



NASA Biological Diversity and Ecological Conservation

- 2024 Newsletter, December 9, 2024 -

We are excited to share the latest news on our initiatives, success stories, and developments from NASA's Biological Diversity and Ecological Conservation (BDEC) Programs.

New Opportunities

ROSES24 - A.60 Earth Action: Ecological Conservation

This program is seeking proposals for projects in any area of ecological conservation. Projects should apply Earth observations to improve or develop decision-making activities in ecological conservation and management.

Two proposal types are accepted:

1. **Feasibility Activities:** This Subelement is designed to support projects that are in the early stages of proving application concepts. Preference will be given to innovative activities leveraging one or more NASA instruments that are new or have been underutilized in applications.

2. **Decisional Activities:** This Subelement solicits proposals for activities and products that will achieve operational deployment and sustained use in decision-making by the end user(s) before the end of the award.

Notices of intent are requested by **February 14, 2025**, and proposals are due **March 14, 2025**. A second virtual meeting for potential proposers will occur Monday, **January 13th** (1-3 PM Eastern Time). Presentations slides and a Questions and Answers document for the first virtual meeting on November 15, 2024, is now available in the [NSPIRES page for this program element](#).

[Go to Solicitation Information](#)

ROSES-24 Amendment 74: A.63 Ecohydrology New Opportunity in ROSES-24

[A.63 Ecohydrology](#) is a special program element of the NASA Terrestrial Hydrology Program in recognition of the need for holistic, interdisciplinary approaches to evaluate and refine modeled coupled water, energy and carbon cycle process representation in a manner that more fully leverages NASA's modeling and Earth observing system. Interdisciplinary teams are invited to propose and implement novel strategies for evaluating and improving the realism of modeled ecosystem response sequences to human- and environmentally forced pulse events.

Notices of intent are requested by January 16, 2025, and proposals are due March 19, 2025. Proposals will be evaluated using [dual-anonymous review](#), so they must be prepared according to the guidelines in Section 6 and in the associated "Guidelines for Anonymous Proposals" document under "Other Documents" on [the NSPIRES page for this program element](#).

Questions concerning [A.63 Ecohydrology](#) may be directed to Craig Ferguson at craig.r.ferguson@nasa.gov.

Planet's Project Centinela: Monitoring Vulnerable

Biodiversity Hotspots For Conservation Action



Eight vulnerable, high-biodiversity locations are the first sites for Project Centinela

Project Centinela is a new program that aims to help leading scientists, conservationists, and stewards monitor and safeguard up to 50 of the world's vulnerable biodiversity hotspots. This program will provide those who are maintaining a lifeline for biodiversity with access to high-resolution, high-frequency satellite imagery, advanced analytics, and Planetary Variables. There are currently eight sites, which exemplify up to 50 hotspots around the world Project Centinela will cover in the next three years. Sites are selected via an open application for eligible teams and sites. See below link to learn more and apply.

[Learn More about Planet's Project Centinela](#)

Job Opportunities

Job Title	Location	Status and Timeline	Posted By	Link
California Cooperative Oceanic Fisheries Investigations (CalCOFI) Program Director	Scripps Institution of Oceanography, San Diego, CA	Open until Filled	UC San Diego	Link

Ecologist Statistician (Interdisciplinary)	Front Royal, VA	Application closes 12/30/24	Smithsonian's National Zoo and Conservation Biology Institute	Public Link From within U.S. Government Link
Post Doctoral RA – Coastal Biogeochemistry	Sequim, Washington	Applications due 12/13/24	Pacific Northwest National Laboratory	Link
Postdoctoral Scholar in Modeling Climate Impacts on Conifer Reproduction	Merced, CA	Applications due 12/31/24	University of California	Link
Fellow on Remote Sensing of Agricultural Conservation Practices	Beltsville, Maryland	Applications due 1/3/25	U.S. Department of Agriculture	Link

[View more open job opportunities](#)

Upcoming Events

American Geophysical Union Fall Meeting 2024

- December 9-13, 2024 - Washington, D.C. -

AGU Session Highlights - Just a few!

Date	Time	Title
December 09, 2024	Oral: 4:00 - 5:30 PM Poster: 8:30 - 12:20 PM	Sensing Biodiversity Remotely: Updates from NASA's First Biodiversity-Focused Airborne and Field Campaign, BioSCape Oral Session , Poster
December 09, 2024	8:30 - 12:20 AM	The Use of Remote Sensing to Evaluate Ecosystem Restoration Approaches Poster
December 10, 2024	12:30 - 1:30 PM	TH231 NASA Earth Science Division Town Hall

