The Alabama DOT MS4 Program

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Alabama DOT

3rd Annual CWRE Conference
21 October 2016

Some MS4 Basics

- **<u>M</u>**unicipal **<u>S</u>**eparate **<u>S</u>**torm **<u>S</u>**ewer **<u>S</u>**ystem
- "**MS4**" can refer to
  - the entire stormwater conveyance system itself
  - the public entity responsible for the system

Wikipedia (R. Lawton)

- NPDES permits to regulate MS4 stormwater discharges in urban areas
  - More potential pollutants in potentially greater amounts
  - More people potentially affected

FHWA

- "MS4 Area"
  - Area eligible for MS4 regulation under an NPDES permit

MS4 Permits Prior to March 2013

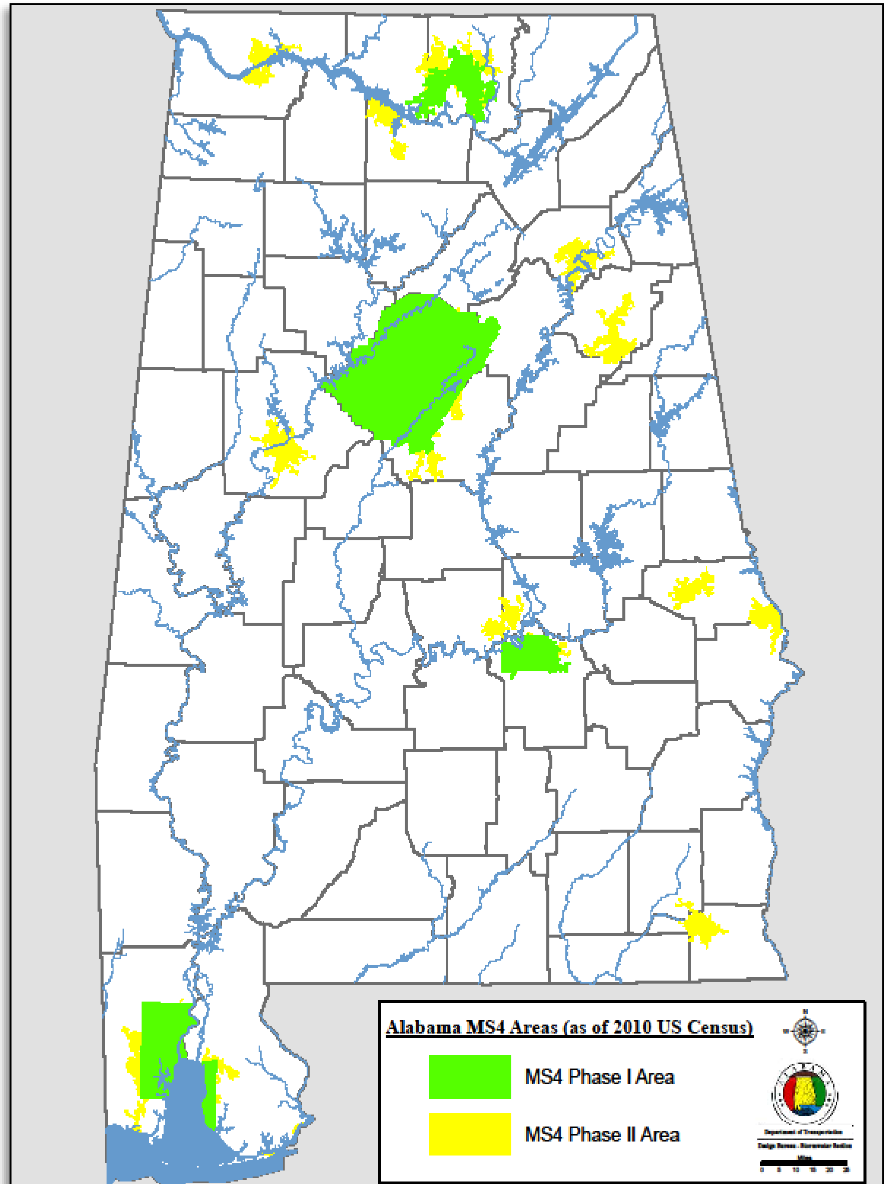
- Large/Medium MS4 (Phase I)
  - Five (5) individual permits for major urban areas
  - ALDOT was a co-permittee under each permit
  - First issued in 1995/96

N. Young

- Small MS4 (Phase II)
  - One (1) statewide general permit
  - ALDOT was covered under the general permit
  - Permit requirements applied to “Urbanized Areas” defined by the decennial U.S. Census
  - First issued in 2003

Wikipedia (R. Langley)

Alabama MS4 Areas



As of March 2013
(ADEM has modified some regulation-eligible areas since)

State DOT as an MS4: Square Peg, Round Hole

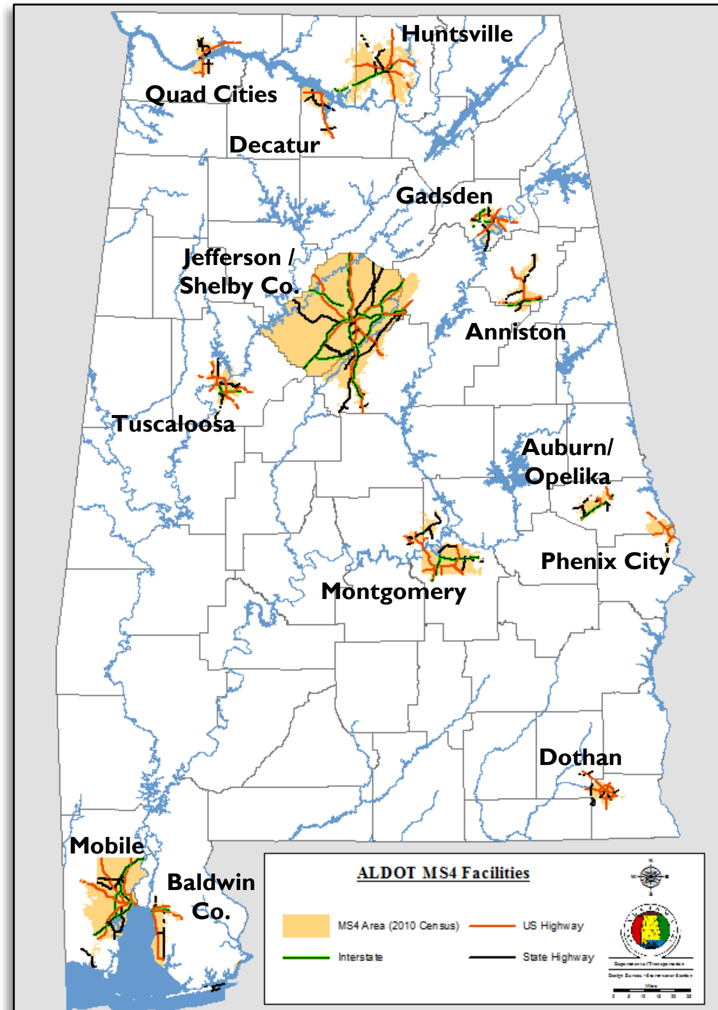
Typical MS4 (Municipality)	Typical State DOT
non-linear areas	mostly **linear** facilities
spatially **focused** and **connected**	**widely spread** network of roadways
more space for appropriate BMPs	**narrow strands of property** constrain space for BMPs
multiple land uses: industrial, commercial, residential, etc.	**mostly roads** of similar characteristics & a few "support facilities"
large influence on watershed	**small contributor** to total watershed drainage
legal authority to regulate activity conducted by various types of entities	**limited** legal authority to regulate non-DOT activity

