GSWCC Trainer Recertification
March 29, 2018
AGENDA
Trainer Recertification
March 29, 2018

7:00-8:00  Registration – UGA Center Registration Desk

8:15      Welcome – Mahler Hall

8:30-9:15 NPDES Construction Stormwater General Permits Reissuance Updates;
           Michael Berry, EPD – Mahler Hall
           BMP Updates in the 2016 Manual for Erosion and Sediment Control; Ben
           Ruzowicz, GSWCC – Mahler Hall

9:15-9:45 Break with Demonstration – Hill Atrium & Area Outside Hill Atrium

<table>
<thead>
<tr>
<th>RED GROUP</th>
<th>ORANGE GROUP</th>
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<tr>
<td><strong>10:00 - 11:00</strong></td>
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<tr>
<td>Session 1</td>
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<tr>
<td>Trainer Information</td>
<td>GEOS</td>
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<td>Room E</td>
<td>Room R</td>
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| **11:00 - 12:00** |                    |
| Session 2         |                    |
| GEOS              | Trainer Information|
| Room R            | Room E             |

| **12:00 – 1:00**  |                    |
|                  | LUNCH              |
|                  | Hill Atrium        |

| **1:00 – 2:00**   |                    |
| Session 3         |                    |
| Organic Amendments| Green Infrastructure|
| Room YZ           | Room FG            |

| **2:00 – 3:00**   |                    |
| Session 4         |                    |
| Green Infrastructure| Vendor Area      |
| Room FG           | Mahler Hall & Hill Atrium |

| **3:00 – 3:30**   |                    |
|                  | BREAK with Demo    |
|                  | Hill Atrium & Area Outside Hill Atrium |

| **3:30 – 4:30**   |                    |
| Session 5         |                    |
| Vendor Area       | Mitigation Management|
| Mahler Hall       | Room J             |

| **4:30 – 4:45**   |                    |
|                  | CLOSING            |
|                  | Mahler Hall        |
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Trainer Responsibilities
Trainer Responsibilities

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Overview of Policies & Procedures

- Scheduling and Holding Certification and Recertification Courses
- After the Course
- Citizenship Paperwork
- Third Party or Trainer Developed Courses
- FAQ
- Trainer Audits

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Scheduling a Course

The following applies to Initial Courses as well as Recertification Courses:

- The approved trainer must notify the GSWCC of the scheduled course at least 15 days prior to the date of the course
- Trainers are required to use the electronic form entitled “Notification of Scheduled Education & Certification Courses for Approved Trainers”
- The following information must be provided
  - Course Name
  - Course Date
  - Maximum # of Attendees
  - Course Location
  - Contact Information

The completed form (Excel Spreadsheet) should be filled out and submitted electronically to gaswcc.certification@gaswcc.ga.gov

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Scheduling a Course

- Courses will be posted on the GSWCC website
- It is the responsibility of the trainer to check the website within 3 days of submittal of the course notification form to verify that the course has been posted
- If the course is not posted on the website, it is not in the system and exams will not be sent
During the Course

- Use approved PowerPoint presentations
- Provide course notebooks and #2 pencils
- Follow the course agenda provided in notebook
- Use “Exam Procedures” PowerPoint to ensure that all participants correctly understand how to complete the Application and Scantron forms

During the Exam

- Trainers are prohibited from:
  - Providing answers to or discussing exam questions
  - Reading the exam questions aloud
  - Altering score sheets
  - Allowing group testing

Initial Course Reminders

LOOK over exam materials turned in by course participants!
- Is DOB correct? (did they use 2018 as the year of birth?)
- Did participant bubble in an Exam Version?
- Is name listed correctly under “first” and “last” on the Scantron form
- Is the information on the application form legible? Did participant fill in full address (many people leave out City & Zip)
Recertification Course Reminders

- Double check the Scantron Roster form before submitting to GSWCC
  - Trainer ID
  - Course # (found on GSWCC website)
  - Date
  - Student ID number must be written and bubbled in on the form.
*Regardless of whether the trainer or the students fill out the form – DOUBLE CHECK to make sure all ID numbers are correct!!

DON’T FORGET CHANGE OF ADDRESS FORMS!!

Recertification FAQ

Q: Can I combine a GSWCC Level 1A & GSWCC Level 1B recertification course, so that each level can attend the course?
A: No, individuals with a Level 1A certification need to take a Level 1A recertification course AND individuals with a Level 1B certification need to take a Level 1B recertification course.

Q: May an individual sit through 4 hours of a certification course to receive recertification credit?
A: No, individuals seeking recertification credit must take a recertification course. GSWCC will not award recertification credit if an individual attends a full certification course.

Q: What recertification course does an individual with a Subcontractor certification need to take?
A: There is not a recertification course for a Subcontractor certification. Individuals with a Subcontractor certification must retake the Subcontractor Awareness seminar every 3 years.

