



**Tennessee Department of Environment and Conservation**  
**Division of Water Resources**  
 William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243  
 1-888-891-8332 (TDEC)  
**Municipal Separate Storm Sewer System (MS4) Annual Report**

**1. MS4 INFORMATION**

Knox County TNS075582  
 \_\_\_\_\_  
 Name of MS4 MS4 Permit Number

Chris Granju Chris.granju@knoxcounty.org  
 \_\_\_\_\_  
 Name of Contact Person Email Address

865-215-5840  
 \_\_\_\_\_  
 Telephone (including area code)

205 West Baxter Avenue  
 \_\_\_\_\_  
 Mailing Address

Knoxville	TN	37917
_____	_____	_____
City	State	ZIP code

What is the current population of your MS4?    256,168

What is the reporting period for this annual report?    From July 1, 2012    to June 30, 2013

**2. WATER QUALITY PRIORITIES (SECTION 3.1)**

A. Does your MS4 discharge into waters listed as impaired on TN’s most current 303(d) list and/or according to the on-line GIS mapping tool?     Yes     No

B. If yes, please attach a list all impaired waters within your jurisdictional area. **Attached**

C. Does your MS4’s jurisdictional area contain any waterbodies where a TMDL has been approved for parameters other than pathogens, siltation and habitat alterations? *NO*    If yes, please attach a list.

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D. Does your MS4 discharge to any Exceptional TN Waters (ETWs) or Outstanding National Resource Waters (ONRWs)? If yes, please attach a list  Yes  No

Waterbody	Description	Basis_for_Inclusion
Flat Creek Unnamed Tributary	Portion in House Mountain State Natural Area. Tributary flows into river mile 7.9 of Flat Creek.	House Mountain State Natural Area
Brice Branch Unnamed Tributary	Portion in House Mountain State Natural Area. Tributary flows into Brice Branch at river mile 1.6.	House Mountain State Natural Area
Brice Branch Unnamed Tributary	Portion in House Mountain State Natural Area. Tributary flows into Brice Branch at river mile 1.8.	House Mountain State Natural Area
Hogskin Branch	Portion in House Mountain SNA.	House Mountain State Natural Area.
Holston River	From confluence with French Broad River to McBee Island.	Federal endangered Pink Mucket, federal threatened Snail Darter. Federally endangered Pink Mucket, federal threatened Snail Darter, state endangered Lake Sturgeon (includes frequent reported sightings from fisherman below dam) and state
French Broad River	From Holston River to Douglas Dam.	threatened Blue Sucker (includes TTU report at mile 22). State Scenic River (Class III Developed River Area).
Tuckahoe Creek	In its entirety.	
Clinch River	From Melton Hill Dam (river mile 23.1) to Pellissippi Parkway (river mile 43.7).	State Scenic River (Class III Developed River Area)
Clinch River - Melton Hill Reservoir	Clinch River from Melton Hill Dam to Pellissippi Parkway.	State Scenic River (Class III - Developed River Area).
Turkey Creek	From Fort Loudon Lake to Hwy 11.	State endangered Sweetscent Ladies'-Tresses

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- E. Are you implementing additional specific provisions to ensure the continued integrity of ETWs or ONRWS located within your jurisdiction?  Yes  No

*The County considers work within the watershed of ETWs or ONRWS (if any) to be priority construction activities. The additional requirements outlined in section 5.4.1 of the TNCGP are applied within the entire watershed.*

### 3. PROTECTION OF STATE OR FEDERALLY LISTED SPECIES (SECTION 3.2.1 General Permit for Phase II MS4s)

- A. Are there any state or federally listed species within the MS4's jurisdiction?  Yes  No
- B. Are any of the MS4 discharges or discharge-related activities likely to jeopardize any state or federally listed species?  Yes  No
- C. Please attach any authorizations or determinations by U.S. Fish & Wildlife Service on the effect of the MS4 discharges on state or federally listed species. **Attached**

### 4. PUBLIC EDUCATION AND PUBLIC PARTICIPATION (SECTION 4.2.1 AND 4.2.2)

- A. Have you developed a Public Information and Education plan (PIE)?  Yes  No
- B. Is your public education program targeting specific pollutants and sources of those pollutants, such as Hot Spots?  Yes  No
- C. If yes, what are the specific causes, sources and/or pollutants addressed by your public education program? See Tables below: Table 1 shows the pollutants and sources. Table 2 provides details on the specifics of the education program.

**Table 1. Water Body Impairment Pollutants and Sources**

Waterbody Name	Cause of Impairment	Source of Impairment
<b>TIER 1 STREAMS</b>		
Little Turkey Creek	Loss of biological integrity due to siltation	Discharges from MS4 area
Grandview Branch	Escherichia coli	Discharges from MS4 area
High Bluff Branch	Escherichia coli	Discharges from MS4 area
Sinking Creek	Escherichia coli	Discharges from MS4 area
Ten Mile Creek (formerly called Sinking Creek)	Habitat loss due to alteration in streamside or littoral vegetative cover Loss of biological integrity due to siltation Escherichia coli	Discharges from MS4 area
Willow Fork	Alteration in stream-side or littoral vegetative cover Loss of biological integrity due to siltation Escherichia coli	Discharges from MS4 area
Cox Creek	Escherichia coli	Discharges from MS4 area
Hines Branch	Habitat loss due to other anthropogenic substrate alterations Escherichia coli	Discharges from MS4 area

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Knob Fork	Loss of biological integrity due to siltation Habitat loss due to other anthropogenic substrate alterations Alteration in stream-side or littoral vegetative cover Escherichia coli	Discharges from MS4 area
Grassy Creek	Loss of biological integrity due to siltation Escherichia coli	Discharges from MS4 area
Meadow Creek	Escherichia coli	Discharges from MS4 area
Plum Creek	Escherichia coli	Discharges from MS4 area
<b>TIER 2 STREAMS</b>		
Grable Branch	Oil & Grease Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	Minor Industrial Point Source Channelization Industrial Permitted Runoff Discharges from MS4 area
Swanpond Creek	Loss of biological integrity due to siltation Alteration in stream-side or littoral vegetative cover Escherichia coli	Channelization Discharges from MS4 Area
Casteel Branch	Loss of biological integrity due to siltation	Pasture Grazing Discharges from MS4 area
Twin Branch	Habitat loss due to alteration in streamside or littoral vegetative cover Loss of biological integrity due to siltation	Pasture Grazing Discharges from MS4 area
McCall Branch	Loss of biological integrity due to siltation	Discharges from MS4 area Streambank Modification
Whites Creek	Other Anthropogenic Habitat Alterations Escherichia coli	Discharges from MS4 area Streambank Modification
Beaver Creek (segment 1000)	Phosphate Nitrates Escherichia coli Low Dissolved Oxygen Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	<u>Section 1000</u> Major Municipal Point Source Pasture Grazing Discharges from MS4 Area
Beaver Creek (segments 2000 and 3000)	Escherichia coli Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	<u>Section 2000 and 3000</u> Pasture Grazing Discharges from MS4 Area
Bullrun Creek	Escherichia coli Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	Discharges from MS4 Area Pasture Grazing Channelization
Love Creek	Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations	Discharges from MS4 area (multiple MS4s)
<b>TIER 3 STREAMS</b>		
Roseberry Creek	Escherichia coli	Pasture Grazing Septic Tanks
Little Flat Creek	Escherichia coli	Animal Feeding Operations (NPS)

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Flat Creek	Escherichia coli	Pasture Grazing Collection System Failure
Fort Loudon Reservoir (segment 1000)	PCBs	Contaminated Sediment
Fort Loudon Reservoir (segment 2000)	Mercury, PCBs	Atmospheric Deposition Contaminated Sediment
Roddy Branch	Alteration in stream-side or littoral vegetative cover Physical Substrate Habitat Alteration, Loss of biological integrity due to siltation Escherichia coli	Pasture Grazing Channelization
Stock Creek (Segments 1000 and 2000)	Escherichia coli	Pasture Grazing
Gun Hollow Branch	Escherichia coli	Pasture Grazing
East Fork Third Creek (Located within the City of Knoxville)	Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations Escherichia coli	Discharges from MS4 area Urbanized High Density Area Land Development Collection System Failure
Third Creek (Located within the City of Knoxville)	Nitrates Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations Escherichia coli	Discharges from MS4 area Urbanized High Density Area Land Development Collection System Failure
First Creek (Located within the City of Knoxville)	Nitrate + Nitrite Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations Escherichia coli	Discharges from MS4 area Urbanized High Density Area Collection System Failure
Second Creek (Located within the City of Knoxville)	Nitrate + Nitrite Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations Escherichia coli	Discharges from MS4 area Urbanized High Density Area Collection System Failure
Williams Creek (Located within the City of Knoxville)	Other Habitat Alterations Escherichia coli	Discharges from MS4 area Collection System Failure
Baker Creek (Located within the City of Knoxville)	Nitrate + Nitrite Other Habitat Alterations Escherichia coli	Discharges from MS4 area Collection System Failure
Goose Creek (Located within the City of Knoxville)	Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations PCBs Escherichia coli	Collection System Failure Discharges from MS4 area RCRA Hazardous Waste
Fourth Creek (Located within the City of Knoxville)	Physical Substrate Habitat Alterations Escherichia coli	Discharges from MS4 area Channelization
Melton Hill Reservoir	PCBs Chlordane	Contaminated Sediment
Williams Branch	Loss of biological integrity due to siltation	Industrial Permitted Runoff



