Savannah District's Revised SOP: Moving Towards A Functional Approach

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Agenda

- SOP Revision Concept
- New Aquatic Resource Credit Types
- New Urban Mitigation Service Area Filter

Background on Savannah District's Mitigation Program

- As a result of the 2008 Mitigation Rule (the Rule), Savannah District initiated an internal audit of the District's Mitigation Program in 2009.

- As a result of this internal audit, Savannah District outlined a three part plan to bring the Mitigation Program into closer alignment with the requirements of the Rule. This approach included revising the following policy components:
  - Mitigation Banking Guidelines (the "Guidelines") for Georgia, dated March 2006.
  - In-Lieu-Fee Program's Banking Instrument.
  - Standard Operating Procedure for Compensatory Mitigation (SOP), dated June 7, 2004.

Savannah District Guidelines

- The Guidelines are the Savannah District's interpretation of the New Mitigation Rule (33 CFR 332).
- Guidelines included the development of comprehensive Monitoring Metrics & Performance Standards (Appendix 10).
- During the development of Guidelines, Savannah District began to conceptualize a revision of the SOP that would compliment Appendix 10. This revision would transition the District's mitigation approach from an activity focused methodology to a functional based methodology.

Why Change The Approach?

- According to the Rule, “the amount of required compensatory mitigation must be, to the extent practicable, sufficient to replace lost aquatic resource functions. In cases where appropriate **functional** or **condition assessment methods** or other suitable metrics are available, **these methods should be used** where practicable to determine how much compensatory mitigation is required.”

- In response to comments encouraging USACE to use functional assessments to determine mitigation requirements, Savannah District set out to develop its own functional assessment methodology for calculating mitigation.

2004 SOP
Wetland Adverse Impact Worksheet

Factor	Options						
Dominant Effect	Fill 2.0	Dredge 1.8	Impound 1.6	Drain 1.4	Flood 1.2	Clear 1.0	Shade 0.5
Duration of Effects	7+ years 2.0	5-7 years 1.5	3-5 years 1.0	1-3 years 0.5	< 1 year 0.1		
Existing Condition	Class 1 2.0	Class 2 1.5	Class 3 1.0	Class 4 0.5	Class 5 0.1		
Lost Kind	Kind A 2.0	Kind B 1.5	Kind C 1.0	Kind D 0.5	Kind E 0.1		
Preventability	High 2.0	Moderate 1.0	Low 0.5	None 0			
Rarity Ranking	Rare 2.0	Uncommon 0.5	Common 0.1				

† These factors are determined on a case-by-case basis.

2004 SOP
Wetland Restoration Worksheet

Factor	Options				
Net Improvement Vegetation	Minimal Enhancement 0.1		to	Complete Restoration 1.4	
Net Improvement Hydrology	Minimal Enhancement 0.1		to	Complete Restoration 1.4	
Credit Schedule	Schedule 5 0	Schedule 4 0.1	Schedule 3 0.2	Schedule 2 0.3	Schedule 1 0.4
Kind	Category 2 0.2	Category 1 0.6			
Maintenance	High 0	Moderate 0.1	Low 0.2	None 0.3	
Monitoring and Contingencies Plan	N/A 0	Minimum 0.1	Moderate 0.2	Substantial 0.3	Excellent 0.4
Control	RC 0.1	RC + CE or GPP 0.3	RC + CE + GPP 0.5		

2004 SOP
Wetland Preservation Worksheet

Factor	Options			
Degree of Threat	None 0	Low 0.1	Moderate 0.3	High 0.5
Kind	Category 2 0.2	Category 1 0.6		
Control	RC 0.1	RC + CE or GPP 0.3	RC + CE + GPP 0.5	

2004 SOP
Stream Impact Worksheet

Factors	Options								
Stream Type Impacted	Intermittent 0.1			Perennial Stream > 15' in width 0.4			Perennial Stream ≤ 15' in width 0.8		
Priority Area	Tertiary 0.5			Secondary 0.8			Primary 1.5		
Existing Condition	Fully Impaired 0.25			Somewhat Impaired 0.5			Fully Functional 1.0		
Duration	Temporary 0.05			Recurrent 0.1			Permanent 0.2		
Dominant Impact	Shade/ Clear 0.05	Utility X-ing 0.4	Bank Armor 0.7	Detention 1.5	Stream Crossing (≤ 100') 1.7	Impound 2.7	Morpho-logic Change 2.7	Pipe >100' 3.0	Fill 3.0
Scaling Factor (Based on # linear feet impacted)	< 100' impact 0	100-200' impact 0.05	201-500' impact 0.1	501-1000' impact 0.2	> 1000' impact 0.4 for each 1000' feet of impact (round impacts to the nearest 1000') (example: 2,200' of impact – scaling factor = 0.8; 2,800' of impact – scaling factor – 1.2)				

