears to be frequently inundated. The road covering is a sandy-clay material.

Location of Problem Areas:

- Mile Post 0.2: The road crosses a stream (convergence of Flat and Reedy Creeks) where stormwater runoff discharges and significant sediment deposits were observed
- Mile Post 0.3: A large sediment pile, believed to be the result of grading activity, is located adjacent to the stream and the river with evidence of severe erosion

River Road facing east near MP 0.3 (6 February 2010).

The road essentially serves as a channel for stormwater runoff from the area, delivering sediment to the stream and river. Water diversions discharge (terminate) directly to, or in close proximity to, the stream or river. This segment was ranked #2 in the earlier survey and conditions have not improved. Either relocation of the road to higher ground or significant engineering (fill, drainage, stabilization) will be required to eliminate the environmental concerns. Temporary measures to reduce impacts could include removal of accumulated sediment, vegetative stabilization of area surrounding the stream crossing and surface treatment of the road surface with rock.

Road Name: Linholm Road **Length:** 3.93 miles **Maintenance Area:** 200
EC + MD Score: 12 **Field Inspection Date:** February 6, 2010

General Description: Linholm Road runs from County Road 64 to County Road 87. The road has red sandy-clay covering most of the length with gravel treatment in certain areas. It serves several residences on both ends but primarily forest lands in the middle area. There are stream crossings for Eight Mile Creek, Dry Branch, Elam Creek and several wetland crossings.

Location of Problem Areas: (MP measured heading east from County Road 64)

- MP 0.8 – Eight Mile Creek crossing with gravel – Sediment & turbid water in wetlands
- MP 1.2 – Dry Branch crossing with gravel – Minor erosion at culvert
- MP 2.7 – Elam Creek crossing – Sediment in stream from turnouts
- MP 2.9 – Elam Creek crossing – stream flows in north side of ditch for 0.2 miles, submerged cross drain with fish observed in ditch, turnouts have blown out from sediment overload

Linholm Road MP 2.9 (6 February 2010).

Linholm Road was ranked #10 in the earlier survey and the road has received a surface gravel/rock treatment in several areas and at least one ditch line was found lined with rip-rap. Turn-outs generally discharge to upland areas for much of the road; however several were noted as failing (filled with sediment with runoff directed back to roadway. Near MP 2.9 Dry Branch now flows within the ditch line apparently due to an inadequate cross drain and ditch construction. Surface treatment appears to have been effective in areas where it was applied but was in need of "freshening".

Road Name: Griggers Road **Length:** 2.42 miles **Maintenance Area:** 200
EC + MD Score: 11 **Field Inspection Date:** February 6, 2010

General Description: Griggers Road runs from Peter Morris Road to County Road 64 Extension and serves as access to timberland. The road generally has a red clay covering; with evidence of previous surface treatment in some areas. There is a stream crossing for Eight Mile Creek.

Location of Problem Areas: (MP measured from Peter Morris Road)

- MP 1.3 to MP 1.7 – gravel treatment
- MP 1.8 – Gully erosion in road draining sediment to wetland bottom
- MP 1.9 – Eight Mile Creek crossing – Wetland filled with large plume of sediment

Griggers Road near MP 1.8 (6 February 2010).

Griggers Road appears in the earlier survey with a ranking of #21. The primary area of concern is the portion just past MP 1.7 (portion that has been treated). Although there is some evidence of previous surface treatment, heavy ditch line erosion near MP 1.8 is delivering significant quantities of sediment downgrade to a wetland bottom and stream crossing at MP 1.9. Diversion of surface runoff and ditch stabilization should be performed, followed by surface treatment.

Road Name: Peter Morris Road **Length:** 3.45 miles **Maintenance Area**: 200
EC + MD Score: 9 **Field Inspection Date:** February 6, 2010

General Description: Peter Morris Road runs north from Linholm Road to Griggers Road and primarily provides access to timberlands. The road is mostly imported red clay with several wetland drainage crossings.

Location of Problem Areas: (MP measured heading north from Linholm Road)

- MP 0.9 – Wetland crossing with sediment and turbid water in wetlands
- MP 1.5 – Wetland crossing with sediment in wetlands
- MP 1.7 – Wetland crossing with sediment in wetlands
- MP 2.0 – Turnouts to wetlands with sediment in wetlands
- MP 3.1 – Wetland crossing with sediment in wetlands and fresh clay covering

Peter Morris Road near MP 1.5 (6 February 2010).

As usual, the primary concerns are where the roadway crosses wetland areas. In several of these areas, repair and maintenance activities have included clearing a portion of the right-of-way and placement of fill without the benefit of best management practices (BMPs) to control erosion and sedimentation. Temporary BMPs should be employed in these critical areas until disturbed right-of-way is restabilized. Surface treatment should be considered to prevent the erosion of imported fill material. Peter Morris Road was not included in the earlier survey.

Road Name: Goat Cooper Road **Length:** 1.4 miles **Maintenance Area:** 200
EC + MD Score: 9 **Field Inspection Date:** February 6, 2010

General Description: Goat Cooper Road runs east and west of Goat Cooper Road North at its end. The road is mostly covered by red clay. The east section is ~0.7 miles in length, a stream crossing at MP 0.1, and at MP 0.3 there are no signs of recent or routine County maintenance – the shoulders and mid-portion being vegetated. The west section is ~0.5 miles in length, narrow, with red clay and a dry culvert crossing at ~MP 0.1. Some gravel treatment exists on the last 0.2 miles.

Location of Problem Areas: (MP measured heading south from end of Goat Cooper Road North)

- MP 0.1 on east section – Dry Branch crossing with severe channel erosion and turnouts of sediment into stream

Goat Cooper Road near MP 0.1 (east) (15 March 2010).

The only portion of Goat Cooper Road that is of significant environmental concern is the discharge from the first 0.1 miles to Dry Branch. Historical discharges apparently enlarged the "turnout" into a gully which has been treated with rip-rap and is vegetated with cogon grass. A new turnout is now located just past the gully. The imported red fill material has caused vegetative staining, an indication that stormwater discharges are highly turbid. This discharge location also receives stormwater runoff from the last 0.1 miles of Goat Cooper Road North (where residences begin). Runoff from the north should be diverted into the wooded area along its western ROW. Alternative fill materials or treatments should be considered to reduce turbid discharges.

Road Name: Barrineau Park Road **Length:** 2.8 miles **Maintenance Area:** 200
EC + MD Score: 16 **Field Inspection Date:** February 6, 2010

General Description: Barrineau Park Road runs from Hwy 112 in a northeasterly direction to the Perdido River at the Florida State Line. The road serves only timberlands and is red sandy-clay with two wetland crossings and a direct discharge to Perdido River on the eastern terminus.

Location of Problem Areas: (MP measured heading east from Hwy 112)

- MP 0.3 – Wetland crossing with sediment and turbid water in the wetland area
- MP 2.0 – Wetland crossing with sediment and turbid water in the wetland area
- MP 2.2 – Springs in road bed to wetland area
- MP 2.3-2.8 – gully erosion in ditches discharging to Perdido River

Barrineau Park Road wetland crossing MP 2.2 (6 February 2010).

Barrineau Park Road was included on the earlier survey (as Duck Road) with a ranking of 17, the primary concern being the direct discharge from the ditches to Perdido River at the bridge. During the field inspection of 6 February 2010 the road was impassable at the wetland crossing located near MP 2.2. Where possible water diversions (turn-outs) should be located such that they discharge away from wetlands and into upland areas. The portion of the road that crosses wetlands (MP 0.3 and 2.0-2.2) should be repaired and stabilized and the wetlands restored. The eastern ~0.5 miles drain directly to the Perdido River and significant gully erosion is occurring along both ditch lines. Routine maintenance past MP 2.2 was not evident. Repair and treatment for ditches leading to Perdido River (MP 2.3-2.8) is necessary to reduce sediment discharges.