Returning Exam Packages

- Exam Packages & Class Registration List must be sent with a tracking method such as UPS/FedEx/Certified Mail USPS
- The trainer may drop off the exam package at the GSWCC office in Athens, GA
- All Exam Packages must be postmarked or delivered within 48 hours of exam
Canceled Certification Course

• If a certification course is canceled, and the trainer has already received the exam packet, those exams must be sent back to GSWCC within 48 hours of the course being canceled
• Exams may not be held and used for another course
• If a trainer submits completed exams from a canceled course, the exams will not be scored

Canceled Recertification Course

• If a recertification course is canceled, the canceled course code cannot be used for another recertification course
• GSWCC will not accept recertification rosters from an unscheduled course

Citizenship Documentation

O.C.G.A. 50-36-1: Must verify the legal immigration status of any person 18 years or older who applies for state or local public benefits as defined in federal law under 8 U.S.C. Section 1621

As of July 2, 2013, U.S. citizens and legal residents only **HAVE TO SUBMIT DOCUMENTATION ONCE.** All Qualified Aliens will have to submit the documentation for each course they attend

Most participants in recertification courses have submitted documentation. However, trainers should double check the paperwork status on the GSWCC website
Citizenship Documentation

- All citizenship forms are available at [www.gswwc.georgia.gov](http://www.gswwc.georgia.gov) under “Documents” as well as on the Education and Certification page.
- Trainers should have forms available if someone forgets to bring theirs.
- Trainers should remind the applicants of the requirements when they register for the course.
- Trainers are to collect from the applicant:
  - The checklist
  - The appropriate affidavit
    - Make sure the affidavit is notarized
  - A legible photocopy of secure and verifiable form of ID

Required Documentation

(1) GSWCC Checklist for Verification of Lawful Presence Within the United States
Required Documentation

(2) Affidavit

- Legal U.S. Citizen
- Legal Permanent Resident
- Qualified Alien or Non-immigrant under the federal Immigration & Nationality Act

The affidavit must be notarized by a Notary Public

Required Documentation

• A legible photocopy of at least one secure and verifiable document must accompany the affidavit that is being submitted by an applicant. A “secure and verifiable document” is defined in O.C.G.A. § 50-36-2

Secure & Verifiable Documents

• Secure & Verifiable Documents include, but are not limited to:
  - State/Government issued Drivers License, ID Card
  - Military ID
  - Passport issued by US or foreign government
  - Certificate of Citizenship or Naturalization

• The Office of the Attorney General of the State of Georgia created a catch-all in the list of Secure & Verifiable documents requiring acceptance of documents for proof of or documentation of identity if so required by federal law

• Such documents are deemed “Secure & Verifiable Documents” by the Attorney General of the State of Georgia
Third Party or Trainer Developed Courses

- GSWCC will allow a GSWCC-approved Trainer to develop a training course that may be used to satisfy continuing education requirements.
- All 3rd party courses must be taught by a GSWCC-approved Trainer.
- Only the approved trainers listed on the application will be allowed to teach the course.
- Applications for a 3rd party course must be completed and submitted at least 45 days prior to the commencement of the course.
- All applications are processed in the order in which they are received.

Third Party or Trainer Developed Courses

- Those trainers that are interested in developing a recertification course must submit an Application for Continuing Education Course Approval.
- Available at [www.gaswcc.georgia.gov](http://www.gaswcc.georgia.gov).

Third Party or Trainer Developed Courses

- Applications will be evaluated on the basis of subject matter presented and time devoted to the topic(s).
- Discussions relating to all aspect of erosion and sediment control and land disturbing activities may be considered for approval of credit hours.

Examples

- Monitoring/Sampling
- NPDES General Permits
- BMP Installation
- Structural & Vegetative BMPs
- ES&PC Plans
- Site Inspections
Third Party or Trainer Developed Courses

- The GSWCC Education & Certification Program will
  - Review the course outline and the instructor’s qualifications and assign the appropriate credit hours
  - Education credit hour(s) will be assigned on a basis of 1.0 credit per hour of actual course instruction time with a maximum of 4.0 credit hours
  - Assign a course name/code that will be specific to that course
    - Examples of topics that will not be considered for credit include:
      - Business Management
      - Marketing Techniques
      - Public Relations
      - Sales Presentations

Trainer Course Audits

- Periodically GSWCC will arrive unannounced to audit a course:
  - A GSWCC representative will introduce themselves and observe the trainer and the course
  - If any violations are found, a formal report will be written. A copy will be sent to the trainer and placed in his/her trainer file.

- If the GSWCC attempts to audit a course, and the course is not being held at the specified location and the trainer did not notify the GSWCC before the course, the course will be canceled and the exams will not be accepted

  - This applies to both open and closed courses
Replacement Cards

• Individuals must submit a written request for a replacement card along with a self addressed stamped envelope to:
  GSWCC
  4310 Lexington Rd
  Athens, GA 30605
• No charge for replacements

Questions??

GSWCC
Urban Program
4310 Lexington Rd.
Athens, GA 30605
(706) 552-4474
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Getting Started in GEOS
Back of Tab
Getting Started in GEOS

Presented by Jessica Jones, Licensing Technician, NE District Office, Georgia EPD
E&S Day at UGA March 29, 2018

INTRODUCTION

• GEOS – Georgia EPD Online System
• How to get there
  • epd.georgia.gov
  • “GEOS Guidance”
• What to do before creating a submittal
  • Responsible Official (RO) vs Preparer
  • If you are a Preparer, RO must create an account in GEOS as well
• Create your account
  • “Storm Water Construction”

IMPORTANT POINTS

• 50+ Acres
• Submittal ID
• 14-day Clock
• RO vs Preparer
• Track Submittals
• Edit Pending
  • If it was not submitted, it will not receive coverage
• Submittal receipt
• LIAs
ADDITIONAL FUNCTIONS

- Public Portal
- Sampling Reports
- Manage Certification
  - Modify/Terminate/Reissue Coverage
- Contact EPD
- LIA Map
- Manage Consultants/Preparers
  - Delete/Add/Associate to Facilities
- Older Submittals