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**Table 2. Education Program Target Groups and Target Pollutants**

Description	Goal	Type	Target Groups	Target Pollutants	2010 Permit Citation(s)
Brochure(s) Distribution	To broaden public understanding of the storm drainage system and how behaviors contribute to water quality	Publications	Homeowners, Engineers, Developers, Construction Workers, Public	All	4.2.1a,b,c,f,g &h
Website	<ul style="list-style-type: none"> <li>▪ To provide manuals, policies and information regarding construction-phase and long term stormwater management.</li> <li>▪ To educate the public on how to prevent stormwater pollution and become involved with County programs</li> <li>▪ To educate the public on illicit discharge detection and reporting</li> </ul>	Internet	Engineers, Developers, Construction Workers, Public	All	4.2.1a-h
Social Media	To engage the public in a discussion of water pollution prevention and raise awareness on how the public can get more involved in County programs	Internet	Homeowners, Engineers, Developers, Construction Workers, Public	All	4.2.1a,b,c,f,g &h
Interactive BMP Tour	To provide education and demonstrate green infrastructure practices	Internet/ Educational Sites	Engineers, Developers, Construction Workers, Public	All	4.2.1 and 4.2.2
Signage at select Knox County Parks	To provide education and demonstrate green infrastructure practices	Educational Site	Engineers, Developers, Construction Workers, Public	All	4.2.1 and 4.2.2
Adopt A Stream	<ul style="list-style-type: none"> <li>▪ To provide an opportunity for citizen involvement in visual stream assessments, cleaning streams and reporting illicit discharges.</li> <li>▪ To educate the public on how to prevent stormwater pollution and become involved with County programs</li> </ul>	Training/ Educational Event	Public	All	4.2.1 and 4.2.2
Adopt A Watershed	To educate middle and high school students about watershed concepts and stormwater pollution prevention through service based learning projects	Training/ Educational Event	Public	All	4.2.1 and 4.2.2
Waterfest	To engage elementary students in learning about water pollution and watershed concepts	Training/ Educational Event	Public	All	4.2.1

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Description	Goal	Type	Target Group	Target Pollutants	2010 Permit Citation(s)
Festivals/Exhibitions/ Speaking Engagements	To provide requested stormwater pollution prevention awareness to public and private groups	Training/ Educational Event	Public	All	4.2.1
Watershed Initiatives	<ul style="list-style-type: none"> <li>▪ To encourage citizens to take ownership of their water resources</li> <li>▪ To provide education and demonstrate stormwater pollution prevention techniques</li> </ul>	Training, Events, Projects	Homeowners, Engineers, Developers, Construction Workers, Public	All	4.2.1
Tennessee Yards and Neighborhoods	To assist residents and neighborhood associations on tactics that can be employed in yards to encourage water infiltration and prevent stormwater pollution	Training/ Educational Event	Homeowners, Public	All	4.2.1a
Homeowner BMP Manual and Workshops	To broaden public understanding of stormwater best management practices and maintenance activities needed to ensure functionality of the BMP	Publication	Homeowners	Siltation	4.2.1b
Contractor Education	To make construction workers and sub-contractors aware of water quality impacts from daily operations	Training Event	Construction Workers	Siltation	4.2.1c & g
Development Workshops	To make development community aware of regulations, guidance materials and long-term water quality impacts from development activities	Training Event	Engineers, Developers, Construction Workers	All	4.2.1c & g
Pre-Construction Meetings	To make development community aware of regulations, guidance materials and long-term water quality impacts from development activities	Event	Engineers, Developers, Construction Workers	All	4.2.1c & g
Outreach to Professional Chemical Applicators	To limit the improper storage, use and disposal of items in areas which are exposed to stormwater runoff	Training Event/ Internet	Chemical applicators	Phosphate, Nitrate	4.2.1d & e
Public Notices	To comply with applicable state and local laws governing this activity	Publications, Internet	Public	All	4.2.2
Municipal Employee Training	To make municipal employees aware of water quality impacts from daily operations, and to educate staff on how to identify and report illicit discharges	Training Event/Publication	Municipal Staff	All	4.2h



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D. Note specific successful outcome(s) (NOT tasks, events, publications) fully or partially attributable to your public education program during this reporting period. Please see chart below:

**Outcomes from Education/Participation Programs**

Description	Adopt A Watershed Program	Environmental Stewardship Program	Grant Funded Projects	Other Knox Co. Programs
<b>Rain gardens installed</b>	1 rain garden installed at Austin East Magnet High School in the Williams Creek Watershed	4	3 rain gardens installed at Cedar Crossing subdivision in the Beaver Creek watershed	
<b>Storm drain inserts</b>	<b>TOTAL=240 pounds</b> 140 pounds of sediment kept from entering Beaver Creek and 100 pounds of sediment kept from entering Ten Mile Creek.			
<b>Upland stabilization projects</b>	<b>TOTAL=3330 square feet of erosion control matting installed</b> 2280 square feet of erosion matting installed at Powell High School in Beaver Creek Watershed, 1,000 square feet of erosion matting installed at West Valley Middle School in the Ten Mile Creek Watershed and 50 square feet installed at Austin East Magnet School in Williams Creek Watershed.			
<b>No mow and buffer agreements established</b>	<b>TOTAL=160 linear feet</b> 160 linear feet of no mow area created at Holston Middle School in the Love Creek Watershed .		<b>TOTAL= 1,400 linear feet of riparian buffer established.</b> Mill Run Subdivision in the Beaver Creek Watershed. 9 homeowners signed the buffer agreement. <b>TOTAL=1800 feet no mow zone established</b> at Halls Community Park in the Beaver Creek watershed	
<b>Water catchment systems installed</b>			<b>TOTAL=1720 gallons</b> 4- 55 gallon rain barrels were installed in the Cedar Crossing Subdivision. 1500 gallon cistern at Halls High School designed to capture 1" storm every 72 hours.	
<b>Water catchment systems sold</b>				377 rain barrels sold during 4 "Make It, Take It" workshops and one truckload sale
<b>Grassed swales installed</b>		19		



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<b>Stream bank restoration</b>			1,400 linear feet of highly eroded stream bank was stabilized in the Mill Run Subdivision in the Beaver Creek Watershed. 9 homeowners agreed to have the work completed.	
<b>Septic repairs</b>			3 pump outs, 1 repair in Stock Creek (319 grant)	
<b>Citizens reached through workshops and classroom outreach</b>	1536 middle and high school students participated in water quality educational activities. 1237 middle and high school students showed a 10% increase in watershed knowledge based on pre/post testing and were engaged in projects that improved the health of local watersheds.			1,949 citizens were exposed to stormwater pollution prevention ideas by Knox County Stormwater education initiatives.
<b>Stream clean ups conducted</b>				5 stream clean ups were completed removing 890 pounds of trash in and along local streams through the Adopt A Stream program. Blue way one on one discussions with homeowners and 21 debris jams removed in Beaver Creel watershed
<b>Invasive species removal</b>	<b>TOTAL=7160 pounds of invasive species removed.</b> 200 lbs @ South Doyle High School in the Stock Creek Watershed. 1280 lbs by Karns High School at two farms in the Beaver Creek Watershed. 1500 lbs at Hardin Valley Academy in the new outdoor classroom in the Beaver Creek Watershed. 600 lbs at West Valley Middle in the Ten Mile Creek Watershed			
<b>Social Media</b>	140 Facebook Fans of Water Quality Team, 651 Knox County Stormwater			13, 848 page views at Knox County Stormwater website. 653 Facebook fans at Knox County Stormwater Management
<b>Stream Removed from 303d list</b>	Cox Creek has been removed from the Draft 303d list for 2012			

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- E. Do you have an advisory committee or other body comprised of the public and other stakeholders that provides regular input on your stormwater program?  Yes  No
- F. How do you facilitate, advertise, and publicize public involvement and participation opportunities? *Knox County posts information on the website ([www.knoxcounty.org/stormwater](http://www.knoxcounty.org/stormwater)), Facebook, Newspaper articles and advertisements, emails to list serves and reaching out to specific organizations to post pertinent information on their social media and web pages.*
- G. Do you have a webpage dedicated to your stormwater program?  Yes  No  
If so, what is the link/URL: *www.knoxcounty.org/stormwater*
- H. Are you tracking and maintaining records of public education, outreach, involvement and participation activities? Please attach a summary of these activities. **2 documents attached.**  Yes  No

### 5. ILLICIT DISCHARGE DETECTION AND ELIMINATION (SECTION 4.2.3)

- A. Have you completed a map of all outfalls and receiving waters of your storm sewer system?  Yes  No
- B. Have you completed a map of all storm drain pipes of storm sewer system?  Yes  No
- C. How many outfalls have you identified in your system? *3985 outfalls: 1534 pipes, 2266 ditches, 185 springs*
- D. Have any of these outfalls been screened for dry weather discharges?  Yes  No
- F. What is your frequency for screening outfalls for illicit discharges? *Weekly, if weather permits and when an illicit discharge is reported to us.*  Yes  No
- G. Do you have an ordinance that effectively prohibits illicit discharges?  Yes  No
- H. During this reporting period, how many illicit discharges/illegal connections have you discovered (or been reported to you)? 154
- I. Of those illicit discharges/illegal connections that have been discovered or reported, how many have been eliminated? *142 --Out of the 142, several complaints were not found to be legitimate complaints, are being monitored or are being investigated more thoroughly. Also, we have performed three septic pump-outs and one septic repair.*

### 6. CONSTRUCTION SITE STORMWATER RUNOFF (SECTION 4.2.4)

- A. Do you have an ordinance or adopted policies stipulating:
- Erosion and sediment control requirements?  Yes  No
- Other construction waste control requirements?  Yes  No
- Requirement to submit construction plans for review?  Yes  No
- MS4 enforcement authority?  Yes  No
- B. How many active construction sites disturbing at least one acre were there in your jurisdiction this reporting period? *168 Residential and 30 Commercial*

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- C. How many of these active sites did you inspect this reporting period? 198
- D. On average, how many times each, or with what frequency, were these sites inspected (e.g., weekly, monthly, etc.)? monthly
- E. Do you prioritize certain construction sites for more frequent inspections?  Yes  No
- If Yes, based on what criteria? All sites are considered priority sites in Knox County. Additional inspections are done for active construction and installation of infrastructure (e.g., road and pipe installation), NOV (notice of violation) follow up and work orders.

