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Towards the Development of Metrics for No Net Loss of Biodiversity in Peru

Ernani Pilla, Editor

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Acronyms

ANA	National Water Authority
BBOP	Business and Biodiversity Offsets Programme
CDC	Centro de Datos para la Conservación (Conservation Data Center, part of UNALM)
CI	Conservation International
CIAM	Regional Amazonian Governments platform
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSF	Conservation Strategy Fund
CTF	Conservation Trust Fund
DGFFS	Forestry and Fauna Agency
EIA	Environmental Impact Assessment
EU	European Union
FT	Forest Trends
GBIF	Global Biodiversity Information Facility
GIZ	German Development Agency
GOREMAD	Regional Government of Madre de Dios
IBA	Important Bird Areas
IDB	InterAmerican Development Bank
IFC	International Finance Corporation
IIAP	Research Institute for the Peruvian Amazon
INRENA	Instituto Nacional de Recursos Naturales (National Institue of National Resources)
IUCN	International Union for the Conservation of Nature
MEF	Ministry of Economy and Finance
MINAG	Ministry of Agriculture
MINAM	Ministry of Environment

MINEM	Ministry of Energy and Mining
MTC	Ministry of Transport and Communications
NGO	Non-governmental Organization
NNL	No Net Loss (See Glossary)
NPI	Net Positive Impact (same as “net gain”)
OEFA	Agency for Environmental Assessment and Control
ONERN	Oficina Nacional de Evaluación de Recursos Naturales (National Office for the Evaluation of Natural Resources)
PA	Protected Area
PES	Payment for Ecosystem Services
PNUD/UNDP	United Nations Development Programme
PS6	Performance Standard 6 (IFC)
SEA	Strategic Environmental Assessment
SEIA	Sistema de Evaluacion de Impacto Ambiental
SENACE	Servicio Nacional de Certificación Ambiental para las Inversiones Sostenibles (National Service of Environmental Certification for Sustainable Investments
SERNANP	Peruvian National Parks Service
SINIA	National System of Environmental Information
SPDA	Sociedad Peruana de Derecho Ambiental (Peruvian Society for Environmental Law)
TBC	Transboundary Conservation Specialist Group (IUCN)
TNC	The Nature Conservancy
UNALM	Universidad Nacional Agraria La Molina
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund
ZEE	Ecologic and Economic Zonification

Glossary

Averted risk: The removal of a threat to biodiversity for which there is reasonable and credible evidence.

Averted-risk offset: Biodiversity offset interventions that prevent future risks of harm to biodiversity from occurring.

Benchmark: A benchmark can be used to provide a reference point against which losses of biodiversity due to a project and gains through an offset can be quantified and compared consistently and transparently. It usually comprises a number of representative and characteristic „attributes„ used to represent the type, amount and quality of biodiversity which will be lost / gained. Comparing the observed level (or „score") of each benchmark attribute at the impact site (before and as predicted after the impact) against the level at the benchmark can help to quantify the loss of biodiversity to be caused by the project. Similarly, comparing the observed level (or „score") of each benchmark attribute at the offset site (before the offset and as predicted after the offset intervention) against the level at the benchmark can help to quantify the gain in biodiversity caused by the offset. A benchmark can be based on an area of land that provides a representative example, in a good condition, of the type of biodiversity that will be affected by the proposed development project.

Benchmark attributes: Benchmark attributes are the features of a biotope or habitat used to create a benchmark to represent the type, amount and quality of biodiversity present at a site. They may have to do with structure, composition and function of individual species, features of communities/assemblages, or even characteristics that operate at the landscape scale, such as connectivity.

Currency: Currencies (or metrics) are the unitary measures of biodiversity lost, gained or exchanged. This varies from very basic measures such as area, to sophisticated quantitative indices of multiple biodiversity components, which may be variously weighted.

Graduated response: An approach whereby under an offset scheme, like-for-like criteria for a significant biodiversity loss may be set so that a close match is required for the offset, while the criteria for losses of biodiversity of lower significance may be quite flexible, for example by allowing exchange within a wider range of biodiversity types.

Like-for-like: Conservation (through the biodiversity offset) of the same type of biodiversity as that affected by the project. More frequently referred to as in-kind. Several biodiversity-offset policies are based on a principle either of "like-for-like" or of "like-for-like or better."

No Net Loss (NNL)/Net Gain or Positive Impact (NPI): A target for a development project in which the impacts on biodiversity caused by the project are balanced or outweighed by measures taken to avoid and minimise the project's impacts, to undertake on-site restoration and finally to offset the residual impacts, so that no loss remains. Where the gain exceeds the loss, the term "net gain" or "net positive impact" may be used instead of no net loss. No net loss (or net gain/positive impact) of biodiversity is a policy goal in several countries and is also the goal of voluntary biodiversity offsets. Achieving NNL requires creating meaningful indicators and metrics that allow measurement of residual impact and the gains from an offset program.

Residual impact: The remaining adverse impact on biodiversity after appropriate avoidance, minimization and rehabilitation measures have been taken according to the mitigation hierarchy.

Trading up: Conserving components of biodiversity that are a higher conservation priority (for example because they are more irreplaceable and vulnerable) through an offset rather than those affected by the development project for which the offset is envisaged.