Road Name: Brady Road **Length:** 10.18 miles **Maintenance Area:** 100 & 200
EC + MD Score: 13, 13 **Field Inspection Date:** February 6, 2010

General Description: Brady Road runs from County Road 68 Extension to Truck Trail 17, thence northward, crossing Truck Trail 17, to Old Brady Road. The road is covered by red sandy clay and has numerous wetland crossings. There are three segments of Brady Road listed by the County. The first (BCHD designation SEG 4) is in maintenance area 200 and is 2.15 miles in length. There were no significant environmental problems observed on this first segment and it is not included in the review. The second segment is in maintenance area 100 and is 6.78 miles in length (BCHD designation SEG 1). The third segment is in maintenance area 100 and is 3.4 miles in length (BCHD designation SEG 2). The BCHD demarcation between the second and third segment is the Commission district line which was unclear in the field so the two were combined for this report.

Location of Problem Areas: (MP measured heading north from Truck Trail 17)

- MP 0; MP 0.2; MP 0.7; MP 1.0; MP 1.7; MP 1.9; MP 2.4; MP 3.5; MP 4.7; MP 5.6; MP 6.0; MP 6.6; MP 7.1; MP 7.3; MP 7.8; MP 8.1; MP 8.5; MP 8.8; MP 9.2; MP 9.4; MP 10.3; MP 10.6; MP 10.9 – Wetland cross drains with sediment impacts
- MP 4.1; 5.0; 7.6 – Grady pond crossing with turbidity and/or sediment impacts

Brady Road near MP 5.0, sediment from turnout impacting Grady pond (6 February 2010).

Although Brady Road follows the ridge top along much of its route, there are 23 cross drains at wetland areas within the first 11 miles of the second segment, each with sediment impacts noted. Significant impacts to Grady ponds, associated with sediment discharges from turnouts, were noted at three locations. Sediment should be removed from turnouts located close to wetlands; turnouts relocated such that they discharge to upland areas (where possible), and impacted wetlands restored. If the I-10 – I-65 connector follows this route, most of the problems can be eliminated or addressed.

Road Name: Bretz Lane **Length:** 0.65 miles **Maintenance Area:** 300
EC + MD Score: 14 **Field Inspection Date:** February 20, 2010

General Description: Bretz Lane runs from County Road 83 west to its terminus. It serves residential and agricultural properties. The road surface is red clay with gravel treatment in most areas. Miflin Creek is located just north of the intersection of County Road 83 and Bretz Lane.

Location of Problem Areas:

- Intersection of County Road 83 & Bretz Lane – Sediment plumes located in Miflin Creek from turnouts funneling sediment into creek
- MP 0.1 – Large ditches with slope funneling sediment to creek; Unnamed tributary flows within road side ditch to cross drain (~ 100 feet west of CR 83) into Miflin Creek
- MP 0.3 – Downhill approach to Miflin Creek

Bretz Lane discharge to Miflin Creek MP 0.0 (20 February 2010)

The ditches along this road channel stormwater runoff and sediment directly into Miflin Creek. There is evidence of sedimentation in Miflin Creek and adjacent wetlands. The incised ditches continue to erode sediment. There are rip rap lined ditches along the steepest slope and gravel treatment on portions of the road surface; however these BMPs are not adequate for the conditions of the road. Recommendations include filling the ditches, crowning the road and paving the length.

Road Name: Malkoskie Road **Length:** 2.0 miles **Maintenance Area:** 300
EC + MD Score: 9 **Field Inspection Date:** February 20, 2010

General Description: Malkoskie Road runs from County Road 95 east to its terminus. It serves residential and agricultural properties. The road surface is red clay. It crosses an unnamed tributary to Threemile Creek and an unnamed tributary to Narrow Gap Creek. There are also numerous wetland crossings.

Location of Problem Areas:

- MP 0.3 – UT Threemile Creek crossing with minor erosion and sediment in the stream
- MP 0.6 – UT Threemile Creek & wetland crossing with sediment impacts & turbid water; turnouts funneling sediment into wetland (aquatic vegetation noted in stream)
- MP 1.2 – Wetland crossing with extremely turbid water; Sediment deposited at cross drain and cross drain completely filled with sediment
- MP 1.4 – Wetland crossing with sediment plume and deep road side ditches
- MP 1.9 – UT Narrow Gap Creek crossing with sediment plumes and clay staining in wetlands

Malkoskie Road near MP 0.6 (20 February 2010)

Portions of the road are within Grady ponds and headwater wetlands. Each crossing has evidence of sedimentation and turbidity impacts. Cross drains are clogged with sediment and water flow has been impeded. Recommendations would include maintenance of cross drains and sediment removal from wetlands and streams. Wetland and stream crossings would benefit from gravel treatment.

Road Name: Hagendorfer Road **Length:** 1.75 miles **Maintenance Area:** 300
EC + MD Score: 12 **Field Inspection Date:** February 20, 2010

General Description: Hagendorfer Road stretches from County Road 97 to County Road 91. The road serves agricultural (row crop and sod) and residential properties. The road surface is red clay with small areas of fresh gravel treatment where recent repairs were conducted. An unnamed tributary of Soldier Creek crosses the road. There are also adjacent wetlands to the stream crossing.

Location of Problem Areas: (MP measured from County Road 97 east to County Road 91)

- MP 0.1 – UT Soldier Creek crossing with recently placed red clay and small area of gravel treatment of crossing; heavy sedimentation observed in stream; wetlands and stream have sedimentation and turbidity impacts

Hagendorfer Road near MP 0.1 (20 February 2010)

The western ¾ mile of the road is the most environmentally damaging due to its drainage point at the stream and wetlands. The gravel treatment at the crossing may lessen the sediment loss; however the additional red clay application will likely erode into the stream. Recommendations for improvements would include paving the western ¾ mile of the road and removing the sedimentation from the stream and wetlands. The ditches should be treated and the road crowned and treated.

Road Name: Wolf Field Road **Length:** 1 mile **Maintenance Area:** 300
EC + MD Score: 12 **Field Inspection Date:** February 20, 2010

General Description: Wolf Field Road stretches from Josephine Drive north to its terminus. The road surface is covered by red clay with some gravel treatment. It serves residential and vacant properties. At its northern end it crosses Spring Branch. There is also a crossing of an unnamed tributary of Roberts Bayou with adjacent wetlands. The southern end of the road drains directly into Roberts Bayou.

Location of Problem Areas: (MP measured from Josephine Road north)

- MP 0 – Erosion evident at end of road with sediment in UT of Roberts Bayou
- MP 0.25 – Lack of cross drain for wetland area; Major sediment loss into wetland area; Red staining on vegetation up to 4 feet in height
- MP 0.5 – Lack of cross drain for UT Roberts Bayou with erosion of road and major sedimentation in UT Roberts Bayou and adjacent wetlands

Wolf Field Road near MP 0.25 (20 February 2010)

The lack of drainage from the wetland areas to the streams is causing considerable erosion. The sedimentation and turbid water impacts are evident on both sides of the road at the ½ mile mark. The south end of the road routinely erodes into Roberts Bayou and has recently eroded a channel from Josephine Road northern right-of-way to the stream. Recommendations include installation of cross drains at wetland and stream crossings as well as paving, or otherwise treating with non-staining materials, the length of the road.

Road Name: County Road 26 **Length:** 1 mile **Maintenance Area:** 300
EC + MD Score: 7 **Field Inspection Date:** February 20, 2010

General Description: The dirt road portion of County Road 26 travels between Breman Road and County Road 95. The road surface is red clay with partial gravel treatment. The headwaters of Hammock Creek cross the road at the half mile mark. There are also several wetland crossings along the road. The road serves largely residential and wooded properties.

