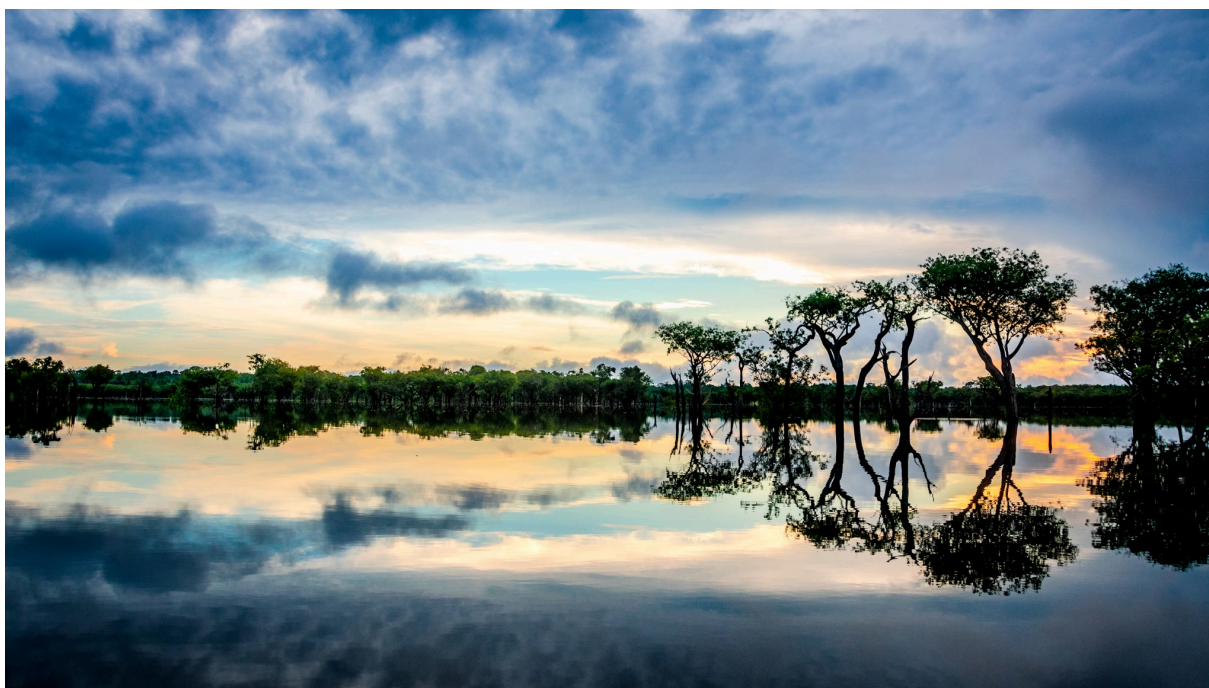




## Assessing Climate Risks to Indigenous Peoples & Local Communities and the Nature within their Territories



Sébastien Goldberg, Unsplash

### Proposers

Isa Elias, *MESM 2026*  
[gelias@ucsb.edu](mailto:gelias@ucsb.edu), (775) 781-0980

Isabella Pucker, *MESM 2026*  
[ipucker@ucsb.edu](mailto:ipucker@ucsb.edu), (617) 678-0224

### Client

Sushma Shrestha Sangat, PhD, *Social Scientist, Indigenous and Community Governance*  
Global Indigenous Peoples and Local Communities Center, Conservation International  
[sshrestha@conservation.org](mailto:sshrestha@conservation.org), (703) 341-2400

### Additional Collaborators at Conservation International

Camila Donatti, PhD, *Senior Director, Climate Change Adaptation*, [cdonatti@conservation.org](mailto:cdonatti@conservation.org)

Patrick Roehrdanz, PhD, *Director, Climate Change Biology*, [proehrdanz@conservation.org](mailto:proehrdanz@conservation.org)

Nick McManus, PhD, *Associate Scientist, Climate-Smart Planning*,  
[nmcmanus@conservation.org](mailto:nmcmanus@conservation.org)

Carly Siege, *Manager, International Policy*,  
[csiege@conservation.org](mailto:csiege@conservation.org)

Douglas Becker, *Postdoctoral Associate, Nature's Contributions to People*,  
[dbecker@conservation.org](mailto:dbecker@conservation.org)

