PROJECT IMPLEMENTATION REPORT (PIR)

for the project:

Spatial Planning for Protected Areas in Response to Climate Change (SPARC)

Final project report
2/1/2016 – 7/31/2019

Executing Partners

Project Information

Project Title:	Spatial Planning for Protected Areas in Response to Climate Change (SPARC)		
Country(*ies*)**:**	83 tropical countries in the 3 target regions (Neotropical, Afro-tropical, and Indo-Malayan biogeographic realms)	**GEF ID**:	5810
GEF Agency(*ies*)**:**	Conservation International	**Duration In Months**:	44
Other Executing Partners:	Moore Center for Science (Conservation International), University of Arizona, University of Leeds, Stellenbosch University, Catholic University of Chile, Xishuangbanna Tropical Botanical Gardens, CSIRO	**Start Date**:	2/1/2016
GEF Focal Area(*s*)**:**	Biodiversity	**Actual Project Close Date**:	9/30/2019
GEF Grant Amount:	$1,804,862	**Date of Last Steering Committee Meeting**:	05/22/2019
Expected Co-financing:	$3,655,992	**Mid-Term Review-Planned Date**:	Waived
Total Project Cost:	$5,460,854	**Mid-Term Review-Actual Date**:	Waived
Co-financing Realized as of June 30, 2019:	$3,686,317	**Terminal Evaluation-Planned Date**:	07/31/2019
Date of First Disbursement:	2/1/2016	**Terminal Evaluation-Actual Date**:	
Disbursement as of June 30, 2019:	$1,673,442	**PIR Prepared by:** **CI-GEF Program Managers:**	Patrick R. Roehrdanz Free de Koning, Susana Escudero

The CI-GEF Project Agency Project Implementation Report (PIR) is composed of five sections:

- **Section I: Project Implementation Progress Status Summary**: provides a brief summary of the project as well as the implementation status and rating of the previous and current fiscal years;
- **Section II: Project Results Implementation Progress Status and Rating**: describes the progress made towards achieving the project objective and outcomes, the implementation rating of the project, as well as recommendations to improve the project performance, when needed;
- **Section III**: **Project Risks Status and Rating**: describes the progress made towards managing and mitigating project risks, the project risks mitigation rating reassessment as needed, as well as recommendations to improve the management of project risks;
- **Section IV: Project Environmental and Social Safeguards Implementation Status and Rating:** describes the progress made towards complying with the Environmental & Social Safeguards and the Plans prepared during the PPG phase, the safeguard plans implementation rating, as well as recommendations to improve the project safeguards;
- **Section V: Project Implementation Experiences and Lessons Learned**: describes the experiences learned by the project managers and the lessons learned through the process of implementing the project; and

SECTION I: PROJECT IMPLEMENTATION PROGRESS STATUS SUMMARY

PROJECT SUMMARY

The most accepted and common strategy for conserving biodiversity is the establishment of protected areas. The GEF-recipient countries, GEF agencies, and co-financing partners are among the largest investors in protected area creation and management. However, these investments and their successful application are placed at risk by climate change.

Biodiversity, and threats to biodiversity, will be changing in response to climate change, affecting the context of success for protected areas. Many species' ranges will move to track suitable conditions with increasing likelihood that they fall outside of the protected areas systems originally designed to conserve such features. As species shift, ecosystems will fragment, adjust and re-assemble affecting habitat coverage and spatial representation across protected areas.

The location of species will not only shift within national territories, they will move in ways that involve multiple countries. About half of all plant species are believed to be multi-country endemics, while roughly 80% of the world's birds are resident in two or more countries. As a result, scientific recommendations for actions that will increase the effectiveness of national protected area networks in the face of climate change will require a trans-boundary perspective that includes multiple countries and encompasses the movement of key species groups that reserve networks focus on, as well as changes in the distribution of threats to biodiversity.

Through synthesized data and scenario analysis in Component 1, and focused regional assessments to produce research to policy briefs in Component 2, the SPARC project aims to help countries in the Neotropics, Indo-Malayan tropics and Afrotropics to (1) understand the change and potential loss of species representation in protected areas; (2) understand the loss of ecosystem representation in protected areas and (3) explore options that reverse or reduce the risk presented to species and ecosystems representation in national and regional protected area frameworks.

PRIOR PROJECT IMPLEMENTATION STATUS (FY17-18)

The first year of the SPARC project was designed to be devoted primarily to Component 1 – consisting of global data compilation, methods recruitment + evaluation, preliminary pan-tropical analysis and planning for the in-depth analysis that will be conducted through the regional assessments in Component 2. To this end, the project successfully consolidated a diverse array of high-resolution global datasets – including a state-of-the-science effort to further consolidate occurrence records for hundreds of thousands of vascular plant species into a database that can be centrally accessed by project partners for analysis.

Additional novel products resulting from the first year of effort include: 1) high resolution models of species ranges for 60,000+ plant species and 3,000+ vertebrate species; 2) a high resolution analysis of remaining habitat (i.e., scope for additional protection); 3) climate model selection ensuring a range of high-quality projections is considered; 4) a suite of climate exposure metrics (e.g. velocity of climate change, climate stability index); 5) a novel application of the Generalized Dissimilarity Model to prioritize additional protected areas under climate change; 6) Network Flow, a spatial prioritization method that explicitly links modeled species distributions through time that can optimize protected areas placement, for many thousands of species. The project obtained global projections of ecosystem change from dynamic global vegetation models (DGVM) and worked with collaborators to produce custom DGVM in each region.

Building on the first year of the project, which was focused on global data compilation and methods evaluation, the second year of the project was focused on Component 2, including the launch of the regional assessments and the deployment of centrally developed methods to begin a finer scale analysis in each region. The products from the regional assessment will ultimately comprise the final project outputs and the information that will populate the research to policy briefs and in person trainings. Each regional assessment was launched with a kickoff meeting in Q1 of FY18. Kickoff meetings were well attended, each with 25-40 scientists and practitioners with broad geographic representation from each region.

Key outcomes from the kickoff meetings included: 1) review and evaluation of central project methods and preliminary results; 2) composition of the regional assessment teams which conducted the research throughout FY18; 3) identification of regional projects financed through 'onward grants' to formally involve regional scientists and institutions; 4) development of a regional assessment workplan with timeframe and key deliverables; 5) initiation of outreach to practitioners (Protected Area (PA) policymakers or managers) as to how SPARC may best inform PA decision making processes. All three regional assessments were successfully launched and results will be finalized at a synthesis workshop for each region currently planned for Q3 of FY19.

The second major activity of FY18 was the beginning of the design phase of the decisions support system which will allow stakeholders to efficiently review project outputs and recommendations in a protected area planning or management setting.

Initial elements that will contribute to the overall decision support platform have been constructed including tools to rapidly query climate projections and a database interface to query, download, and view species occurrence data and range models. Further refinement to these elements is expected throughout the upcoming project year. Additionally, a co-design workshop is planned for FY19 that will invite protected areas decision makers from each region to participate in the design of the platform. The decision support platform will be completed in time for the regional synthesis workshops in FY19.

Risks have not increased and risk mitigation measures are being implemented according to plan. No safeguard issues were encountered.

FINAL PROJECT IMPLEMENTATION STATUS (FY19)

The third year of the project focused on generating the project outputs using the input data and methods identified in the first year of the project and refined in cooperation with the regional assessment teams. Outputs include geographic ranges for 110,000 plant and animal species across the tropics – produced with a range of methods and iteratively refined based on expert review. Projections of geographic ranges across many distinct climate scenarios provides inputs for: 1) full accounting of current and potential future representation of species in countries and protected areas; 2) protected-area specific assessments of species and ecosystem change and/or vulnerability; 3) inputs for synthetic spatial prioritization surfaces that aim to maximize species and ecosystem conservation in a changing climate.