December 11, 2024	4:00 - 6:00 PM	TH35J - NASA Earth Science in Action Town Hall
December 11, 2024	Oral: 8:30 - 11:50 AM Poster: 1:40 - 5:30 PM	Advances in Remote Sensing for Monitoring Biodiversity Change: Integrating Data and Models Across Scales and Technologies Oral Session I & Session 2 , Poster
December 11, 2024	12:30 - 1:30 PM	TH33D - Drylands in the Earth System: A Community Assembly to Discuss, Inform, and Celebrate the ARID (Adaptation and Response in Drylands) NASA Field Campaign Scoping Study Actionable Science Plan Town Hall
December 12, 2024	Oral: 8:30 - 10:00 AM Poster: 1:40 - 5:30 PM	Advances in Remote Sensing for Monitoring Biodiversity Change: Integrating Data and Models Across Scales and Technologies IV Oral Session I & Session 2 , Poster

[Check out the Online Scientific Program and Schedule](#)

ARSET Trainings

ARSET offers online and in-person trainings for beginners and advanced practitioners alike. Trainings cover a range of datasets, web portals, and analysis tools and their application to air quality, agriculture, disasters, land, and water resource management. Since 2009, the program has reached more than 100,000 participants from 183 countries and more than 17,000 organizations worldwide.

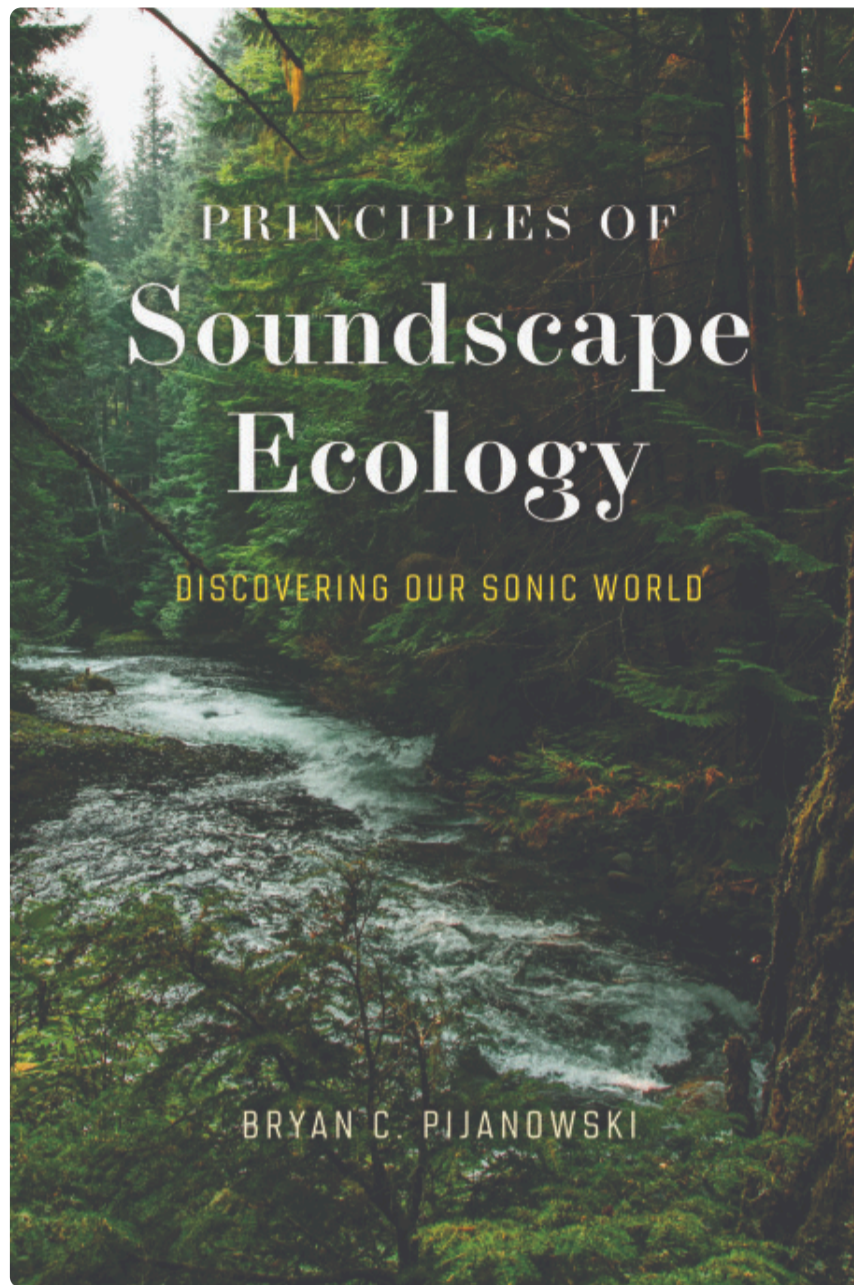
ARSET - Earth Observations of Blue Carbon Ecosystems	December 3, 2024 - December 5, 2024
ARSET - Developing Sustainable Earth Science Applications	Online, Self-paced

[Take me to all ARSET trainings](#)

[Publication Updates](#)

