COOPERATIVE EXTENSION

College of Agriculture, Forestry and Life Sciences

STORMWATER & LITTER: A LOCAL COLLABORATION

Cassie Castleberry

Water Resources

Sumter County & City of Sumter



The College of Agriculture, Forestry and Life Sciences is deeply rooted in Clemson University's heritage as a land-grant institution, advancing founder Thomas Green Clemson's vision of higher education that benefits South Carolina.

Sumter, SC

- According the 2020 census data the population for Sumter County is 105,556 (16th most populated county in SC)
- Of that total, 43,463 people live in the city (10th most populated city in SC)
- 46 counties total





Becoming a small MS4

- Sumter County obtained coverage under the state of SC National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges from regulated Small MS4s on September 24, 2007.
- SCDES (SC Department of Environmental Services) issues these permits
- Population threshold for becoming a small MS4 (Municipal Separate Storm Sewer System) is 50,000 however DES can require MS4 permits for municipalities that are showing an adverse effect on the water quality in the area.
- SC has 1 large MS4 (SCDOT), 3 medium MS4s (City of Columbia, Greenville County, and Richland County), and over 70 small MS4s.
- 6 Minimum Control Measures are listed in Sumter's MS4 permit.

Public Education and Outreach
Public Involvement and Participation

- These 2 are my main focus.
- Partnership with Clemson University Extension Service
- Educational consortium
- To inform the Sumter community about water quality issues through advertising campaigns, school programs, tabling at community events, presentations at public events and local groups.

Carolina CLEAR by Clemson Extension

SUMTER STORMWATER SOLUTIONS BY CLEMSON EXTENSION

ANDERSON & PICKENS COUNTIES stormwater PARTNERS BY CLEMSON EXTENSION

ASHLEY COOPER STORMWATER EDUCATION CONSORTIUM BY CLEMSON EXTENSION

COASTAL WACCAMAW STORMWATER EDUCATION CONSORTIUM BY CLEMSON EXTENSION

LOWCOUNTRY STORMWATER PARTNERS By Clemson Extension

FD FLORENCE/DARLINGTON STORMWATER CONSORTIUM BY CLEMSON EXTENSION

Partnerships

The success of any MS4 is in its partnerships.

Sumter Soil & Water Conservation District

CLARENDON SWCD

CENTRAL CAROLINA TECHNICAL COLLEGE

PRISMA HEALTH SHOT POUCH GREENWAY

POINSETT STATE PARK

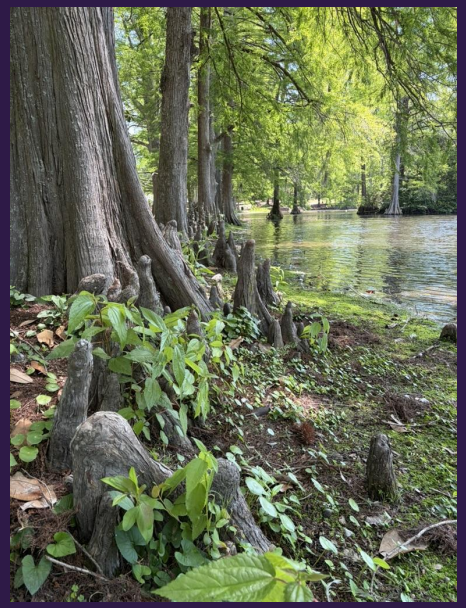
CITY OF Sumter SOUTH CAROLINA

UNIVERSITY OF South Carolina SUMTER

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Welcome to the Swamp



Level II Arboretum
Awarded the 2021
Heritage Tree Award

FREE!





Began in 1927 as a private fishing retreat for Hamilton Carr Bland.

