

UNG | UNIVERSITY of NORTH GEORGIA™

LEWIS F. ROGERS INSTITUTE FOR
ENVIRONMENTAL AND SPATIAL ANALYSIS

Environmental Education Workshop 5

UNG –Gainesville Campus

Tumbling Creek, Hall County, Georgia

Oct 19, 2019



Grant #
00D882218

Welcome to the Environmental Education Workshop.

We are thrilled that you have decided to attend this workshop! At the workshop, our goal is that you learn more about north Georgia's forests, soils, water, and environment. With this information we hope that our communities will become responsible stewards of the air, water, and soils in north Georgia. We hope the workshop is both enjoyable and educational. Finally, we encourage you to share the information learned today with your friends, family, and neighbors to have the largest positive impact on our communities to keep our air, soils, and water clean and safe. If you have any questions, please contact Dr. Allison Bailey or Dr. Jamie Mitchem. Enjoy the workshop!



Environmental Education Project

The project objectives focus on comprehensive knowledge, application, technology, and environmental science skills on the environmental issues of invasive insect species, vegetation management, impairment of waterways due to sediment, soil and water quality issues affecting native forest ecosystems in urban, suburban, or rural communities, as all of these community types have native forest ecosystems in Georgia. One of the major issues in vegetation management is how to control invasive plant species without the excessive use of pesticides. Most citizens cannot identify native species in the Foothills landscape, nor proper methods for treatment; and therefore, are unable to act as good stewards of native forests/trees in Georgia rural, suburban, or urban landscapes. Learning activities on native/invasive plant identification and best treatment practices will mitigate this lack of knowledge.

About the Grant Team



Dr. Allison Bailey (Left) & Dr. Jamie Mitchem (Right)

Dr. Allison J. Bailey

Associate Professor of Geography & Environmental Sustainability Studies, IESA

Dr. Bailey's teaching emphasizes environmental communication, human interaction with nature, and conducts research on forest health, tree canopy, wildlife habitat, and public green spaces.

Dr. Jamie Mitchem

Professor of Geography/GIS, IESA

Dr. Mitchem's teaching and research have been in the areas of hazards geography, Geographic Information Science (GIS), meteorology, storm chasing (tornadoes), climatology, climate change, social vulnerability, and emergency management.

Jacob Lougee, Student GIS Technician

Student Workers:

Natalie Crews, Biology Major

Aaron Carney, Environmental Spatial Analysis Major

Collaborating Partners

Sustaining Georgia's green legacy by partnering with individuals, organizations, and communities in raising awareness toward improving and maintaining Georgia's community forests.



Promote sustainable management that leads to naturally diverse and healthy forests and watersheds within the more than 867,510 acres of national forest lands in Georgia; to engage and educate the public to join in this effort; and to promote preservation of this legacy for future generations.

The Georgia Forestry Commission (GFC) is a dynamic state agency responsible for providing leadership, service and education in the protection and conservation of Georgia's forest resources



GEORGIA FORESTRY COMMISSION *protecting and conserving Georgia's forests*



Chattahoochee Riverkeeper is an environmental advocacy organization dedicated solely to protecting and restoring the Chattahoochee River Basin.

Keeping Watch Over Our Waters Since 1994

The Georgia Master Gardener Association, Inc. (GMGA) has as its primary purpose the support of and advocacy for master gardeners and master gardener organizations throughout the state. We work collaboratively with the University of Georgia (UGA) Extension to provide unbiased, research-based horticultural information to the public through our master gardener extension volunteers.



Lumpkin Coalition is a diverse group of wonderful folks -- young and not-so-young, working and retired, Georgia natives and transplants from all over the country -- united by a common commitment to preserving and enhancing the special quality of life here in north Georgia.

The Hall County Master Gardener Extension volunteers help the University of Georgia Cooperative Extension staff convey research-based information about gardening, horticulture and best practices to the public.



