Coastal Georgia Regional Council

Water Quality Resource Assessment

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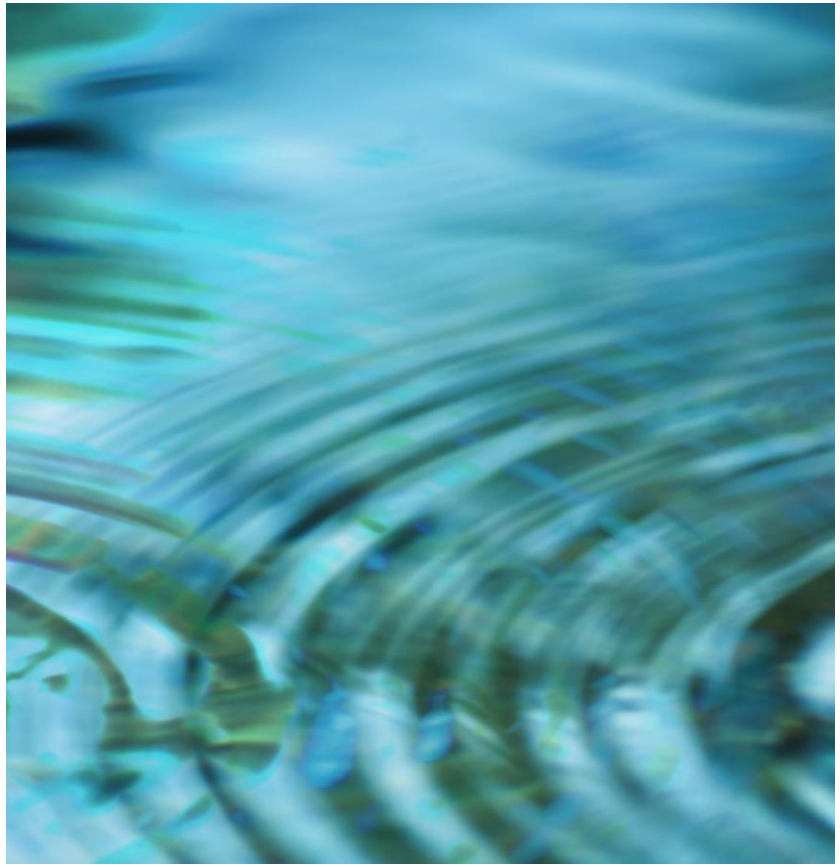
GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Outline

- 2019 Triennial Review
  - EPA Recommendation
  - GAEPD Identified Changes
  - Public Comment Based Changes
- 2022 Triennial Review
- State Water Planning Process
- Water Quality Resource Assessment
- Water Quality Modeling
  - GA DOAG and GA Riv-1 Modeling
  - LSPC Watershed Model
  - EFDC Lake Modeling
- 2022 305(b)/303(d) Listed Segments
- Questions

2019 Triennial Review

- Adapted the 2009 EPA Acrolein Aquatic Life Criteria
- Adapted 2012 EPA Carbaryl Aquatic Life Criteria
- Replaced “Use Classifications” with “Designated Uses”
- Added Primary and Secondary Recreation Definitions
  - Primary Recreation – full immersion contact
  - Secondary Recreation – incidental contact
- Added Water Effect Ratio (WER) to Metal Equations
- Added Site Specific Metal Criteria Based on BLM and WER
- Changed Drinking Water and Fishing Bacteria Criteria
- Developed Lakes Oconee and Sinclair Criteria
  - Included Site-Specific Chlorophyll Criteria
- Changed 14 Waterbody Designated Uses



Bacteria Criteria

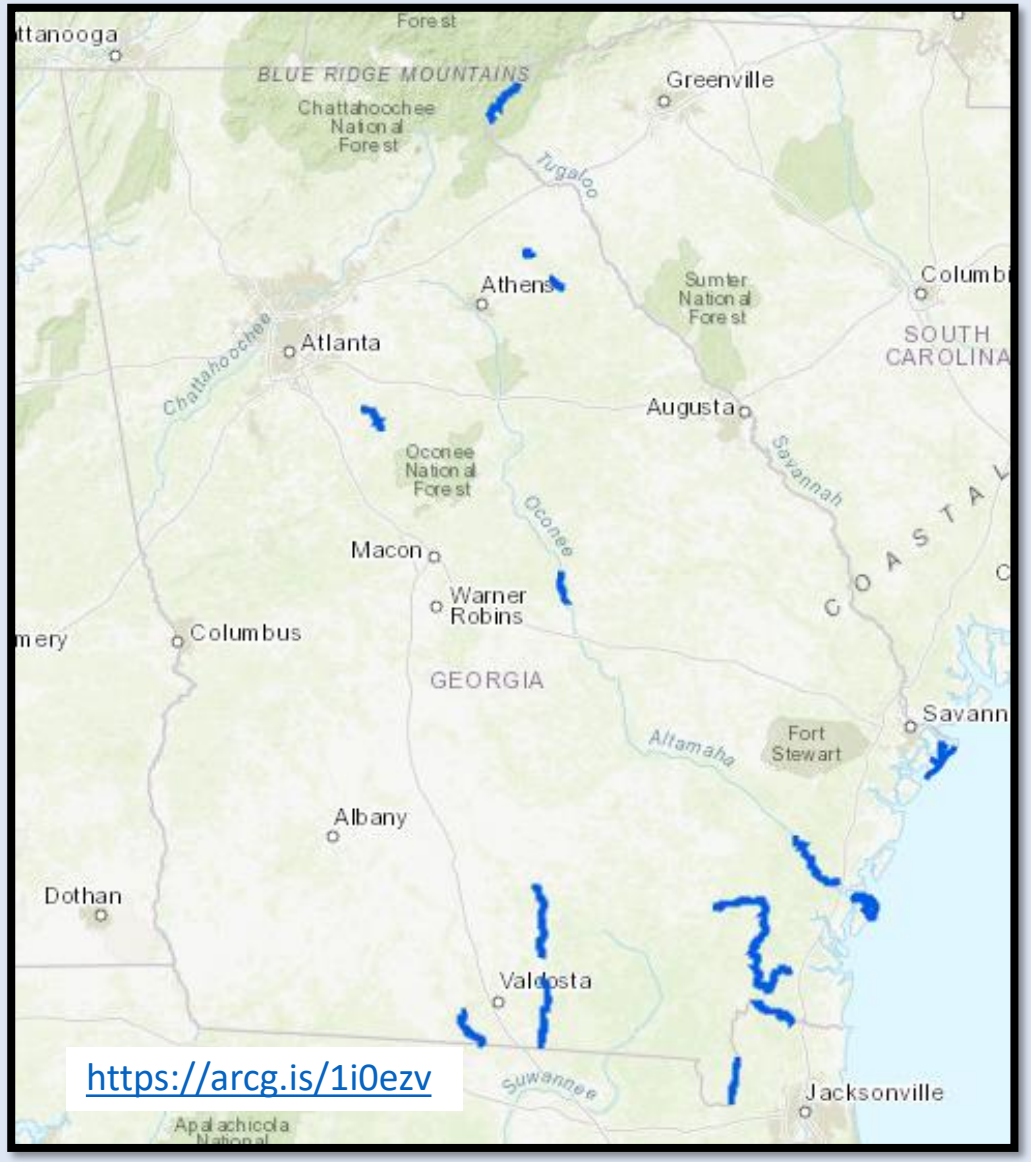
- Changed bacteria indicate from fecal coli to E. coli and enterococci for Drinking Water and Fishing designated uses
- Recreation designated use already used E. coli and enterococci criteria.
- Secondary recreational criteria were calculated based on the water ingestion rates from a study in EPA's Exposure Factors Handbook, Chapter 3.
- Winter-time secondary contact recreation criteria are 2.1 times higher than bacteria criteria for primary contact recreation.

Bacteria Criteria for Drinking Water and Fishing Designated Uses:

- Primary contact recreation bacteria criteria in May-October
  - E. coli (freshwaters): not to exceed 30-day geometric mean of 126 counts per 100 mL. No more than 10% excursion frequency of 410 STV
  - Enterococci (coastal and estuarine waters): not to exceed 30-day geometric mean of 35 counts per 100 mL. No more than 10% excursion frequency of 130 STV.
- Secondary contact recreation bacteria criteria in November-April:
  - E. coli (freshwaters): not to exceed 30-day geometric mean of 265 counts per 100 mL. No more than 10% excursion frequency of 861 STV.
  - Enterococci (coastal and estuarine waters): not to exceed 30-day geometric mean of 74 counts per 100 mL. No more than 10% excursion frequency of 273 STV.
- Removed Non-human source Bacteria Criteria

Waterbodies Changed to Include Recreation

- Alapaha River - Cherry Creek to Stateline
- Alapaha River - Willacoochee River to Dampier Branch
- Altamaha River - Doctors Creek to Butler River
- Broad River - Comer-Carlton Rd (Athens Hwy) to Mill Branch
- Broad River - Wildcat Bridge Rd. to Scull Shoal Creek
- Chattooga River - confluence with West Fork Chattooga to Tugaloo Lake
- Little St. Simons Island - Littoral waters on the ocean and sound side of Little St. Simons Island
- Oconee River - Dead River to Flat Creek
- Satilla River - Alabaha River to Woodbine boat ramp at Hwy 17
- South River - Honey Creek (Henry County) to Lake Jackson at GA Hwy 36
- St. Marys River - Deep Creek to Boone Creek
- St. Marys River - Prospect Landing Rd. to Little St. Marys River
- Wassaw Sound - Open Sea and littoral waters of Wassaw and Little Tybee Islands
- Withlacoochee River - Tiger Creek to State Line