### 7. PERMANENT STORMWATER CONTROLS (SECTION 4.2.5)

- A. Do you have an ordinance or other mechanism to require:
- Site plan reviews of all new and re-development projects?  Yes  No
- Maintenance of stormwater management controls?  Yes  No
- Retrofitting of existing BMPs with green infrastructure BMPs?  Yes  No
- B. What is the threshold for new/redevelopment stormwater plan review? (e.g., all projects, projects disturbing greater than one acre, etc.) One acre of disturbance or 10,000 square feet of imperviousness added
- C. Have you implemented and enforced performance standards for permanent stormwater controls?  Yes  No
- D. Do these performance standards go beyond the requirements found in Section 4.2.5.2 and require that pre-development hydrology be met for:
- Flow volumes  Yes  No
- Peak discharge rates  Yes  No
- Discharge frequency  Yes  No
- Flow duration  Yes  No
- E. Please provide the URL/reference where all permanent stormwater management standards can be found.  
[www.knoxcounty.org/stormwater/](http://www.knoxcounty.org/stormwater/)
- F. How many development and redevelopment project plans were reviewed for this reporting period? 35
- G. How many development and redevelopment project plans were approved? 31
- H. How many permanent stormwater management practices/facilities were inspected? 7
- I. How many were found to have inadequate maintenance? 1
- J. Of those, how many were notified and remedied within 30 days? (If window is different than 30 days, please specify) 0
- K. How many enforcement actions were taken that address inadequate maintenance? 1
- L. Do you use an electronic tool (e.g., GIS, database, spreadsheet) to track post-construction BMPs, inspections and maintenance?  Yes  No
- M. Do all municipal departments and/or staff (as relevant) have access to this tracking system?  Yes  No
- N. Has the MS4 developed a program to allow for incentive standards for redeveloped sites?  Yes  No

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O. How many maintenance agreements has the MS4 approved during the reporting period? 22

### 8. CODES AND ORDINANCES REVIEW AND UPDATE (SECTION 4.2.5.3)

A. Is a completed copy of the EPA Water Quality Scorecard submitted with this report?  Yes  No

B. Include status of implementation of code, ordinance and/or policy revisions associated with permanent stormwater management.

*Knox County Staff is currently developing revisions of the Stormwater Management Ordinance as well as the referenced technical design manual for land development.*

### 9. STORMWATER MANAGEMENT FOR MUNICIPAL OPERATIONS (SECTION 4.2.6)

A. Have stormwater pollution prevention plans (or an equivalent plan) been developed for:

All parks, ball fields and other recreational facilities  Yes  No

All municipal turf grass/landscape management activities  Yes  No

All municipal vehicle fueling, operation and maintenance activities  Yes  No

All municipal maintenance yards  Yes  No

All municipal waste handling and disposal areas  Yes  No

B. Are stormwater inspections conducted at these facilities?  Yes  No

1. If Yes, at what frequency are inspections conducted? *Once every two weeks for the Engineering and Public Works facility located at 205 W Baxter Avenue.*

C. Have standard operating procedures or BMPs been developed for all MS4 field activities? (e.g., road repairs, catch basin cleaning, landscape management, etc.) –They have been for Engineering and Public Works only.  Yes  No

D. Do you have a prioritization system for storm sewer system and permanent BMP inspections?  Yes  No

E. On average, how frequently are catch basins and other inline treatment systems inspected? *As needed.*

F. On average, how frequently are catch basins and other inline treatment systems cleaned out/maintained? *As needed.*

G. Do municipal employees in all relevant positions and departments receive comprehensive training on stormwater management?  Yes  No

H. If yes, do you also provide regular updates and refreshers?  Yes  No

If so, how frequently and/or under what circumstances? *Annually. A required on-line Stormwater Pollution Prevention test is taken with other required safety test, but it is very general and not job specific.*

### 10. STORMWATER MANAGEMENT PROGRAM UPDATE (SECTION 4.4)

A. Describe any changes to the MS4 program during the reporting period including but not limited to:

Changes adding (but not subtracting or replacing) components, controls or other requirements (Section 4.4.2.a).  
*N/A*

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Changes to replace an ineffective or unfeasible BMP (Section 4.4.2.b).

- **Minimum Control Measure: Illicit Discharge Detection and Elimination**
  - *The milestones for goal 2C from Knox County’s Notice of Intent need to be amended. The goal says that Knox County will continue to develop and implement an IDDE plan for Knox County’s storm sewer system. The original milestones referenced the creation and management of a “working group” for this goal. Knox County proposes to change the original milestones. Knox County is continuing to evaluate and develop the scope of work and the staffing needs, above the recent hire of an Environmental Crimes Investigator, for this plan all while conducting dry weather screening and continuing to identify and eliminate illicit discharges, as necessary. There will be on-going discussion, evaluation and implementation of this plan as more information is gathered.*
- **Minimum Control Measure: Pollution Prevention and Good Housekeeping**
  - *The Goal for 5A says that Knox County Stormwater Management will continue to aid in the development of training programs by working with departments under the Knox County Mayor and all other branches of Knox County Government where there is pollution potential. This goal needs to be amended, so Knox County Stormwater proposes to change this to Knox County Stormwater Management will continue to aid in the development of training programs by working with departments directly under the Knox County Mayor and will continue to reach out and offer aid to other Knox County Departments not under the direct authority of the Knox County Mayor.*
  - *The Goal for 5B says Knox County Stormwater Management will continue to aid in the development and implantation of policies and procedures that will prevent or reduce the potential for stormwater pollution. Knox County Stormwater Management will continue to offer support and collaboration to the departments under the Knox County Mayor and all other branches of Knox County Government. Knox County proposes to change the last sentence to say: Knox County Stormwater Management will continue to offer support and collaboration to the departments under the Knox County Mayor and all other branches of Knox County Government not under the direct authority of the Knox County Mayor. This means the milestones will not include working groups and MOUs. Stormwater Management will continue to support all departments at their request.*
  - *The goal for 5C says Knox County Stormwater Management will continue to offer support and collaboration to the departments under the Knox County Mayor and all other branches of Knox County Government in the development and implementation of SWPPPs for Knox County facilities. Knox County proposes to change this to: Knox County Stormwater Management will continue to offer support and collaboration to the departments under the Knox County Mayor and all other branches of Knox County Government not under the direct authority of the Knox County Mayor. This means the milestones will not include working groups and MOUs. Stormwater Management will just continue to support all departments at their request.*
- **Minimum Control Measure: Permanent Stormwater Management Program:**
  - *The milestones for goal 4E from Knox County’s Notice of Intent need to be amended. Knox County has developed the core tools for an educational program for non-governmental groups regarding maintenance of permanent BMPs. Staff has been inspecting BMPs for compliance with submitted plans. The original milestones referenced creation and management of a “working group” for BMP management. Knox County proposes changing the “working group” approach to assignment of Knox County staff to monitor on-going maintenance need of the program, functionality of the BMPs, and on –going educational needs to ensure BMPs are operating as originally designed*

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Information (e.g. additional acreage, outfalls, BMPs) on program area expansion based on annexation or newly urbanized areas. N.A.

Changes to the program as required by the division (Section 4.4.3). N.A.

## 11. EVALUATING/MEASURING PROGRESS

- A. What indicators do you use to evaluate the overall effectiveness of your Stormwater Management Program, how long have you been tracking them, and at what frequency? Note that these are not measurable goals for individual BMPs or tasks, but large-scale or long-term metrics for the overall program, such as in-stream macroinvertebrate community indices, measures of effective impervious cover in the watershed, indicators of in-stream hydrologic stability, etc.

Indicator	Began Tracking (year)	Frequency	Number of Locations
<i>Example: E. coli</i>	2003	Weekly April–September	20
E. Coli	2003	Varies	30
Benthics	1998	Varies	14
Tree Cover	2001	10 Years	All of Knox County
Stream Inventory	2008	5 Years	Listed Streams

- B. Provide a summary of data (e.g., water quality information, performance data, modeling) collected in order to evaluate the performance of permanent stormwater controls installed throughout the system. This evaluation may include a comparison of current and past permanent stormwater control practices.

