Conservation Strategy Fund

BUILD Year 4 Annual Report

October 1, 2014 – September 30, 2015

I: Summary of Activity Status and Progress

a. Introduction:

Between October 1, 2014 and September 30, 2015, Conservation Strategy Fund (CSF) and partners implemented the fourth and final year of the USAID program: Biodiversity Understanding in Infrastructure and Landscape Development (BUILD). The program aims to harmonize the development of infrastructure with the maintenance of biodiversity in the Andes, Amazon, Albertine Rift and Himalayas regions. CSF has provided technical support to governments and stakeholders in the Andes-Amazon, Albertine Rift and Himalayas regions to incorporate biodiversity impacts into infrastructure planning, approval and implementation. Our activities have included training conservation professionals, media, and infrastructure developers and regulators how to analyze infrastructure projects and incorporate environmental and social costs and benefits; providing analysis tools so that these and other professionals can analyze infrastructure projects; making information about infrastructure development more readily available to the public; identifying infrastructure policy best practices and innovations; helping conservationists and affected people articulate their concerns in economic terms; and helping infrastructure developers and governments mitigate and compensate environmental and social costs and benefits in reality through the facilitation of appropriate financial mechanisms.

During Year 4 of BUILD, our aim was to build upon the successes of the first three years of the program to promote environmental-economic analysis of biodiversity and infrastructure in the focus regions and worldwide by strategically communicating all of our BUILD work products. We published project results digitally and in print in multiple languages and developed multi-media communications products including infographics, powerpoint presentations, animated videos, and documentary videos. In Year 4, we communicated our BUILD work on a bigger scale through participating in regional, national and international events to share our global review of infrastructure policy best practices and innovations, recommendations for financial mechanisms for mitigation and compensation in infrastructure projects, and results from BUILD other CSF analyses that have improved infrastructure development decision-making. One landmark event during Year 4 was the signing of the ministerial resolution on environmental compensation by Peru's Environmental Minister in December of 2014. We are now conducting test cases of this innovative compensation policy for oil, road, waterway and hydro projects in Loreto and Madre de Dios, results of which will be used by Peru's Ministry of Environment (MINAM) to draft an official compensation manual. We also consolidated our analysis training curriculum related to infrastructure development, and developed an In-house training workshop for USAID staff focused on economic tools for integrating biodiversity into infrastructure development. On the analysis front, we completed

analyses of roads, oil pipelines and hydroelectric dams in Peru, Uganda and Brazil, supported and implemented important local, regional and national results dissemination in Uganda and Peru, and conducted an ecosystem services valuation study in the Tapajós River Basin in Brazil.

b. Highlights:

In Year 4 we accomplished the following:

- Created an overarching communication strategy for BUILD products, refined and polished our message about infrastructure and biodiversity, and created dissemination materials across diverse media and in multiple languages. Materials clearly explain, through the use of BUILD case studies and publications, the importance of incorporating biodiversity and ecosystem services into infrastructure planning and development as well as how it can be done. Materials include animated video lessons, documentary video, publications, infographics, web content, press releases, and improved powerpoint presentations for infrastructure-biodiversity results workshops. We also trained key BUILD staff members in communication and public presentation skills to help them promote environmental-economic analysis for infrastructure planning and development to improve biodiversity outcomes.

- Participated in several high-profile international events related to infrastructure and biodiversity:
    - CSF collaborated with The Nature Conservancy (TNC) to convene a side event at the UNFCC COP20 in Lima in December 2014, during which CSF staff and collaborators presented results of the Pucallpa-Cruzeiro do Sul road and railway analysis, and shared recommendations from our reviews of infrastructure policy best practices and financial mechanisms for mitigation and compensation.
    - CSF participated in the University of Florida's "Envisioning a Sustainable Tropics" Conference in March 2014, giving a presentation on "Making the economic case for avoidance of biodiversity loss" that showcased road and dam infrastructure examples, including BUILD analyses.
    - In April 2015, CSF participated in the 2015 International Association for Impact Analysis (IAIA) Conference in Florence, Italy. CSF and WCS-Uganda staff presented results of the WCS oil pipeline analysis, Bwindi road analysis, and Pucallpa-Cruzeiro do Sul projects, as well as presented our recommendations for financial mechanisms for mitigation and compensation.

- Completed the cost-benefit analysis of the Pucallpa-Cruzeiro do Sul road and railway options between Peru and Brazil, including value estimates of social and environmental externalities, showing the financial and economic infeasibility of both options. CSF disseminated these results in local presentations in Pucallpa and Rio Branco to local and regional government officials, indigenous group representatives, academics and NGO representatives; at a national forum in Lima held as part of the Initiative for Conservation of the Andean Amazon Phase II (ICAA II) Indigenous Landscapes Consortium; and to international audiences during CSF's side event at the UNCC COP20 in Lima and the IAIA15 Impact Assessment Conference in Italy. The final report was published in March 2015, and was also translated into a shorter English discussion paper, both of which have been disseminated through the CSF network and website as well as the ICAA II consortium network. We also produced a video about the project, which was shared during the July 2014 forum in Lima, and through the CSF website, CSF newsletter, and the ICAA bulletin.

- Completed the Bwindi road analysis with the International Gorilla Conservation Programme (IGCP) in Uganda, showing the higher benefits and lower risks of road alternatives outside the park. Results communication has occurred at local, national and international levels. A policy brief of the study was published at the end of Year 3, and in Year 4 we published the full report on our website, and are in the process of printing the final report in hard copy for dissemination in Uganda, with additional dissemination support from NEMA. In March 2015 an important draft position paper was presented by a representative of the Uganda Poverty and Conservation Learning Group (U-PCLG) at the Bwindi Mgahinga Conservation Area stakeholders meeting. The results of the study were also presented to an international audience in April 2015 at the IAIA15 Impact Assessment Conference in Florence, Italy.

- Completed the analysis of oil pipeline routing around Murchison Falls, Uganda in collaboration with WCS Uganda. The final discussion paper was published on our website and disseminated via CSF's network, and results of the study have been shared at a national level during methodology and dissemination workshops with NEMA, UWA and the Ministry of Water and Environment, and presented to an international audience by CSF and our WCS Uganda collaborators in April 2015 during the IAIA15 Impact Assessment Conference in Florence, Italy.

- Continued technical support to the NEMA/UWA oil pipeline analysis, and the draft report has been completed and is under external review. NEMA plans to use the results to inform policy and decision-making on the sustainable development of oil pipeline infrastructure.

- Conducted applied economic valuation study of ecosystem services impacted by the proposed São Luiz do Tapajós hydroelectric dam in the Tapajós Basin in Brazil. CSF-Brazil has participated in various communications activities regarding the study, including meeting with government and community stakeholders in the Tapajós region, participating in a "Dams in Tapajós River" workshop at the Pontifícia Universidade Católica (PUC) University in Rio de Janeiro, giving presentations about study progress to the Amazon Infrastructure Working Group in Brazil, and participating in a workshop in Brasilia "Analysis of the São Luís do Tapajós Dam's Environmental Impact Assessment".

- Delivered an In-house training for USAID staff: *Economic Tools for Integrating Biodiversity and Ecosystem Services into Development Investments*. Course curriculum included economic analysis of energy and transportation, how to value and incorporate environmental impacts, innovative tools such as CSF's online HydroCalculator and Roads Filter, and strategies for effective communication of results to diverse audiences (communities, banks, governments, NGOs). Participants in the training ranked the overall value of the course as 4.5 out of 5, and 100% said they would recommend the training to others.

- Launched CSF's Cost-benefit analysis animated video lessons, with over 20,000 views over the past year.

- Successful passing of the Peruvian compensation policy, a major focus of our policy support during the first three years of BUILD. In December of 2014, Peru's Ministry of the Environment made a major policy announcement in a landmark ministerial resolution on compensation and mitigation that establishes guidelines for developers to offset the impacts of their projects.

- Launched compensation policy test cases in Peru on four specific infrastructure projects: the Hidrovía Amazonicas and Mazán hydroelectric projects in Loreto, and the Interoceanica Sur road and Hunt oil concession in Madre de Dios. One goal of the test cases will be to provide, where possible, an analysis of cumulative impacts of infrastructure development considering indirect impacts such as illegal mining and deforestation. The result of this work will be a compensation plan for selected projects, and, even more importantly, models for determining pragmatic ways to quantify environmental equivalency and financial mechanisms that can be applied to many other projects in the future.

- Publication of peer-reviewed paper about the Peruvian compensation policy in May 2015 in the Journal of Sustainable Forestry: *Ecological Compensation to Address Environmental Externalities: Lessons from South American Case Studies*. The paper emphasizes that the success of Peru's system will depend on it being practical enough

to implement at scale while at the same time being rigorous enough to deliver environmental benefits, and the authors offer recommendations to balance both needs.

- MINAM launched official national valuation guidelines, which developed out of our nine-month In-house capacity building program in environmental valuation in Year 3. The training improved participants' ability to understand and interpret valuation studies, identify appropriate methodologies to value environmental goods and services in different situations, contribute to the design of Environmental Impact Assessment (EIA) terms of reference, and participate in the formulation and implementation of Peruvian law related to valuation.

c. & d. Challenges and Adaptive Management in Action

The politically sensitive nature of oil development in Uganda has continued to be a challenge for completion and dissemination of the pipeline analysis projects. Providing technical support to NEMA for the oil pipeline analysis project also continued to be challenging due to the limited capacity within the institution to finalize the analysis, combined with institutional resistance to foreign external technical support. Another challenge in implementing this activity was limited access to information and valid data on oil and gas developments in Uganda. The provision of local technical support through WCS Uganda, backstopped by international experts, was the most effective strategy towards sharing and training NEMA-UWA experts on these innovative GIS mapping tools for pipeline planning. CSF provided support to share results of the WCS project to an international audience, and has worked with both WCS and NEMA to identify creative solutions to complete the NEMA-UWA analysis, which is now under external review. Any future analysis projects in the Albertine Rift would benefit from a more permanent presence by CSF staff in the region. Despite these challenges and setbacks, the analyses have yielded important results in support of biodiversity conservation, developed innovative analysis methods, provided alternative routing options for roads and pipelines, and increased technical capacity of all the organizations involved.

The lack of official information about the Tapajós dam complex made it difficult to gather all of the necessary data for the analysis. To overcome this challenge, we focused on the São Luiz do Tapajós dam that had more available information, worked with other organizations that were also evaluating the same dam from a biological or social point of view, and also drew upon parallels from the Belo Monte experience and other similar regions to conduct benefits transfer estimates of ecosystem service values.

The compensation policy test cases have required complex institutional coordination with MINAM, WCS, SPDA and various stakeholders to agree on methodology and workplans,

which has been an important and successful process but has lengthened the timeline of the implementation of the cases. We have also found that the existing environmental impact assessments (EIAs) lack the information needed to identify the projects' residual impacts and the application of the compensation hierarchy. This limitation was overcome through our own data analysis to estimate residual impacts.

Producing high-quality presentations and communications products related to our BUILD work requires a very specific set of skills. After initial disappointment with some of the results from external communications and graphic design consultants, we have produced more things in-house via our Communications Specialist, incorporating advice and recommendations from trusted external experts.

e. Table of Activity Status:

Activity Number	Activity Title	Status
Objective 1: Government and civil society understand, discuss and use information on the real economic and ecological tradeoffs of infrastructure projects to improve ecological and economic outcomes.		
1-1	Train key people inside and outside government to perform integrated environmental-economic project analysis.	Completed
1-2	Improve groups' access to information required to analyze and compare infrastructure options.	Completed
1-3	Use training and case analysis to change outcomes of specific infrastructure project to protect biodiversity	Completed
Objective 2: There are clear policies governing project selection, mitigation and compensation.		
2-1	Ensure that policy-makers have access to good models.	Completed
2-2	Provide technical assistance to decision-makers and advocates formulating policies.	Completed
Objective 3: There are financial mechanisms that maximize compliance with mitigation and compensation agreements and regulations.		
3-1	Promote adoption of financial mechanisms.	Completed
3-2	Ensure local people affected by infrastructure projects and compensatory measures are involved in monitoring mitigation and compensation.	Completed Andes-Amazon; Mixed performance Uganda

II. Detailed Description of Progress

a. Key short and long-term program objectives.

The overall goal of Conservation Strategy Fund's (CSF) BUILD program is development of infrastructure policies and investment decisions that are ecologically sound, economically efficient and socially equitable to different populations and genders. CSF gathered, tested and disseminated best practices at a global level, while investing in capacity and policy change in specific regions: the Amazon and Andes and the Albertine Rift. Limited activities were also directed to the Himalayan regions.

CSF's BUILD program has created human capacity for infrastructure analysis, gathered and shared information globally on what countries are doing *right*, and worked intensively with several governments in the Albertine Rift and Andes-Amazon regions on policy innovations to reduce biodiversity loss due to infrastructure development. By improving selection, design and mitigation of key infrastructure projects, BUILD has impacted biodiversity conservation in the focus regions in the short term. In the long-term, BUILD will have biodiversity impacts by building analytical talent, technical knowledge and better policies, which together will determine the scale of biodiversity and social impacts of dozens of infrastructure decisions over the coming decades of economic growth.

CSF recognizes that there are economic, institutional, cultural and legal barriers to the adoption of biodiversity-friendly infrastructure policies. Throughout our BUILD program, we worked to identify the leverage points that can bring about systemic change in on-the-ground outcomes, and to engage with the actors in control of those levers.

In this way, CSF's BUILD program has contributed to USAID's overall BUILD goal to *"Improve policy, regulatory and planning approaches to avoid or reduce negative impacts of infrastructure development on biodiversity through innovation and learning, focused on engagement with government, local stakeholders and civil society."*

We have three major objectives that we believe are necessary conditions for achieving the overall goal of our BUILD program:

1. Government and civil society understand and discuss the real economic and ecological tradeoffs of infrastructure projects.

   Activities under this Objective include formal training in environmental economics for governments, NGOs and other stakeholders, mentored environmental-economic analyses, in-house technical capacity building, media

training, and improved access to information required to analyze and compare infrastructure options.

2. There are clear policies and procedures governing project selection, mitigation and compensation.

   Activities under this Objective include a review of best practices in infrastructure policy, recommendations for policy improvement, dissemination of existing policy innovations, and policy design support for government, NGOs and affected peoples.