1 Introduction and context

Over the past two years, the Wildlife Conservation Society (WCS) and Forest Trends (FT) have worked closely to support the Government of Peru in developing its regulatory framework on biodiversity offsets through training workshops and direct consultations and support. Recently, our organizations began working to develop implementation mechanisms for a proposed policy on like for like compensation (biodiversity offsets) being discussed by the Peruvian Ministry of Environment (MINAM) that will result in no net loss of biodiversity through biodiversity offsets.

Given the challenges that MINAM could face in the short term to prepare for implementation of the proposed offset policy, FT and WCS undertook a contract with the Interamerican Development Bank (IDB) to prepare interim advice to MINAM on:

1. Development of proposed metrics for determining loss and gain of biodiversity including explanatory guidelines on how to quantify loss and gain in terms of area and condition and how to determine "like-for-like or better" as outlined in the technical meeting held in 2012 and discussed with MINAM by FT and WCS in 2013. (FT lead)

2. Establishment of the scientific framework (i.e. data sets, maps, classifications of habitat types and conditions) to support the metrics for loss and gain and determination of like-for-like or better based on existing data and field analyses conducted by WCS. This will cover terrestrial and aquatic ecosystems (non-marine) and will draw as much as possible on existing Peruvian classifications and datasets, so these can readily be used as the basis for the metrics in point 1. This will be coordinated closely with the work outlined under point 1 above to yield the desired results and will draw on the advice of relevant Peruvian experts from a variety of organisations. (WCS lead.)

The final deliverables of the project were described in the terms of reference as documents setting out proposed metrics and exchange rules, with associated guidance for applying them, for immediate use by MINAM to explain to developers how to proceed when the new policy takes effect.

However, the launch of the new policy does not mean its implementation would take place immediately. Legislation now establishes that implementation of the policy will not be required until such time that the functions of review and approval of EIAs has been transferred from the various ministries to the National Service of Environmental Certification for Sustainable Investments

(SENACE), a process that could take until the end of 2014 or the beginning of 2015. In the meantime, the implementation process for the proposed policy will take place on a voluntary basis, with companies specifically agreeing to apply the compensation policy. The Ministry expects to identify specific companies to apply the principles of no net loss (NNL) and net gain to garner important experience for future implementation.

This transition period would provide MINAM and SENACE time to put in place the systems necessary to meet the proposed policy objectives and provide the foundation for its possible future application and implementation through SENACE. The pilot projects undertaken during this transition period would be instrumental in creating the data collection process and establishing the necessary benchmarks against which the system of metrics proposed in this document can be applied.

The first section of this report provides a short overview of biodiversity offset principles and their development in the international arena. This is followed by a review of the current status in Peru of biodiversity offsets along with a comparison to existing best practice. This section also provides a description of the institutional setting and process that would be necessary to introduce a NNL policy in Peru.

Sections 2 and 3 focus on the necessary scientific baseline and metrics required for establishing a biodiversity offset system. Section 2 offers a discussion of the concept of like-for-like and reviews the state of information on biodiversity in the country, much of which is available at a scale that is inadequate to support the classification required to deliver NNL. Section 3 creates the foundation for development of a system of metrics that takes into account the area of the impact as well as the quality of the habitat impacted by the project to come up with a unit of exchange. Unfortunately, due to the lack of adequate information, specific metrics for different habitat types have not been developed. The framework for a system of metrics is proposed and the system for calculating gains outlined, but the specific metrics need to wait for the development of an appropriate classification system based on work in the field. We recommend that this work begin as soon as possible so that a system of metrics can be developed, ideally in those areas where projects are planned.

As a result, Section 4 provides the elements and activities for a roadmap and next steps on implementing a biodiversity offset scheme in Peru in the short, medium, and long-term, with specific actions identified that can help move the process forward in coordination with MINAM, SENACE, and other stakeholders. The report concludes with a final section on key recommendations on steps MINAM could take to establish the long-term system for compensation (e.g. improved like-for-like or better criteria and improved metrics).

This report[1], which was made possible with the generous contribution from IDB, provides some initial recommendations to the Government of Peru on further advancing the implementation of a NNL policy. The drafting of the report included consultations with key representatives from government, academia (Universidad Nacional Agraria La Molina), and civil society (Sociedad Peruana de Derecho Ambiental -SPDA), all of whom are working on some aspects of biodiversity offsets in Peru.

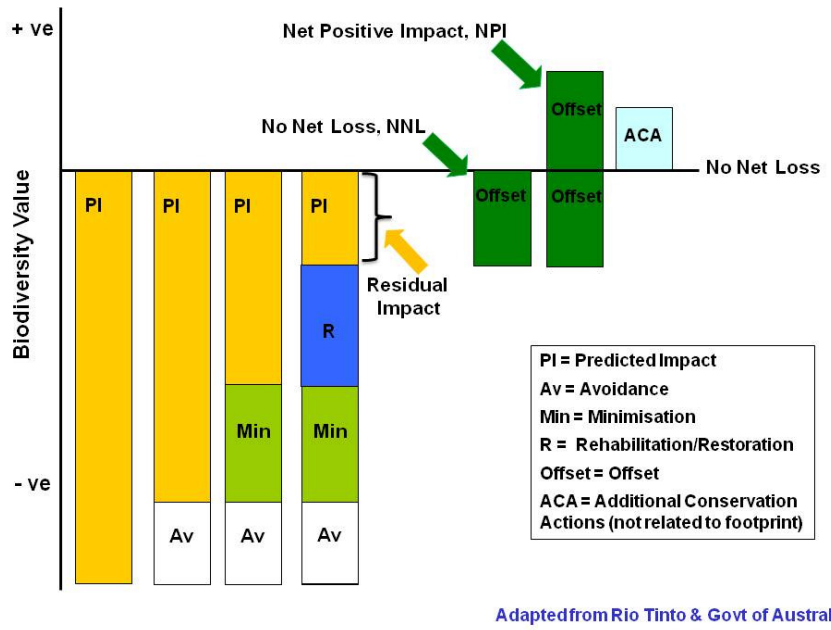
1.1 Key features and principles of biodiversity offsets

