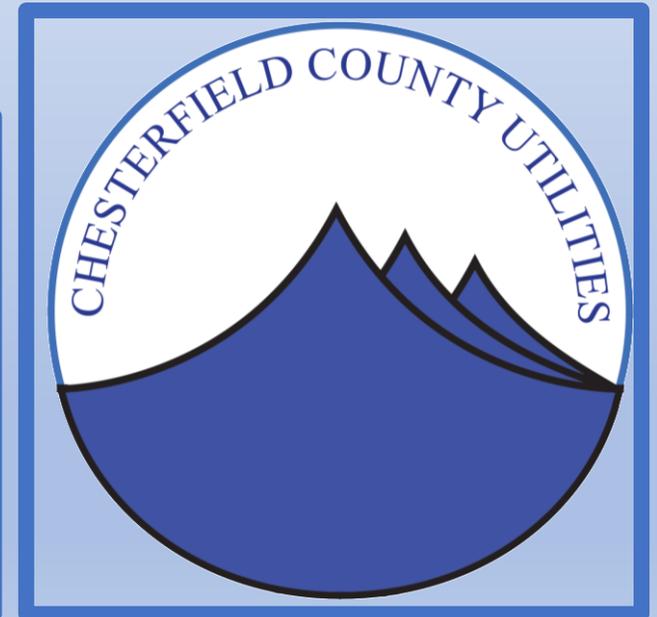


Environmental Stewardship

DEPARTMENT OF UTILITIES



Environmental Stewardship



- Wastewater Collections
- Industrial Pretreatment Program
- Wastewater Treatment
- Water Distribution
- Water Treatment



Wastewater Collections Inflow and Infiltration Reduction Program



- Large Wastewater Collection System
- Rainfall inflow & groundwater infiltration increase operational and CIP costs
- Leaking manhole covers contribute rainfall induced inflow
- Proactively installing manhole inserts; reducing inflow & cost
- ROI - 1,000 inserts, 2.5 GPM reduction/each, hour rainfall event, reduces volume 150,000 gallons. 1,000 inserts \$60K; CIP plant expansion cost avoidance \$1.5M



COURTHOUSE RD

Utilities Operations Center

Stormwater Improvement Projects

Legend

- Stormwater Ditch
- Stormwater Pipes



PUBLIC WORKS RD

9200

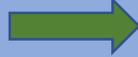
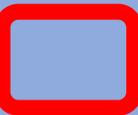
COURTHOUSE RD

PUBLIC WORKS RD

Utilities Operations Center

Stormwater Improvement Projects

Legend

-  Stormwater Ditch
-  Stormwater Pipes
-  Drainage Flow
-  Spoil Pile



COURTHOUSE RD

Utilities Operations Center

Stormwater Improvement Projects

Legend

- Stormwater Ditch
- Stormwater Pipes
- Drainage Flow
- Spoil Pile
- Wash Station



Utilities
Operations
Center

Stormwater
Improvement
Projects



**Construction
Vehicle Wash
Down Area**

**Spoil Pile
Containment
Area**

Utilities Operations Center Stormwater Improvement Projects



Construction vehicle wash-down area



Check dams installed in concrete drainage ditch



Industrial Pretreatment Program



- 26 of 35 permitted industries receive achievement awards in various categories.
- Award winners published in the newspaper and provided cost saving monitoring relief.
- Program success - no Significant Non-Compliance (SNC) / zero fines.



Year	Notice of Violations	Warnings	Fines / Penalties \$	Administrative Orders for Significant Non-Compliance (SNC) Status
2016	35	1	0	0
2017	30	0	0	0
2018	10	1	0	0

Wastewater Treatment



- Chesterfield County is a leader in protecting the water quality in the James River and the Chesapeake Bay.
- Both plants have installed advanced Biological Nutrient Removal (BNR) technologies to remove nutrients.
- Approximately 2,500,000 pounds of nitrogen and 385,000 pounds of phosphorus removed each year!