3. There are financial mechanisms to maximize compliance with environmental requirements.

   Activities under this Objective include reviewing options for financial mechanisms and channels, promoting the adoption of those mechanisms by policymakers, and ensuring involvement of local people in monitoring mitigation and compensation.

Year 1 of CSF's BUILD program focused on efforts to plan, coordinate and launch the program, deliver training courses in the Amazon-Andes and Albertine Rift regions, launch in-house technical support programs, gather information on proposed infrastructure projects, invite proposals for follow-up analysis in the Albertine Rift, and review infrastructure policy best-practices and financial compensation mechanisms at regional and global levels.

Year 2 of CSF's BUILD program focused on efforts to coordinate and implement with partners follow-up analyses in the Albertine Rift, implement the in-house training program in Peru, deliver media and economic tools training courses in the Amazon-Andes and Albertine Rift regions, provide technical support to the Peruvian government to design and implement biodiversity compensation policy, participate in infrastructure policy forums and networks in Brazil, promote sharing of infrastructure project information in Uganda, provide technical support to NEMA to identify potential policy improvements, document different financial compensation mechanisms, and assess with partners innovative policy measures that could improve biodiversity safeguarding in infrastructure planning, approval and implementation around the world.

Year 3 of CSF's BUILD program focused on launching our infrastructure website and publications on infrastructure policy best practices and financial incentive mechanisms, completing follow-up analysis projects and outreach in the Albertine Rift, extending and disseminating infrastructure analysis results in the Andes-Amazon, completing the In-house valuation training program in Peru, delivering a media training in Brasilia on

infrastructure projects in the Brazilian Amazon, delivering infrastructure analysis and policy forums in the Himalayas and Albertine Rift, developing a Himalayan regional course in Bhutan focused on infrastructure analysis tools, and continuing to provide technical support to the Peruvian and Ugandan governments on compensation policies and valuation guidelines.

Year 4 of CSF's BUILD program focused on strategically communicating the successes of the first three years of BUILD to achieve greater impact in the focus regions and worldwide. This included creating a multi-media communications strategy; sharing analysis case studies that have improved infrastructure development decision-making in national and international events; completing environmental-economic analyses in Peru, Uganda and Brazil; developing additional dissemination and communication strategies for analysis results in the focus regions; and sharing with international audiences our global infrastructure policy best practices study and review of financial mechanisms for environmental compliance in infrastructure projects. We also developed an In-house training course for USAID staff, completed a valuation study of ecosystem services in Brazil, and continued our policy guidance in the Andes-Amazon and Albertine Rift including continued engagement with NEMA in Uganda and test cases of the innovative Peruvian compensation policy.

b. Summary of Progress for Each Site

Overarching

During Year 4, we scaled up the impact of BUILD by launching a communications strategy aimed at: 1) highlighting the importance of using economic analysis that incorporates biodiversity and ecosystem services as a cornerstone of smart infrastructure planning, 2) disseminating available analysis and capacity-building tools that can be used to improve infrastructure planning and development, including the innovative GIS models that have been developed in the BUILD Ugandan road and oil pipeline studies, and 3) encouraging the appropriate decision-makers to promote, in the infrastructure planning and development process, the use of comprehensive environmental economic analyses, financial incentives that promote compliance with environmental standards, and biodiversity offsetting techniques.

As part of this strategy, we created overarching communication products, refined and polished our message about infrastructure and biodiversity, and created dissemination materials across diverse media and in multiple languages. Materials clearly explain, through the use of BUILD case studies and publications, the importance of incorporating biodiversity and ecosystem services into infrastructure planning and development as well as how it can be done. Materials include animated video lessons, documentary video,

publications, infographics, web content, press releases, and improved powerpoint presentations for infrastructure-biodiversity results workshops. We also trained key BUILD staff members in communication and public presentation skills to help them promote environmental-economic analysis for infrastructure planning and development to improve biodiversity outcomes.

Our strategy also involved participating in several high-profile international events related to infrastructure and biodiversity:

- CSF collaborated with TNC to convene a side event at the UNFCC COP20 in Lima in December 2014, during which CSF staff and collaborators presented results of the Pucallpa-Cruzeiro do Sul analysis, and shared recommendations from our reviews of infrastructure policy best practices and financial mechanisms for mitigation and compensation.
- CSF participated in the University of Florida's "Envisioning a Sustainable Tropics" Conference in March 2014, giving a presentation on "Making the economic case for avoidance of biodiversity loss" that showcased road and dam infrastructure examples, including BUILD analyses.
- In April 2015, CSF participated in the 2015 International Association for Impact Analysis (IAIA) Conference in Florence, Italy. WCS-Uganda and CSF staff presented results of the Pucallpa-Cruzeiro do Sul road analysis, WCS oil pipeline analysis and Bwindi road analysis projects, as well as our recommendations for financial mechanisms for mitigation and compensation.

In Year 4 we also delivered an In-house capacity building workshop for USAID staff to increase the scale and reach of the BUILD program. The three-day training, *Economic Tools for Integrating Biodiversity and Ecosystem Services into Development Investments* was delivered from June 16-18, 2015 as part of USAID University with operational support from the Training Resources Group (TRG). As part of this In-house training process, we consolidated our experiences and curriculum for teaching integrated environmental-economic analysis that we developed and tested over the past three years of BUILD courses in Peru, Brazil, Uganda, DRC and Himalayas. Participants in the USAID training ranked the overall value of the course as 4.5 out of 5, and 100% said they would recommend the training to others.

Andes-Amazon

Focus countries in the Andes-Amazon region in Year 4 were Peru and Brazil.

In Peru, we completed the cost-benefit analysis of the Pucallpa-Cruzeiro do Sul road and railway options between Peru and Brazil, including value estimates of social and

environmental externalities, showing the financial and economic infeasibility of both options. CSF disseminated these results in presentations in Pucallpa and Rio Branco to local and regional government officials, indigenous group representatives, academics and NGO representatives; at a national forum in Lima held as part of the Initiative for Conservation of the Andean Amazon Phase II (ICAA II) Indigenous Landscapes Consortium; and to international audiences during CSF's side event at the UNCC COP20 in Lima and the IAIA15 Impact Assessment Conference in Italy. The final report was published in March 2015, and was also translated into a shorter English discussion paper, both of which have been disseminated through the CSF network and website as well as the ICAA II consortium network. We also produced a video about the project, which was shared during the July 2014 forum in Lima, and through the CSF website, CSF newsletter, blog articles, and the ICAA bulletin.

In Years 1, 2 and 3, CSF was intensively engaged with the Ministry of Environment of Peru and with a working group of civil society organizations on the policy for ecological compensation for infrastructure impacts. In December of 2014, Peru's Minister of the Environment made a major policy announcement in a landmark ministerial resolution on compensation and mitigation that establishes guidelines for developers to offset the impacts of their projects. In May 2015, the Journal of Sustainable Forestry published our article about the Peruvian compensation policy: *Ecological Compensation to Address Environmental Externalities: Lessons from South American Case Studies*. The paper emphasizes that the success of Peru's system will depend on it being practical enough to implement at scale while at the same time being rigorous enough to deliver environmental benefits, and the authors offer recommendations to balance both needs.

In Year 4, we began implementing test cases of the compensation policy in Peru, focusing on four specific infrastructure projects: the Hidrovía Amazonicas and Mazán hydroelectric projects in Loreto, and the Interoceanica Sur road and Hunt oil concession in Madre de Dios. One goal of the test cases will be to provide, where possible, an analysis of cumulative impacts of infrastructure development considering indirect impacts such as illegal mining and deforestation. The result of this work will be a compensation plan for selected projects, and, even more importantly, models for determining pragmatic ways to quantify environmental equivalency and financial mechanisms that can be applied to many other projects in the future.

In Year 4, MINAM also launched national valuation guidelines, which developed out of our nine-month In-house capacity building program in environmental valuation in Year 3. The training improved participants' ability to understand and interpret valuation studies, identify appropriate methodologies to value environmental goods and services in different situations, contribute to the design of Environmental Impact Assessment (EIA)

terms of reference, and participate in the formulation and implementation of Peruvian law related to valuation.

In Brazil, we conducted an applied economic valuation study of ecosystem services impacted by the proposed São Luiz do Tapajós hydroelectric dam in the Tapajós Basin, including forest timber and non-timber provisioning services, freshwater quality, recreation, and carbon sequestration. CSF-Brazil has participated in various communications activities throughout the study. We presented study progress during several meetings of the Amazon Infrastructure Working Group in Brazil (CSF, Imazon, Insituto Centro de Vida, Idesam, World Wildlife Fund, Instituto Socioambiental, Avina Foundation, TNC, OEco and others). In June 2015, CSF participated in a workshop about "Dams on the Tapajós River", held at the Pontifícia Universidade Católica (PUC) in Rio de Janeiro, Brazil. It was an opportunity to debate with students, professors and other NGOs on the subject of large infrastructure development in Amazon and its implications for social and environmental issues. At the end of September, CSF presented our Tapajós study at a workshop in Brasilia: "Analysis of the São Luís do Tapajós Dam's Environmental Impact Assessment". The workshop was organized by Greenpeace as part of their effort to organize and conduct a scientific analysis of the EIA document. Indigenous Munduruku leaders, public Ministries, scientists and NGOs were invited to the event.

Albertine Rift

The focus country in the Albertine Rift in Year 4 was Uganda.

In Year 4, CSF continued to provide technical support to three applied economics research projects in Uganda that analyzed the environmental-economic impacts of specific infrastructure threats to biodiversity. We have shared updates and results of these infrastructure analysis projects in newsletter articles, blog articles, policy briefs, discussion papers and full reports. We also shared results of the projects in international conferences and as featured case studies during training courses for USAID staff and for other international audiences.

In Year 4, we completed the Bwindi road analysis with the International Gorilla Conservation Programme (IGCP) in Uganda. The objective of the project was to evaluate the economic and environmental impacts of upgrading a road that crosses the Bwindi Impenetrable Forest National Park, and compare them with those of building an alternative road that does not cross the park but serves communities that lack road access. Results show that the road alternatives outside the park have higher benefits for local communities and present lower risks to gorilla populations and tourism revenues. Communication has occurred at local, national and international levels. A policy brief of

the study was published at the end of Year 3, and in Year 4 we published the full report on our website, and are in the process of printing the final report in hard copy for dissemination in Uganda, with additional dissemination support from NEMA. In March 2015 an important draft position paper was presented by a representative of the Uganda Poverty and Conservation Learning Group (U-PCLG) at the Bwindi Mgahinga Conservation Area stakeholders meeting. The results of the study were also presented to an international audience in April 2015 at the IAIA15 Impact Assessment Conference in Florence, Italy.

In Year 4, we also completed the analysis of oil pipeline routing around Murchison Falls in collaboration with Wildlife Conservation Society (WCS) Uganda. The objective of the project was to use GIS least cost modeling techniques to determine the most economically viable (most financially and environmentally acceptable) route for the proposed oil pipeline in Murchison Falls National Park. The final discussion paper was published on our website and disseminated via CSF's network, and results of the study have been shared at a national level during methodology and dissemination workshops with NEMA, UWA and the Ministry of Water and Environment, and were presented to an international audience by CSF and our WCS Uganda collaborators in April 2015 during the IAIA15 Impact Assessment Conference in Florence, Italy.

We also continued to provide substantial technical support to the NEMA/UWA oil pipeline analysis, backstopped by support from WCS staff. The project evaluated the planned oil pipeline development in Murchison Falls National Park, and used similar methodology as the WCS analysis to determine the most financially and environmentally acceptable pipeline route, as well as used benefits transfer valuation methods to identify and quantify some of the impacts on biodiversity and other environmental services. The draft report has been completed and is currently under external review. NEMA plans to use the results to inform policy and decision-making on the sustainable development of oil pipeline infrastructure.

Himalayas

No additional activities were conducted in the Himalayas in Year 4.

c. Activity Description

Objective 1: Government and civil society understand, discuss and use information on the real economic and ecological tradeoffs of infrastructure projects to improve ecological and economic outcomes.

Activity A1-1: Train key people inside and outside government to perform integrated environmental-economic project analysis.

Major Achievements and Progress in Year 4:

- Expected Year 4 Outcome: Additional technical support and further dissemination of the results of the economic analysis projects carried out in the Albertine Rift region.

  Result: Three field research projects were conducted with graduates from the 2012 BUILD Uganda course to analyze the environmental-economic impacts of specific infrastructure threats to biodiversity. Two of them are complete and the third is pending external review of the final report draft. The National Environmental Management Authority (NEMA) / Ugandan Wildlife Authority (UWA) analysis project aimed to identify and quantify the environmental impacts on biodiversity of the planned oil pipeline development in Murchison Falls National Park. The objective of the Wildlife Conservation Society (WCS) Uganda analysis project was to determine the most economically viable (defined as the most financially and environmentally acceptable) route for the proposed oil pipeline in Murchison Falls National Park. The objective of the International Gorilla Conservation Programme (IGCP) analysis project was to evaluate the economic and environmental impacts of upgrading a road that crosses the Bwindi Impenetrable Forest National Park, and compare them with those of building an alternative road that does not cross the park but serves communities that lack road access.

- Expected Year 4 Outcome: Implementation of an In-house training program for USAID staff consisting of an environmental economics workshop focusing on economic concepts and tools related to infrastructure development and biodiversity.

  Result: From June 15-19, 2015 we delivered a training course for USAID entitled *Economic Tools for Integrating Biodiversity and Ecosystem Services into Development Investments* as part of USAID University with operational support from the Training Resources Group (TRG). The course included instructors from CSF, Harvard University, and Cambridge Resources International (CRI), as well as speakers from The Nature Conservancy (TNC) and Resources for the Future (RFF). Participants rated the overall value of the course as 4.5 out of 5, and 100% said they would recommend the course to others.

- Expected Year 4 Outcome: Consolidation of BUILD infrastructure training and curriculum for integrated environmental-economic cost-benefit analysis of large-scale infrastructure development and impacts on biodiversity.

Result: In Year 4 we consolidated our CBA curriculum, including case studies of BUILD infrastructure projects and other CSF analyses, and incorporated this into training courses and presentations in national and international events.