There are many different approaches and methodologies to compensation and biodiversity offsets around the world, but analysing them reveals that there are also many shared principles among them, with some providing more specific guidance on the offsets and the achievement of no net loss (see Inter American Development Bank –IADB- Environmental Safeguards Policy, International Finance Corporation-IFC- Performance Standard 6 and Guidance Notes, Business and Biodiversity Offsets Programme-BBOP- Principles and Standard, the International Union for Conservation of Nature-IUCN-/Transboundary Conservation Specialist Group-TBC- Report on Forecasting the Path towards a Net Positive Impact on Biodiversity for Rio Tinto QMM).

Biodiversity offsets and compensation are defined in a number of different ways, but all definitions place biodiversity offsets as the last step in the mitigation hierarchy, illustrated graphically in Box 1:

[1] This report was prepared by Carlos Cañas*, Oscar Castillo*, Michael Crowe^, Amrei von Hase^, Kerry ten Kate^, Patrick Maguire^,, Mariana Montoya*, Mariana Varese*, Ray Victurine* and Sebastian Winkler^. Those marked with ^ are from Forest Trends and those marked with * are from WCS.

Box 1: The Mitigation Hierarchy (source: BBOP, 2013)



The design and implementation of biodiversity offsets are guided by generally accepted core principles. Box 2 provides a list of principles developed by the BBOP Advisory Group as part of its work on the development of offset best practice.

Box 2: Principles on Biodiversity Offsets supported by all the members of the BBOP Advisory Group

Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development* after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity.

These principles establish a framework for designing and implementing biodiversity offsets and verifying their success. Biodiversity offsets should be designed to comply with all relevant national and international law, and planned and implemented in accordance with the Convention on Biological Diversity and its ecosystem approach, as articulated in National Biodiversity Strategies and Action Plans.

1. ***Adherence to the mitigation hierarchy***: A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimization and on-site rehabilitation measures have been taken according to the mitigation hierarchy.

2. ***Limits to what can be offset***: There are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected.

3. ***Landscape context***: A biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, social and cultural values of biodiversity and supporting an ecosystem approach.

4. ***No net loss***: A biodiversity offset should be designed and implemented to achieve in situ, measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity.

5. ***Additional conservation outcomes***: A biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. Offset design and implementation should avoid displacing activities harmful to biodiversity to other locations.

6. ***Stakeholder participation***: In areas affected by the project and by the biodiversity offset, the effective participation of stakeholders should be ensured in decision-making about biodiversity offsets, including their evaluation, selection, design, and implementation and monitoring.

7. ***Equity***: A biodiversity offset should be designed and implemented in an equitable manner, which means the sharing among stakeholders of the rights and responsibilities, risks and rewards associated with a project and offset in a fair and balanced way, respecting legal and customary arrangements. Special consideration should be given to respecting both internationally and nationally recognized rights of indigenous peoples and local communities.

8. ***Long-term outcomes***: The design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation, with the objective of securing outcomes that last at least as long as the project's impacts and preferably in perpetuity.

9. ***Transparency***: The design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner.

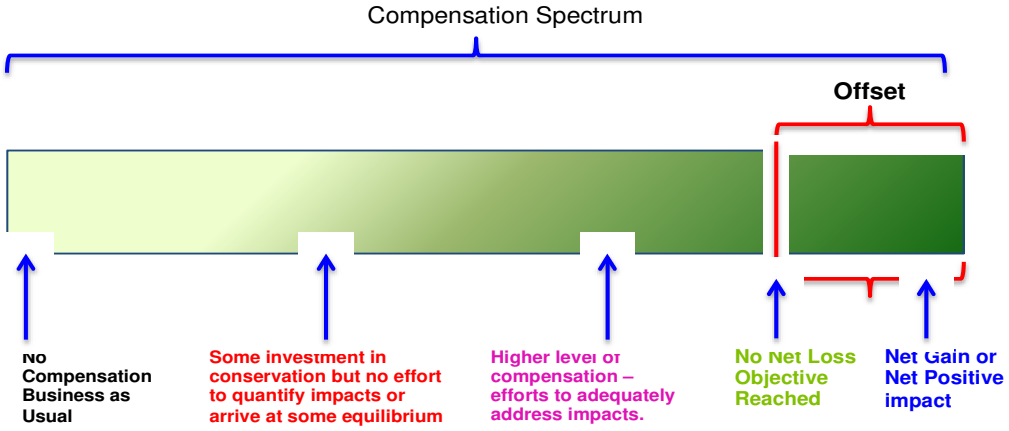
10. ***Science and traditional knowledge***: The design and implementation of a biodiversity offset should be a documented process informed by sound science, including an appropriate consideration of traditional knowledge.

* While biodiversity offsets are defined here in terms of specific development projects (such as a road or a mine), they could also be used to compensate for the broader effects of programmes and plans.