2004 SOP
Stream Channel Restoration Worksheet

Factors	Options				
Net Benefit	All proposals must include at least a 25' riparian buffer on both banks Buffers ≥50' +2'/%slope also may generate riparian credit (use see buffer worksheet)				
	Streambank Stabilization	Structure Removal	Stream Channel Restoration and Stream Relocation		
	2.0	4.0 to 8.0	Priority 4 1.0	Priority 3 4.0	Priority 1 or 2 8.0
Monitoring/ Contingency	Minimal (Required) 0	Moderate 0.3	Substantial 0.4	Excellent 1.0	
Priority Area	Tertiary 0.05	Secondary 0.2	Primary 1.0		
Control	RC on restored channel and 25' buffer (Required) 0.1	Required RC + CE or GPP 0.3	Required RC + CE + GPP 0.5		
Mitigation Timing	Schedule 3 0	Schedule 2 (Use for all banks) 0.1	Schedule 1 0.5		

2004 SOP
Stream Riparian Restoration Worksheet

Factors	Options			
Net Benefit - select value for each stream side	Riparian Restoration/Habitat Improvement/Preservation Factors – MBW = Minimum Buffer Width = 50'+2'/% slope Select Values from Table 1			
System Credit Condition 1	Condition 1: MWB restored or protected on both streambanks To Calculate Value: Average of the Net Benefit values for Stream Side A and Stream Side B			
System Credit Condition 2	RC Placed on Channel 0.05		RC and CE Placed on Channel 0.1	
M&C - select value for each stream side	Mimimal (Required) 0	Moderate 0.2	Substantial 0.25	Excellent 0.3
Priority Area	Tertiary 0.05	Secondary 0.2	Primary 0.7	
Control	RC on restored channel and 25' buffer (Required) 0.1	Required RC + CE or GPP 0.3	Required RC + CE + GPP 0.5	
Mitigation Timing - select value for each stream side	Schedule 3 0	Schedule 2 (Use for all banks) 0.05	Schedule 1 0.15	

2011 SOP Concept

- For impacts and restoration, the first step is to determine how much function does the aquatic resource currently have (i.e., a functional assessment of existing conditions).

- Once the existing condition is determined, then you can calculate the appropriate functional loss or gain from the baseline score dependent upon the proposal.

- The existing conditions, impacts, and restoration worksheets are structured to follow the 3 factor approach in Appendix 10 of the Guidelines.

2011 SOP – Existing Conditions (Streams)

FUNCTIONAL SCORESHEET - STREAMS (EXISTING CONDITIONS)

I. Background Information

Date:	December 11, 2011	**USACE Project #:**	SAS-2011-00010
Stream Name:	Stream 1	**Formal Stream Name:**	List stream name (if named trib.)
Stream Type:	1st and 2nd Order Perennial		
Stream Coordinates:	**Latitude -** 34.00000 **N**	**Longitude -** 84.00000 **W**	
County:	Forsyth County	**Name of Nearest Downstream Trib.:**	List tributary name
8-Digit Hydrologic Unit Code:	03150104 Etowah River	**12-Digit Hydrologic Unit Code:**	031501041504
Level III Eco-Region:	Piedmont (45)		
Level IV Eco-Region:	Southern Outer Piedmont (45b)		

2011 SOP – Existing Conditions (Streams)

II. Physical Functions

Channel Dimension (Bank Height Ratio):	1.00 to < 1.20	1.00
Channel Dimension (Entrenchment Ratio):	> 2.2	1.00
Channel Pattern and Profile (Pool to Pool Spacing Ratio):	> 4.0 to 5.0	1.00
Channel Stability (BEHI Score):	Very Low	1.00