Publication Highlights

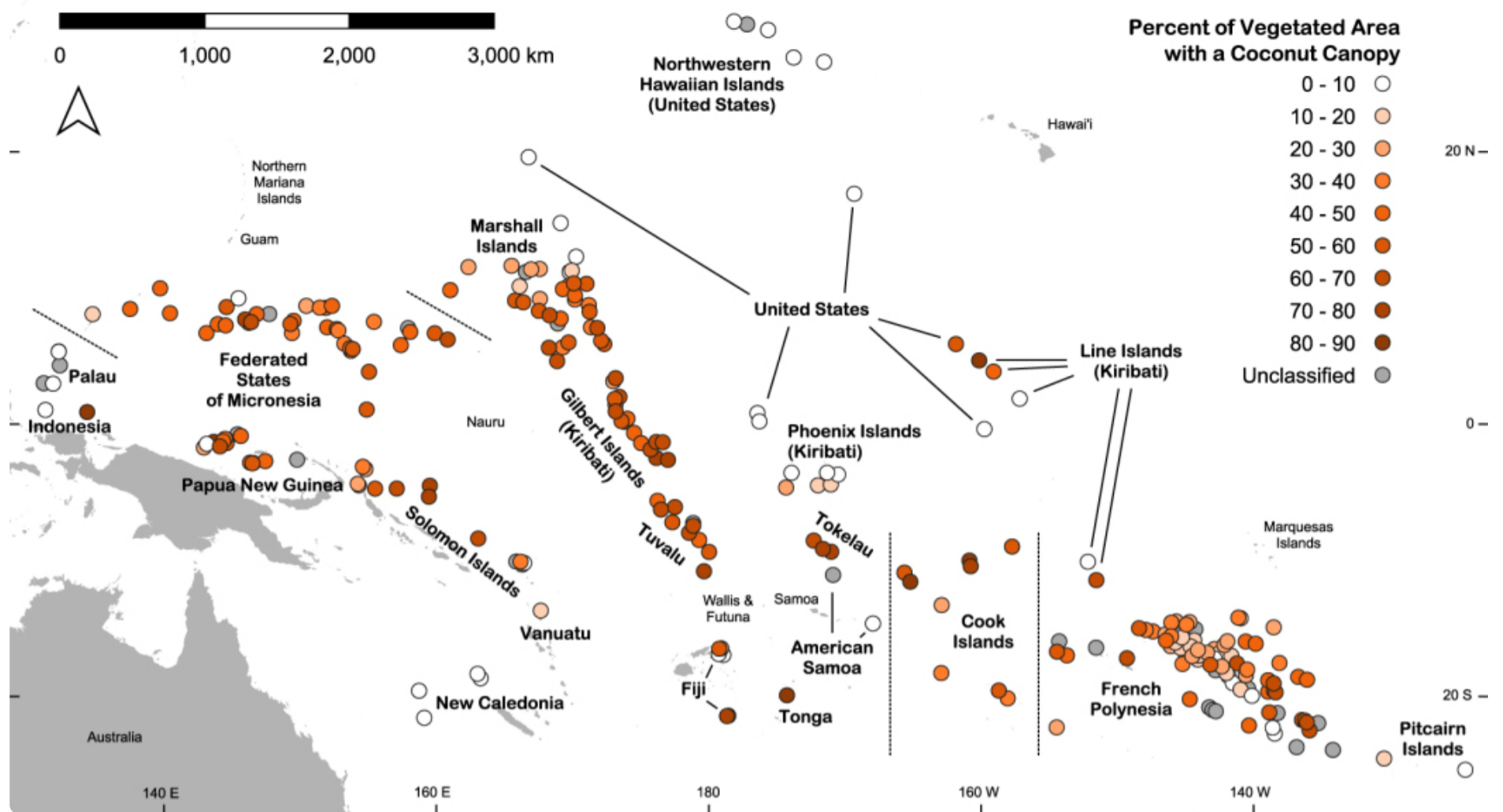
New Book: Principles of Soundscape Ecology Discovering Our Sonic World



Started in late 2020 and published June 2024, this textbook by Dr. Bryan C. Pijanowski at Purdue University covers many topics related to the NASA Biodiversity project (grant #80NSSC21K1146) including the basis of landscape and biogeography theories, data analytics, summaries of common data sources for use in biodiversity assessments including those from NASA (Landsat, MODIS, DESIS, ECOStress and GEDI).

[Learn more about the book here](#)