Location of Problem Areas: (MP measured from Breman Road east to County Road 95)

- MP 0 – Wetland cross drain at intersection with Breman Rd is submerged
- MP 0.1 – Wetland crossing with sedimentation impacts from turnouts
- MP 0.2 – Gravel surface treatment for ~0.3 miles
- MP 0.3 – Wetland crossing with minor sedimentation in wetland ; head cut at outlet
- MP 0.5 – Hammock Creek crossing with sediment in stream and wetlands
- MP 0.7 – Turnouts funneling sediment into wetlands

County Road 26 near MP 0.7 (20 February 2010)

Gravel treatment had minimized turbidity impacts in the stream; however erosion of road has heavy sedimentation in the stream and wetlands. Cross drains require maintenance. The stream crossing culvert needs outlet protection to prevent further erosion. Turnouts need to be directed to upland areas to limit sedimentation impacts to wetlands. Turnout maintenance should include the removal of accumulated sediment.

Road Name: Spring Creek Drive **Length:** 0.57 miles **Maintenance Area:** 300
EC + MD Score: 11 **Field Inspection Date:** February 20, 2010

General Description: Spring Creek Drive runs west from Ted Lysek Road for a distance of approximately 0.6 miles until it terminates at a cul-de sac. It serves a number of residences and agricultural properties along its length. Surface material is primarily sandy with red sandy clay having been imported for fill and repair. Near MP 0.3 the road turns south and the last ~0.3 miles slopes toward Baker Branch. The terminus of this segment is approximately 200 feet from Baker Branch.

Location of Problem Areas: (MP measured from Ted Lysek Road)

- MP 0.3 – erosion at culvert crossing discharging sediment
- MP 0.6 – erosion of road and ditches discharging from terminus

Spring Creek Drive near terminus (20 February 2010).

The terminus of the road is substantially scoured with gullies forming in the ditches and red clay staining and sediment is present off the ROW. Sediment accumulation was present in uplands and encroaching on the floodplain and wetlands adjacent to Baker Branch. Surface treatment and creative water diversions are suggested.

Road Name: Lipscomb Road **Length:** 0.87 miles **Maintenance Area:** 300
EC + MD Score: 10 **Field Inspection Date:** February 20, 2010

General Description: The first approximately 0.5 mile of Lipscomb Road south of Mannich Lane has been paved. Pavement stops at the hill top leaving the slopes largely untreated. The surface is primarily a sandy material. The road serves residential and agricultural properties. Some historical evidence of treatment with gravel and diversion swales was present.

Location of Problem Areas: (MP measured from end of pavement off Mannich Lane)

- MP 0.2 – wetland crossing with evidence of sediment impacts, turnouts directing sediment to wetlands

Lipscomb Road near MP 0.2 (20 February 2010).

Swales have been blown out resulting in runoff being discharged directly to an unnamed tributary of Eslava Creek. Significant erosion was occurring and sediment plumes were present in adjacent wetlands.

Road Name: Norris Lane **Length:** 2.02 miles **Maintenance Area:** 300
EC + MD Score: 3 **Field Inspection Date:** February 20, 2010

General Description: Norris Lane begins at Laurant Road and runs south for a distance of approximately 2.02 miles terminating at CR 12. The surface is primarily a sandy material with significant amounts of imported reddish sandy clay, The road primarily serves agricultural land (sod farms) and a few residences. This segment is relatively flat and crosses three unnamed tributaries of Weeks Creek at MP 0.4, MP 0.8 and MP 0.9. Significant work has been done by the county to manage stormwater including realignment of a drainage ditch.

Location of Problem Areas: (MP measured from Laurent Road heading south)

- MP 0.4 – stream crossing with sediment impacts evident
- MP 0.8 – stream crossing with sediment impacts and erosion of side-cast stockpile
- MP 0.9 – watercourse crossing at power line sediment impacts and staining evident
- MP 1.0 – stream crossing with sediment impacts and inadequate culvert protection

Side-cast stockpile at stream crossing on Norris Lane near MP 0.8 (20 February 2010).

New red clay fill was evident in some areas where culverts had previously blown out. Significant amounts of sediment were present in all three stream crossings and impacts were observed in Weeks Creek as far downstream as Sherman Road. Some effort to protect the culvert outlet were evident at MP 1.0, however scour erosion was still evident. Staining of vegetation along stream banks and ditch lines, due to the red color of the fill material, was evident. A large pile of reddish sandy-clay, apparently form side-casting during ditch maintenance, was noted along the ditch line near MP 0.8. This road segment appears to require constant maintenance to the roadway and ditches resulting in continued impacts to the streams.

Culvert outlet scour Norris Lane near MP 0.9 (20 February 2010).

Sediment impacts to Weeks Creek downstream of Norris Lane
(photo taken upstream of Sherman Rd) (20 February 2010).

Road Name: Mannich Lane (S2)* **Length:** 0.5 miles **Maintenance Area:** 300
EC + MD Score: 11 **Field Inspection Date:** February 20, 2010

General Description: Mannich Lane from Norris Lane heading west to CR 49 North (BCHD designation SEG 2) crosses the headwaters of Spring Branch. The surface is primarily sandy material with little clay or gravel. The road services residential, agricultural and undeveloped property.

Location of Problem Areas: (MP measured from Norris Lane westward)

- MP 0.3 – Spring Branch Crossing, sediment in wetlands and channel

Mannich Lane (S2) near MP 0.3 (20 February 2010).

A significant amount of sediment deposition was present in wetlands and the braided stream channel. Spring Branch collects all runoff from this portion of Mannich Lane. Mannich Lane crosses Spring Branch at MP 0.3 significant erosion is occurring on the outfall side of the culvert due to lack of protection. Agriculture and residential development near Mannich lane appear to be sources of sediment to Spring Branch, however, Mannich Lane appears to be the significant contributor.

Road Name: Paul Cleverdon Road **Length:** 1.5 miles **Maintenance Area:** 300
EC + MD Score: 8 **Field Inspection Date:** February 20, 2010

General Description: This segment begins at CR 34 and runs south terminating at CR 32, for a distance of 1.5 miles. The surface material is sandy clay with reddish sandy clay being used for fill and repair. The road primarily serves agricultural land (sod farms) and some residential. This segment has two stream crossings (tributaries to Baker Branch) and one large wetland crossing.

Location of Problem Areas: (MP measured from CR34)

- MP 0.1 – stream crossing with erosion around culvert and sediment in stream
- MP 0.3 – stream crossing with minor amount of sediment noted in stream

Paul Cleverdon Road sediment impacts at stream crossing (20 February 2010).

The first stream crossing occurs at MP 0.1 where major erosion was present at the culvert crossing and sediment plumes were observed downstream. At MP 0.3 the second stream crossing occurs with minor traces of sediment present. No significant impacts to wetlands were identified. Protection around stream culverts and surface treatment near stream crossings would reduce erosion and sediment delivery to the streams.

Road Name: Mannich Lane (S4)* **Length:** 1.5 miles **Maintenance Area:** 300
EC + MD Score: 11 **Field Inspection Date:** February 20, 2010

General Description: This segment of Mannich Lane (BCHD designation SEG 4) is between Lipscomb Road and County Road 9. The surface is primarily sandy material with been some gravel surface treatment, however, very little of the treatment presently remains. The road services residential and unimproved properties.

Location of Problem Areas: (MP measured from Lipscomb Road westward)

- MP 0.5 – culvert crossing with sediment plume
- MP 0.9 – culvert crossing with sediment plume

Mannich Lane (S4) near MP 0.9 (20 February 2010)

Significant sediment plumes occur at MP 0.5, MP 0.7 and MP 0.9. Gully erosion is occurring in the ditches with the ROW being a large contributor of sediment to the headwaters of Eslava Creek.