WHAT HAPPENS NEXT

- Partial vs Complete Submittal
- GEOS Automated Emails
- Agency Review
  - Location Map
  - ES&PC Plans when applicable
  - Fees when applicable

RESOURCES

- District Offices
  - 7 office locations
- EPD Website
- GEOS Site
- Instructions
- Submittal video
- Training
Insert Yellow Sheet
Back of Yellow Sheet
Resources

Websites:

EPD Website
https://epd.georgia.gov/

GEOS Log In Page
https://geos.epd.georgia.gov/GA/GEOS/Public/GovEnt/Shared/Pages/Main/Login.aspx

District Offices:

Coastal District - Brunswick Office
400 Commerce Center Drive
Brunswick, GA 31523-8251
(912) 264-7284

East Central District – Augusta Office
3525 Walton Way Extension
Augusta, GA 30909-1821
(706) 667-4343

Mountain District - Cartersville Office
P.O. Box 3250
Cartersville, GA 30120-1705
(770) 387-4900

Mountain District - Atlanta Satellite
4244 International Parkway, Suite 114
Atlanta, GA 30354-3906
(404) 362-2671

Northeast District – Athens Office
745 Gaines School Road
Athens, GA 30605-3129
(706) 369-6376

West Central District - Macon Office
2640 Shurling Drive
Macon, GA 31211-3576
(478) 751-6612

Southwest District – Albany Office
2024 Newton Road
Albany, GA 31701-3576
(229) 430-4144
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Why Green Infrastructure & Why Now?
Why Green Infrastructure

WHY NOW?!

WHY “GREEN INFRASTRUCTURE”
1) POPULATION & GROWTH
2) WATERSHED SIZE
3) IMPERVIOUS SURFACES
   • Pollutant Load
   • SW Volume
   • SW Velocity
4) GEORGIA RAINFALL
   (compared to other states)
5) GEORGIA AQUATIC HABITAT
   (unique in all the world)
6) A GI PERSPECTIVE
   • QUALITY OF LIFE
   • MS4 NPDES PERMITS
   • MGNWPD
   • GSWMA “The BLUE BOOK”

1

POPULATION & GROWTH
The World
300 years ago

Growth Rate
2.5 per Second
216,000 per Day
8,501,000 per Month
78,019,200 per Year

The World
Today

Our World is Growing
Really Fast!

www.npdestraining.com
678-469-5120
POPULATION EXPLOSION
in already
STRESSED WATERSHEDS

GEORGIA
~10.5 Million

ATLANTA Metro
~ 6.5

Metro Atlanta's
Growing Really Fast

3

IMPERVIOUS SURFACES
Common problems or pollutants in urban stormwater

- Increased water Volume & Velocity
- Sediment
- Nutrients
- Pathogens (dog & wildlife feces)
- Heavy Metals
- Oils & Greases
- Heat
- Trash

IMPERVIOUS SURFACES and the Hydrologic Cycle
Training that helps it all make sense

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Training that helps it all make sense

**SUWANEE CREEK**

**IMPERVIOUS SURFACEs**

**STREAMBANK EROSION**

1958 - ~38,000 people

**Urban Creeks & Rivers**

Overwhelmed by Increased Volume & Velocity

**SEDIMENT**

Sediment Clouds the Water & Covers the Bottom of Streams, Rivers & Lakes, which Reduces Dissolved Oxygen for Aquatic Habitat

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Sediment reduces drinking water storage volume.

Algae from nitrates and phosphates (fertilizers) depletes dissolved oxygen, causes algae blooms and increased mosquito populations.

Algal blooms

Bulldozers have been placed on the shores to remove the surging population of algae from here. Pictures of the green shades of water are available on internet.

I Wish......

Pathogens
HEAVY METALS
Streets, Parking Lots & Roofs

The primary source of many metals in urban runoff is vehicle traffic. Copper, lead, and cadmium appear to be directly correlated to traffic intensity on surfaces such as highways, streets, and parking lots. Runoff originated in roofs is also a significant source of copper, and cadmium.

PAHs in urban sources

All concentrations in mg/kg (means of as many as 6 studies)

- Fresh asphalt: 1.5
- Weathered asphalt: 3
- Fresh motor oil: 150
- Brake particles: 370
- Road dust: 440

Pavement Sealcoat

- Asphalt Based: ~50
- Coal-tar-based: ~70,000

US Geological Survey
GEORGIA RAINFALL
(compared to other states)

STATE DIFFERENCES in Population Growth & Precipitation

<table>
<thead>
<tr>
<th>STATE</th>
<th>~2016 POP</th>
<th>PEOPLE/SQ MILE</th>
<th>ANNUAL PRECIPITATION</th>
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<tbody>
<tr>
<td>AZ</td>
<td>6.7 Million</td>
<td>56.3</td>
<td>13.6</td>
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<tr>
<td>CA</td>
<td>38.9 Million</td>
<td>2391</td>
<td>32.2</td>
</tr>
<tr>
<td>GA</td>
<td>10.5 Million</td>
<td>168.4</td>
<td>50.6</td>
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<tr>
<td>IN</td>
<td>6.6 Million</td>
<td>184</td>
<td>40.6</td>
</tr>
<tr>
<td>MO</td>
<td>6.1 Million</td>
<td>87.1</td>
<td>46.9</td>
</tr>
<tr>
<td>NV</td>
<td>2.9 Million</td>
<td>26.7</td>
<td>14.3</td>
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</tbody>
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The US population by 2050 is estimated to be 439 million
(up from ~326 million today)
GEORGIA AQUATIC HABITAT
(Unique in all the World)

The Change in Temperature from Hot Hardened Surfaces Decreasing the Oxygen Supply and Natural Ecosystem Composition

THERMAL POLLUTION
Urban Runoff

AQUATIC HABITAT
They can swim in it, they just can't live in it!
Training that helps It all make sense

[Image of SEDIMENT & Turbidity]

Fig. 1. Comparison of the mean number of food items consumed by Cootes Paradise (shaded bars) and Rice Lake (open bars) juvenile largemouth bass during 1-h feeding trials across four levels of turbidity. Vertical bars represent ± 1 SE.