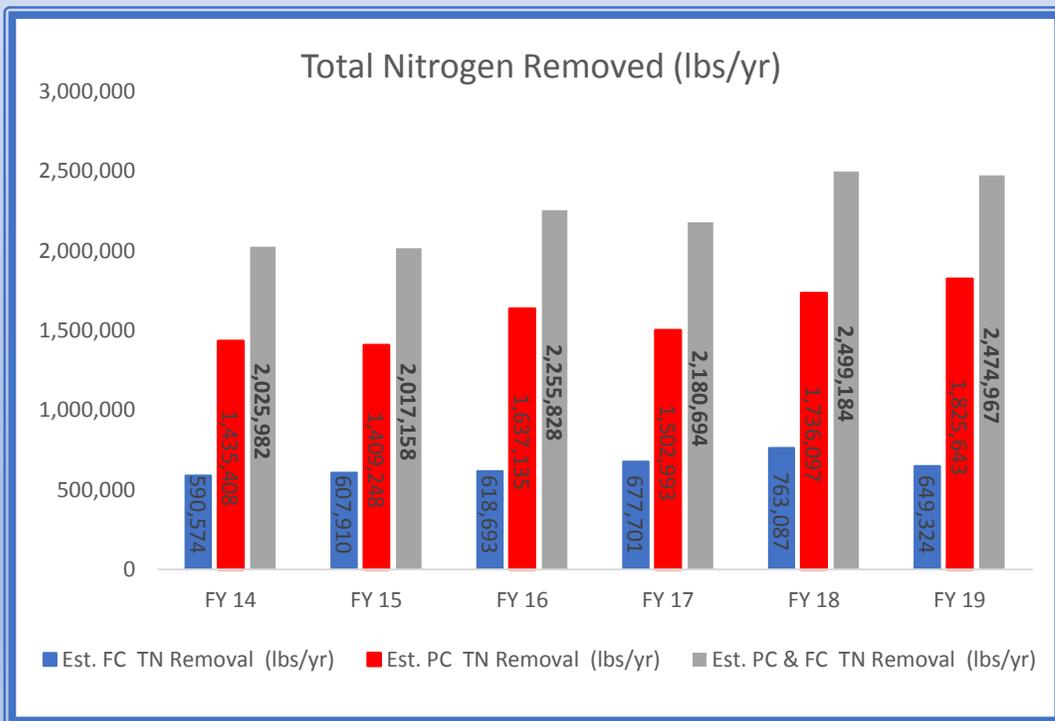




Wastewater Treatment

Current Nitrogen Removal = 2.5M pounds per year

- Equal to removing 208,000 bags of fertilizer per year!
- Equal to the volume of more than two Olympic-sized swimming pools of dry fertilizer!

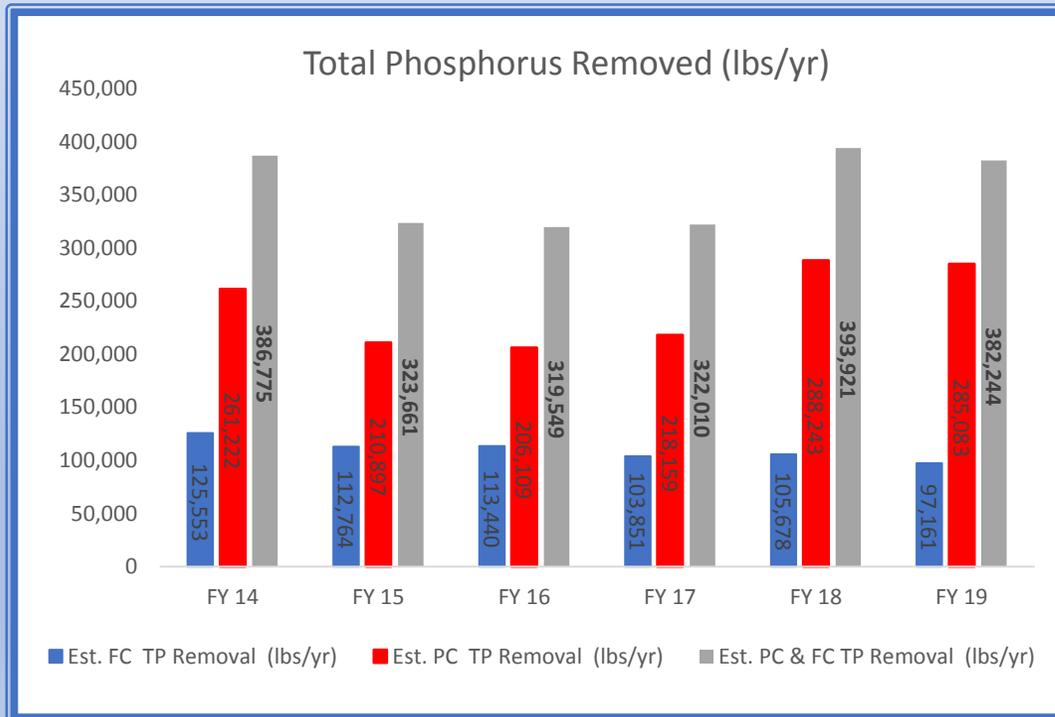




Wastewater Treatment

Current Phosphorus Removal = 385K pounds per year

- Equal to removing 192,000 bags of fertilizer per year!
- Equal to the volume of more than two Olympic-sized swimming pools of dry fertilizer!