The Current ALDOT MS4 Permit

- Current permit issued by ADEM on 21 March 2013; became effective 1 April 2013
- Five-year permit term ends 31 March 2018
- Better accounts for ALDOT's unique characteristics & challenges
  - ALDOT, ADEM, & environmental advocacy groups were all in favor of specific permit
- Applies to ALDOT facilities in areas regulated by MS4 Phase I & Phase II permits issued to other entities
- Permit requirements do not distinguish between Phase I-regulated & Phase II-regulated areas

ALDOT Facilities & MS4 Areas

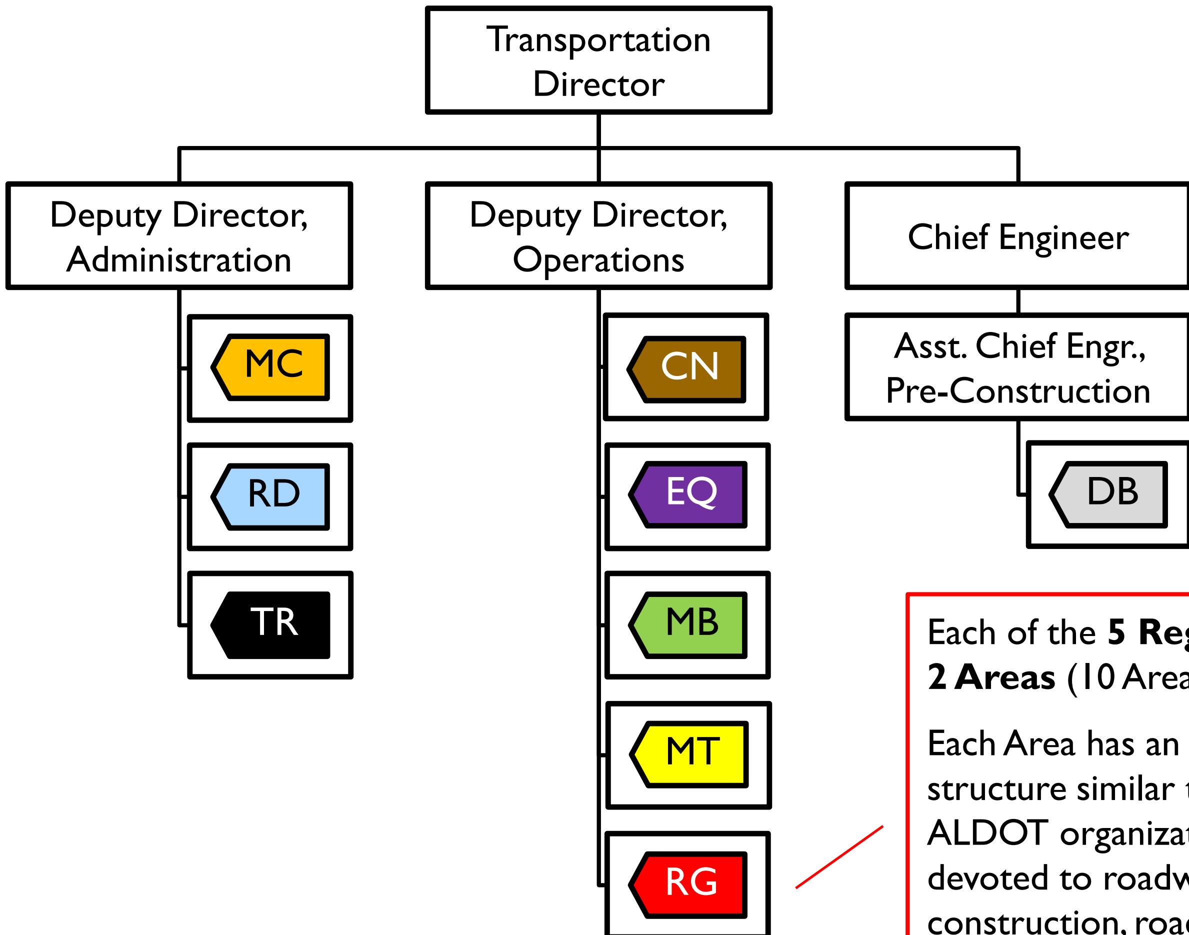
- Transportation Facilities
  - 2,700+ miles of roadways
    - <25% of all ALDOT roadways
  - No rest areas
- Support Facilities
  - Central Office
  - 17 Field Offices
    - 5 Area Offices
    - 11 District Offices
    - Tunnel Office (Mobile)



ALDOT MS4-Participating Parties

- Construction Bureau... CN
- Design Bureau.. DB
- Equipment, Procurement, & Services Bureau........................ EQ
- Maintenance Bureau.. MB
- Materials & Tests Bureau... MT
- Media & Community Relations Bureau................................. MC
- Regions (5 total).. RG
  - North, East Central, West Central, Southeast, Southwest
- Research & Development Bureau... RD
- Training Bureau.. TR

The MS4-Applicable ALDOT Organization



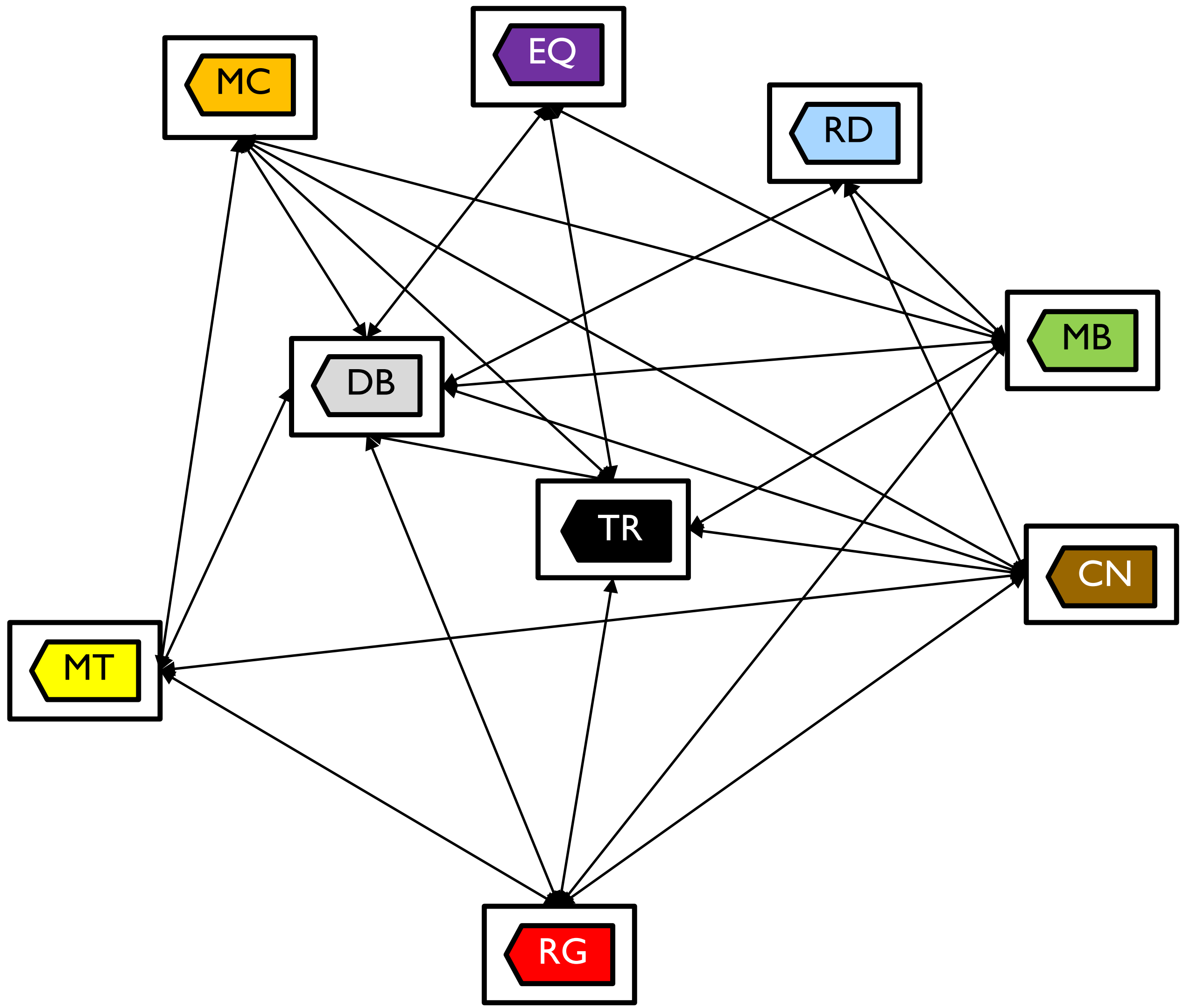
Each of the **5 Regions** is comprised of **2 Areas** (10 Areas total)

