Graduate Research Assistantships in Conservation and Sustainable Development in Colombia, Ecuador, and Peru

Overview. The NASA-funded project, "Maintaining Life on Land (SDG15) under Scenarios of Land Use and Climate Change in Colombia, Ecuador, and Peru", is seeking applications for three Ph.D. Research Assistantships. The positions will be based within the Montana State University Department of Ecology, the Northern Arizona University Ecological and Environmental Informatics Program, and the University of Northern British Colombia Natural Resources & Environmental Studies Program. While the positions will be under the jurisdictions of each hosting institution, the students will expected to collaborate with one another and with the project team which also includes the United Nations Development Programme (UNDP), the Wildlife Conservation Society, the Alexander von Humboldt Institute, the Colombia National University, and government ministries in Colombia, Ecuador, and Peru. The positions are expected to be funded for a three-year period with the potential for a fourth year of funding arranged within each host institution. The target start date for the positions is August 2019 or sooner.

Description of the project. The United National General Assembly recently adopted the 17 Sustainable Development Goals (SDGs) to end poverty, protect the planet, and ensure prosperity for all by 2030. The targets for SDG 15, Life on Land, include sustainably managing forests, combating desertification, halting and reversing land degradation, and halting biodiversity loss. UNDP is the leading agency in the UN system in assisting governments to integrate the SDGs into their national development plans and policies. This assistance requires access to spatial data, thus UNDP is a partner in a current NASA applications project designed to provide decision support for countries in the humid tropics meeting the Convention on Biological Diversity's Aichi Biodiversity Targets. The goal of the proposed project is to develop and implement, in collaboration with Colombia, Ecuador, and Peru, a decision support system for scenario planning, forecasting, policy development, and reporting on SDG 15.

Focus of each position (Full Position Descriptions Follow).

- *Montana State University*. Climate projections under IPCC scenarios; forecasting ecosystem type, vegetation structural condition, and selected vertebrate species response to climate and land use change using species distribution models; decision support for collaborating countries.
- *Northern Arizona University.* Forecasting change in forest structure, fragmentation and connectivity; water risk based on changes in forest structure and spatial patterns; decision support for collaborating countries.
- *University of Northern British Colombia.* Forecasting human pressure and land use under IPCC scenarios; assessing conservation implications; decision support for collaborating countries.

Resources provided

An opportunity to attain a PhD in the appropriate field; a tuition waver; a stipend that is generally sufficient to pay living expenses and student fees, including medical coverage, travel from and to partner countries.

How to apply. Follow the application instructions within each of the following position descriptions. The screening process will begin March 7 2019 and continue until the positions are filled.

Montana State University Position Description
Ph.D. Research Assistantship in Tropical Ecosystem Response to Climate and Land Use Change

Montana State University is seeking a Ph.D. student to work with an interdisciplinary team engaged in the NASA-funded project "Maintaining Life on Land (SDG 15) under Scenarios of Land Use and Climate Change in Colombia, Ecuador, and Peru" (see above). Under the supervision of the Principle Investigators, the student will develop and execute methods for forecasting ecosystem type, forest structure, and select vertebrate species response to scenarios of climate and land use change. The work will be done to support decision making by relevant ministries Colombia, Ecuador, and Peru regarding SDG 15. The student is expected to work in collaboration with full project team including two Ph.D. students at the Northern Arizona University and the University of Northern British Colombia.

This a 1.0 FTE Ph.D. Research Assistantship position that is expected to be available for a three year period with an additional year of funding available through a Teaching Assistantship. In addition to the assistantship, funds for travel to Montana State University will be provided. The intended start data is August 2019 or sooner.

Duties

Assess the needs of the collaborating countries with regards to SDG 15 regarding ecosystem and species responses to climate and land use scenarios.
Compile predictor data sets including climate, geomorphology, human pressure, and land use for a historic calibration period and under scenarios to 2100.
Develop statistical functions for the historic period relating ecosystem type, forest structure, and select vertebrate species to the predictors.
Use the statistical functions to forecast biodiversity response under scenarios of climate and land use.
Analyze and interpret the results with regards to conservation strategies aimed at meeting the SDG15 targets identified by each collaborating country.

Required Qualifications:

Demonstrated understanding of or aptitude for attaining an understanding theory and application in ecology and ecosystem structure, function, and composition, and in conservation biology.
Adequate training, experience, or aptitude in spatial analysis and statistical techniques.
Interest and/or experience in working with natural resource managers on national-scale conservation application and reporting.
Potential to execute and publish ecological research.
Experience in working on integrated science teams.

Desired Qualifications

M.S. in ecology or related field.
English proficiency in Spanish and English.
Demonstrated proficiency in the use of Esri products, Google Earth Engine, Python, and/or R.
Experience in publishing peer reviewed scientific papers.
Successful collaborations with large research teams.
Experience in managing large data bases.