Road Name: Sherman Road **Length:** 1.0 miles **Maintenance Area:** 300
EC + MD Score: 11 **Field Inspection Date:** February 20, 2010

General Description: Traveling north from County Road 16 to Weeks Road this segment crosses Weeks Creek. The segment from County Road 16 to County Road 12 is paved. The portion from County Road 12 north to Weeks Road is red clay with previous surface treatment near its terminus. The road primarily serves agricultural and residential areas.

Location of Problem Areas: (MP measured from CR 12 westward)

- MP 0.4 – cross drain with significant sediment discharging off ROW

Sherman Road near MP 0.4 (16 March 2010).

Red staining is present on the vegetation in ditches and in adjacent sod fields where stormwater backs up from the road. The stormwater eventually drains to Weeks Creek. Sediment plumes were evident downstream of cross drains.

Road Name: Nolte Creek Drive **Length:** 0.7 miles **Maintenance Area:** 300
EC + MD Score: 12 **Field Inspection Date:** February 20, 2010

General Description: Nolte Creek Drive begins at Nelson Road and runs generally in a southwesterly direction for a distance of approximately 0.7 miles where it terminates approximately 300 feet east of Nolte Creek. The road serves a number of residences and some agricultural property. Surface material is primarily sandy clay. At MP 0.2 a tributary of Nolte Creek is crossed.

Location of Problem Areas: (MP measured from Nelson Road)

- MP 0.2 – stream crossing with sediment impacts evident
- MP 0.3 – erosion gullies perpendicular to road

Nolte Creek Drive near MP 0.2 (20 February 2010).

At the MP 0.2 stream crossing red staining of vegetation was observed and diversion swales are cut to direct sediment laden runoff to the flood plain and tributary. There was also strong evidence that this portion of the road is frequently inundated by stormwater and erosion gullies were observed perpendicular to the roadway near MP 0.3.

Road Name: Kilcrease Road **Length:** 2.84 miles **Maintenance Area:** 100
EC + MD Score: 6 **Field Inspection Date:** March 12, 2010

General Description: Kilcrease Road begins at Highway 225 and runs east to Old Stockton Road. The road is wide with a sandy clay surface, shallow ditches and is relatively flat. It serves primarily wooded hunting and timber lands with some residential properties. There are two crossings of unnamed tributaries to Martin Branch.

Location of Problem Areas: (MP measured from Hwy 225 eastward)

- MP 0 – Road discharges south at Hwy 225 to wetland area with turbidity impacts
- MP 1.1 – Red clay surface with high shoulders, steep slope and incised ditches
- MP 1.5 – Past gravel treatment observed
- MP 1.8 – UT Martin Branch crossing with sediment impacts; head cutting at culvert due to no outlet protection; turnouts funneling sediment into stream
- MP 2.0 – Past gravel treatment and old asphalt treatment
- MP 2.3 – UT Martin Branch crossing with sediment impacts; culvert ¾ full of sediment; north side of road has beaver pond; sediment observed downstream causing channel to be braided
- MP 2.4 – Turnouts funneling sediment into wetlands

Kilcrease Road near MP 1.8 (12 March 2010).

Kilcrease Road has two major areas of concern at the stream crossings. The sediment should be removed from the stream. Turnouts need maintenance by removal of sediment. Culverts do not have outlet protection downstream which would help minimize erosion. Culverts also need maintenance when impeded by sediment.

Road Name: Ewing Farm Road **Length:** 0.5 miles **Maintenance Area:** 100
EC + MD Score: 5 **Field Inspection Date:** March 12, 2010

General Description: Ewing Farm Road travels east from County Road 61 to the Florida state line. It serves residential and agricultural properties. The surface is sandy clay with high gravel content, and the terrain is hilly. The road has a crossing over Hurricane Creek.

Location of Problem Areas: (MP measured from CR 61 east)

- MP 0.2 – Hurricane Creek crossing with sediment impacts; sediment impacts from road upstream at Grady pond; turnouts funneling sediment into stream and wetlands

Ewing Farm Road near MP 0.2 (12 March 2010).

Ewing Farm Road has the entire length draining into Hurricane Creek. The recommendation would be asphalt treatment. Sediment removal from Hurricane Creek and floodplain wetlands should be considered.

Road Name: Sawmill Road **Length:** 0.8 miles **Maintenance Area:** 100
EC + MD Score: 5 **Field Inspection Date:** March 12, 2010

General Description: Sawmill Road travels from Dixie Landing Road from the end of pavement to the end of pavement. It serves mainly timber land with a few residential properties. The surface is a sandy clay mix with gravel. The road parallels the floodplain of Little River to the north.

Location of Problem Areas: (MP measured from Dixie Landing Road east from pavement)

- MP 0.1 – Ditch drain to floodplain
- MP 0.2 – Fresh red clay fill with gravel mix
- MP 0.4 – Cross drain with sediment impacts in wetland area down gradient

NO PHOTO AVAILABLE

Sawmill Road follows a ridge along the floodplain of Little River. Impacts observed were minimal, but there is a great potential for impacts due to the close proximity of the road to state waters and the steepness of the shoulder sloping toward the water. Recommendation would be to provide a surface treatment the length of the roadway and direct runoff away from surface waters.

Road Name: Holly Creek Road **Length:** 5.08 miles **Maintenance Area:** 100
EC + MD Score: 10 **Field Inspection Date:** March 12, 2010

General Description: Holly Creek Road travels from Hwy 59 to the end of pavement. It serves residential properties and hunting clubs. The surface is sandy clay with gravel mix. It is relatively flat. From Hwy 59, Holly Creek parallels the road for 2 ½ miles. The road crosses Holly Creek and its tributaries in eleven locations.

Location of Problem Areas: (MP measured from Hwy 59 heading west to EOP)

- MP 1.0 turnouts discharging sediment to stream
- MP 1.9 – Holly Creek crossing; rip rap headwall with asphalt overlay on road; turnouts funneling sediment and gravel into stream
- MP 2.0 – Holly Creek crossing – ditch erosion; garbage and sediment in stream
- MP 2.4 – Cross drain – no impacts
- MP 3.2 – UT Holly Creek crossing – scour on downstream side of culvert
- MP 3.4 and MP 3.7 – Wetland crossing – no impacts
- MP 4.7 – UT Holly Creek crossing – turnouts from slope to stream - minimal sediment

Holly Creek Road sediment impacts to stream and wetland (12 March 2010).

Holly Creek Road near MP 0.9 depicting garbage in stream (12 March 2010).

At the time of field investigation, there were minimal impacts noted at most of the stream crossings (i.e. MP 0.5, 1.3, 1.5, 2.9, 3.0, 3.9, 4.4). Holly Creek Road has great potential for environmental impacts due to the numerous stream crossings. The road has become a major dumping ground near MP 0.9. Turnouts require maintenance when filled with sediment and culverts in some areas need outlet protection to minimize erosion. It is recommended that a surface treatment be applied to the road surface particularly on sections at or near stream crossings and the BCHD work with the County Solid Waste Department to address illegal dumping.