Yet, not all efforts to compensate for biodiversity losses meet the strict standard for an offset. Compensation actions cover a broad range of approaches, which include but are not necessarily offsets. According to BBOP, compensatory conservation "involves some investment in biodiversity conservation as a result of a project, but does not necessarily satisfy [all offset] requirements," especially with regard to NNL. Achieving no net loss or a net gain in biodiversity assumes that appropriate metrics and indicators are in place, and that the impacts can be offset. Many cases exist where companies have financed conservation actions, including creation of protected areas as a way to compensate for their impacts but did not develop metrics or indicators to quantify the losses and gains. Without those specific metrics, it is not possible to determine a net loss or net gain. Conservation actions may be beneficial but were not developed in line with particular metrics. Offsets represent a high level of compensation, reflecting best practice efforts to ensure that losses of specific types of biodiversity are blanked by gains in similar biodiversity.

Figure 1 demonstrates the spectrum from no compensation at all through various levels until reaching a level of best practice compensation, or NNL at the far right of the figure.

Figure 1. Compensation vs. offsets



Examples of compensation measures that would not necessarily reach the higher standard of offsets in this compensation hierarchy could be, *inter alia*:

- A financial transfer settling the balance of an ecological debt with no defined field actions attached to it
- A partial compensation of impacts and therefore a residual loss, with no quantification and equivalence between impacts and gains
- Conservation actions that are short-term and do not last at least for the duration of the compensated impacts
- Measures implemented in habitats or with species other than the ones impacted, possibly because the impact cannot be offset (irremediable loss, lack of equivalent land, ecological engineering uncertainties)
- Additional compensation measures that do not translate into measurable conservation net gains on the ground such as training, capacity building, research, and education

Compensation therefore addresses a broad range of activities that may or may not result in NNL of biodiversity. The key for biodiversity conservation is to ensure that any compensation measures are designed as near to compliance with offset principles as possible to support conservation objectives and minimize the biodiversity impacts from infrastructure and development investments. In the case of Peru, where the stated goal is NNL of biodiversity, compensation actions should be designed and targeted to achieve NNL, or in other words, to deliver an offset. Reaching this goal will require an investment of time and expertise to develop the appropriate metrics, financial mechanisms and institutional capacity within national and regional governments, and the private sector.

1.2 International evolution of biodiversity offsets

There is a plethora of approaches and initiatives in the field of biodiversity offsets. Since its establishment in late 2004, BBOP[2] has brought together an international and multi-stakeholder platform, which has fomented additional interest while providing a space to ensure coherence and standard setting on biodiversity offsets. The mechanisms and approaches developed in BBOP by experts in many countries have also informed the content of this report.

Offsets started some 30 years ago in the US and have evolved over the years.[3] The last decade has seen acceleration in government policy, guidance and legislation that enable biodiversity offsets, including increasing commitments by individual companies. In 2011, Madson et al. documented the existence of 45 compensatory mitigation programs ranging from programs with active mitigation banking of biodiversity credits to programs channeling development impact fees to policies that drive one-off offsets. The authors identified an additional 27 in various stages of development. The United States led the development of offsets as a result of its NNL for wetlands under the Clean Water Act during the late 1980s. Other countries are now exploring the concept of offsets applied to biodiversity more generally:

- The European Union (EU) with its 28 Member States is currently developing a NNL initiative, which will further boost the demand for offsets. Germany, the United Kingdom, France, and most recently Spain have some type of policy and legislation in place and other countries in Europe, such as the Italy and Sweden, are already following suit.

- In Africa, a system is being developed by South Africa at a national level and at a state level. Namibia is integrating biodiversity offsets into their Strategic Environmental Assessment (SEA). Uganda, Madagascar, Gabon, Mozambique, Guinea are also initiating processes to develop some type of policy, legislation and guidance on biodiversity offsets.

- In Asia, the efforts by Vietnam, Japan, and Mongolia are well advanced.

- In Oceania, there is federal law and policy in Australia and various states and territories (i.e. New South Wales, Victoria, Northern Territories, Queensland, and Western Australia) also

[2] http://bbop.forest-trends.org

[3] Definitions of biodiversity differ to some degree but generally agree on a few key principles as developed in the definition developed by BBOP in 2004 - Biodiversity offsets are "measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. Some definitions specifically include that the goal of biodiversity offsets is to attain no net loss of biodiversity (or a net gain), while others do not include that defintion (See BBOP, IFC PS6, Government of NSW, Australia, Government of New Zealand, Government of Colombia).

have law and policy in place, while developments by the national government are underway in New Zealand.

- In Central and Latin America, Mexico, Costa Rica, Colombia, Chile, Argentina, Paraguay and Peru are among the countries that have or are developing biodiversity offset or compensation policies requiring biodiversity offsets.

A variety of countries are also looking at the potential for developing markets for offset credits. Development of markets requires the existence of regulations that require offsets, thereby creating a demand that conservation banks could supply, for example. Currently the United States dominates the market for offset credits with annual sales ranging between US$ 2 and 3.4 billion. The global value of these credits is at least US$ 4 billion but more precise figures are not available due to a lack of transparency and data collection.