## Objectives

While the crucial role of Indigenous peoples and local communities (IPs & LCs) and their territories in realizing global climate and conservation goals is well established (Garnett et al., 2018; Noon et al., 2022; Schuster et al., 2019), a significant gap exists in scientific knowledge in terms of the current and future implications of a changing climate on IPs & LCs' territories. The newly established Global Indigenous Peoples and Local Communities Center (GIPLCC) at Conservation International (CI) seeks to work with and for IPs & LCs to enhance the climate resiliency of these communities and their territories. As part of this effort, this project aims to understand the current and future impact of climate change on IPs & LCs and the biodiversity and carbon within their territories. Based on this understanding, the project team will identify strategies and actions that can be implemented to increase climate resiliency of IPs & LCs' territories. The core objectives of the project are to:

- 1) Produce global and regional (Amazonia) maps of 8 major climate change impacts and risks to IPs & LCs, their territories, and the biodiversity and carbon within these regions.
- 2) Identify Nature-based Solutions (NbS) needed to reduce the climate impact on IPs & LCs in Amazonia and the nature within their territories.
- 3) Develop regional policy recommendations that promote IPs & LCs' implementation of NbS toward climate resilience and biodiversity conservation.

## Implications

IPs & LCs are key actors in global environmental governance, owning and/or managing over half of the Earth's lands and waters (Rights and Resources Initiative, 2020). IPs & LCs' territories overlap with high biodiversity and carbon-rich areas. Over one-third of irrecoverable carbon—carbon that is essential to keep the global temperature at 1.5 °C and if lost cannot be recovered in the next 30 years—is held within IPs & LCs' territories (Noon et al., 2022). IPs & LCs steward some of the world's most biologically diverse areas, comprising at least 37% of the remaining natural lands worldwide (Garnett et al., 2018). Many of these areas provide critical services to humans, in the form of food, water, medicine, along with a number of other ecosystem services (Chaplin-Kramer et al., 2022). Additionally, the natural ecosystems used and managed by IPs & LCs underpin their cultural practices and knowledge systems. Biocultural diversity, in turn, is crucial for Indigenous livelihoods, self-determined conservation, and development. However, IPs & LCs and their territories are at the forefront of experiencing the effects of climate change, impacting both biological as well as cultural diversity (Reyes-Garcia et al., 2024).

Due to the high concentration of irrecoverable carbon and biodiversity within IPs & LCs' territories, there is an opportunity for targeted conservation solutions to increase global climate resilience and minimize biodiversity loss while supporting IPs & LCs in sustainably stewarding their territories. With the approaching deadline of the Global Biodiversity Framework's 30 by 30 target, this timely analysis will help inform policies that support IPs & LCs in managing their territories to help move the world closer to achieving 30% protection of global lands and waters by 2030.

The analysis and insights from this project will be novel to CI and will support the organization in identifying high-priority IPs & LCs' territories for climate resilience efforts. The primary objectives of this project will further several ongoing CI initiatives that seek to partner with IPs & LCs in conservation, restoration, and improved land management, particularly adaptation, mitigation, and strategies and planning related to climate change led by CI's Nature for Climate Solutions and Moore Center for Science. The project outputs will also help shape the organization's policy position in advance of the climate COP in November of 2025 in Amazonia.

While recent funding initiatives represent a step toward supporting IPs & LCs' land tenure and conservation efforts, there remains a substantial gap between the financial resources required and those currently allocated (Norway Rainforest Foundation, 2021). This project will highlight to the global financing community the urgent need to expand direct access to funding for the implementation of NbS and climate resilient actions by and for IPs & LCs.

### **Equity**

IPs & LCs have historically been displaced from their land and marginalized by colonial expansion and resource extraction. Despite these challenges, IPs & LCs have employed Traditional Ecological Knowledge and sustainable practices that contribute significantly to carbon sequestration and biodiversity conservation. IPs & LCs depend on their native flora and fauna for food, shelter, fuel, medicine, and cultural value. This intimate relationship heightens the vulnerability of these communities to the impacts of environmental degradation and biodiversity loss. Through a presentation of our proposed project methodology and analysis to Amazonian IPs & LCs stakeholders, this research will incorporate the perspectives of communities that have historically been excluded from the global conservation agenda.