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Jay Dickson

Acronyms

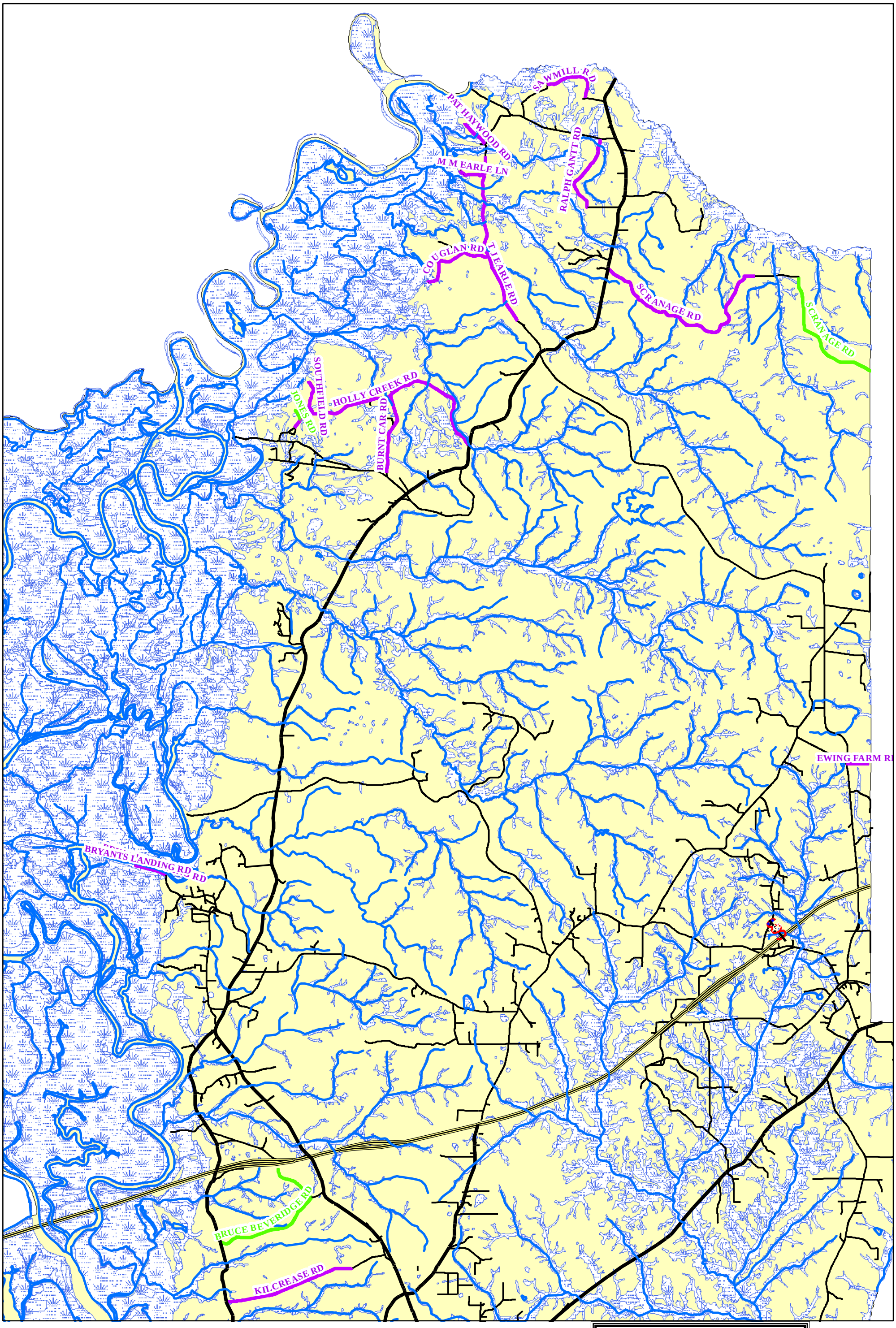
ADEM	Alabama Department of Environmental Management
ALDOT	Alabama Department of Transportation
BCC	Baldwin County Commission
BCEAB	Baldwin County Environmental Advisory Board
BCHD	Baldwin County Highway Department
BMP	Best Management Practice
CEA	Certified Environmental Auditor
CPESC	Certified Professional in Erosion and Sediment Control
CIAP	Coastal Impact Assistance Program
CWA	Clean Water Act - aka - Federal Water Pollution Control Act
EPA	U.S. Environmental Protection Agency
GIS	Geographic Information System
QCI	Qualified Credentialed Inspector (an ADEM designation)
REPA	Registered Environmental Property Assessor
NPDES	National Pollutant Discharge Elimination System

Biographical Information of Sub-Committee Members

John Carlton, C.P.E.S.C. Mr. Carlton moved to Baldwin County in 1962 and currently resides in Spanish Fort. He graduated from Fairhope High School and attended college at the University of South Alabama, graduating with a B.S. degree in Biology in 1979. He was employed by the Alabama Department of Environmental Management from 1979 until his retirement in 2004. During this time he served as Chief of the Mobile Branch Office, responsible for water quality monitoring, NPDES permit inspection, air quality monitoring, underground storage tank inspection and spill response in southwest Alabama and coastal management permitting for Mobile and Baldwin Counties. He obtained his designation as a Certified Professional in Erosion and Sediment Control in 2005 and currently works as an independent environmental consultant.

Brett Gaar, R.E.P.A., C.E.A.. Mr. Gaar is a sixth generation Baldwin County resident and currently lives in Magnolia Springs. He graduated from Foley High School and attended Auburn University receiving his B.S. in Geography. Upon graduation from Auburn, Mr. Gaar began his career as an environmental scientist with Volkert Environmental Group, Inc. He also attended the graduate program at the University of South Alabama in Biological Science and has been with Volkert for 18 years. He serves on the Board of Directors of Volkert Environmental Group and was elected to the Magnolia Springs Town Council in 2008 where he serves as the Environmental Protection Committee Chairman. Mr. Gaar has gained experience in the NPDES program throughout his career and specifically on roadway projects in the southeastern states. Mr. Gaar is a Registered Environmental Property Assessor and a Certified Environmental Auditor.

Leslie Lassitter, C.P.E.S.C. Ms. Lassitter is a native of South Baldwin County, growing up and currently residing on Wolf Bay. Upon graduation from Foley High School, she attended the University of South Alabama, obtaining a B.S. degree in Marine Biology in 1999. Beginning a career with the Alabama Department of Environmental Management in Mobile, she gained experience in the NPDES construction stormwater program for five years. In 2006, she began working as the environmental manager for the City of Foley. She manages enforcement of ordinances, NPDES permitting and inspections and environmental programs. Ms. Lassitter is a Certified Professional in Erosion and Sediment Control and serves on the Wolf Bay Watershed Watch, the Elberta Planning Commission and the Baldwin County Watershed Coalition.