All results were presented and reviewed through three regional assessment synthesis meetings – each meeting resulted in minor tweaks in either the methodology or, more often, in the effective communication of results to both scientists and more policy-oriented stakeholders. Results are synthesized in regional reports as well as country-specific research to policy briefs. The final phase of the project was focused on finalizing the decision support platform/data access and engaging in focused outreach to deliver project results to key decision-makers. Engagement opportunities began in earnest in association with the regional synthesis workshops – where many promising connections were made and opportunities for follow-up were identified. Workshops to discuss SPARC results (research to policy briefs) and training in decision support tools comprised 19 meetings/events representing a minimum of 15 countries.

Risks have not increased and risk mitigation measures were implemented according to plan. No safeguard issues were encountered.

Summary of Project Progress Rating

PROJECT PART	PRIOR (FY18) IMPLEMENTATION PROGRESS RATING	END-OF-PROJECT IMPLEMENTATION PROGRESS RATING[1]	RATING TREND[2]
OBJECTIVE	HS	HS	Unchanged
COMPONENTS AND OUTCOMES	HS	HS	Unchanged
RISKS	S	S	Unchanged
ENVIRONMENTAL & SOCIAL SAFEGUARDS	HS	HS	Unchanged

[1] ***Implementation Progress (IP) Rating***: Highly Satisfactory (**HS**), Satisfactory (**S**), Moderately Satisfactory (**MS**), Moderately Unsatisfactory (**MU**), Unsatisfactory (**U**), and Highly Unsatisfactory (**HU**). For more details about IP rating, please see the Appendix I of this report

[2] ***Rating trend***: Improving, Unchanged, or Decreasing

SECTION II: PROJECT RESULTS IMPLEMENTATION PROGRESS STATUS AND RATING

This section describes the progress made towards achieving the project objective and outcomes, the implementation progress rating of the project, as well as recommendations to improve the project performance. This section is composed four parts:

a. Progress towards Achieving Project Expected Objective: this section measures the likelihood of achieving the objective of the project

b. Progress towards Achieving Project Expected Outcomes (by project component)

c. Overall Project Results Progress Rating, and

d. Recommendations for improvement

a. Progress towards Achieving Project Expected Objective:

This part of the report assesses the progress in achieving the objective of the project.

PROJECT OBJECTIVE:	Provide countries in the Neotropical, Afrotropical and Indo-Malayan biogeographic realms with the assessments and data needed to improve planning, design and management of terrestrial protected areas for climate change resilience.

OBJECTIVE INDICATORS	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[3]	COMMENTS/JUSTIFICATION
Indicator a: Number of plans governing national protected areas systems integrating the effects of climate change on species and ecosystem targets	Potential protected areas action as a result of SPARC engagement efforts in Angola, Liberia, Thailand, Indonesia (West Papua), Colombia, Ecuador, Peru, Chile. We expect further engagement opportunities at parks congresses in Latin America and Africa in the fall/winter of 2019 a well as at the COP in Chile December 2019.	CA	SPARC engagement in countries occurred throughout the project but most effective engagement occurred toward the end of the project in concert with the delivery of project findings (research to policy briefs) and decision support tools.
Indicator b: Number of policies or regulations integrating research-to-policy brief recommendations.	Communication of results engendered potential climate change-smart conservation action in Angola, Liberia, Thailand, Indonesia (West Papua), Colombia, Ecuador, Peru, Chile. Several countries have expressed interest in using SPARC outputs for revised national biodiversity action plans. Additionally, SPARC collaborators affiliated with IPCC have indicated SPARC outputs will inform recommendations in the biodiversity section of the forthcoming report.	CA	36 country research-to-policy briefs and 6 multi-national policy briefs were produced. Direct stakeholder engagement with country officials comprised of 19 meetings in the final year of the project alone.
Indicator c: Number of opportunities identified to reduce loss of species or ecosystem representation in protected areas due to climate change.	14 focal regions identified.	CA	Focal areas within each region have been defined based on preliminary results and expert discussion during the regional assessment kickoff meetings.

[3] **O**= Overdue; **D**= Delayed; **NS**= Not started on schedule; **IS**= Under implementation on schedule; and **CA**= Completed/Achieved

OBJECTIVE INDICATORS	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[3]	COMMENTS/JUSTIFICATION
Indicator d: Number of protected areas agency staff trained in and implementing climate change decision support tools.	Total stakeholders trained in decision support tools: 179 through in person workshops; 200+ more through webinar or other remote presentations (including presentation to ~150 Thai parks superintendents on August 1, 2019).	CA	Stakeholder engagement activities generated substantial interest for further technical training and deployment of SPARC methods/data for country and multi-country planning under climate change

OBJECTIVE IMPLEMENTATION PROGRESS RATING	JUSTIFICATION
HS	The project has convincingly achieved its objectives and for several indicators exceeded expectations. High resolution large global datasets were compiled, and a series of novel methodological approaches was developed. Significant engagement has been achieved through regional assessments, delivery of research tools, and communication efforts. A large number of scientific publications has been accepted or is in process. 6 multi-national reports are completed and 36 research to policy briefs are finalized. A decision support platform was completed. In a series of countries protected areas action is expected as result of the project.

b. Progress towards Achieving Project Expected Outcomes (by project component).

This part of the report assesses the progress towards achieving the outcomes of the project.

COMPONENT 1	Global data compilation and analysis of protected area vulnerability to climate change

Outcome 1:	Information on species range shifts and ecosystem change made available for regional assessments.
Outcome 2:	Conservation planning methods allowing regional assessment of representation losses resulting from species range shifts and ecosystem changes developed and readily available.
Outcome 3:	Regional assessment teams have information needed to understand priority areas for protected areas system planning to counteract loss of representation due to climate change.

OUTCOMES TARGETS/INDICATORS	END OF PROJECT INDICATOR TARGET	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[4]	COMMENTS/JUSTIFICATION
Outcome indicator 1.1.: Species and ecosystem change databases and geospatial data available to regional assessment teams	Data on species and ecosystem change is available for regional analysis from a spectrum of methods; including species	Completed in FY17 with ongoing refinements with additional	CA	Much of this activity was completed in FY17. However, with the launch of the regional assessments additional improved data were received with which the models of species and ecosystem change were refined.

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OUTCOMES TARGETS/INDICATORS	END OF PROJECT INDICATOR TARGET	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[4]	COMMENTS/JUSTIFICATION
	distribution models, climate vulnerable traits assessment, novel and disappearing climates, velocity of climate change, Dynamic Global Vegetation Models and Generalized Dissimilarity Modeling (GDM). Data are comparable across regions. Data from large global datasets are extracted and made available for regional assessment. Methods for interpreting surrogates such as GDM and velo city of climate change are available and ready for application in conservation planning software.	or improved information from the regional assessments. Models have been produced for80,000+ vascular plant species; 9500+ bird species; 4500+ mammal species; 4000+ reptile species; 2500+ amphibian species; 2000+ insect species.		All datasets and/or products were made available to the regional assessments and all products were created with reproducible methods and workflows to allow for the process of iteration and refinement in the regional assessments.
Outcome indicator 1.2.: Method for regional conservation planning for climate change available to regional assessment teams.	Network Flow, Marxan and Zonation conservation planning software are tested for application at continental scales for regional assessment. The best performing methods are adapted specifically for regional assessments, or hybrid or novel methods that outperform existing methods developed and made available. The conservation planning software can assess loss of species and ecosystem representation and generate recommendations for siting of new protected areas to	Completed in FY17 with ongoing refinements with additional or improved information from the regional assessments.	CA	Conservation planning approaches were evaluated throughout the course of FY17. Standardized workflows that can effectively incorporate both species and ecosystems current distributions as well as their potential range shifts under climate change have been developed using Zonation software (https://github.com/cbig/zonation-core/releases/download/4.0.0/zonation_manual_v4_0.pdf) and through Network Flow analysis – for which algorithms have been developed in-house for this project. Example workflows and outputs of both methods of spatial prioritization have been presented to the project science advisory panel as well as the regional assessment workshops. Importantly, as conservation planning relies heavily on local context and priorities, both methods are sufficiently flexible to assimilate expert validated local information. Refined algorithms that capture the principles of Network Flow analysis, but that reduce the computational resources required have been developed and successfully deployed on a regional scale. A description of the revised method and a demonstration of its application in spatial

