



## **NASA Biological Diversity and Ecological Conservation (BDEC)**

— Fall 2023 Newsletter —

*This quarterly newsletter contains news about upcoming events, opportunities, and resources relevant to the NASA Biological Diversity & Ecological Conservation programs.*

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## **BioSCape : An International Effort to Study Biodiversity in South Africa's Greater Cape Floristic Region**

— Started October 12th! —





BioSCape is an international collaboration between the US National Aeronautics and Space Administration (NASA) and several South African organizations to study biodiversity in South Africa's Greater Cape Floristic Region (GCFR). The program will explore the structure, composition, function, and threats to biodiversity across terrestrial and aquatic systems in the region.

BioSCape will look at coastal and marine environments in the GCFR using airborne imaging spectroscopy, lidar, and new hyperspectral data ranging from UV to thermal wavelengths. These remotely sensed data will combine with existing and new field observations of the spatial distribution of species, ecosystems, and their characteristics. Together, these observations enable high-resolution mapping of biodiversity, functional traits, and environmental variations and local disturbances (weather, human activity, land degradation, etc.).

The BioSCape team will study the region's ecosystems to help address the information and decision-support needs of stakeholders in the region and internationally. The data will be free and open access to all.

BioSCape airborne and field campaigns run from October to December. Be sure to look for project updates in upcoming newsletters!

[Learn more about BioSCape here](#)



Check out the ARSET training!

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## Drivers and Impacts of Amazon Forest Degradation

Tropical forests, as some of the most biodiverse areas on Earth, play a vital role in providing essential ecosystem services with both local and global significance, such as regulating precipitation patterns, providing sustenance for local communities, and storing carbon dioxide. Recent advancements in remote sensing technology have greatly enhanced our ability to understand deforestation rates, extents, and its consequences in the Amazon rainforest. However, there has been limited research focusing on the persistent and worsening degradation that persists in the wake of deforestation across this landscape.

In a recent review published in *Science* and supported by NASA, Lapola *et al.* (2023), a team of researchers conducted an analysis spanning 17 years (2001-2018).

Leveraging data from NASA sensors MODIS and Landsat TM, the team estimates that roughly 5.5% of the Amazon forest is currently degraded in some way—factoring in extreme drought events increases this estimate to approximately 38% of the remaining Amazon forest showing signs of degradation.

Importantly, the drivers behind these disturbances primarily benefit a select group of regional and global stakeholders, yet the repercussions are distributed both locally and globally. Communities disproportionately impacted include indigenous forest communities and urban residents in the Andean regions. Moreover, the disturbances discussed in this *Science* Review can be responsible for almost as much biodiversity loss as deforestation itself. This underscores the pressing need for comprehensive understanding of the causes and consequences of the ongoing degradation of the

Amazon forest, given its role in maintaining biodiversity and delivering vital ecosystem services to the region and planet.

Read more: [Lapola, David M., et al. "The drivers and impacts of Amazon forest degradation." Science 379.6630 \(2023\): eabp8622. DOI: 10.1126/science.abp8622](https://doi.org/10.1126/science.abp8622)

This project was supported in part by NASA Ecological Conservation funding to Victor Gutierrez-Velez under the ROSES16A.50 GEO Solicitation.