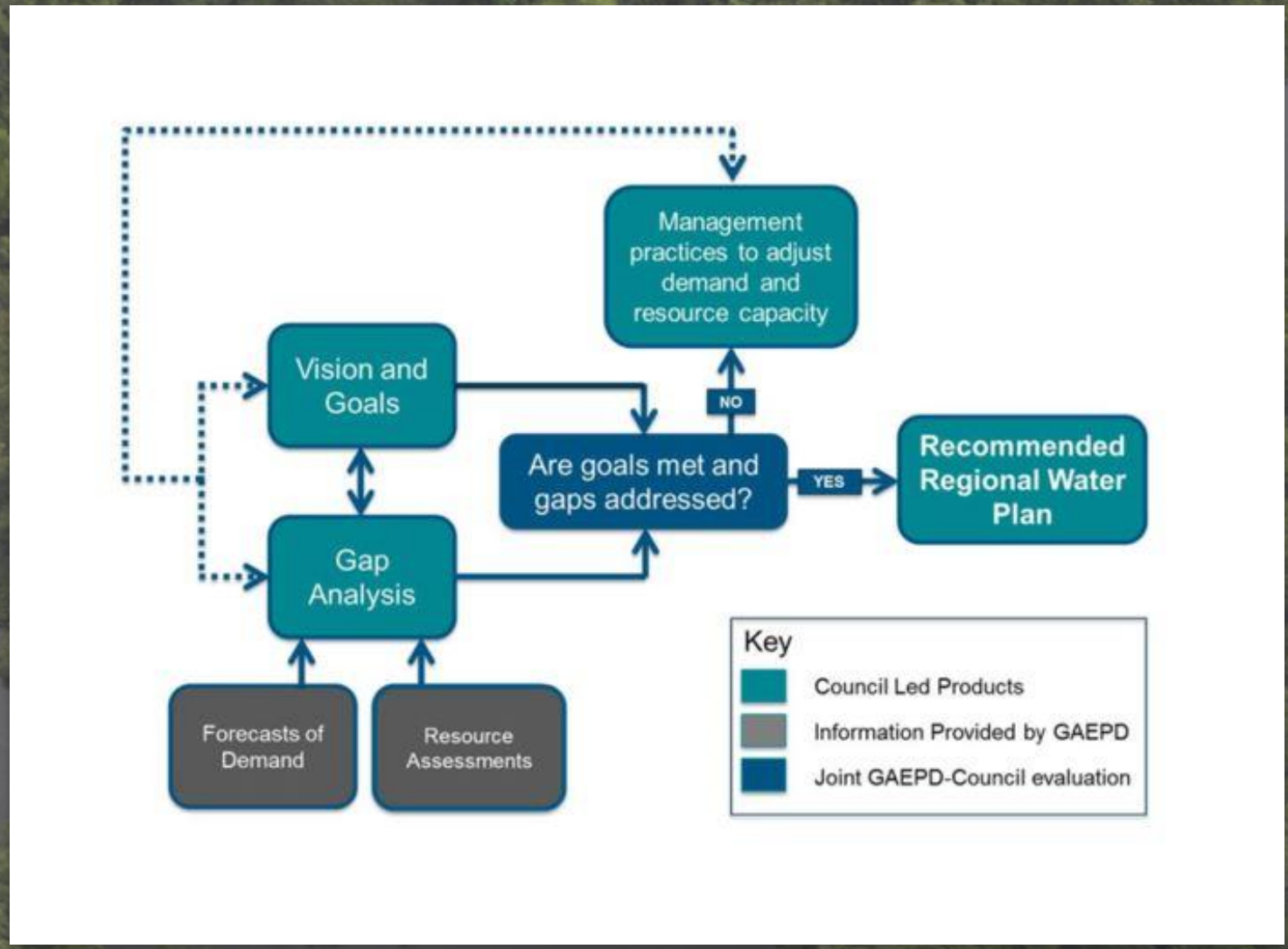


2022 Triennial Review

Items Begin Considered

- Human Health Ambient Water Quality Criteria: 2015
- Aquatic Life Ambient Water Quality Criterion for Selenium - Freshwater 2016
- Aquatic Life Ambient Water Quality Criteria for Aluminum – Freshwater 2018
- Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin – 2019

State Water Planning Process



Resource Assessment

Surface Water Quality

- Assimilative capacity is used to define the ability of a waterbody to naturally absorb and use a discharged substance without water quality becoming impaired or aquatic life being harmed
- Evaluating the amount of pollutants that can be discharged to a specific waterbody without exceeding water quality standards
  - Current Assessment
  - Future Assessment

Water Quality Modeling

GA DOSAG
GA ESTUARY
GA RIV-1
Watershed Model

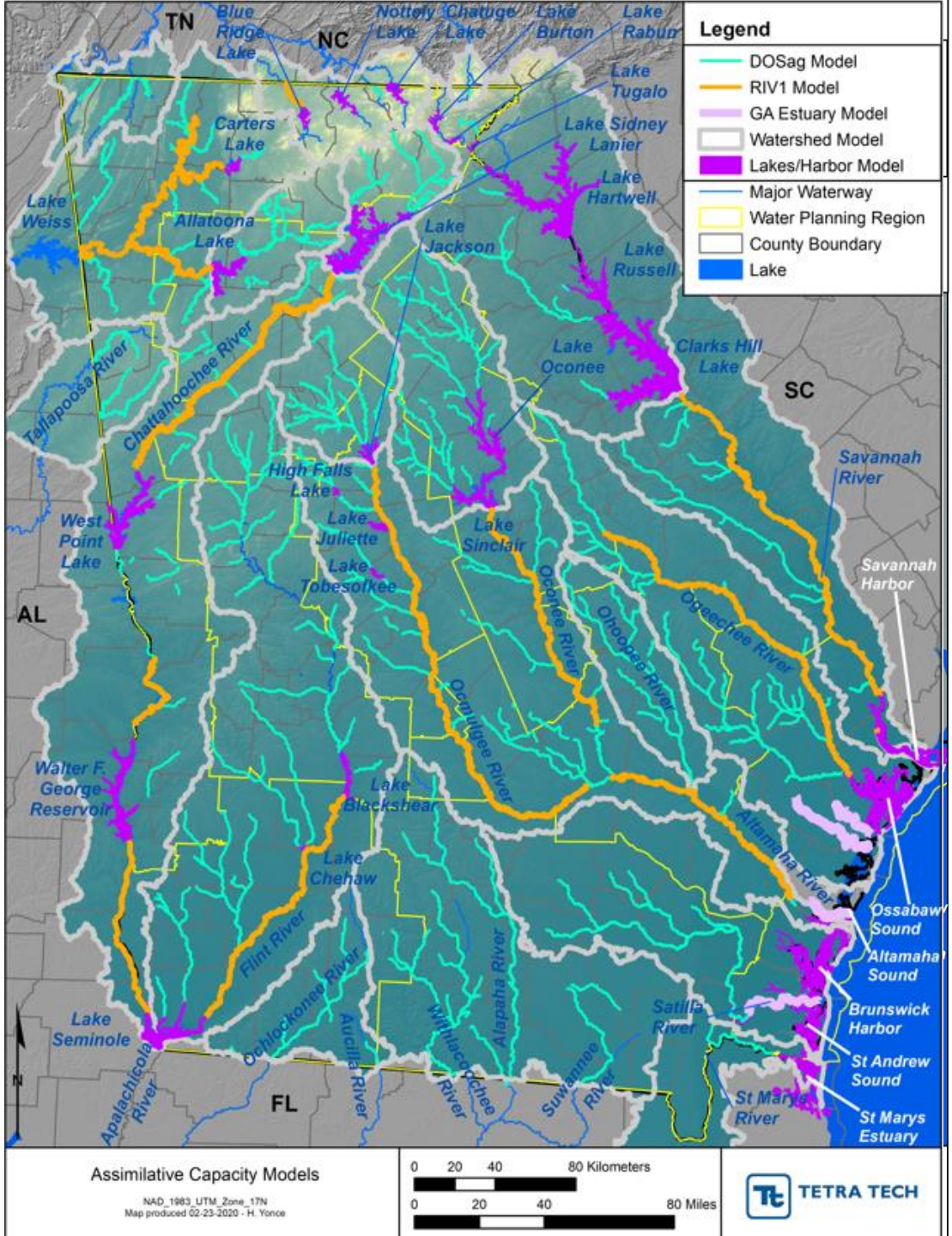
- Loading Simulation Program C++ (LSPC)

Hydrodynamic Model

- Environmental Fluid Dynamics Code (EFDC)

Water Quality Models

- Environmental Fluid Dynamics Code (EFDC)
- Water Quality Analysis Simulation Program (WASP 7.3)



Assimilative Capacity Assessment

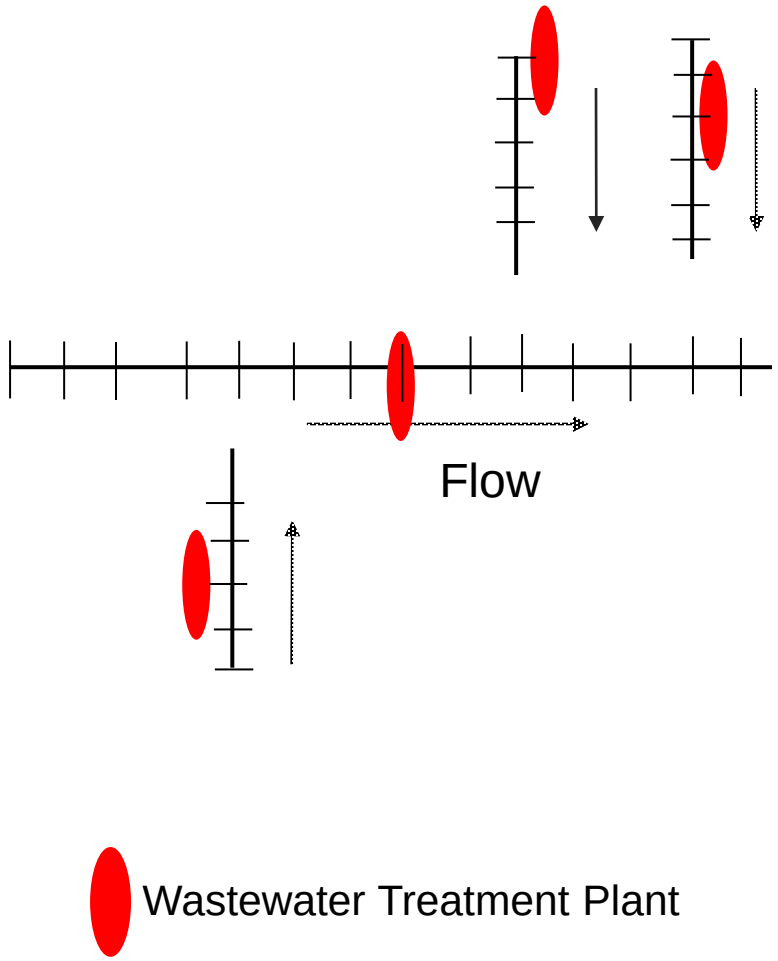
- Develop models
- Use available data and conservative assumptions
- Calibrate models to existing conditions
- Evaluate current/future permits
- Determine available assimilative capacity
- Determine areas of concern