Wastewater Treatment



Stormwater Management

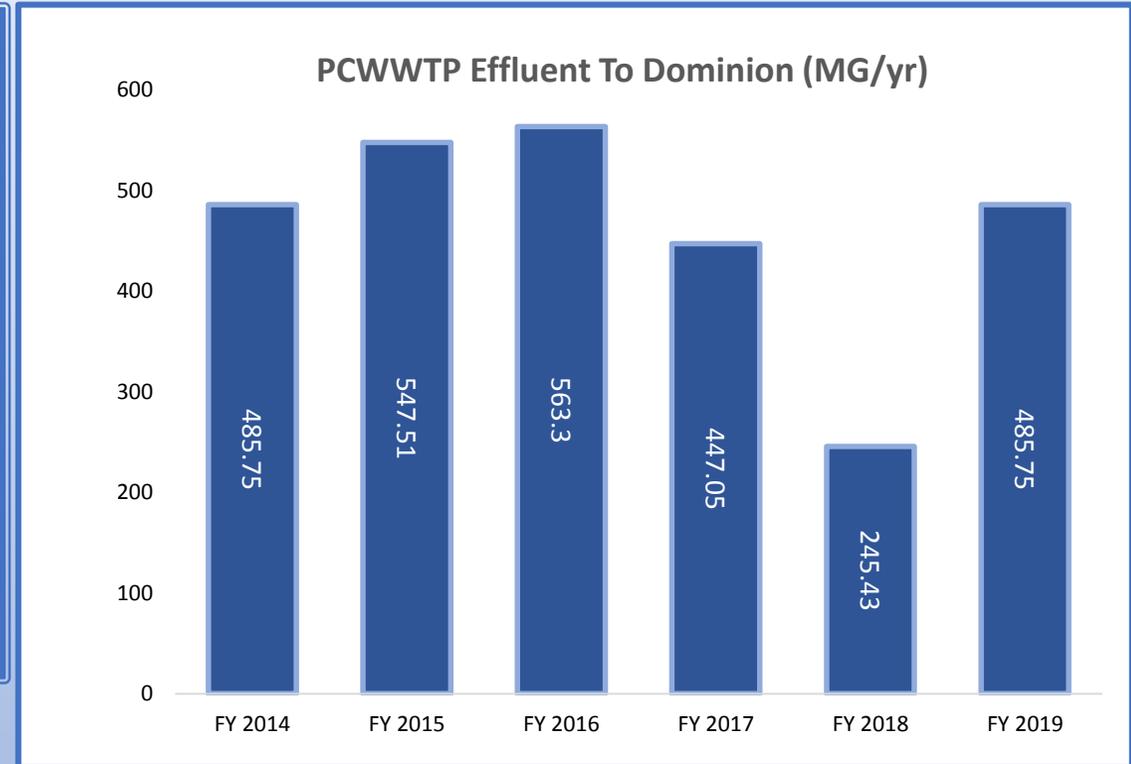
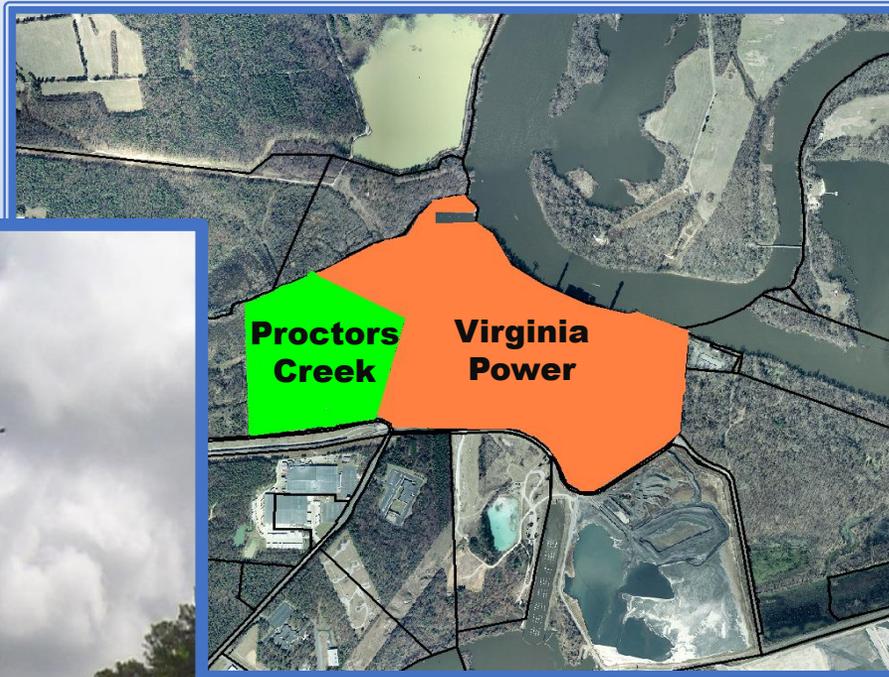
- No Exposure Certificates from DEQ
- All chemical storage and delivery systems have containment at both facilities. Operating procedures have been established to minimize the risk of spills and respond to spill events.
- Motorized gates installed at each stormwater discharge point at both facilities. In the event of a spill, these gates are close to prevent deleterious discharges into nearby waterways.