If you need this document in another format, please contact Dr. Allison Bailey at allison.bailey@ung.edu

Today's Agenda

<u>Time</u>	<u>Speaker</u>	<u>Topic</u>	<u>Location</u>
9:30	Bailey	Registration & Orientation	Nesbitt 2201
10:00	Mcdonald	Fluvian Geomorphology in the Southeastern U.S.	Nesbitt 2201
11:00	Holloway	Planning for Pollinators	Nesbitt 2201
Noon		Lunch	
12:30	Lougee	Using the Tree ID app	Nesbitt 2201
13:00	Caldwell	Chattahoochee Headwaters	Nesbitt 2201
14:00	Caldwell	Walking tour of Tumbling Creek Trails.	Tumbling Creek
15:00	Mitchem	Climate Conditions & Georgia Ecosystems	Nesbitt 2201
16:00	Mitchem	Closing Remarks	Nesbitt 2201

***Nesbitt 2201** is in Building 17 on the campus map

***Tumbling Creek** is located near the Police building (point 14) on the campus map



Campus Map

UNG
UNIVERSITY of
NORTH GEORGIA™
GAINESVILLE CAMPUS
Campus Buildings

N

1 Administration	B3
<ul style="list-style-type: none"> • Academic Affairs • Bursar Office • Complete College Georgia • Comptroller Office • Faculty Records • Honors Programs • Human Resources • University Relations • Vice President 	
2 Dunlap-Mathis	B3
<ul style="list-style-type: none"> • Art • Center for Teacher, Learning, and Leadership (CTLL) • Director for Veteran and Adult Learners • IT • Military Resource Center • Student Disability Services 	
3 Student Center	B3
<ul style="list-style-type: none"> • Admissions • Adult Learners Resource Center • Book Store • Card Services • Career Services • Financial Aid • Food Services • Game Room & Cybercafe • Imaging Center • Registrars Office • Robinson Ballroom • Student Affairs • Student Involvement • Student Money Management • The Nest Student Printing Services 	
4 Music	B2
<ul style="list-style-type: none"> • Classrooms • Faculty Offices 	
5 Hugh Mills Physical	A2
<ul style="list-style-type: none"> • Basketball Gym • Education Center • Pool • Weight Room 	
6 Loyd Strickland Academic	B3
<ul style="list-style-type: none"> • Classrooms • Computer Labs • Some Faculty Offices 	
7 John Harrison Hosch Library	A3
8 Plant Operations	B1
8a Facilities & Plant Ops Storage	B1
9 Field House	A2
10 Professional Continuing Education /Performing Arts	B4
<ul style="list-style-type: none"> • Ed Cabell Theatre • Professional & Continuing Education • Roy Moore Art Gallery 	
11 Drama Storage	C4
12 J. Foster Watkins Academic	B3
<ul style="list-style-type: none"> • ACTT Center • Learning Support 	
13 Science, Engineering, and Technology	C3
14 University Police	C1
16 Oakwood Building	C4
<ul style="list-style-type: none"> • Faculty and Staff Offices 	
17 Martha T. Nesbitt Academic	A2
<ul style="list-style-type: none"> • Classrooms • Coffee Shop • Computer Lab • ESL Lab • Foreign Language Lab • Writing Center 	
18 Gainesville Campus Testing Center	C5

Visit go.ung.edu/map for more information.

If you need this document in an alternate format for accessibility purposes please contact webteam@ung.edu.
Updated May 16, 2018

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Fluvial Geomorphology in the Southeastern U.S.

Fluvial geomorphology is the study of how running water (fluvial) erodes, transports, and/or deposits sediment while creating, destroying, or modifying the Earth's surface (geomorphology). Fluvial geomorphologists study alluvial landforms to understand flow conditions in the past (i.e., days, months, years). Using these findings, fluvial geomorphologist can predict the effects future flow conditions will have on the landscape. Alluvium is the term for sediment that was deposited by fluvial processes.