*Knox County has taken a watershed approach to improve water quality. Knox County has created several watershed initiatives which encompass the Lower Clinch and Fort Loudon watersheds. Within these watersheds stormwater staff has developed the Beaver Creek, Bullrun Creek, and Stock Creek watershed initiatives. The task forces meet regularly to discuss ways to target problems based upon existing data and to target data collection based upon strategies implemented. Knox County coordinates monitoring efforts based upon our partners required monitoring and what stormwater staff believes are useful data sets. Some data is generated based upon grants received from partnership efforts.*

*Knox County used Integrated Pollution Source Index (IPSI) data from TVA to help guide efforts in Stock Creek and Bullrun Creek which primarily focused on bacteria sources. Knox County continues monitoring both streams for bacteria with the help of partners Knox Chapman Utility, Halls-Dale Powell Utility, First Utility District, UT, and TVA. Knox County plans to continue monitoring these streams to evaluate any improvements that may result from Ag improvements and sewer and septic rehabilitations. Knox County plans to determine bacteroides when it will help guide strategy.*

*There have been numerous studies done on Beaver Creek over the last Ten years. Knox County has used these studies to help develop watershed management plans. The watershed plan is the guiding document for grants received to improve Beaver Creek. Knox County is focusing on retrofits in Beaver Creek to improve water quality in different land uses such as Ag, parks, and residential areas.*

*The Stormwater department collected benthic samples in Beaver Creek, Whites Creek, Ten Mile Creek, Turkey Creek, and Stock Creek for our TMDL and 303d listed monitoring requirements this summer. A benthic sample was collected in the Halls Community Park restoration project to see if the restoration is improving habitat. Stormwater staff is waiting on the results. Several samplers have been installed in Cedar Crossing subdivision to monitor storm water runoff in anticipation of installing bioinfiltration systems to determine its effectiveness in reducing pollutants as well as volume reduction. Stormwater staff collected*

## Municipal Separate Storm Sewer System (MS4) Annual Report

*bacteria samples this summer for our 303d listed stream segments in the Ft. Loudon watershed. The data is currently being reviewed.*

*The Stock Creek initiative is currently implementing a watershed improvement plan with the help of a 319 grant. The focus is on septic rehabilitation, Ag BMP installations, and green infrastructure opportunities such as bioinfiltration.*

*Prior to 2005, when most of the built environment occurred, Knox County stormwater requirements focused on peak flow mitigation. Knox County updated its stormwater ordinance to include a “first flush” requirement and buffer regulation in 2005. In 2008 Knox County updated its ordinance to include water quality volume requirements that include an 80% TSS removal component and a buffer requirement. Since 2008 Knox County has created 139 maintenance agreements for permanent stormwater controls related to new developments. We have cost shared through our Environmental Stewardship Program to install 10 Green Infrastructure type BMP’s with landowners this past year which will reduce sediment, flow, and increase habitat.*

### 12. ENFORCEMENT (SECTION 4.5)

- A. Identify which of the following types of enforcement actions you used during the reporting period, indicate the number of actions, the minimum measure (e.g., construction, illicit discharge, permanent stormwater control) or note those for which you do not have authority:

Action	Construction	Permanent Stormwater Controls	Illicit Discharge	Authority?	
Notice of violation	# <u>60</u>	# <u>1</u>	# <u>30</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Administrative fines	# <u>N/A</u>	# <u>N/A</u>	# <u>0</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Stop Work Orders	# <u>6</u>	# <u>N/A</u>	# <u>0</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Civil penalties	# <u>17</u>	# <u>N/A</u>	# <u>0</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Criminal actions	# <u>0</u>	# <u>N/A</u>	# <u>0</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Administrative orders	# <u>0</u>	# <u>N/A</u>	# <u>N/A</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Other <u>Holds placed on building lots</u>	# <u>12</u>	# <u>N/A</u>	# <u>N/A</u>		

- B. Do you use an electronic tool (e.g., GIS, data base, spreadsheet) to track the locations, inspection results, and enforcement actions in your jurisdiction?  Yes  No

## Municipal Separate Storm Sewer System (MS4) Annual Report

C. What are the 3 most common types of violations documented during this reporting period?

**Construction:**

1. *Temporary erosion prevention/sediment controls are not properly installed, functional and/or maintained. Sediment has the potential to leave the site.*
2. *Failure to temporarily stabilize non-vegetated areas within 15 days since location was actively worked. This includes individual building lots*
3. *Failure to obtain necessary permits.*

**Illicit Discharges:**

1. *Failing or leaking sewer and septic systems and grey water discharges.*
2. *Dumping of other materials in storm sewer system or stream.*
3. *Dumping of yard waste in storm sewer system.*

**13. PROGRAM RESOURCES (OPTIONAL)**

- A. What was your annual expenditure to implement the requirements of your MS4 NPDES permit and SWMP this past reporting period? \$1,117,407
- B. What is next year's budget for implementing the requirements of your MS4 NPDES permit and SWMP?  
\$1,241,831
- C. Do you have an independent financing mechanism for your stormwater program?  Yes  No
- D. If so, what is it/are they (e.g., stormwater fees), and what is the annual revenue derived from this mechanism?  
Source: N.A. Amount \$N.A.  
Source: N.A. Amount \$N.A.
- E. How many full time employees does your municipality devote to the stormwater program (specifically for implementing the stormwater program vs. municipal employees with other primary responsibilities that dovetail with stormwater issues)? 19
- F. Do you share program implementation responsibilities with any other entities?  Yes  No

Entity	Activity/Task/Responsibility	Your Oversight/Accountability Mechanism
University of Tennessee	Public Outreach and Involvement	Projects are done cooperatively between agencies and summary reporting is provided annually.
Town of Farragut	Public Outreach and Involvement	Projects are done cooperatively between agencies and summary reporting is provided annually.

G. Please attach a copy of your Organizational Chart: Attached



## Municipal Separate Storm Sewer System (MS4) Annual Report

### 14. CERTIFICATION

**This report must be signed by a ranking elected official or by a duly authorized representative of that person. See signatory requirements in sub-part 6.7.2 of the permit.**

*“I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.”*

Printed Name and Title	Signature	Date

**Annual reports must be submitted in accordance with the requirements of Section 5.4. (Reporting) of the permit. Annual reports must be submitted to the appropriate Environmental Field Office (EFO) by September 30 of each calendar year, as shown in the table below:**

EFO	Street Address	City	Zip Code	Telephone
Chattanooga	540 McCallie Avenue STE 550	Chattanooga	37402	(423) 634-5745
Columbia	1421 Hampshire Pike	Columbia	38401	(931) 380-3371
Cookeville	1221 South Willow Ave.	Cookeville	38506	(931) 432-4015
Jackson	1625 Hollywood Drive	Jackson	38305	(731) 512-1300
Johnson City	2305 Silverdale Road	Johnson City	37601	(423) 854-5400
Knoxville	3711 Middlebrook Pike	Knoxville	37921	(865) 594-6035
Memphis	8383 Wolf Lake Drive	Bartlett	38133	(901) 371-3000
Nashville	711 R S Gass Boulevard	Nashville	37216	(615) 687-7000

**List of Attachments**

- 1. List of Impaired Waters within the Jurisdictional Area.....Page 19**
  
- 2. Determination Letter from U.S. Fish and Wildlife Service.....Page 23**
  
- 3. Tracking Documents for Education/Outreach Activities:**
  - a. Adopt A Watershed Annual Report.....Page 24**
  - b. Knox County Stormwater Staff Education/Outreach Activities.....Page 30**
  
- 4. Knox County Stormwater Management Organizational Chart.....Page 33**

# Municipal Separate Storm Sewer System (MS4) Annual Report

## Impaired Waters

### 1.1.1. 3.2.1 Discharges to Water Quality Impaired Waters

Under section 303(d) of the Clean Water Act, states are required to develop lists of impaired waters. A waterbody (i.e., stream reaches, lakes, waterbody segments) is considered “impaired” when the results of monitoring by TDEC indicate chronic or recurring violations of the applicable numeric and/or narrative water quality criteria. The list, commonly called “the 303(d) list” also provides information on the pollutant(s) for which the stream is not meeting criteria and the source(s) of those pollutants. The 303(d) list is typically updated every other year.

In the State of Tennessee, the NPDES Phase II permit requires that each MS4 maintain awareness of the streams and other waterbodies in their jurisdictions that are on the 303(d) list. More importantly, the permit includes a provision for monitoring the streams on the 303(d) list for which “Discharges from the MS4” is designated as a pollutant source. Additionally, some streams on the 303(d) list have sources that have a direct relation to requirements of the NPDES Phase II permit. For example, a stream that is included on the 303(d) list for the pollutant “sediment” and the source of the sediment is “land development” would be a stream of special interest to a permitted MS4 due to the permit’s focus on management of pollutants at land development (i.e. construction) sites. MS4s are required to implement best management practices to control pollutants, including sediment, from land developments.

Table 7 provides a listing of impaired streams in Knox County, as identified in the EPA Approved Final Year 2010 303(d) List for the State of Tennessee. The table is divided in three priority tiers depending upon the source(s) of the stream’s pollutant and the relevance of that source to the requirements of the NPDES Phase II permit, as explained below.