Wastewater Treatment



Water Reuse



- Dominion Energy's Dutch Gap Power station uses 0.5 to 1.5 million gallons/day of treated effluent from the PCWWTP to remove sulfur from flue gas.

Wastewater Treatment



Benefits of Water Reuse

- Reclaimed water used to reduce air pollution; efficient 98% removal of sulfur dioxide emissions.
- Reduced nutrient loadings to the James River and the Chesapeake Bay.
- Dominion responsible for nutrient loadings; Chesterfield preserves plant capacity; equivalent to 1,200 residential connections in FY 2018.





Water Distribution

- Aerosol can puncturing unit and procedure to properly dispose of residual liquids and recycle empty aerosol cans.
- Meter Replacement Program - recycling old water meters to minimize waste and reduce cost.



Meters to be recycled



Can puncturing unit



Water Distribution

- Remove chlorine from the water flushed from fire hydrants to eliminate adverse effects to the environment.
- One method is environmentally friendly dechlorinating tablets.



Dechlorination tablets in a flushing diffuser



Dechlorination tablets in a flushing mat

Water Treatment



Algal Monitoring and Control



LG Sonic - Latest technologies for monitoring algal populations:

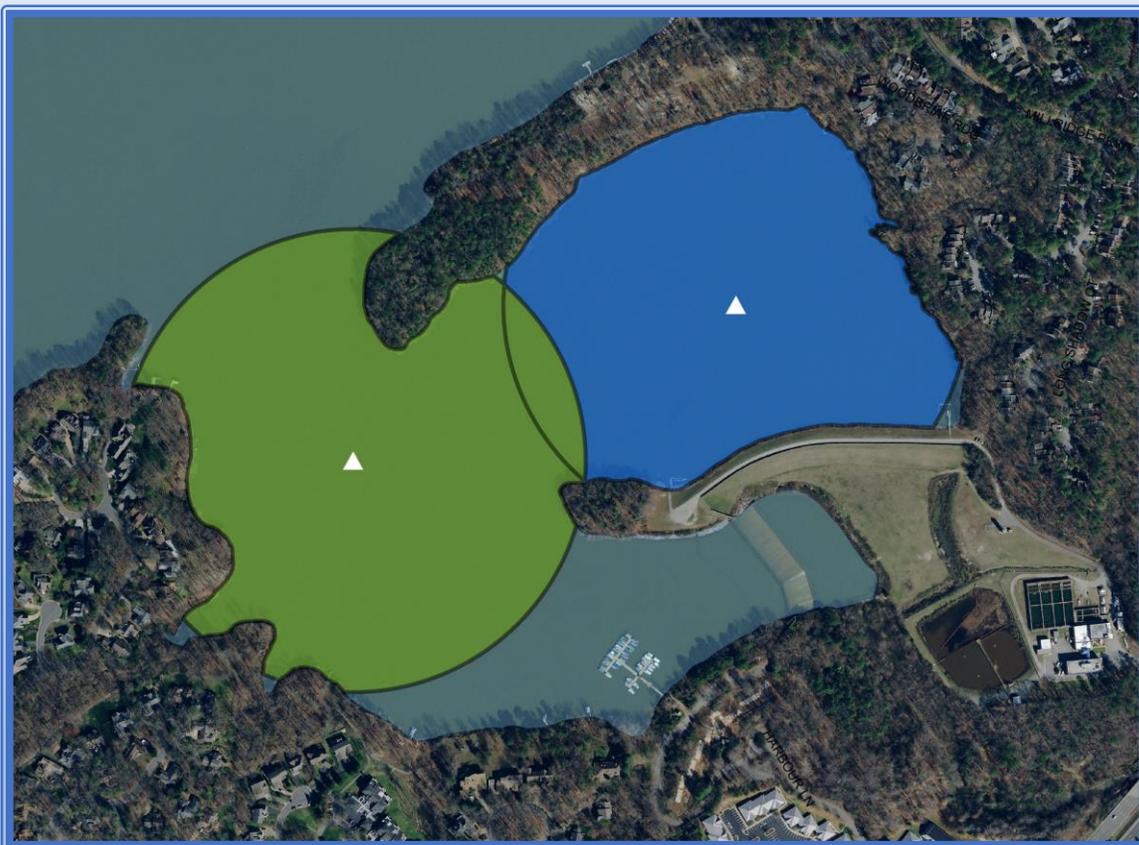
- Solar Powered
- Continuous sensors
- Transmission of real time data
- Algal control by ultrasound