Each Area has an organizational structure similar to that of the whole ALDOT organization with groups devoted to roadway design, roadway construction, roadway maintenance, employee training, etc.

Each Area is comprised of **3-6 Districts**

More Accurate ALDOT Organization for MS4

- Functional internal coordination is necessary…



DB

ALDOT Office of Environmental Coordination

- Provides connectivity among ALDOT parties
  - Finds common ground among the stormwater management objectives & activities of individual ALDOT parties
  - Facilitates & moderates discussions between parties
  - Acts as a mediator to resolve conflicts between parties
- Frequent point-of-contact with which external parties interface regarding environmental matters
  - Regulators (e.g., ADEM, EPA)
  - Environmental advocates
  - Innovators (e.g., academia)
  - Public-at-large

DB

Stormwater Management Program Plan

- SWMPP details activities ALDOT performs to meet MS4 permit requirements
- Information provided
  - Activities associated with permit requirements
  - ALDOT parties associated with activities
  - Permit term goals
  - Implementation timeframes

Current version of SWMPP online at http://www.dot.state.al.us/dsweb/div_ped/Stormwater/pdf/MS4SWMPP.pdf

- Evolves as needed throughout permit term
  - New technologies & research findings
  - ALDOT trial-&-error
  - Emerging situations in the field

Most recent annual report online at http://www.dot.state.al.us/dsweb/div_ped/Stormwater/pdf/MS4%20Annual%20Report%20-%20FY%202015.pdf

- Annual reports describe implementation progress & give rationale for modifications

MS4 Program Activities & Accomplishments

- SWMPP Components
  - Control Measures
    - Public Education & Public Involvement
    - Illicit Discharge Detection & Elimination
    - Construction Site Runoff Control
    - Post-Construction Stormwater Management (& Structural Controls Operation)
    - Pollution Prevention / Good Housekeeping
  - MS4 Monitoring
- 2016 ADEM audit
  - ALDOT waiting on official audit rating
  - Verbal feedback from ADEM after audit completion implies rating will be "satisfactory" or better

Public Education & Public Involvement (1)

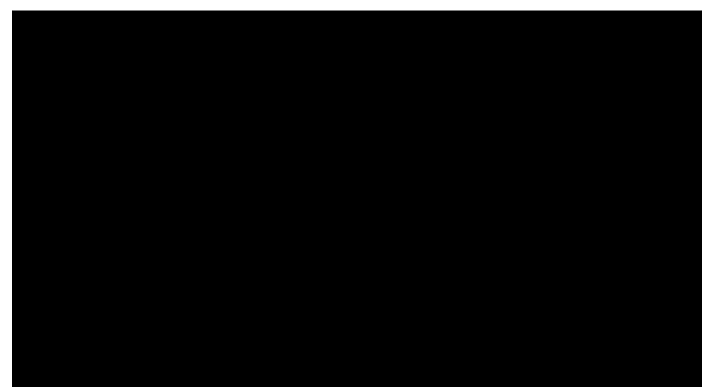
- Supporting & implementing anti-litter programs

Litter awareness campaigns

Alabama PALS

Community litter pickup events

Keep Alabama Beautiful



Public Education & Public Involvement (2)

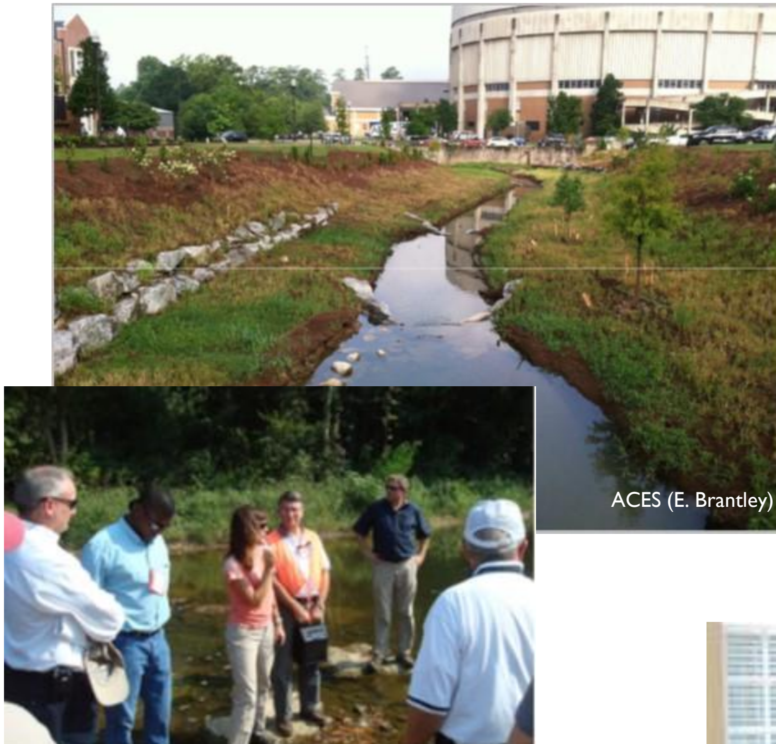
- Broader environmental awareness for citizens

Youth education activities

Collaboration with many partners

Public Education & Public Involvement (3)

- Involvement with local communities



Stream restoration projects

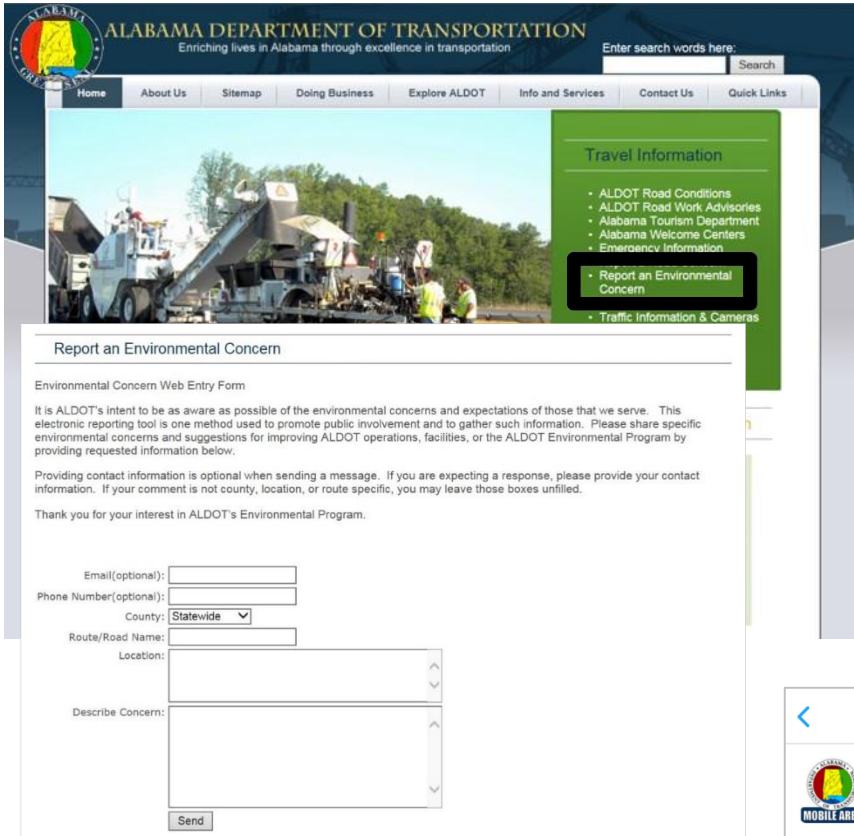
One Clean Mobile

Community outreach groups

CN
DB
MB
MT
MC
RG
RD
TR

Public Education & Public Involvement (4)