- **Tier 1** includes those streams where discharges from the County’s public stormwater conveyance system (i.e., the MS4) are considered as the *sole* source of pollutant(s). *Tier 1 streams are of primary focus in the County’s water quality program, therefore permit compliance activities target the impairments in these waterbodies.* The County’s stormwater management program includes activities that target the pollutant(s) causing the impairment(s).
- **Tier 2** includes those streams where discharges from the County’s public stormwater conveyance system are one of several sources of pollutant(s). *Tier 2 streams are also a strong focus of the County’s water quality program; therefore permit compliance activities target the impairments in these waterbodies.* However, water quality improvements in these waterbodies likely cannot be achieved by the County’s efforts alone.
- **Tier 3** includes those streams where discharges from Knox County’s public stormwater conveyance system are NOT considered a source of pollutant(s). Water quality in these waterbodies are addressed by the County’s stormwater management ordinance, general public education/outreach efforts and by other County stormwater program activities (e.g., illicit discharge enforcement), but the County’s stormwater management resources are typically not highly focused on these streams.

## Municipal Separate Storm Sewer System (MS4) Annual Report

Table 7. Impaired Waters in Knox County		
Waterbody Name	Cause of Impairment	Source of Impairment
<b>TIER 1 STREAMS</b>		
Little Turkey Creek	Loss of biological integrity due to siltation	Discharges from MS4 area
Grandview Branch	Escherichia coli	Discharges from MS4 area
High Bluff Branch	Escherichia coli	Discharges from MS4 area
Sinking Creek	Escherichia coli	Discharges from MS4 area
Ten Mile Creek (formerly called Sinking Creek)	Habitat loss due to alteration in streamside or littoral vegetative cover Loss of biological integrity due to siltation Escherichia coli	Discharges from MS4 area
Willow Fork	Alteration in stream-side or littoral vegetative cover Loss of biological integrity due to siltation Escherichia coli	Discharges from MS4 area
Cox Creek	Escherichia coli	Discharges from MS4 area
Hines Branch	Habitat loss due to other anthropogenic substrate alterations Escherichia coli	Discharges from MS4 area
Knob Fork	Loss of biological integrity due to siltation Habitat loss due to other anthropogenic substrate alterations Alteration in stream-side or littoral vegetative cover Escherichia coli	Discharges from MS4 area
Grassy Creek	Loss of biological integrity due to siltation Escherichia coli	Discharges from MS4 area
Meadow Creek	Escherichia coli	Discharges from MS4 area
Plum Creek	Escherichia coli	Discharges from MS4 area
<b>TIER 2 STREAMS</b>		
Grable Branch	Oil & Grease Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	Minor Industrial Point Source Channelization Industrial Permitted Runoff Discharges from MS4 area
Swanpond Creek	Loss of biological integrity due to siltation Alteration in stream-side or littoral vegetative cover Escherichia coli	Channelization Discharges from MS4 Area
Casteel Branch	Loss of biological integrity due to siltation	Pasture Grazing Discharges from MS4 area
Twin Branch	Habitat loss due to alteration in streamside or littoral vegetative cover Loss of biological integrity due to siltation	Pasture Grazing Discharges from MS4 area
McCall Branch	Loss of biological integrity due to siltation	Discharges from MS4 area Streambank Modification
Whites Creek	Other Anthropogenic Habitat Alterations Escherichia coli	Discharges from MS4 area Streambank Modification
Beaver Creek (segment 1000)	Phosphate Nitrates Escherichia coli Low Dissolved Oxygen Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	<u>Section 1000</u> Major Municipal Point Source Pasture Grazing Discharges from MS4 Area

## Municipal Separate Storm Sewer System (MS4) Annual Report

**Table 7. Impaired Waters in Knox County**

Waterbody Name	Cause of Impairment	Source of Impairment
Beaver Creek (segments 2000 and 3000)	<u>Section 2000 and 3000</u> Escherichia coli Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	<u>Section 2000 and 3000</u> Pasture Grazing Discharges from MS4 Area
Bullrun Creek	Escherichia coli Loss of biological integrity due to siltation Physical Substrate Habitat Alterations	Discharges from MS4 Area Pasture Grazing Channelization
Love Creek	Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations	Discharges from MS4 area (multiple MS4s)
<b>TIER 3 STREAMS</b>		
Roseberry Creek	Escherichia coli	Pasture Grazing Septic Tanks
Little Flat Creek	Escherichia coli	Animal Feeding Operations (NPS)
Flat Creek	Escherichia coli	Pasture Grazing Collection System Failure
Fort Loudon Reservoir (segment 1000)	PCBs	Contaminated Sediment
Fort Loudon Reservoir (segment 2000)	Mercury, PCBs	Atmospheric Deposition Contaminated Sediment
Roddy Branch	Alteration in stream-side or littoral vegetative cover Physical Substrate Habitat Alteration, Loss of biological integrity due to siltation Escherichia coli	Pasture Grazing Channelization
Stock Creek (Segments 1000 and 2000)	Escherichia coli	Pasture Grazing
Gun Hollow Branch	Escherichia coli	Pasture Grazing
East Fork Third Creek (Located within the City of Knoxville)	Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations Escherichia coli	Discharges from MS4 area Urbanized High Density Area Land Development Collection System Failure
Third Creek (Located within the City of Knoxville)	Nitrates Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations Escherichia coli	Discharges from MS4 area Urbanized High Density Area Land Development Collection System Failure
First Creek (Located within the City of Knoxville)	Nitrate + Nitrite Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations Escherichia coli	Discharges from MS4 area Urbanized High Density Area Collection System Failure
Second Creek (Located within the City of Knoxville)	Nitrate + Nitrite Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations Escherichia coli	Discharges from MS4 area Urbanized High Density Area Collection System Failure
Williams Creek (Located within the City of Knoxville)	Other Habitat Alterations Escherichia coli	Discharges from MS4 area Collection System Failure
Baker Creek (Located within the City of Knoxville)	Nitrate + Nitrite Other Habitat Alterations Escherichia coli	Discharges from MS4 area Collection System Failure

## Municipal Separate Storm Sewer System (MS4) Annual Report

**Table 7. Impaired Waters in Knox County**

Waterbody Name	Cause of Impairment	Source of Impairment
Goose Creek (Located within the City of Knoxville)	Loss of biological integrity due to siltation Other Anthropogenic Habitat Alterations PCBs Escherichia coli	Collection System Failure Discharges from MS4 area RCRA Hazardous Waste
Fourth Creek (Located within the City of Knoxville)	Physical Substrate Habitat Alterations Escherichia coli	Discharges from MS4 area Channelization
Melton Hill Reservoir	PCBs Chlordane	Contaminated Sediment
Williams Branch	Loss of biological integrity due to siltation	Industrial Permitted Runoff

# Municipal Separate Storm Sewer System (MS4) Annual Report

## Determination Letter from U.S. Fish and Wildlife Service



### United States Department of the Interior

FISH AND WILDLIFE SERVICE  
446 Neal Street  
Cookeville, TN 38501

August 19, 2013

Ms. Parci Gibson  
Knox County Stormwater Management  
205 West Baxter Avenue  
Knoxville, Tennessee 37917

Re: FWS #13-CPA-0635

Dear Ms. Gibson:

Thank you for your e-mail received July 8, 2013, regarding compliance with the Tennessee Department of Environment and Conservation (TDEC) Notice of Coverage annual reporting requirements for Knox County's MS4 permit (TNS075582) and stormwater management program in Knox County, Tennessee. U.S. Fish and Wildlife Service (Service) personnel have reviewed the 2012 Knox County Stormwater Management Plan, pertinent stormwater regulations, and the spatial data provided by your office.

Historic records for large-river federally endangered Unionid mussel species exist in Knox County. Most of these species have been extirpated from Knox County; however, the federally endangered pink mucket (*Lampsilis abrupta*), spectaclecase (*Cumberlandia monodonta*), and sheepnose (*Plethobasus cyphus*) may occur in suitable habitats within the jurisdictional boundaries of Knox County's stormwater management program. The federally threatened snail darter (*Percina tanasi*) may also occur in these medium to large river habitats. In 2007, the Service finalized regulations authorizing the establishment of non-essential experimental populations of 15 federally listed mussel, snail, and fish species in suitable habitats in the Douglas Dam tailwaters of the French Broad River (72 FR 52433-52461). The Service and its conservation partners also have an active reintroduction program for the lake sturgeon (*Acipenser fulvescens*) in the Lower French Broad River.

We appreciate the efforts of the Knox County's Stormwater Management Program in helping to ensure that the quantity and quality of stormwater discharges from development activities in upland areas protect water quality in the tributaries to the larger rivers which support these species. In view of this, we believe that adverse effects to federally listed species from activities carried out under that program are not anticipated.

Thank you for the opportunity to comment. If you have any questions, please contact Steve Alexander of my staff at 931/528-6481, ext. 210, or via e-mail at [steven\\_alexander@fws.gov](mailto:steven_alexander@fws.gov).