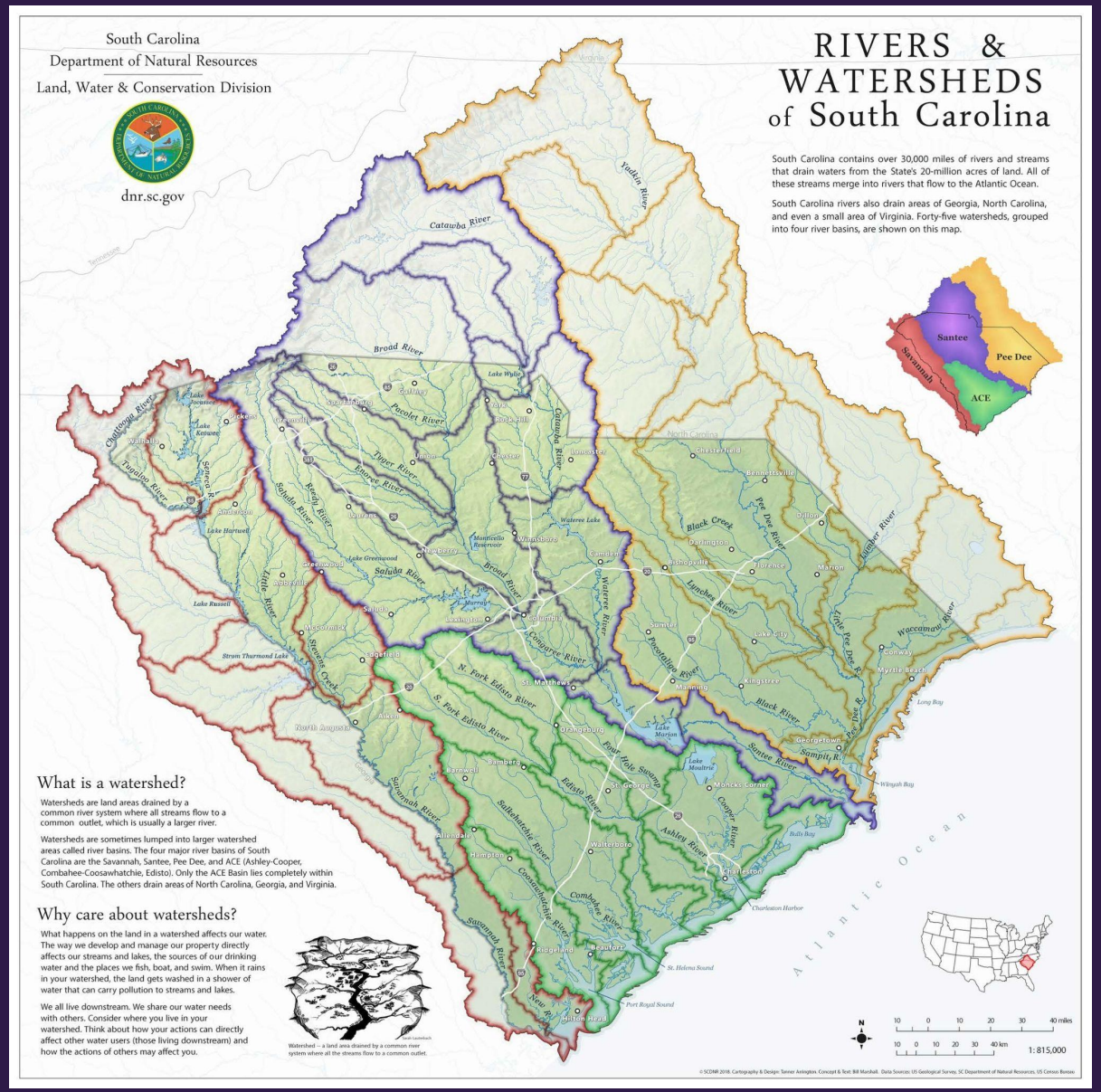


SC oldest festival-the Iris Festival



Only public park in the US to have all 8 swan species

Swan Lake Iris Gardens
822 W. Liberty St.
Sumter, SC



Shot Pouch Creek & Turkey Creek

- 2 significant creeks in Sumter
- Both are shallow sandy bottom creeks surrounded by bottomland hardwood forests (river swamps)
- “Bottomland Hardwoods serve a critical role in the watershed by reducing the risk and severity of flooding to downstream communities by providing areas to store floodwater. In addition, these wetlands improve water quality by filtering and flushing nutrients, processing organic wastes, and reducing sediment before it reaches open water.”
- “Two hundred years ago, magnificent bottomland forests covered almost thirty million acres across the Southeastern United States. Today, only about forty percent of that area still supports these productive and unique ecosystems. Is is estimated that losses of these swamps reached rates as high as 431,000 acres per year from 1965 to 1975, largely due to conversion to croplands, particularly for soybeans. In some regions of the lower Mississippi floodplain, only a very small percentage of original bottomland hardwood forests remain.”

EPA. (Last updated on April 15, 2026). *Bottomland Hardwoods*. epa.gov. https://www.epa.gov/wetlands/bottomland-hardwoods#:~:text=Bottomland%20hardwood%20forests%20are%20river,States%2C%20generally%20in%20broad%20floodplains.

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Shot Pouch Creek















Turkey Creek











Beach Sweep/River Sweep
September 19, 2026
Costas Farm







Litter doesn't just "go away".
We all live downstream.

