

# RESEARCH HIGHLIGHTS



Smithsonian  
Institution

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## EXTINCT-IN-THE-WILD ANTELOPE RETURNS TO THE GRASSLANDS OF CHAD

Thirty years after the scimitar-horned oryx were driven to extinction, the desert antelope will return to the last-known place it existed: Chad's Sahelian grasslands. The reintroduction—the culmination of decades of work—was led by the Environment Agency-Abu Dhabi ("EAD"), the government of Chad and their implementing partner, the Sahara Conservation Fund. The Smithsonian Conservation Biology Institute ("SCBI") and Zoological Society of London are leading post-release satellite-tracking efforts that will result in the collection of one of the most comprehensive datasets for any wildlife species returned to its native habitat.



*Photo Credit: John Newby, Sahara Conservation Fund*

"This is an epic homecoming for this majestic species and a significant step forward for wildlife conservation," said Steve Monfort, the John and Adrienne Mars director of SCBI. "Every conservationist aspires to ensure that wildlife thrive in their natural environment. This project was designed to ultimately give scimitar-horned oryx that chance, while also helping restore this grasslands ecosystem and to inspire and inform similar reintroduction efforts for other species."

In July, SCBI postdoc Jared Stabach traveled to Chad where he helped fit 21 of 23 scimitar-horned oryx with GPS collars (two individuals were too young for collars but will return to the wild with the herd). Twice a day, Stabach and team will receive the position of every animal collared. Based on these coordinates, field staff will monitor the population. Overall, the data will tell scientists where the oryx go seasonally, how far they travel, whether they stay together or disperse into different social groups, and even if a poacher has taken an animal.

"This dataset is gold to any conservation researcher," Stabach said. "We know so little about this species in the wild and the data we're collecting will tell us where these animals are—and what's going on with them—in near real-time over a number of years. We're essentially opening up a window that will help us understand how and why individuals move across the landscape and allow us to monitor each individual in a way that was never before possible." The project aims to build a self-sustaining population by releasing 500 wild oryx over the next five years. The released animals come from EAD's "world herd" of oryx, including animals raised in human care from the United States, Europe, and United Arab Emirates.

Climate change and human encroachment are among the primary threats to the antelope, which were also hunted to extinction and killed during times of civil unrest in Chad and neighboring regions. They were once widely distributed across the Sahel, from Senegal to Sudan. By releasing the oryx into their native habitat during the rainy season when better resources are available—giving them time to acclimate to the new climate in a large fenced area and hiring rangers to patrol the reserve—project partners are hopeful the animals will now have a better chance at survival.

## FROM SEED BANKS TO SEDIMENT CORES, SCIENTIFIC COLLECTIONS ILLUSTRATE THE CHALLENGE OF FOOD SECURITY

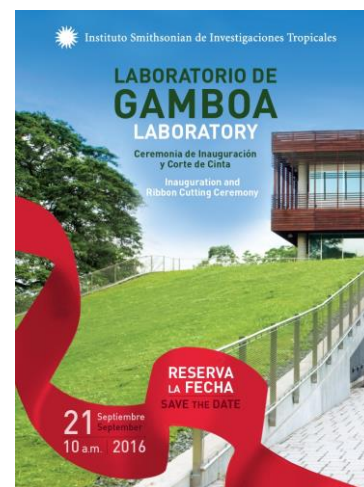
In a world where our food needs are expected to increase drastically as the populations continue to grow, scientists and policymakers alike need new and creative tools to ensure food security. Scientific Collections International (“SciColl”) works to promote interdisciplinary relationships that stretch beyond institutional boundaries and illustrate how collections can respond to these challenges.

Sediment cores that chronicle past climate conditions may also contain pollen grains from ancient crops. Pest and pollinator collections in natural history museums are vital resources for ongoing research on plant protection and increased production. New technology has enabled us to apply novel molecular techniques to old specimens and expand the scope of research beyond the lab or the museum.

A symposium “Stressors and Drivers of Food Security: Evidence from Scientific Collections”, was held from September 19 - 21, 2016, at the United States Department of Agriculture’s (“USDA”) National Agriculture Library in Beltsville, Maryland, to engage researchers from anthropology, archaeology, earth sciences, biodiversity, agriculture, and other fields in discussions that examine food supplies throughout human history. Emphasis on new partnerships, networks, and organizational behavior illustrated how collections are uniquely suited to support ongoing and future research. SciColl is a global consortium devoted to promoting the use and impact of object-based scientific collections across disciplines, including archaeology, biology, biomedicine, earth and space sciences, technology and others. The SciColl Secretariat is housed at the Smithsonian.