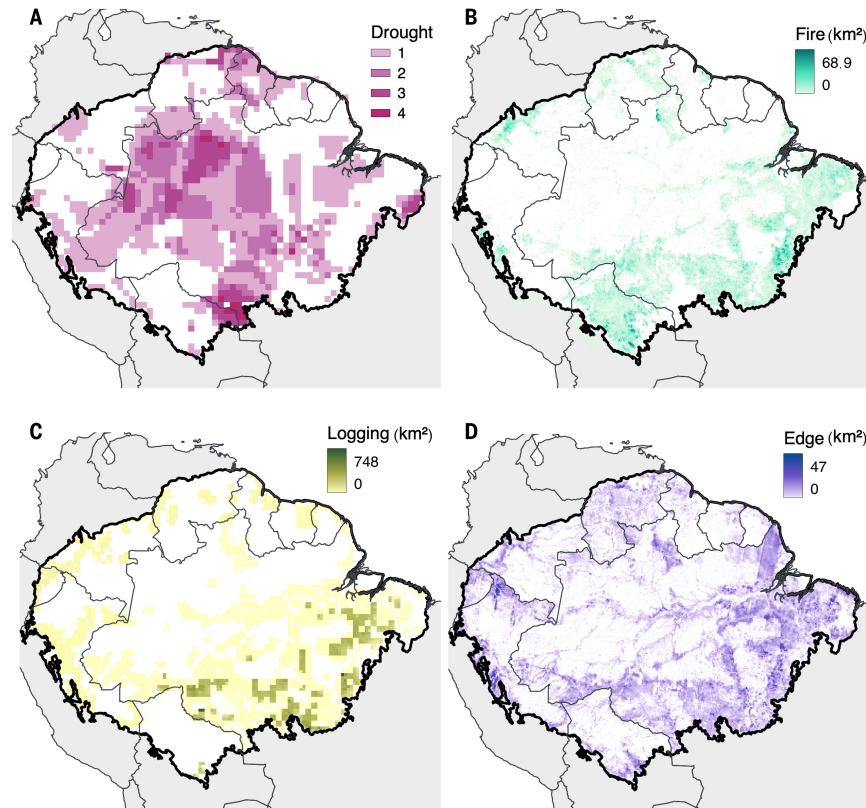


Fig. 2. from Lapola et al. (2023) shows the spatial distribution of the four main drivers of forest degradation in the Amazon forest, excluding deforestation and savanna areas over the period of 2001-2018.

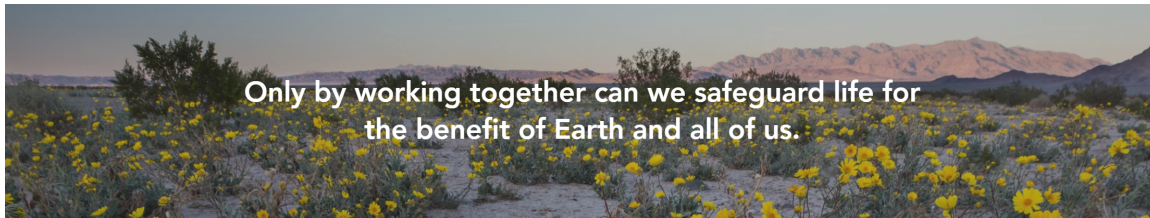
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## Catalyst for Biodiversity Conservation in California

Catalyst is a new program with funding from NASA to catalyze biodiversity conservation at large scales in the state of California. We are losing the diversity of life faster than we are saving it, and must accelerate biodiversity conservation for the benefit of us all. NASA's remote sensing tools can help.

Catalyst is still in the draft phase, with contributors working hard to get the program started. Keep an eye out for more information and funding opportunities to come!





Learn more about Catalyst here

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## Recent Biological Diversity & Ecological Conservation Publications

- Ditmer, M.A., Carter, N.H., Hersey, K.R., Leclerc, M., Wittemyer, G. and Stoner, D.C., 2023. Navigating the wildland-urban interface: Sensory pollution and infrastructure effects on mule deer behavior and connectivity. *Basic and Applied Ecology*. doi: [10.1016/j.baae.2023.10.002](https://doi.org/10.1016/j.baae.2023.10.002)
- Frawley, T.H., Muhling, B., Brodie, S., Blondin, H., Welch, H., Arostegui, M.C., Bograd, S.J., Braun, C.D., Cimino, M.A., Farchadi, N. and Hazen, E.L., 2023. Dynamic human, oceanographic, and ecological factors mediate transboundary fishery overlap across the Pacific high seas. *Fish and Fisheries*. doi:[10.1111/faf.12791](https://doi.org/10.1111/faf.12791)
- Martinuzzi, S., Olah, A.M., Rivera, L., Politi, N., Silveira, E.M., Pastur, G.M., Rosas, Y.M., Lizarraga, L., Názaro, P., Bardavid, S. and Radeloff, V.C., 2023. Closing the research-implementation gap: Integrating species and human footprint data into Argentina's forest planning. *Biological Conservation*, 286, p.110257. doi: [10.1016/j.biocon.2023.110257](https://doi.org/10.1016/j.biocon.2023.110257)
- Rosellón-Druker, J., McAdam-Otto, L., Suca, J.J., Seary, R., Gaytán-Caballero, A., Escobar-Briones, E., Hazen, E.L. and Muller-Karger, F., 2023. Local ecological knowledge and perception of the causes, impacts and effects of Sargassum massive influxes: a binational approach. *Ecosystems and People*, 19(1), p.2253317. doi: [10.1080/26395916.2023.2253317](https://doi.org/10.1080/26395916.2023.2253317)
- Weidberg, N., Chiquillo, L.K.L., Román, S., Román, M., Vázquez, E., Olabarria, C., Woodin, S.A. and Wethey, D.S., 2023. Assessing high resolution thermal monitoring of complex intertidal environments from space: The case of ECOSTRESS at Rias Baixas, NW Iberia. *Remote Sensing Applications: Society and Environment*, 32, p.101055. doi: [10.1016/j.rsase.2023.101055](https://doi.org/10.1016/j.rsase.2023.101055)
- Doughty, C.E., Gaillard, C., Burns, P., Keany, J., Abraham, A., Malhi, Y.S., Aguirre-Gutierrez, J., Koch, G., Jantz, P., Shenkin, A. and Tang, H., 2023. Tropical forests are mainly unstratified especially in Amazonia and regions with lower fertility or higher temperatures. *Environmental Research: Ecology*. doi: [10.1088/2752-664x/ace723](https://doi.org/10.1088/2752-664x/ace723)
- Lind, B., Strydom, T. and Hanan, N.P., 2023. Termite mound impacts on hydrology vary with herbaceous vegetation and topsoil texture. *Journal of Arid Environments*, 216, p.104997. doi: [10.1016/j.jaridenv.2023.104997](https://doi.org/10.1016/j.jaridenv.2023.104997)
- Vukomanovic, J., Smart, L.S., Koch, J., Dale, V.H., Plassin, S., Byrd, K.B., Beier,

