

MOUNTAINS

WORD FROM THE SMOKIES

Convergence of diversity in Natural History room



The Natural History Collections room at Twin Creeks Science and Education Center in Gatlinburg, Tennessee, is the one place in the world where the endlessly surprising diversity of life found in Great Smoky Mountains National Park is assembled together as one astounding whole.

Beyond a preparation room with computers and microscopes and through an entry room with sticky mats to clean the bottom of your shoes is an expanse of stark white cabinets and shelves under careful temperature and humidity control. Inside these cabinets and suspended in jars are rows and rows of plants, birds, bats, mice, fish, fireflies, beetles, snakes, turtles, and salamanders. Taken all together, the collection constitutes a modern-day ark of biodiversity — more than a century of neatly organized plant, animal, and insect specimens collected from the Smokies for scientific study.

Museum Curator Baird Todd currently manages the park’s collection while natural history technicians Miranda Zwingelberg and Cecelia Stephens have been responsible for maintaining and expanding it in recent years along with longtime volunteer Janie Bitner.

“At the beginning of the tours, my rules are no food, no drink — and don’t pet anything,” said Zwingelberg. And for the groups lucky enough to get a guided tour of the collection, the temptation to touch is real. Nowhere else in the park can one so closely inspect the bushy tail of a fox or the intricate scale patterns of a rattlesnake — details that might elude even a lifelong hiker of the Smokies.

“I really love it because it’s the details that you wouldn’t necessarily see out in the woods. If something scurried by you, you might think, ‘Oh it’s just a mouse,’” said Zwingelberg. “But there is so much detail and uniqueness to these different individual species that you can really see up close.”

In a corner rests a specimen of the now-extinct passenger pigeon. Nearby is a jar containing the largest hellbender ever collected in the Smokies, which dates to 1940.

“The twin goals of collections are preservation and access,” said Zwingelberg. “So, it’s balancing those two things: keeping our specimens as long as we can and making them accessible to the researchers and the park staff.”

Maintaining that balance is no small task. Altogether some 50,000 to 60,000 catalogued specimens are housed in the Twin Creeks Natural History Collections room along with nearly three to four times that number in a backlog still waiting to be meticulously verified and catalogued for study.

For a collection this size, the work is nonstop, and the team at Twin Creeks is often busy caring for the fragile, often decades-old specimens. Environmental data from room sensors are downloaded and monitored. Dust is carefully vacuumed and removed from the premises.

Traps must be inspected and replaced regularly to protect the collections from pests like spiders, silverfish, millipedes, and dermestid beetles that would naturally break down organic materials like fur and feathers.

Once the team ensures the specimens are safe, each one needs to be filed away and logged with accompanying collection information to be of scientific value.



Cecelia Stephens (left) and Miranda Zwingelberg (right) compare plant specimens collected in the park. Plant specimens are dried, checked for pests, and stored in flat folders. PROVIDED BY JOYE ARDYN DURHAM

“I actually enjoy cataloguing a lot, and I feel like it’s one of the most useful things we do,” said Stephens. “It gets the stuff out there, and it really makes an impact — people are going to be using these records for years.”

The Smokies collection in particular boasts an impressive number of insect species and includes biological records of life with holdings collected before the park was established.

“Every specimen is a unique example of that species at a specific time and place in the park,” said Zwingelberg.

Above all, consistently pairing these physical records with their corresponding study information is key.

“You assign an accession number, based on the collector and permit, and those go on the label and sheet with the plant specimen and into the database,” said Bitner, who has volunteered doing the tedious job for more than a decade. “The standard is to be able to go into the collection and find the plant in five minutes or less. You can go straight to the directory, and the genera are alphabetized by file folders.”

Maintaining this system of organization is particularly important considering the number of other researchers relying on the collections team at Twin Creeks.

“We get researchers coming in and grad students from the local colleges doing research on a particular group that want to see our specimens, or sometimes they’re collecting and adding to the collection,” said Zwingelberg.

A recent focus has been to finish digitizing the herbarium records in coordination with the University of Tennessee, Chattanooga. After years of work from both staff and volunteers, records for each plant specimen are now available on the Southeast Regional Network of Expertise and Collections, a digital trove of information for researchers interested in the biodiversity of the Southeast.

Researchers from all over the world may use these digitized collections in their work studying the impacts of climate change, pesticides, and air quality on species distribution and genetics. And for those that come to the center in person, the plants and animals in the collection serve as a vital link to the re-



The Great Smoky Mountains are home to 39 species of reptiles including snakes, turtles, and lizards. PROVIDED BY JOYE ARDYN DURHAM



The facilities at Twin Creeks Science and Education Center in Tennessee include offices, a wet lab, natural history collections, and work spaces for visiting researchers. PROVIDED BY JOYE ARDYN DURHAM

gion’s unique natural history.

For the collection’s caretakers like Zwingelberg and Stephens, details as fine as the scales of a rattlesnake don’t just tell us something about life in the Smokies’ distant past. They hold the promise of preserving those species well into the future, too.

This story is an edited excerpt of a much longer article by Frances Figart, Aaron Searcy, and Elise Anderson that appeared in the spring 2021 issue of “Smokies Life” magazine. Aaron Searcy is a Publications Associate for the 29,000-member Great Smoky Mountains Association, an educational non-profit partner of Great Smoky Mountains National Park. Learn more at SmokiesInformation.org and reach the author at aaron@gsmassoc.org.

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Postal information

Citizen Times, USPS #236-000, ISSN #0336-0000, is published Monday through Sunday at 14 O. Henry Ave., Asheville, NC 28802. Periodicals postage paid at Asheville, NC 28802.
Postmaster: Send address changes to Customer Service, PO Box 5830, Augusta, GA 30916