The morphology (channel widths and bank characteristics; Figure 1) of rivers (nonwadeable) and streams (wadeable), and their associated landforms, are the result of a dynamic equilibrium between sediment and discharge. In an undisturbed system, the bankfull area of a river or stream will grow to accommodate the 1 to 5 year recurrence interval (RI) discharge. A 1-year RI discharge means that there is a 100% chance that a discharge of that magnitude will happen every year. A 100 year RI discharge means that there is a 1% chance that a discharge of that magnitude can happen every year and a 100% chance that discharge will happen at least once in 100 years. The relationship between bankfull area and discharge allows fluvial geomorphologists to determine how flood frequencies/magnitudes have fluctuated through time.

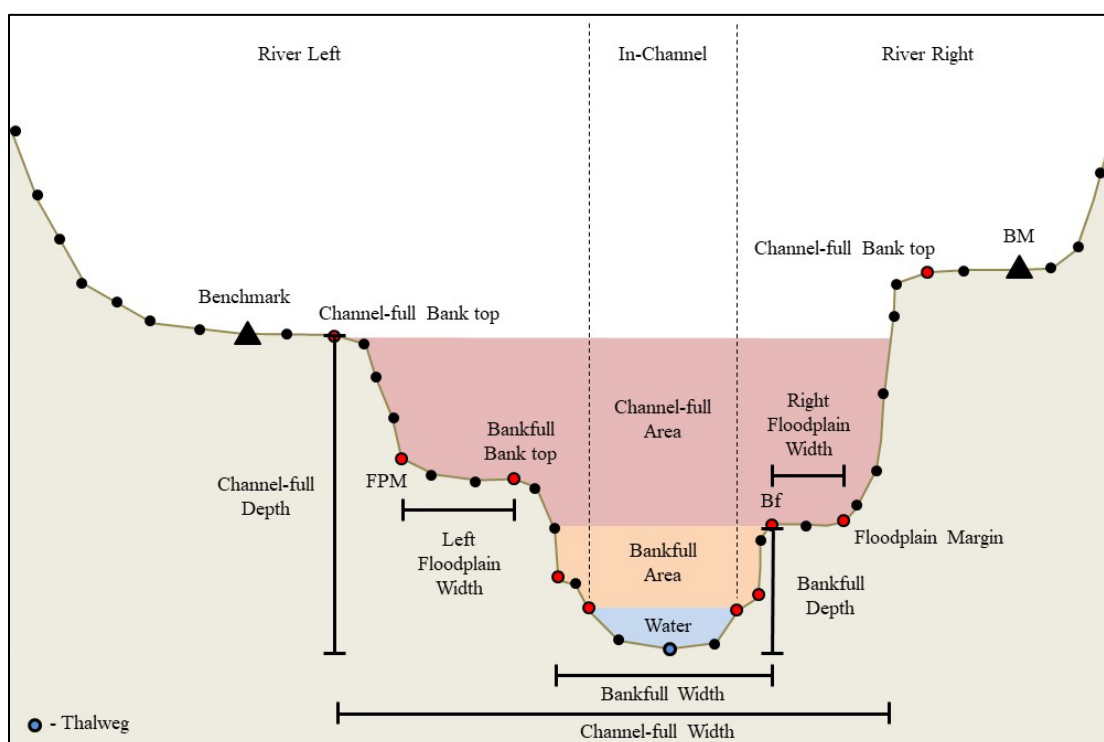


Figure 1. Examples of diagnostic geomorphic surfaces that can be surveyed and the descriptive characteristics that will be derived from the data. Bankfull area includes baseflow area (light blue) and bankfull area (orange). Channel-full area includes baseflow, bankfull, and channel-full (red) areas. This figure is from a National Park Service monitoring protocol (McDonald et al. 2018).

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The morphology of the rivers and streams in the southeastern United States are a directly legacy of poor land use/management that began when Europeans/Americans began settling the area (Figure 2). The rivers and streams in the region went from gravel bedded, clear flowing channels (Bartram 1955) to the sandy beds, high banks, and turbid waters that characterize the waterways today.