### **Available data**

The analyses for this project will rely on preexisting datasets on IPs & LCs' territories and tenure, climate vulnerability, carbon, and biodiversity. These datasets are all either publicly available or held by CI and can be readily shared with the project team. No NDAs will be required for this project. The project will utilize a combination of the following datasets to provide a novel map of IPs & LCs' territories—and the carbon and biodiversity in these regions—against current and projected climate impacts:

#### IPs & LCs Territories & Tenure:

- *IPs & LCs' Territories & Tenure* (Sushma et al., 2024). Provides geospatial datasets corresponding to legally recognized, collectively, and communally governed or managed IPs & LCs' lands and waters covering 9.8 M km<sup>2</sup> across 57 countries.

#### Climate & Carbon:

- *Climate Vulnerability* (Donatti et al., 2023). Identifies vulnerability of the global human population to 8 major climate impacts—river and coastal floods, heatwave, wildfire, food security, landslide, vector borne diseases, water stress—and locates areas where conservation, restoration, or improved land management could potentially reduce human vulnerability to climate impacts.
- [\*Irrecoverable Carbon\*](#) (Noon et al., 2022). Offers maps and data on carbon vulnerable to human influence that if lost, could not be restored within 30 years.
- [\*Biomass Carbon Density\*](#) (Spawn et al., 2020). Presents a global map of carbon density within terrestrial ecosystems.
- [\*Carbon Storage Potential\*](#) (Walker et al., 2022). Assesses current and future unrealized potential carbon storage under RCP8.5 out to 2050.

#### Biodiversity:

- [\*Red List of Threatened Species\*](#) (IUCN, 2024). Contains spatial data for over 130,000 species, including mammals, amphibians, birds, reptiles, and plants.
- [\*Species Richness and Rarity-Weighted Richness\*](#) (IUCN, 2024). Indicates relative importance by proportionally accounting for individual species' habitat range.
- [\*Red List Species Habitat Suitability\*](#) (Brooks et al., 2019). Refines species ranges from the IUCN Red List by focusing on habitat suitability.

## **Possible approach**

The project will begin with a literature review to provide the team with a foundational understanding of the impacts of climate change on IPs & LCs' territories. Following this preliminary research, the team will conduct a global spatial analysis to assess current and projected impacts of climate change on IPs & LCs' territories, taking into account various socioeconomic and climatic scenarios. The analysis will identify the overlap between IPs & LCs' territories, the geographic areas most affected by climate change, and the areas that are most important for providing ecosystem services. The results will be aggregated into country- and regional-level findings to offer CI's Global Indigenous Peoples and Local Communities Center with insights on priority regions for focused interventions.

A similar spatial analysis will then narrow the focus to Amazonia, generating detailed data, maps, and analyses on the current and projected impacts of climate change on IPs & LCs' territories and the biodiversity within this region. The regional analysis will focus on Amazonia due to the region's impending climate tipping points, its concentration of megadiverse countries, and its significant reserves of irrecoverable carbon. Additionally, the region offers a rich data landscape, making it an ideal area for in-depth analysis.

To ensure that the analysis is aligned with the perspective and goals of IPs & LCs, the results will be shared and discussed with IPs & LCs during a virtual presentation at the CI headquarters. Time and resources will be included in the project schedule to make adjustments based on this collaboration. The findings from this regional analysis will later be used by CI to produce a scientific publication that will incorporate Indigenous and Western knowledge to increase climate resilience in IPs & LCs' lands. Based on the priority areas for conservation determined by the analysis, the project team will develop policy recommendations that facilitate conservation, restoration, and improved management in these areas, ensuring that the research outputs align with the organization's implementation efforts. This approach aims to bridge scientific insights and Indigenous knowledge with actionable policy solutions.

## **Deliverables**

In addition to a final written report, executive summary, and oral presentation, the team will produce:

- A global map and data that highlights current and projected climate impacts on IPs & LCs' territories. The results from the global analysis will be aggregated into country- and regional-level to make this data regionally relevant to CI's geographic priority-setting.
- A zoomed-in regional analysis in Amazonia that will provide a more thorough understanding of the extent of climate change risk and its impact on IPs & LCs' lands, culture, and nature.
- A set of global and regional policy recommendations that support the implementation of NbS in IPs & LCs' territories, with the goal of advancing progress toward the 30 by 30 target and preventing the tipping point in Amazonia.
- An in-person presentation at the CI office to IPs & LCs in order to receive their feedback and ensure that their perspectives are reflected within the project's deliverables.