OUTCOMES TARGETS/INDICATORS	END OF PROJECT INDICATOR TARGET	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[4]	COMMENTS/JUSTIFICATION
	minimize representation loss.			prioritization in response to climate change is currently in preparation for publication.
Outcome indicator 1.3.: Regional maps of high-risk areas available.	Preliminary, coarse scale conservation planning is available for the three regional assessments. The coarse-scale results are based on multiple lines of evidence concerning species and ecosystem change, and on conservation planning software tested for climate change. Systematic combination and comparison allows quantifying level of agreement between methods for the first time. Preliminary identification of areas most at risk is available, allowing the three regional assessment teams to focus resources on taxa and geographies especially important in each region.	A total of 14 focal areas determined for three regions	CA	Focal areas as determined by preliminary assessments based on multiple dimensions of projected climate change impact on species and ecosystem were defined at each regional kickoff meeting in Q1 of FY18 and revised following the SPARC PI meeting in January 2019. Focal areas represented areas not only of high risk/vulnerability but also opportunity due to scope for conservation action and ongoing PA expansion initiatives. SPARC focal areas within each region include (but are not necessarily limited to): Asia Tropics: • Thailand & adjoining nations • New Guinea/PNG • Nepal/India/Bhutan/Bangladesh • Island of Borneo Afrotropics: • Liberia/W. Africa • Angola and KAZA • South Africa • Kenya/Uganda/Tanzania Neotropics: • Tropical Andes • Guyana Shield • Cerrado • Eastern Chaco • Central Chile • Mesoamerica

COMPONENT 1 IMPLEMENTATION PROGRESS RATING	JUSTIFICATION	RATING TREND

HS	All outcomes and outputs for this component have been achieved and, in some cases, exceeded expatiations. For example, models were produced for a very large number of vascular plant species, bird species, mammal species; reptile species, amphibian species, and insect species, thereby exceeding the targets of the project for the number of models. Conservation planning software has been developed and published. 14 focal areas were identified with high vulnerability to climate change but also opportunities for conservation action.	Unchanged

COMPONENT 2	Global data compilation and analysis of protected area vulnerability to climate change

Outcome 1:	Regional assessments produced by teams of leading scientists from each of the three regions.
Outcome 2:	Research-to-policy briefs prepared and presented to government protected areas agencies.
Outcome 3:	Decision support tools for visualization and interactive use of research results produced.

OUTCOMES TARGETS/INDICATORS	END OF PROJECT INDICATOR TARGET	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[5]	COMMENTS/JUSTIFICATION
Outcome indicator 2.1.: Regional assessment results available and published in the peer-review literature.	Regional assessments are available, providing context that enables efficient country-level assessments and actions. All countries have regional protected areas context and country-specific assessment of species and ecosystem change. Efficient country assessments result as regional assessments provide context that does not have to be repeated by every country. Efficient country actions result because there are no missing or incomplete country assessments of species and ecosystem change. A spectrum of evidence, from physical surrogates to species models	3 Regional assessments completed. A minimum of 12 publications accepted or in process.	CA	Analysis in each region is completed and results were reviewed and presented to stakeholders in three synthesis workshops that occurred in Q3 FY19. January 14-16 – Cape Town (Afrotropics) March 4-6 – Bangkok (Asia Tropics) April 4-6 – Santiago (Neotropics) Final results were synthesized into regional reports and country-specific research to policy briefs. High level findings have been submitted a forthcoming special issue of *Science Advances* which aims to come out in advance of the COP in Chile later this year. SPARC supported projects with manuscripts either published or in draft include: 1. Coldrey and Turpie 2019 Climate Change Vulnerability Assessment of tropical protected areas, in prep. 2. Fajardo J., Corcoran D., Roehrdanz P., et al. GCM CompareR, submitted *Methods in Ecology and Evolution*

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OUTCOMES TARGETS/INDICATORS	END OF PROJECT INDICATOR TARGET	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[5]	COMMENTS/JUSTIFICATION
	to ecosystem simulations are available to all countries in the region. Data from large global datasets and expensive modeling efforts are available in simple GIS format for use in country assessments. Data in the region is effectively applied to geographies and taxa most critical to climate change resilience because regional priorities are known. The best expert opinion in the region informs interpretation of the best available regional and global evidence.			3. Arias et al. 2019. Present-day and future climate in the Neotropics according to CMIP5 models. Submitted *International Journal of Climatology*. 4. Freeman B., Roehrdanz P. et al. 2019. Modeling endangered mammal species distributions and forest connectivity across the humid Upper Guinea lowland rainforest of West Africa. *Biodiveristy and Conservation* 28:3 671-685. 5. Camera-Leret et al. 2019. The Manokwari Declaration *Forest and Society* 3:1. http://dx.doi.org/10.24259/fs.v3i1.6067 6. Bonebrake, et al. 2019. Climate change impacts on the conservation of Asian butterflies, *in prep.* 7. Feng X., Enquist B., Hannah L., Roehrdanz P., Lovett J., et al. 2019. Moore's law for global biodiversity *in review, Science* 8. Enquist et al. 2019 The commonness of rarity. submitted *Science Advances* 9. Hannah L., Roehrdanz P., Marquet P., Enquist B, Midgley G. et al. 2019 Effect of sytematic protected areas planning for climate change on avoiding extinction risk. Submitted, *Science Advances* 10. Merow et al. 2019 Species modeling workflow for tropical plants. In prep. 11. Maitner, B. S. et al. The BIEN R package: A tool to access the Botanical Information and Ecology Network (BIEN) database. Methods in Ecology and Evolution 9, 373–379 (2018). 12. Villavicenzio et al. 2019. Assessing the Causes Behind the Late Quaternary Extinction of Horses in South America Using Species Distribution Models. Front. Ecol. Evol., 27 June 2019
Outcome indicator 2.2.: Number of multi-national and country research-to-	Protected areas policymakers and technical decision makers have access to	6 multi-national reports are completed and	CA	Research to policy briefs were produced following the conclusion of the regional synthesis workshops. The design and format of the policy briefs is defined in parallel with the co-design of the decision support system so