One of two units located in intake bay. Approximate dimensions are 7 feet x 8 feet x 3 feet high.



Water Treatment

Algal Monitoring and Control



Ultrasonic range 1,600 feet, two buoys cover entire intake bay.

How it Works

Ultrasound frequency and power to destroy gas vesicles in the blue-green algae, causing them to sink and naturally decay.

Impact to Environment

Proven to be safe for fish, plants, zooplankton and insects.

Environmentally friendly solar powered.



Water Treatment

Hydrilla Monitoring and Control Program

- 2009 the invasive weed hydrilla first was identified in the Swift Creek Reservoir
- 2010 Reservoir Hydrilla Management Group Formed



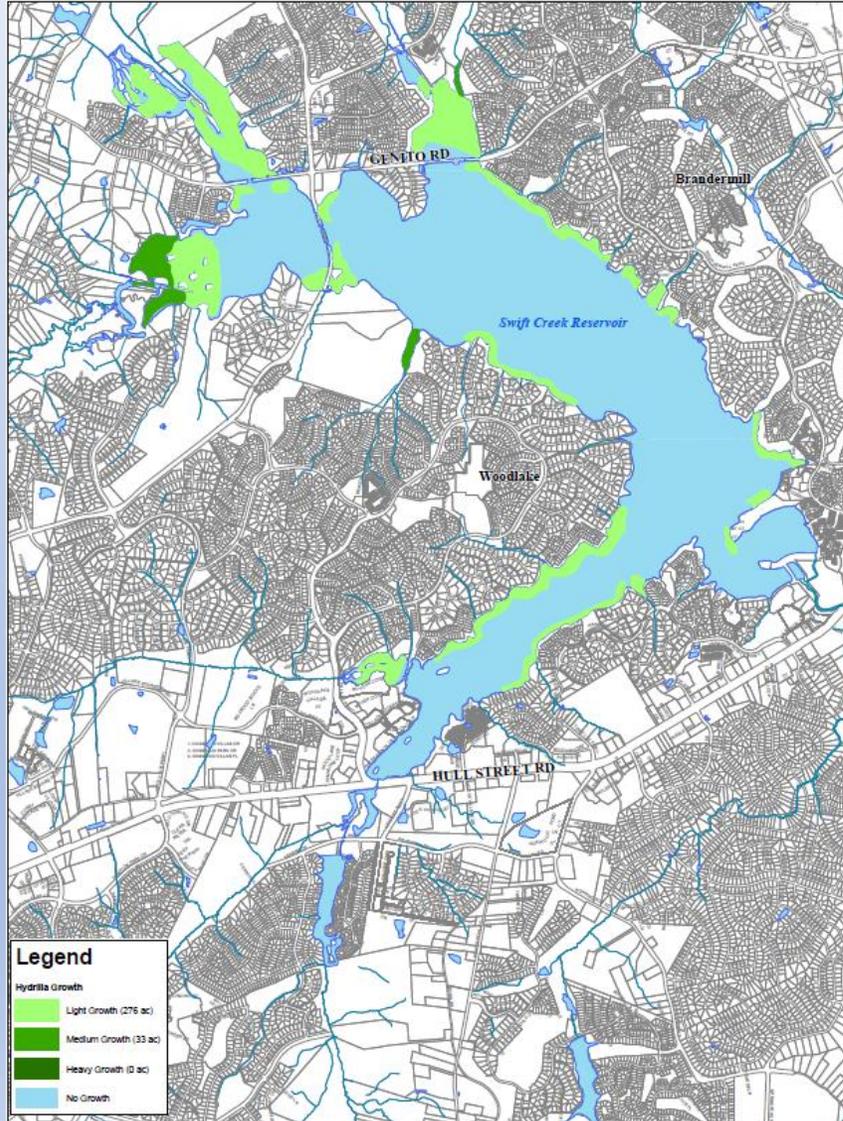
- Hydrilla Monitoring and Control program aimed at protecting the Swift Creek Reservoir as a long-term water supply.