Sincerely,

Acting for Mary E. Jennings  
Field Supervisor

xc: Robert Karesh, TDEC, Nashville  
Karina Bynum, TDEC, Cookeville  
Jonathan Burr, TDEC, Knoxville

# Municipal Separate Storm Sewer System (MS4) Annual Report

## Adopt A Watershed Report: Knox County funds the AmeriCorps Water Quality Team 2012-2013

<p><b>Adopt-A-Watershed Hands-on Learning</b></p>	<ul style="list-style-type: none"> <li>• <b>1536 middle and high students</b> participated in Adopt-A-Watershed (AAW) water quality educational activities, each activity lasting between 60 – 90 minutes.</li> </ul>
<p><b>Adopt-A-Watershed Service Projects</b></p>	<ul style="list-style-type: none"> <li>• <b>1237 middle and high school students</b> completed AAW standards (a minimum of 10% increase in watershed knowledge based on pre/post testing and fully engaging in service) and were engaged in AAW projects that improved the health of and/or quality-of-living in our local watersheds.</li> <li>• <b>Watershed improvement projects</b> included: <ul style="list-style-type: none"> <li><b><u>Baker Creek Watershed</u></b> <b>South Doyle Middle</b> <ul style="list-style-type: none"> <li>• Mr. Dave Gorman's 7<sup>th</sup> grade Science Club installed 10 shrubs and tree identification signage in the Baker Creek riparian corridor and replanted a demonstration native plant butterfly garden located in their outdoor classroom.</li> </ul> </li> <li><b><u>Beaver Creek Watershed</u></b> <b>Halls High</b> <ul style="list-style-type: none"> <li>• Mr. Blankenship's fall Forestry class created a Halls Outdoor Classroom (HOC) Level 1 Arboretum brochure that provides tree identification and a map.</li> <li>• Mr. Blankenship's fall Horticulture Science assisted with the Knox Co. Soil Conservation District-sponsored <i>Native Grass-Root Box Display</i> that demonstrates the length of native grass roots. The class took the initial steps to germinate grass seeds and maintain them.</li> <li>• Mr. Blankenship's Fall Land and Turf class helped to create an overall plan for the HOC fence repair project that included developing a budget and materials list.</li> <li>• Mr. Blankenship's spring Greenhouse Management classes helped to complete the HOC trail maintenance project and planted and maintained the <i>Native Grass Root Box Display</i>.</li> <li>• Mr. McMurray's Construction Core class worked to replace and repair the HOC's entire perimeter fence (600 ft).</li> <li>• Mrs. Johnson's spring Environmental Chemistry Class performed <i>Household Hazardous Waste</i> audits of their homes and learned about and made alternative green-cleaning products. In addition, they educated their parents on proper waste disposal and obtained pledges from them to consider using alternative greener cleaner products in their homes and properly disposing of all hazardous waste products.</li> </ul> </li> </ul> </li> </ul>



# Municipal Separate Storm Sewer System (MS4) Annual Report

<p>Adopt-A-Watershed Service Projects</p>	<p><b>Karns High</b></p> <ul style="list-style-type: none"><li>• Mr. Doug Lakin's fall AP Environmental Science class continued the <i>Storm Drain Monitoring Initiative</i>, collecting 75 lbs of debris from the 17 storm drain inserts on campus and replacing missing creek curb markers. They also visited a farm in the Beaver Creek Watershed and assisted the landowner by removing 750 lbs of privet that was located in the Beaver Creek riparian corridor that traverses her property.</li><li>• Mrs. Katy Longmire's fall Marine Ecology class removed 800 lbs of privet within the riparian zone located on a landowner's farm in the Beaver Creek Watershed.</li><li>• Mrs. Katy Longmire's fall Ecology classes (2<sup>nd</sup> and 3<sup>rd</sup> period) cleared and built two planting beds for a demonstration native grass area. The students started switchgrass plugs to be installed in the garden areas, picked up trash and conducted general maintenance of their campus outdoor classroom.</li><li>• Mrs. Jill Shinlever's spring AP Environmental Science class continued the storm drain insert project and her class removed ~65 lbs of debris throughout the semester with help from Mrs. Longmire's Marine Ecology class. Her students also helped plant 250 seedlings at Mrs. Becky Teague's farm.</li><li>• Mrs. Katy Longmire's spring Marine Ecology class assisted with the storm drain insert project and the seedling planting at the farm.</li><li>• Mrs. Katy Longmire's spring Ecology class completed the switchgrass plot started in the fall and performed continuing maintenance of the outdoor classroom such as laying down grass seed on exposed dirt, removing trash and weeding.</li></ul> <p><b>Powell Middle</b></p> <ul style="list-style-type: none"><li>• Mr. Patrick Davis's 7<sup>th</sup> grade Science class learned about native plants, identified ones appropriate for rain gardens and assisted with their planting in the school's two rain gardens. The students also conducted an <i>Erosion Prevention Initiative</i>, applying 2,280 sq ft of erosion control matting on an eroding hill on campus.</li><li>• The afterschool <i>Rain Garden Club</i> conducting ongoing maintenance of the gardens and assisted with plantings.</li></ul> <p><b>Conner Creek Watershed</b></p> <p><b>Hardin Valley High</b></p> <ul style="list-style-type: none"><li>• Mr. Caleb Paquette's two fall semester Ecology classes installed creek curb markers on all on campus storm drains. The students also designed and painted two rain barrels to be sold for \$100 each for the outdoor classroom. Twenty posters containing information on storm water and pollutants were also made and hung around the school.</li><li>• Mr. Caleb Paquette's three spring semester Botany/Zoology classes identified most trees in the outdoor classroom. The students made 27 name stakes, installed them, and created an informational packet for a future arboretum. Students also participated in the HVA OC Kick-Off Celebration that included the removal of ~1500 lbs of privet.</li></ul>
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## Municipal Separate Storm Sewer System (MS4) Annual Report

- Mr. Michael Knapp's spring AP Environmental Science class assisted with the planning, advertising, and conducting the HVA spring Outdoor Classroom Kick-Off Celebration that included privet removal along Conner Creek and the repair of a footbridge.

### **First Creek Watershed**

#### **Central High**

- Mr. John Alexander's spring Wildlife Principles class kicked off a *Storm Drain Monitoring Initiative*, installing 15 storm drain inserts.

### **Love Creek Watershed**

#### **Holston Middle**

- Mr. Tom McMillan's 7<sup>th</sup> grade Science class participated in a *Riparian Zone Signage Competition*, with each student creating a sign that indicated the need to protect the riparian corridor and to call the COK Hotline for concerns. Two winners were selected and with the support of the COK Stormwater Program, the graphics were duplicated on 12" X 24" metal signs and were subsequently installed along Love Creek. The class also took additional steps to protect the riparian zone by installing a fence along its edge.

### **Stock Creek Watershed**

#### **South Doyle High**

- Mr. Joshua Cameron's fall semester Wildlife Management courses (1<sup>st</sup> & 3<sup>rd</sup> period) enhanced the wildlife habitat on school property by removing over 200 lbs of privet and starting switch grass plugs to add more native vegetation around campus.
- Mr. Joshua Cameron's spring Principles of Agriculture class grew switch grass and Brown-Eye Susans and then donated them to a newly installed rain garden at Austin-East High School.
- Mr. Joshua Cameron's spring Forestry class created displays on native trees and the traditional uses of the lumber Arbor Day Celebration at Marble Springs Historic site.
- Mr. Joshua Cameron's spring Plant and Soil Science class raised switchgrass plugs for the Austin-East rain garden and created displays for the Marble Spring's Arbor Day Celebration.
- Mrs Laura Neff's spring AP Environmental Science class conducted a feasibility study of installing rain gardens at three potential sites on campus. They then organized their findings into a presentation that was given to Stock Creek Watershed partners.

### **Ten Mile Creek Watershed**

#### **West Valley Middle (WVM)**

- Mrs. Jennifer Hayes, Mr. Dwayne Alexander and Mrs. Amy Lyttle built and painted 10 bird boxes, installing three of them; weeded and expanded the plantings in the rain garden; removed algal mats from the permanent pond; removed 600 lbs of privet and bush honeysuckle; created and installed five trail signs; created and installed 18 tree identification labels; removed temporary fabric that had been installed in the building of the rain garden; planted 36 perennials in the Outdoor Classroom; installed 10

# Municipal Separate Storm Sewer System (MS4) Annual Report

	<p>buckets (over hundred plugs) of star sedge in the rain garden; and glued eight storm drain labels on parking lot drains.</p> <ul style="list-style-type: none"> <li>• Mr. Anthony Hussey, Mrs. Laura Crowley, and Mrs. Christy Lewis' 7<sup>th</sup> grade Science classes dug out a clogged culvert, replaced rip rap with 5,200 lbs of river stone, removed algal mats, weeded the rain garden, installed 1 roll of erosion matting, and mulched trees on the WVM campus.</li> </ul> <p><b><u>Third Creek Watershed</u></b> <b>West High</b></p> <ul style="list-style-type: none"> <li>• Mrs. Owen's 2<sup>nd</sup> period Ecology class installed a native plant garden in front of previously-installed rain barrels in the West High Outdoor Classroom. The installation of the garden was videotaped and used in the development of a PSA to promote the use of rain barrels. The PSA is currently on the WQF Website and was used to advertise the WQF Rain Barrel Sale. It is also on the school's fusion page to educate students about rain barrels.</li> <li>• Ms. Nanney's Environmental Science class created a video to educate the public on the effects of excess nutrients in Third Creek. The students' script was loosely based on the concept of The Magical School Bus®, with the students taking the bus on an underwater trip through a nutrient-enriched creek. The film is now posted on Ms. Nanney's Fusion page.</li> </ul> <p><b><u>Williams Creek Watershed</u></b> <b>Austin East Magnet High</b></p> <ul style="list-style-type: none"> <li>• Ms. Headrick's fall Ecology classes competed in a <i>Rain Garden Poster Competition</i>, with the winning entries displayed at the Burlington Library.</li> <li>• Ms. Headrick's spring Ecology classes, in conjunction with UT's Every Child Outdoors Program, installed a rain garden in the Austin East courtyard. Students used plants that they grew in the greenhouse. In addition to the rain garden, a pervious patio using <i>Bodpave</i>® was installed by the students.</li> </ul>
<p>Development of School/Community Outdoor Classrooms</p>	<p><b>Halls Outdoor Classroom (HOC)</b></p> <ul style="list-style-type: none"> <li>• Worked with Mrs. Brooks' Special Needs class to weed and plant the quilt and other gardens</li> <li>• Worked to remove all of the geo-textile material from under the trails to begin the transition from mulched trails to mowed trails. This was done with the participants in the UT Center for Leadership program on the MLK Service Day; the Knox County Sheriff's Department's inmate crew; and Halls High students.</li> <li>• Removed over 650 lbs of invasive Callery Pears</li> <li>• Worked with the East TN Chapter of the American Society of Landscape Architects (ASLA) to host a charrette with students to develop an HOC master plan</li> <li>• Helped to prepare and conduct the <i>2013 Spring HOC Celebration</i> including marketing, coordinating logistics, preparing the site, and assisting with its implementation</li> <li>• Repaired 600' ft of perimeter fence. This was a coordinated effort among Mr. Blankenship and Mr. McMurray's classes with community and partner support</li> </ul>