Northern Arizona University Position Description
Ph.D. Research Assistantship in Tropical Ecosystem Response to Climate and Land Use Change

Northern Arizona University is seeking a Ph.D. student to work with an interdisciplinary team engaged in the NASA-funded project "Maintaining Life on Land (SDG15) under Scenarios of Land Use and Climate Change in Colombia, Ecuador, and Peru". Under the supervision of the Principle Investigators, the student will develop and execute methods for: (1) mapping high risk areas where deforestation may disproportionately impact water related ecosystem services (WRES), (2) mapping areas where forest protection and restoration may be most effective in enhancing forest connectivity and maintaining provision of WRES in a changing climate, and (3) conducting multi-criteria assessments in targeted watersheds to understand potential climate change impacts to delivery of WRES. The work will be done to support decision making by relevant ministries in Colombia, Ecuador and Peru regarding Sustainable Development Goal 15. The student is expected to work in collaboration with the full project team including Ph.D. students at Montana State University and the University of Northern British Columbia. Additional details on NAU's GEODE lab are available online.

This a 1.0 year, full time equivalent, Ph.D. Research Assistantship position that is expected to be available for a three year period with a possibility of continued support through teaching or research assistantships. The intended start date is August 2019 or sooner.

Duties

- In the context of SDG15, assess the needs of the collaborating countries with a focus on the vulnerability of forests and water resources to climate and land use change.
- Compile data sets including climate, geomorphology, human pressure, and land use for a historic calibration period and under scenarios to 2100.
- Develop and implement spatial and surface hydrology algorithms for identifying watershed locations where deforestation may disproportionately impact water resources.
- Develop spatial multi-criteria models to understand where forest protection and restoration may best maintain WRES provision in various climate and land use change scenarios.
- Analyze and interpret the results to inform conservation strategies aimed at meeting the SDG15 targets identified by each collaborating country.

Required Qualifications

- Demonstrated understanding of, or aptitude for attaining an understanding of, the concepts of ecosystem structure, function, and composition as well as interrelationships with biodiversity and conservation prioritization.
- Adequate training, experience, or aptitude in spatial analysis, statistics, and computation for ecological informatics.
- Interest and/or experience in working with natural resource managers on national-scale conservation application and reporting.
- Potential to execute and publish research.
- Experience working on integrated science teams.

Desired Qualifications

- Proficiency in Spanish and English
- Demonstrated proficiency in the use of GIS software, Google Earth Engine, and programming languages such as Python or R.
- Experience publishing peer reviewed scientific papers.
- Successful collaborations with large research teams.
- Experience managing large databases.
- Masters degree in a related field.

University of Northern British Colombia Position Description
Ph.D. Research Assistantship in Cumulative Impacts of Land Cover Change

The University of Northern British Columbia is seeking a Ph.D. student to work with an interdisciplinary team engaged in the NASA-funded project "Maintaining Life on Land (SDG15) under Scenarios of Land Use and Climate Change in Colombia, Ecuador, and Peru" (see above). Under the supervision of the Principle Investigators, the student will develop and execute methods for forecasting the impacts of changing human pressures on ecosystem values in the region. The work will be done to support decision making by relevant ministries Colombia, Ecuador, and Peru regarding Sustainable Development Goal 15. The student is expected to work in collaboration with full project team including two Ph.D. students at the Montana State University and Northern Arizona University.

This a 1.0 FTE Ph.D. Research Assistantship position that is expected to be available for a four year period. In addition to the assistantship, limited funds for travel to collaborate with partners will be provided. The intended start data is September 2019 or sooner.

Students must meet the entry requirements for UNBC Natural Resource and Environmental Studies PhD Program (https://www.unbc.ca/nres-graduate-program/phd), which includes an MSc degree, English language proficiency and a minimum GPA.

Duties

Assess the needs of the collaborating countries with regards to SDG15 regarding human pressures to ecosystems.
Adapt global Human Footprint maps of cumulative pressure using national and regional datasets.
Compile predictor data sets that include biophysical and socio-economic drivers of human pressure for a historic calibration period and future scenarios.
Develop statistical functions for the historic period relating changing patterns in Human Footprint with potential drivers.
Use the statistical functions to forecast future human footprint and biodiversity impacts.
Analyze and interpret the results with regards to conservation strategies aimed at meeting the SDG15 targets identified by each collaborating country.
Perform spatial and statistical analyses using Esri products, Google Earth Engine, R, and other software;
Contribute to the writing and preparation of scientific publications;
Manage, archive, and serve numerous large data sets;
Maintain the lab web pages;
Coordinate multidisciplinary research teams; and
Prepare maps, graphics, resource briefs and other visuals for communication to diverse audiences.

Required Qualifications:

M.Sc. in ecology or related field;
Demonstrated understanding of or aptitude for attaining and understanding theory and application in ecology and human threats to ecosystems.
Strong training, experience, or aptitude in spatial analysis and statistical techniques.
Interest and/or experience in working with natural resource managers on national-scale conservation application and reporting.
Potential to execute and publish ecological research;

Experience in working on integrated science teams.

Desired Qualifications

Proficiency in or aptitude for learning Spanish
Demonstrated proficiency in the use of Esri products, Google Earth Engine, Python, and/or R.
Experience in publishing peer reviewed scientific papers;
Successful collaborations with large research teams;
Experience in managing large data bases.