- C., Wilson, M. and Doyon, F., 2023. Translating stakeholder narratives for participatory modeling in landscape ecology. *Landscape Ecology*, pp.1-22. doi: [10.1007/s10980-023-01724-9](https://doi.org/10.1007/s10980-023-01724-9)
- Sydeman, W.J., Thompson, S.A., García-Reyes, M., Kroeger, C., Hoover, B., Batten, S.D. and Rojek, N.A., 2023. Effects of currents and temperature on ecosystem productivity in Unimak Pass, Alaska, a premier seabird and biodiversity hotspot. *Progress in Oceanography*, p.103082. doi: [10.1016/j.pocean.2023.103082](https://doi.org/10.1016/j.pocean.2023.103082)
  - Barenblitt, A., Fatoyinbo, L., Thomas, N., Stovall, A., de Sousa, C., Nwobi, C. and Duncanson, L., 2023. Invasion in the Niger Delta: remote sensing of mangrove conversion to invasive *Nypa fruticans* from 2015 to 2020. *Remote Sensing in Ecology and Conservation*. doi: [10.1002/rse2.353](https://doi.org/10.1002/rse2.353)
  - Román, S., Olabarria, C., Weidberg, N., Román, M. and Vázquez, E., 2023. Population structure and habitat assessment for two commercial clam species exploited in small-scale fisheries. *Reviews in Fish Biology and Fisheries*, pp.1-22. doi: [10.1007/s11160-023-09791-6](https://doi.org/10.1007/s11160-023-09791-6)
  - Nathan, M. and Gruner, D.S., 2023. Sustained mangrove reproduction despite major turnover in pollinator community composition at expanding range edge. *Annals of Botany*, p.mcad085. doi: [10.1093/aob/mcad085](https://doi.org/10.1093/aob/mcad085)
  - Binley, A.D., Bennett, J.R., Schuster, R., Rodewald, A.D., La Sorte, F.A., Fink, D., Zuckerberg, B. and Wilson, S., 2023. Species traits drive responses of forest birds to agriculturally-modified habitats throughout the annual cycle. *Ecography*, p.e06457. doi: [10.1111/ecog.06457](https://doi.org/10.1111/ecog.06457)
  - Jamil, A.L., Kavanaugh, M.T. and Spitz, Y.H., 2023. Drivers of physical and biological frontal variability in the northern California Current System. *Journal of Geophysical Research: Oceans*, 128(6), p.e2022JC019408. doi: [10.1029/2022jc019408](https://doi.org/10.1029/2022jc019408)
  - Casey, K.A., Rousseaux, C.S., Gregg, W.W., Boss, E., Chase, A.P., Craig, S.E., Mouw, C.B., Reynolds, R.A., Stramski, D., Ackleson, S.G. and Bricaud, A., 2020. A global compilation of in situ aquatic high spectral resolution inherent and apparent optical property data for remote sensing applications. *Earth system science data*, 12(2), pp.1123-1139. doi: [10.5194/essd-12-1123-2020](https://doi.org/10.5194/essd-12-1123-2020)
  - Ruhl, H.A., Bett, B.J., Ingels, J., Martin, A., Gates, A.R., Yool, A., Benoist, N.M., Appeltans, W., Howell, K.L. and Danovaro, R., 2023. Integrating ocean observations across body-size classes to deliver benthic invertebrate abundance and distribution information. *Limnology and Oceanography Letters*. doi: [10.1002/lol2.10332](https://doi.org/10.1002/lol2.10332)
  - Sutherland, K.P., Griffin, A., Park, A., Porter, J.W., Heron, S.F., Eakin, C.M., Berry, B., Kemp, D.W., Kemp, K.M., Lipp, E.K. and Wares, J.P., 2023. Twenty-year record of white pox disease in the Florida Keys: importance of environmental risk factors as drivers of coral health. *Diseases of Aquatic Organisms*, 154, pp.15-31. doi: [10.3354/dao03727](https://doi.org/10.3354/dao03727)
  - Lewińska, K.E., Ives, A.R., Morrow, C.J., Rogova, N., Yin, H., Elsen, P.R., de Beurs, K., Hostert, P. and Radeloff, V.C., 2023. Beyond “greening” and “browning”: Trends in grassland ground cover fractions across Eurasia that account for spatial and temporal autocorrelation. *Global Change Biology*. doi: [10.1111/gcb.16800](https://doi.org/10.1111/gcb.16800)
  - Oliver, R.Y., Iannarilli, F., Ahumada, J., Fegraus, E., Flores, N., Kays, R., Birch, T., Ranipeta, A., Rogan, M.S., Sica, Y.V. and Jetz, W., 2023. Camera trapping expands the view into global biodiversity and its change. *Philosophical*