## Municipal Separate Storm Sewer System (MS4) Annual Report

	<ul style="list-style-type: none"> <li>• Planned and conducted the 2013 HOC celebration involving about 250 community members and students. The HOC Committee took a lead role in coordinating with extensive support and participation by Beaver Creek Task Force partners and community members. In addition, the Halls High Ecology club managed the children's activities.</li> </ul> <p><b>West Valley Middle School Outdoor Classroom (WVM OC)</b></p> <ul style="list-style-type: none"> <li>• Coordinated a photography contest for the outdoor classroom fundraiser. Fifteen 8<sup>th</sup> grade classes took pictures around their campus and wrote a small writing portion pertaining to watershed health. The winning entries were displayed and used as a part of a silent auction.</li> <li>• Fundraised \$500.00 for supplies and development of the WVM OC.</li> </ul> <p><b>Hardin Valley Academy Outdoor Classroom (HVA OC)</b></p> <ul style="list-style-type: none"> <li>• Created the HVA OC Committee to meet regularly</li> <li>• Raised \$1,350 for development of the WVM OC</li> <li>• Removed over 2,500 lbs of invasive privet</li> <li>• Repaired Conner Creek walking bridge</li> <li>• Removed two beaver dams in Conner Creek</li> <li>• Identified and labeled 27 trees in outdoor classroom in preparation of attaining the Level 1 Arboretum status.</li> <li>• Hosted two community events (Martin Luther King Jr. Service Day and HVA OC Kick-Off Celebration) that were attend by over 100 people.</li> </ul>
<p><b>Knox Co. Blueways</b></p>	<ul style="list-style-type: none"> <li>• Assisted in removing beaver dams and 10 tons of debris along stretch of Beaver Creek that will be designated as a blueway</li> </ul>
<p><b>Rain Barrel Workshops</b></p>	<ul style="list-style-type: none"> <li>• Created a stormwater nonpoint source pollution demonstration to be used at workshops</li> <li>• Prepared over 150 barrels for the WQF's "Make it, Take it" Rain Barrel Workshops and assisted with their implementation</li> <li>• Promoted and assisted with the WQF Rain Barrel Truckload Sale</li> </ul>
<p><b>Adopt-A-Stream</b></p>	<ul style="list-style-type: none"> <li>• Assisted with four AAS group clean ups/stream assessments</li> <li>• Created program promotional flyer and sign</li> <li>• Delivered AAS Promotional Trash Displays throughout Knox County</li> <li>• Conducted outreach with nine environmentally friendly businesses</li> <li>• Conducted promotional presentation for Halls Business &amp; Professional Association</li> </ul>
<p><b>EarthFest</b></p>	<ul style="list-style-type: none"> <li>• Attended <i>Earthfest</i> Planning Committee meetings and served on the <i>Earthfest</i> Education Committee.</li> <li>• Assisting in developing and conducting the <i>Earthfest</i> Scavenger Hunt. Contacted <i>EarthFest</i> vendors and sponsors, collecting questions and educational facts from 47 organizations</li> <li>• Contacted businesses about prize donations and helped collect 30 prizes from local/regional businesses</li> </ul>

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<b>WaterFest</b>	<ul style="list-style-type: none"> <li>• Assisted with planning &amp; conducting <i>WaterFest</i>, with ~700 elementary school students participating</li> <li>• Coordinated with multiple schools for the Poetry &amp; Art contest – visited schools to educate about the topic</li> <li>• Coordinated volunteers for each event/station</li> <li>• Assisted with the Poetry &amp; Art contest judging</li> </ul>
<b>Stock Creek Initiative</b>	<ul style="list-style-type: none"> <li>• Participated in Stock Creek Watershed Education Committee</li> <li>• <b>Bonny Kate Elementary School Fun Night:</b> Conducted water quality educational activities with ~50 children. Adult outreach was conducted in conjunction with these activities including promoting the Stock Creek Septic Initiative.</li> </ul>
<b>Beaver Creek Initiative</b>	<ul style="list-style-type: none"> <li>• <b>Rain Gardens:</b> Maintained the Powell Station Park and the Powell Middle rain gardens</li> <li>• <b>Stream Restorations:</b> Assisted with restoring a section of Beaver Creek in the Halls Community Park including creating riffles, planting trees, and removing invasive plants</li> <li>• <b>Mill Run Restoration:</b> Helped coordinate ~35 volunteers to perform repairs from flood damage of a recently restored section of Beaver Creek</li> <li>• <b>Cistern Installation:</b> Helped to plan and coordinate the installation of the Halls High Greenhouse cistern that can hold 1500 gallons of water and is estimated to annually collect and reuse 36,000 gallons of rainwater.</li> </ul>
<b>River Rescue</b>	<ul style="list-style-type: none"> <li>• Assessed 10 creek cleanup sites</li> <li>• Prepared and organized supplies for all sites</li> <li>• Captained and coordinated volunteers at four creek sites</li> </ul>
<b>Stream Monitoring</b>	<ul style="list-style-type: none"> <li>• Conducted ~120 hours of monitoring</li> <li>• Assessed six watersheds</li> <li>• Assisted TDEC in fish and benthic monitoring</li> </ul>

# Municipal Separate Storm Sewer System (MS4) Annual Report

## Knox County Stormwater Staff Education/Outreach Activities

Tracking of Knox County's stormwater education, outreach, involvement and participation activities

July 1, 2012-June 30,2013

7/19/2012	<b>Speaking Engagement:</b> Landscapers/Chemical Applicators	spoke to 35 landscapers about water quality and BMPs that can be employed to reduce pollution contribution. Did this in combination with UT Extension. This is part of the PIE plan.
8/20/2012	<b>Speaking Engagement:</b> Tate's School of Discovery	using the Enviroscape, I spoke to 27 4th & 5th grade students about non-point source pollution and water pollution BMPs.
8/23/2012	<b>Staff Training:</b> Pave Drain Seminar	11 employees attended
9/6/2012	<b>AAS Training:</b> Water and Civilization Class UTK	39 students attended the training
9/17/2012	<b>AAS Training:</b> Water and Civilization Class UTK	36 students attended the training
9/18/2012	<b>Staff Training:</b> UTK Watershed Symposium	4 employees attended
9/18/2012	<b>Staff Training:</b> Bioretention webcast	13 employees attended
9/18/2012	<b>Speaking Engagement:</b> 2012 TRPA Conference	Spoke to 20 people about Stormwater Best Management Practices for Parks
9/26/2012	<b>Annual Report Hearing</b>	4 people attended
9/27/2012	<b>Staff Training:</b> Water Quality vs. Water Quantity webcast	14 employees attended
9/29/2012	<b>TYN</b>	7 people at Three Rivers Market
10/4/2012	<b>Speaking Engagement: Perfect Water</b>	talked with 9 employees about new stormwater infiltration requirements and how rain water harvesting can be incorporated into meeting those requirements.
10/6/2012	<b>TYN</b>	7 people at Three Rivers Market
10/11/2012	<b>Speaking Engagement: Internal Auditors</b>	46 people attended a presentation about new stormwater regulations and what it means for businesses
10/13/2012	<b>TYN</b>	7 people at Three Rivers Market
10/18-19/2012	<b>Staff Training: SESWA Annual Conference</b>	6 employees attended
11/2/2012	<b>AAS Cleanup: Asset Planning Corp</b>	450 pounds of trash removed and stream assessment performed
11/13/2012	<b>TYN</b>	7 people at Three Rivers Market