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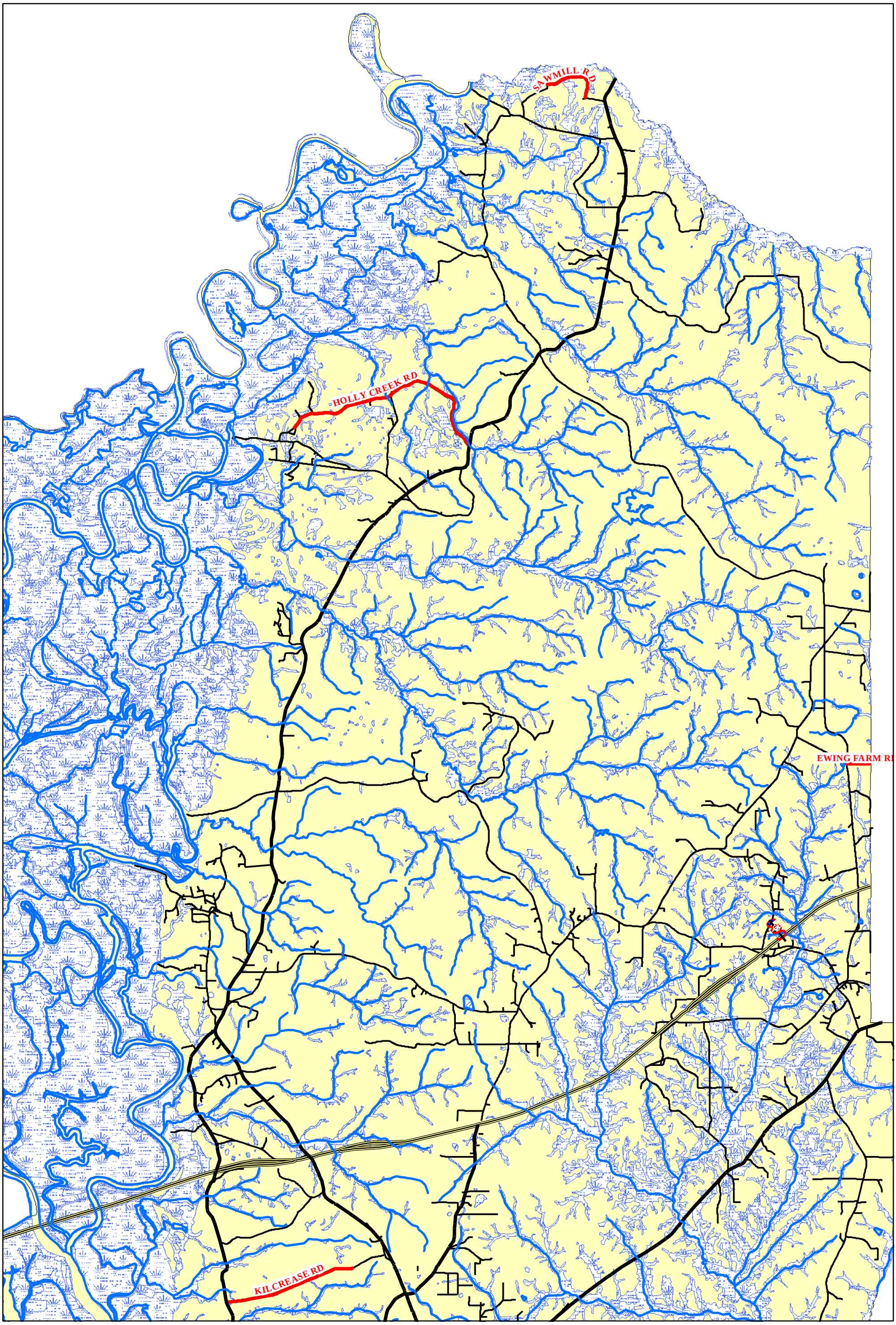
AREA 100 NORTH FIELD REVIEW & QUALITY CONTROL

Legend

- Area 100 Quality Control Segments
- Field Review Area 100
- County_Maintained_Roads



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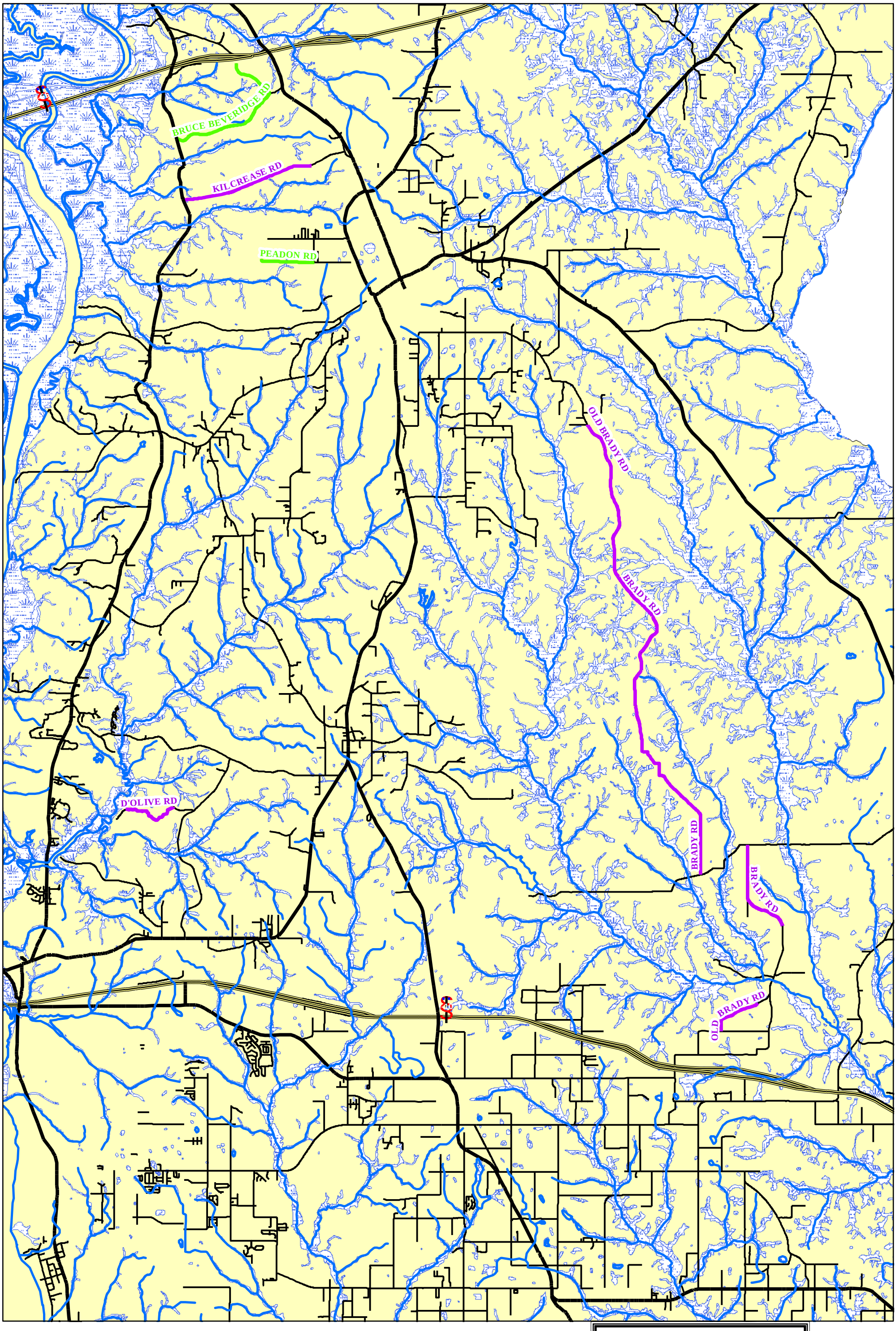
AREA 100 NORTH
TOP ENVIRONMENTALLY DAMAGING DIRT ROADS

Legend

- Top 25 Environmentally Damaging Dirt Roads Area 100
- County_Maintained_Roads



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AREA 100 SOUTH FIELD REVIEW & QUALITY CONTROL

Legend

- Area 100 Quality Control Segments
- Field Review Area 100
- County_Maintained_Roads