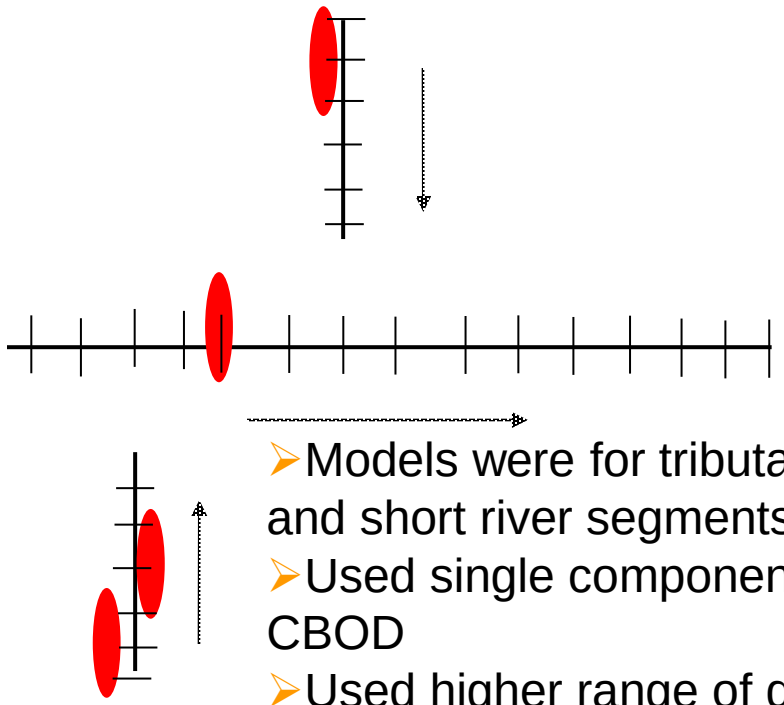
Assimilative Capacity Assessment

- Parameters of concern
  - Biochemical Oxygen Demand
  - Ammonia
  - Total Nitrogen
  - Total Phosphorus
- Water Quality Standards Effected
  - Dissolved Oxygen
  - Chlorophyll a (Algae)
  - Nutrients

Historic GA DOSAG Models

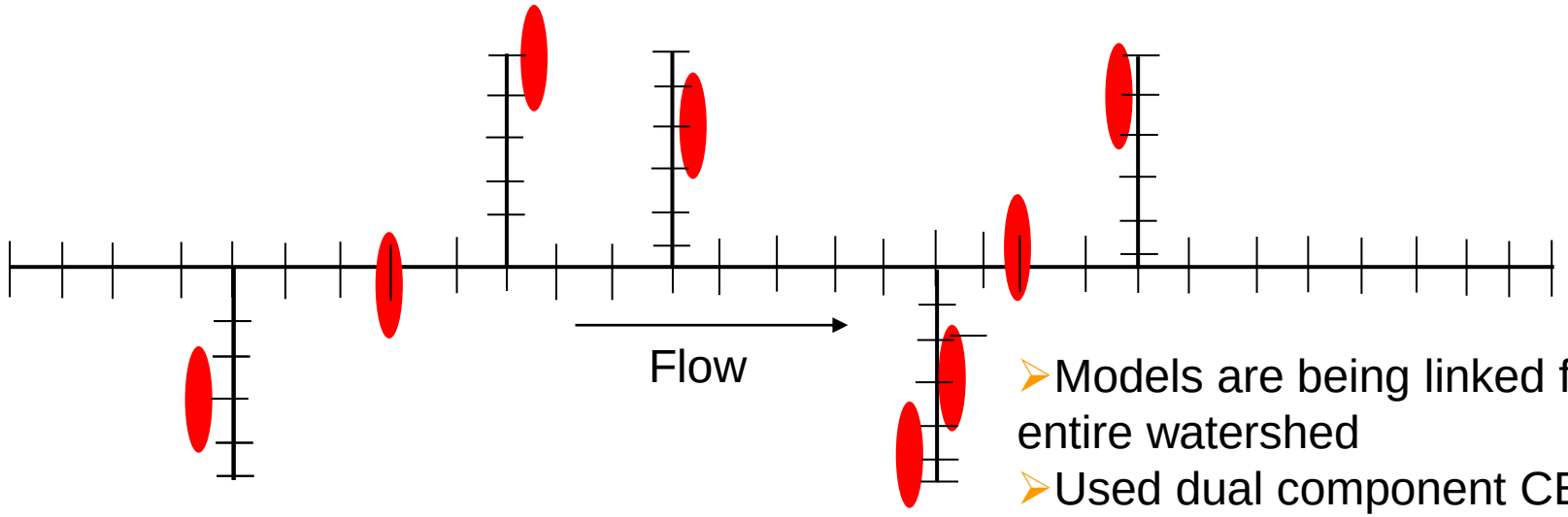
Determines impact of oxygen demanding substances on DO





- Models were for tributaries and short river segments
- Used single component CBOD
- Used higher range of decay rates (k rate)
- Sediment Oxygen Demand (SOD) was not considered

State Water Plan GA DOSAG Models

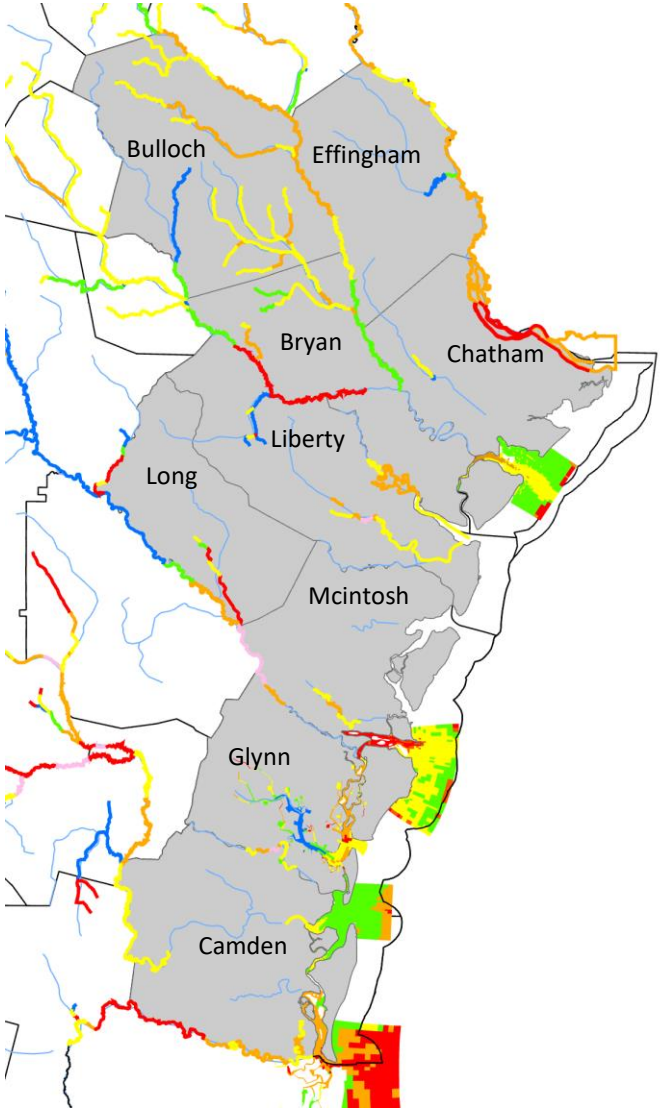


Wastewater Treatment Plant

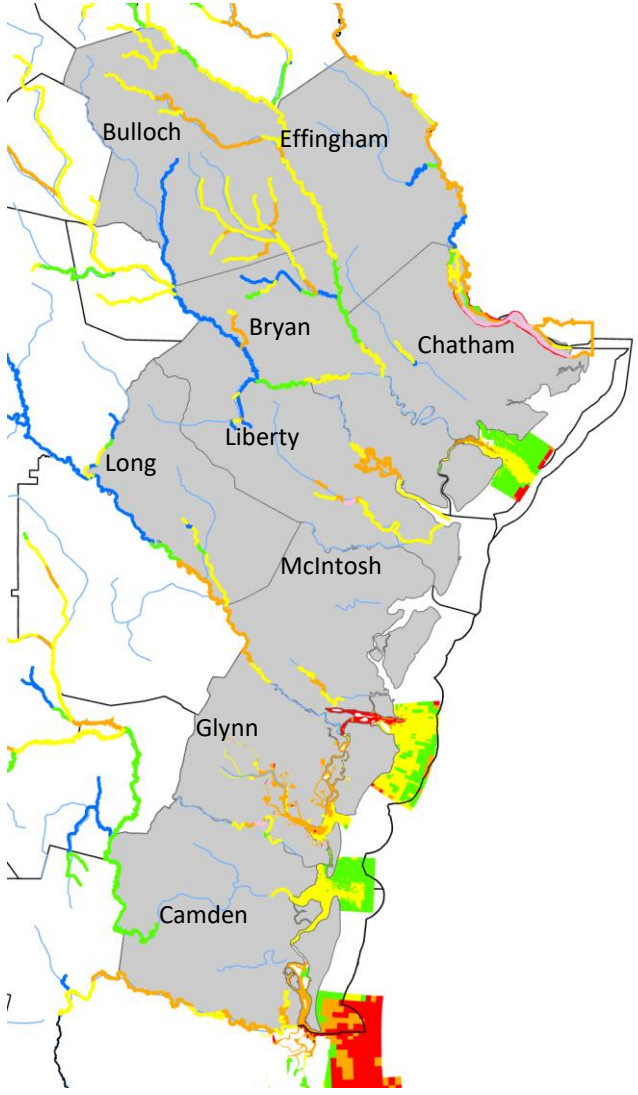
- Models are being linked for entire watershed
- Used dual component CBODs
- Used decays rates from long-term BOD test results
  - Instream
  - Effluent
- Sediment Oxygen Demand is being considered

