

Natural History Museum of Utah, University of Utah

Research and Collections Media Fact Sheet

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Overview:

The Natural History Museum of Utah is an active research institution affiliated with the University of Utah. Its systematic collections emphasize the earth sciences, biology, and anthropology of the Great Basin and Colorado Plateau and serve as a major resource to researchers in a variety of fields. The Museum's scientific staff is responsible for collections management and conducts specimen-based research in the areas of biology, conservation biology, botany, geology, paleontology, and anthropology. Staff members collaborate on research projects with state and federal agencies and other academic institutions at locations throughout Utah, as well as around the country and the world. Several Museum scientists also hold academic teaching positions within the University and advise graduate students, as well as provide hands-on field and laboratory learning opportunities to a broad spectrum of students. Museum researchers regularly publish their work in a variety of scientific journals and have been covered extensively in the press. The expertise of the scientific staff is available through the Experts Guide, located on the Museum's Newsdesk, www.newsdesk.nhmu.utah.edu

Vertebrate Biology:

Curator of Vertebrates Dr. Eric Rickart, Ph.D, is researching the effects ecosystems have on the mammal communities that dwell within them and is conducting a comparative survey of small mammals in the Great Basin. Rickart and Dr. Rebecca Rowe, research associate at the University of New Hampshire, are reassessing small mammal communities in four mountain ranges in Nevada and Utah--Ruby, Toiyabe, Pine Forest and Tushar ranges-- that were surveyed by biologists 50-100 years ago. The interval study will measure the faunal changes by comparing historical and modern data, and investigate whether changes are due to land usage, such as the effects of livestock grazing, fire suppression, invasive species, or climate change. The goal of the study is to understand the severity of the problems affecting small mammal communities in the Great Basin, and to predict how these communities are likely to respond to future changes.

In addition, for the past 20 years, Rickart is studying mammals of the Philippine Islands where isolation together with geographic complexity has led to the evolution of one of the world's most unique mammal faunas. Rickart, along with Dr. Lawrence Heaney, research associate at the Field Museum, and several Filipino colleagues, is studying the patterns of diversification and community structure of mammals, mostly rodents and bats. The researchers have conservation concern for many regions of the islands due to rapid human population growth and associated loss of natural habitat. Rickart and colleagues are taking a closer look at the interactions of beneficial native mammals and non-native pest species to better understand the following factors impacting conservation: how different species react to varying amounts of disturbance; how native species persist in native habitat; and how natives respond to disturbed areas that are rehabilitated.

Museum Research Curator Dr. Bill Newmark, Ph.D, is in his 25th year of conducting a long-term research project in the Eastern Arc Mountains of Africa, one of the 17 biodiversity "hot spots" in the world. Newmark annually assess the effects of habitat fragmentation on forest bird populations in the Usambara Mountains in northern Tanzania. This area has the highest ratio of endangered plant and animal species in the world and Newmark's work is looking at the best way to not only reduce the loss of species, but how to reconnect the fragmented portions of the ecosystem with viable corridors. Additionally, Newmark is looking at the effects that farming and fencing has had on large mammal migration in the parks of Tanzania, and he is also in the process of mapping deer and elk migration patterns in Red Butte Canyon (Utah), Idaho and Montana. By logging the migration patterns of the elk and deer, Newmark is looking to identify what effects predation has on those patterns.

Paleontology:

Under the direction of Curator of Paleontology Randall Irmis, paleontologists are actively conducting research at Ghost Ranch in New Mexico and at three different sites in Utah: Grand Staircase-Escalante National Monument, Lisbon Valley and Dinosaur National Monument. Work at Ghost Ranch, Lisbon Valley and Dinosaur National Monument is focusing on rock formations from the Triassic Period (200-250 million years ago). Studying Triassic-era forma-

Paleontology:

tions at different sites allows paleontologists to describe how the area varied in both environment and biota during this time in Earth's history. The Triassic Period is of particular interest to Museum paleontologists because it is when dinosaurs first appeared and began to diversify, and it is also the origin of the modern ecosystems we find on Earth today. Fossils found from the Triassic period include small predatory dinosaurs, like *Tawa hallae*, and other reptiles, including distant crocodilian relatives.