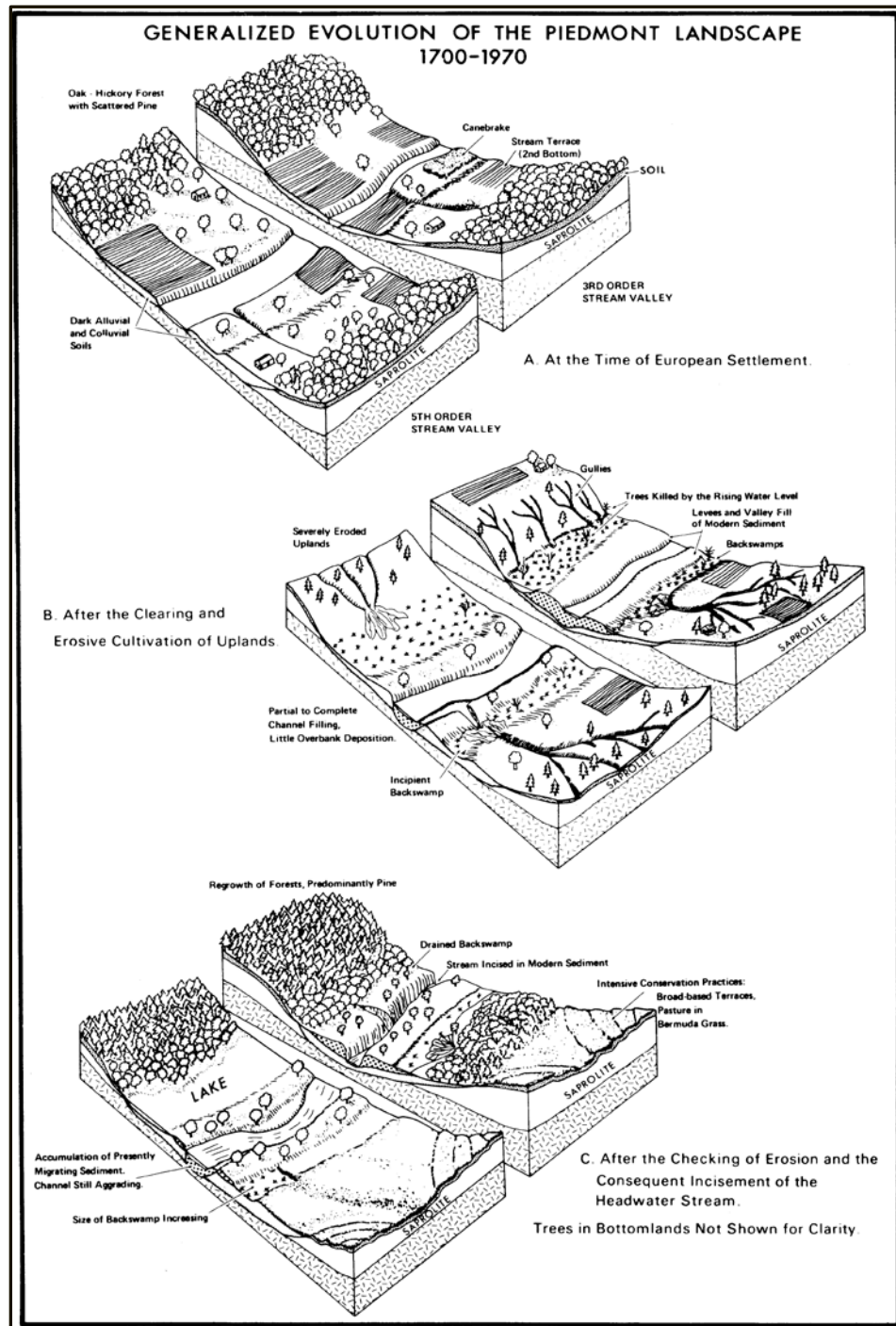


Figure 2. Effects of European/American settlement on the fluvial systems of the Appalachian Piedmont (southeastern United States). From Trimble (1974).

The effects of poor land use/management are not limited to the southeastern United States and a great deal of research has been done to track the changes that occur in alluvial systems post-disturbance. This research has discovered a semi-predictable set of stages (a channel evolution model [CEM]) that disturbed systems will go through as they re-equilibrate to their sediment/discharge regimes (Figure 3).