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11/16/2012	<b>Speaking Engagement:</b> US Green Building Council	60 people attended the panel discussion about new stormwater infiltration requirements and the QLP program
12/5/2012	<b>Staff Training:</b> Oil Eating Bacteria Demonstration	6 employees attended
12/5/2012	<b>Staff Training:</b> Terraseeding Seminar	8 employees attended
12/6-7/2012	<b>Staff Training:</b> LID workshop at Amec	5 employees attended
12/11/2012	<b>Speaking Engagement:</b> American Society of Civil Engineers	55 people attended the presentation about the establishment of the QLP in Knox County
12/18/2013	<b>Staff Training:</b> TDEC Level I recertification course	11 employees attended
12/19/2012	<b>Workshop:</b> Sub-Contractor Education	74 sub contractors attended a 30-minute educational session at the new Carter Elementary School on Strawberry Plains Pike.
1/23/2013	<b>Staff Training:</b> Stormwater Infrastructure Asset Management Webinar	7 employees attended
1/24/2013	<b>Staff Training:</b> IDDE Employee Training Video and Test	19 employees attended
2/14-15/2013	<b>Staff Training:</b> TNSA, City of Knoxville/Knox County Development Symposium	15 employees attended
2/14-15/2013	<b>Workshop:</b> TNSA, City of Knoxville/Knox County Development Symposium	250 engineers, landscape architects, developers, etc. attended this symposium. The symposium was put together by the City of Knoxville and Knox County stormwater staff and had the goal of educating the attendees on LID and the new 1" runoff reduction requirements for MS4's. It was a requirement and a deliverable in the PIE plan.
2/15-17/2013	<b>Exhibit:</b> Dogwood House and Garden Show booth	55 people stopped by the booth to chat about stormwater pollution prevention and drainage
2/25/2013	<b>Speaking Engagement:</b> TCDEA presentation on site level infiltration practices and rain barrels	45 Soil Conservation District employees, NRCS employees and soil board members from across the state watched the presentation.
2/26/2013	<b>Staff Training:</b> Why Watersheds ppt viewing assignment	5 employees watched and turned in assignment

## Municipal Separate Storm Sewer System (MS4) Annual Report

3/13/2013	<b>Speaking Engagement:</b> East TN Building Officials Association	23 members attended a presentation on 1" stormwater reduction rule in NPDES permit and site level LID that can help accomplish that.
3/14/2013	<b>Staff Training:</b> QLP Training	18 employees were trained on QLP implementation at Knox County
3/16/2013	<b>AAS Clean up:</b> Sweet B's	8 citizens did a Stream Assessment and picked up 100 pounds of trash in the Beaver Creek Watershed.
3/23/2013	<b>Speaking Engagement:</b> City of Knoxville, Knox County neighborhood conference.	75-minute presentation on the 9-principles of a Tennessee Friendly yard to 20 citizens. Discussed how stormwater becomes polluted from a typical yard.
4/20/2013	<b>Festival:</b> Earth Fest	KCSWM had a booth at the event highlighting the most common pollutants coming from a typical yard. Staff talked with about 45 people on the subject. In addition, staff dressed up as enviro-characters and asked questions of about 50 people and chatted with them about impacts of sediment on a creek
4/26/2013	<b>AAS Clean up:</b> TCA-4H	10 kids and adults participated in a stream clean up in the Beaver Creek watershed. 130 pounds of trash was removed.
4/26/2013	<b>AAS Clean up:</b> Asset Planning Corp	7 citizens participated in a stream clean up in the Ten Mile Creek watershed. 200 pounds of trash was removed.
4/27/2013	<b>Workshop:</b> Rain Barrel W/S at Ijams Nature Center	51 citizens made 47 rain barrels. In addition, there was a one hour educational session on stormwater pollution and prevention.
5/3/2013	<b>Festival:</b> WaterFest	KCSWM staff created and ran a NPS pollution walkable enviroscape. About 400 elementary students learned about how various landuses pollute water and steps kids can take to help reduce pollution.
5/7/2013	<b>Festival:</b> Farm City Day	300 elementary students were introduced to non-point source pollution through the enviroscape. They learned about typical pollutants that come off of the following landuses: farm, neighborhood, construction and commercial. They also learned about actions they can take at home to reduce pollution contribution.
5/11/2013	<b>Workshop:</b> Rain Barrel W/S at UT Gardens	25 citizens made 22 rain barrels. In addition, an educational session about stormwater pollution was presented.
5/20/2013	<b>Speaking Engagement:</b> West Hills Elementary School	120 first graders were introduced to non-point source pollution through the enviroscape. They learned about typical pollutants that come off of the following landuses: farm, neighborhood, construction and commercial. They also learned about actions they can take at home to reduce pollution contribution.
5/20/2013	<b>Workshop:</b> Rain Barrel w/s with Brownie Troop	6 rain barrels
6/1/2013	<b>Workshop:</b> Rain Barrel w/s at New Harvest Park	39 rain barrels were made by 42 people. In addition, an educational session about stormwater pollution was presented.
6/1/2013	<b>AAS Clean up:</b> SDNA, inc	5 citizens did a stream assessment and picked up 10 pounds of trash
6/15/2013	<b>Rain Barrel/Compost Bin Truckload Sale at Chilhowee Park</b>	Sold 263 rain barrels at this one day event organized by Knox County Stormwater Management. Sold 36 compost bins.
6/19/2013	<b>Ed/Outreach with UT Garden Camp</b>	used the sediment survival game to teach 60 students about sediment in our waterways
6/22/2013	<b>Families in the Creek</b>	40 children and adults attended an all day event at Halls Community Park. The group was divided into four rotating teams that completed a fish assessment, benthic assessment, stream walk and a land use scavenger hunt.





Tennessee Department of Environment and Conservation  
 Division of Water Resources  
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**Municipal Separate Storm Sewer System (MS4) Annual Report**

KNOX COUNTY

STORMWATER MANAGEMENT PLAN

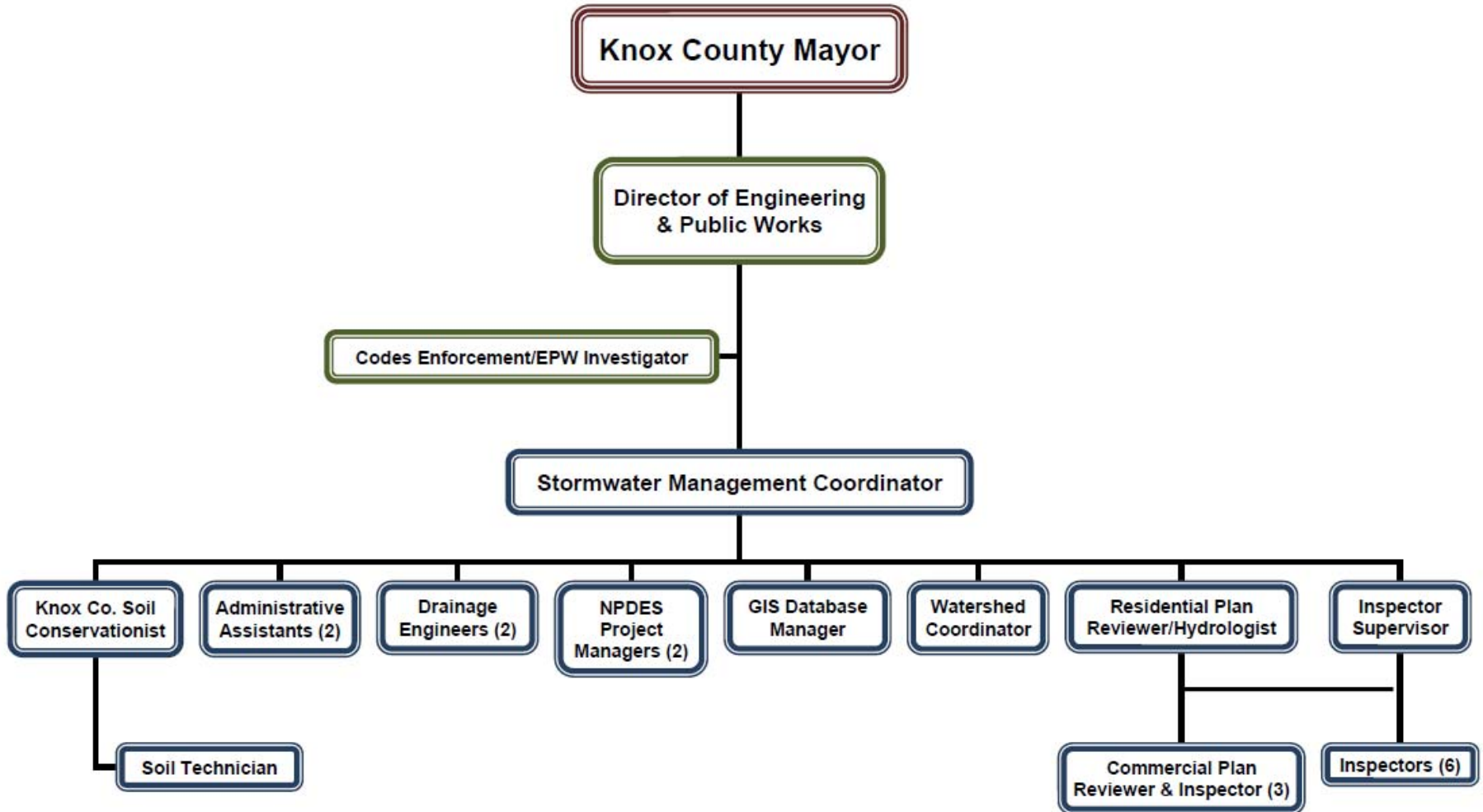


Figure 9. 2012 Organization Chart – Knox County Stormwater Management Division