In parallel, over recent years, financial institutions have increasingly incorporated the consideration of biodiversity offsets into their environmental safeguard systems. The most recent is the IFC with its Performance Standard 6 (PS6), which entered into force on January 1st, 2012, and requires a net gain for impacts on critical habitat and NNL, where feasible, for impacts to natural habitat (IFC 2012). The financial institutions, which have adopted the Equator Principles, have subscribed to PS6 and are now incorporating biodiversity offsets into their policies. In addition, the World Bank is currently reviewing its Environmental Safeguard System and its representatives have stated that the revised version is likely also to incorporate biodiversity offsets more explicitly.

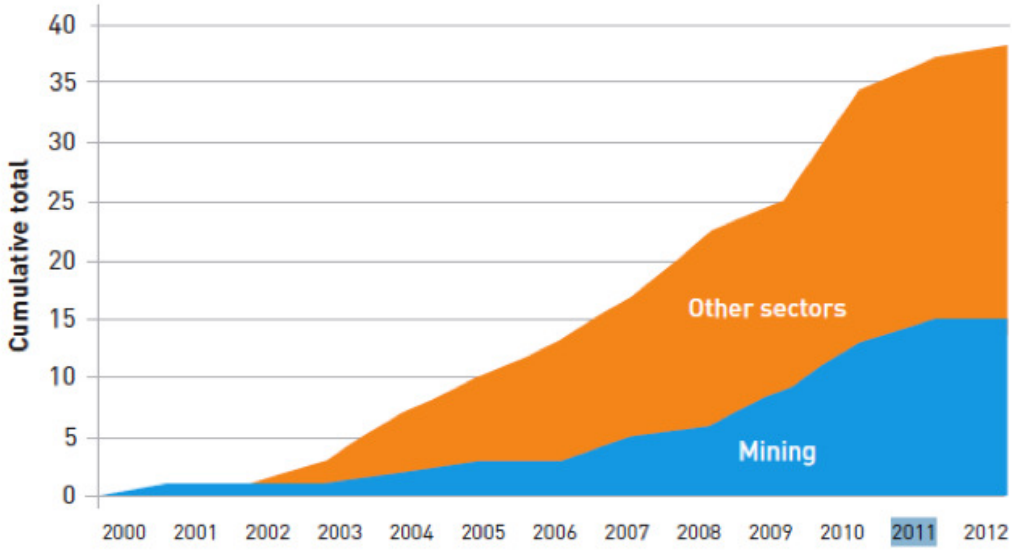
The IDB already incorporates the concept of compensation and offsetting into its Environment and Safeguards Compliance Policy. Under that policy, the IDB attempts to approve financing for activities sited on lands that have already been converted and prefers to avoid support for projects that involve significant conversion or degradation of natural habitats[4]. However, the IDB does recognize that projects will be proposed that do impact on these natural habitats. Such projects will be considered only under specific circumstances, such as: (i) there are no feasible alternatives

[4] IDB defines natural habitats as biophysical environments where: (i) the ecosystems' biological communities are formed largely by native plant and animal species; and (ii) human activity has not essentially modified the area's primary ecological functions. Natural habitats may be sites that (i) provide critical ecological services required for sustainable human development (e.g., aquifer recharge areas, areas that sustain fisheries, mangrove or other ecosystems that help to prevent or mitigate natural hazards); (ii) are vital to ensure the functional integrity of ecosystems (e.g., biological corridors, natural springs); and (iii) have high levels of endemism. Natural habitats may occur in tropical humid, dry, and cloud forests; temperate and boreal forests; Mediterranean-type shrub lands; natural arid and semi-arid lands; mangrove swamps, coastal marshes, and other wetlands; estuaries; seagrass beds; coral reefs; underwater vents; freshwater lakes and rivers; alpine and sub-alpine environments, including herb fields, grasslands, and páramos; and tropical and temperate grasslands.

acceptable to the Bank; (ii) comprehensive analysis demonstrates that overall benefits from the operation substantially outweigh the environmental costs; and (iii) mitigation and compensation measures acceptable to the Bank—including, as appropriate, minimizing habitat loss and establishing and maintaining an ecologically similar protected area that is adequately funded, implemented and monitored. The Bank will not support operations that introduce invasive species. These specific measures, along with the policy requirements for implementation of effective EIAs to determine the impacts prior to project development, are consistent with the policy intent of the Peruvian draft offset policy. This convergence of bank lending policy and national governmental policy represents an important step in solidifying efforts to protect and manage biodiversity and ecosystem services in countries around the world.

Not only are there new developments in biodiversity policy, guidance and legislation at national and provincial level, and lender policy requiring offsets, as described above, but a growing number of companies are also making voluntary commitments to NNL. The following figure (Fig. 2 is Fig. 5 from TBC, 2012) depicts the evolution within the private sector:

Figure 2: The rise in No Net Loss-type commitments in the private sector 2000-2012



There are currently 38 companies with no net loss-type commitments, including 15 from the mining and aggregates sectors (TBC 2012b).[18]

Despite the growth in voluntary commitments by companies, there is general recognition that a policy approach to offsets offers a more effective way to ensure the protection of biodiversity.

Regulation provides the guidelines that all investors must follow, creating a level playing field for all companies operating in a country, which is appreciated specially by those companies who have already made best practice commitments. The requirement for offsets also creates a level of certainty that can lead to expansion of protected areas with greater certainty of funding, or the investment in conservation by private entities, which recognize the opportunity of selling offset credits to developers.