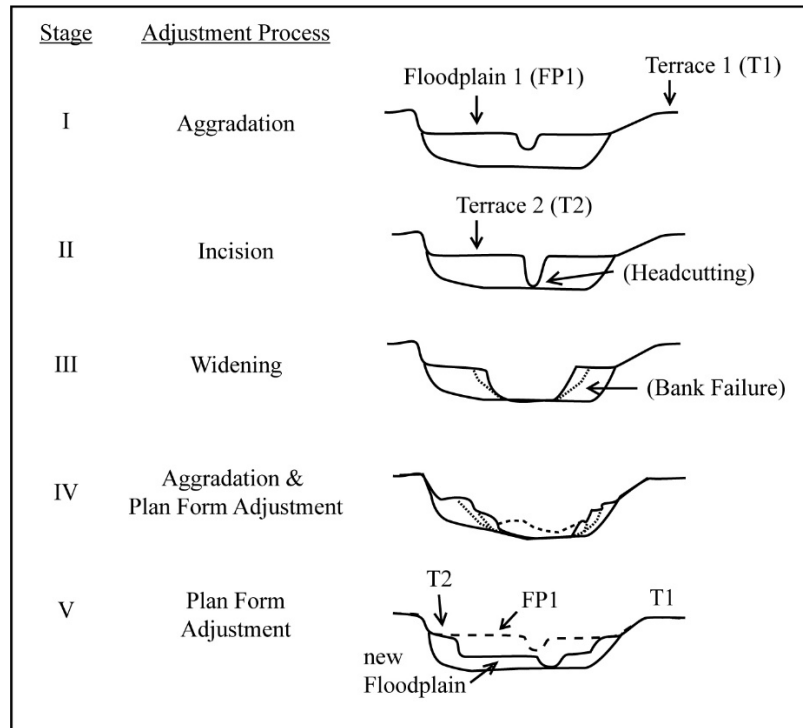


Figure 3 – Generalized channel evolution model (modified from Schumm et al. 1984).

The vast majority of streams in the Appalachian Piedmont (northern portion of Alabama, Georgia, South and North Carolina) are in CEM stage III. Streams are widening as they attempt to reestablish a meandering planform with a bankfull/floodplain surface inset within a higher channel-full area. The exact trajectory that each stream will take as it re-equilibrates is difficult to predict because each stream's watershed (the area that flows to that stream) has different geomorphic characteristics (e.g., slope and relief) and different amounts and distributions of land use/land cover (e.g., percent developed, forested, or in grassland/pasture).

If you have a stream in your backyard, start taking measurements/photographs and track the long-term evolution/development of your waterway!!!

References

- McDonald, J. M., M. B. Gregory, J. W. Riley, and E. N. Starkey. 2018. Monitoring wadeable stream habitat conditions in Southeast Coast Network Parks: Protocol narrative. Natural Resource Report NPS/SECN/NRR—2018/1715. National Park Service, Fort Collins, Colorado.
- Schumm, S.A., M. D. Harvey, and C. C. Watson. 1984. Incised channels: morphology, dynamics and control. Water Resources Publications, Littleton, Colorado.
- Trimble, S. W. 1974. Man-induced soil erosion on the southern Piedmont. Soil Conservation Society of America.

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Gardening and Pollinators

Pollinators play important roles in biodiversity, crop production, and even the economy. A 2014 economic impact study by University of Georgia experts determined that the annual value of pollination to Georgia is over \$360 million. Even better? The services pollinators provide is totally free.

Pollination is key to seed production, and without pollinators like hummingbirds, bees, ants, butterflies, wasps, and many others, our favorite fruits and vegetables would never make it to our tables. Pollinators are also key to the survival of wild plant species, they help to control pests that destroy agricultural crops and they help in decomposition, which is extremely important in crop production because the process aerates the soil.