## RIBBON CUTTING FOR NEW RESEARCH LABORATORY IN GAMBOA, PANAMA

Smithsonian Tropical Research Center’s (“STRI”) new research Laboratory in Gamboa was inaugurated on September 21, 2016. Gamboa has long been a jumping off point for the Smithsonian’s research station on Barro Colorado Island and a center for STRI’s terrestrial research programs. Research in the new Gamboa Laboratory will directly complement and augment the science undertaken on Barro Colorado Island. The Gamboa Lab will enable *experimental* studies, while research on Barro Colorado Island is restricted to observational studies. The Gamboa Laboratory will play a prominent role in advancing tropical biology and as a training center for tropical biologists from around the world. In addition to STRI’s core staff scientists, more than 800 visiting scholars annually conduct research in Gamboa.



The three-story Gamboa Laboratory will now provide 41,710 square feet of new space housing STRI’s burgeoning programs and will be the vibrant hub of the larger campus community. The new offices and research space will house signature programs in animal behavior, neurobiology, forest ecology and climate change, which are all mission-critical science frontiers for STRI. The growth of STRI’s presence here will contribute information about best practices in land management and about local flora and fauna. The unique juxtaposition of rainforest, open areas for outdoor experimental research and the new, state-of-the-art laboratory are ideally situated to enhance STRI’s ongoing studies of forests, animals and microbe.

## ORANGUTAN BORN AT THE NATIONAL ZOO

For the first time in 25 years, primate staff at the Smithsonian’s National Zoo are celebrating the birth of a male Bornean orangutan on September 12, 2016. Both 19 years old, female Batang and male Kyle bred in January following a breeding recommendation from the Association of Zoos and Aquariums’ Species Survival Plan (“SSP”). Primate staff have confirmed the newborn is a male. Staff have observed Batang nursing the infant who has been clinging closely to his mother, and they are cautiously optimistic that the newborn will thrive.

“Each and every birth of a critically endangered species is significant, but it is all the more exciting, and this is a historic moment for our Smithsonian’s National Zoo,” said Meredith Bastian, curator of primates and member of the Orangutan SSP Steering Committee. “I look forward to watching the infant experience everything for the first time—especially meeting the other orangutans and going outside for the first time with Batang.”

For the past three years, keepers have been acclimating Batang to the experiences of motherhood and training her to care for an infant. Building upon behaviors Batang has learned through routine training sessions, keepers have trained Batang to hold a baby upright, present it to keepers for bottle feedings and place the baby in a specially designed box when asked. This training enables staff to retrieve the infant if medically necessary and evaluate its health in a way that is safe and not stressful for the animals.



*Photo credit: Alex Reddy*

## VENUS-LIKE EXOPLANET MIGHT HAVE OXYGEN, BUT NO LIFE

The distant planet GJ 1132b intrigued astronomers when it was discovered last year. Located just 39 light-years from Earth, it might have an atmosphere despite being baked to a temperature of around 450 degrees Fahrenheit. But would that atmosphere be thick and soupy or thin and wispy? New research suggests the latter is much more likely.

Harvard astronomer Laura Schaefer (Harvard-Smithsonian Center for Astrophysics, or CfA) and her colleagues examined the question of what would happen to GJ 1132b over time if it began with a steamy, water-rich atmosphere. Orbiting so close to its star, at a distance of just 1.4 million miles, the planet is flooded with ultraviolet or UV light. UV light breaks apart water molecules into hydrogen and oxygen, both of which then can be lost into space. However, since hydrogen is lighter it escapes more readily, while oxygen lingers behind. “On cooler planets, oxygen could be a sign of alien life and habitability. But on a hot planet like GJ 1132b, it’s a sign of the exact opposite—a planet that’s being baked and sterilized,” said Schaefer. Since water vapor is a greenhouse gas, the planet would have a strong greenhouse effect, amplifying the star’s already intense heat. As a result, its surface could stay molten for millions of years.