[Image of RELATIONAL INDICATORS OF FRESHWATER FISH ACTIVITY TO TURBIDITY VALUES AND TIME]

[Image of FISH REPRODUCTION]

Eggs from Salmon, Steelhead, Striped Bass, American Shad and Trout are very susceptible to sediment pollution.

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On June 2, 1932 George W Perry caught the world-record Largemouth Bass at Telfair County, Georgia. Montgomery Lake is now silted-in and void of fish.

SEVERE SEDIMENTATION
Exterminated Native Fisheries

A GI PERSPECTIVE

Green Infrastructure is a Realization that Urban Parks Are Nice, But Not Enough

“No single park will provide people with all the beneficial influences of nature.”
Frederick Law Olmsted, Designer of Central Park

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“Green space is not an amenity, it’s a necessity”
Mark Benedict & Ed McMahon, 2006

Green Infrastructure was first defined in 1999 by the USDA Forest Service & Conservation Fund, as “our Nation’s Natural Life Support System, and is…….”

“……nothing more than allowing mother nature to improve on man’s best effort of creating aesthetically pleasing natural environments within a city (a park), so that it also links the life sustaining qualities of clean air, land and water into our everyday urban lives.”
T. Luke Owen, NPDES Training Institute

The Interconnected Networks of Green Infrastructure

HUB
- Small Town
- Recreation Area
- Camp Ground
- Bike Park
- Skateboard Park
- City Park
- Metro Park

LINK
- River Corridor
- Trail Along a Landscaped Roadway
- Rail Trail

SITE
(a combination of development & habitat)
- Shopping Centers
- Schools
- Sensitive Habitat Areas
- Greenways
- Some will not have Trails
The Interconnected Networks of Green Infrastructure

Enables the area to better:
1) Carry and filter stormwater runoff
2) Remove pollutants from the air, and
3) Support diverse plant & wildlife species

Green Infrastructure is....... a form of Biomimicry, to mimic natural life support systems as human population grows
GSWMM (Blue Book)
Performance Standards

Runoff Reduction
Runoff reduction practices should be sized and designed to retain the first 1.0 inch of rainfall on the site to the maximum extent practicable.

Water Quality
Stormwater management systems should be designed to retain or treat the runoff from 80% of the storms that occur in an average year (1.2 inches) and reduce average annual post-development total suspended solid loadings by 80%.

GSWMM Performance Standards
GSWMM WATER QUALITY PERFORMANCE STANDARDS

An 80% removal rate for the 1.2 inch rainfall event is the standard for addressing water quality in the GSWMM. Therefore 100 TSS removal through volume reduction of the 1.0 inch rainfall event will address the same requirement. In another method of describing total TSS removal, 80% of 1.2 inches equals (0.96) approximately equates to 100% of 1.0 inches.

Georgia MS4 NPDES Phase II General Permits

4.2.5.1 Stormwater Design Manual
The permittee must implement either
1. The appropriate part of the latest version of the Georgia Stormwater Management Manual (GSWMM)
2. An equivalent or more stringent local design manual.
For those permittees located in the 11-county coastal management program service area (Bryan, Brantley, Camden, Charlton, Chatham, Effingham, Glynn, Liberty, Long, McIntosh, and Wayne), the adopted manual must include the applicable parts of the Coastal Stormwater Supplement (CSS) to the GSWMM, specifically the performance standards.

All permittees must implement the GSWMM and/or CSS to the maximum extent practicable. For new permittees, the adoption of either
1. The GSWMM, or
2. A local design manual, and/or
3. The CSS must be completed within one year of designation.
Documentation of the design manual adoption must be provided to EPD with that year’s annual report. Implementation must begin upon adoption.
Benefits of Green Infrastructure - Stormwater

**Traditional Infrastructure**
- Stormdrain
- Impermeable Surface (Asphalt)

**Green Infrastructure**
- Bioretention
- Permeable Surface Pavers
- Curb Cut
- Domed Landscape

Benefits of Green Infrastructure

**Stormwater Management from Gray to Green**

GSWCC Erosion Control Day

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People value neighborhoods based on Smart Growth principles. A majority of consumers want single-family detached homes in a pedestrian-friendly community that has shopping within walking distance. NAR/NAHB survey.

Key Concepts:

- In its purest form, GI
- Provides interconnected Hubs, Links & Sites
- Shapes the urban form & provides a framework for growth
- Encourages natural systems in urban environments
- Moves GI from "nice" to have to a "must" have
- Promotes and supports conservation action
REALTORS® Go Green

REALTORS® Go Green

(Sept. 4, 2016) In response to growing consumer demand for GREEN HOMES & BUILDING PRACTICES, the National Association of Realtors® has introduced a new Green designation for Realtors.

Excerpted from the APA Elements of Smart Growth

A study conducted by the National Association of Realtors® – On Common Ground: Realtors & Smart Growth – showed that:

57% of Americans who live near green space are more likely to purchase a home near green space, and

50% are willing to pay 10% more for their home.