1.3 Peru's work on biodiversity offsets

In 2012, MINAM embarked on a stakeholder-led process to develop a regulatory offset policy ('the policy') to ensure NNL of biodiversity resulting from investment from large-scale infrastructure development projects in the country. Consultations with local stakeholders were followed by a technical workshop including international experts who contributed to discussions and to the development of a draft regulation in July 2012. The draft regulation, *Lineamientos Para La Elaboracion E Implementacion Del Plan Compensacion Ambiental En El Marco Del Sistema De Evaluacion De Impacto Ambiental – SEIA,* went through a variety of revisions during 2012 and a final draft for comment was developed for discussion in mid-2013. WCS, FT and local partner SPDA, among others, contributed throughout this process.

In 2013, the Government of Peru, with support from the SPDA and WCS, convened an international workshop with participation of representatives of the Ministries of Environment of Peru, Colombia, Ecuador and Chile, civil society, and the private sector to review country-level progress toward implementation of the mitigation hierarchy and the use of offsets to address residual impacts. The workshop demonstrated growing interest among governments, civil society, and the private sector for establishment of effective rules of the game to ensure protection of biodiversity and establish a level playing field for companies and their efforts to reduce and offset their impacts. At the time of the workshop, the Ministry of Environment of Peru presented the key elements of the compensation or offset policy that was under development, and which has yet to be finalized.

In September 2013, IDB provided funding to WCS and FT to support MINAM in further advancing the proposed biodiversity offset policy in Peru. The objective of the 13-week contract was to develop a system of metrics and establish the scientific framework to support the development and use of those metrics. The team developed the framework for a system of metrics and began to analyse the existing data only to find that there was limited data of the quality and scale necessary to develop adequate benchmarks and develop the system of metrics. This finding led the team to identify key gaps and steps necessary to be able create and operationalize the system of metrics during the time between the promulgation of the policy and the formal take over of Environmental

Impact Assessment (EIA) system responsibilities by SENACE. The team suggests adoption of a technical plan for MINAM to begin the process of integrating offset standards and mechanisms into the EIA system and the newly created agency, SENACE, including science-based guidelines for effective offset metrics by as soon as possible after the policy comes into effect in order to support its first-stage implementation. This report provides the findings of this work and the result of some initial consultations with MINAM and other stakeholders.

Originally anticipated for the end of 2013, the adoption of the policy has been delayed and an exact date for its release is not known. The intent is that it will be released sometime in the near future, with the launch anticipated in the first quarter of 2014, and implemented through MINAM's specialised agency - SENACE. Created in December 2012 (Law 29968), SENACE will be the authority responsible for the review and approval of all EIAs for category III projects (large-scale investments), starting probably in 2015.[5] According to the policy, Category II projects may particularly be required to implement a Compensation Plan due to the severity of the potential environmental and social impacts and may also be addressed by SENACE. Initially, however, these projects will likely remain within the jurisdiction of the relevant Ministries.

The draft policy requires that all project investments, both public and private, that fall into Category III within existing EIA criteria, follow the mitigation hierarchy and deliver NNL of biodiversity. This implies that companies will need to demonstrate their efforts to avoid and minimize their impacts and to develop an effective plan to offset residual impacts. The draft policy also established that SENACE would be responsible for the implementation of the policy, so the implementation timeline of the policy is closely tied with SENACE's. Current legislation implies that the policy will not be implemented until such time that all EIA responsibilities have been transferred from the Ministries to SENACE. The transfer should start at the end of 2014 or early 2015 when SENACE is expected to be operational. Until the transfer is complete for each sector, companies can choose to voluntarily implement the policy and help strengthen its implementation.

Implementation of the new policy will require that companies wishing to obtain an environmental license develop a biodiversity offset plan. The draft policy establishes a broad framework for delivering NNL through application of the mitigation hierarchy and implementation of offsets but does not provide sufficient guidance to companies on how to achieve NNL. In part, this is due to the fact that the information upon which this guidance should be developed is still insufficient and

[5]The process of creation and implementation, and the transfer of functions, of SENACE are on going. In April 2013, a timeline was established (DS-003-2013-MINAM), according to which the phase of transference of competences (phase 3) will start only after phases 1 (installation of Directive Board and Chief) and 2 (preparation and implementation of tools) are completed. Phase 1 was completed on December 9, 2013, with the designation of the Chief of SENACE (RS-012-2013-MINAM) and Phase 2 may take ten months according to the established timeline.

uneven across different habitats and scales (see section 2.2). As part of the overall strategy for operationalizing the regulation, we have recommended to MINAM a medium-term strategy (five years) for the full development of policies, processes and technical guidelines to fill the data gaps and make the system operational. However, in the short-term (starting as soon as SENACE is ready to begin reviewing Category III projects (most likely in 2015), there is a need for interim arrangements for the key parts of the system so that it can get up and running when needed. The development of appropriate exchange rules and metrics so that companies can measure both biodiversity losses and gains and deliver an offset is a key component to the success of the implementation of the policy.

Once the policy is released, and in the timeline established for its implementation, projects falling within its scope will need to comply with its provisions. In other cases (namely, for projects that do not fall within Category III), sectorial ministries in government (e.g. the Ministry of Energy and Mines) will have the power to decide on proposed compensation plans using the current sectorial regulations (reglamentos) for environmental protection, essentially a continuation of business as usual. Given the general nature of the draft NNL policy, which defers development of much of the operational detail promised to 'complementary legal documents', developers are highly likely to request immediate guidance from MINAM for implementation in order to demonstrate compliance, albeit voluntary compliance at this stage. Consequently, clear interim guidance for projects needs to be in place in the short term that companies can apply in the field. Pilot experience from developers using the interim guidance will contribute to further policy development and implementation and will increase the effectiveness of SENACE over the long term. This guidance will allow companies to comply with the new policy in the short term while final provisions are put in place as approaches are refined and data become increasingly available.