OUTCOMES TARGETS/INDICATORS	END OF PROJECT INDICATOR TARGET	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[5]	COMMENTS/JUSTIFICATION
policy briefs presented to protected areas agency staff	systematic information on climate change and priorities for climate change response. The research is peer-review journal caliber, but reaches protected areas agency staff directly, without lengthy review and publication delays. Priority geographies for multi-national collaboration on protected areas adaptation directly reach relevant staff in the form of research-to-policy briefs. This puts state-of-the-science research immediately into the hands of policy and decision makers. The research results are interpreted in regional context and for policymakers and technical staff rather than for academic research audiences of journals, making it immediately more relevant for actual agency policy and planning, and management decisions.	36 research to policy briefs are completed and available here:		that the most essential information for PA planning and policy is conveyed. Delivery and outreach of policy briefs commenced primarily during the period May-July of 2019 with a total of 12 meetings/workshops involving decision makers representing 15 countries to discuss the project findings and review the policy briefs. Many policy briefs were further refined based on feedback from this stakeholder engagement.
Outcome indicator 2.3.: Decision support tools developed and disseminated.	A decision support tool allows policymakers and planners to query climate change and protected areas research results. This interactive tool will allow exploration of multiple options and decision consequences on a mid-level laptop computer. The species	Decision support platform consisting of three pillars completed: 1) SPARC Visualizer interactive data viewer; 2) GCM CompareR web	CA	Throughout FY18 the core project team sought input with regard to the essential elements of an effective decision support system. The consensus was that there is indeed a need for such a system, but the specific features identified as most needed varied widely among different constituencies. Seeking additional input, we leveraged GEF networks and distributed an invitation to potential stakeholder to participate in both the co-design platform and the testing/refinement phase once a functional prototype was developed. We convened a stakeholder co-design workshop that took place in November of 2018 in Santa Barbara. Participants who served in roles that bridge science and policy from seven

OUTCOMES TARGETS/INDICATORS	END OF PROJECT INDICATOR TARGET	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[5]	COMMENTS/JUSTIFICATION
	and ecosystem representation improvements from designation of possible new protected areas can be assessed and alternatives explored. Where there is sufficient natural habitat for protected areas expansion, this tool will help define design options both for current representation and for representation as climate changes. Policymakers and technical staff will make better-informed decisions about new protected areas and will be more likely to factor climate change into those decisions.	application; 3) BIEN R Package and species range viewer.		different countries (Mexico, Brazil, Indonesia, Nepal, Thailand, South Africa, Liberia) contributed to the identification of key elements that should be included in the platform and also identified potential use cases that may require specific means of interacting with the data. A web development firm was contracted to build interactive functionality into existing CI geo information platforms. Ultimately, the project has produced the following key elements of the decision support platform: 1) BIEN R package – allows users to query consolidated species observation data as well as range models; 2) GCM CompareR – allows users to explore the range of GCM projections for their region of interest 4) 'SPARC visualizer' which allows the user to explore different levels of conservation action and potential co-benefits (e.g. carbon storage). The SPARC Visualizer appears as part of Conservation International's Resilience Atlas (www.resilienceatlas.org) which serves as an online data portal for Conservation International spatial products. The SPARC Visualizer built the additional functionality that allows a user to explore different thresholds of priority and/or conservation action, analyze quickly with user defined domains, and generate a PDF report of the session. As the SPARC Visualizer is housed within the Resilience Atlas which is supported by other projects as well, it is likely that the platform will be maintained and improved upon in the months and years to come (certainly beyond the funding life of SPARC). This also provides an opportunity view SPARC results in context with other GEF-funded projects. The SPARC Visualizer is accessible here: www.resilienceatlas.org/map The BIEN R package is described here: https://cran.r-project.org/web/packages/BIEN/index.html The BIEN/SPARC range model data portal is here: www.biendata.org GCM CompareR can be accessed here: http://www.ecoinformatica.net/GCMcompareR.html

COMPONENT 2 IMPLEMENTATION PROGRESS RATING	JUSTIFICATION	RATING TREND
HS	All outcomes and outputs for this component have been achieved. It is rated as highly satisfactory. 3 Regional assessments were completed and a significant number of scientific publications has been accepted or is in process. 6 multi-national reports are completed and 36 research to policy briefs are completed. The decision support platform was completed.	Improved

COMPONENT 3	Monitoring and Evaluation

Outcome 1:	Participatory M&E framework and an informative and proactive feedback mechanism integrated at all levels of project management.
Outcome 2:	Adaptive implementation of regional assessments.

OUTCOMES TARGETS/INDICATORS	END OF PROJECT INDICATOR TARGET	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[6]	COMMENTS/JUSTIFICATION
Outcome indicator 3.1.: Monitoring plan completed and reflected in data compilation and regional assessment work plans.	Leading regional scientists work together, using an active monitoring framework to help move knowledge ahead synthetically. Knowledge links across disciplines is actively sought out and connections facilitated by the monitoring framework. An integrated work plan allows advances in climate science, climate change biology and protected areas planning to advance in coordination. Scientists will work directly with one another across disciplines, short-circuiting the usual information dissemination through the literature.	Project monitoring plan completed and agreed to during project inception meeting in FY17. All deliverables and outcomes were considered when developing and confirming regional assessment workplans.	CA	Project monitoring plan and integrated work plan were developed collaboratively at the project inception workshop and subsequently confirmed by the project steering committee. Project scientists have been dedicated to identifying state-of-the-science approaches to advance the science of integrated protected areas planning and produce the best possible recommendations for siting protected areas under scenarios of climate change.

[6] [6] **O**= Overdue; **D**= Delayed; **NS**= Not started on schedule; **IS**= Under implementation on schedule; and **CA**= Completed/Achieved

OUTCOMES TARGETS/INDICATORS	END OF PROJECT INDICATOR TARGET	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[6]	COMMENTS/JUSTIFICATION
Outcome indicator 3.2.: Number of adaptations to regional assessments based on learning from other regions.	Scientists in the three major tropical regions systematically learn from one another. Regional assessments adapt based on experience and transmit those lessons to other regions. Knowledge mapping and adaptive management provide information about improvements that can be implemented as the project progresses. Sharing of insights across regions speeds regional learning.	3 Regional assessments launched in Q1 of FY18 and concluded in Q3 of FY19. Knowledge sharing among regions has continued to remain strong as project has progressed	CA	Coordination among the three regional assessments was centralized and was largely the responsibility of the core management team. The three regions produced a similar core set of products and standardized recommendations. That said, the three assessments were distinct endeavors as each region offered unique opportunities as well as challenges. Communication among the regional PIs was frequent and lessons learned were quickly assimilated; e.g. through immediate feedback and modification to meeting format as the kickoff meetings progressed. Perhaps the most illustrative example of cross-region knowledge sharing were the individual projects financed within region that contributed to outputs in all three regions, namely 1) GEnS analysis (Asia); 2) Global protected area vulnerability analysis (Africa); 3) Network flow algorithm and GCM evaluation (Neotropics).

COMPONENT 3 IMPLEMENTATION PROGRESS RATING	JUSTIFICATION	RATING TREND
HS	All outcomes and outputs of this component were achieved. A project monitoring plan and an integrated work plan were developed collaboratively at the beginning of the project and implemented consistently. Knowledge sharing was strong throughout the project.	Unchanged

c. Overall Project Results Rating

OVERALL PROJECT RESULTS IMPLENTATION RATING

OVERALL RATING	JUSTIFICATION	RATING TREND[7]
HS	Overall project achievements have been very good, and for some outcomes and outputs the project exceeded the expectations, such as for example for the number of species distribution models that were generated. The project is therefore overall rated as highly satisfactory. High resolution global datasets were compiled for a large number of species and a series of novel state-of-the art methodological approaches was developed. 3 Regional assessments were completed and a significant number of scientific publications has been accepted or is in process. 6 multi-national reports were finalized, as well as 36 research to policy briefs. The decision support platform was completed.	Unchanged

[7] **Rating trend**: Increasing, Unchanged or Decreasing

d. Recommendations`

CORRECTIVE ACTION(S)	RESPONSIBLE PARTY	DEADLINE
N/A	N/A	N/A

SECTION III: PROJECT RISKS STATUS AND RATING

a. Progress towards Implementing the Project Risk Mitigation Plan

This section describes the activities implemented to manage and reduce high, substantial, modest, and low risks of the project. This section has three parts:

a. Ratings for the progress towards implementing measures to mitigate project risks and a project risks annual reassessment
b. Recommendations for improving project risks management

a. Progress towards Implementing the Project Risk Mitigation and Plan Project Risks Annual Reassessment