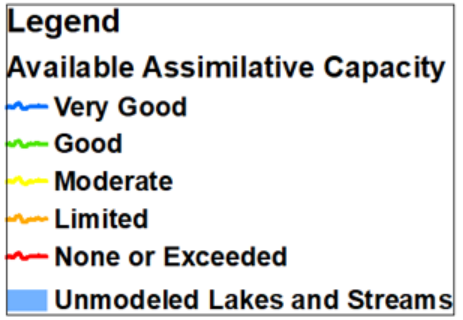
DO Conditions: Coastal Georgia Counites

Current Conditions



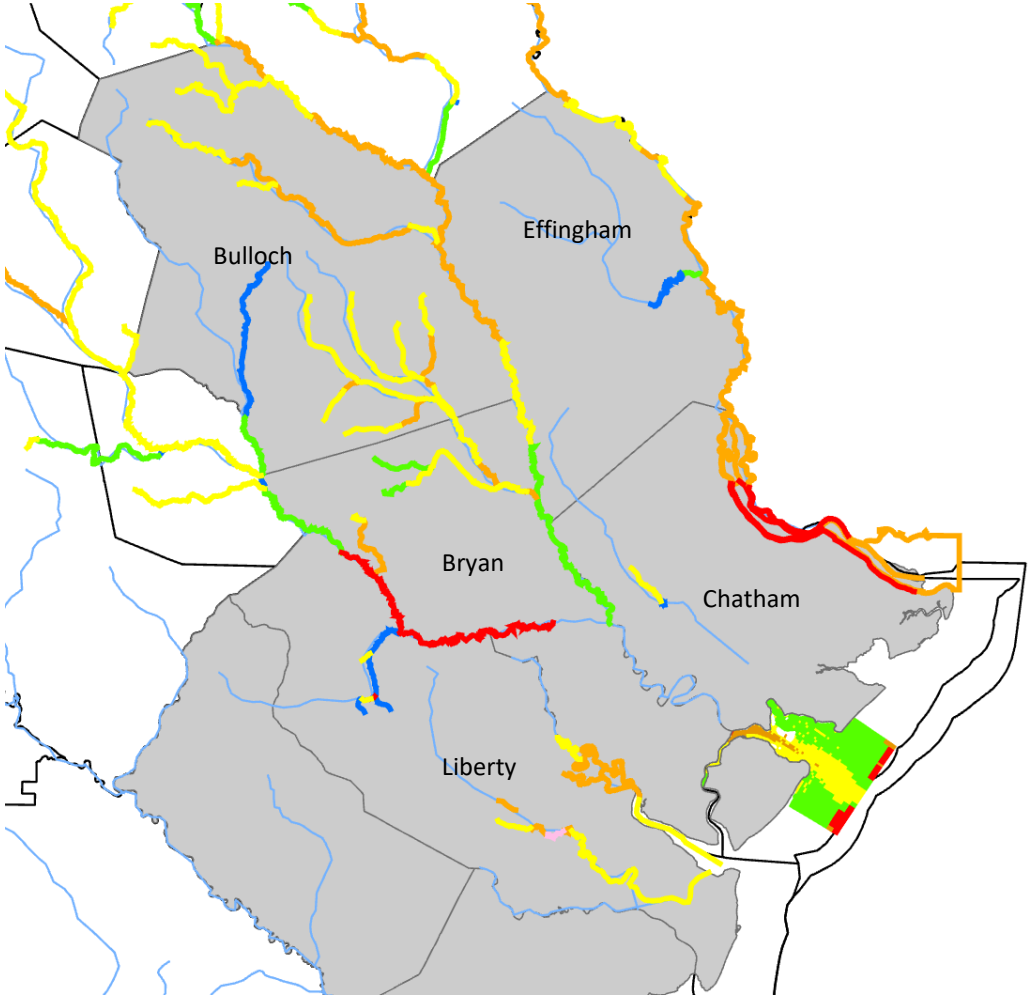
Future Conditions





DO Conditions: Savannah and Ogeechee River Basins

Current Conditions



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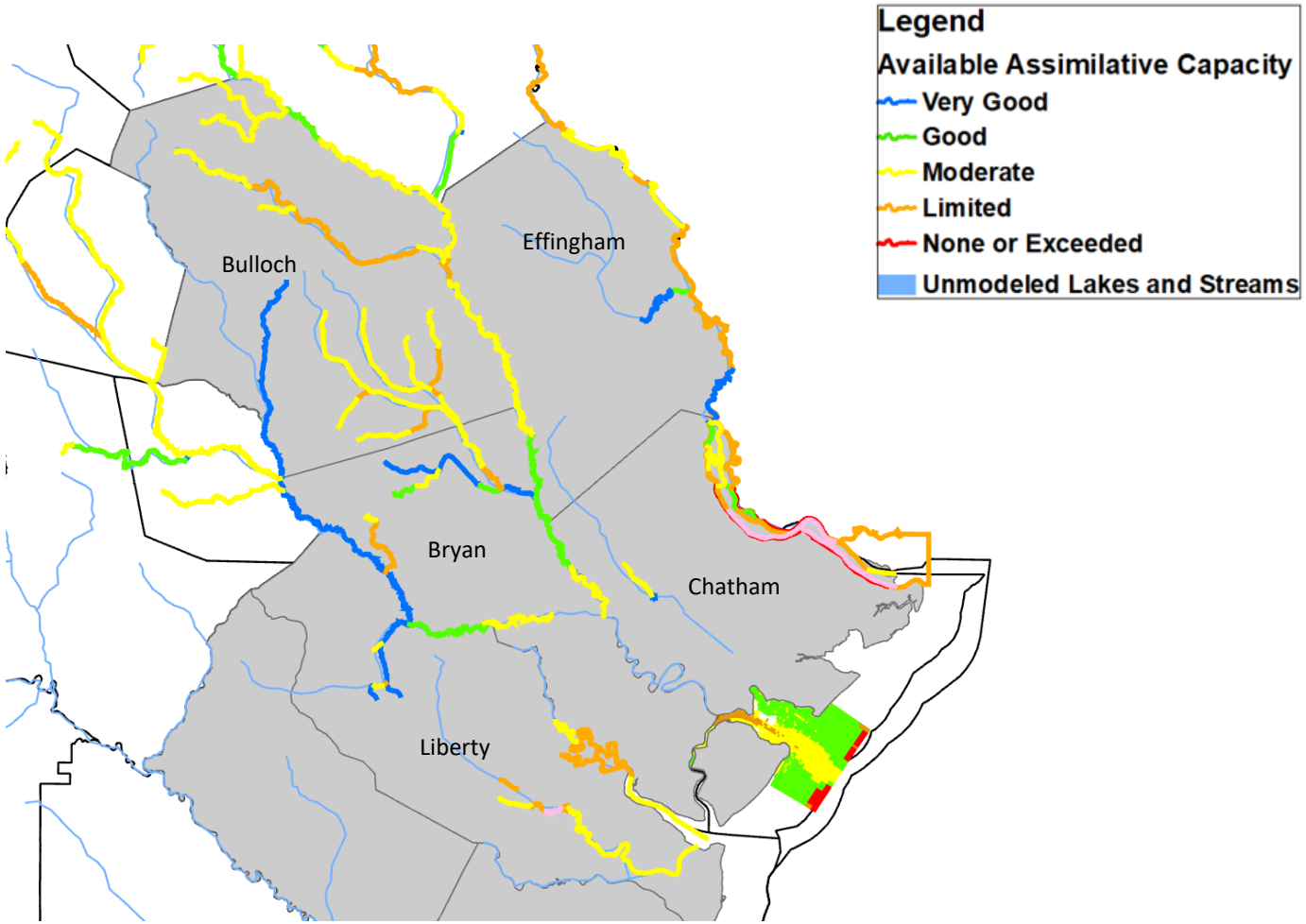
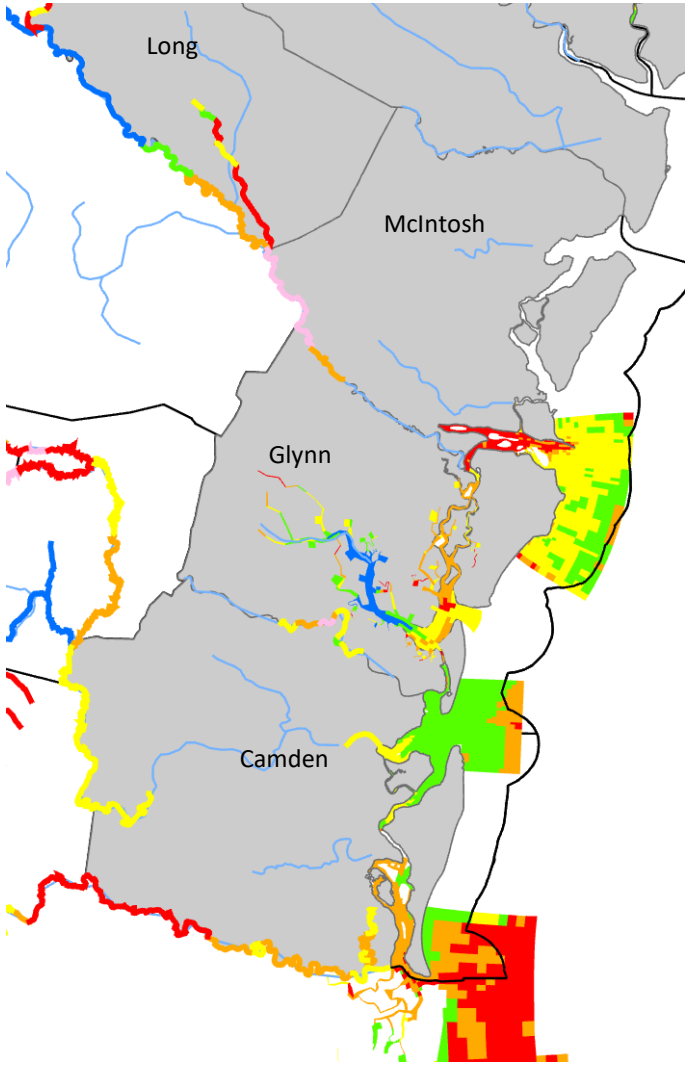