A “magma ocean” would interact with the atmosphere, absorbing some of the oxygen, but how much? Only about one-tenth, according to the model created by Schaefer and her colleagues. Most of the remaining 90 percent of leftover oxygen streams off into space, however some might linger. “This planet might be the first time we detect oxygen on a rocky planet outside the solar system,” said co-author Robin Wordsworth (Harvard Paulson School of Engineering and Applied Sciences). If any oxygen does still cling to GJ 1132b, next-generation telescopes like the Giant Magellan Telescope and James Webb Space Telescope may be able to detect and analyze it. The magma ocean-atmosphere model could help scientists solve the puzzle of how Venus evolved over time. Venus probably began with Earthlike amounts of water, which would have been broken apart by sunlight. Yet it shows few signs of lingering oxygen. The missing oxygen problem continues to baffle astronomers.

Schaefer predicts that their model also will provide insights into other, similar exoplanets. For example, the system TRAPPIST-1 contains three planets that may lie in the habitable zone. Since they are cooler than GJ 1132b, they have a better chance of retaining an atmosphere.



*This work has been accepted for publication in the Astrophysical Journal. Artist's conception: Dana Berry / Skyworks Digital / CfA*



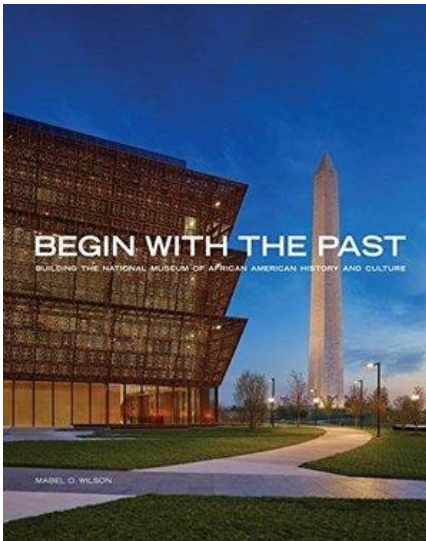
## THERE GOES THE NEIGHBORHOOD

In the early 2000s, Washington, D.C. and other large cities across the United States began experiencing steady population growth for the first time in fifty years. Meanwhile, for the first time ever, the surrounding suburbs began facing growing rates of poverty. This reversal in longstanding trends that defined the twentieth century’s “urban crisis” has raised important questions about the causes and consequences of the rapid transformation of urban neighborhoods in the twenty-first century.

Exploring both the historical and contemporary transformation of neighborhoods in all four quadrants of the nation’s capital—including Shaw, Chinatown, Anacostia, Adams Morgan, Southwest, Brookland, and more—“There Goes the Neighborhood”, a research effort of the Anacostia Community Museum, highlights the role that residents, business owners, tenants’ associations, developers, activists, and government officials have played in reshaping Washington, D.C. over the past half-century. Revealing how and why metropolitan Washington neighborhoods developed the way they have, the exhibition offers historical insights about urban change while also uncovering the possibilities for an equitable urban future.

“There Goes the Neighborhood” will run from September 18, 2017 through September 16, 2018. The exhibition will serve to mark and to celebrate the 50<sup>th</sup> anniversary of the Anacostia Community Museum which opened its doors on September 15, 1967.

## BEGIN WITH THE PAST: BUILDING THE NATIONAL MUSEUM OF AFRICAN AMERICAN HISTORY AND CULTURE



Rising on the National Mall next to the Washington Monument, the National Museum of African American History and Culture is a tiered bronze beacon inviting everyone to learn about the richness and diversity of the African American experience and how it helped shape this nation. *Begin with the Past: Building the National Museum of African American History and Culture* is the story of how this unparalleled museum found its place in the nation’s collective memory and on its public commons. *Begin with the Past* presents the long history of efforts to build a permanent place to collect, study, and present African American history and culture.

In 2003, the museum was officially established at long last, yet the work of the museum was only just beginning. The book traces the appointment of the director, the selection of the site, and the process of conceiving, designing, and constructing a public monument to the achievements and contributions of African Americans. The careful selection of architects, designers, and engineers culminated in a museum that embodies African American sensibilities about space, form, and material and incorporates rich cultural symbols into the design of the building and its surrounding landscape.

The National Museum of African American History and Culture is a place for all Americans to understand our past and embrace our future, and this book is a testament to the inspiration and determination that went into creating this unique place.