PROJECT RISKS	PRODOC RISK MITIGATION MEASURE	MITIGATION MEASURES IMPLEMENTATION	PROGRESS RATING[8]	COMMENTS/JUSTIFICATION	PRODOC RISK RATING	END OF PROJECT RISK RATING	RISK RATING TREND[9]
Risk 1: National protected areas agencies do not use systematic planning or cannot use climate change information	Training in how to use climate change information and decision support tools; production of decision support tools that explicitly incorporate systematic planning.	Conceptualization and design of decision support tool is in preliminary phase.	CA	The decision support platform produced has explicit modules both for communication of uncertainty around climate change projections (GCMCompareR) but also with understanding systematic planning that takes the effects of climate change into account. In addition to the standalone decision support tool, many stakeholders from the countries we were able to directly engage expressed interest in further technical training and application of some of the SPARC methods (e.g. conservation prioritization using network flow) in their countries/regions.	Low	Low	Unchanged
Risk 2: GCM uncertainty undermines agency confidence in ability to make meaningful decisions	Use of IPCC-standard ensemble procedures to manage uncertainty; training to deal with uncertainty through	Standard ensemble procedures to communicate the scenario space and uncertainty have been used thus far and will continue to be used in regional assessments. Climate model selection	CA	The project has developed an interactive web tool based in R called GCM CompareR – which allows a user to rapidly query and compare climate projections of various GCMs/Scenarios to aid an understanding of the range of possible scenarios (as well as uncertainty) in their region of interest.	Medium	Medium	Unchanged

[8] **O**= Overdue; **D**= Delayed; **NS**= Not started on schedule; **IS**= Under implementation on schedule; and **CA**= Completed/Achieved

[9] **Rating trend**: Increasing, Unchanged or Decreasing

PROJECT RISKS	PRODOC RISK MITIGATION MEASURE	MITIGATION MEASURES IMPLEMENTATION	PROGRESS RATING[8]	COMMENTS/JUSTIFICATION	PRODOC RISK RATING	END OF PROJECT RISK RATING	RISK RATING TREND[9]
	ensembles and scenarios	procedure used to limit analysis to best performing models in each region.		This tool is part of the final decision support system package.			
Risk 3: Lack of remaining habitat for new or extended protected areas	Recommendation of management actions in existing protected areas in place of additional protection	Pan tropical analysis of remaining scope for protection completed early in the project. Project prioritization tools explicitly account for available minimally disturbed habitat. Additionally, priority outputs may be interpreted through the lens of restoration.	CA	The window of opportunity for additional protected areas expansion is rapidly closing due to accelerating development pressures, habitat degradation as well as dedicated efforts to expand protected areas to their current extent. Recognizing that opportunities for expansion vary appreciably by country and by region, many of the project outputs have been analyzed with respect to individual PAs to produce a vulnerability index across multiple dimensions of projected change. This analysis is also a key feature of the decision support platform and will allow PA managers efficient access to information regarding the projected impact of climate change on an individual PA.	Medium	Medium	Unchanged
Risk 4: Regional scientists' willingness to participate in regional assessments	Provision of opportunities to participate in high-profile peer-review publications; small grants	Sustained outreach of project goals and opportunities in each region conducted by central project managers and regional lead scientists.	CA	Each regional assessment successfully recruited high profile scientists to participate in the kick off workshop as well as contribute to the regional assessments through targeted onward grants. The project never had shortage of willing expert collaborators and there is strong evidence that the project has formed the beginnings of a vibrant global community of practice that has already resulted in successfully funded proposals for activities that directly build upon the efforts of SPARC	Low	Low	Unchanged

PROJECT RISKS MITIGATION MEASURES RATING	JUSTIFICATION	RISK RATING TREND[10]
S	Risk mitigation measures were adequate.	Unchanged

Recommendations

MITIGATION AND CORRECTIVE ACTION(S)	RESPONSIBLE PARTY	DEADLINE
No corrective actions are needed	N/A	N/A

SECTION IV: PROJECT ENVIRONMENTAL AND SOCIAL SAFEGUARDS IMPLEMENTATION STATUS AND RATING

This section of the PIR describes the progress made towards complying with the approved Environmental and Social Safeguard plans, as well as recommendations to improve the implementation of the safeguard plans, when needed. This section is divided in three parts:

a. Progress towards Complying with the CI-GEF Project Agency's Environmental & Social Safeguards

b. Overall Project Safeguard Implementation Rating

c. Recommendations

a. Progress towards Complying with the CI-GEF Project Agency's Environmental & Social Safeguards

MINIMUM SAFEGUARD INDICATORS	PROJECT TARGET	END OF PROJECT STATUS	PROGRESS RATING[11]	COMMENTS/JUSTIFICATION
ACCOUNTABILITY AND GRIEVANCE MECHANISM 1. Number of conflict and complaint cases reported to the project's Accountability and Grievance Mechanism	All conflict cases that arise are effectively routed to the Accountability and Grievance Mechanism.	0	CA	Accountability and grievance mechanism in place and communicated

[10] **Rating trend**: Increasing, Unchanged or Decreasing

[11] **O**= Overdue; **D**= Delayed; **NS**= Not started on schedule; **IS**= Under implementation on schedule; and **CA**= Completed/Achieved

				to project participants and stakeholders.
2. Percentage of conflict and complaint cases reported to the project's Accountability and Grievance Mechanism that have been resolved	100%	NA	CA	No conflicts or complaints have been reported to date.
GENDER MAINSTREAMING				
1. Number of men and women that participated in project activities (e.g. meetings, workshops, consultations)	Equal number of men and women participating in project activities.	Project total for activities (workshops, presentations, advisory) = 1190 (639 male; 551 female)	IS	We are pleased to report more equitable gender representation in workshops and meeting than in previous years. This past year, of the 248 people engaged in project workshops/meetings/trainigs 108 (44% were women). While this is not in perfect gender balance our efforts to achieve balanced representation dis result in improvements over previous years
2. Number of men and women that received benefits (e.g. employment, income generating activities, training, access to natural resources, land tenure or resource rights, equipment, leadership roles) from the project	Equitable provision of employment/training opportunities within the project	Employment benefits by partner: CI: 2 male, 4 female Chile: 4 male, 3 female Stellenbosch: 9 male, 7 female Leeds: 1 male, 2 female XTBG: 2 male, 3 female Arizona: 1 male Consultancies: 2 male, 2 female Total = 21 male, 21 female	CA	At the conclusion of the project, those receiving employment/training benefits through official roles within the project was gender-balanced
3. Number of strategies, plans (e.g. management plans and land use plans) and policies derived from the project that include gender considerations (this indicator applies to relevant projects)	All recommendations from project results will include considerations of gender.	100%	CA	All documents produced were completed with consideration of gender.
STAKEHOLDER ENGAGEMENT				