KILCREASE RD

BRADY RD

BRADY RD

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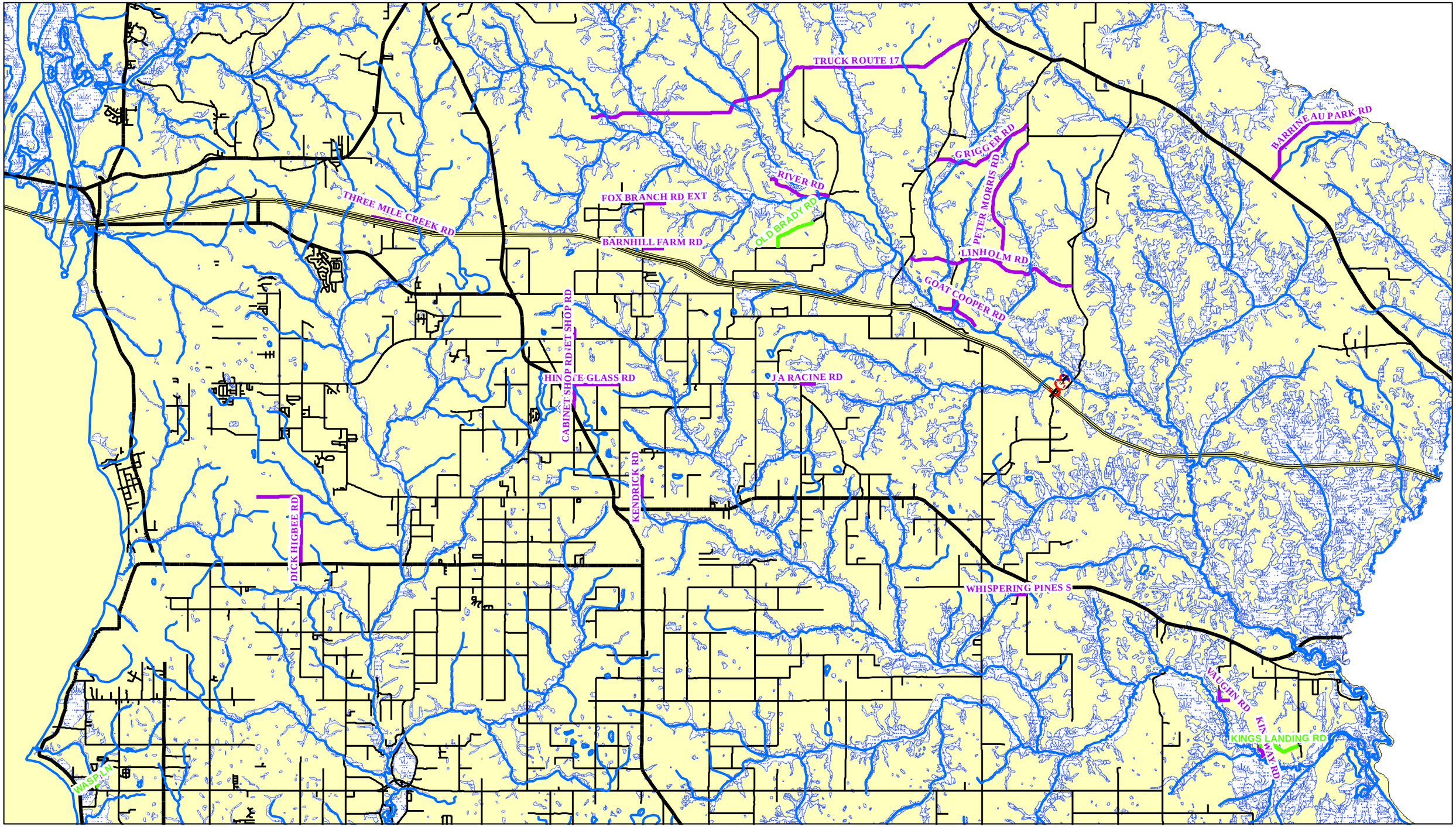
AREA 100 SOUTH
TOP ENVIRONMENTALLY DAMAGING DIRT ROADS

Legend

- Top 25 Environmentally Damaging Dirt Roads Area 100
- County_Maintained_Roads



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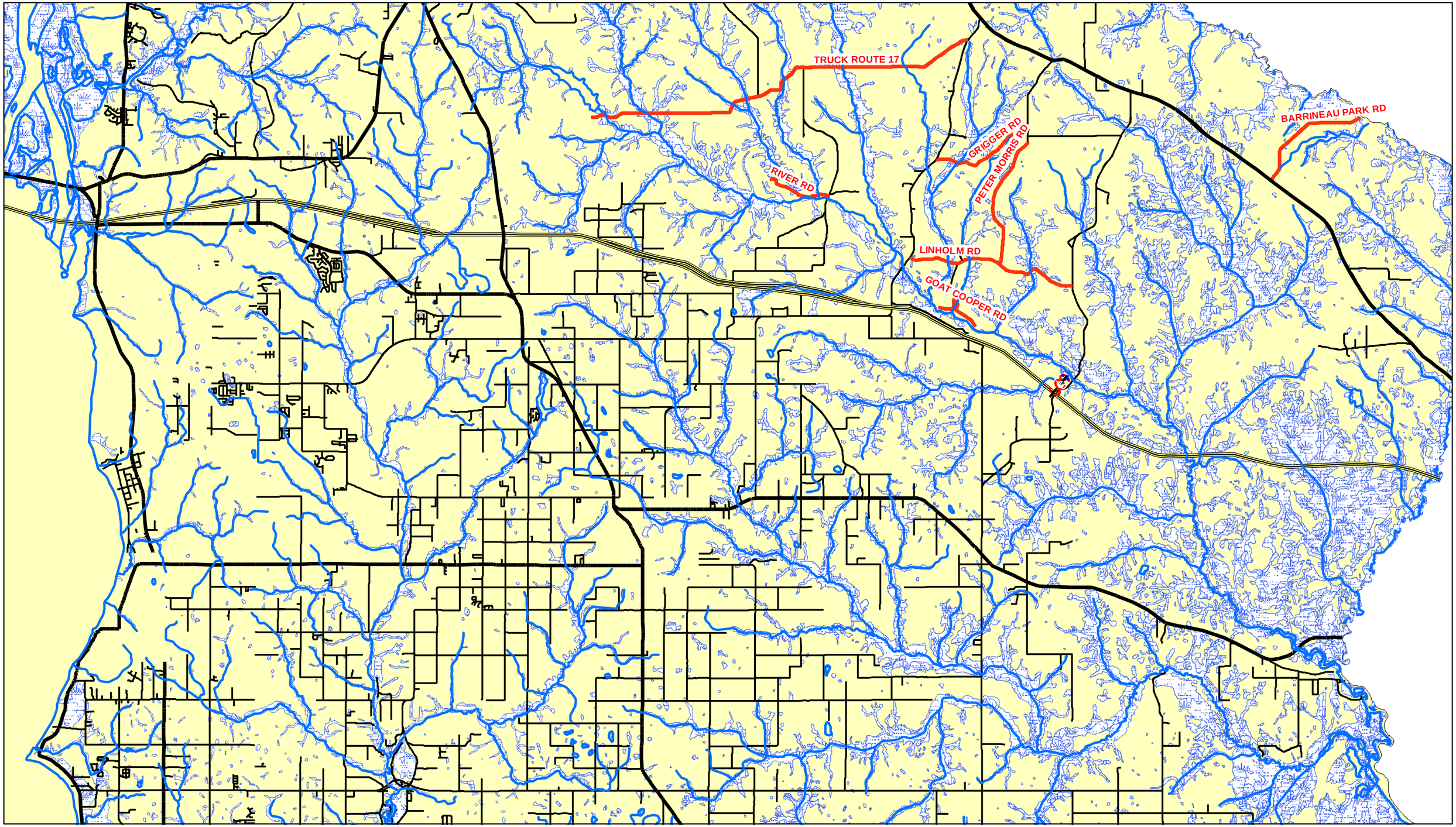
AREA 200
FIELD REVIEW &
QUALITY CONTROL

Legend

- Area 200 Quality Control Segments
- Field Review Area 200
- County_Maintained_Roads