- Online outreach to the general public



http://www.dot.state.al.us/

http://www.betterbeltline.org

CN

DB

MB

MT

MC

RG

RD

TR

Public Education & Public Involvement (5)

- Supporting contributions to the body of knowledge

Development of Silt Fence Tieback Design Methodology for Highway Construction Installations

Wesley C. Zech, Jarid L. Halverson, and T. Prabhakar Clement

This research effort focuses on impro
used at highway construction projects
and correctly installed silt fence appli
cated that tying silt fence installations
ing a J-shaped hook (or a tieback) is
efficiency of silt fence installations. Silt
porary detention basin, which helps
sedimentation. The purpose of this res
numerical method for designing such
construction sites. The proposed m
model to estimate the volume of runof
shed and balances the water with the
installed with a tieback. First, the Soil
is used to estimate the amount of storm
storm event. Then, with the cross-sect
struction project, a graph is generated
available behind a silt fence for various
these data, the designer can determine
cies of silt fence tiebacks along a linea
This paper provides the mathematical
cedure. An example problem is also p
applicability.

Because of the rapid rate of urban
United States, contamination of surf
storm water runoff has become a m
After a storm event, construction site
of environmental pollutants into the
which ultimately will be discharged into waterways. Among the pollutants commonly discharged from construction sites, suspended sediments are the main pollutant of concern (1). The sediment-laden runoff waters discharged from construction sites can cause reservoirs and harbors to clog with silt, cause the loss of recreational areas and wildlife habitat, and reduce the beneficial uses of water for humans by harming the plant, animal, and fish species that live in the water.

containment system, allowing suspended particles to be deposited. As a result, proper installation and rigorous maintenance practices are essential (4). This research effort focuses on improving sediment control along highway construction projects using properly designed, correctly installed, and rigorously maintained silt fence installations. Our literature review indicated that tying silt fence installations back into the contour (creating a J-shaped hook) to form a temporary detention basin that can trap sediments is an effective way to improve the conventional silt fence designs (5–7). Previous studies also have suggested that approximately 75% of the suspended solids contained in construction site runoff were removed by the process of sedimentation in the ponds that formed behind fences (8). More recently, Zech et al. (9) investigated the effectiveness of silt fence tiebacks in removing sediment from storm water runoff on an intermediate-scale highway erosion model. The model was able to simulate off-site sediment migration from a highway construction site equipped with a silt fence installation configured with and

W. C. Zech and T. P. Clement, 238 Harbert Engineering Center, Auburn University, Auburn AL 36849-5337. J. L. Halverson, 4498 Orchard Creek Court SE, Grand Rapids, MI 49546. Corresponding author: W. C. Zech, zechwes@eng.auburn.edu.

Transportation Research Record: Journal of the Transportation Research Board, No. 2011, Transportation Research Board of the National Academies, Washington, D.C., 2007, pp. 21–28.
DOI: 10.3141/2011-03

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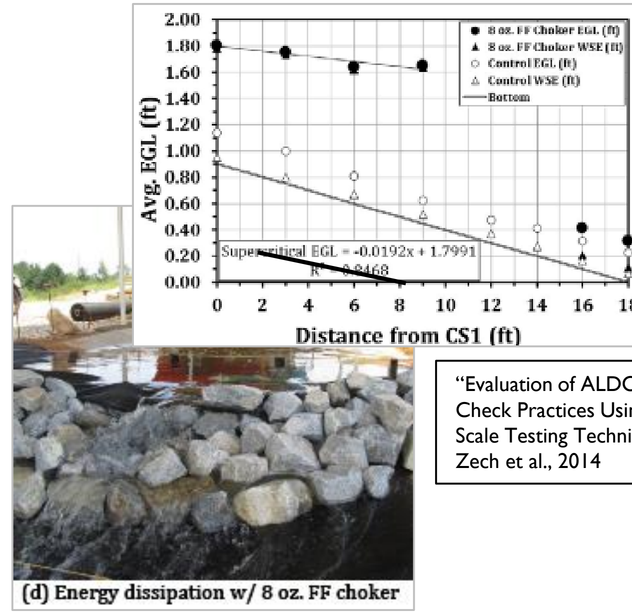
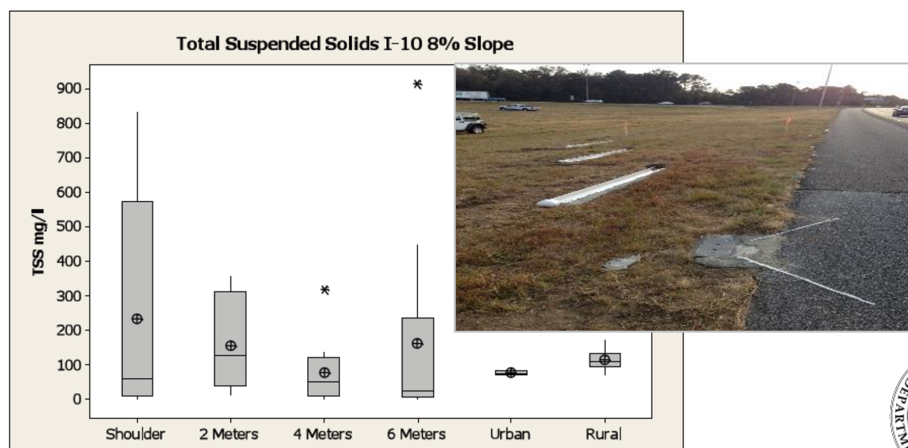


(d) Energy dissipation w/ 8 oz. FF choker

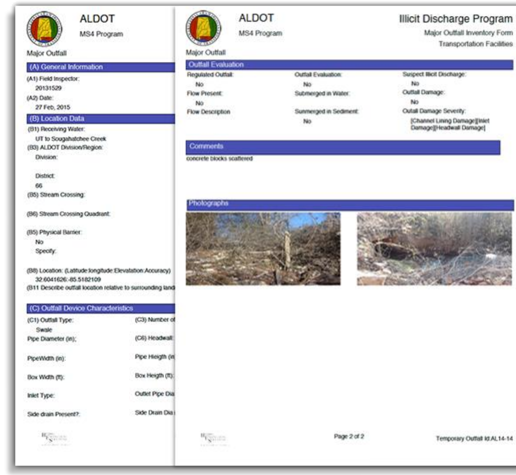
"Evaluation of ALDOT Ditch Check Practices Using Large-Scale Testing Techniques," Zech et al., 2014



"Vegetated Filter Strip Performance Evaluation for Cost-Effective Roadway Runoff Treatment in Alabama," White & Bernhard, 2014

Illicit Discharge Detection & Elimination (1)