Mean Physical Score ($Phys_{score}$): **1.00**

2011 SOP – Existing Conditions (Streams)

III. Chemical Functions

Temperature:	90° F and below	1.00	
DO:	≥ 4 mg/l (warm water) or ≥ 5 mg/l (cold water)	1.00	
pH:	6.0 to 8.5	1.00	
Turbidity:	0 to 50 NTU	1.00	
Supplementary Variable #1:	Fecal Coliform	Meets EPD Criteria	1.00
Supplementary Variable #2:	Choose Supplementary Chemical Var.	Choose Water Quality Cat.	Index Value
Supplementary Variable #3:	Choose Supplementary Chemical Var.	Choose Water Quality Cat.	Index Value
Supplementary Variable #4:	Choose Supplementary Chemical Var.	Choose Water Quality Cat.	Index Value

Mean Chemical Score ($Chem_{score}$):	**1.00**

2011 SOP – Existing Conditions (Streams)

IV. Biological Functions

A. Riparian Buffer and Landscape Analysis:

Riparian Buffer Comp.:

	Index	%	Cumulative Index
Reference Standard Vegetation	1.00	100.00	1.00
Choose Riparian Buffer Composition	Index Value	0.00	0.00
Choose Riparian Buffer Composition	Index Value	0.00	0.00
Choose Riparian Buffer Composition	Index Value	0.00	0.00
Choose Riparian Buffer Composition	Index Value	0.00	0.00
	Total	100.00	1.00

Riparian Buffer Structure:

	Index	%	Cumulative Index
Stand older than 40 years	1.00	100.00	1.00
Choose Riparian Buffer Structure	Index Value	0.00	0.00
Choose Riparian Buffer Structure	Index Value	0.00	0.00
Choose Riparian Buffer Structure	Index Value	0.00	0.00
Choose Riparian Buffer Structure	Index Value	0.00	0.00
	Total	100.00	1.00

Percent Relative Cover of Invasive Species:

	Index	%	Cumulative Index
0% Invasive Cover	1.00	100.00	1.00
Choose Percent of Invasive Cover (Baseline)	Index Value	0.00	0.00
Choose Percent of Invasive Cover (Baseline)	Index Value	0.00	0.00
Choose Percent of Invasive Cover (Baseline)	Index Value	0.00	0.00
Choose Percent of Invasive Cover (Baseline)	Index Value	0.00	0.00
		100.00	1.00

2011 SOP – Existing Conditions (Streams)

Localized Drainage Basin Condition:		Index	%	Cumulative Index
	Forest and Native Range - > 75% ground cover	1.00	100.00	1.00
	Choose Local Drainage Basin Cover Class	Index Value	0.00	0.00
	Choose Local Drainage Basin Cover Class	Index Value	0.00	0.00
	Choose Local Drainage Basin Cover Class	Index Value	0.00	0.00
	Choose Local Drainage Basin Cover Class	Index Value	0.00	0.00
		Total	100.00	1.00

B. In-Stream Biological Analysis:

Macro-Invertebrate Site Index Scores:	Excellent	1.00		
Fish Index of Biological Integrity Scores (IBI):	Excellent	1.00		
Habitat Assessment Scores:	Optimal	1.00	**Biological Surrogate Option:**	No
Mean Biological (Bio_{score}):	**1.00**			

2011 SOP – Existing Conditions (Streams)

V. Summary Existing Conditions Score

$Phys_{score}$ =	**1.00**
$Chem_{score}$ =	**1.00**
Bio_{score} =	**1.00**

Total Mean Existing Condition Score = $Phys_{score} + Chem_{score} + Bio_{score} / 3 =$ **1.00**

2011 SOP – Impact Index (Streams)

STREAM IMPACT SCORESHEET

I. Background

Date:	December 11, 2011	USACE Project #:	SAS-2011-00010
Stream Name:	Stream 1		
Stream Type:	1st and 2nd Order Perennial		
Stream Impact Size:	300.00 **l.f.**		

2011 SOP – Impact Index (Streams)

II. Primary Impact Index

Total Mean Existing Condition Score:	1.00	
Impact Category:	Fill/Pipe	1.00
Impact Duration:	> 7 years	1.00
Mean Primary Impact Score:	**1.00**	

2011 SOP – Impact Index (Streams)

III. Secondary Impact Index (On Remaining Stream Resources)

Secondary Impacts (Following Impact):	Yes		
Remaining Stream Existing Condition Score:	1.00		
Secondary Impact Type:	Morphological Change	0.45	
Impact Duration:	> 7 years	1.00	
Impact Length (Adjacent To Primary Impact):	100	**l.f.**	
Mean Secondary Impact Score:	**0.45**		