BENEFITS of Green Infrastructure

- Stormwater Management Improvements
- Air Quality Improvement
- Microclimate Modification
- Enriched Habitat and Biodiversity
- Localized Economic Improvement
- Recreational & Transportation Opportunities

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Benefits of Green Infrastructure

Urban Forest

Wildlife Habitat

Watershed Corridors for People and Nature

Enriched Habitat & Biodiversity

A variety of birds & animals indicates a healthy environment

Wildlife move along rivers and streams

Health of habitats depends on size and connectivity
Training that helps it all make sense

Green Infrastructure Examples
- Rain Gardens
- Stormwater Planters
- Dry wells
- Rainwater Harvesting
- Bioretention
- Infiltration Practices
- Dry Swales
- Grass Channels

Green Infrastructure Examples
- Soil Restoration
- Site Reforestation
- Green Roofs
- Permeable Pavements
- Undisturbed Pervious Areas (Green Space)
- Vegetated Filter Strips
- Downspout Disconnection

NOW WHAT?

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THE GI JOURNEY
Step by Step

1) COMMIT 100% to Green Infrastructure
   - Convince Yourself First!
     - Learn about your community’s Air/Water/Land challenges and benefits of GI
     - Grow - Gain Membership in Active Stormwater Organizations
2) SEEK ADVICE from other GI Experts with your issues
   - Establish/Create your SOP & Tool Box
3) SET UP GI Task Force from your Stakeholders
   - Determine Your Urban Environmental Problems
   - Determine Areas to Focus GI Efforts
   - Determine your GI Goals
   - Determine GI BMPs to accomplish your goals & be flexible
4) Document Your GI Success Stories & Lessons Learned
5) Communicate with Stakeholders Along the Way
6) Share Your Story with Other Municipalities

Implementing
Green Infrastructure
is worth it!

- Triple Bottom Line
  - Economic benefits
  - Social benefits
  - Environmental benefits
- Leads to Sustainable Development

MS4 STORMWATER
EFFORTS MATTER!

“THEY ARE THE GATEWAY
TO AMERICA’S FUTURE
QUALITY OF LIFE”
In SUMMARY

Ten Principles of Green Infrastructure

taken from Green Infrastructure: Linking Landscape & Communities by Mark Benedict and Edward McMahon, 2006

1) Connectivity is key
2) Context matters
3) Grounded in science and land use theory & practice
4) Functions as a framework
5) Planned and protected before development
6) A critical public investment
7) Benefits nature and people (for generations)
8) Respects landowners and other stakeholders
9) Requires connections within and beyond the community
10) Requires long term planning & maintenance
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Organic Amendment Restoration
Back of Tab
Organic Amendment
Restoration of Degraded
Upland Landscapes in the
Chestatee-Yahoola Watershed

Presenters
Dr. Justin Ellis, Director
Jacob Roberts, GIS Specialist

3 Watersheds in Chestatee Watershed
Have Impaired Fish Biota
Due to Sedimentation

- Chestatee River Watershed in Lumpkin County provides 28% of the annual average inflow (558 cfs) to Lake Sydney Lanier
- Home to 3 out of the 6 watersheds in the Upper Chattahoochee that fail to support native FISH DIVERSITY due to sedimentation
- 14 miles of stream are impaired due to sedimentation
  - Cane Creek = 8 miles
  - Cavenders Creek = 2 miles
  - Tate Creek = 6 miles

OUR GOAL
Watershed Scale Restoration

Sediment Impacts on Fish

- During heavy rains, turbid water clogs fish gills increasing the release of stress hormones.
- As sediment settles, it fills all the interstitial spaces in the stream bed (all the openings around the cobbles and pebbles).
- Interstitial spaces is where most fish food (benthic macroinvertebrates ie. aquatic insects) lives underneath the rocks.
- Once this interstitial habitat has been destroyed, it prevents fish from laying their eggs in rock crevices or in the spaces between gravel.

Step #3 – Recognize sediment impacts
Step #2 Fall in LOVE with your watershed
• Paddle
• Fish
• Hike
• Make Maps
• Form Groups
• Stage Events/Workshops
• Understand Laws
• Tell Stories
• Form Partnerships
• Take Action
• Take WQ Samples
• Plant Vegetation
• Try New Practices

For degraded landscapes, additions of organic amendments (often leaf and chipped wood mulch) are the most efficient way to stop erosion and kickstart secondary succession processes.

Additional Benefits of Using Organic Mulch

Mulch and compost provide many additional benefits other than erosion control:
• ACTS like a SPONGE - increasing rainfall infiltration
• Increased vegetative productivity due to increased nutrients, water holding capacity, and pH (depending on feedstocks)
• Enhanced soil ecology which improves nutrient cycling and soil physical properties.
• Overtime, improves soil porosity and bulk density (due to increased activity of soil organisms).
• Increased carbon sequestration potential.

Traditional E&S BMPs at the Watershed Landscape Scale may be impractical and don’t address underlying deficiencies

• Vegetation is cited as the most efficient and economic soil erosion control.
• However, for DEGRADED LANDSCAPES vegetative re-establishment is extremely challenging.
• Soils lack pore space, organic matter, nutrients, water holding capacity, and soil organisms that cycle nutrients back to the roots of plants.
• I.e. Soils are bare, compacted, with low pH, often red, and eroding.

After vegetation, mulch is the 2nd most effective erosion control technique after compost.

Effectiveness of mulch for erosion control relative to bare soil.