- Major outfall inventory



ALDOT
MS4 Program
Major Outfall

(A) General Information
(A1) Field Inspector:
20131529
(A2) Date:
27 Feb, 2015

(B) Location Data
(B1) Receiving Water:
UT to Sougahatchee Creek
(B3) ALDOT Division/Region:
Division:
District:
66
(B5) Stream Crossing:
(B6) Stream Crossing Quadrant:
(B5) Physical Barrier:
No
Specify:
(B8) Location: (Latitude:longitude:Elevation:Accuracy)
32.6041626:-85.5182109
(B11 Describe outfall location relative to surrounding land

(C) Outfall Device Characteristics
(C1) Outfall Type:
Swale
(C3) Number of
Pipe Diameter (in):
(C6) Headwall:
PipeWidth (in):
Pipe Hiegth (in
Box Width (ft):
Box Heigth (ft):
Inlet Type:
Outlet Pipe Dia
Side drain Present?:
Side Drain Dia

ALDOT
MS4 Program
Major Outfall

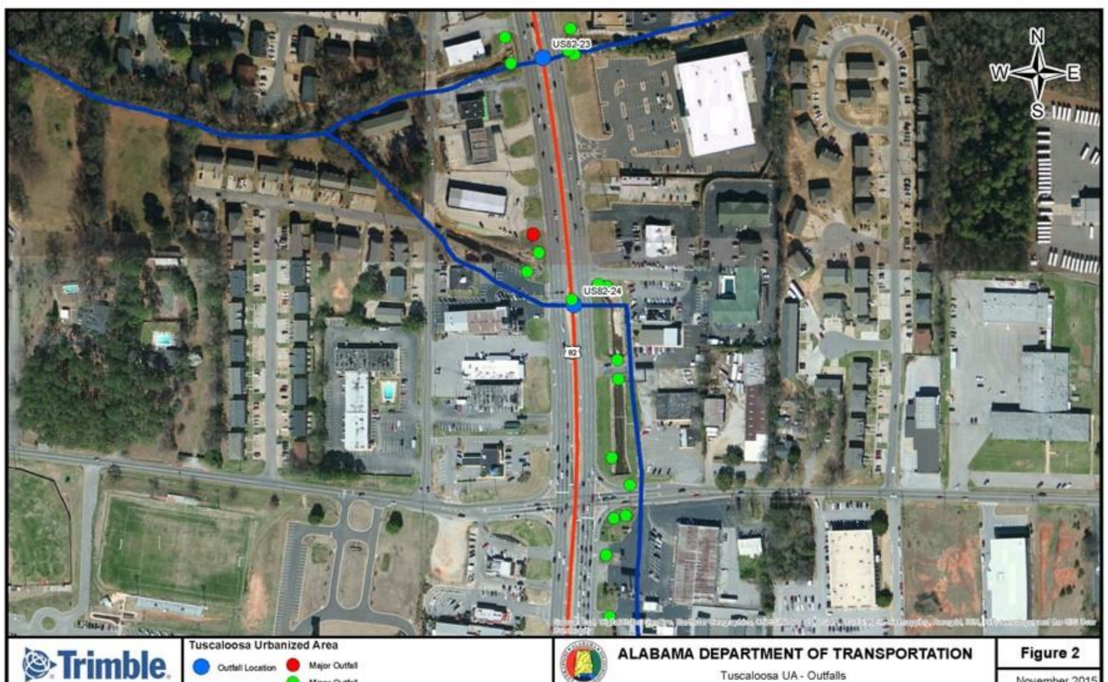
Illicit Discharge Program
Major Outfall Inventory Form
Transportation Facilities

Outfall Evaluation
Regulated Outfall:
No
Outfall Evaluation:
No
Suspect Illicit Discharge:
No
Flow Present:
No
Submerged in Water:
Outfall Damage:
No
Flow Description
Summerged in Sediment:
No
Outall Damage Severity:
[Channel Lining Damage][Inlet Damage][Headwall Damage]

Comments
concrete blocks scattered

Photographs

Page 2 of 2
Temporary Outfall Id:AL14-14

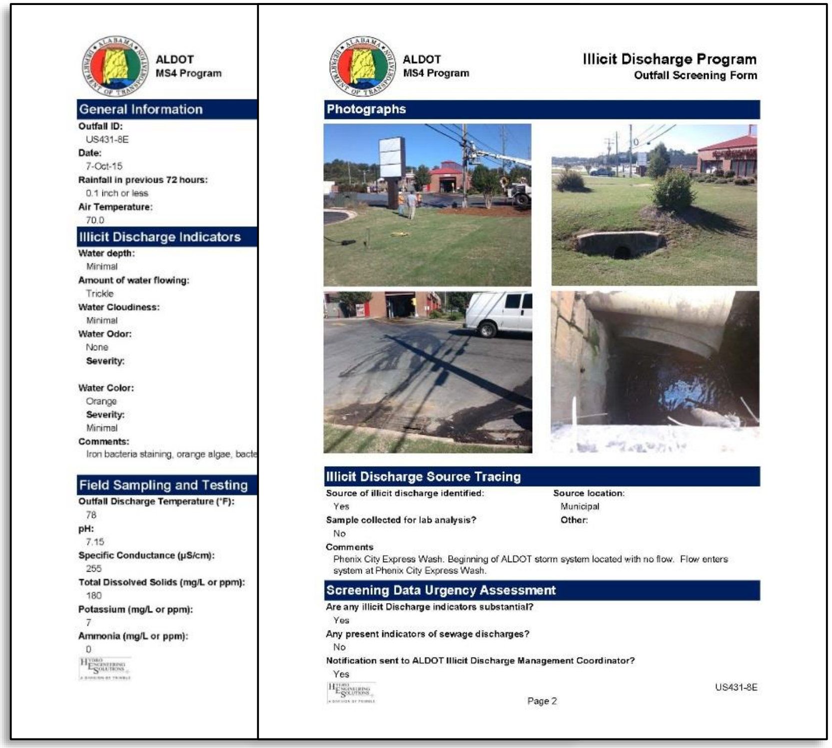


<u>Completed so far:</u>
Dothan
Auburn/Opelika
Montgomery
Tuscaloosa
Decatur
Mobile
Baldwin Co.
Quad Cities
(>150 major outfalls)

DB
EQ
MB
RG
TR

Illicit Discharge Detection & Elimination (2)

- Major outfall screening



ALDOT
MS4 Program

General Information

Outfall ID:
US431-8E
Date:
7-Oct-15
Rainfall in previous 72 hours:
0.1 inch or less
Air Temperature:
70.0

Illicit Discharge Indicators

Water depth:
Minimal
Amount of water flowing:
Trickle
Water Cloudiness:
Minimal
Water Odor:
None
Severity:

Water Color:
Orange
Severity:
Minimal
Comments:
Iron bacteria staining, orange algae, bacte

Field Sampling and Testing

Outfall Discharge Temperature (°F):
78
pH:
7.15
Specific Conductance (µS/cm):
255
Total Dissolved Solids (mg/L or ppm):
180
Potassium (mg/L or ppm):
7
Ammonia (mg/L or ppm):
0

ALDOT
MS4 Program

Illicit Discharge Program
Outfall Screening Form

Photographs

Illicit Discharge Source Tracing

Source of illicit discharge identified:
Yes
Source location:
Municipal
Sample collected for lab analysis?
No
Other:
Comments
Phenix City Express Wash. Beginning of ALDOT storm system located with no flow. Flow enters system at Phenix City Express Wash.