- Additional Year 4 Result: CSF has continued collaborating with Cambridge Resource International (CRI), the major CBA trainer for USAID, and was invited by CRI to send two staff members to their six-week cost-benefit analysis training program: *Investment Appraisal and Risk Analysis* at Queen's University in Canada.

Regional Detail

Overarching

From June 15-19, 2015 we delivered a training course for USAID staff entitled *Economic Tools for Integrating Biodiversity and Ecosystem Services into Development Investment.* The training was delivered as part of USAID University with operational support from the Training Resources Group (TRG). As part of this In-house training process, we consolidated our experiences and curriculum for teaching integrated environmental-economic analysis that have been developed and tested over the past three years of BUILD courses in Peru, Brazil, Uganda, DRC and Himalayas. Instructors from CSF, Harvard University, and Cambridge Resources International (CRI) laid a foundation in microeconomics, natural resource economics, and ecosystem services, and explained methods for conducting valuation studies. Speakers from The Nature Conservancy (TNC), Resources for the Future (RFF) and CSF presented case studies of valuation projects and integrated environmental-economic analyses in Latin America and Africa, including showcasing examples and experiences from CSF's BUILD projects. The course concluded with cost-benefit analysis theory presented by CRI, which also conducts CBA training for USAID economists, and a hands-on exercise in cost-benefit analysis.

The participants were extremely pleased with the course, and came away with new perspectives on their work around the world. In the end-of-course evaluations, 100% of participants said they would recommend the course to others, and participants rated the overall value of the course as 4.5 out of 5, and the course modules as an average of 4.3 out of 5. Ranked most highly were the CBA case studies presented by CSF, which were ranked 4.9 out of 5 in the evaluations. Some selected quotes from the training:

"I think many people who work in conservation (myself included) badly need a better understanding of economics drivers, and how they can be used to influence decisions."

"It's an eye opener to issues we never thought about in our investments."

"I will be better able to evaluate the completeness and rigor of proposals to USAID and multilateral development banks. I will be better able to justify attention to externalities and the need for well-designed surveys and consultations."

The Participant List, Training Schedule, and Evaluation Data are included as Appendix 1.

In Year 4 we continued our collaboration with Cambridge Resources International (CRI), one of the primary CBA trainers for USAID. CRI Senior Associate Economist Bahman Kashi taught the CBA theory module during the USAID in-house training in June 2015, and has also taught in other CSF courses. Bahman shared with us that collaborating with CSF has made him more aware of environmental issues, and has improved how he incorporates environmental externalities in CBA at CRI. Two CSF BUILD staff members were invited to participate in the CRI-affiliated six-week CBA training Program on Investment Appraisal and Risk Analysis at Queen's University in Canada in July 2015, further fostering exchange and interaction between CSF and CRI.

In Year 4 we consolidated our BUILD infrastructure training and curriculum for integrated environmental-economic cost-benefit analysis of large-scale infrastructure development and impacts on biodiversity. This has included developing case studies of various infrastructure projects, and delivering training and presentations in courses and conferences. Attached as Appendix 2, 3 and 4 are CBA lecture presentations and case studies from the June 2015 USAID course, as well as our August 2015 International course held at Stanford University.

Andes-Amazon:

In Year 4, CSF did not train additional professionals in the Andes-Amazon to conduct integrated environmental-economic analyses. Rather, CSF staff completed our analysis of the Pucallpa-Cruzeiro do Sul road between Peru and Brazil, and conducted an ecosystem services valuation study in the Tapajós Basin in Brazil in collaboration with other professionals in the region. These activities are described in more detail under Activity A1-2 and A1-3.

Albertine Rift:

In Year 4, we continued to provide technical support to three field research projects in Uganda that analyzed the environmental-economic impacts of specific infrastructure threats to biodiversity. Two of the analyses have been completed, and the third is pending external review. Communications activities for these projects are described under Activity A1-3.

i. **Cost-Benefit analysis of the proposed upgrading of the Ikumba-Ruhija-Buhoma road, through Bwindi Impenetrable National Park, Southwestern Uganda**. The objective of the International Gorilla Conservation Programme (IGCP) analysis project is to evaluate the economic and environmental impacts of upgrading a road that crosses the Bwindi Impenetrable Forest National Park (BINP), and compare them with those of building an alternative road that does not cross the park but serves communities that lack road access. The analysis concluded that road alternatives outside BINP would have better overall economic performance than upgrading the route through the park. This conclusion rests on lowered overall risks to the gorilla population, lowered risks to specific groups upon which lucrative tourism activity depends, and on the greater number of people and communities who would benefit from routes outside the park. These benefits outweigh the higher construction costs of the alternative routes. Furthermore, both the national and specific objectives under which the Ikumba – Ruhija road improvement was proposed are best met by alternatives that divert vehicles outside of the park. A policy brief summarizing these conclusions and recommendations was completed in the fall of 2014, and is included as Appendix 5a. The final report: *Pave the Impenetrable? An economic analysis of potential Ikumba-Ruhija road alternatives in and around Uganda's Bwindi Impenetrable National Park* was published in May 2015, and is included as Appendix 5b.

ii. **Cost Effectiveness Analysis of Oil Pipeline Construction in the Albertine Rift.** The objective of the Wildlife Conservation Society (WCS) Uganda analysis project was to use GIS analysis to determine the most economically viable (most financially and environmentally acceptable) route for the proposed oil pipeline to transport oil from the central processing facilities that will be located just below Murchison Falls National Park to the refinery located in Kabale parish in Hoima district.

The project developed an innovative GIS methodology for identifying routes that would avoid environmental impacts – the first step in the mitigation hierarchy. Findings suggest that there is indeed significant scope for reducing environmental impacts of linear infrastructure, including pipelines, by systematically including information on conservation values when analyzing potential routes. The environmental pipeline route has higher financial costs of construction, but will likely incur lower overall costs when implementing a mitigation hierarchy. In order to select the economically optimal pipeline route, the next step will be to include important socio-economic variables and fine-tune financial and environmental costs of pipeline construction across the landscape. After this, a

measurement of restoration could be applied and offsets considered for any remaining residual impacts, to achieve the goal of no net loss/net positive gain.

The final report: *A Cost Effectiveness Approach to Routing of Linear Infrastructure in Environmentally Sensitive Areas: A Case of a Crude Oil Pipeline In the Albertine Rift in Uganda* was published in early April 2015, and is included as Appendix 6.

iii. **Estimating the environmental and biodiversity costs accruing from planned oil pipeline development in the Albertine Rift, the Case of Murchison Falls National Park.** The National Environmental Management Authority (NEMA) / Uganda Wildlife Authority (UWA) analysis project aimed to identify and quantify the impacts on biodiversity of the planned oil pipeline development in Murchison Falls National Park.

Methodology and preliminary results were presented at the Year 3 national policy forum in Kampala with emphasis on the innovative methodology, approach and process. Policy forum participants endorsed the methodology and requested further communications, so that methodologies and results can be used to inform upcoming plans and decisions.

In Year 4, we worked with NEMA and UWA to complete the study, which included technical support from WCS staff, a two-day analysis methods workshop at NEMA, final document and model revision, and plans for communication of results. The final report is now undergoing external review. NEMA plans to use the results to inform policy and decision-making about the sustainable development of oil pipeline infrastructure in protected areas and in the Albertine Rift in general. One of the most valuable outcomes of the study has been the building of analytical capacity for the NEMA and UWA staff involved in the process, and building awareness of these economic analysis tools at an institutional and national level.

All of the Ugandan analysis projects received both technical and financial support from CSF for the following: 1) defining their objectives, methodology and work plan; 2) conducting and writing literature reviews; 3) selecting and designing the methodology; 4) designing surveys, conducting fieldwork and collecting relevant data; 5) running methodologies appropriately; 5) analyzing results; 6) incorporating feedback; and 7) drafting final reports, executive summaries and public presentations. CSF provided in-person support via workshops, field visits and analysis work sessions with each research team, and also participated in results communication events at national and international levels.

Key management issues and challenges in Year 4:

Providing technical support to NEMA for the oil pipeline analysis project continued to be challenging due to the limited capacity within the institution to finalize the analysis, combined with institutional resistance to foreign external technical support. Another challenge in implementing this activity was limited access to information and valid data on oil and gas developments in Uganda. The provision of local technical support through WCS Uganda, backstopped by international experts, continued to be the most effective strategy towards sharing and training NEMA and UWA staff on these innovative GIS mapping tools for pipeline planning. Any future analysis projects in the Albertine Rift would benefit from a more permanent presence by CSF staff in the region.

Sustainability of Life of Project Outcomes for Activity A1-1

After the conclusion of the BUILD Program, we will continue to develop and improve our infrastructure curriculum for integrated environmental-economic analysis. This curriculum will be incorporated into CSF courses, both in-person and online, and shared through our network of Training Partners. We have developed a successful In-house training model through our valuation training with Ministry of Environment (MINAM) staff in Peru that combines both in-person workshops and distance learning curriculum that we expect to improve and replicate in the future. We will also explore any opportunities to integrate this training into future USAID internal capacity building efforts. The follow-up analysis projects in the Albertine Rift will conclude at the close of the BUILD program, although we will continue collaborating with our partners to help disseminate any additional results or communications products developed by the research teams.

Activity A1-2: Improve groups' access to information required to analyze and compare infrastructure options.

Major Achievements and Progress in Year 4:

- Expected Year 4 Outcome: Refine CSF's BUILD infrastructure-biodiversity message, tailor dissemination material that is motivating and easily understood and used by target audiences, and train key staff members on the effective dissemination of the material.

  Result: In Year 4, we focused on creating an overarching communication strategy for BUILD products, refining and polishing our message about infrastructure and

biodiversity, creating dissemination materials in multiple languages and across diverse media that are motivating and easily understood by target audiences, and participating in regional, national and international events related to infrastructure and biodiversity. We have also trained key BUILD staff members in communication and public presentation skills to help them promote environmental-economic analysis for infrastructure planning and development to improve biodiversity outcomes.

- Expected Year 4 Outcome: Participate in at least one international biodiversity and infrastructure event to promote the use of environmental economic analysis of biodiversity and infrastructure and share infrastructure policy best practices for mitigation and compensation.

  Result: In Year 4, CSF staff participated in several international biodiversity and infrastructure events to share the results of our BUILD program, including the University of Florida's "Envisioning a Sustainable Tropics" Conference, and the International Association for Impact Assessment (IAIA) 2015 Conference in Italy.

- Expected Year 4 Outcome: Participate in the UNFCC COP20 event in Peru and hold a side meeting to promote the use of environmental-economic analysis of biodiversity and infrastructure, share infrastructure policy best practices for mitigation and compensation, and share results of the Pucallpa-Cruzeiro do Sul analysis.

  Result: During the UNFCC COP20 event in Lima, Peru in December 2014, CSF held a side event on Infrastructure and Conservation to promote the use of environmental-economic analysis of biodiversity and infrastructure, showcasing the results of the Pucallpa-Cruzeiro do Sul analysis and sharing infrastructure policy best practices for mitigation and compensation.

- Expected Year 4 Outcome: Participate in one prominent regional or national meeting in Brazil to promote the use of environmental-economic analysis of biodiversity and share infrastructure policy best practices for mitigation and compensation.

  Result: In June 2015, CSF-Brazil participated in a workshop about "Dams in Tapajós River", held at the Pontifícia Universidade Católica (PUC) University in Rio de Janeiro, Brazil. In September 2015, we presented our Tapajós study at a workshop in Brasilia: "Analysis of the São Luís do Tapajós Dam's Environmental Impact Assessment" organized by Greenpeace. Indigenous Munduruku leaders, public Ministries, scientists and NGOs were invited to the event. We have also continued to participate in the GT Amazon Infrastructure Working Group in Brazil, and have given several presentations about progress on the Tapajós dam study.

- Expected Year 4 Outcome: Share broadly through different channels and events the methodology and results of the infrastructure analysis projects in Uganda.

  Result: In Year 4 we shared results of our three infrastructure analysis projects in Uganda on our website and in newsletter articles, blog articles, policy briefs, discussion papers and full reports. We also shared results of the projects in international events and as featured case studies during training courses for USAID staff and international audiences. At a national level, results of the Bwindi study were shared during important regional meetings, and the pipeline analyses have been shared during meetings in Kampala with WCS, NEMA, UWA and the Ministry of Water and Environment.

- Expected Year 4 Outcome: Plan and hold small information-sharing meetings with partners, governments and banks to promote the use of environmental-economic analysis of biodiversity and to share infrastructure policy best practices for mitigation and compensation.

  Result: CSF presented results of our BUILD analyses during meetings at USAID, and in presentations at the International Association for Impact Assessment (IAIA) 2015 Conference that were attended by staff from the InterAmerican Development Bank, International Finance Corporation, and other World Bank Group members. CSF also facilitated meetings with various civil society organizations and government institutions in Uganda to share information about our analysis projects. We have also continued to participate in the GT Amazon Infrastructure Working Group in Brazil, giving several presentations about progress on the Tapajós dam study. In Peru, CSF has held meetings and a forum with various government organizations and collaborators to share results of the Pucallpa analysis, and we have continued to participate in the stakeholders working group (MINAM, CSF, TNC, WCS and SPDA) around the compensation policy.

- Expected Year 4 Outcome: Expand the reach and impact of CSF's online infrastructure resources and tools by promoting use of the HydroCalculator and Roads Filter tools during various events and meetings, and by developing additional content targeted at non-technical audiences such as media professionals reporting on infrastructure or people concerned with impacts of infrastructure development.

  Result: In Year 4, we continued to improve the Infrastructure & Biodiversity Resource section of CSF's website, which includes links and descriptions to both the Hydrocalculator and the Roads Filter. We also promoted use of the tools during presentations at national and international meetings, during CSF training courses, and

in communications products aimed at non-technical audiences such as our infrastructure and biodiversity infographic. One of the biggest areas of success for sharing tools for both technical and non-technical audiences to analyze and compare infrastructure options has been CSF's animated video lessons. Our valuation videos were launched in 2015, and the cost-benefit analysis lessons have had over 20,000 views since their launch in June 2014.

- Expected Year 4 Outcome: Publish infrastructure articles in CSF newsletters. These will be digital newsletters sent via email as well as online documents housed on CSF's website. They will be publicized via CSF's network of colleagues, partners and course graduates, as well as shared during meetings and events related to the BUILD program.