## **Internships**

CI can commit to supporting two unpaid remote internships in Summer 2025. While CI cannot provide internship funding at this time, Dr. Shrestha Sangat has committed to covering the costs associated with the travel of 1-2 group members to the CI office in Arlington, VA as part of the presentation associated with the final deliverable.

## Citations

- Brooks, T. M., Pimm, S. L., Akçakaya, H. R., Buchanan, G. M., Butchart, S. H. M., Foden, W., Hilton-Taylor, C., Hoffmann, M., Jenkins, C. N., Joppa, L., Li, B. V., Menon, V., Ocampo-Peñuela, N., & Rondinini, C. (2019). Measuring Terrestrial Area of Habitat (AOH) and Its Utility for the IUCN Red List. *Trends in Ecology & Evolution*, 34(11), 977–986. <https://doi.org/10.1016/j.tree.2019.06.009>
- Chaplin-Kramer, R., Neugarten, R. A., Sharp, R. P., Collins, P. M., Polasky, S., Hole, D., Schuster, R., Strimas-Mackey, M., Mulligan, M., Brandon, C., Diaz, S., Fluet-Chouinard, E., Gorenflo, L. J., Johnson, J. A., Kennedy, C. M., Keys, P. W., Longley-Wood, K., McIntyre, P. B., Noon, M., ... Watson, R. A. (2023). Mapping the planet's critical natural assets. *Nature Ecology & Evolution*, 7(1), 51–61. <https://doi.org/10.1038/s41559-022-01934-5>
- Garnett, S. T., Burgess, N. D., Fa, J. E., Fernández-Llamazares, Á., Molnár, Z., Robinson, C. J., Watson, J. E. M., Zander, K. K., Austin, B., Brondizio, E. S., Collier, N. F., Duncan, T., Ellis, E., Geyle, H., Jackson, M. V., Jonas, H., Malmer, P., McGowan, B., Sivongxay, A., & Leiper, I. (2018). A spatial overview of the global importance of Indigenous lands for conservation. *Nature Sustainability*, 1(7), 369–374. <https://doi.org/10.1038/s41893-018-0100-6>
- IUCN Red List of Threatened Species. (n.d.). Retrieved December 21, 2024, from <https://www.iucnredlist.org/resources/other-spatial-downloads>
- Noon, M. L., Goldstein, A., Ledezma, J. C., Roehrdanz, P. R., Cook-Patton, S. C., Spawn-Lee, S. A., Wright, T. M., Gonzalez-Roglich, M., Hole, D. G., Rockström, J., & Turner, W. R. (2022). Mapping the irrecoverable carbon in Earth's ecosystems. *Nature Sustainability*, 5(1), 37–46. <https://doi.org/10.1038/s41893-021-00803-6>
- Rainforest Foundation Norway. (2021). *Falling short: Donor funding for Indigenous Peoples and local communities to secure tenure rights and manage forests in tropical countries (2011–2020)*. [https://dv719tqmsuwvb.cloudfront.net/documents/Publikasjoner/Andre-rapporter/RFN\\_Falling\\_short\\_2021.pdf](https://dv719tqmsuwvb.cloudfront.net/documents/Publikasjoner/Andre-rapporter/RFN_Falling_short_2021.pdf)
- Reyes-García, V., García-del-Amo, D., Álvarez-Fernández, S., Benyei, P., Calvet-Mir, L., Junqueira, A. B., Labeyrie, V., Li, X., Miñarro, S., Porcher, V., Porcuna-Ferrer, A., Schlingmann, A., Schunko, C., Soleymani, R., Tofighi-Niaki, A., Abazeri, M., Attoh, E. M. N. A. N., Ayanlade, A., Ávila, J. V. D. C., ... Zakari, I. S. (2024). Indigenous Peoples and local communities report ongoing and widespread climate change impacts on local social-ecological systems. *Communications Earth & Environment*, 5(1), 1–10. <https://doi.org/10.1038/s43247-023-01164-y>
- Rights and Resources Initiative, “Estimate of the area of land and territories of Indigenous Peoples, local communities, and Afrodescendants where their rights have not been recognized” (Technical, Rights and Resources Initiative, Washington DC, 2020); <https://rightsandresources.org/>