2011 SOP – Impact Index (Streams)

IV. Watershed Factor Score

#1 Watershed Factor:	303(d) listed streams	0.20
#2 Watershed Factor:	High impervious areas (greater than 9.20%)	0.20
#3 Watershed Factor:	Primary Trout Streams (EPD designated)	0.20
#4 Watershed Factor:	Georgia rare and threatened species habitat	0.20
#5 Watershed Factor:	Federal threatened and endangered species habitat	0.20

Total Watershed Factor Score (W_{fs}): **1.00**

2011 SOP – Impact Index (Streams)

V. Summary Impact Score (Credits Owed)

Primary Impact Credits Owed =	(Primary Impact Score) x (9 Credits+Wfs Credits) x (l.f.)	=	3000.00
Secondary Impact Credits Owed =	(Secondary Impact Score) x (9 credits+Wfs Credits) x (l.f.)	=	450.00
Total Impact Credits Owed =	Primary Impact Credits Owed + Secondary Impact Credits Owed	=	**3450.00**

2011 SOP – Restoration Index (Streams)

STREAM RESTORATION SCORESHEET

I. Background

Date:	December 11, 2011	**USACE #:**	SAS-2011-00010
Stream Name:	Stream 1		
Stream Type:	1st and 2nd Order Perennial		
Stream Restoration Size:	300.00 **l.f.**		

2011 SOP – Restoration Index (Streams)

II. Physical Restoration Index

Mean Existing Condition $Phys_{score}$:	0.00	**Net Restoration Potential:**	1.00
Type of Mitigation:	Restoration/Enhancement		

	Proposed Function	Restoration Index	EC Index	Net Index Change
Channel Dimension (Bank Height Ratio):	1.00 to < 1.20	1.00	0.00	1.00
Channel Dimension (Entrenchment Ratio):	> 2.2	1.00	0.00	1.00
Channel Pattern and Profile (Pool to Pool Spacing Ratio):	> 4.0 to 5.0	1.00	0.00	1.00
Channel Stability (BEHI Score):	Very Low	1.00	0.00	1.00

Physical Restoration Score ($Phys_{restoration}$):	**1.00**

2011 SOP – Restoration Index (Streams)

III. Chemical Restoration Index

Mean Existing Condition $Chem_{Score}$:	0.00	**Restoration Potential:**	1.00
Type of Mitigation:	Restoration/Enhancement		

	Proposed Function	Restoration Index	EC Index	Net Index Change
Temperature:	90° F and below	1.00	0.00	1.00
DO:	≥ 4 mg/l (warm water) or ≥ 5 mg/l (cold water)	1.00	0.00	1.00
pH:	6.0 to 8.5	1.00	0.00	1.00
Turbidity:	0 to 50 NTU	1.00	0.00	1.00
Supplementary Variable #1:	Fecal Coli form	1.00	0.00	1.00
Supplementary Variable #2:	Choose Supplementary Chemical Var.	1.00	Index Value	Index Value
Supplementary Variable #3:	Choose Supplementary Chemical Var.	1.00	Index Value	Index Value
Supplementary Variable #4:	Choose Supplementary Chemical Var.	1.00	Index Value	Index Value

Chemical Restoration Score ($Chem_{restoration}$):	**1.00**

2011 SOP – Restoration Index (Streams)

IV. Biological Restoration Index

Mean Existing Condition Bio_{Score}:	0.00	**Restoration Potential:**	1.00
Type of Mitigation:	Restoration/Enhancement		

A. Riparian Buffer and Landscape Analysis:

Riparian Buffer Comp.:

Proposed Function	Restoration Index	%	Cumulative Index
Reference Standard Vegetation	1.00	100.00	1.00
Choose Riparian Buffer Composition	Index Value	0.00	0.00
Choose Riparian Buffer Composition	Index Value	0.00	0.00
Choose Riparian Buffer Composition	Index Value	0.00	0.00
Choose Riparian Buffer Composition	Index Value	0.00	0.00
	Total	100.00	1.00
		Net Index Change	**1.00**

Riparian Buffer Structure:

Proposed Function	Restoration Index	%	Cumulative Index
Stand older than 40 years	1.00	100.00	1.00
Choose Riparian Buffer Structure	Index Value	0.00	0.00
Choose Riparian Buffer Structure	Index Value	0.00	0.00
Choose Riparian Buffer Structure	Index Value	0.00	0.00
Choose Riparian Buffer Structure	Index Value	0.00	0.00
	Total	100.00	1.00
		Net Index Change	**1.00**