DO Conditions: Altamaha, Satilla & St Marys River Basins

Current Conditions



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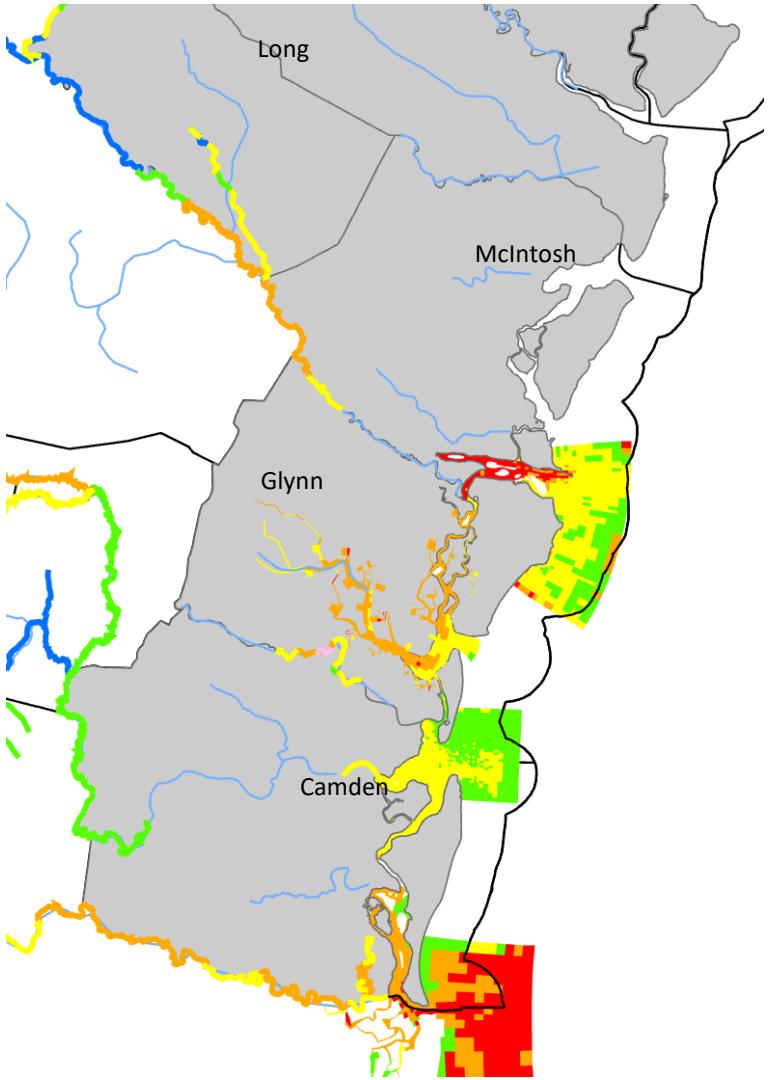
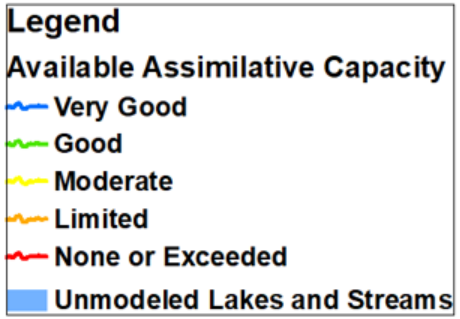
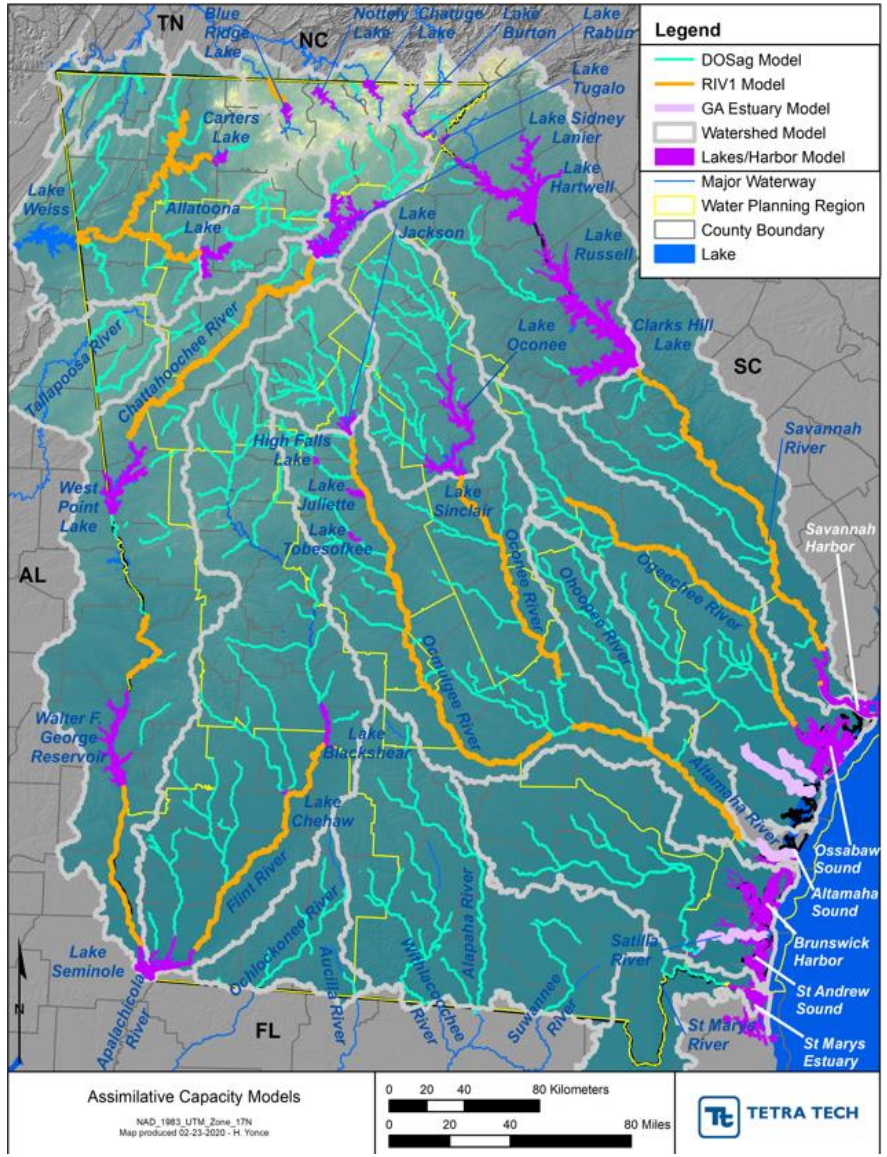




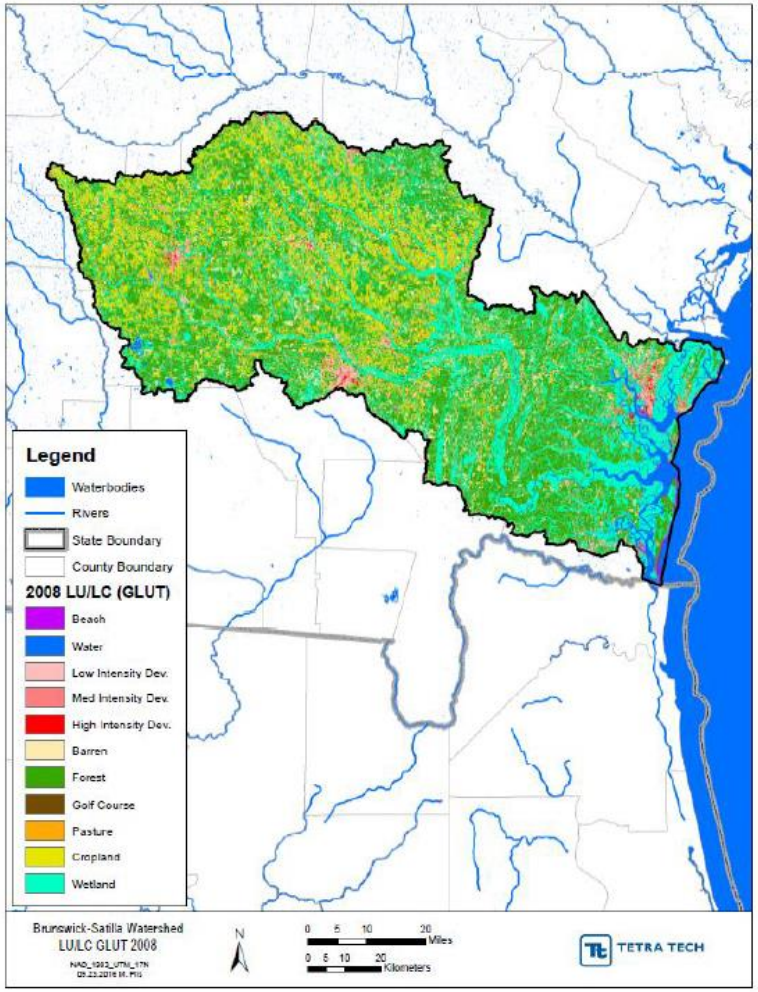
Watershed Modeling

- The LSPC models are not updated at this time, but updates are underway
  - Time-varying landuse inputs
  - Updated meteorological conditions using radar
- Current Conditions:
  - Dischargers at 2019 permit limits
- Future Conditions:
  - 2060 assumed permit limits based on previous forecasted flows
- Heat Maps
  - Loadings – by subbasin – under representative wet and dry years
  - Biochemical Oxygen Demand (BOD)
  - Total Nitrogen
  - Total Phosphorus