Awareness doesn't = action





Shed light on
what's not seen.

Making the Connections



- 4-H (Cindy)
- City of Sumter (Glenn)
- Sumter Soil & Water Conservation District (Anna)
- Water Goat Initiative
- Visual
- Simple





OUR HISTORY

Soil and Water Conservation Districts (SWCDs) were established in the 1930s as a direct response to the catastrophic erosion of the Dust Bowl, aiming to protect the nation's soil and water resources. These local, nonregulatory government units connect landowners with technical and financial assistance for voluntary conservation practices. There are 46 Districts in SC, one in every county.

WHAT IS A WATERGOAT?

The WATERGOAT is designed to operate successfully in fast moving, rapidly fluctuating waters while collecting large amounts of debris. The WATERGOAT is a highly effective trash barrier system that can by utilized in streams, canals, ponds, and lakes. Sumter is home to a beautiful walking/bike path called Shot Pouch Greenway. The water that runs alongside the Greenway had so much litter and debris. Sumter SWCD saw a need for a way to improve the water quality.



THE GRANT

The PalmettoPride WATERGOAT Program supplies funding directly to WATERGOAT for 25 systems, beginning in 2022. There are approximately 12 WATERGOAT systems available in South Carolina. Sumter SWCD applied and received the grant! This led to multiple collaborations.



COLLABORATION

WITH THE ASSISTANCE OF CLEMSON EXTENSION'S 4-H CLUB, THE CITY OF SUMTER AND CLEMSON EXTENSION'S CAROLINA CLEAR, IN THREE MONTHS 52 BAGS OF LITTER AND A LOT OF DEBRIS HAVE BEEN PULLED OUT OF THE GREENWAY WEIGHING A TOTAL OF 2,048.8, POUNDS!

BEFORE



AFTER



THE RESULTS

CHALLENGES

The area along the Greenway is under development, which has led to major litter from both workers and equipment.



VICTORIES

Collaboration through the community has strengthened each organization! The WaterGOAT has been more successful at keeping Shot Pouch clean than even anticipated.



COMMUNITY BENEFITS

The WATERGOAT as attracted much attention and praise throughout Sumter. The impact has stretched to Swan Lake, a big source of tourism for our city and the many species of plants and animals that live there.



What is 4-H?



What is 4-H?

4-H is the youth development program of Cooperative Extension that provides **hands-on learning experiences** supported by research-based curriculum.

The 4 H's:

- Head – critical thinking
- Heart – belonging & relationships
- Hands – service & teamwork
- Health – wellness & confidence

Who we serve: Youth ages 5-18 through clubs, camps, school enrichment, and afterschool programs.

Impact: Builds leadership, life skills, and career readiness through experiential learning.

4-H makes water stewardship personal





A youth-development story with a civic purpose

- **Youth**
  - **Learn by Doing**
- **Civic Life**
  - **Care becomes Action**
- **Water**
  - **The Shared Place**

Why the Work Matters

- **Youth Development: Build Capability**
  - Youth **practice** observation, communication and leadership.
- **Civic Engagement: Build Belonging**
  - Youth see how everyday choices **connects** to neighbors, public spaces, and local decisions.
- **Learning together: Build a Shared Understanding**
  - Families, educators, city staff, community partners **learn from one another**.
- Benefit
  - ***Conservation most likely to last when people understand both the science and the role in the solution.***

A Practical City of Sumter Collaboration

Start small, make it visible and let the youth take the next step.

- **Learn**
  - Youth explore runoff drainage and water quality in places they know.
- **Connect**
  - Youth work with city staff, families, educators and local agencies and partners on a shared question.
- **Act**
  - Youth share findings and complete a visible stewardship action in Sumter County.
- *A first project could be a youth-led stormwater map story, school-site runoff audit, or neighborhood stewardship day.*
- Next step could be to have 4-H + City of Sumter + Local Community partners to choose one shared pilot question.

4-H Collaboration in Practice

Sumter County 4-H Water Goat Project:

September 5, 2026, Water Goat Lunch & Learn: Ending Pollution: A Local Call to Action

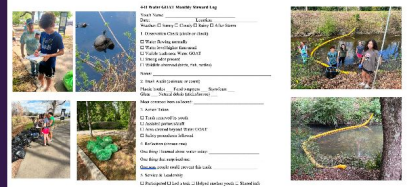
Purpose & Project Questions

The purpose of the Water Goat is to rapidly fluctuate water while capturing large amounts of debris. 4-H youth collected and recorded the debris that was collected by the Water Goat's net

- Project Question 1 – How is the unnatural environment surrounding the Water Goat affect the number of debris collected?
- Project Question 2 – Does the Water Goat affect the visible pollution of its environment?