Screening Data Urgency Assessment

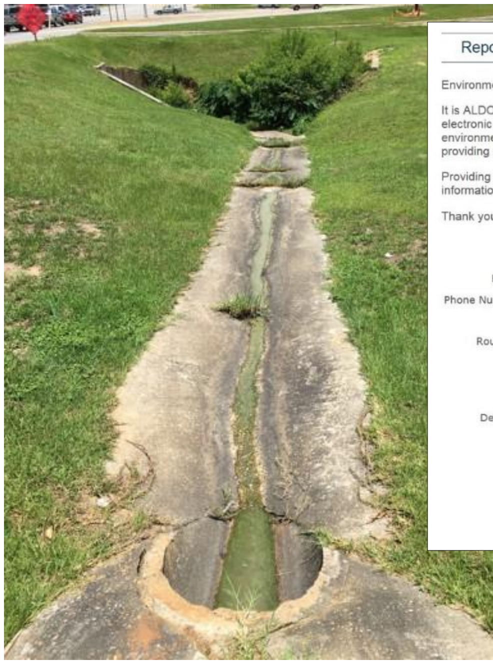
Are any illicit Discharge indicators substantial?
Yes
Any present indicators of sewage discharges?
No
Notification sent to ALDOT Illicit Discharge Management Coordinator?
Yes

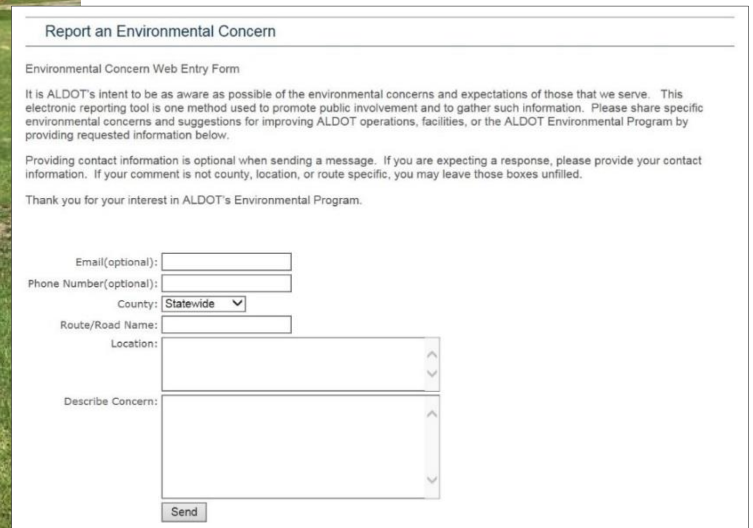
US431-8E

Page 2

Illicit Discharge Detection & Elimination (3)

- Addressing reported possible illicit discharges




Report an Environmental Concern

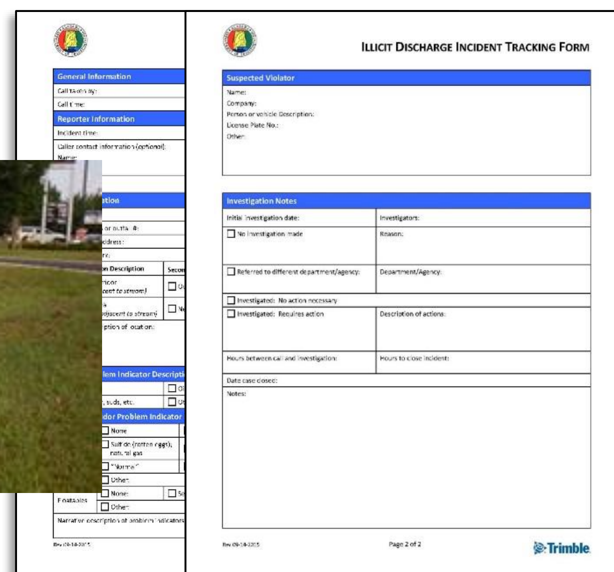
Environmental Concern Web Entry Form

It is ALDOT's intent to be as aware as possible of the environmental concerns and expectations of those that we serve. This electronic reporting tool is one method used to promote public involvement and to gather such information. Please share specific environmental concerns and suggestions for improving ALDOT operations, facilities, or the ALDOT Environmental Program by providing requested information below.

Providing contact information is optional when sending a message. If you are expecting a response, please provide your contact information. If your comment is not county, location, or route specific, you may leave those boxes unfilled.

Thank you for your interest in ALDOT's Environmental Program.

Email(optional):
Phone Number(optional):
County: Statewide
Route/Road Name:
Location:
Describe Concern:
Send


ILLICIT DISCHARGE INCIDENT TRACKING FORM

General Information
Call taken by:
Call time:
Reporter Information
Incident time:
Caller contact information (optional):
Name:

Suspected Violator
Name:
Company:
Person or vehicle Description:
License Plate No.:
Other:

Investigation Notes
Initial investigation date:
Investigators:
No investigation made
Reason:
Referred to different department/agency:
Department/Agency:
Investigated: No action necessary
Investigated: Requires action
Description of actions:
Hours between call and investigation:
Hours to close incident:
Date case closed:
Notes:

Page 2 of 2
Trimble

Construction Site Runoff Control (1)

- Traditional erosion & sediment control practices

CN
DB
TR

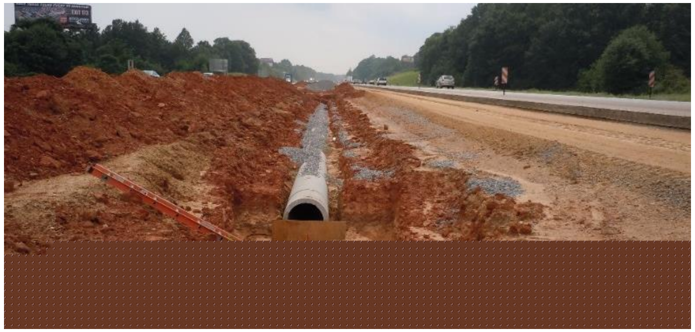
Construction Site Runoff Control (2)

- Innovative erosion & sediment control practices

Step pool, Birmingham Northern Beltline

Five Pillars of Construction Stormwater Management

Communication → Work → Water → Erosion → Sediment



Traditional

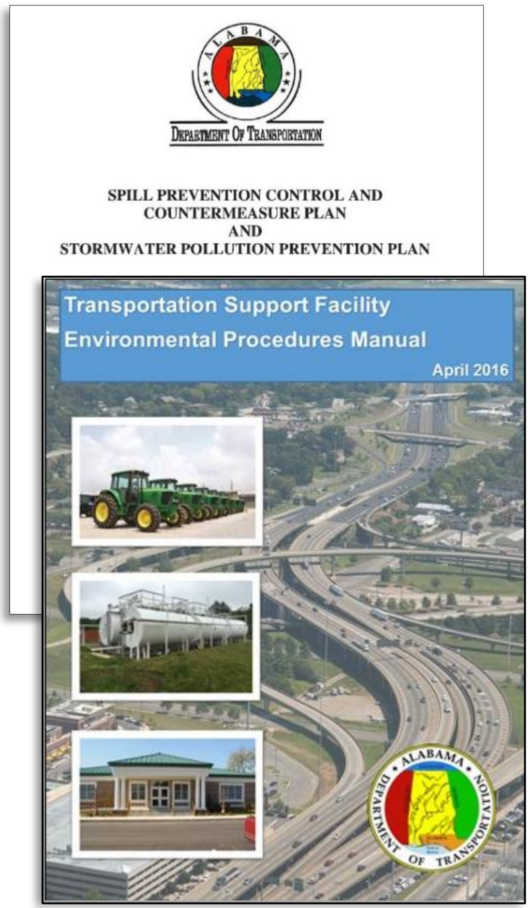
I-20/59 widening, Tuscaloosa (**99%** sediment yield reduction)

Alternate

MB
MT
RG
TR

Pollution Prevention / Good Housekeeping (1)

- Material storage, handling, transportation, & disposal at support facilities



<u>FY 2015 inspection findings:</u>
No deficiencies found at 8 of 18 facilities
Many observed deficiencies minor