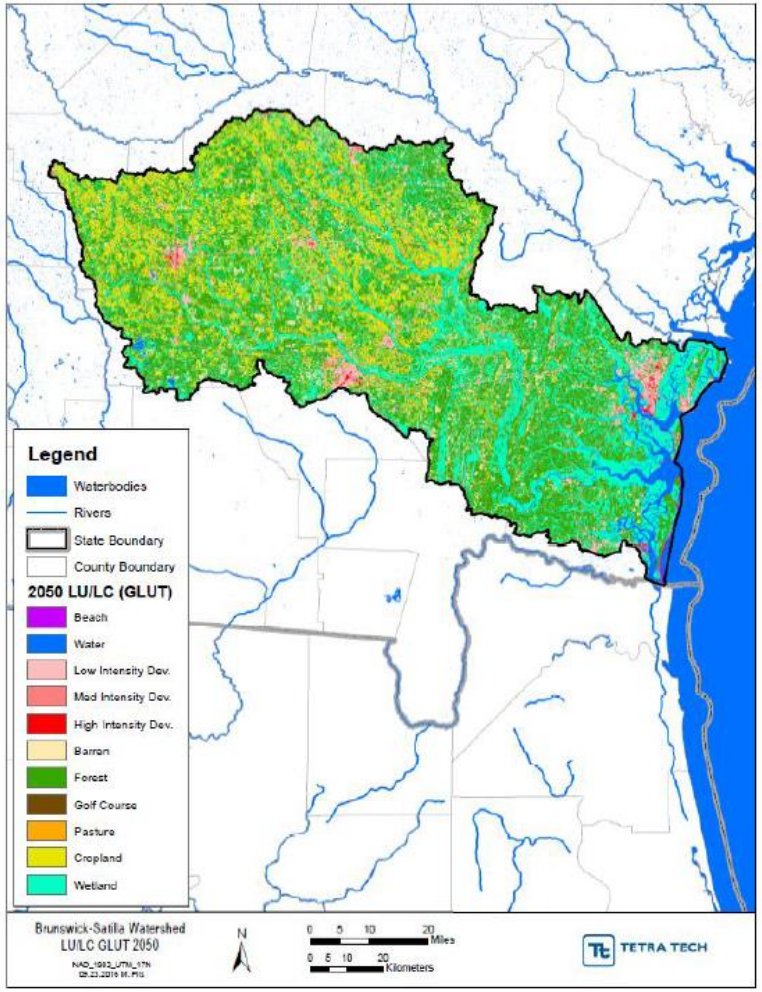


Landuse Changes (2008-2050)

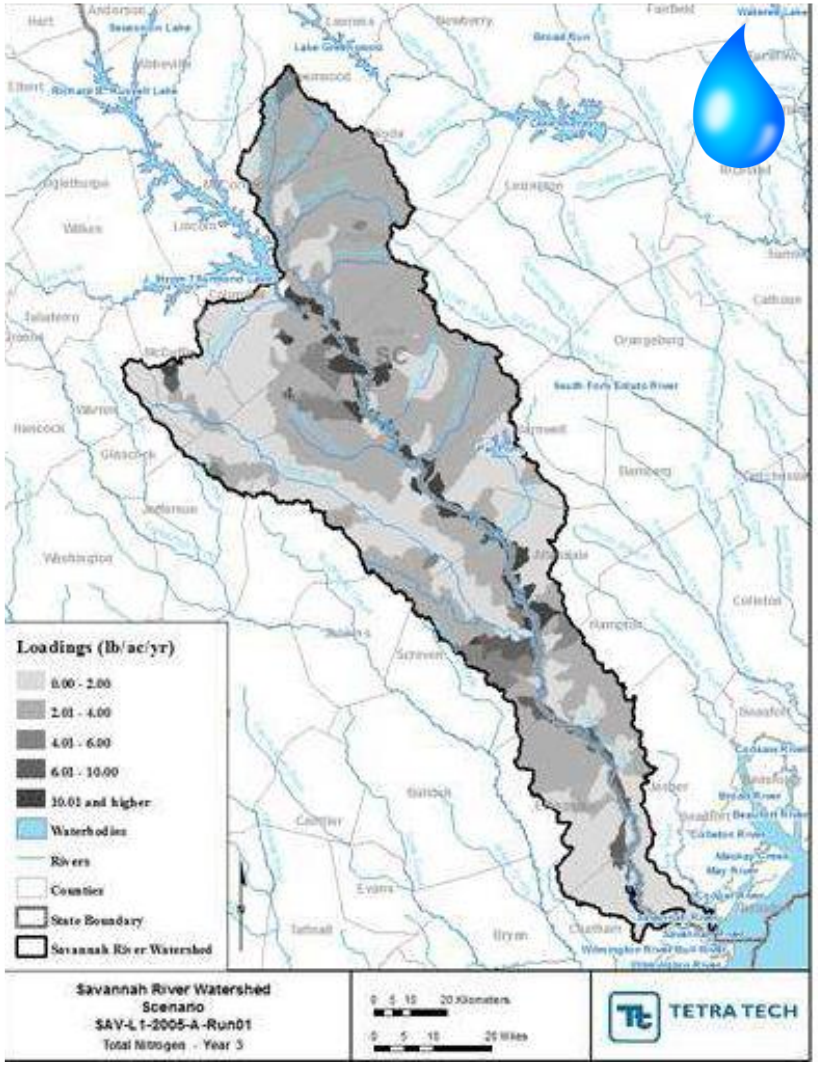
Satilla Basin Landuse (2008)

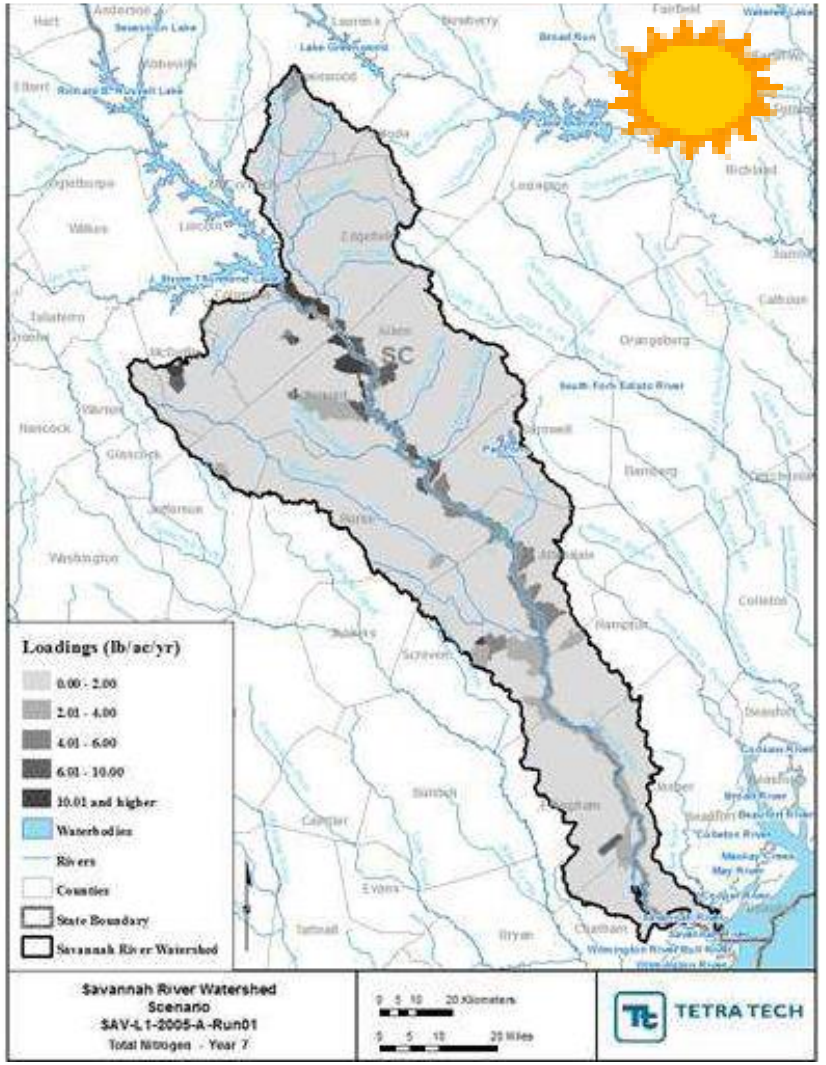


Satilla Basin Landuse (2050)



Watershed Model Total N Loads





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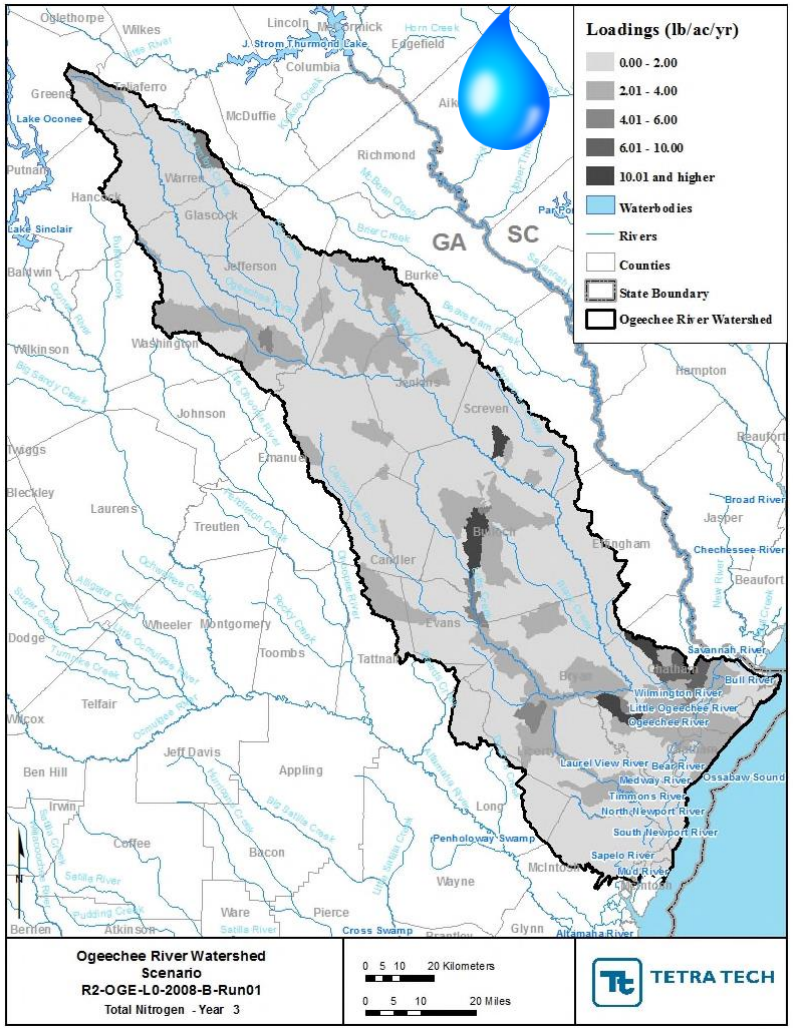