  Result: We have continued to publish infrastructure newsletter articles, blog posts, policy briefs, discussion papers, videos and technical reports on CSF's website, disseminating them to a broad audience of over 5,000 people.

- Additional Year 4 Result: Peer-reviewed article published with Yale colleagues in the Journal of Sustainable Forestry: *Ecological Compensation to Address Environmental Externalities: Lessons from South American Case Studies* by Reid et al May 2015. This paper was invited for a special issue of the Journal after CSF gave a presentation with SPDA on the development of Peru's compensation policy at Yale's January 2014 conference, "Forests as Capital".

Regional Detail

Global

Communications Strategy:

In Year 4, we focused on creating an overarching communication strategy for BUILD products, refining and polishing our message about infrastructure and biodiversity, creating dissemination materials in multiple languages and across diverse media that are motivating and easily understood by target audiences, and participating in national and international events related to infrastructure and biodiversity.

Communications products include the following:

- An internal one-page document refining CSF's infrastructure and biodiversity message, produced in English, Spanish and Portuguese. The English version is attached as Appendix 7.

- Animated video about the important connection between infrastructure, economic analysis and biodiversity. The video is in production, and the script is attached as Appendix 8.
- Infographic in English, Spanish and Portuguese about the important connection between infrastructure, economic analysis and biodiversity. The English version is attached as Appendix 9.
- Overview powerpoint presentations on roads, dams and biodiversity, which are attached as Appendix 10.
- Video about the Pucallpa-Cruzeiro road analysis, which was shared during a high-profile forum in Lima in July 2015, and through CSF's website, the CSF newsletter and the ICAA bulletin.

Communications Training:

In Year 4 we trained key BUILD staff members in communication and public presentation skills to help them more effectively participate in local, national and international events to promote the adoption of environmental-economic analysis for infrastructure planning and development to improve biodiversity outcomes. The first of these training events took place in Costa Rica in December 2014 for staff from Costa Rica, Peru and Brazil (agenda can be found in Appendix 11), and the second training event for U.S. based staff took place in April 2015 by Mandel Communications.

Online Resources and Tools:

Website

In Year 4, we continued improving the Infrastructure section of CSF's website, which was renamed to "Smart Energy & Transportation Infrastructure. This section includes links to infrastructure analysis and training, infrastructure publications and news, global inventories of infrastructure development, and additional infrastructure resources. Also included on the landing page is a video discussing why economics is key to addressing environmental impacts of roads. There are also links and descriptions to both of CSF's infrastructure analysis tools: the HydroCalculator and the Roads Filter.

Video Lessons

One of the biggest areas of success for creating tools for non-technical and technical audiences to analyze and compare infrastructure options has been the launch of CSF's animated video lessons. Our Cost-Benefit Analysis series, with over 20,000 views since its launch in July 2014, contains a comprehensive set of short lessons on the following

topics:

- Introduction to Cost-Benefit Analysis
- Analysis Scenarios
- Perspectives
- Real vs. Nominal
- Discounting
- Time Horizons
- Net Present Value
- Internal Rate of Return
- Benefit-Cost Ration and Payback
- Parameters for a Financial Analysis
- Cash Flows for a Financial Analysis
- Conducting an Economic Analysis
- Sensitivity Analysis
- Risk Analysis

In Year 4 we also launched a Valuation of Ecosystem Services series, which includes the following topics so far:

- Introduction to Valuation
- Classes of Values
- Market Based Valuation Approach
- Replacement Cost Method
- Public vs. Private Goods

Analysis Tools

During Year 4, we added 26 dam analyses to the HydroCalculator tool, including 20 in Africa. This effort was part of a collaboration with the International Rivers Network (IRN) to identify the most worrying World Bank-financed dams in Africa in terms of social, environmental and economic performance. CSF staff assisted IRN in using the HCT tool to evaluate dams throughout Africa, including 10 in the Albertine Rift region. The result of this effort is the publication *Right Priorities for Africa's Power Sector: An Evaluation of Dams Under the Programme of Infrastructure Development for Africa (PIDA)*, which is attached as Appendix XX. IRN is disseminating this publication on their website and throughout their network in hopes of influencing World Bank financing away from the worst dams.

During this time period, we had over 1100 views of the tool, and over 2700 views of our HydroCalculator help articles.

Online Publications and Videos:

In Year 4, we published the following infrastructure-related policy briefs, technical

reports and discussion papers:

Policy Briefs:

- Economic comparison to alternatives to building on Goat Islands: Does Jamaica need to sacrifice a world class conservation site in order to build a world class port? - 10/29/14
- Infrastructure and Conservation: The case of a Pucallpa-Cruzeiro do Sul Transport Link - 11/30/14

Technical Reports:

- Economic comparison to alternatives to building on Goat Islands: Does Jamaica need to sacrifice a world class conservation site in order to build a world class port? - 10/29/14
- Análisis económico y socioambiental de los proyectos de interconexión Pucallpa-Cruzeiro do Sul - 03/29/15
- Pave the Impenetrable? An economic analysis of potential Ikumba-Ruhija road alternatives in and around Uganda's Bwindi Impenetrable National Park - 05/26/15

Discussion Papers:

- A Cost Effectiveness Approach to Routing of Linear Infrastructure in Environmentally Sensitive Areas: A Case of Crude Oil Pipeline in the Albertine Rift in Uganda - 02/16/15

CSF's *Pave the Impenetrable?* policy brief about our analysis of the proposed road through Uganda's Bwindi Impenetrable National Park is the 3rd mostly highly viewed publication on the CSF website, and seven of the top 20 most-viewed publications on the website focus on infrastructure.

Infrastructure articles published in our bi-monthly *Numbers for Nature* newsletter include the following:

- Sep/Oct 2014 – *Pave the impenetrable?* (Bwindi study); *Groundbreaking gathering at CSF's infrastructure forum in Uganda* (NEMA forum)
- Nov/Dec 2014 – *Jamaica can have its goat and eat it too* (Jamaica port development)
- Feb/Mar 2015 – *Pucallpa policy brief now available in English* (Pucallpa report)
- April/May 2015 – *CSF study seeks solutions for Amazonian river basin slated for massive energy development* (Tapajós project)
- June/July 2015 – *Moving oil in Uganda's Albertine Rift* (WCS report); *Railways and roads in the Peruvian jungle* (Pucallpa video)

- Aug/Sept 2015 – *Smart Infrastructure: A case for numbers* (CSF infographic)

Infrastructure-related blog articles published in Year 4 include the following:

- Environmental Economic Analysis and Infrastructure Policy in Uganda – 10/15/14
- CSF presents study at COP 20 in Lima, Peru – 12/19/14
- What is Conservation Economics? – 3/5/15
- CSF begins analysis of proposed dam in Brazil's Tapajós river basin – 5/18/15
- Video: Infraestructura y Conservación: El Caso Pucallpa-Cruzeiro do Sul – 7/17/15
- Foro de debate sobre la viabilidad económica de la interconexión vial Pucallpa – Cruzeiro do Sul – 07/28/15
- Smart infrastructure: A case for numbers – 09/27/15

All publications are housed on CSF's website. Newsletters are sent via email to 5,000+ recipients and all articles are posted onto CSF's blog on the website.

International Communications Events:

During Year 4, CSF staff participated in several international events to showcase results of our BUILD program.

In December 2014, BUILD funds made it possible for CSF to participate in the UNFCC COP20 event in Lima, Peru and hold a side event on Infrastructure and Conservation to promote the use of environmental-economic analysis of biodiversity and infrastructure. During the event, CSF shared infrastructure policy best practices for mitigation and compensation, and shared results of the Pucallpa-Cruzeiro do Sul analysis. This event was a tremendous opportunity to disseminate results to leading decision-makers and to highlight the importance of completing comprehensive economic analyses of proposed infrastructure development projects in order to identify and integrate the potential environmental and social impacts of the project. The event was moderated by Gonzalo Varillas from USAID's Initiative for Conservation of the Andean Amazon Phase II (ICAA II), and opened with remarks by Ted Gehr, Director of the USAID mission in Peru, and Cristian Vallejos, CSF's Latin America Director. CSF, GRADE, and TNC then presented the results of the Pucallpa studies. The analysts concluded that as a result of the negative environmental and social impacts, as well as the major costs that would be incurred, none of the connection alternatives proposed to date (road or railway) are viable options. The presentation was attended by about 80 people, including members of civil

society organizations, government officials, and the general public. Attached as Appendix 12 is the COP20 event invitation and attached as Appendix 13 are the CSF overview and Pucallpa-Cruzeiro do Sul presentations. Photos from the event can be found in Appendix 14.

At the end of March 2015, BUILD Program Manager Irene Burgués participated in the University of Florida's "Envisioning a Sustainable Tropics" Conference organized by the Center for Latin American Studies and the Tropical Conservation and Development (TCD) program. Irene participated in sessions focused on infrastructure development in the Amazon, and gave a presentation on "Making the economic case for avoidance of biodiversity loss" which showcased road and dam infrastructure examples, including BUILD analyses. According to Philip J. Williams, Director of the Center for Latin American Studies, and Bette Loiselle, TCD Director, "the case studies provided a valuable contribution of how to use economic analysis to inform decision-makers and influence their adoption of environmentally-friendly development alternatives". During the conference, CSF had the opportunity to engage with TCD students, faculty, and partners who work on analyzing the impacts of hydroelectric dams in the Amazon, and learned about current research in Brazil that may be relevant for the Tapajós analysis. CSF's conference presentations can be found in Appendix 15.

In April 2015, CSF participated in several sessions organized by the Smithsonian Institution at the 2015 International Association for Impact Analysis (IAIA) Conference, held in Florence, Italy. The results of the Pucallpa-Cruzeiro do Sul road analysis, WCS oil pipeline analysis and Bwindi road analysis projects were brought to an international audience and presented by WCS-Uganda and CSF staff during various sessions focused on green infrastructure, financial mechanisms, and mitigation hierarchies. Information about the sessions and the conference presentations are attached as Appendix 16. Francisco Dallmeier from the Smithsonian's Center for Conservation and Sustainability thanked CSF for our contribution to the meeting: "Thank you for your contribution, *Financial Mechanisms for the Mitigation Hierarchy & EIA Compliance* and *Making the Economic Case: Avoidance of Biodiversity Loss in Infrastructure Development* at the International Association for Impact Assessment 2015 Conference. The five sessions were a huge success and totaled over 220 Participants thanks to your hard work and preparation! It was a genuine pleasure to meet you in person at the Conference and we hope there will be future opportunities to continue our collaboration." During the Financial Mechanism presentation (which was so well attended that people literally had to sit on the floor), lively discussions led to questioning the applicability of the Mitigation Hierarchy if the banks fail to internalize the mitigation and compensation process within their approval and disbursement process. In general, from the discussions during the presentations and other sessions attended, it is clear that the Environmental Impact

Assessment (EIA) Practitioners and International Financial Institution (IFI) staff that deal with environment impacts are interested in learning to apply cost-benefit and effectiveness analyses that incorporate the valuation of social and environmental impacts. Also, it is clear that financing institutions could be playing a more important role in promoting the avoidance of biodiversity loss.

Andes-Amazon

Focus countries in the Andes-Amazon region for Activity A1-2 in Year 4 were Peru and Brazil.

In the Andes Region, we shared results of our Pucallpa-Cruzeiro do Sul analysis during the COP20 event in Lima, as well as during a forum we convened in Lima on July 1 in partnership with TNC. The forum, "Challenges for sustainable interconnection in the Ucayali region", was held as part of the ICAA Indigenous Landscapes Consortium. During the event, Alfonso Malky from CSF and Manuel Glave from Grupo de Análisis para el Desarrollo (GRADE) presented the study results showing the economic inefficiencies of the proposed options, as well as the additional externality costs of both alternatives. Discussion panelists included Marc Dourojeanni, infrastructure and environmental specialist renowned in Peru; Manuel Glave GRADE principal investigator, PhD in Economics and co-author of the study; Martin Arana, adviser to MINAM; and Lizardo Lazo, Director of the Ucayali Regional Environmental Authority (Regional Government of Ucayali).

We also continued to participate in infrastructure and biodiversity policy activities through the Initiative for Conservation of the Andes Amazon Phase II (ICAA II), consortium including showcasing results of our successful Research Fellows scholarship program. Also, we continued to share information on infrastructure project trade-offs, mitigation and compensation with MINAM in Peru through the compensation policy test cases and the stakeholder process we are coordinating with SPDA, WCS, TNC and other civil society organizations.

In Brazil, we continued to work with our current collaborators such as the Amazon Infrastructure Working Group in Brazil (CSF, Imazon, Insituto Centro de Vida, Idesam, WWF, Instituto Socioambiental, Avina Foundation, TNC, OEco and others). In June 2015, CSF-Brazil participated in a workshop about "Dams on the Tapajós River", held at the Pontifícia Universidade Católica (PUC) in Rio de Janeiro, Brazil. It was an opportunity to debate with students, professors and other NGOs on the subject of large infrastructure development in Amazon and its implications for social and environmental issues. The Heinrich Böll Foundation in Brazil featured an article about the event,

including an interview with CSF-Brazil staff member Camila Jericó-Daminello, lead researcher for the São Luiz do Tapajós dam study. At the end of September, CSF presented our Tapajós study at a workshop in Brasilia: "Analysis of the São Luís do Tapajós Dam's Environmental Impact Assessment". The workshop was organized by Greenpeace as part of their effort to organize and conduct a scientific analysis of the EIA document. Indigenous Munduruku leaders, public Ministries, scientists and NGOs were invited to this event.

Albertine Rift:

The focus country in the Albertine Rift for Activity A1-2 in Year 4 was Uganda. We made continued progress on sharing results and disseminating information about the three analysis projects, and shared updates and results on our website and in newsletter articles, blog articles, policy briefs, discussion papers and full reports. We also shared results of the Bwindi road analysis and WCS oil pipeline analysis as featured case studies during training courses for USAID staff and other audiences, and to an international audience at the International Association for Impact Analysis IAIA15 Conference, held in Florence, Italy. At a national level, results of the Bwindi study were shared by the International Gorilla Conservation Programme (IGCP) and Uganda Chapter of the Poverty and Conservation Learning Group during an important regional Bwindi Mgahinga Conservation Area stakeholders meeting. The methodology and results of the oil pipeline analyses have been shared during meetings in Kampala with WCS, NEMA, UWA and the Ministry of Water and Environment.