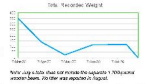
Record Book



Results & Major Findings

6 months of one clean-up per month resulted in 100% decrease of litter.
The number on average of:

- Plastic bottles decreased from 35 to 0
- Styrofoam decreased from 50+ to 0
- Glass decreased from 25 to 0
- Food Wrappers decreased from 20 to 0



MAJOR FINDINGS:

- Six months of monthly cleanups at the Sumter Water Goat significantly reduced the amount of pollution collected at the site.
- With support from the City of Sumter Litter Division, a local construction company was made aware about its contribution to pollution at the Water Goat
- Tools such as Water Goats are effective methods for limiting and deterring litter in the community.

Process

- Monthly cleanup staring March 7th- August 1st 2026
- Water Goat is located at Shot Pouch Greenway YMCA Trailhead, Sumter, SC
- Collaboration between Sumter County 4-H Youth, Sumter Soil and Water Conservation District, the City of Sumter Litter Division, along with Clemson University Sumter County Extension
- Project equipment included: water waders, rakes, water nets, portable scale, trash bags, gloves, and the 4-H record book
- Clean-up times varied from 1 hour to 2 hours depending on debris present

Collaborators

- **Sumter County 4-H Youth:** Cecilia Ayers, Knox Beane, Harley Finley, Mary Foley, Jane Foley, Joseph Foley, Ceren Gemici, Elisa Getz 4-H *Adult volunteers:* Lesley Beane, Penny Esterley, Randy Esterley

Sumter Soil and Water Conservation District: Anna Makiewicz
District Manager, **Joshua Castleberry**, **Associate Commissioner**

- **City of Sumter Litter Division:** Glen Button
- **Clemson University Sumter County Extension:** Cassie Castleberry, Water Resource & Dr. Cindy Foley, Sumter County 4-H Youth Development

Record Book Data

DATE	Plastic Bottles	Styrofoam	Glass	Natural Debris	Food Wrappers	Total (lbs.)
March 7, 2026	35	50+	25	A lot	20 pieces	345.23 lbs.
April 4, 2026	15	25	20	A lot	10	139.21 lbs.
May 3, 2026	15	Lots	0	A lot	20+	24.64 lbs.
June 6, 2026	12+	Lots	7	A lot	5+	115.08 lbs.
July 18, 2026	A lot	A lot	15	A lot	10	117.22 lbs. (1,200 lbs. wooden beam)
August 1, 2026	0	0	0	10+	0	none

Additionally, data included: weather, water flow, water level, visible trash, odor and wildlife.
Notes:
March: A deceased otter was found at the water goat by our water resource agent and determined it died of natural causes
April: Large quantity of pollen was found on surround surface of the water and Josh Castleberry informed the along odor was present due to natural breaking down of natural debris.
May and June: No notes reported.
July: A large wooden beam was stopped by the water goat. City of Sumter Litter Division was contacted and extracted the estimated 1200lb beam from the waterway.
August: Glen Button, City of Sumter Litter Division spoke with nearby construction company about their potential impact of litter. Two weeks had passed since the last clean-up and youth determined that no litter was visible at the water goat for clean-up.

Discussion & Future Implications

- **Project Question 1 – How is the unnatural environment surrounding the Water Goat affect the number of debris collected?**

The unnatural environment surrounding the Water Goat, particularly nearby construction activity, contributed significantly to the number of debris and pollution collected.

- **Project Question 2 – Does the Water Goat affect the visible pollution of its environment?**

The Water Goat was an effective tool for capturing visible litter washed into the waterway, thereby reducing pollution in the surrounding environment.

- **Future Implications**

Expanding the number of cleanups and increasing volunteer participation could further reduce pollution in this waterway.
Sumter currently has one Water Goat in one waterway. Incorporating more Water Goats into major waterways could reduce pollution on a larger scale and help keep environments such as Swan Lake Iris Garden cleaner.



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Mary Foley and Jane Foley, Wilson Hall 4-H Club



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Youth described the amount of litter collected from the first clean-up on in March 2026 (345 lbs of trash) to the 6th clean-up (0 lbs of trash) in early August 2026. In total youth have collected roughly 645 lbs of trash *(not including roughly 1200 lbs beam).*

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Next Step: Youth will continue waterway clean-ups for next 6 months. In addition, youth will begin to present their presentation to local agency meetings and City Council Meetings.

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Thank you!!!