



# Smithsonian Institution

## OUR SHARED FUTURE: RESEARCH HIGHLIGHTS JANUARY 2024

The following stories highlight Smithsonian research that has helped to shape and champion our strategic pan-Institutional initiatives, notably **Life on a Sustainable Planet**, from research focused In the Ocean to Across the Universe. These highlights also show the collaborative nature of the Institution's research and educational outreach not only across Smithsonian units but in connection with leading universities and national and international research organizations aimed at mitigating climate change and other human impacts on nature.

## SMITHSONIAN AT COP28 IN DUBAI



Pictured: Holly Glover (**Smithsonian Science Education Center, SSEC**); Josh Tewskbury (**Smithsonian Tropical Research Institute, STRI**); Ellen Stofan (**Under Secretary for Science and Research**); Ana Spalding (**STRI**); Carol O'Donnell (**SSEC**); Steve Canty (**Smithsonian Environmental Research Center**); Stuart Davies (**ForestGEO**); and Britta Garfield (**Office of International Relations**).

In December 2023, the Smithsonian sent a delegation to the United Nations Framework Convention on Climate Change's Conference of the Parties for the second time. Smithsonian **Under Secretary for Science and Research**, Ellen Stofan, led a group of scientists and educators to COP28 in Dubai, reflecting the Institution's ongoing commitment to "Our Shared Future." Dedicated to fostering harmony between humanity and nature, the Smithsonian partners with local communities worldwide to deepen the collective understanding of and advocate for nature-based solutions to enhance Earth's sustainability. Having established the **Our Shared Future: Life on a Sustainable Planet** goal at the previous year's COP, in 2024, the Institution will focus on broadening and deepening its scientific partnerships and continuing to develop excellent data to inform climate action.

The Smithsonian featured several pivotal advances it is taking in the Life on a Sustainable Planet Initiative:

- Celebrating a year of progress, the Smithsonian will steward \$20 million in resources for "Ecosystems on the Edge" with Life on a Sustainable Planet: In the Ocean.

- Previewing Ocean! — the Smithsonian will publish a forthcoming new community research guide from the **Smithsonian Science for Global Goals** project for students aged 11 to 18, to be released February 2024.
- Advancing Climate Research and Education, the Smithsonian will launch the **Adrienne Arsht CommunityBased Resilience Solutions Initiative** with \$10 million support from business leader and philanthropist Adrienne Arsht;
- Launching **GEO-TREES**, the Smithsonian will launch the first international consortium to ensure the accuracy of satellite monitoring of forest biomass, seeded by a \$12 million grant from the Bezos Earth Fund.

These efforts are firmly rooted in a dedication to fostering the well-being of the planet and its inhabitants, preserving biodiversity, and promoting environmental equity. Learn more about ***Our Shared Future: Life on a Sustainable Planet*** at the newly updated website: [science.si.edu](https://science.si.edu)

## STABILITY FOR THE SCIMITAR-HORNED ORYX



The Scimitar-horned oryx is a culturally and ecologically significant species across North Africa and Arabia. This desert antelope was driven to extinction in the 1980s by hunting and competition with domestic livestock. Though Extinct in the Wild, the species remained in existence in captivity, with over 220 zoological institutions involved in a global captive breeding program including the **National Zoo and Conservation Biology Institute** where in 2021, two Scimitar-Horned Oryx Calves were born via non-surgical artificial insemination.

This landmark international effort sparked a conservation renaissance for the oryx. Following more than 240 successful reintroductions, the wild population saw a resurgence. In a historic move in December 2023, the International Union for the Conservation of Nature (IUCN) down-listed the species from “Extinct in the Wild” to “Endangered”—a testament to the conservation triumph. Now, over 600 oryx roam Chad’s expansive Ouadi Rimé-Ouadi Achim Faunal Reserve, a sanctuary exceeding 78,000 square kilometers.

Scientists from the **National Zoological Park and Conservation Biology Institute** track these reintroduced oryx using satellite collars, gathering invaluable data on their movements and survival rates. These GPS-enabled collars are pivotal for on-ground monitoring and radio telemetry, offering insights into the oryx's adaptation and informing ongoing management and conservation strategies.

## SMITHSONIAN AND NOAA HOST SUMMIT ON OCEAN BIODIVERSITY



Monk seal swimming over a coral reef bottom in the Northwest Hawaiian Islands. (Image credit: NOAA)

On January 23 in Washington, D.C., leaders and experts from across the nation will participate in the **Summit on Ocean Biodiversity** to amplify the importance of ocean, coastal, and Great Lakes biodiversity. Participants will discuss solutions to protect and sustain the nation's natural resources for the benefit of all Americans. The summit, organized by the National Oceanic and Atmospheric Administration (NOAA) and the Smithsonian Institution, features leaders in science, policy, philanthropy, industry, tribal communities, and conservation who will share their insights to advancing our understanding of ocean biodiversity. Their insights will foster collaborative action to conserve, restore, and sustainably use the ocean's living resources.