Satellite imagery reveals widespread coconut plantations on Pacific atolls

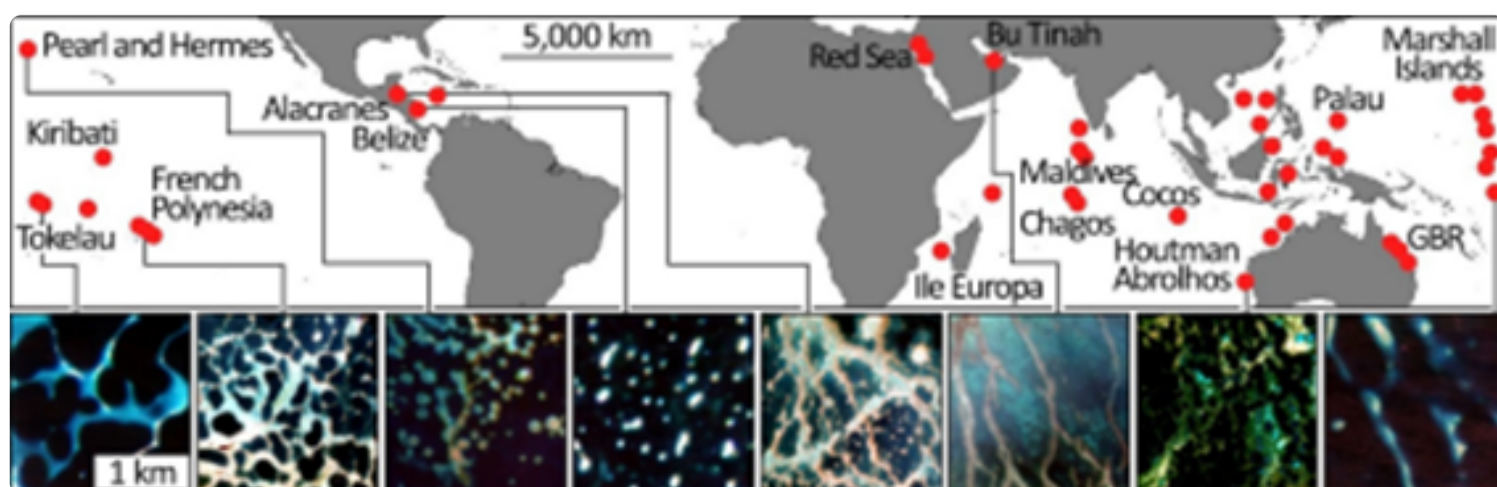


Locations of the 266 Pacific atolls, colored according to coconut canopy fraction (the percent of vegetated land classified as coconut canopy). Gray dots represent atolls that were not successfully classified. Bolded countries include at least one atoll.

Using NASA CSDA imagery, Michael Burnett at the University of California, Santa Barbara, and colleagues created the first maps of vegetation on nearly every Pacific atoll. Their work found that over 80% of atolls were planted with coconut palm for colonial plantations over the past two centuries, and that even decades after most plantations were abandoned, over half of atoll forests are still dominated by coconut palm. This is the first large-scale examination of the legacy of colonial planting on remote Pacific islands. These maps will help Pacific atoll communities evaluate the potential for ecological restoration and groundwater conservation on their islands.

[Check out the publication here](#)

Emergent coral reef patterning via spatial self-organization

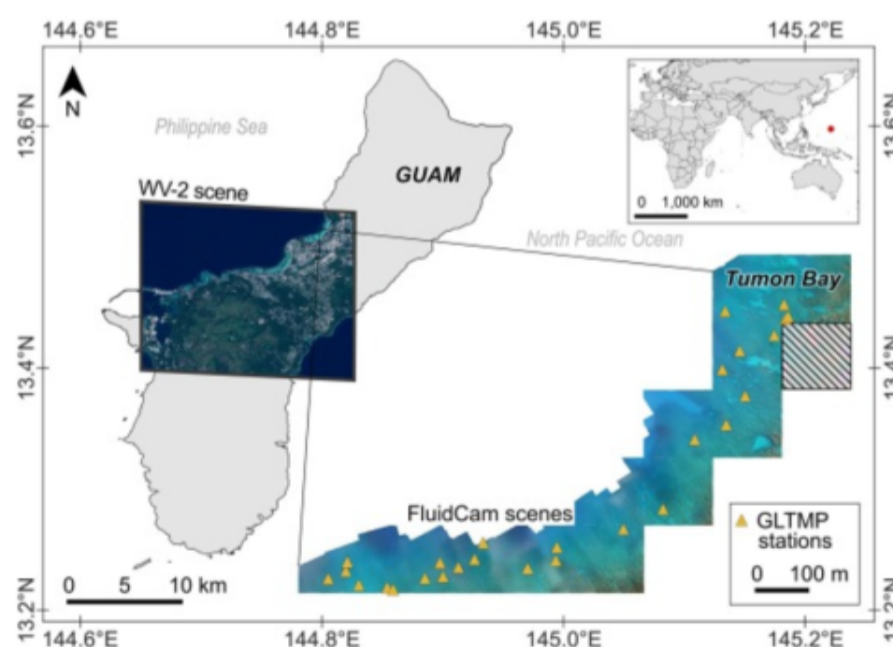


Locations of the 63 coral reefs where reef patterns were satellite mapped. For each site, a representative 2×2 km area was mapped to capture reef patterning. Eight representative sites for reference.

Arising out of NASA ROSES Biodiversity Award 20-BIODIV20-0108 – MarineVERSE – a new paper by Haiwei Xi, Xiaoli Dong, Ved Chirayath, Arthur Gleason, and Sam Purkis leverages satellite imagery and theoretical modeling to uncover the mechanisms driving spatial patterning in coral reefs. By analyzing reef sites across the Atlantic, Pacific, and Indian Oceans, the researchers demonstrate how interactions between coral growth, sedimentation, and hydrodynamic flow lead to self-organized reef ridges forming intricate emergent patterns detectable from orbit. Their generalized Turing model suggests these patterns evolve through a four-phase trajectory, stabilizing when currents diminish, potentially signaling ecosystem stress at the colony level. This discovery opens pathways for using emergent reef patterns as global indicators of reef health, enhancing remote sensing capabilities for conservation efforts.