2011 SOP – Restoration Index (Streams)

Percent Relative Cover of Invasive Species:

Proposed Function	Restoration Index	%	Cumulative Index
0% Invasive Cover	1.00	100.00	1.00
Choose Percent of Invasive Cover (Baseline)	Index Value	0.00	0.00
Choose Percent of Invasive Cover (Baseline)	Index Value	0.00	0.00
Choose Percent of Invasive Cover (Baseline)	Index Value	0.00	0.00
Choose Percent of Invasive Cover (Baseline)	Index Value	0.00	0.00
	Total	100.00	1.00
		Net Index Change	**1.00**

Localized Drainage Basin Condition:

Proposed Function	Restoration Index	%	Cumulative Index
Forest and Native Range - > 75% ground cover	1.00	100.00	1.00
Choose Local Drainage Basin Cover Class	Index Value	0.00	0.00
Choose Local Drainage Basin Cover Class	Index Value	0.00	0.00
Choose Local Drainage Basin Cover Class	Index Value	0.00	0.00
Choose Local Drainage Basin Cover Class	Index Value	0.00	0.00
	Total	100.00	1.00
		Net Index Change	**1.00**

2011 SOP – Restoration Index (Streams)

B. In-Stream Biological Analysis:

	Proposed Function	Restoration Index
Macro-Invertebrate Site Index Scores:	15.00	1.00
Fish Index of Biological Integrity Scores (IBI):	15.00	1.00

	Proposed Function	Restoration Index	EC Index	Net Index Change
Habitat Assessment Scores:	Optimal	1.00	0.00	1.00

Fish Surrogate Option: No

Biological Restoration Score ($Bio_{restoration}$): **1.00**

2011 SOP – Restoration Index (Streams)

V. Watershed Factor Score

#1 Watershed Factor:	303(d) listed streams	0.20
#2 Watershed Factor:	State Wildlife Action Plan (SWAP) – High Priority Areas	0.20
#3 Watershed Factor:	Areas directly adjacent to areas of perpetual protection	0.20
#4 Watershed Factor:	Primary trout streams (EPD designated)	0.20
#5 Watershed Factor:	Federal threatened and endangered species habitat (except within the Etowah River Basin)	0.20

Total Watershed Factor Score (W_{fs}): **1.00**

2011 SOP – Restoration Index (Streams)

VI. Summary Restoration Score (Credits Generated)

($Phys_{restoration}$)(3 Credits)	=	**3.00**	
($Chem_{restoration}$)(3 Credits)	=	**3.00**	
($Bio_{restoration}$)(3 Credits)	=	**3.00**	
Total W_{fs} Credits	=	**1.00**	
Sum of Credits Generated	=	**10.00**	**per l.f.**

Total Credits = (Sum of Credits Generated)(Stream Length) = **3000.00**

2011 SOP – Project Applicability

- In 2004 SOP, it specifically states that the methodology is applicable to projects resulting in adverse impacts to 10 acres or less of wetland and/or 5,000 linear feet of stream.

- This has left a hole in the SOP's ability to determine mitigation requirements for large projects (i.e., reservoirs).

- The intent of the 2011 SOP revision is that it will be applicable to all projects, no matter what the extent of the impact.

New Aquatic Resource Credit Types

- To date, Savannah District has operated its compensatory mitigation program on generic credit types (i.e., stream credits and wetland credits)

- However, it has become evident through stakeholder comments that these generic credit types often do not provide the desired in-kind mitigation.

- In response, Savannah District has developed new aquatic resource categories for implementation into the Georgia Mitigation Marketplace. These new aquatic resource categories will replace the previous generic credit types with the intent to ensure functional replacement.

New Aquatic Resource Credit Types

- Wetland Credits will be replaced by the following wetland credit types (based upon hydro-dynamics):
  - Riverine (i.e., Bottomland Hardwoods)
  - Lacustrine Fringe
  - Depressional
  - Slope (i.e., Seeps and Bays)
  - Flats (i.e., Pine Flatwoods)
  - Salt Tidal (i.e., Saltwater Marsh)
  - Fresh Tidal (i.e., Freshwater Marsh)

- Stream Credits will be replace by the follow stream credit types (base upon flow regime):
  - Ephemeral
  - Intermittent
  - 1st and 2nd Order Perennial
  - 3rd Order Perennial and greater