MB

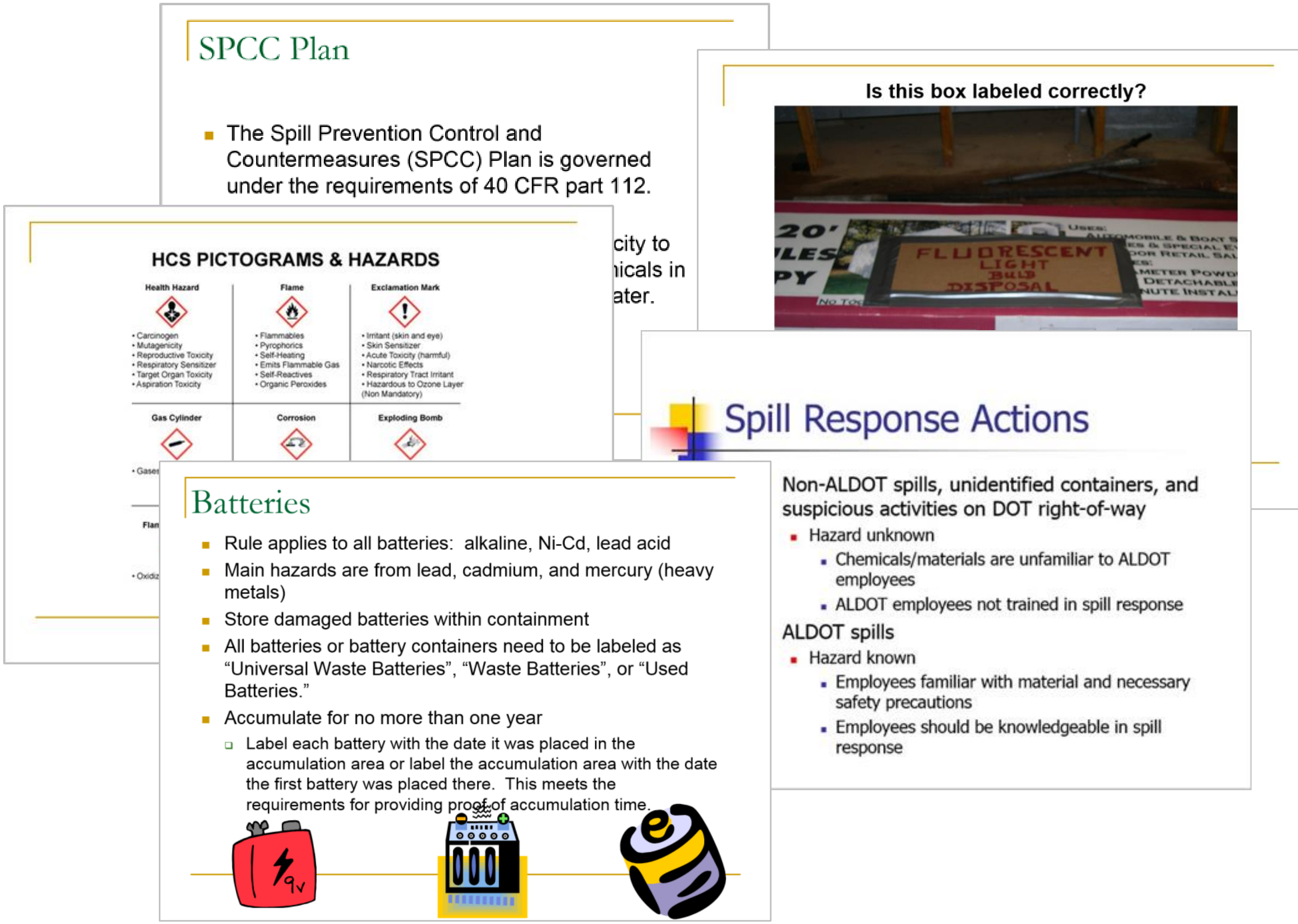
MT

RG

TR

Pollution Prevention / Good Housekeeping (2)

- Support facility employee good housekeeping training



MB

MT

RG

TR

Pollution Prevention / Good Housekeeping (3)

- Maintenance methods for transportation facilities

Salt brine for snow & ice control

Efficient herbicide application

Statewide Average - All Road Classes - 3 Year Trends				
Group	Feature	2013	2014	2015
Drainage	Unpaved Ditches	B-	B	B
Roadside	Erosion Control - Front Slopes	B	A-	B+
	Erosion Control - Back Slopes	B-	B+	B-
	Mowing	A	A-	A-
	Undesirable Vegetation	C	C+	C
	Litter Control	C	C	C

Annual roadway condition assessments

<u>Herbicide surveillance:</u>
Started in June 2012
No adverse incident found so far

MB

MT

RG

TR

Pollution Prevention / Good Housekeeping (4)

- Vegetation Management Training

2015 VEGETATION MANAGEMENT TRAINING CROSSWORD PUZZLE

Down
1) Redu
2) The
3) All A
4) Comn
6) The
7) ----
9) For
13) This
14) An e
16) It's

Across
3) In 2
5) Herb
8) How
10) Inje
11) Acce
12) Herb
14) Right
15) A su
17) Herb
18) Only

Alabama Department of Transportation
Vegetation Management Training
2015 Program Agenda

8:30 A.M.	**Howard Peavey**, ALDOT Agronomist - Welcome & Introductions - Miscellaneous Vegetation Management & Herbicide Issues
9:15 A.M.	**Herbicide Industry Representative** - Mixing Do's & Don'ts • Jacob Hodnett, Dow AgroSciences • Gueth Braddock, Bayer Crop Sciences • Jerry McGukin, Bayer Crop Science • Dr. Jason Belcher, Bayer Crop Science
9:45 A.M.	BREAK
10:05 A.M.	**Dale Dickens**, Urban Forestry Coordinator, Alabama Forestry Commission - Tree Trimming Techniques and Consequences
10:50 A.M.	**Jonathan Woodham**, ALDOT Agronomist - Herbicide Application Reporting
11:10 P.M.	**Farrell Baggett**, ALDOT Superintendent: S.W. Region - The Right Early Spring Application Can Be Budget Friendly
11:50 A.M.	LUNCH (on your own)
12:50 P.M.	**Howard Peavey**, ALDOT Agronomist - Herbicide Program Review
1:20 P.M.	**Randy Rankin**, ALDOT - Safety Issues
2:00 P.M.	BREAK
2:20 P.M.	**Jonathan Woodham**, ALDOT Agronomist - Herbicide / Mechanical Control Cost Comparisons
2:50 P.M.	**Howard Peavey**, ALDOT Agronomist - Herbicidal Brush Control
3:10 P.M.	Final Comments / Adjourn

Annual course:
200-400 trainees/year

JOHNSONGRASS

Johnsongrass is named for Colonel William Johnson of Selma, Alabama. In 1840, Johnson went to visit John H. Means, future governor of South Carolina, who gave him grass seed. Johnson planted the seed on his plantation and eventually grew large amounts of it for forage. It became locally known as "Johnson grass."

In South Carolina, the grass was known as "Means grass" and, after a number of years, as "that damned Means grass." It seems

ALDOT MAINTENANCE OPERATIONS
A Better Road Ahead

ALDOT

VEGETATION MANAGEMENT NEWSLETTER

April, 2015

ESPLANADE® & OUTRIDER®

- As you have noticed by now, these two products are not on contract this year; separate PO's have now been issued and will be administered by the Maintenance Bureau; when you are ready to order call Howard Peavey in the Central Office.

COGONGRASS

- Cogongrass will be blooming soon in the southern part of the state and the bloom should move slowly northward. Outbreaks can easily be spotted while in bloom making this is an excellent time to identify areas for future treatment and to update Cogongrass spreadsheets.