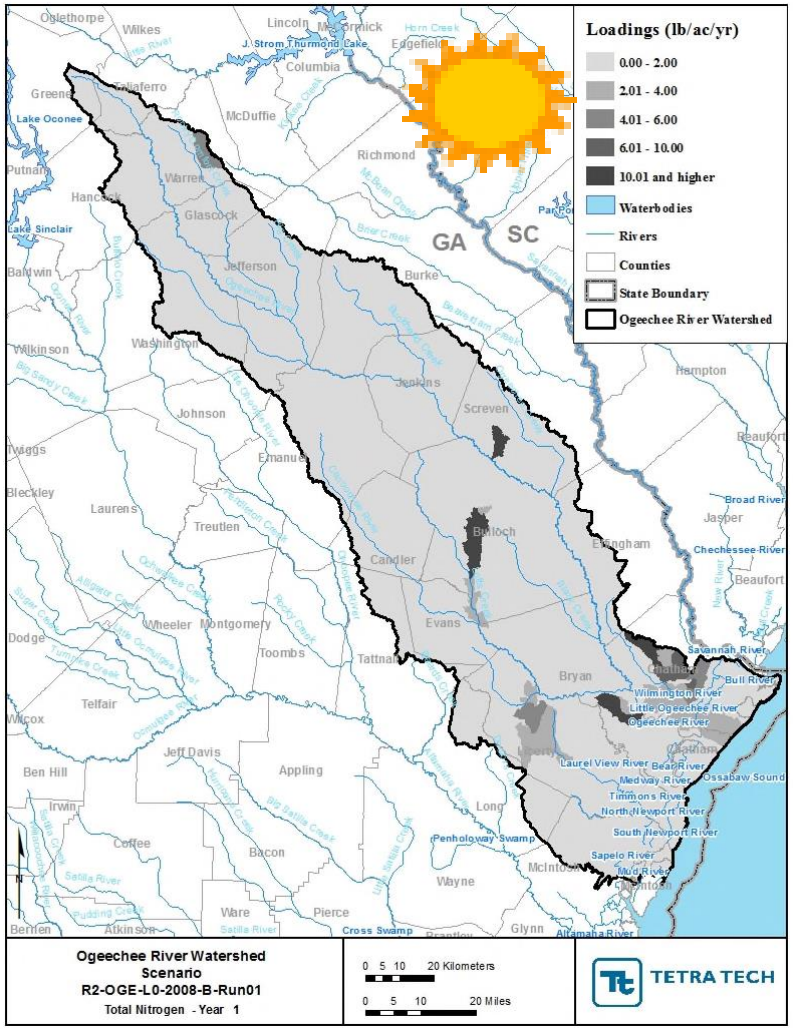

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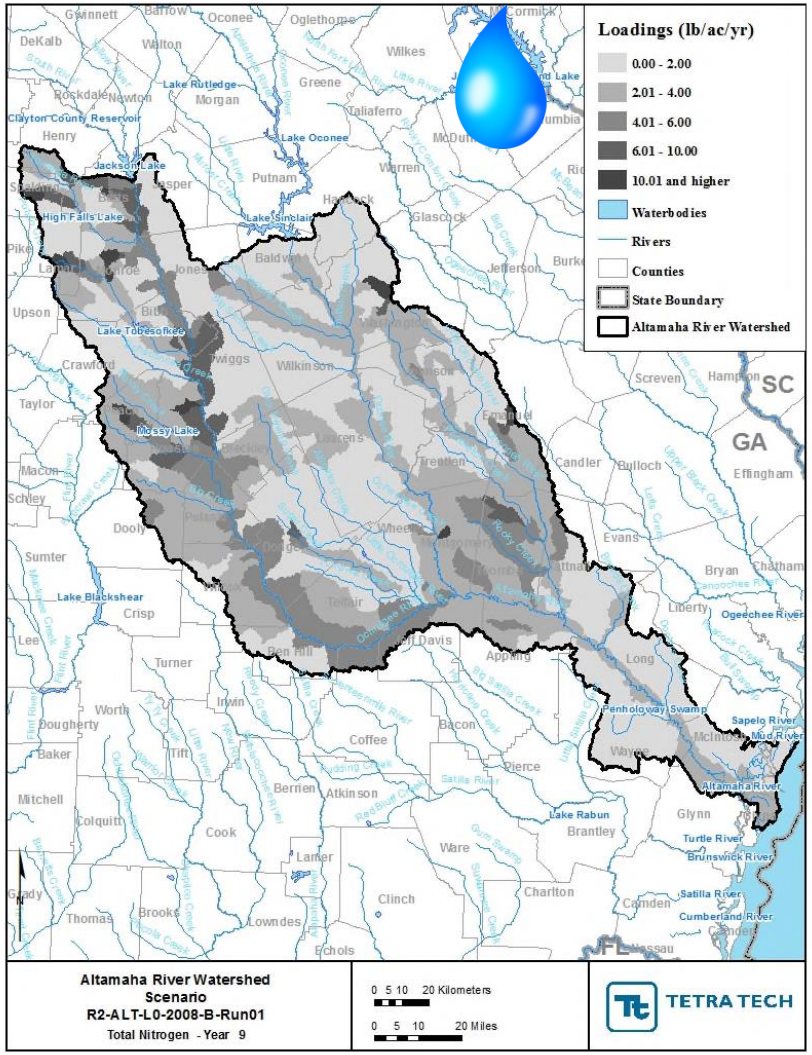

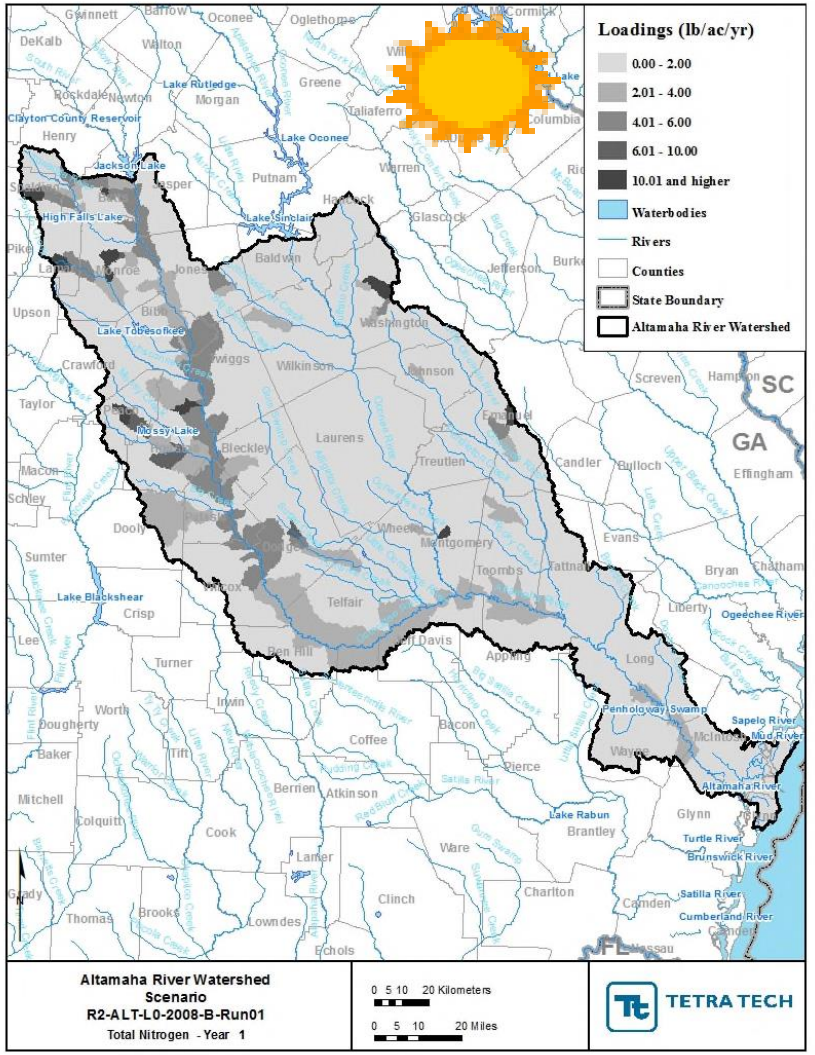

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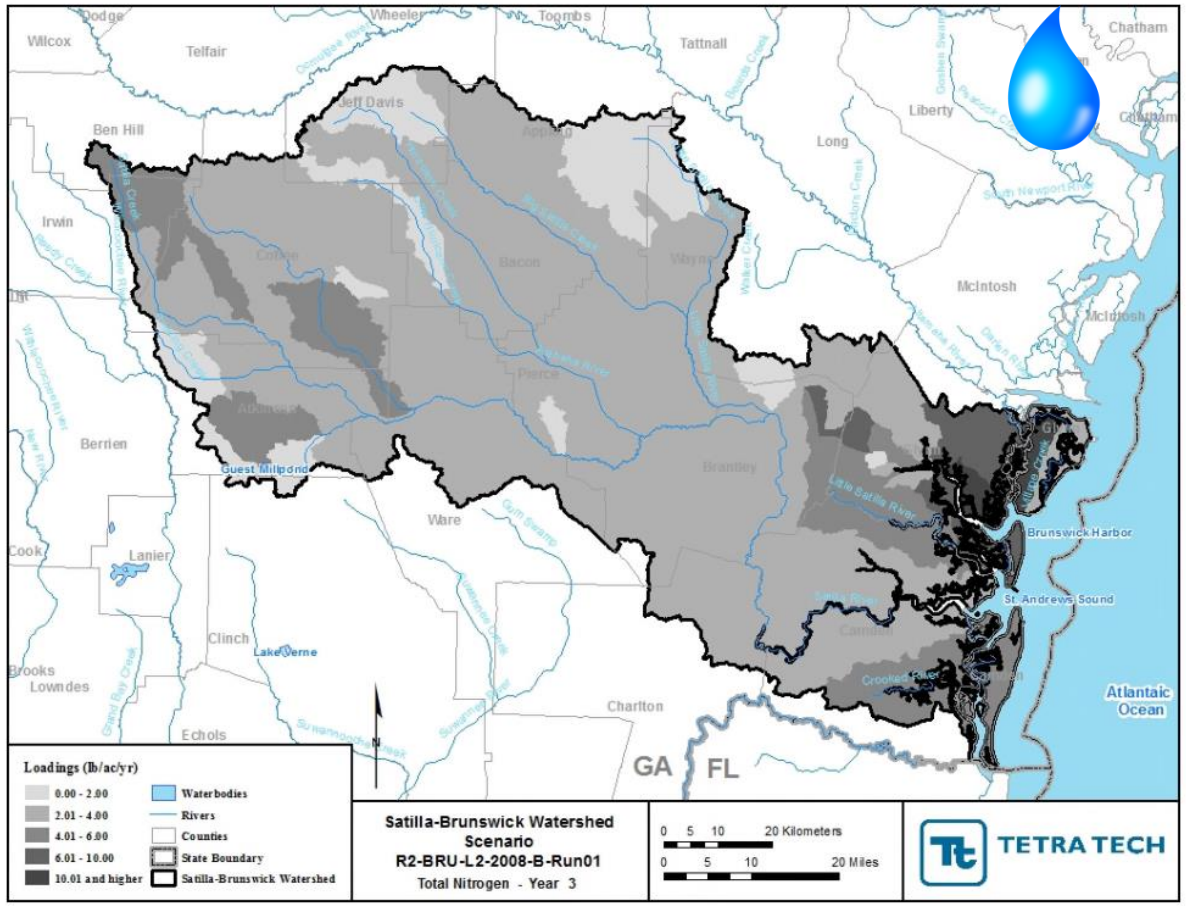