Although wasps, ants, and bees don't yield warm and fuzzy feelings for most people, that doesn't mean they should be ignored. Pollinator populations are decreasing. Not only in population, but also in diversity. Research from UGA is helping to identify not only the reasons behind the decline, but also what homeowners can do to help them. To help pollinators like bees and butterflies do their jobs of moving pollen, home gardeners can provide a habitat that provides water and shelter.



A pollinator-friendly garden can be created in the shade. For homeowners surrounded by shade, pollinator-friendly landscapes can seem unattainable, but they don't have to be. Landscapes graced with trees and an abundance of shade can be great resources for pollinators, too.

<http://extension.uga.edu/topic-areas/timely-topics/pollinators.html>

Practice Citizen Science on your own device

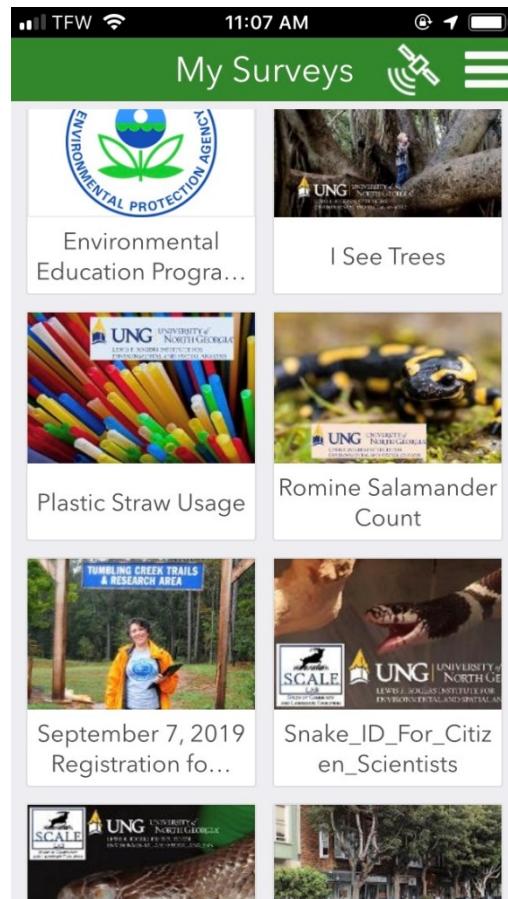


1. Download Survey123 app from the Apple Store or Google Play.
2. Scan the QR code with your camera or QR reader.
3. Open in app and then you can access the survey now and later.
4. Have fun collecting data.

For more information about GIS classes at UNG, visit us at

www.ung.edu/iesa

Tree ID App



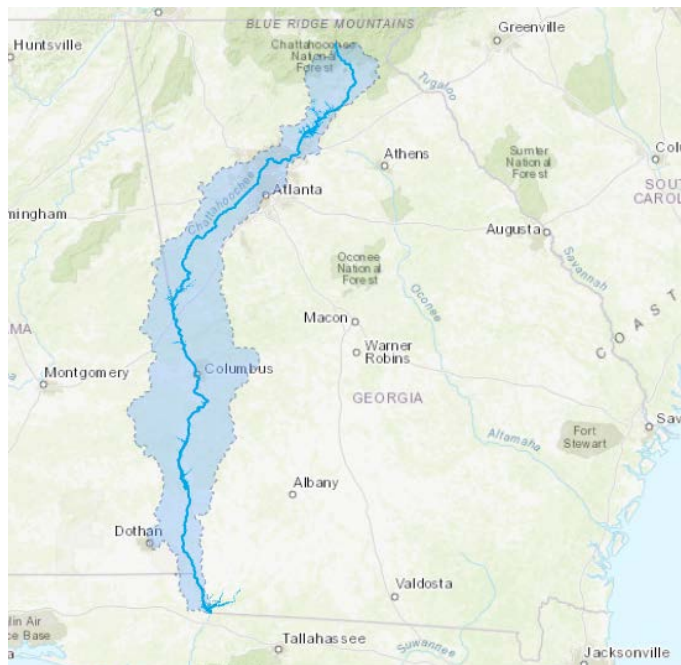
Chattahoochee Headwaters

The Chattahoochee River is one of the smallest river systems in the entire country to provide water supply to a major metropolitan city. This reality compounds the challenges our region faces.