Transactions of the Royal Society B, 378(1881), p.20220232.

doi:[10.1098/rstb.2022.0232](https://doi.org/10.1098/rstb.2022.0232)

- Frank, K.M., Ditmer, M.A., Stoner, D.C., Currie, W.S., Olson, D.D. and Carter, N.H., 2023. Dark roads aid movement but increase mortality of a generalist herbivore in the American Southwest. *Ecosphere*, 14(5), p.e4508. doi: [10.1002/ecs2.4508](https://doi.org/10.1002/ecs2.4508)

Visit [Biological Diversity & Ecological Conservation \(nasa.gov\)](https://www.nasa.gov/biodiversity-ecological-conservation) for more project publications.

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## NASA Earth Science Research Results Portal

Attention NASA employees and NASA-funded investigators! 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](mailto:megan.e.mcgroddy@nasa.gov)).

Share your key findings with us!

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## Upcoming Events and Save the Dates

*Catch up with Biodiversity & Ecological Conservation at an upcoming event:*

Society of American Foresters National Convention

October 25-28, 2023

<https://eforester.org/safconvention2023>

The Wildlife Society's 30th Annual Conference

November 5-9, 2023

<https://twskonference.org/>

American Geophysical Union Fall Meeting

December 11-15, 2023

<https://www.agu.org/fall-meeting>

Ocean Sciences Meeting

February 18-23, 2024  
<https://www.agu.org/ocean-sciences-meeting>

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## Resources and Opportunities

### Upcoming ARSET Trainings

[ARSET - SAR for Detecting and Monitoring Floods, Sea Ice, and Subsidence from Groundwater Extraction](#)

October 24, 2023 - November 01, 2023

[ARSET - Spectral Indices for Land and Aquatic Applications](#)

October 26, 2023 - November 09, 2023

### Applied Earth Observations Innovation Partnership (AEOIP) Webinar Series

<https://www.aeoip.com/events>

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## Contribute Content for an Upcoming Newsletter

If you're a NASA-funded PI or student, please use [this form](#) to help us feature your updates in the next newsletter. We welcome your news, project updates, or announcements regarding published or forthcoming papers, reports, media, software, or events.

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

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*\*I live and work on the ancestral, traditional and contemporary lands of the [Piscataway](#) (the people where the rivers blend) and the ancestral lands of the [Nacotchtank](#).*