[Check out the publication here](#)

Remotely Sensed Spectral Variability Predicts Reef Fish Diversity

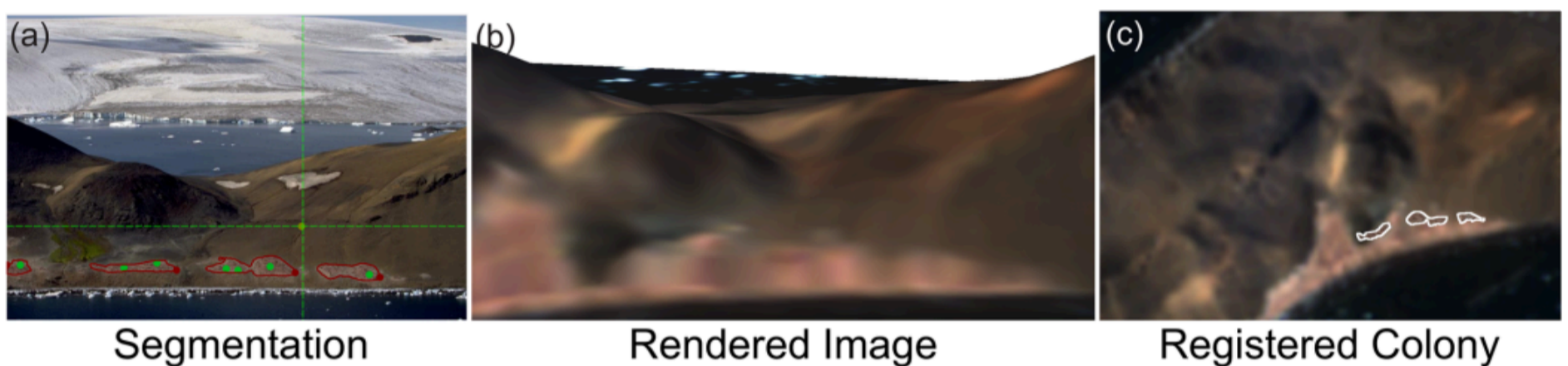


This publication explores the application of the spectral variability hypothesis (SVH) to estimate species diversity in terrestrial landscapes using satellite data, allowing for large-scale biodiversity assessments. The study extends this concept to the marine realm by testing the ability of their hypothesis to retrieve coral reef fish biodiversity from remote sensing data across a global transect of reef sites. The findings demonstrate that SVH is as effective underwater as on land, revealing its potential to serve as a reliable proxy for reef biodiversity and emphasizing the value of remote

sensing data for mapping seabed habitats and for biodiversity monitoring in marine ecosystems. Congratulations to Dr. Anna Bakker, lead author, who recently graduated from the University of Miami with her PhD in Dr. Sam Purkis' Remote Sensing Lab at the University of Miami's Rosenstiel School of Marine, Atmospheric, and Earth Science.

[Check out the publication here](#)

Tourist Photos from Antarctica May Help Map Penguin Colonies



Overview of penguin colony registration on Devil Island, Antarctica.

A recent interview on *Science Friday* highlighted a NASA project lead by Dr. Heather Lynch, a Professor of Ecology & Evolution at Stony Brook University. She discussed her NASA-led project and the findings of her recent paper, *Penguin Colony Georegistration Using Camera Pose Estimation and Phototourism*, published in *PLOS ONE*. The paper examines the key roles of satellite-based remote sensing and uncrewed aerial imagery in mapping wildlife populations and habitats. They utilized the Segment Anything Model (SAM) for interactive identification and segmentation of penguin colonies.

[Read more about the interview here](#)

[Read more about the publication here](#)

Vanishing Corals, Part Two: Climate Change is Stressing Corals, But There's Hope



August 8, 2023, Coral Bleaching in Horseshoe Reef

A new article from *Ask NASA Climate* highlights research led by Ved Chirayath, focusing on the decline of coral reefs due to both climate change and human activities. The study emphasizes how burning fossil fuels is driving global warming, affecting both the atmosphere and oceans. In addition to climate change, pollution and physical damage from ships and divers also contribute significantly to the degradation of these vital ecosystems. This article highlights the impact and importance of this research in understanding and addressing the complex threats to coral reefs.