- Triploid Grass Carp were identified as the most cost-effective and environmentally-friendly solution to control hydrilla, as they prefer hydrilla as their food source.

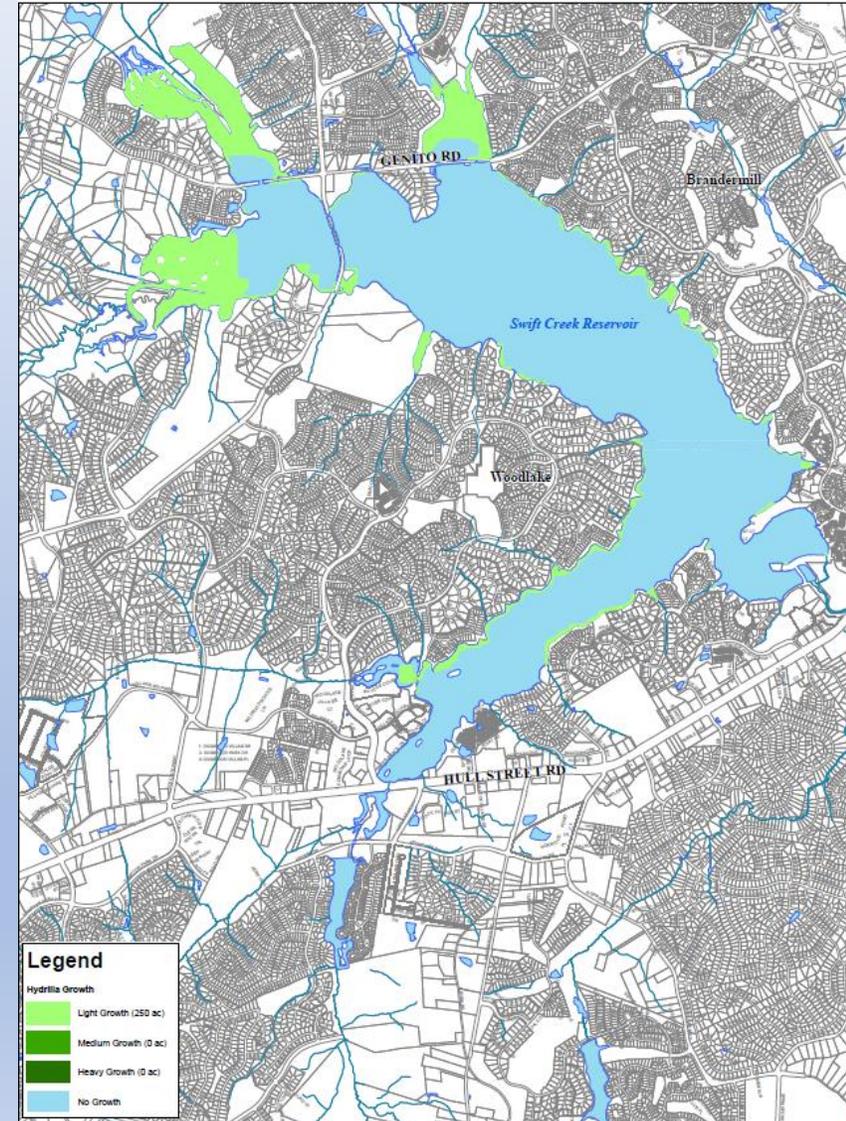
June - Hydrilla Monitoring and Control Program



June 2018 — 309 acres



June 2019 — 250 acres





The Annual Water Quality Report is available online or by
calling 804-748-1876.