New Urban Service Area Filter

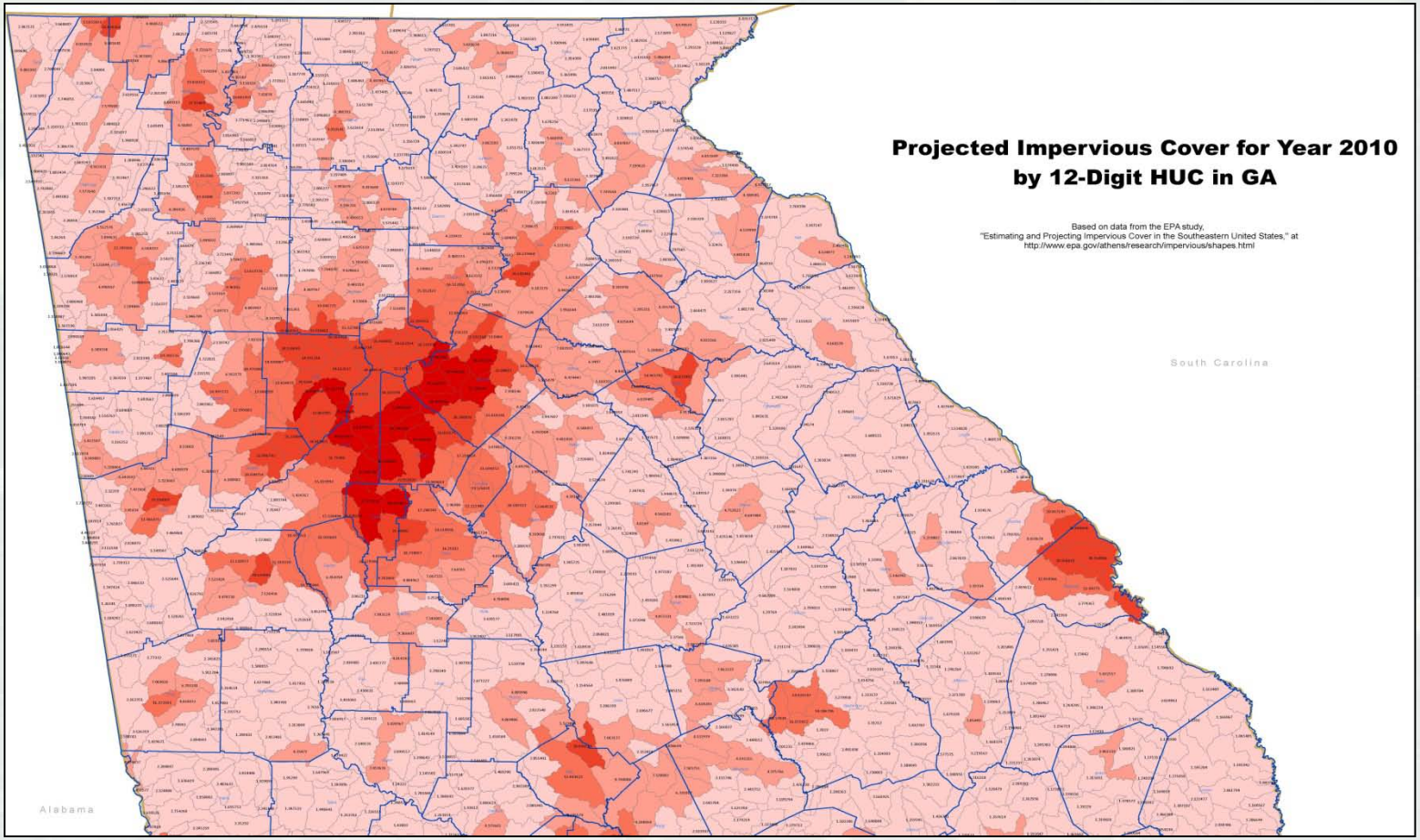
- As a measure to ensure aquatic functions are not trans-located from urban areas through the purchase of credits from non-urban mitigation banks, Savannah District has developed a new urban service area filter concept.

- This concept would provide additional filter in which to determine the preferential mitigation option. This urban filter would be placed upon the existing primary service areas and give urban mitigation banks higher preference to compensate for impacts that occur within urban designated 12-digit HUCs.

- Urban 12-digit HUCs will be identified through a selected percentage of impervious surface present.

- The threshold of the percentage of impervious surface for the "urban" categorization has yet to be finalized.

New Urban Service Area Filter



Questions?

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