[Read the Article Here](#)

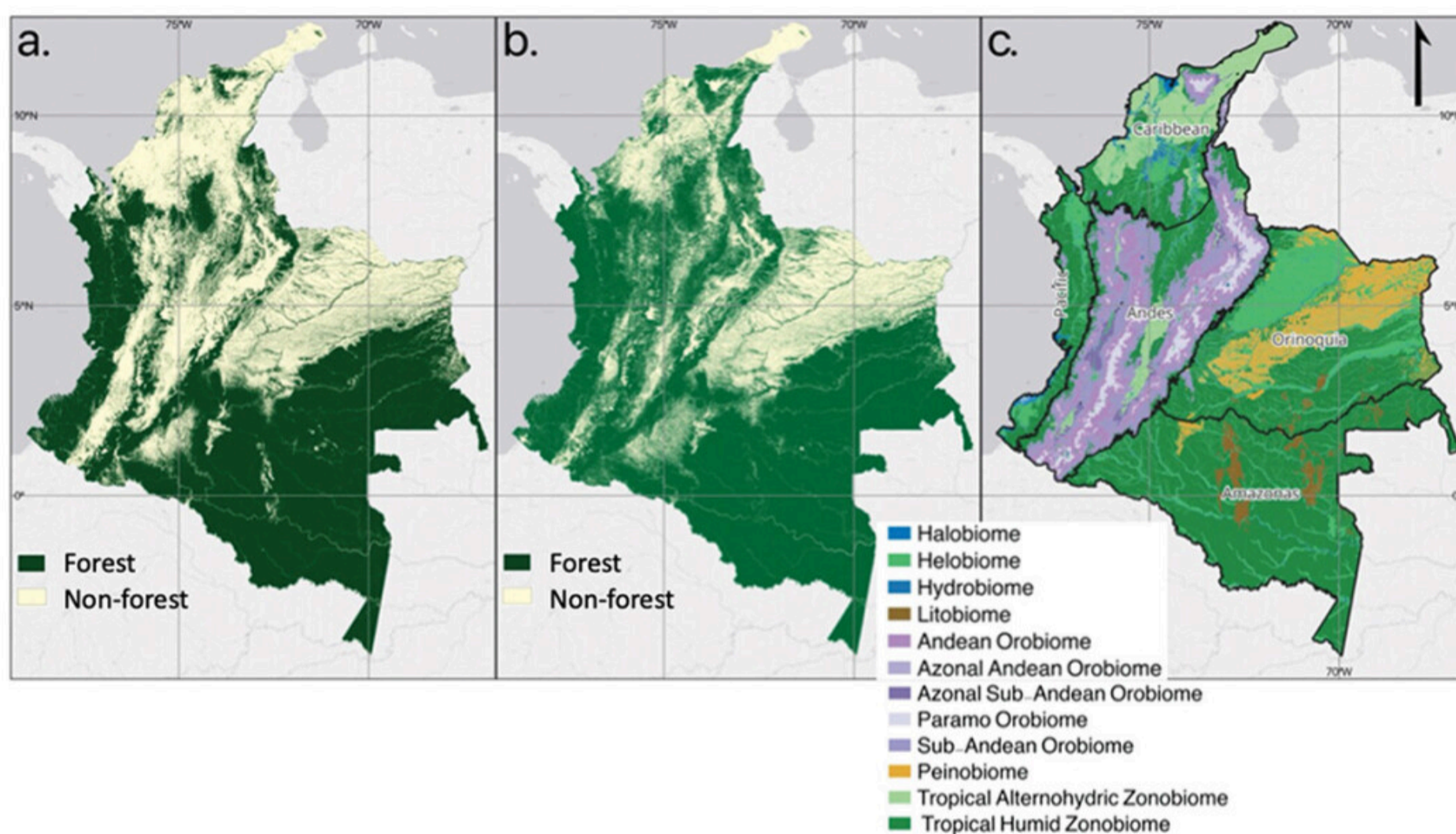
[News Story of Impact of Coral Bleaching Using this Work](#)

A wholesale revolution in wildlife science



An Ecological Conservation project is developing a cutting edge, [AI-enabled, habitat suitability framework based on acoustic monitoring](#) of the endangered California Spotted Owl (CSO). The CSO is being outcompeted for prey by the invasive Barred Owl. The framework development, led by Zach Peery of the University of Wisconsin, will enable the US. Fish and Wildlife Service to select priority areas, and ultimately conduct management intervention (i.e., culling) of the barred owl in the selected areas. This activity was recently featured in the Washington Post.

Mapping forest cover and change as continuous variables is essential to advance consistency across forest monitoring products



Study area and maximum forest cover extent mapped by a. IDEAM and b. GFC (b.). c. great biomes containing the 396 biotic units used here (Londoño et al. Citation2015) for the production of sub-national optimal tree cover thresholds.

The publication demonstrates that discrepancies in mapping forest cover and changes across operational forest monitoring products can be minimized by mapping forest cover and change as continuous variables rather than categorical ones. It advocates for advancing remote sensing capabilities to represent forest cover and change through continuous measures like Aboveground Biomass Density or Canopy Height instead of binary classifications like forest and non-forest. This approach can enhance consistency in forest cover definitions and map representations, improve comparability among products and forest area loss estimates, and strengthen accountability in assessing forest area loss.