1. Number of government agencies, civil society organizations, private sector, indigenous peoples and other stakeholder groups that have been involved in the project implementation phase on an annual basis	No numeric total for number of organizations engaged.	Formal outreach/engagement (phone calls or meetings) with 120+ scientists from 50+ institutions. Contacts with PA agencies reps from 18 countries including: Chile, Ecuador, Colombia, Mexico, South Africa, Liberia, Nepal, Thailand, Brazil, Myanmar, Laos, Vietnam, Malaysia, Angola, Tanzania, Uganda, Namibia	CA	Project outreach has focused on the scientific community from each region, PA practitioners from countries within SPARC focal areas, and individuals/organization operating in the international policy arena. Regional syntheses workshops had significant attendance (and therefore engagement) by key decision maker with potential to influence PA planning policy (e.g. Director of Thailand National Parks; Deputy Commissioner of Protected Areas in Guyana). Please see accompanying SPARC engagement tracker and meeting summary documents here:
2. Number persons (sex disaggregated) that have been involved in project implementation phase (on an annual basis)	No numeric total for number of persons involved.	1190 Total Persons 639 male (52%) 551 female (48%)	CA	We will continue to engage stakeholders through synthesis workshops, presentation of project results and trainings in the decision support platform. All engagement activities will strive for equality in gender representation and participation.
3. Number of engagement (e.g. meeting, workshops, consultations) with stakeholders during the project implementation phase (on an annual basis)	No numeric target for number of workshops.	This past year, SPARC either organized or participated in a minimum of 22 workshops (19 of which communicated project results and/or decision support tools).	CA	Please see accompanying documentation of workshops here:

4. Percentage of stakeholders who rate as satisfactory the level at which their views and concerns are taken into account by the project	100%	100%	CA	While there have been suggestions for improvement or refinement of all project results and products, we have not received any negative feedback that the products were not inclusive of perspectives.

b. Overall Project Safeguard Implementation Rating

SUMMARY: PROJECT SAFEGUARD IMPLEMENTATION RATING BY TYPE OF PLAN

SAFEGUARDSTRIGGERED BY THE PROJECT (delete those not applicable)	END OF PROJECT IMPLEMENTATION RATING	RATING TREND
Accountability and Grievance Mechanisms	HS	Unchanged
Gender Mainstreaming Plan (GMP)	HS	Unchanged
Stakeholder Engagement Plan (SEP)	HS	Unchanged

OVERALL PROJECT SAFEGUARD IMPLEMENTATION RATING

RATING	JUSTIFICATION	RATING TREND
HS	The project achieved good results for gender mainstreaming, stakeholder engagement and accountability/grievance mechanism. Notably, gender mainstreaming improved compared to previous years with women participation at almost 50%.	Unchanged

c. Recommendations

CORRECTIVE ACTION(S)	RESPONSIBLE PARTY	DEADLINE
No corrective action to be taken at this time.	N/A	N/A

SECTION V: PROJECT IMPLEMENTATION EXPERIENCES AND LESSONS LEARNED

Required topics

1. Project institutional arrangements, including project governance

From previous PIR: *"The project is structured so that the project management team is all based within Conservation International with the remaining six project Principal Investigators (PIs) residing in separate institutions linked to the project through sub-agreements. While the coordination with the project PIs has gone very well through frequent communication and regular information exchange, the initial execution of the sub-agreements with each institution was time-consuming. This was due to idiosyncratic concerns of each institution with regard to the standard grant agreement language. That the lengthy sub agreement negotiations have not adversely impacted the overall project timeline is largely due to the resilience and creativity demonstrated by the project PIs to remain engaged in the project."*

This challenge in executing individual grants and contracts, particularly those that 'onward grants' within each regional budget and therefore decentralized from the core project management team, continued through FY18. Challenges in the timely execution of grants were sufficient to cause a delay in both total project expenditure and output generation. It is notable that the 'onward grants' for the Asia region that were managed centrally by the core project team at CI ultimately experienced the fewest delays and have all concluded at the writing of this report. This is an important lesson should there be future projects that include an 'onward grants' component as a mechanism for regional engagement – there needs to be sufficient time allotted in the project time frame for grantee institutions (who may have little institutional knowledge of the overall project) to formulate and execute onward grants/contracts.

Upon final reflection and completion of the project, the issue that stands out regarding institutional arrangements and governance was again the challenges around grants management and reporting with partner institutions. This problem was further compounded with 'onward grants' – many of which as mentioned previously were delayed due to the administrative overburden that often exceed the capacity of the institutional departments we partnered with. It is notable that nearly 100% of our project partners expressed some degree of surprise at the reporting requirements – and this feedback is originating from PIs from institutions with plenty of experience receiving and managing all types of awards. This speaks to the need to possibly involve institutional financial/administrative managers in the kickoff meeting as opposed to just project PIs as this type of work is usually delegated to those with the relevant expertise and is not under the explicit purview of an academic PI.

2. Capacity building

From previous PIR: *A well-designed and accessible decision support platform will be crucial to the overall impact of the project. As the regional assessments have begun, it is clear that there is vast but unevenly distributed expertise in the issues that SPARC hopes to address. It will be essential to develop an information platform that is sufficiently flexible to both provide a scientifically rigorous explanation of some of the novel methods SPARC brings to the table but also provide a low barrier of entry to explore key project products that are inputs into the more synthetic recommendations (e.g. climate change projections, species models, PA vulnerability metrics). Striking this balance of communicating the scientific advances as well as comparatively basic climate change information is an ongoing communication challenge for the project in all phases of stakeholder engagement – and will need to be precisely tuned to effectively build capacity for different audiences in different settings.*

The project continues to provide opportunities for individuals to deepen research experience and develop technical skills with project resources. A list of targeted research projects and the individuals/institutions involved is described earlier in this report.

Perhaps the most encouraging and rewarding development near the conclusion of the project was the genuine interest from stakeholders/decision makers in multiple countries for further training in SPARC methods – particularly those around species modeling, high performance computing, and conservation planning. Although some countries in our project domain already have exceptional capacity in these issues (e.g. Chile, Mexico, South Africa) there are many others that expressed interest in learning beyond what is possible with a decision support tool – and to implement SPARC-type projects within the context of their own national conservation planning issues. It is our genuine hope that we will be able to continue to engage and pursue follow-on opportunities to take SPARC methods and results even closer to ground.

3. Implementation of safeguard policies, including gender mainstreaming, accountability and grievance mechanisms, stakeholder consultations

From previous PIR: *Throughout the project, we have been conscious of the gender distribution among project participants and stakeholders we have engaged. Though we have made every effort to achieve gender parity in our activities, we have - in some cases - fallen short of that target. In particular the attendance of the regional assessment kickoff workshops had a measurable male bias (32% of participants were female across all three kickoff meetings). This was despite our best efforts at achieving gender balance and primarily reflects a differing response rate to a gender-balanced invitation list. Our efforts at achieving gender balance throughout the project are reflected in that, from those kickoff workshops, those selected for onward grants and/or project employment are 46% female. In general, our project outreach and stakeholder engagement activities had fairly balanced gender representation (53% female). We will continue to actively work to close the gap in gender representation where one exists through equitable provision of opportunities in the project – with particular focus on the planned regional synthesis meeting and stakeholder engagement in FY19.*

No grievances have been filed to date.

We are pleased to report that participation in our final year of workshops was much closer to achieving gender balance than in the initial round of workshops. This past year, 44% of workshop participants were women. There was a conscious effort among all project partners to achieve that equal representation goal. While we did not achieve the target of perfect gender balance in participation, I believe that the improvement trend demonstrates our intent and effort.

4. Factors that improve likelihood of long-term sustainability of project impacts

From previous PIR: *As highlighted in the previous PIR, we are quite mindful that meaningful project impact will only result from being able to provide the right information at the right time in a decision-making process. From the broad net we have cast to reach out to national PA policy makers and PA managers, there is a recognized need to consider the impacts of climate change in PA system planning and management. That this project will definitely be able to fill that need instills confidence that there is the possibility of lasting impact from the project outputs. The timing of final project outputs and the dedicated outreach phase is fortuitous as the information will be well placed for discussions leading up to CBD post-2020 target setting and the associated sense of urgency that the window of opportunity for PA expansion is rapidly closing.*

Building on entry from previous PIR, we do have several high-profile opportunities to continue engaging on the issue in the upcoming year. Those opportunities in no intentional order of importance are: 1) Country specific follow up potential in Angola, Thailand, Liberia, Ecuador, Peru, Chile, Colombia; 2) Latin American parks congress (SPARC or SPARC decendent has been offered a session); 3) Climate COP in Chile December 2019 (SPARC PI

Pablo Marquet is organizing the biodiversity track of the COP); 4) African parks congress; 5) Potential publications (pending acceptance) in advance of CBD 2020 in China. The potential opportunities to influence and inform national and/or international policy are many and we will work ensure the outputs of this project are available to inform those discussions.