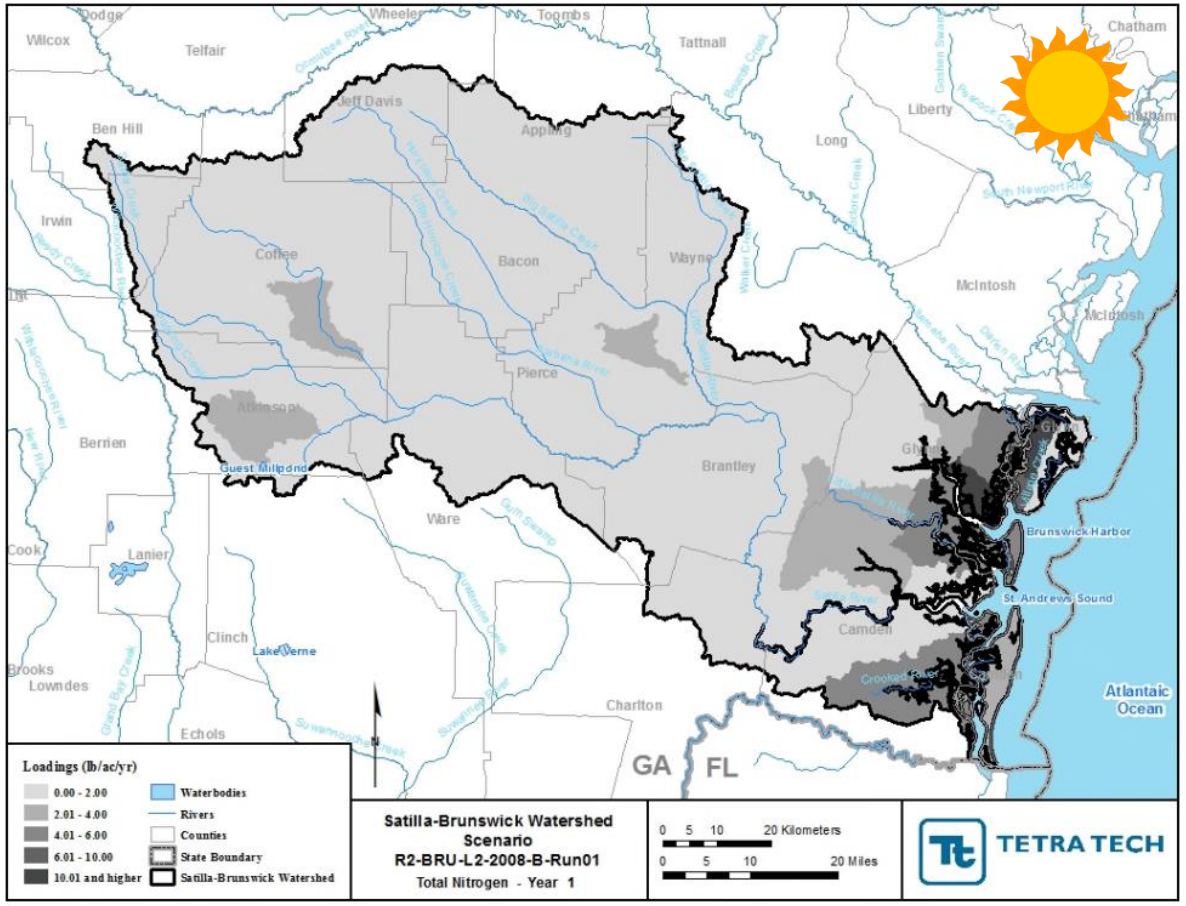

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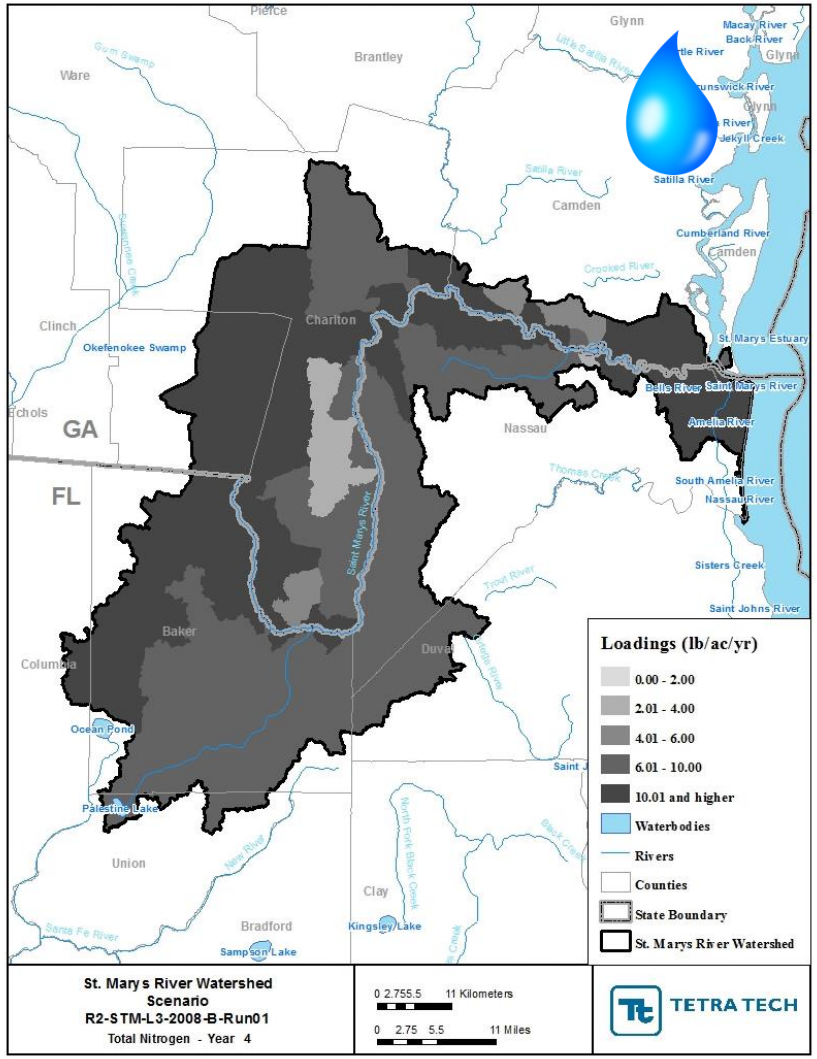

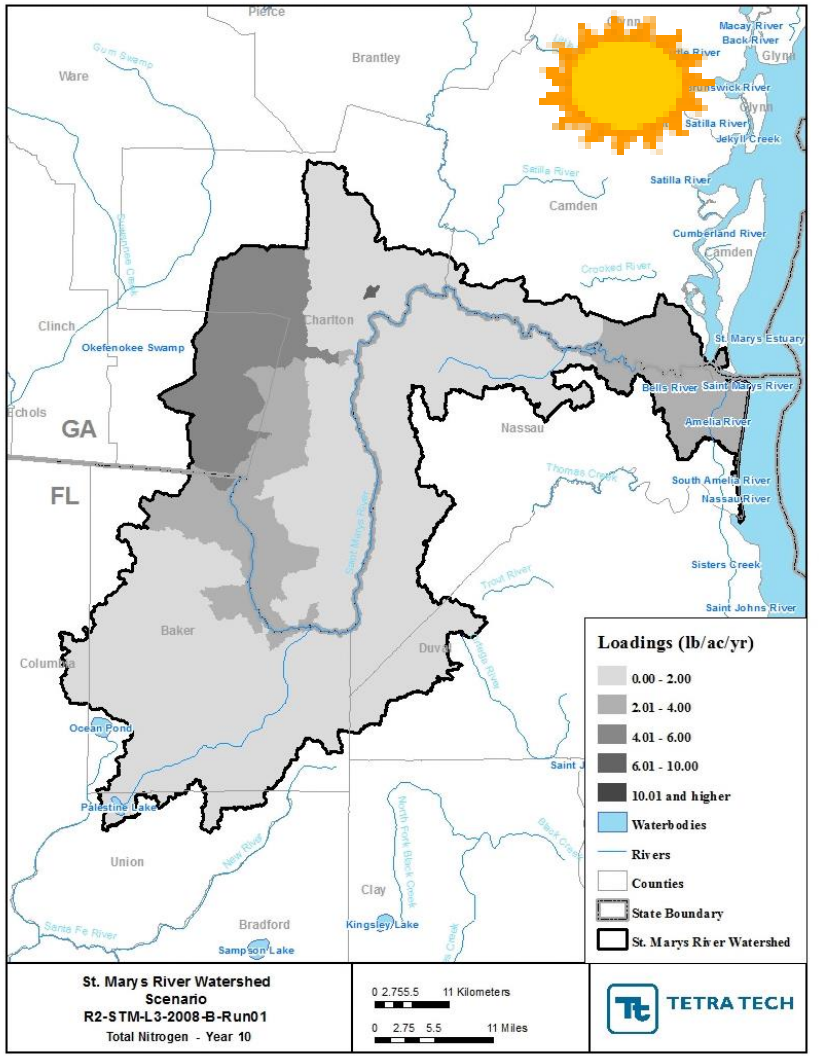

2022 305(b)/303(d) Listed Segments

Impairments	Extent
None	5,572 miles
Assess Pending	1,412 miles
Impaired	10,205 miles
Pathogens	5,600 miles
Biologic Integrity	3,559 miles
Mercury	1,803 miles
Dissolved Oxygen	1,267 miles
PCBs	680 miles
Metals	328 miles
Other	477 miles