Schuster, R., Germain, R. R., Bennett, J. R., Reo, N. J., & Arcese, P. (2019). Vertebrate biodiversity on indigenous-managed lands in Australia, Brazil, and Canada equals that in protected areas. *Environmental Science & Policy*, 101, 1–6. <https://doi.org/10.1016/j.envsci.2019.07.002>

Spawn, S. A., Sullivan, C. C., Lark, T. J., & Gibbs, H. K. (2020). Harmonized global maps of above and belowground biomass carbon density in the year 2010. *Scientific Data*, 7(1), 112. <https://doi.org/10.1038/s41597-020-0444-4>

*The IUCN Red List of Threatened Species*. (n.d.). IUCN Red List of Threatened Species. Retrieved December 21, 2024, from <https://www.iucnredlist.org/en>

Walker, W., Gorelik, S., Cook-Patton, S., & Griscom, B. (2022). The global potential for increased storage of carbon on land. *PNAS*, 119(23). <https://www.pnas.org/doi/full/10.1073/pnas.2111312119>

### **Budget and justification**

The expenses for this project will not exceed the \$1,000 allotment from the Bren School.

## Client letter of support

Master of Environmental Science (MESM) Group Project Committee  
Bren School of Environmental Science and Management  
University of California, Santa Barbara

January 10, 2024

Dear Group Project Selection Committee,

Conservation International (CI) is pleased to express its support and commitment as the client for the “*Assessing Climate Risks to Indigenous Peoples & Local Communities and the Nature within their Territories*” project. If selected by the committee, the project will contribute significantly to CI’s recently established Global Indigenous Peoples and Local Communities Center (GIPLCC) whose mission is to value and elevate Indigenous Peoples and Local Communities (IPs & LCs) led conservation models by unlocking finance and innovative partnership based on the rights, needs, interests, and vision of IPs & LCs. The proposed project is part of the *Culture, Knowledge, and Exchange* priority programmatic initiative that seeks to generate data and evidence of crucial IPs & LCs’ role and contribution to nature conservation and climate mitigation/adaptation. This project will enhance GIPLCC’s ongoing effort to incorporate Indigenous knowledge and Western scientific knowledge systems to secure and support the stewardship of IPs & LCs and their territories. The outcomes and insights from Amazonia regional analysis will be shared with IPs & LCs for feedback, particularly to chart pathways to climate adaptation as prioritized by them to be climate resilient. Amazonia results can also be presented and highlighted at global climate and conservation forums including COP 30 in the Amazon in 2025 to call attention to the potential impact of climate change on IPs & LCs and the actions needed to reduce those impacts.

The project will i) produce global and regional (Amazonia) maps of 8 major climate change impacts and risks to IPs & LCs, their territories, and the biodiversity and carbon within these regions; ii) identify Nature-based Solutions (NbS) needed to reduce the climate impact on IPs & LCs in Amazonia and the nature within their territories; and iii) develop regional policy recommendations that promote IPs & LCs’ implementation of NbS toward climate resilience and biodiversity conservation. All data for this project will be provided by CI and will be readily available to access by the project team.

CI has had successful partnerships with Bren students, and I look forward to working with the students if selected. CI can commit to providing two unpaid remote summer internships for the group project members. The interns will have the opportunity to apply and grow their research and analytical skills, get mentorship from the GIPLCC team, collaborate, and engage with other CI staff, including the Moore Center for Science, and the Policy division. The interns will also be able to present their work to CI, and IPs & LCs partners. GIPLCC can fund 1-2 students to visit the CI-Arlington office for the presentation.

Thank you for considering our proposal. Please feel free to reach out for any questions at [sshrestha@conservation.org](mailto:sshrestha@conservation.org).

Sincerely,

Sushma Shrestha Sangat

Social Scientist, Indigenous and Community Governance  
Global Indigenous Peoples and Local Communities Center, Conservation International  
Arlington, Virginia