Museum paleontologists have been working at Grand Staircase-Escalante National Monument since 2000, and have begun to reveal its long-held secrets dating back to the late Cretaceous (99-65 million years ago) Period. This particular slice of time has shown to have been a diverse ecosystem, and paleontologists are trying to uncover what influence both the Western Seaway that bisected modern North America and climate had on the evolution of dinosaurs and their ecosystems. A diverse fossil record has been found at sites across North America, and Museum paleontologists have been able to add to the record of biodiversity with the naming of several new horned ceratopsian dinosaurs, such as *Utahceratops* and *Kosmoceratops*, duck-billed dinosaurs, armored dinosaurs, like *Ankylosaur*, and several meat-eating dinosaurs, including Velociraptors. The Museum's paleontology staff recently began looking at older, previously unstudied formations in Grand Staircase-Escalante National Monument for fossil material, peering into the Wahweap Formation (dating from 81-78 million years ago) and the Straight Cliffs Formation (dating from 93-83 million years ago).

Garrett Herbarium:

Dr. Mitchell Power, Ph.D, curator of the Garrett Herbarium, studies historical biogeography, vegetation history, fire, paleoecology, paleoclimatology and environmental change. Power and his staff are using a 30-foot core from Utah Lake's lakebed to create benchmarks of variability to determine if the eutrophication, or the movement of a body of water's trophic status in the direction of increasing plant biomass by the addition of artificial or natural substances, such as nitrates and phosphates to an aquatic system, is unprecedented or if it is part of the lake's natural variability through time. The study will help researchers understand the lake's historical nutrient load and its climate and vegetation histories. While a lot of geomorphology work has been conducted in the Uinta Mountains in northwest Utah, little research has been done on its paleoclimate. Power aims to help researchers understand the resiliency of vegetation to both rapid climate change and disturbance and is documenting the long-term vegetation history to establish the biogeographic history of the Uinta Mountains. His research explores the possibility that the region was a land bridge for plant migration through time.

Power is also studying one of the largest wildfires in Utah history-- the Milford Flat Fire in July, 2007, burned more than 360,000 acres and Power is researching the long-term effects of wildfire in the west desert. Also, Herbarium staff is using both its 130,000-plus collection and freshly collected material to create a modern pollen database. Additional research centers on the 2000-year history of agricultural practices in French Guiana and a historical study of the vegetative history around the Amazon Stonehenge in Amapa, Brazil. Power also actively contributes to an international working group, the Global Palaeofire Working Group. The Group works to create research synergies, and its dataset, the *Global Charcoal Database*, aims to improve model and forecast accuracy.

Archeology:

In the summer of 2002 a team of Utah archaeologists, lead by Museum Curator of Archeology Duncan Metcalfe, began what would become the Range Creek Research Project. What they discovered, protected behind the gates of the private Wilcox Ranch located in south eastern Utah, was a remote and difficult to access canyon with an amazingly rich and relatively untouched archaeological record. The Project, coordinated through the Natural History Museum of Utah and the University of Utah Departments of Anthropology and Geography, is a multidisciplinary coalition of researchers, educators, and individuals investigating the natural and human history of this remarkable place. Range Creek has been recognized as a national treasure because of the high density of virtually undisturbed prehistoric sites that have been found, with nearly 400 sites identified and recorded including granaries, rock art panels, ruins and artifact scatters. Most of the sites are associated with the Fremont archaeological complex, a term used to describe Utah's earliest farmers who inhabited the region from about A.D. 300 to A.D. 1350. Based on the results of radiocarbon dating it appears that prehistoric occupation of the canyon may have been particularly intense from A.D. 1000 - A.D. 1175, a time near the end of the Fremont Period. More research details can be found at http://umnh.utah.edu/rangecreek_home