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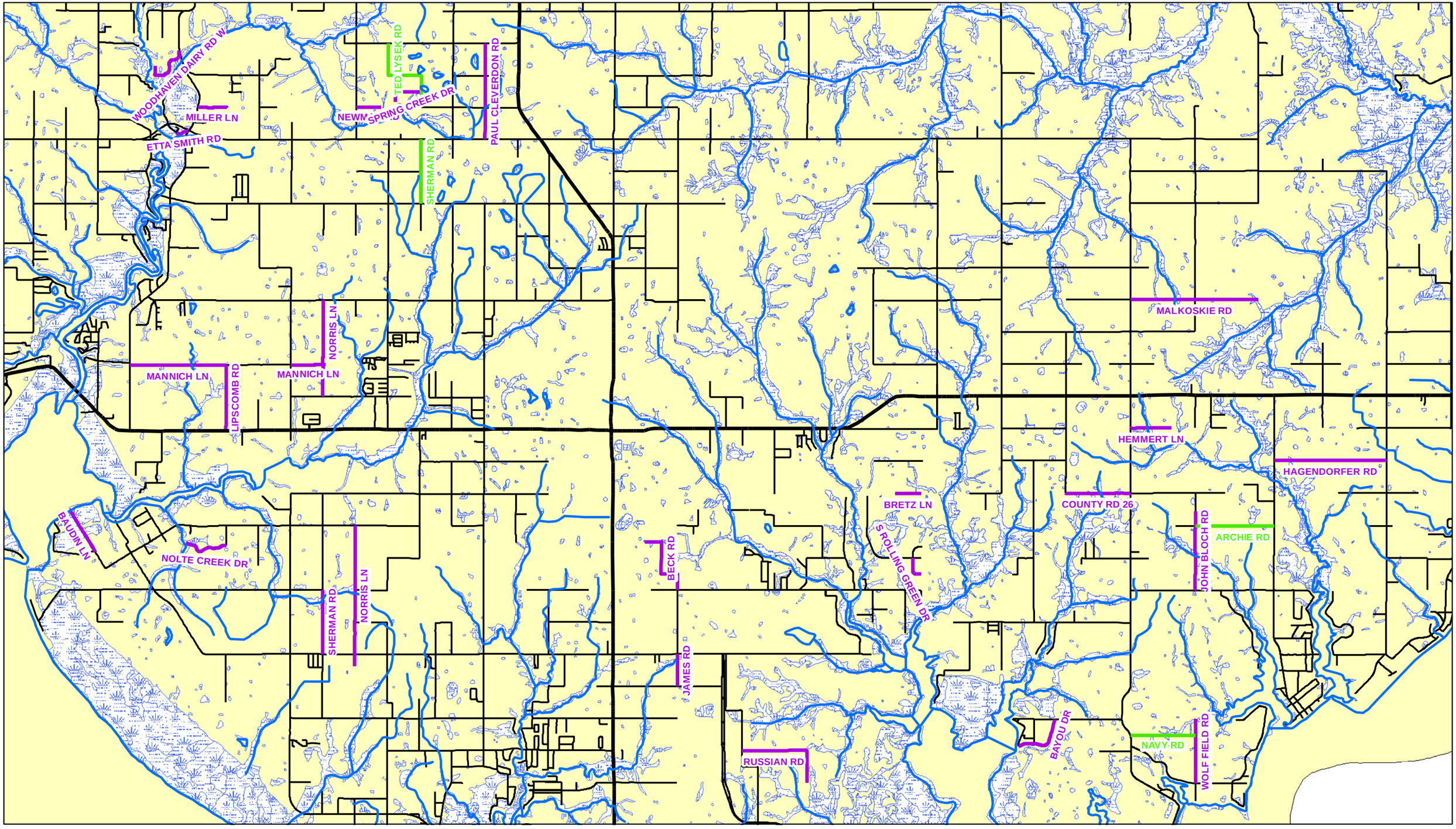
AREA 200
TOP ENVIRONMENTALLY DAMAGING DIRT ROADS

Legend

- Top 25 Environmentally Damaging Dirt Roads Area 200
- County_Maintained_Roads



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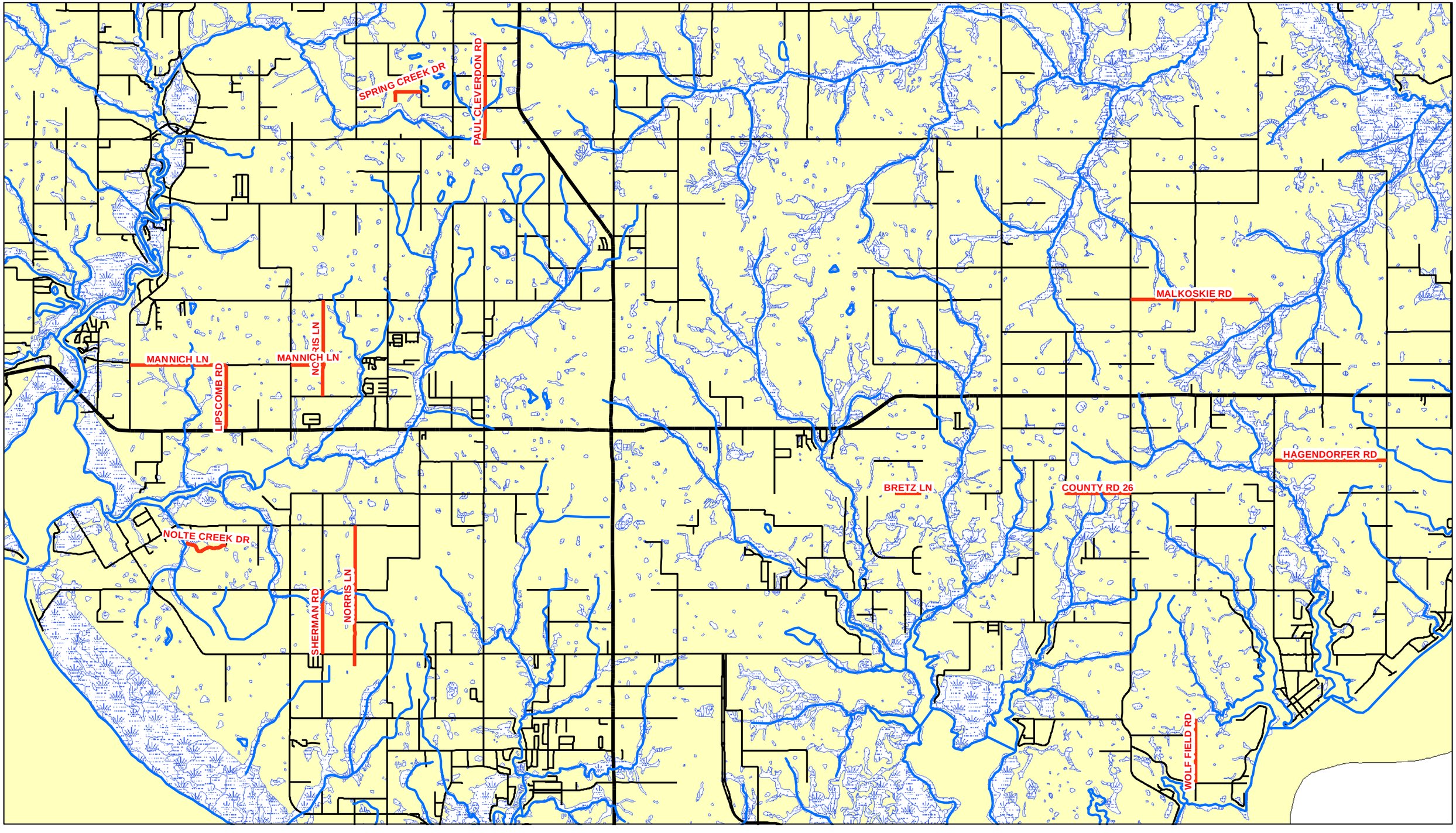
AREA 300
FIELD REVIEW &
QUALITY CONTROL

Legend

- Area 300 Quality Control Segments
- Field Review Area 300
- County_Maintained_Roads



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AREA 300
TOP ENVIRONMENTALLY DAMAGING DIRT ROADS

Legend

- Top 25 Environmentally Damaging Dirt Roads Area 300
- County_Maintained_Roads