[Read publication here](#)

Other Recent Publications

- Pijanowski, B.C., Fuenzalida, F.R., Banerjee, S., et al. (2024). *Soundscape Analytics: A New Frontier of Knowledge Discovery in Soundscape Data*. Springer Nature 9(88-107). <https://doi.org/10.1007/s40823-024-00101-9>
- Russo, N. J., Nshom, D. L., Ferraz, A., Barbier, N., Wikelski, M., Noonan, M. J., Ordway, E. M., Saatchi, S., & Smith, T. B. (2024). *Three-dimensional vegetation structure drives patterns of seed dispersal by African hornbills*. *Journal of Animal Ecology*. <https://doi.org/10.1111/1365-2656.14202>
- Moon, T. A., Cohen, B., Black, T. E., Laidre, K. L., Stern, H. L., & Joughin, I. (2024). *Characterizing southeast Greenland Fjord Surface Ice and freshwater flux to support biological applications*. *The Cryosphere*. <https://tc.copernicus.org/articles/18/4845/2024/>
- Keyser, S. R., Pauli, J. N., Fink, D., Radeloff, V. C., Pigot, A. L., & Zuckerberg, B. (2024). *Seasonality structures avian functional diversity and niche packing across North America*. *Ecology Letters*, 27(10). <https://doi.org/10.1111/ele.14521>

[PI-Led Trainings/Conferences Spotlight](#)

BioSCape Field Spectroscopy and Data Skills Workshop



First ever in-person BioSCape field spectroscopy & data skills workshop in collaboration with BioSCape researchers, ARSET, and ORNL-DAAC. It was a jam-packed week filled with learning & networking for researchers & practitioners

BioSCape hosted a 5-day in-person Field Spectroscopy and Data Skills workshop in Cape Town, South Africa on 7-11 October 2024. The workshop aimed to increase the ability of end users to access and use BioSCape and NASA Earthdata in their work and decision making. Specifically, it provided tools for participants to utilize field (terrestrial and aquatic), airborne (AVIRIS-NG, PRISM, HyTES, and LVIS), and orbital (EMIT, ECOSTRESS, PACE, and GEDI) data to engage with a range biodiversity-related topics including: harmful algal blooms, post-fire recovery, invasive species, diversity indices, and plant functional traits.

This is the first ever joint ARSET & ORNL DAAC training event and together they hosted 47 local participants from around South Africa. The majority of attendees were from governmental organizations, including protected area agencies, local municipalities, research agencies, and natural resource management institutions and departments. These government employees were tightly aligned with decision making and conservation implementation, holding roles such as conservation and spatial planners, protected area managers, data managers, and researchers from ten institutions. They were also joined by academic participants including professors and graduate students from seven South African universities as well as representatives from an NGO, a UNESCO-managed reserve, and a private landowner.

Early workshop feedback indicates that nearly 95% of participants felt that their ability to find, access, and work with NASA Earthdata has improved, and 86% of

participants have a greater ability to use these data in their work or decision making. Below is a quote taken from the feedback surveys:

"It was extremely useful to me, not only to navigate and process BioSCcape data, but also to get some exposure to other software/coding language options and different ways of working with remote sensing data than I am used to. I enjoyed your lectures and practical demonstrations and appreciated the link between the data and ecological interpretations thereof. The training was just what I needed now to progress with aspects of SBAPP."

This workshop was a community effort made possible through contributions from: UNESCO, ARSET, ORNL DAAC, The South African Environmental Observation Network (SAEON), Amazon Web Services, The Nature Conservancy, University of Cape Town, University of Wisconsin, University of California Merced, University at Buffalo, JPL, GSFC, and the South African Astronomical Observatory (SAAO). All workshop materials will be made publicly available at bioscape.io.

Workshop: Earth Observation for Monitoring of Coastal Protected Areas in West Africa



Organized by NASA Goddard Space Flight Center, IUCN, BlueSeeds, Centre de suivi écologique (CSE) and the World Bank, this in-person workshop hosted in Dakar, Senegal on November 11th-15th, brought together 26 participants from 15 different countries. This workshop served as an opportunity for all partners to convene, exchange insights, and discuss the integration of EO-based data for enhanced management and decision-making. In addition, capacity-building sessions focused on Earth Observation data and the generation of actionable insights (maps, metrics,

etc.) supported partners in leveraging satellite data for local use. 100% of participants said they benefited from participation in the workshop!

"I have increased my knowledge of EO solutions being used and am convinced of the relevancy of GEE and available open-access tools, particularly those provided by NASA, for monitoring coastal ecosystems in the region."

"I have gained knowledge on R, and Google Earth Engine that I can share with the other colleagues at my office ."

Dr. Temilola Fatoyinbo at NASA Goddard Space Flight Center is leading a project supported by the Ecological Conservation Program that focuses on protected areas (PA) in West Africa, from Senegal to Gabon. The project aims to develop pathways to incorporate operational use of Earth observations-based information for conservation and restoration projects in West African PAs. PAs in Africa and mangrove PAs worldwide are the least effective at conserving C when compared to others most likely due to the high rates of deforestation and degradation and lack of funding available to maintain and monitor these PAs effectively. The project will improve the effective implementation of climate change mitigation and adaptation through the restoration, conservation and sustainable use of mangroves and forests at local, national and regional scale.