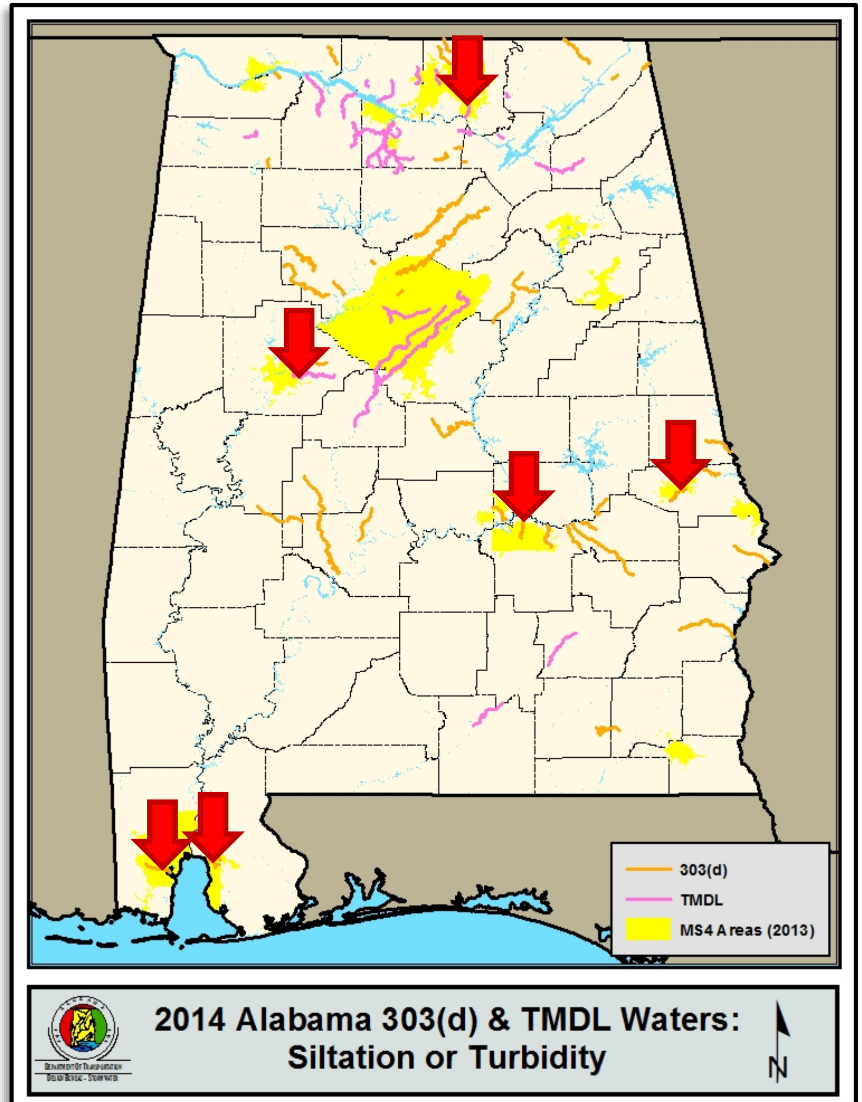
MOWING

- Mowing operations will begin soon and we should adhere **(and insist that our Contractors adhere)** to the guideline of mowing at a height of 6 inches and no less. The best defense against weed pressure is a good dense vegetative cover. Mowing at a lower height will not necessarily result in less frequent mowing. However, mowing at heights lower than 6 inches can place undue stress on turf and promote a decline in desirable vegetation and an increase in weed competition; this is also true for weed-eating operations around guardrails. The resulting loss of vegetation can lead to erosion along the roadsides and on back slopes. Low mowing also influences worker and traveler safety by increasing the occurrence of thrown objects. Consideration should be given to raising the mowing height on steep slopes.
- To reduce rutting and the initiation of additional erosion problems, mowing of wet areas (especially on slopes) should be restricted until the areas have dried.
- Consideration should be given to weed eating rather than mechanical mowing steep slopes.

Newsletter

MS4 Monitoring (1)

- In-stream, continuous monitoring approach



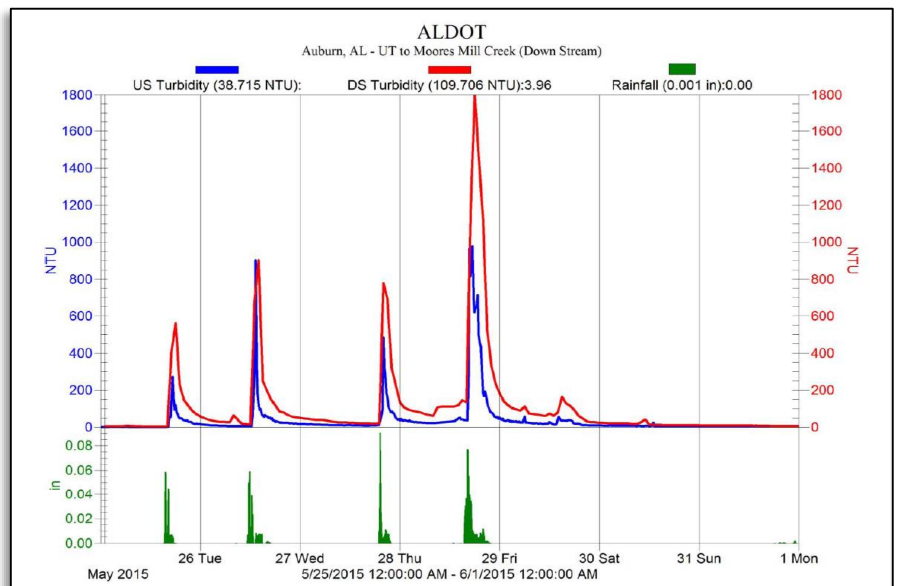
MS4 Monitoring (2)

- Analysis of collected data

Upstream

Downstream

Moore's Mill Creek, Auburn



So far, **no conclusive evidence** of significant ALDOT pollution contribution at any monitoring location

MS4 Program Economics (I)

- Pursuing "win-win" scenarios
  - Stormwater management benefit
  - Cost-effectiveness for ALDOT (i.e., the taxpayer)
- Communication is key (internally & externally)
  - ADEM understanding ALDOT's resource challenges led to an MS4 permit feasible to implement
  - Resources focused to effectively address concerns communicated by regulators & the public
  - Coordinating among ALDOT parties reduces redundancies in activities conducted
- "If it ain't broke, don't fix it"
  - Many MS4 program activities were established prior to the current MS4 permit, but were rebranded as part of the MS4 program in the SWMPP
  - No need for costly BMPs if current practices are sufficient

MS4 Program Economics (2)

- "An ounce of prevention…." – source control
  - Motivating the public to not litter vs. deploying maintenance crews to remove litter
  - Minimizing the potential for erosion vs. removing sediment from runoff
- "The best things in life are free" (or almost free)
  - Online education & outreach
  - Use of existing vegetation as a BMP
- Letting others do what they do well
  - Encouraging the public to report possible illicit discharges instead of relying on ALDOT major outfall screening to be lucky enough to find them
  - Illicit discharge investigations & follow-up are usually conducted by neighbor MS4s
  - MS4 Monitoring data sharing with the City of Daphne

MS4 Program Economics (3)

- Preparing for the future
  - When fiscally reasonable, an MS4-related policy may be effective statewide instead of being only for MS4 Areas
    - If MS4 Areas are modified in the future, no need to revise policies
    - Policies are more straightforward to implement
  - Many "minor" outfalls are being inventoried during "major" outfall inventory effort
    - Minor outfalls will already be on record if in the future major outfall criteria broaden to include smaller outfalls

The Alabama DOT MS4 Program

Acknowledgment
Dewayne Smith, PE, CPMSM, CPSWQ, CPESC
Trimble Navigation Limited

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