Improving Natural History Collections at Great Smoky Mountains National Park

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Introduction

Great Smoky Mountains National Park

Great Smoky Mountains National Park spans two states, North Carolina and Tennessee, with over 522,427 acres. We are the most visited of any of the national parks with around 11 million visitors in 2014. The park is unique as it is a hotbed of biodiversity; it is America's most biologically diverse national park area. The elevation changes throughout the park from 850 to 6,643 feet and the glacial influence on the Smokies climate accommodates incredible variety of plant and animal life throughout five forest types. The Smokies is home to 1,500 species of flowering plants and at least 4,000 non-flowering varieties. Further, we're not the "salamander capital of the world" for just any reason. The Smokies house 30 species in five families, one of the most diverse areas in the world for the order Caudata (salamanders).

The All Taxa Biodiversity Inventory

Along with partner organization Discover Life in America, park scientists have been participating in the All Taxa Biodiversity Inventory (ATBI) since 1997 to document all life in the park, the first effort of its kind. We are currently at 18,545 species known with 8,095 new to the park since ATBI's inception and 951 new to science. When ATBI was initiated, only about 8,000 species in the park had been inventoried out of an estimated 100,000.

The Natural History Collections

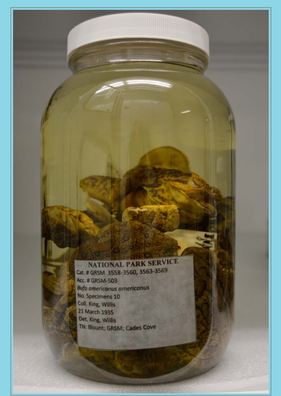
As scientists keep collecting, documenting, and describing species in the park, the natural history collections here have grown considerably. The collections house over 200 geology specimens and 235,000 biology specimens. They have a beautiful home at the state of the art Twin Creeks Science and Educational Center, built eight years ago. Unfortunately, there is a large backlog of specimens that need to be catalogued or rehoused due to increased collecting in the past ten years from ATBI.

Accessioning and Organizing Lichens

As with birds, when I arrived there was a backlog of approximately 20 lichen specimens that needed to be accessioned and catalogued. I added these to ICMS (the Department of the Interior's museum collections database), rehoused them, and stored them upon rearranging the order Ascomycota (lichens) according to current phylogenetic understandings. This entailed reorganizing our collection of 536 lichens. However, as many of our lichen specimens are on loan to researchers, their ICMS records were updated to reflect the current taxonomic understanding and their labels will be edited upon their return.

Improving Housing Conditions of Wet Specimens

Originally, the organization of herpetological wet specimens was by species. All of the same species, regardless of collection date or locality, were grouped together by jar. A collections technician before me had already started this project, so I completed splitting specimens into new jars as far as resources allowed. I created labels for jars with multiple specimens and printed labels from ICMS for those that did not. When resources ran out, I made a spreadsheet and the instructions necessary for the next person who works in the collections to finish splitting the large salamander collections.



Accessioning and Organizing Birds

While birds aren't actively being collected in the park anymore, when an uncommon species of bird is found dead, for example by flying into a window, it is preserved and added to the collections. Approximately 30 birds had been collected over 10 years and their study skins were prepared, however they were backlogged and had not yet been accessioned into the collections. I accessioned them and catalogued each specimen into ICMS. After writing their tags and tying them on, they were ready to be placed in the collection. However, the collections were not organized according to the current phylogenetics of the class Aves (birds). I reorganized all of the orders according to The American Ornithologists' Union checklist and updated the taxonomy of species that had changed. For example, within the past five years, the family of New World warblers Parulidae has been revised and nine genera had been subsumed. Once their tags and ICMS records had been updated, they were returned to their new place in the collection.

Taking Inventory of the Collections

Yearly, the curator is tasked with taking inventory of the museum collections for the park. This happens in several ways. It is necessary to do an inventory of numbers assigned randomly, an inventory of accessions, and of controlled property. While the curator completed the inventory of the accessions, I completed the random sampling inventory and the controlled property inventory of natural history specimens. For this, I had to locate the specimens, inspect their condition, and check to see if their label or tag was correct and had all the pertinent information necessary.

Assisting in Field Work

I had the fortune of doing field work with scientists working in the park several times. With the park entomologist, I went out to evaluate the population of aquatic macroinvertebrates in a site in Deep Creek as part of the vital signs monitoring of streams in the park. As part of the vital signs monitoring, fish are surveyed through the fisheries department. I assisted them in electroshocking, netting, and taking data on fish populations in a site in Abrams Creek. With the park botanist, I replanted poached ginseng roots that had been aged, weighed, and dyed. Besides park scientists, outside researchers are permitted to do work as well. I assisted bat researchers from The University of Tennessee, Knoxville with netting and tracking bats on several occasions to aid in a project assessing habitat use of tricolored bats (*Perimyotis subflavus*).

Acknowledgments

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