<table>
<thead>
<tr>
<th>Depth (in)</th>
<th>Bare</th>
<th>Mulch</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>155</td>
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</table>
The Revised Universal Soil Loss Equation

\[ A = R \times K \times L \times S \times C \times P \]

where \( A \) = soil loss (tons/acre/year)

- \( R \) = rainfall erosivity factor
- \( K \) = soil erodibility factor
- \( L \) = slope length factor
- \( S \) = slope gradient factor
- \( C \) = crop/vegetation and management factor
- \( P \) = support practice factor (1 for watershed)

6 factors yield a SOIL LOSS estimate Measured in tons per acre per year.

**OUR GOAL**

Demonstrate RUSLEs applicability for Watershed Assessment and Prioritization

Give to other Watersheds for ADOPTION

---

Rainfall Erosivity factor (R)

- \( R \) is defined as the average annual sum of individual storm erosion index values, \( EI_{30} \), where \( E \) is the storm kinetic energy per unit area and \( I_{30} \) is the maximum 30 minutes rainfall intensity
- \( R \) factor calculation is complex as it involves collection of years of storm (precipitation) intensity data
- Data used- NOAA GIS Grid Atlas Precipitation freq estimates \( EI_{30} \)
- Calculate \( R = I_{30} \times (331 \times \log_{10}(I_{30}) + 916) \)

---

Length Slope factor (LS)

- \( L \) - Slope Length ratio of soil loss to slope length
- \( S \) - Slope Steepness ratio of soil loss to slope steepness

- Derived from a Digital Elevation Model (DEM)
  - Use GIS tools to get layers for Slope and Flow Accumulation
  - Conditional formulas relative to standard erosion plot and slope of 22.1m at 9% slope
Soil Erodibility factor (K)

- Represents a soils susceptibility for particles to be detached by water
- Sourced from gSSURGO database
  - Field called $K_{fact}$
- Low $K$ values = soils resistant to detachment (High in Clay)
- High $K$ values = soils prone to detachment (High in Sand/Silt)

Land Cover Management factor (C)

- Ratio of soil loss from a specific type of vegetation cover
- When RUSLE is done at the plot scale, precise values are associated with many different species of crops
- For the watershed scale, a few broader classes are used and the values are less precise
- We used 3m resolution imagery (4 band NAIP)
  - Supervised classification into 6 classes
- Other potential sources include LiDAR data or National Land Cover Database (30m resolution)

The Revised Universal Soil Loss Equation

$$ A = R \cdot K \cdot L \cdot S \cdot C \cdot P $$

A (model output) is in Tons/Acre/Year
Prioritize Parcels and Land Use Classes For Restoration

- A values indicate landscapes with the highest erosion potential
- Using tax assessor parcel layer identify possible partners for restoration
- Rank parcels by tons per acre
- Consider other factors:
  - Ease in access
  - Feasibility
  - Type of BMP

Fairview constructed 2008
5 years after construction (2013)
very little permanent vegetation
Restoration efforts began in 2013—started with lime followed by trees.

Step #4
Add Organic Matter

GSWCC Erosion Control Day
Developing Partnerships with Mulch Providers

Mulch Availability
Every county in the state of Georgia generates 100's to 1000's of tons of organic matter each and every year.

Targeting this material to priority areas has the potential to transform catchment hydrology.

Mulch Partners
- Municipal Leaf and Limb pickup
- Electric Utility right of way crews
- Tree Service companies
- DOT right of way maintenance

Straightforward Implementation
Stockpiled Materials to be spread in March

Organic amendment restoration of the Commons Residence Dorms
For more rapid vegetative establishment in high aesthetic areas— we utilized aged leaf mold material.

- Leaf mulch is an ideal organic amendment in these settings to allow more rapid decomposition and grass seed re-establishment.
- Leaf mulch is ideal in areas that can remain untouched for 2-3 yrs.

**Challenge:** Upland Pasture Restoration and Cattle Exclusion

Isolate cattle from sensitive areas with installation of temporary exclusion fencing until full vegetative re-establishment is achieved.

- Isolate cattle from sensitive areas with installation of temporary exclusion fencing until full vegetative re-establishment is achieved.

- Permanent exclusion fencing, followed by streamside plantings in riparian buffer for bank stability.

- CHALLENGE—upland watering.
**Dirt Road / Right of Way Improvement**

**Before**

- Technique: Outward Sloping Road
- No inside ditches
- Crossover Bumps (divert water from road)
- Also known as water bars

**After**


**Broad-based Dips & Outward Sloped Roads**

- Broad-based Dips (or rolling dip)
- A surface drainage diversion built into the bed of a road to intercept and divert surface water out of the road while allowing vehicles to maintain normal speeds.

**Road Side Ditches / Road Right of Ways**

- Vegetated Ditches where possible
- Maintain "sheet flow" by controlling ditch shape
- Where water is concentrated - use turnouts to to stable, mature vegetated areas
- Avoid in-sloping roads when possible

**Table**: General Rule for Spacing of Dips

<table>
<thead>
<tr>
<th>Dips on Road</th>
<th>Distance between Dips and Ditch Wall</th>
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<tbody>
<tr>
<td>2'</td>
<td>5'</td>
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<td>3'</td>
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<td>5'</td>
<td>7'</td>
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<tr>
<td>6'</td>
<td>7'</td>
</tr>
</tbody>
</table>

(Chart credit: Georgia Soil & Water Conservation Commission, Erosion Control Manual for Roads)

**Notes**:

- Ditch bottom at least 2' wide, flat, parabolic, or rounded-U shaped, but NOT straight U or V shaped.
- Grade ditch and bank side slopes at 2:1 maximum slope (i.e., 2 feet horizontal for each 1 foot vertical rise).
Sediment Loss from Utility Right of Ways

- As the RUSLE model is refined, we anticipate UTILITY Right of Ways represent a unique land class for sediment losses.
- This is due to the frequent disturbance required and the steepness of slope.
- Illegal ATV use is an additional factor.
- We plan to work with Right of Way managers and local municipalities and law enforcement on new recommendations to address these areas.