Throughout the process of these studies, meetings have been held in Uganda with numerous organizations and institutions as part of our outreach and communication strategies, including NEMA, UWA, WCS, Ministry of Water and Environment, Uganda Chapter of the Poverty and Conservation Learning Group, Economic Policy Research Centre (EPRC), Tullow Oil, Environmental and Natural Resources Advisory Council (ENRAC), China National Offshore Oil Corporation (CNOOC), Ministry of Works and Transport, Office of the Prime Minister (OPM), Uganda National Road Authority (UNRA), Makerere University, and the Ministry of Energy and Mines, among others.

Key management issues and challenges in Year 4:

Producing high-quality presentations and communications products related to our BUILD work requires a very specific set of skills. After initial disappointment with some of the results from external communications and graphic design consultants, we have produced more things in-house via our Communications Specialist, incorporating advice and recommendations from trusted external experts.

Sustainability of Life of Project Outcomes for Activity A1-2

Energy and transportation infrastructure development has been identified as one of CSF's four priority program areas in our 2015-2020 strategic plan. We believe that an economics-based approach has the potential to have significant impacts in support of biodiversity by improving environmentally destructive and economically inefficient policies and projects. We will therefore continue to focus on improving access to information about large-scale infrastructure development in our engagement with governments, our publications and communications outreach, our online tools, and in our efforts to participate in key national and international meetings and events. We will continue improving our online HydroCalculator and Roads Filter analysis tools and the infrastructure portion of our website, and we plan to expand our infrastructure project inventory. We are also planning to create additional online materials and training targeted at non-technical audiences to help them understand the economic and environmental impacts of infrastructure development as well as international standards, safeguards and best practices.

Activity A1-3: Use training and case analysis to change outcomes of specific infrastructure projects to protect biodiversity.

Major Achievements and Progress in Year 4:

- Expected Year 4 Outcome: Continue communication and dissemination activities for the Pucallpa-Cruzeiro road analysis, including a presentation of the project at the COP20 event in Lima, publication and dissemination of the printed report, creation of a short video about the project, meetings with key government representatives and other organizations, presentations of the final results in Pucallpa to the monitoring group and indigenous community representatives, and continued participation in the bi-national Border Working group in Acre. We will also develop several communications products in English.

  Result: Both phases of the Pucallpa-Cruzeiro do Sul road analysis in Peru have been completed, and results have been shared in publications in Spanish and English through the CSF website and the Initiative for Conservation of the Andean Amazon Phase II (ICAA II) consortium network, and during different dissemination events in Peru and Brazil. Results of the Pucallpa road analysis were presented at a local level in Pucallpa, Peru and Rio Branco, Brazil, to an international audience at CSF's COP20 event in Lima and the IAIA15 Impact Assessment Conference in Italy, and to regional and national government, NGO, academics and other stakeholders during an

ICAA II forum event in Lima. We also produced a documentary video about the project: Infraestructura y Conservación: El Caso Pucallpa-Cruzeiro do Sul.

- Expected Year 4 Outcome: Continue providing technical support for communication and dissemination activities for follow-up economic analysis projects in the Albertine Rift.

  Result: We have completed the Bwindi road analysis with the International Gorilla Conservation Programme (IGCP), and CSF has supported results communication at local, national and international levels. A policy brief of the study was published at the end of Year 3, and in Year 4 we published the full report on our website and are in the process of printing it in hard copy for dissemination in Uganda. In March 2015 an important draft position paper was presented at the Bwindi Mgahinga Conservation Area stakeholders meeting, and results of the study were also presented by CSF to an international audience at the IAIA15 Impact Assessment Conference in Florence, Italy. The final report of the WCS oil pipeline analysis was completed in early 2015, and the final discussion paper was published on our website and disseminated via CSF's network. Results of the study have been shared at a national level during the methodology and dissemination workshops with NEMA, UWA and the Ministry of Water and Environment, and at an international level by CSF and our WCS Uganda collaborators during the IAIA15 Impact Assessment Conference in Italy. We have also continued to provide technical support to the NEMA/UWA oil pipeline analysis, and the draft final report is currently under external review.

- Expected Year 4 Outcome: Conduct an applied economic valuation study of the proposed hydroelectric dam projects in the Tapajós Basin in Brazil, and provide decision makers and other stakeholders at local and regional levels with information about the costs and benefits of the projects, focusing on biodiversity and other ecosystem services.

  Result: In Year 4, we conducted an applied ecosystem service valuation study in the Tapajós Basin in Brazil, where 44 hydroelectric dams are being planned. This work stems from our active participation in the Brazilian Amazon GT Infrastructure Working Group during the first three years of BUILD. Tapajós is one of the most important areas of Amazonian biodiversity and home to many traditional peoples, while at the same time it faces proposed implementation of a wide variety of infrastructure projects. Our study focuses on impacts from the São Luiz do Tapajós dam, with the goal of providing stakeholders at local and regional levels with information about potential changes in the values of ecosystem service benefits such as carbon sequestration, forest subsistence values, water quality, and recreation.

During the study, we interviewed and consulted with different key actors, local stakeholders, local movements and key governmental institutions including the Ministério Público Federal, Fundação Nacional do Índio, Instituto Chico Mendes para a Biodiversidade, Associação Comunitária do Pimental, Movimento Tapajós Vivo, and the Munudurku indigenous leadership.

Regional Detail

Andes-Amazon:

Peru

Pucallpa-Cruzeiro do Sul

In 2014, CSF led additional in-depth research with collaborators The Nature Conservancy (TNC) and Grupo de Análisis para el Desarrollo (GRADE) to complete a more detailed cost-benefit analysis of the Pucallpa-Cruzeiro do Sul road that integrates social and environmental externalities and that includes a feasibility analysis of alternatives. The analysis includes a cost-benefit analysis of the road, a railway alternative for the road, deforestation projections under different scenarios, and a land-use and opportunity-cost-of-land analysis. The analyses concluded that as a result of the negative environmental and social impacts, as well as the major costs that would be incurred, none of the connection alternatives proposed to date (road or railway) are viable options, and that there are technical limitations related to the natural meandering of the Ucayali River that render the considering the proposed routes infeasible. It was also determined that, even though the train project has significantly higher investment costs, it represents the least worst alternative because it has significantly lower environmental costs than the road.

Results have been shared in publications in Spanish and English through the CSF website and during different dissemination events in Peru and Brazil. Throughout the analysis process, CSF, TNC and GRADE have held workshops to share progress and results of the study at and at a local level in Pucallpa, Peru and Rio Branco, Brazil, as well as at national and international levels. The final report *Análisis económico y socioambiental de los proyectos de interconexión Pucallpa-Cruzeiro do Sul* was published in March 2015, and was also translated into a shorter English discussion paper *Infrastructure and Conservacion: The case of a Pucallpa-Cruzeiro do Sul Transport Link*, both of which have been disseminated through the CSF network and website as well as through the Initiative for Conservation of the Andean Amazon Phase II (ICAA II) consortium network. We also produced a documentary video about the project: *Infraestructura y Conservación: El Caso Pucallpa-Cruzeiro do Sul,* which was shared during the July 2014 forum in Lima, and through the CSF website, CSF newsletter, and the ICAA bulletin.

The 8-page English summary of the project can be found in Appendix 17, and the full report and document explaining the deforestation projections can be found in Appendix 18.

As reported in Activity A1-2, CSF presented these results in several international events, including in December 2014 during CSF's side event on Infrastructure and Conservation during the UNFCC COP20 event in Lima, Peru in December 2014, at the University of Florida's "Envisioning a Sustainable Tropics" Conference organized by the Center for Latin American Studies and the Tropical Conservation and Development (TCD) program in March 2015, and at the annual International Association for Impact Analysis (IAIA) Conference, held in Florence, Italy in April 2015. More details about these events can be found in Activity A1-2, above.

In September 2014, CSF participated in a two-day workshop in Rio Branco, in the state of Acre in Brazil. During the workshop, CSF presented the Pucallpa-Cruzeiro project and general CBA analysis concepts to government and civil society organizations, including the Brazilian civil society organizations Comissão Pró-Índio do Acre (CPI), SOS Amazônia, Acre state government (AEPI), and the National Indian Foundation (FUNAI). From Peru, the Infrastructure Mega-Projects Monitoring Group of Ucayali was represented by TNC, SERNANP, the regional government of Ucayali, Instituto del Bien Comun (IBC), and CSF. At the conclusion of the workshops, the participating organizations signed an agreement to define a Border Working Group that will be monitoring the project with a bi-national range, and defined several activities for the beginning of the group.

In March 2015, CSF presented final results of the study to the Pucallpa monitoring group (Grupo de Monitoreo) and Indigenous group representatives (Comunicadores Indigenous), as well as to the Ucayali Regional Government. CSF presented on the road and railroad alternatives, and TNC gave a presentation on environmental compensation for the proposed projects. The event was attended by 30-40 people, representing indigenous communities, migrant settlements, and representatives of the regional government, local university and NGOs. In general, indigenous communities expressed concerns about the project's impacts in terms of decreasing land tenure security and cultural disruption, as they have seen with the Inter-Oceanica Sur project (crime, prostitution, etc.), while migrants tended to advocate for the projects, arguing improved access to services (health and education) and markets. Additional questions were raised about how the negative externality costs were calculated for carbon and accidents, and how the deforestation projections were estimated. CSF's presentation can be found in Appendix 19.

In July 2015, we convened a forum in Lima in partnership with TNC to disseminate and discuss the results of the Pucallpa-Cruzeiro do Sul road and rail analysis. The forum, "Challenges for sustainable interconnection in the Ucayali region", was held as part of the ICAA II Indigenous Landscapes Consortium. Over 80 people attended the event, representing local and national government, NGOs, private companies, and academic institutions. During the event, CSF's Alfonso Malky and GRADE's Manuel Glave presented the study results showing the economic inefficiencies of the proposed options, as well as the additional externality costs of both alternatives. The study concludes that the railway option, while still economically inefficient, would generate fewer externality costs than the road alternative. Discussion panelists included Marc Dourojeanni, renowned infrastructure and environmental specialist in Peru; Manuel Glave GRADE principal investigator, PhD in Economics and co-author of the study; Martin Arana, adviser to MINAM; and Lizardo Lazo, Director of the Ucayali Regional Environmental Authority (Regional Government of Ucayali). Marco Dourojeanni was quoted as saying: "Es un trabajo magnífico. Si bien no demostró nada que no se supiera antes, lo demostró con cifras contundentes, hechas por economistas reputados. Estos estudios son excelentes. Esa visión económica de los recursos naturales es excelente. Ha sido muy útil. Eso sí, se van a necesitar muchos más estudios de ese tipo para poder conversar con los que opinan diferente." The forum was publicized via the CSF website and the ICAA bulletin. The forum participant list and presentation are attached as Appendix 20 and Appendix 21, and a copy of the ICAA bulletin press release is attached as Appendix 22.

Following the forum, CSF also held a meeting with USAID staff in Lima to discuss strategies and tools for identifying risky projects and developing an "early warning stystem" for bad development projects, using tools such as CSF's HydroCalculator and Roads Filter.

The study, and the associated communication and dissemination events at regional, national and international levels have fostered an important debate about the project that would not have been possible without our analysis. CSF's work provided key information to identify and estimate the value of externalities being generated by the project, as well as developed an innovative methodology for applying the Road Economics Decisions (RED) model to railway development. CSF will continue to work with TNC and GRADE to disseminate results of the Pucallpa-Cruzeiro do Sol road analysis in one-on-one meetings with the main government players including MINAM, the Finance Ministry, and other key government institutions such as Transport and Communications, as well as in continued meetings with regional government and indigenous communities in Ucayali.

Brazil

Tapajós

In Year 4, we conducted an applied ecosystem service valuation study in the Tapajós Basin in Brazil, where 44 hydroelectric dams are being planned. This work stems from our active participation in the Brazilian Amazon GT Infrastructure Working Group during the first 3 years of BUILD. Tapajós is one of the most important areas of Amazonian biodiversity and home to many traditional peoples, while at the same time it faces the implementation of a wide variety of infrastructure projects. The aim of our study is to provide stakeholders at local and regional levels with information about one of the largest hydroelectric dam projects planned for the middle and lower Tapajós Basin, the São Luiz do Tapajós dam, focusing on the impacts on values of ecosystem service benefits such as carbon sequestration, water quality, forest products, and recreation.

A CSF internal overview presentation about the project is attached as Appendix 23, and the draft final report is attached as Appendix 24.

While the infrastructure decision-making process in Brazil depends on the approval of an environmental impact assessment (EIA), the EIA document does not objectively integrate the value of ecosystem services. Moreover, while potentially affected communities must legally be consulted, their participation is limited by a huge information gap related to how they will be impacted. Thus, we aimed to estimate the economic impacts of the proposed hydroelectric project on local populations. The particular key challenges in ensuring that this information can support good decision-making relate to the need to generate results quickly, and to do so in a data-poor context. We therefore drew on expert interviews, local key-actors assessment and a broad literature review on the impacts of dams to tropical forest communities to identify the expected changes in key ecosystem services, and estimate the value of these changes based on secondary data from the region and the judicious application of benefit transfer. During the study, we interviewed and consulted with different key actors, local stakeholders, local movements and key governmental institutions including the Ministério Público Federal, Fundação Nacional do Índio, Instituto Chico Mendes para a Biodiversidade, Associação Comunitária do Pimental, Movimento Tapajós Vivo, and the Munudurku indigenous leadership.

In March 2015, CSF's Brazil team visited the Tapajós region to conduct preliminary fieldwork and data gathering. They visited the two cities of Santarém and Itaituba, and the community of Pimental, which will be flooded if the dams are built. Information meetings were conducted with federal, state and municipal government officials (environmental protection office, federal prosecutor's office, protected area agency), religious leaders, urban and rural community members, leaders of local resistance

movements, indigenous organizations, and NGO groups working in the region. The research team found almost no official information about the dams; the communities, the people from the cities, and the indigenous communities know very little about the projects, including what dams would be built, where they would be located, and the resulting social and environmental impacts. Official institutions such as ICMbio, which administrates the Protected Areas, have very limited information about the negotiations, whether the projects are going to happen, and how they would be developed. The weak governance in the region was an issue that came to light during the field visit. The lack of consistent information, the precarious communication and coordination among institutions, and the lack of knowledge about civil rights results in a poor or inexistent governance of public decisions and natural resources in the region. On the other hand, it was interesting to note the strong organization of some local movements against the dams, particularly ones involving indigenous peoples. They are actively evaluating their rights, exchanging knowledge, and taking people to see Belo Monte to discuss what they do not want to happen in the Tapajós region. The Munduruku people are the biggest and most charismatic resistance group.