5. Factors that encourage replication, including outreach, dissemination of lessons learned, and communications strategies

From previous PIR: *Despite the challenges noted earlier with the decentralized structure of the project (including onward grants issued by grantees institutions) – the shear breadth in terms of the geographic scope and the number of institutions involved has provided a signal boost beyond what a regionally focused project with similar resources could achieve. The core science team of the project is quite strong and has built extensive networks among the research community as well as the broader conservation community. As a result, the regional assessment teams also include some of the most highly regarded scientists in the regions who will provide their expertise to vet the final project results and recommendations. The project findings will certainly carry more weight with the endorsement of the regional experts – which will increase the likelihood the information could influence PA policy decisions. That many of the regional experts have committed to the project based on small onward grants (typically $5-10k) is an extraordinarily efficient use of funds that more than compensates for the additional administrative challenges.*

The biggest asset to encourage replication and dissemination of project methods/results is the dedicated group of experts that are interested in this issue and are willing to engage on an intellectual as well as implementation level. The community of practice formed from the regional assessment teams opened many doors to proactive engagement among decision makers not only through the SPARC project but on a peer to peer level. The core SPARC group has also already been successful in fundraising around a continuation and advancement of some of the methods used for SPARC. As mentioned many other places, the project has many opportunities for country-specific follow up --- and we hope to continue to cultivate those relationships even after this grant has concluded.

Additional topics (please choose two)

6. Scientific and technological issues

From previous PIR: "*The scientific ambitions of the project are quite large. Although the availability of high-resolution datasets and ever-increasing computational power have made pan-tropical analysis at 1km^2 a possibility, the planned analysis is pushing the envelope of what is possible without dedicated high performance computing resources. Although the project is leveraging access to cloud-based high-performance computing resources (as well as the skills to perform massive parallel processing on such resources), this was not something that was explicitly budgeted for. Conducting this analysis over many different climate models and scenarios of climate change does pose a significant challenge in terms of processing time and data storage. The project has actively worked to develop efficient and in some cases novel methods of processing and sharing data among the three regions. This also emphasizes the importance of the decision support tool which is being developed to efficiently communicate project results with low computational overhead.*"

The computational demand of the project continues to be impressive and, at times, a challenge for the rate of progress. The project has indeed strategically leveraged large scale compute resources that are available for academic institutions. Additionally, several members of the extended project analytical team have acquired new skills in high performance computing and Amazon Web Services (the SPARC Neotropical lead institution has purchased

dedicated cloud resources to conduct analysis for the project). As the project approaches delivery of final results and development of the decision support platform, it will again need to creatively leverage existing resources to provide the storage and compute environment to run the platform – particularly if the platform is to remain functional after the project end date.

Computation continues to get faster and cheaper – this was evident even over the three-year timeline of the project. A task that sounded impossible/daunting at the beginning of the project (e.g. projecting ranges for 100,000+ species) was able to be completed fully within a four-day time period by the end of the projects due to access to high performance machines, efficient modeling workflows and faster processors. A major result/outcome of the project is the combined workflow of assimilating/standardizing species information, producing species models, projecting species models into different climate conditions and producing a spatial prioritization. This work flow is spread out amongst a community of practice that was in part ignited by SPARC and will continue to make strides in generating useful data for the issue of biodiversity conservation under climate change.

7. Financial management and co-financing.

From previous PIR:

[Financial management]

Financial management has been expertly handled by core CI staff. As indicated previously, some challenges have arisen with regard to financial reporting from the project grantees due to differing institutional accounting procedures, currency exchanges, time differences, language differences, and staff turnover. This is not unique to this project and is likely a challenge in any multinational research initiative. That said, due to the shear breadth in geographic scope, future projects of similar scope should recognize the appreciable administrative demands on the core project management and financial teams to resolve frequent (though mostly minor) issues with grantee financial reporting.

As mentioned earlier in this iteration of the PIR, internal financial reporting had very few issues, but many complications arose with reporting documents from partner institutions – resulting in project delays and mutual frustration among finance + administrative professionals. Language and cultural barriers potentially contributed in places but again it was surprising to me how reporting for this project proved to be quite challenging for partner organizations.

[Co-financing]

At the writing of this report, the project has realized all of the expected co-financing – indicating the breadth of existing knowledge and expertise the project is effectively leveraging to produce the outcomes.

All co-financing realized.

APPENDIX I: PROJECT ANNUAL IMPLEMENTATION PROGRESS RATING

Rating		Overdue (O)	Delayed (D)	Not started on schedule (NS)	Under implementation on schedule (IS)	Completed/Achieved (CA)
Highly Satisfactory (HS)	**HS**	0%		100%		
Satisfactory (S)	**S**	20%		80%		
Moderately Satisfactory (MS)	**MS**	40%		60%		
Moderately Unsatisfactory (MU)	**MU**	60%		40%		
Unsatisfactory (U)	**U**	80%		20%		
Highly Unsatisfactory (HU)	**HU**	100%		0%		

- **Highly Satisfactory**: 100% of the indicators: a) have been completed/achieved, b) are under implementation on schedule, and/or c) have not started but are on schedule, according to the original/formally revised Project Annual Workplan for the project. The project can be presented as an example of "good practice" project,
- **Satisfactory**: 80% of the indicators: a) have been completed/achieved, b) are under implementation on schedule, and/or c) have not started but are on schedule, according to the original/formally revised Project Annual Workplan for the project; except for only 20% that are delayed and/or overdue and need remedial action,
- **Moderately Satisfactory**: 60% of the indicators: a) have been completed/achieved, b) are under implementation on schedule, and/or c) have not started but are on schedule, according to the original/formally revised Project Annual Workplan for the project; while 40% are delayed and/or overdue and need remedial action,
- **Moderately Unsatisfactory**: 40% of the indicators: a) have been completed/achieved, b) are under implementation on schedule, and/or c) have not started but are on schedule, according to the original/formally revised Project Annual Workplan for the project; while 60% are delayed and/or overdue and need remedial action,
- **Unsatisfactory**: only 20% of the indicators: a) have been completed/achieved, b) are under implementation on schedule, and/or c) have not started but are on schedule, according to the original/formally revised Project Annual Workplan for the project; while 80% are delayed and/or overdue and need remedial action, and
- **Highly Unsatisfactory**: 100% of the indicators: a) are overdue, and/or b) delayed in their implementation, according to the original/formally revised Project Annual Workplan for the project.