From north Georgia to the Florida line, the Chattahoochee River watershed faces many threats to its chemical, physical and biological health and integrity, including:

- Storm-water and wastewater pollution
- Increased water consumption
- Landscape changes that interrupt natural flow patterns
- A changing climate

Although river health has improved in recent decades, more than 1,000 miles of waterways within the Chattahoochee watershed still do not meet water-quality standards. And that means potential health threats to people and wildlife that come in contact with it.



Meanwhile, government agencies—typically underfunded and understaffed—are often unable to conduct the vigilant monitoring necessary to enforce environmental laws and inform important water-management decisions.



Compounding water-quality problems are human activities that alter the natural hydrology of the watershed. These include:

- Hardened landscapes from impervious surfaces
- Denuded stream buffers
- A complex system of dams, and...
- Water withdrawals

All of these activities have reduced flows in the river system, along with altering the seasonal variability that many fish and wildlife species depend on. Add to that a changing climate, with weather events becoming more extreme, with alternating periods of intense storms and droughts that are damaging to river health and downstream communities.



Keeping Watch Over Our Waters Since 1994

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Climate Conditions and Georgia Ecosystem



Trees affect our climate, and therefore our weather, in three primary ways: they lower temperatures, reduce energy usage and reduce or remove air pollutants. Each part of the tree contributes to climate control, from leaves to roots. The outdoor air conditioning provided by trees reduces the energy used inside your home or office. Shade provided by strategically planted

deciduous trees cools buildings during the warm months, allows the sun's warming rays to shine through its branches in the winter and also protects buildings from cold winds. With some planning, urban trees can help minimize the heat island effect that saddles many cities.

UNG has data collecting weather stations at each of the five campuses. The study of weather provides an excellent foundation for science, technology, engineering and math (STEM) education. The system provides an array of public safety features including lightning alerts, severe weather alerts, temperature forecasts, environmental cameras and agricultural monitoring. It also archives past weather and gives weather forecasts for the coming days. The data can be used to teach about atmospheric pressure, wind speed and direction, and cloud types. The system creates cloud movies, 24-hour time-lapse videos that show the sky conditions for an entire day, in less than a minute. The videos are linked with graphs of temperature, pressure, and dew point.



The UNG Weather STEM Station

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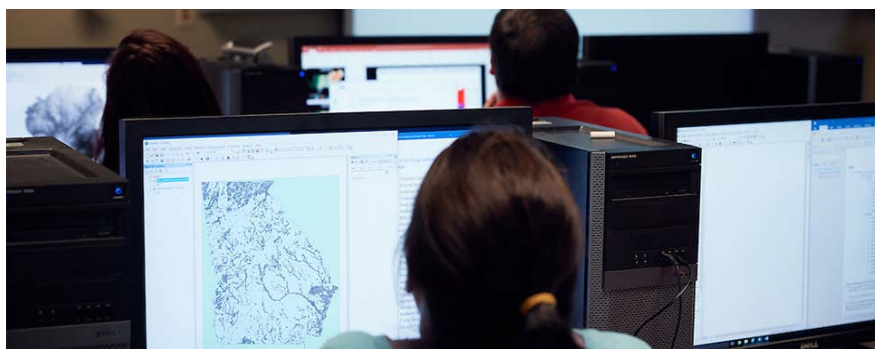
Established in 2001, the Lewis F. Rogers Institute for Environmental and Spatial Analysis (IESA) on UNG's Gainesville Campus promotes environmental education through the use of advanced technology, interdisciplinary instruction, collaborative learning, and community service. Graduates from our degree and certificate programs have found employment at impressive rates and many go on to reputable graduate schools throughout the United States. Our students follow a curriculum built around a solid core of geospatial science and technology and related courses in areas of their interest, such as environmental science, environmental studies, engineering, education, urban planning and community development, environmental health, and the geosciences. Students find the flexibility to follow their passions, while earning valuable, work-ready training in applied geospatial techniques.

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Notes