Application of New BMPs – Seep/Weep Berms

Weep berms are a type of earthen berm that slowly releases upslope runoff into a riparian area. This water is cleaner, and increased holding time of upslope water increases the productivity of riparian trees.

Benefits of Seep/Weep Berms

- Slows down runoff
- Creates sediment storage above a streamside area
- Reduces sediment delivery to streams
- Enhances water storage (groundwater recharge)
- Enhances streamside forests
- Captures lost upslope topsoils for reuse; it’s a win, win!
Moving Forward

• Georgia is still developing mechanisms for addressing many non-point source controls, especially in more rural counties.
• TMDLs are written but not fully implemented
• Most GA County Governments and other municipalities have GIS personnel and resources.
• RUSLE input parameters are readily available and with some guidance erosion potential priority maps can be generated at the county or sub-watershed level.

For additional information:
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Environmental Leadership Center
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Cell 706-499-2261
justin.ellis@ung.edu
Jacob Roberts
706-867-4596
Jake.roberts@ung.edu

• Mobilization of mulch resources is possible in every county of the State. Prioritizing sites for restoration using RUSLE is the first step.
• Costs for spreading mulch are miniscule.
• The potential for restoration of the majority of degraded landscapes in a watershed over a period of years (decades) is significant with dramatic improvement to catchment hydrology, water quality, and ecosystems services.
Insert Tab

Mitigation Management
Back of Tab
Mitigation Banking in Georgia

Matt Peevy

Founded Mitigation Resource Group, LLC in 2007.
• First consolidated holding company of bank credits in GA
• Primary investors established first stream bank in GA in 2001
• Serves as bank sponsor for 14 mitigation projects in GA
• Last bank was approved in 2015, implemented in 2016
• Co-sponsoring mitigation proposal for Tired Creek impacts

Founded Mitigation Management, LLC in 2010.
• Provides credit brokerage and ecological consulting services
• Exclusive sales agent for 25 banks in GA
• Principals have had direct involvement in over 35 mitigation projects combining for more than:
  • 120 miles of stream mitigation
  • 8,500 acres of critical habitat protection

GERA
GERA is a collaboration of mitigation bankers, environmental consultants, engineers, contractors, conservation non-profits, and other professionals that are active in and committed to an ecosystem restoration marketplace in Georgia.

www.garestoration.org
What Is Mitigation Banking?

The restoration, enhancement, or preservation of a wetland, stream, or other habitat area undertaken expressly for the purpose of compensating for unavoidable resource losses in advance of development actions.

Before After

Types of Permits

Federal:
1. Nationwide – for impacts less than 300 feet of stream or .5 acres of wetlands. Typically take 45-60 days to approve.
2. Individual – for impacts greater than 300 feet of stream or .5 acres of wetlands. Typically take 6 months to a year.
3. Both permit types must prove avoidance, minimization, and mitigation (in that order).

State:
1. State Stream Buffer Variance
2. 401 Water Quality Certification (included in Nationwide permits)

Regulatory Jurisdictions
Who needs to purchase credits?

- Residential Developers
- Georgia Department of Transportation
- Commercial and Industrial Developers
- Pipeline Companies
- Power Line Companies
- Rail Road
- Counties and Cities
- Reservoirs

Types of Mitigation Projects

1. **Mitigation Banks:** Credits are released to the bank sponsor based on activity and performance milestones. Credits are then sold speculatively to numerous permittees over time.

2. **In-Lieu Fee (ILF):** If bank credits are not available, permittees may be able to purchase credits from an ILF program. Once the ILF program has sufficient funds in a service area, it will issue a request for proposals for mitigation site development in that area. The funds are then released to the selected mitigation provider as its project meets activity and performance milestones, and credits are released to the ILF program. Similar to a mitigation bank, except that credit revenues to the selected project sponsor are not speculative.

3. **Permittee-Responsible Mitigation (PRM):** If bank credits and ILF credits are not available, then permittees may be approved to implement their own mitigation project. However, often times permittees will still contract with mitigation providers to deliver the mitigation project for them. From a mitigation provider perspective, these projects are similar to ILF projects except that the client is the permittee rather than the ILF program, and there are no credit “releases” since the credits are not being transferred to third parties.
Mitigation Banking

How Many Banks?
There are 145 public & private mitigation banks in Georgia.

- 45,500+ acres of land protected in perpetuity
- 265+ miles of stream restored and preserved
- 21,300+ acres of wetland and upland buffer restored and preserved

Source: www.garestoration.org

Who Are Bankers?