The situation in the lower Xingu region after the construction of Belo Monte offers many parallels to the Tapajós region in terms of environment, governance issues, government's role, and the complex mosaic of actors and conflicts. This enabled us to incorporate secondary data from the Belo Monte Hydroelectric complex and its environmental and social impacts when considering the potential impacts in the Tapajós basin.

As a result of the information and data gathered during our field visit, we decided to focus our valuation study on four main ecosystem services:

1. **Ecosystem services related to subsistence and timber and non-timber income of local population** – rural, riverside and indigenous. Services include fish, fruits, roots, seeds, games and family agriculture products such as manioc, among others, were considered. The dam construction causes impacts such as increasing deforestation, affecting the water quality negatively and forcing some people to move from their homes. In turn, these impacts affect drastically local peoples' access to provisioning services, which are essential for their livelihoods. Using the benefits transfer methodology, our analysis estimated how much the decrease in access to ecosystems services will change local peoples wellbeing in monetary terms.
2. **Good quality freshwater from Tapajós River.** Seven municipalities along the stretch of river from the planned dam site to the Amazonas river benefit from the provision of good quality freshwater from the Tapajós River. The dam will negatively affect provision of this ecosystem service by reducing the quality of the water downstream, by changing river's natural dynamics and by interfering with the water's physical and chemical properties. Using the avoided cost methodology, we have

estimated the value of the water currently being provided by the river by estimating the costs municipalities will have to incur to implement and maintain traditional water treatment systems to respond to the expected reduction of the water quality.

3. **Recreational value of Amazônia National Park** is relevant at the local level, since this is one of the main areas for local people's entertainment and leisure. The dam is planned to be attached to the park's border and will block the pier's view of the river and some trails, two of the most visited destinations of the park. The benefits transfer methodology was also used in this case and it was based on the recreational values of three similar tropical forest parks.
4. **Greenhouse gas emissions** were estimated for the planned flooded area as well as for the projections of indirect deforestation. The dam will promote direct and indirect deforestation both from reservoir construction and induced immigration, which will release the stored carbon into the atmosphere. A market price valuation was conducted to estimate the foregone income from the potential REDD market.

The results show that in total, more than USD $600 million (in present value terms) of the local communities' economy will be lost over a 30-year period if the dam is constructed, because of the negative impact on these important ecosystem services.

To communicate these results, CSF is leading a special group inside Infrastructure Working-Group focused on the Tapajós region, with the aim of discussing and implementing projects that support sustainable development in that area. The Infrastructure Working-Group has the main objective of discussing common agendas, exchanging among different projects and the possibility of collaborations and partnerships regarding the impacts of infrastructure projects to communities and environment. Many NGOs and institutions are part of it, such as: Instituto Centro de Vida, International Rivers, The Nature Conservancy, Instituto de Pesquisa Ambiental da Amazônia, World Wild Fund, Greenpeace, among others.

In June 2015, CSF-Brazil participated in a workshop about "Dams on the Tapajós River", held at the Pontifícia Universidade Católica (PUC) in Rio de Janeiro, Brazil. It was an opportunity to debate with students, professors and other NGOs on the subject of large infrastructure development in Amazon and its implications for social and environmental issues. The Heinrich Böll Foundation in Brazil featured an article about the event, including an interview with CSF-Brazil staff member Camila Jericó-Daminello, lead researcher for the São Luiz do Tapajós dam study. At the end of September 2015, CSF also presented the Tapajós study at a workshop in Brasilia: "Analysis of the São Luís do Tapajós Dam's Environmental Impact Assessment". The workshop was organized by Greenpeace as part of their effort to organize and conduct a scientific analysis of the EIA document. Munduruku leaders, public Ministries, scientists and NGOs were invited to this event.

We also plan to continue working with the various stakeholder interviewed during our field visit to the region:

- Ministério Público Federal, which has been the main legal institution supporting the indigenous and traditional communities agenda;
- Fundação Nacional do Índio, the governmental institution that takes care of indigenous issues, including the hydroelectric's impacts and proposed mitigation;
- Instituto Chico Mendes para a Biodiversidade, the governmental institution that manages the federal protected areas;
- Associação Comunitária do Pimental, association of the community that will be flooded by the dam's reservoir;
- Movimento Tapajós Vivo, local resistance movement against the dam;
- Munudurku leadership, Munduruku is the most populous ethnic group in that region.

Albertine Rift:

Communications strategies were developed as part of the work plans for each of the three BUILD analysis projects in Uganda, and have occurred throughout the duration of the projects.

1. Cost Effectiveness Analysis of Oil Pipeline Construction in the Albertine Rift. Wildlife Conservation Society (WCS)

- Present project goals and methods during information sharing meeting at NEMA in February 2013.
- Meet with key stakeholders throughout the project, including meetings with with Hoima District Government, Bulisa District Local Government and Kasese District Local Government.
- WCS Multi Stakeholder Marxan/Tradeoffs Workshop in July 2014 to present goals, methods and preliminary results of the project.
- Present methods, results and conclusions during national infrastructure analysis and policy forum in Kampala in September 2014.
- Prepare executive summary and final report in digital form.
- Disseminate results via CSF network and WCS network, and via meetings with NEMA, UWA and Ministry of Water and Environment.
- Present results during International Association of Impact Assessment (IAIA) Conference in Italy in April 2015.

The final discussion paper of the WCS analysis of oil pipeline routing was completed in early April 2015: *A Cost Effectiveness Approach to Routing of Linear Infrastructure in Environmentally Sensitive Areas: A Case of a Crude Oil Pipeline In the Albertine Rift in*

Uganda. The report was disseminated via CSF's website and network via our newsletter and blog posts, and is attached as Appendix 6.

WCS Uganda shared the analysis results at a national level in meetings with NEMA, UWA and the Ministry of Water and Environment. The results of the project were brought to an international audience and presented by WCS-Uganda and CSF during sessions organized by the Smithsonian Institution at the IAIA 2015 Impact Assessment Conference in Florence, Italy. WCS Uganda's Geoffrey Mwedde and Dr. Grace Nangedo presented "Promoting avoidance through cost-effective routing", sharing the results of the oil pipeline analysis and innovative GIS least-cost path methodology. Conference participants, including EIA practitioners and staff from international financing institutions, some of which work in Uganda, expressed a great deal of interest in the work and approached both Geoffrey and Grace during the conference. Present at the conference were a number of firms working in the oil sector, including the EIA consultants hired by the oil company Total and Tullow, who are exploring in Murchison Falls National Park. The presentations at the conference illustrated to those present that these projects are being analyzed from an environmental perspective with sophisticated economic and spatial modeling methods, and that environmental professionals in Uganda are gaining the technical capacity to conduct these types of analyses with the ultimate goal of helping companies do a better job and holding them accountable to national and international environmental standards. Presentations from the conference are included in Appendix 16.

2. Cost-Benefit analysis of the proposed upgrading of the Ikumba-Ruhija-Buhoma road, through Bwindi Impenetrable National Park, Southwestern Uganda. International Gorilla Conservation Programme (IGCP)

- Present project goals and methods during information sharing meeting at NEMA in February 2013.
- Meet with key stakeholders throughout the project, including Uganda National Road Authority (UNRA), Uganda Wildlife Authority (UWA), and Uganda Chapter of Poverty and Conservation Learning Group (Ug-PCLG).
- Present methods, results and conclusions during national infrastructure analysis and policy forum in Kampala in September 2014.
- Prepare policy brief, executive summary and final report in digital form.
- Disseminate results via CSF network and IGCP network.
- Present results of study during U-PCLG forum in March 2015
- Present results to international audience at IAIA Conference in Italy in April 2015
- Print copies of final report for local and national dissemination

IGCP carried out their communication strategy from the outset and engaged with key stakeholders throughout the analysis process. Once preliminary results were ready, IGCP carried out various presentations to UWA and to Ug-PCLG. CSF presented preliminary results of the analysis to UNRA in an informal meeting, and UNRA seemed open to discussion and analyzing further the design of alternative routes. While in Kampala in September 2014 for the forum, the IGCP and CSF analysis team formally presented the study results to UWA, and IGCP has continued to support UWA in the elaboration of additional presentations to share and promote the results of the analysis.

A policy brief of the study was published in September 2014, and the final report *Pave the Impenetrable? An economic analysis of potential Ikumba-Ruhija road alternatives in and around Uganda's Bwindi Impenetrable National Park* was published in May 2015. CSF has also disseminated the results of the Bwindi analysis via our website and network through our newsletter and blog articles, and to an international audience during the IAIA 2015 Impact Assessment Conference in Florence, Italy.

Since completion of the study, IGCP has been very active on the engagement regarding the Bwindi road, and has been working within the Uganda Poverty and Conservation Learning Group (U-PCLG). In March 2015 an important draft position paper was presented by a representative of the U-PCLG at the Bwindi Mgahinga Conservation Area stakeholders meeting. IGCP's Director gave an introduction about the background of the study on which the position paper is based. She reports that the meeting discussions were open, productive, and with everyone in agreement that roads to these areas were important, but that a road diverted outside of the park is in the best interest of the people and Bwindi, and to long-term sustainable development goals.

The Government of Uganda is yet to communicate a decision regarding the routing of the road, but the analysis conducted by CSF in partnership with IGCP is informing the dialog still underway. The U-PCLG has also taken up the issue based on the publication and further consultations and have issued a position paper on the topic. IGCP is currently working with the U-PCLG to provide this brief and a description of the discussion from the stakeholders meeting to communities in local languages as well as in English. Continued government advocacy at the national level in Kampala is also being planned, and the final report is currently being printed in hardcopy for distribution.

The policy brief and final report of the Bwindi road study are included in Appendix 5.

3. Estimating the environmental and biodiversity costs accruing from planned oil pipeline development in the Albertine Rift, the Case of Murchison Falls National Park (NEMA / UWA)

- Present project goals and methods during information sharing meeting at NEMA in February 2013.
- Meet with key stakeholders throughout the project, including NEMA, UWA, WCS, Ministry of Finance, Planning and Economic Development, Tullow Oil.
- Share preliminary analysis results in meetings within NEMA and UWA.
- Present methods and preliminary results during national infrastructure analysis and policy forum in Kampala in September 2014.
- Plan methodology, analysis and report writing workshop in collaboration with NEMA in June 2015.
- Send draft report and GIS modeling layers to external experts for review.
- Prepare executive summary and final report in digital form.
- Disseminate results via CSF network and NEMA / UWA network.

After the oil pipeline studies were presented during the national infrastructure policy forum in Kampala in Year 3, representatives from the Petroleum Exploration and Production Department (PEPD) showed interest in both the WCS and NEMA-UWA studies, and expressed openness to the idea of using the methodologies to improve pipeline routing.

In Year 4, we gave technical and logistical support to NEMA and UWA to complete the analysis, which included collaboration and technical support from WCS staff, a one-week analysis methods workshop at NEMA, final document revision, and plans for communication of results. The final report and GIS model is now undergoing external review.

NEMA and UWA plan to use the results to inform policy and decision-making on the sustainable development of oil pipeline infrastructure in protected areas and in the Albertine Rift in general. One of the most valuable outcomes of the study has been the building of analytical capacity for the NEMA and UWA staff involved in the process, and building awareness of these economic analysis and modeling tools at an institutional and national level.

Key management issues and challenges in Year 4:

Various challenges with the Ugandan analysis projects have been described under Activity A1-1. The politically sensitive nature of oil development in Uganda has continued to be a challenge for completion and dissemination of the pipeline analysis projects. CSF provided support to share results of the WCS project to an international audience, and has worked with both WCS and NEMA to identify creative solutions to complete the NEMA-UWA analysis, which is now under external review. Despite these challenges and setbacks, the analyses have yielded important results in support of biodiversity conservation, developed innovative analysis methods, provided alternative

routing options for roads and pipelines, and increased technical capacity of all the organizations involved.

The lack of official information about the Tapajós dam complex made it difficult to gather all of the necessary data for the analysis. To overcome this challenge, we focused on the São Luiz do Tapajós dam that had more available information, worked with other organizations that were also evaluating the same dam from a biological or social point of view, and also drew upon parallels from the Belo Monte experience and other similar regions to conduct benefits transfer estimates of ecosystem service values.

Sustainability of Life of Project Outcomes for Activity A1-3

As mentioned under Activity A1-2, infrastructure development is one of CSF's four priority program areas in our 2015-2020 strategic plan, and we will continue to focus on large-scale infrastructure for our training and analysis work, and in our engagement with governments to change outcomes of environmentally destructive and economically inefficient projects. The follow-up analysis projects in the Andes-Amazon (Pucallpa analysis) and Albertine Rift (Uganda projects) will conclude at the close of the BUILD program, but we will continue collaborating with our partners to help disseminate any additional results or communications products developed by the research teams in an effort to modify these projects in favor of greater biodiversity protection.

In Brazil, we will continue the work in the Tapajós basin, focusing on a strong communication strategy and deepening of strategic questions. We plan to publish the study and present it in different workshops, one focused on the local population and decision makers, and another focused on academics, government institutions and NGOs. There will also be opportunities to disseminate our results through conferences, participation in debates, and media articles. We have received a small grant from the Porticus Foundation to conduct some of these follow-up dissemination activities in the region. We are also in discussions with Insituto Centro de Vida (ICV) about the replication of this study for other dams planned for the upper part of Tapajós basin, in the Juruena region. There is a request from local communities there to better understand the potential impacts of the dam on their livelihoods. With TNC, we are discussing a possible analysis to evaluate the impacts of additional planned infrastructure development on the Tapajós river on ecosystem services and local populations throughout the entire basin.

Objective 2: There are clear policies governing project selection, mitigation and compensation

Activity A2-1: Ensure that policy-makers have access to good models.