In terms of achieving NNL, experience indicates that the best results come from metrics that combine area and condition measurements (quantity and quality of biodiversity loss and gain), accommodate the needs of threatened species of conservation concern, and also establish clear "exchange rules" so developers can easily apply the principle of ecological equivalence, or "like-for-like or better." Metrics and exchange rules of this kind are proposed in this document.

In the process of developing the draft policy, the Peruvian Government committed to following best international best practice, adopting many of the important principles for effective offsetting including the following:

- Adherence to the mitigation hierarchy

- NNL of Biodiversity, including the concept of ecological equivalence ("like-for-like")
- Additionality
- Long-term conservation outcomes (sustainability of the offset)

In the draft version of the policy, MINAM indicates the importance of identifying priority areas for offsets and for mapping areas of offsets to assist planning (landscape context). One gap between the key principles in best practice and the contents of the policy is currently the lack of establishment of clear limits as to what can be offset. Conditions may be such that impacts will cause loss of important species or irreparable harm to certain ecosystems. In such cases, the government should consider the establishment of no-go areas where projects would either not be allowed or be required to go through review to determine the importance of the project and, if approved, what measures and activities would need to be put in place to ensure adequate compensation.

However, the detailed methodologies and guidelines for how these principles are to be applied in designing and implementing offsets in Peru, together with the institutional mechanisms and procedures for doing so, have yet to be established. The Peruvian draft policy on offsets sets out some particular tasks to resolve these issues in the future, including:

- Development of complementary instruments to the policy, to guide the appropriate characterization of the impacted area and of the offset area
- Development of guidelines for the characterization and valuation of impacts and offsets, including methodologies and offsets
- Preparation of a clear outline of the required sections and elements of the Environmental Compensation Plan (offset)
- Establishment of a system for accrediting institutions and registering experts to undertake the development of Environmental Compensation Plans. This system may be associated with the recently created system for accrediting institutions that conduct environmental impact studies
- Development of complementary guides and technical manuals, to be approved by MINAM, which will define the minimum necessary variables for characterising the area impacted
- Development of guidelines and establish requirements for the design and implementation of offset plans

- Development of guidelines addressed to the government staff in charge of reviewing/approving the offset plan, and evaluation of the implementation of the plan
- Development of guidelines for monitoring the offset plan
- Development and implementation of pilot projects and case studies
- Establishment of an offsets cadastre managed by MINAM's National System of Environmental Information (SINIA)
- Generation of spatially-explicit baseline information on priority ecosystems, environmental services, habitats, ecological values, watersheds and wetlands, forest cover, and others; and, vulnerability or risk maps to identify natural areas, ecosystems or habitats under threat that will be modified if no additional conservation and protection measures are implemented. Part of this analysis will be used to help establish additionality criteria and guidelines.
- Development of a portfolio of priority offset areas in coordination with regional and local authorities, according to the priority types of ecosystems and considering the objectives of restoration and conservation of these ecosystems. SINIA will lead this process.

1.4 Moving toward development of implementation mechanisms

In recent months, the German Development Agency (GIZ) and the Peruvian Universidad Nacional Agraria La Molina (UNALM) have worked closely with MINAM to further advance the methodology and metrics for biodiversity offsetting in Peru. The choice was made to focus initially on the highland grasslands of Peru, given that much of the country's mining is carried out in this region and the availability of base line information on biodiversity and ecosystem characterization. It is envisaged to undertake a similar process of developing baselines and metrics for the coastal and rainforest zones at a later stage.

Highland grasslands in Peru above 3500 meters above sea level (masl) are characterized by three major regional ecosystems, namely:

- Tall grasslands (*pajonales*)
- Short grasslands (*césped de puna*)
- Shrubland (*tolares*)

The proposed methodology is based upon the condition of these ecosystems. As a first step, UNALM defines the 'optimal' condition of the ecosystems that will be used as the reference for the impacted

ecosystems. Functional attributes (Site Floristics; Soil Stability; and Biotic Integrity) and several indicators within each attribute serve to describe the optimal condition and also serve to evaluate the specific situation of an ecosystem in the field. Based on the findings from applying the indicators, the methodology proposes a range from 1 to 10, where 10 would be the value for an optimal condition or the 'perfect' site.

The work of UNALM and GIZ complements the work undertaken by FT and WCS under the grant provided by the IDB, given that our proposed metrics are also based on area x condition. This should allow convergence on an approach that embraces quality as well as area in determining the losses and gains in biodiversity caused by projects and offsets respectively.

2. 'Like-for-like or better'

2.1 The concept of 'like-for-like or better'

Biodiversity offsets involve exchanging a residual biodiversity loss at one place for a biodiversity gain at another. An important part of an offsetting policy is to define the 'rules' of this exchange process, usually referred to as the 'like-for-like-or-better' criteria. The biodiversity in one place is never exactly the same as the biodiversity in any other place, so setting like-for-like criteria becomes an exercise in categorising biodiversity into classes or types within which exchange will be permitted.