Public Bankers:
- Georgia DOT
- Gwinnett County
- Chatham County
- City of Fairburn

Private Bankers:
- Mitigation Resource Group
- Timber Companies
- Georgia Power
- Monastery of the Holy Spirit
- Elachee Nature Science Center
- Piedmont College
- Private Landowners

*Partial Listing
Permitting Mitigation Banks

- Permitting Process:
  - IRT meeting
  - Site Visit
  - Submit Draft Banking Instrument (400-600 page document)
  - Public Notice Period, Respond to Comments
  - Submit Final Banking Instrument
  - Record Restrictive Covenants

Release Schedule Overview

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Credits Released (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approval (3-5 Years)</td>
<td>10%</td>
</tr>
<tr>
<td>Implementation (12-24 Months)</td>
<td>10%</td>
</tr>
<tr>
<td>Monitoring (7-10 Years)</td>
<td>80%</td>
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<tr>
<td>Total:</td>
<td>100%</td>
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</tbody>
</table>
Monitoring and Maintenance

• Long Term Monitoring and Maintenance (7 years):
  • Geomorphic Measurements
  • Biological testing for fish and macro invertebrates
  • Water Quality
  • Tree Growth (301/acre with 50% survival rate)
  • Beaver, Hog, Invasive Species Control

• In order to receive future credit releases, we must demonstrate a quantifiable improvement ("ecological lift") in our tested scores over baseline conditions.
GSWCC Erosion Control Day

![Image of erosion control map]

“Back of the Napkin” Financial Analysis

**CASH IN**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>Stream Credit Sale</td>
<td>$2,400,000</td>
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<tr>
<td>Wetland Credit Sale</td>
<td>$2,520,000</td>
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<tr>
<td>Land Disposition</td>
<td>$250,000</td>
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<td><strong>TOTAL CASH IN</strong></td>
<td>$5,270,000</td>
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**CASH OUT**

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<td>Land</td>
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<td>Survey &amp; Engineering</td>
<td>($500,000)</td>
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<td>Phase I Surveys</td>
<td>($100,000)</td>
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<td>Environmental Consulting</td>
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<td>Legal</td>
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<td>Construction of Bank</td>
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<td>Sales Commission (NS)</td>
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<td>Project Mgmt Fees</td>
<td>($30,000)</td>
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<td>Monitoring Costs</td>
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<td>($60,000)</td>
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<tr>
<td>Long Term Royalties</td>
<td>($100,000)</td>
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<td><strong>TOTAL CASH OUT</strong></td>
<td>($2,415,000)</td>
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**NET CASH FLOW**

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<td>$2,755,000</td>
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![Image of trap]

**IT’S A TRAP!**
GSWCC Erosion Control Day

Years 1 - 8

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Stream Credits Sold

Source: RIBITS

Avg Sold Per Year Since 2008: 240,000
2017 – Paulding County Reservoir Sale
GSWCC Erosion Control Day

Wetland Credits Sold

- Savannah District - Commercial Banks
- Estimated Credit Revenue

- Wetland Credit Supply

- Healthy Markets to invest in are typically around 5 – 7 years of supply.
Stream Credit Supply

<table>
<thead>
<tr>
<th>Stream</th>
<th>Basin</th>
<th>Years</th>
<th>Credits per Year</th>
<th>Remaining Credits</th>
<th>Years</th>
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<td>Altamaha</td>
<td>13</td>
<td>10</td>
<td>(235,921.00)</td>
<td>303,411.00</td>
<td>16.73</td>
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<tr>
<td>Coweta</td>
<td>13</td>
<td>10</td>
<td>(617,774.00)</td>
<td>641,710.00</td>
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</tr>
<tr>
<td>Lower Flint</td>
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<td>(161,773.00)</td>
<td>314,774.00</td>
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</tr>
<tr>
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<td>10</td>
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<td>86,172.00</td>
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<tr>
<td>Mobile</td>
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<td>(396,677.00)</td>
<td>1,120,696.83</td>
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<tr>
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<td>0.00</td>
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</tr>
<tr>
<td>Tarpon</td>
<td>10</td>
<td>10</td>
<td>(4,917.00)</td>
<td>27,648.50</td>
<td>56.68</td>
</tr>
<tr>
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<td>10</td>
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<td>644,772.00</td>
<td>27.10</td>
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<tr>
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<td>10</td>
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<td>666,483.00</td>
<td>41.12</td>
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<tr>
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<td>(28,851.00)</td>
<td>12,238.75</td>
<td>5.50</td>
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</table>

Healthy Markets to invest in are typically around 5 – 7 years of supply.

Stream Credit Inventory

<table>
<thead>
<tr>
<th>Credits</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>2008</td>
</tr>
<tr>
<td>2009</td>
<td>2010</td>
</tr>
<tr>
<td>2011</td>
<td>2012</td>
</tr>
<tr>
<td>2013</td>
<td>2014</td>
</tr>
</tbody>
</table>

Pricing vs Year Supply

86% Decrease in Credit Pricing

Why is year supply of credits important?

- Appropriately priced mitigation reinforces avoidance & minimization
- Financial bank failure can lead to regulatory bank failure
- More efficient allocation of regulatory resources
MARKET CHALLENGES

Regulatory
- Standard Service Areas
- SOP Credit Generation
- Success Guidelines
- Mitigation Hierarchy Preferences (Key Personnel)

Market
- Supply – Existing Banks, Future Competition, Barriers to Entry
- Demand – Historical Sales, Future Estimates, Demand Drivers

Project
- Bank Approval
- Implementation & Maintenance
- Monitoring & Performance Standards

FUTURE OF BANKING IN GA

1. Definition of “Waters of the United States”
2. Trump Administration Changes
   1. Infrastructure Bill
   2. Faster permits
   3. Pro Mitigation Banking?
3. SOP “No Net Loss” Fix
   1. USACE currently working on fix
4. GIS Enforcement
5. New Credit Programs
   a. USFWS – Darters, Bats, Migratory Birds, etc.
   b. NMFS – Essential Fish Habitat, others
   c. DOI currently curbing most of these programs?

Contact Information

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