Major Achievements and Progress in Year 4:

- Expected Year 4 Outcome: Further disseminate the infrastructure policy best practice reports through creation of additional user-friendly materials, and through active circulation and presentation of these materials in regional, national and international events and through CSF newsletters and website.

  Result: In Year 4 we further disseminated the results from the ELAW review of infrastructure policy best practices: *Moving towards greener infrastructure: Innovative legal solutions to common challenges* (Policy Brief and Discussion Paper) in national and international settings. These documents have been published on CSF's website, shared via CSF's newsletters and network, highlighted in policy meetings with partners, and incorporated into CSF's training courses, media trainings, and policy forum events. We shared our lessons learned about infrastructure policy best practices and models during international infrastructure and biodiversity related events including the UNFCC COP20 side event in Lima, the University of Florida Conference, and the IAIA15 Conference in Italy.

- Expected Year 4 Outcome: Participate in infrastructure policy meetings and events in the Andes and Brazil, and in the Himalayas and Uganda if opportunities arise.

  Result: In Peru, we participated in the UNFCC COP20 meeting and held a side event showcasing our infrastructure policy and analysis work, and we have also continued to participate in infrastructure and biodiversity policy activities through the Initiative for Conservation of the Andes Amazon Phase II (ICAA II). In Brazil we are continuing to work with our current collaborators such as the GT Amazon Infrastructure Working Group (CSF, Imazon, Instituto Centro de Vida ICV, Idesam, WWF, Instituto Socioambiental, AVINA Foundation, TNC, OEco and others). We identified additional collaborators for the Tapajós project such as ICV and TNC through our field visit to the region and through our participation in various national and international forums and events. We have also continued to be available to provide technical support to analysis teams and partners to participate in relevant infrastructure and biodiversity events in Uganda, such as participation by the International Gorilla Conservation Programme (IGCP) in the Bwindi stakeholder events described in Activity A1-3. In Year 4 we did not identify additional opportunities to participate in infrastructure policy meetings or events in the Himalayas.

- Expected Year 4 Outcome: Provide information on compensation implementation models to the Peruvian government as part of the implementation of compensation test cases.

  Result: We have continued to share information with the Peruvian Ministry of Environment (MINAM) on infrastructure project trade-offs, mitigation and compensation through the compensation policy test cases and the stakeholder process we are coordinating with the Peruvian Society for Environmental Law (SPDA), Wildlife Conservation Society (WCS), The Nature Conservancy (TNC) and other local organizations.

Regional Detail

Global:

In Year 4 we further disseminated the results from the ELAW review of infrastructure policy best practices: *Moving towards greener infrastructure: Innovative legal solutions to common challenges* (Policy Brief and Discussion Paper) in national and international settings. These documents have been published on CSF's website, shared via CSF's newsletters and network, highlighted in policy meetings with partners, and incorporated into CSF's training courses, media trainings, and policy forum events. We shared our lessons learned about infrastructure policy best practices and models during international infrastructure and biodiversity related events described in Activity A1-2 including the UNFCC COP20 side event in Lima, the University of Florida's "Envisioning a Sustainable Tropics" Conference, and the International Association for Impact Analysis IAIA15 Conference, held in Florence, Italy. Presentations from these events can be found in Appendix 13, Appendix 15 and Appendix 16.

Andes-Amazon:

In the Andes Region, we continued to participate in infrastructure and biodiversity policy activities through the Initiative for Conservation of the Andes Amazon Phase II (ICAA II). Also, we continued to share information with MINAM on infrastructure project trade-offs, mitigation and compensation through the compensation policy test cases and through the stakeholder process we are coordinating with SPDA, WCS, TNC and other local organizations.

In Brazil, we continued to work with our current collaborators such as the Amazon Infrastructure Working Group in Brazil (CSF, Imazon, Insituto Centro de Vida ICV, Idesam, WWF, Instituto Socioambiental, AVINA Foundation, TNC, OEco and others).

We have also identified additional collaborators for the Tapajós project such as ICV and TNC through our field visit to the region and through our participation in various national and international forums and events.

Albertine Rift

In Year 3, we provided support to NEMA to hold meetings to share our review of infrastructure policy best practices and innovations, and discuss their potential application in Uganda. In Year 4, we provided technical support to analysis teams and partners to participate in relevant infrastructure and biodiversity events in Uganda, such as IGCP's participation in the Bwindi stakeholder events described in Activity A1-3.

Himalayas

In Year 4 we did not identify additional opportunities for participating in infrastructure policy meetings or events in the Himalayas.

Key management issues and challenges in Year 4:

None.

Sustainability of Life of Project Outcomes for Activity A2-1

Beyond the end of BUILD, we will continue to disseminate and share information about infrastructure policy best practices via our website and newsletter communications as part of our Smart Energy & Transportation Infrastructure Program. Our review of policy best practices and innovations conducted with ELAW as part of BUILD will continue to inform our policy work with governments and other organizations, our analysis projects, our training curriculum, and our participation in national and international forums, meetings and events.

Activity A2-2: Provide technical assistance to decision-makers and advocates formulating policies.

Major Achievements and Progress in Year 4:

- Expected Year 4 Outcome: Continue working with the ICAA II network, the Peruvian government, the Brazilian Infrastructure Working Group, and partners and analysis teams in Uganda to identify opportunities for policy reform.

Result: In Peru, we have continued to participate in infrastructure and biodiversity policy activities through the Initiative for Conservation of the Andes Amazon Phase II (ICAA II), and through our work with the Peruvian Environmental Ministry (MINAM). In Year 4, Peru's Ministry of the Environment made a major policy announcement in a landmark ministerial resolution on compensation and mitigation that establishes guidelines for developers to offset the impacts of their projects. The policy was the culmination of important policy support from CSF and several other organizations, including the Peruvian Society for Environmental Law (SPDA), The Nature Conservancy (TNC) and the Wildlife Conservation Society (WCS). Also in Year 4, MINAM published national guidelines for environmental valuation that were the culmination of our In-house training with MINAM in Years 2 and 3 of BUILD. In Brazil we are continuing to work with our current collaborators such as the GT Amazon Infrastructure Working Group (CSF, Imazon, Instituto Centro de Vida, Idesam, WWF, Instituto Socioambiental, AVINA Foundation, TNC, OEco. We have also continued to be available to participate in relevant infrastructure and biodiversity policy events in Uganda.

- Expected Year 4 Outcome: Give technical assistance to collaborators, policymakers and other stakeholders to implement the compensation policy test cases in Peru.

  Result: During Year 4 we continued to provide technical assistance to the Ministry of Environment in Peru (MINAM) to improve compensation regulation, as well as build government staff capacity to integrate biodiversity when planning, approving and implementing infrastructure projects. Details of our support to the development of the compensation policy are reported under Objective 3.

- Expected Year 4 Outcome: Provide technical support on infrastructure policy reform related to project selection, mitigation and compensation to partners in Uganda, if there is a genuine interest and opportunity to implement the policy improvement plan.

  Result: In Uganda, we have been providing technical support for the Ugandan analysis teams to develop recommendations for improving project selection, mitigation and compensation based on the results of their project analyses. We have not provided additional policy support to NEMA since the publication of the valuation guidelines for the economic analysis of environmental impacts in August 2014 and the national policy forum in Kampala in September 2014.

Regional Detail

Andes-Amazon:

Since 2011, the focus of our infrastructure policy work in the Andes-Amazon has been our collaboration with MINAM to design a compensation mechanism for environmental impacts of infrastructure development. In December of 2014, Peru's Minister of the Environment made a major policy announcement in a landmark ministerial resolution on compensation and mitigation that establishes guidelines for developers to offset the impacts of their projects. The official press release about the policy resolution is attached as Appendix 25. The policy was several years in the making and the culmination of important policy support from CSF and several other organizations, including SPDA, TNC and WCS. In Year 4, CSF has provided technical support to implement compensation policy test cases in Peru on specific infrastructure projects. MINAM will use this input to design standards for infrastructure projects in a way that tries to maximize both conservation and cost-effectiveness. These test cases are described under Objective 3. In addition, MINAM published national guidelines for environmental valuation in January 2015 that were the culmination of our nine-month In-house capacity building program with MINAM in Years 2 and 3 of BUILD. The training enabled participants to understand and interpret valuation studies, identify appropriate methodologies to value environmental goods and services in different situations, contribute to the design of Environmental Impact Assessment (EIA) terms of reference, and participate in the formulation and implementation of Peruvian law related to valuation. The official valuation guidelines are attached as Appendix 26.

In Brazil we continued to participate in the GT Amazon Infrastructure Working Group (CSF, Imazon, Instituto Centro de Vida, Idesam, WWF, Instituto Socioambiental, AVINA Foundation, TNC, OEco) and discussed ways to improve policies affecting biodiversity such as the environmental impact assessment process and policies regarding mitigation and compensation. CSF staff attended Working Group meetings in Brasilia in February 2015 and August of 2015, during which they shared progress on the Tapajós study and discussed implications for improving infrastructure development policies.

Albertine Rift:

During Year 3, we provided technical support to NEMA to draft guidelines on economic valuation analysis of environmental impacts, to hold a meeting to discuss infrastructure policy best practices and opportunities for policy innovations and reform in Uganda, and to convene a national infrastructure policy forum in Kampala in September 2014. In Year 4, CSF offered to provide technical support to help NEMA move forward a plan to implement policy recommendations and the economic analysis valuation guidelines, but NEMA has not been able to move forward with this activity to date. CSF has continued providing technical support for the Ugandan analysis teams to develop recommendations for improving policies around project selection, mitigation and compensation based on the results of their project analyses.

Key management issues and challenges in Year 3:

Through the process of providing technical support to the Peruvian government we have learned that it is essential to share knowledge across issues with several different CSF staff members, so that we can be available whenever the need arises to participate in discussions to move forward the policy initiatives.

In Brazil, participating in policy debates at a national level has been difficult, so we have continued focusing our efforts on the Infrastructure Working Group and on communication activities centered on the Tapajós project that can help move the infrastructure policy discussion forward.

Similarly in Uganda, engagement in the policy process at a national level continues to be challenging, but we have achieved success in incorporating important policy questions into communication efforts for the analysis projects.

Sustainability of Life of Project Outcomes for Activity A2-1

We will continue working with the Peruvian government on infrastructure policy reform through the end of 2016 with funding from the Gordon and Betty Moore Foundation and the MacArthur Foundation. Beyond the conclusion of BUILD, we do not have specific plans to continue working with the Ugandan government on infrastructure policy reform, but we will continue participating in the Brazilian Infrastructure Working Group, and will also seek any additional opportunities to engage with governments and organizations in the Andes-Amazon, Albertine Rift and Himalayas in order to guide and improve infrastructure policies in favor of biodiversity protection. In the Tapajós basin in Brazil, we have funding to continue working with the Para state government and municipal governments on ways to avoid, mitigate and compensate the impacts of the São Luiz do Tapajós dam that have been identified through our valuation study described in Activity A1-3. We are also in discussions with Insituto Centro de Vida (ICV) about the replication of this study for other dams in the Tapajós basin, and we are talking with TNC about a possible analysis to evaluate the impacts of additional planned infrastructure development on the Tapajós river on ecosystem services and local populations throughout the entire basin.

Objective 3: There are financial mechanisms that maximize compliance with mitigation and compensation agreements and regulations.

Activity A3-1: Promote adoption of financial mechanisms.

Major Achievements and Progress in Year 4:

- Expected Year 4 Outcome: Provide technical support to implement environmental compensation policy test cases in Peru. These test cases are being supported with additional match funds from the Gordon and Betty Moore Foundation and the MacArthur Foundation, and the analyses are projected to be completed by the end of September 2015.

  Result: Four infrastructure projects in Peru have been selected for the cases, including the Hidrovía Amazónica and Mazán hydroelectric projects in Loreto, and the Interoceánica Sur road and Hunt oil concession in Madre de Dios. In Year 4 we finalized the institutional arrangements between CSF and MINAM, worked with various partners to finalize the methodology for the cases, and began implementing the cases. One of the main findings during implementation was that existing environmental impact assessments (EIAs) lack the information needed to identify the projects' residual impacts and the application of the compensation hierarchy.

- Expected Year 4 Outcome: In Uganda, if there is interest and commitment from partners, CSF will provide technical support to design financial mechanisms for implementation of compensation and mitigation of infrastructure impacts.

  Result: Financial mechanisms options were discussed during the NEMA policy meeting and national policy forum in Year 3. In Year 4, CSF offered to provide technical support for the design of financial mechanisms for compensation and mitigation, but the Ugandan government was not in a position to move forward with this activity.

- Additional Year 4 Result: In April 2015, CSF presented *Financial Mechanisms for the Mitigation Hierarchy & EIA Compliance* at the 2015 International Association for Impact Analysis (IAIA) Conference, held in Florence, Italy. The presentation is attached as Appendix 16c.

- Additional Year 4 Result: Publication of peer-reviewed article in the Journal of Sustainable Forestry: *Ecological Compensation to Address Environmental Externalities: Lessons from South American Case Studies* by Reid et al May 2015. This paper was invited for a special issue of the Journal after our presentation with SPDA on development of the Peruvian compensation policy at Yale's January 2014 conference, "Forests as Capital".

Regional Detail

Global:

In April 2015, CSF participated in several sessions organized by the Smithsonian Institution at the 2015 International Association for Impact Analysis (IAIA) Conference, held in Florence, Italy. During sessions organized by the Smithsonian's Center for Conservation and Sustainability, CSF presented *Financial Mechanisms for the Mitigation Hierarchy & EIA Compliance.* During the presentation (which was so well attended that people literally had to sit on the floor), there were interesting discussions that led to questioning the applicability of the Mitigation Hierarchy if banks fail to internalize the mitigation and compensation process within their approval and disbursement process. Based on the discussions during CSF's presentations and other sessions attended, it is clear that the Environmental Impact Assessment (EIA) Practitioners and International Financial Institution (IFI) staff that deal with environment impacts are interested in learning to apply cost-benefit and effectiveness analyses that incorporate the valuation of social and environmental impacts. Also, it is clear that financing institutions could be playing a more important role in promoting the avoidance of biodiversity loss.