Earth's diverse life is the foundation of human health, prosperity and security. Solving the intertwined challenges of biodiversity loss, climate change, and societal inequity will only succeed when leaders recognize and act on these linkages. Starting at the grass roots level and stretching across all sectors, today's leaders must align their needs and efforts and make commitments towards sustaining a biodiverse planet.

The Summit on Ocean Biodiversity will feature panel discussions focused on the intersection of ocean biodiversity with climate change, technology, and finance, and will challenge ocean leaders to coordinate ideas, efforts, and investments to advance a sustainable ocean ecosystem that supports thriving human communities.

The summit will explore three themes through panel conversations with a diverse group of leaders:

- Biodiversity and Communities at the Frontlines of Climate Change
- Valuing Biodiversity for Conservation and the Blue Economy
- Exploration and Innovation to Sustain Ocean Biodiversity

The Summit on Ocean Biodiversity amplifies a research paper published in January, [New framework reveals gaps in U.S. ocean biodiversity protection](#), published online and open-access in *One Earth*, reporting the first quantitative assessment of biodiversity in and outside of Marine Protected Areas across the U.S. Exclusive Economic Zone. The paper resulted from a collaboration among biodiversity scientists and conservation planners from several countries. It is intended to inform U.S. efforts toward the 30 x 30 goal, and the developing national ocean biodiversity strategy.

**MarineGEO** was the primary co-sponsor of the Summit, with participation from the **National Museum of Natural History** and Ellen Stofan, the **Under Secretary for Science and Research**. The complete agenda can be found [online](#), and a recorded video is available via the [Earth Optimism YouTube channel](#).

## NEW FELLOWSHIPS AWARDED IN SUPPORT OF LIFE ON A SUSTAINABLE PLANET

As part of the [Our Shared Future: Life on a Sustainable Planet](#) initiative, the Smithsonian expanded upon the in-residence fellowship programs: the Smithsonian Climate Change Postdoctoral Fellowship, Smithsonian Environmental Justice Fellowship, and the Resilience and Sustainability Science Postdoctoral Fellowship.

Selections were made in December to support a cohort of 13 new fellows for a period of two years. With advisors from the **Anacostia Community Museum**, **National Zoo and Conservation Biology Institute**, **Smithsonian Environmental Research Center**, and **Smithsonian Tropical Research Institute**, the proposed independent research projects range from *How can efforts to meet country-level global biodiversity commitments support resilience in coastal fishing communities?* to *Modelling trait-based effects of chronic and acute thermal exposure on coral assemblages and reef functioning*.

In addition to their work focused on Climate Change, Environmental Justice, and Resilience and Sustainability, the Fellows will form a cohort that will participate in hybrid training related to leadership skill development, science communication, policy engagement, effective transdisciplinary research techniques, and inclusive approaches to research and equitable outcomes. This cohort-based training will support fellows in connecting their research to action.

## DISTANT STARS SPOTTED FOR THE 1<sup>ST</sup> TIME IN VAST MAGELLANIC STREAM



Image Credit: CfA/Melissa Weiss

For nearly 50 years, astronomers have come up empty-handed in their search for stars within the sprawling structure known as the Magellanic Stream. A colossal ribbon of gas, the Magellanic Stream spans nearly 300 Moon diameters across the Southern Hemisphere's sky, trailing behind the Magellanic Cloud galaxies, two of our Milky Way Galaxy's closest cosmic neighbors.

Now the star search is finally over. Researchers at the [Center for Astrophysics | Harvard & Smithsonian](#) (CfA) and colleagues have identified 13 stars whose distances, motion, and chemical makeup place the stars squarely within the enigmatic stream.

Locating these stars has now pinned down the true distance to the Magellanic Stream, revealing that it extends from 150,000 light-years to more than 400,000 light-years away. The findings pave the way to map and model the Magellanic Stream in unprecedented detail, offering new insights into the history and characteristics of our Galaxy and its neighbors.

"The Magellanic Stream dominates the Southern Hemisphere's sky and our work has at last found a stellar structure that people have sought for decades," says Vedant Chandra, a PhD student in Astronomy & Astrophysics at the CfA and lead author of a new [study](#) published in *The Astrophysical Journal* reporting the findings.

"With these results and more like them, we hope to gain a far greater understanding of the formation of the Magellanic Stream and the Magellanic Clouds, as well as their past and future interactions with our Galaxy," said co-author Charlie Conroy, a Professor of Astronomy at the CfA and Chandra's advisor.

Further studies of the Magellanic Stream should also help astronomers learn more about the composition of our Galaxy. Because the Stream is thought to trace the past paths of the Magellanic Clouds, modeling the evolution of the relatively massive Large Magellanic Cloud via the Stream will improve measurements of the Milky Way's mass distribution. Much of that mass is in the form of dark matter—a poorly understood, gravity-exerting substance. Better gauging the mass of our Galaxy out in its distant hinterlands will aid in accounting for ordinary matter versus dark matter contents, constraining the possible properties of the latter.