Workshop: Integrated Evaluation of the Contribution of NASA Earth Observation Products to Support Biodiversity Decision Making in Colombia



On November 14, 2024, Victor Gutierrez-Velez at Temple University led a workshop as part of a collaborative project with principal investigators from three former NASA awards and the [Von Humboldt Institute for Biological Resources](#). The project, *Integrated Evaluation of the Contribution of NASA Earth Observation Products to Support Biodiversity Decision Making in Colombia*, is capturing, characterizing, and quantifying the impact of funded project products on end user decision-making related to the identification, declaration, and management of protected areas at the national, subnational, and local scales in Colombia.

The in-person workshop hosted at the Von Humboldt Institute for Biological Resources in Bogota, Colombia, brought together 27 representatives across 11 key Colombian organizations including the Association of United Women of San Isidro, the Magdalena Regional Autonomous Corporation (CORPOMAG), the Institute of Hydrology, Meteorology, and Environmental Studies (IDEAM), National Natural Parks (PNN), the Ministry of Environment and Sustainable Development (MADS), and the Institute for Marine and Coastal Research (INVEMAR). The workshop allowed for consultation with these end-users to produce and evaluate indicators of engagement with the award products in terms of relevance, suitability, use, effectiveness, and sustainability. Three illustrative case studies (one for each scale) were discussed during the workshop to further document the current and potential role of former NASA funded products on decision making for biodiversity conservation in Colombia, with emphasis on the declaration and management of protected areas.

“The products that have been developed in the different projects such as BioModelos and the Human Footprint Index (BioTablero) are very important and basic inputs for our work within the methodological route for the identification of priority areas and natural and cultural elements, which are ultimately exercises that will define the conservation goals for the country by 2030”

- Verónica Restrepo Álvarez, National Natural Parks - GGIS

BDEC Team News

In Memoriam: Dr. Joseph (Jay) Skiles

Dr. Joseph (Jay) W. Skiles III passed away at home on October 22. He had a long and varied career studying, teaching, and lecturing about environmental sciences. He received a B.S. in biology from the University of Redlands, an M.S. in Botany from the University of Idaho, and a Ph.D. in Ecology and Evolutionary Biology from the University of California, Irvine.



Joseph (Jay) Skiles

Jay was very passionate about working for NASA and worked at NASA Ames Research Center for over 30 years. He was an Associate Program Manager for NASA's Ecological Forecasting program from 2009 until 2020, when he r

etired from NASA. While at Ames he was very involved with mentoring students and helped start the DEVELOP program in 2003, He has worked modeling the effects of elevated atmospheric CO2 on ecosystems and modeling perturbations of Arctic ecosystems. He studied terrestrial plant responses to increased ultraviolet radiation in the polar regions of Earth and the effects of low intensity microwave fields on vascular plants and used supercomputers to do ecosystem modeling. More information about Jay's illustrious career can be found here: <https://appliedsciences.nasa.gov/our-impact/people/celebrating-jay-skiless-graduation-nasa-earth-applied-sciences>

While not at work, Jay volunteered with the Mountain View Police Department and was active with the local Masonic lodge and was a pretty fair clarinetist. Jay was born in Bakersfield, California, to Rev. Joseph W. Skiles II and Genevieve Eola Moody Skiles. He is survived by his brother Stephen, his sister Elizabeth, and eight nieces and nephews.

Private service arrangements are pending.

Dr. Cindy Schmidt - 2024 Nasa Ames Honor Award Recipient



2024 Ames Honor Award Ceremony

Please join us in congratulating Dr. Cindy Schmidt, who received an Ames Special Recognition Award on her work in NASA's Applied Sciences Capacity Building Program and as an Associate Program Manager in the Ecological Conservation Program. This award honors contractor employees who have delivered superior services or products at an extraordinary level in support of Ames Research Center.

NASA Earth Science Research Results Portal

The NASA Earth Science Research Results Portal is an internal database designed to make it easier for NASA Headquarters Leadership to find, communicate, and promote YOUR accomplishments. NASA funded investigators are encouraged to submit publications, impact stories, photos of field work, scientific visualizations and or other products that demonstrate how important NASA's unique perspective is for understanding Earth systems. Please direct questions to Megan McGroddy, megan.e.mcgroddy@nasa.gov.

Contribute Content for an Upcoming Newsletter!

Thank you for sharing your highlights, news and publications with us! If you're part of a NASA-funded project (including students), we welcome your news, project updates, or announcements regarding published or forthcoming papers, reports, media, software, or events.



NASA's Biological Diversity & Ecological Conservation Program Managers:
Keith Gaddis and Woody Turner

Learn more about NASA's Biological Diversity & Ecological Conservation Program
<https://cce.nasa.gov/biodiversity/>

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