Andes-Amazon:

The focus of our BUILD infrastructure policy work in Andes-Amazon has been our collaboration with the Peruvian Ministry of Environment (MINAM) and the Stakeholder Working Group - CSF, The Nature Conservancy (TNC), Wildlife Conservation Society (WCS) and the Sociedad Peruana de Derecho Ambiental (SPDA) – to design a compensation mechanism for environmental impacts of infrastructure development. In December 2014, MINAM signed into law the landmark policy for an innovative environmental compensation system. In May 2015, the Journal of Sustainable Forestry published our article about the Peruvian compensation policy: *Ecological Compensation to Address Environmental Externalities: Lessons from South American Case Studies*. This paper was invited for a special issue of the Journal after we presented the Peruvian compensation policy in a panel alongside SPDA at Yale's January 2014 conference, "Forests as Capital". The paper emphasizes that the success of Peru's system will depend on it being practical enough to implement at scale while at the same time being rigorous enough to deliver environmental benefits, and the authors offer recommendations to balance both needs. The accepted manuscript is included as Appendix 27.

During Year 4 we have been working with MINAM and the compensation stakeholder group to implement several pilot test cases for the new compensation policy. Four infrastructure projects have been selected for the cases: the Hidrovía Amazónica and Mazán hydroelectric projects in Loreto, and the Interoceánica Sur road and Hunt oil

concession in Madre de Dios. The cases entail analyses of the baseline information, estimation of the biodiversity losses resulting from project impacts, identification of residual losses after mitigation actions, identification of compensation (offset) sites that ensure no biodiversity loss, GIS modeling of opportunity costs for the implementation of the compensation sites (with a focus on adjacent protected areas), estimation of the costs of implementing the environmental compensation in the selected locations, and design of the financial mechanisms to ensure that resources are available for implementing the compensation actions while the impacts last. We are collaborating with The Biodiversity Consultancy (TBC) and WCS for analysis of the biological information.

This information will be integrated into model compensation plans for each of the cases. The cases will, in turn, provide lessons for MINAM to develop general guidance on methodologies for the identification of equivalent areas for environmental compensation focusing on protected areas; recommendations for the integration in EIAs of the necessary information to sustain no net biodiversity loss in environmental compensation plans; tools to estimate the management costs of compensation plans in a cost-effective manner that maximizes conservation outcomes; and recommendations for financial mechanisms such as trust funds, endowments, or mine closure guarantees, that ensure resource availability over the projects' life.

In Year 4, activities focused initially on establishing the regulatory framework and institutional coordination needed for the successful implementation of the project. During the COP20 event in Lima (December 2014), and with support from CSF and partners SPDA, TNC and WCS, MINAM officially launched the environmental compensation policy that had been in development for over two years. CSF also signed another Memorandum of Understanding with MINAM to formalize its collaboration for the development of four compensation test cases, and met regularly with MINAM and National Protected Areas Service (SERNANP) officers to inform them about the project objectives and progress. CSF also worked with project partners WCS and TBC to develop the methodology and scope of their contributions to the model compensation plans.

Contact with the organizations responsible for the infrastructure projects selected for the cases was established, including MINAM (Inteoceánica Sur), the Loreto regional government (Hidrovía and Mazán), Hunt Oil (Lote 76) and the Madre de Dios regional government. These organizations are key stakeholders for the projects, both as information providers and users. Once the institutional framework was established and institutional agreements signed, attention shifted to implementation of the selected compensation cases in Madre de Dios and Loreto. In all cases the EIA's baselines were reviewed, initial estimation of the residual impacts was carried out, and the equivalency metric for the Madre de Dios cases was defined. This metric is the starting point for development of the metric for the Loreto cases, as it needs to be adjusted to the aquatic

nature of the projects analyzed there. One of the main findings was that the existing environmental impact assessments (EIAs), aside from being poorly implemented in most cases, lack the information needed to identify the projects' residual impacts and the application of the compensation hierarchy. This limitation was overcome through our own data analysis to estimate residual impacts.

Next steps for the Madre de Dios cases are the selection of the portfolio of compensation sites, application of the opportunity cost layer, costing of the compensation/offset plans and identification of the financial mechanisms to ensure that resources are available for the implementation of the compensation plans while project impacts last. The same steps will be followed in Loreto, with the addition of the adaptation of the equivalency metric to the conditions of the projects there.

During this implementation phase several meetings were held with MINAM, SERNANP and conservation stakeholders in Madre de Dios and Loreto. These meetings were useful to gather information, share progress on the implementation of the cases, and present to MINAM and SERNANP initial recommendations about the adjustments needed in the EIA format to include the necessary information for developing compensation plans, as well as to provide input on the development of MINAM's technical guidelines for equivalency metrics. A recent internal CSF presentation describing the offset methodology and progress to date on the compensation test cases is included as Appendix 28.

Albertine Rift

In Year 4 we did not undertake additional activities in Uganda related to financial mechanisms for mitigation and compensation. In Year 3, financial mechanism options were discussed during the NEMA policy meeting and national policy forum in Kampala. In Year 4, CSF offered to provide technical support for the design of financial mechanisms for compensation and mitigation, but the Ugandan government was not in a position to move forward with this activity.

Key management issues and challenges in Year 3:

The compensation policy test cases have required complex institutional coordination with MINAM, WCS, SPDA and various stakeholders to agree on methodology and work plans, which has been an important and rewarding process but has lengthened the timeline of the implementation of the cases. We have also found that the existing environmental impact assessments (EIAs) lack the information needed to identify the projects' residual impacts and the application of the compensation hierarchy. This

limitation was overcome through our own data analysis to estimate residual impacts.

Sustainability of Life of Project Outcomes for Activity A3-1

The Peruvian compensation policy test cases are being supported with additional match funds from the Gordon and Betty Moore Foundation and the MacArthur Foundation, and analysis and communications efforts related to the policy test cases will continue through the end of 2016. Beyond the conclusion of BUILD, we will continue to disseminate our work on financial incentive mechanisms for greener infrastructure via CSF's infrastructure website and our participation in national and international meetings and events, and financial incentive mechanisms for mitigation and compensation will also be incorporated into our Smart Energy & Transportation Infrastructure Program, and in our infrastructure training curriculum. We currently do not have plans to continue working with the Ugandan government on financial mechanisms for mitigation and compensation beyond the conclusion of BUILD.

Activity A3-2: Ensure local people affected by infrastructure projects and compensatory measures are involved in monitoring mitigation and compensation.

Major Achievements and Progress in Year 4:

- Expected Year 4 Outcome: Information on mitigation and compensation provided to collaborating organizations in the Andes-Amazon and Albertine Rift that are working in areas where economic analysis projects are taking place.

  Result: In Year 4, we continued to share information on compensation and financial mechanisms with the Pucallpa monitoring groups and the newly formed group in Rio Branco, with stakeholders in the Tapajós basin, and with partners and collaborators for the Uganda analysis projects in and around Murchison Falls National Park and Bwindi Impenetrable National Park.

Regional Detail

Andes-Amazon:

In Year 4, local communications efforts in Peru about mitigation and compensation have focused on the Pucallpa and Rio Branco monitoring groups comprised of local and regional government officials, community representatives, and conservation organizations. Workshops and outreach events have provided information to TNC, Grupo de Análisis para el Desarrollo (GRADE), National Protected Areas Service

(SERNANP), the infrastructure monitoring team (Grupo de Monitoreo), Indigenous group representatives (Comunicadores Indigenous), the Ucayali Regional Government, Instituto del Bien Comun (IBC), Comissão Pró-Índio do Acre (CPI), SOS Amazônia, Acre state government (AEPI), and the National Indian Foundation (FUNAI).

In Brazil, we have made contact with a number of institutions and stakeholder groups in the Tapajós region as part of our valuation study, including the Ministério Público Federal, which has been the main legal institution supporting the indigenous and traditional communities agenda; the Fundação Nacional do Índio, the governmental institution that takes care of indigenous issues including the hydroelectric's impacts and proposed mitigation; Instituto Chico Mendes para a Biodiversidade, the governmental institution that manages the federal protected areas; Associação Comunitária do Pimental, association of the community that will be flooded by the dam's reservoir; Movimento Tapajós Vivo, a local resistance movement against the dam; and the leadership of the indigenous Munduruku, the most populous ethnic group in that region. We plan to include discussions about mitigation and compensation in communications efforts sharing the results of our valuation study (analysis described under Activity A1-3).

Albertine Rift:

In Uganda, the research teams from the National Environmental Management Authority (NEMA), Uganda Wildlife Authority (UWA), Wildlife Conservation Society (WCS), and International Gorilla Conservation Programme (IGCP) have implemented communication activities with local communities.

In Year 4, we provided technical information and support for communications efforts to the research teams, who will continue to implement activities involving local communities. In particular, IGCP has been very active communicating results of the Bwindi road analysis to local people, and has been working within the Uganda Poverty and Conservation Learning Group (U-PCLG). In mid-March 2015, an important draft position paper was presented by a representative of the U-PCLG at the Bwindi Mgahinga Conservation Area stakeholders meeting. IGCP is currently working with the U-PCLG to provide this brief and a description of the discussion from the stakeholders meeting to communities in local languages as well as in English.

Key management issues and challenges in Year 4:

In the Andes, local communications efforts have focused on areas where analysis projects are currently taking place, via the Pucallpa and Rio Branco monitoring groups and various Tapajós stakeholders including local and regional government officials,

community representatives, indigenous groups, and conservation organizations. In the case of the Andes-Amazon, we have been successful in providing information and technical support directly to indigenous community groups.

In Uganda, we have found that directly involving potentially affected people in monitoring mitigation and compensation has proven challenging because of political and social tensions around infrastructure development. This is especially true for a foreign NGO in Uganda. Local communications efforts have been most successful when they focus on areas where analysis projects are taking place. In Uganda, local partners have implemented any activities that have to do with the involvement of local communities in policy processes (NEMA) or with the infrastructure analysis projects (UWA, NEMA, WCS, IGCP), and we have given technical support to help them develop their presentations and materials.

Sustainability of Life of Project Outcomes for Activity A3-2

Beyond the conclusion of the BUILD program, we will continue our efforts to communicate with the Pucallpa and Rio Branco monitoring groups, with relevant organizations in the Tapajós basin, and with the Uganda analysis teams (NEMA, UWA, WCS, and IGCP) about any mitigation and compensation opportunities or commitments.

III. Success Stories and Lessons Learned

A Synthesis Report of Success Stories and Lessons Learned will be developed as part of our BUILD close-out reporting.

IV. Next Steps and Priorities

Our long-term vision is to make biodiversity conservation and management a central component of large-scale development design and implementation. Therefore, our long-term commitments are to continue:

- Effectively communicating that the development of smart infrastructure is only possible if decision-making includes a rigorous economic analysis of impacts and alternatives.
- Building capacity within civil society and governments to understand and conduct comprehensive economic analyses of infrastructure projects.

- Providing support to governments and civil society to design and apply policy that ensures environmentally, socially, and economically sound selection and implementation of large-scale infrastructure projects.

Energy and transportation infrastructure development has been identified as one of CSF's four priority program areas in our 2015-2020 strategic plan. We believe that an economics-based approach has the potential to have significant impacts in support of biodiversity by improving environmentally destructive and economically inefficient policies and projects. We will therefore continue to focus on improving access to information about large-scale infrastructure development in our engagement with governments, in our publications, communications outreach and online tools, and in our efforts to participate in key national and international meetings and events. We will continue improving our online HydroCalculator and Roads Filter analysis tools and the infrastructure portion of our website, and we plan to expand our infrastructure project inventory. We are also planning to create additional online materials and training targeted at media and other non-technical audiences to help them understand the economic and environmental impacts of infrastructure development as well as international standards, safeguards and best practices. We will also continue to disseminate our work on financial incentive mechanisms for greener infrastructure via CSF's infrastructure website and our participation in national and international meetings and events, and financial incentive mechanisms for mitigation and compensation will also be incorporated into our Smart Energy & Transportation Infrastructure Program, and into our infrastructure training curriculum.

We will continue working with the Peruvian government on infrastructure policy reform and compensation policy test cases through the end of 2016 with funding from the Gordon and Betty Moore Foundation and the MacArthur Foundation. Beyond the conclusion of BUILD, we do not have specific plans to continue working with the Ugandan government on infrastructure policy reform, but we will continue participating in the Brazilian Infrastructure Working Group, and will also seek any additional opportunities to engage with governments and organizations in the Andes-Amazon, Albertine Rift and Himalayas in order to guide and improve infrastructure policies in favor of biodiversity protection.

We will also continue to focus on large-scale infrastructure for our training and analysis work to change outcomes of environmentally destructive and economically inefficient projects. The follow-up analysis projects in the Andes-Amazon (Pucallpa analysis) and Albertine Rift (Uganda projects) will conclude at the close of the BUILD program, but we will continue collaborating with our partners to help disseminate any additional results or communications products developed by the research teams in an effort to modify these projects in favor of greater biodiversity protection.

In Brazil, we will continue the work in the Tapajós basin, focusing on a strong communication strategy and deepening of strategic questions. We plan to publish the study and present it in different workshops, one focused on the local population and decision makers, and another focused on academics, government institutions and NGOs. There will also be opportunities to disseminate our results in conferences, participation in debates, and through media reports. We have received a small grant from the Porticus Foundation to conduct some of these follow-up dissemination activities in the region. We are also in discussions with the Insituto Centro de Vida (ICV) about the replication of this study for other dams planned for the upper part of Tapajós basin, in the Juruena region where there is a request from local communities to better understand the potential impacts of the dam on their livelihoods. With TNC, we are discussing a possible analysis to evaluate the impacts of additional planned infrastructure development on the Tapajós river on ecosystem services and local populations throughout the entire basin.

After the conclusion of the BUILD Program, we will continue to develop and improve our infrastructure curriculum for integrated environmental-economic analysis. This curriculum will be incorporated into CSF courses, both in-person and online, and shared through our network of Training Partners. We have developed a successful In-house training model through our valuation training with Ministry of Environment (MINAM) staff in Peru that combines both in-person workshops and distance learning curriculum that we expect to improve and replicate in the future. We will also explore any additional opportunities to integrate this training into USAID internal capacity building efforts.

V. Photos and Videos

VI. Other Appendices

Photos, Videos and Appendices can be found at
https://conservationstrategyfund.onehub.com/csf-project-2011-2015-build-reporting/pages/files