- **APPENDIX II: PROGRESS TOWARDS ACHIEVING PROJECT EXPECTED OUTPUTS**

INDICATORS	PROJECT TARGET	END OF PROJECT INDICATOR STATUS	PROGRESS RATING[12]	COMMENTS/JUSTIFICATION
Outcome 1.1 Information on species range shifts and ecosystem change made available for regional assessments.				
Output Indicator 1.1.1: Number of species change models created or converted into formats readily accessible for regional assessment.	5,000 plants and 3,000 vertebrates modeled.	More than 110,000 species distribution models have been generated at 1km resolution in a format that is readily transferable and allows for projections across multiple scenarios of climate change.	CA	**Completed in FY17:** Although this activity is classified as completed we will be refining models as more species occurrence information is obtained and/or updated climate projections are available.
Output Indicator 1.1.2: Number of ecosystem change models and datasets created or converted into formats readily accessible for regional assessment.	Models or proxies of ecosystem change including novel and disappearing climates, velocity of climate change, Dynamic Global Vegetation Models and Generalized Dissimilarity Modeling (GDM) are produced/compiled and available for regional assessments.	Three classes of ecosystem models are available for each region: 1. Climate-only (GEnS); 2. Biologically scaled climate (GDM); 3. Dynamic process models (DGVM)	CA	Both climate-only models of ecosystem change, physical surrogates of ecosystems (GDM) and dynamic process models (DGVM) are in hand for all three regions. Additionally, we are exploring the application of a novel method called 'ecotones' which would combine remotely sensed information with models of species distribution to classify ecosystems.
Outcome 1.2 Conservation planning methods allowing regional assessment of representation losses resulting from species range shifts and ecosystem changes developed and readily available.				
Output Indicator 1.2.1: Methods manual for regional assessment of representation losses (species and ecosystems) available to regional assessment teams.	Methods evaluated and available for regional assessments.	Methods for representation are available for individual species and higher-level taxa as well as ecosystems/ecosystem proxies under any scenario of climate change. Completed in FY17 See completed technical documentation for all three regional assessments here:	CA	**Completed in FY17:** Representation within protected can be readily assessed for any number of species (for which models are available) or aggregations of species (e.g. families; endangered species) under any scenario of climate change.

Output Indicator 1.2.2: Methods manual for regional protected areas planning to maintain representation in the face of climate change available to regional assessment teams.	Methods evaluated and available for regional assessments.	A suite of methods was evaluated and Zonation + Network flow are the most readily applicable to conservation planning under climate change as both are able to explicitly account for spatial dislocation of species ranges as climate changes. Completed in FY17 See completed technical documentation for methods used across all three regional assessments here:	CA	**Completed in FY17:** In addition to pre-existing methods, we have developed a novel method that uses the concepts of network flow but offers significant savings in computational power.
Outcome 1.3 Regional assessment teams have coarse scale information needed to understand priority areas for protected areas system planning to counteract loss of representation due to climate change.				
Output Indicator 1.3.1: Number of geographies and taxa identified as most in need of regional assessment.	3 Geographies identified in each region; number of taxa TBD.	14 focal areas in total. Each region has identified at least three focal areas that included potential trans-boundary planning opportunities.	CA	See list of focal areas earlier in this PIR
Outcome 2.1 Regional assessments produced by teams of leading scientists from each of the three regions				
Output Indicator 2.1.1: Number of publications of regional assessment results.	No numerical target specified in prodoc.	A minimum of 12 peer reviewed are either published or in process at the time of this writing.	CA	Publications will likely continue to come in after the project end date due to the typical time to prepare a manuscript and respond to reviewer comments. Please see list of publications in process in earlier section of PIR

Output Indicator 2.1.2: Number of potential priority areas for expansion of protection identified.	No numerical target specified in prodoc.	Potential areas for expansion have been identified through three methods of spatial prioritization. Results are of a continuous priority ranking and therefore impossible to pin to one specific number. Priorities are communicated in terms of e.g. most valuable areas for a country to achieve 25% terrestrial conserved area targets	CA	Potential priority areas were identified through the analysis of FY17. These will be further assessed and confirmed through the conclusion of the regional assessments
Outcome 2.2 Research-to-policy briefs prepared and presented to government protected areas agencies.				
Output Indicator 2.2.1: Number of multi-national research-to-policy briefs distributed.	Target is 2-3 multi-national policy briefs per region	Six multi-national research to policy briefs were completed and are available here:	CA	Six multi-country briefs were produced covering the following regions: 1) Liberia – West Africa (Liberia, Sierra Leone, Guinea, Cote Ivoire) 2) Kenya – East Africa (Kenya, Uganda, Tanzania, Rwanda, Burundi) 3) Northern Andes (Colombia, Ecuador, Venezuela) 4) Southern Andes (Ecuador, Peru, Bolivia) 5) Peninsular Asia (Thailand, Laos, Cambodia, Myanmar, Vietnam) 6) Borneo (Malyasia, Indonesia, Brunei)

Output Indicator 2.2.2: Number of country research-to-policy briefs presented.	Target is all 83 countries within the project domain – with in-person presentations to 2-3 countries in each region. Please revise to 36 countries with country-specific policy recommendations. All analytical outputs will be available to other countries not covered by policy briefs.	36 stand alone country research to policy briefs we completed. Policy brief documents are available here:	CA	This was a major error on my part in earlier PIR. Whereas our domain includes 83 countries – and all of our analysis will cover (and will be available for) those 83 countries – many of those countries are small island nations with a very limited number of pixels from a continental modeling perspective. Additionally, it was important for the project to engage local experts within country to provide the essential validation of results and country-specific policy context. We have 36 countries identified across the three regions for production of stand-alone policy briefs. All briefs have been produced with the help of a professional designer to be optimized for digital or print.
Outcome 2.3 Decision support tools for visualization and interactive use of research results produced.				

Output Indicator 2.3.1: Number of protected areas agency staff trained in and using decision support tool.	2-3 trainings within each region with outreach to multiple countries. Trainings may be held in webinar format to increase reach/distribution of resources.	Support tool with three primary components completed in May 2019. Subsequent trainings through in person workshops or webinars reached a minimum of 179 people through 13 engagement events. Additionally, more than 50 people participated in a live webinar – and the recording has been viewed over 300 times since it was posted on June 30, 2019. Many meetings generated interest for yet further technical training/follow up and country specific use of SPARC methods**.**	CA	Trainings and outreach of decision support tools were well received and in nearly all cases led to opportunities for follow up and additional engagement either through further technical training or in deployment of SPARC methods for national/multinational applications. Strongest such opportunities follow up activities have arisen from Liberia, Angola, Namibia, Thailand, Ecuador, Peru, Colombia, Chile.
Outcome 3.1 Participatory M&E framework and an informative and proactive feedback mechanism integrated at all levels of project management.				
Output Indicator 3.1.1: Number of adaptive project management decisions in response to monitoring system information.	Leading regional scientists work together, using an active monitoring framework to help move knowledge ahead synthetically.	Cohesive project workplan and monitoring system was developed through the first two quarters of FY17 and revised/formalized by project lead scientists at a workshop in Nov. 2016. Frequent communication in the form of monthly all-PI web conferences and participation of multiple PIs in project-related meetings has created a free-flowing environment of information sharing and therefore nimble integration of newly available datasets/methods/outreach opportunities. It is difficult to attach a numerical metric to this indicator.	CA	Communications remain frequent – especially in coordination of the planned in-country outreach events that will occur in the upcoming months as well as the production of the policy briefs.
Outcome 3.2 Adaptive implementation of regional assessments.				

Output Indicator 3.2.1: Number of instances of information or knowledge discovery in regional assessments identified in knowledge mapping.	Scientists in the three major tropical regions systematically learn from one another. Regional assessments adapt based on experience and transmit those lessons to other regions.	Regional assessments are coordinated by the central project management team with frequent knowledge sharing activities including workshops and conference calls.	CA	Much was learned from the presentation of results to diverse audiences across the three regional assessment meetings – some of it region specific, but much was applicable across all three regions. Extensive debriefing among and recalibrating of communication strategies resulted from each workshop. Additionally, the project PIs did convene for a final methods/results review in mid-January in preparation for the production of the research to policy briefs and subsequent outreach/trainings.