Like-for-like criteria

Like-for-like criteria can include the following:

- The type of biodiversity (e.g. vegetation type, habitat type, species type)
- Vicinity (where the offset can be located e.g. within the same bioregion)
- Ecological function
- Quality or condition requirement.

Classifications

The basic classification for like-for-like is by type. Classification of terrestrial biodiversity by type is usually based on vegetation (e.g. forest or ecological classes) or species. Vegetation classifications can also serve as habitat classifications for species.

The other basic classification is that of biodiversity value or priority. Priority classifications are based on characteristics such as rarity and level of depletion of the types of vegetation, species habitat, and the condition and connectivity of native vegetation. These conservation priority classifications are usually referred to by titles such as conservation significance, biodiversity importance or biodiversity score and the individual classes referred to as high, medium and low.

Priority classification allows the application of two important like-for-like techniques – graduated response and trading up. Graduated response allows for the like-for-like criteria to be varied according to biodiversity significance. Trading up allows an offset that foregoes one or more like-for-like criteria (e.g., type) if the offset is of a higher significance class than the loss.

In considering classifications there is a design tension in that a high-resolution classification with many types can provide a closer match between the loss and the gain, but also results in less flexibility in the offsetting process, generally making it more difficult to locate a matching offset. However in highly complex ecosystems as the case in Peru, and where biodiversity knowledge is still

limited, it will be important to apply the precautionary principle and err on the side of a higher resolution classification to ensure a match between biodiversity loss and gain.

Information for like-for-like

Establishing a like-for-like system requires information about the biodiversity across the area to which the system applies. The availability of information (e.g. on vegetation type, rarity, depletion, condition and species) is a strong determinant of the nature of the like-for-like that can be contemplated.

Policy

Like-for-like is also a policy issue. Even where detailed information is available, it is a matter of policy choice as to how flexible the like-for-like criteria should be. A very flexible set of criteria will generally provide more offset options than a tighter set, making it potentially easier, faster and cheaper for developers to find an offset. Developers will naturally favour such an approach and will urge governments to adopt such a system. However, the counter consideration is that the more flexible the criteria, the more that biodiversity differences are blurred and unique biodiversity values can be lost in the offsetting process. Using the priority classification to apply graduated response and trading up techniques can ease this situation.

Under a graduated response, the like-for-like criteria for a significant biodiversity loss may be set such that a close match is required for the offset while for lower significance losses the criteria may be quite flexible, allowing exchange, for example, within a wider range of biodiversity types.

A like-for-like-*or-better* design provides further flexibility while at the same time addressing a biodiversity priority. This involves 'trading up', allowing for the match of a loss in one kind of biodiversity with a gain in a different kind of biodiversity, provided that that kind of biodiversity is of higher conservation significance than the former kind of biodiversity.

2.2. Basis for application of the 'like-for-like or better' principle to Peru

The principal questions to be addressed to establish how to apply the 'like-for-like or better' principle to Peru, and our suggestions as to how to proceed are as follows:

(i) Identification of the like-for-like criteria

The basic criteria are type, location, condition of vegetation/ecosystems and species. A type criterion can be based on vegetation type, habitat type, and species. A location criterion can be based on bioregional/distributional information. A condition criterion (e.g. made up of attributes that indicate vegetation quality, or ecosystem functionality) can be implemented on a site-by-site basis if a

method for measuring condition is available or is developed. A comprehensive like-for-like criterion for threatened species requires a high level of information (e.g. on populations, distribution) and predictive capability about the specific species involved. This will generally not be available in the short term, so a priority for work in the short term is to explore what other practical responses can be considered, requiring project developers to carry out assessments at the level of habitat used by the species, so that species impacts are adequately addressed as part of project and offset design.

To identify the affected area (with residual impacts that cannot be avoided or minimized) by the project and thus need to be offset, the developer will need to complete the project baseline assessment and the EIA. During the process, the area will be characterized using the like-for-like criteria. This will allow MINAM to have information of the area related to ecosystem functionality, provision of ecosystem services and the criteria listed in the above section. This will imply making changes to the Terms of References for the baseline studies and the EIA to both have a thorough assessment of the area and collect the type of information necessary to determine biodiversity loss. These could be incorporated into the operationalization of SENACE, for example.

In Peru, a megadiverse country, we recommend the following priority criteria (in no priority order) to develop a "like-for-like or better" offset system:

- ***Ecological function*** *(e.g. connectivity, reproductive areas, feeding and nursing areas): refers to landscape types or the ecosystems biophysical structure, and to the crucial role of specific ecosystems (such reproductive areas, migration routes, feeding and nursing areas) to support faunal populations and communities, and biodiversity.*
- ***Provision of ecosystem services****: as some natural areas represent the foundation to support food, water security, and shelter for different regions across the country.*
- ***Biodiversity*** *(alpha, beta, and gamma): the different levels at which diversity needs to be approached. Alpha diversity refers to diversity within a particular area or ecosystem; beta diversity focuses on comparing species composition between two ecosystems; and gamma diversity measures the overall diversity for the different ecosystems within a region.*
- ***Quality or condition of the system*** *against a benchmark: providing a reference point by which to judge the ecosystem.*
- ***Species and Species habitat****: to inform about key habitats or priority species to protect as part of offsetting process.*

- ***Vicinity****: so as to consider locations within the same or nearby ecological units (ecoregion, basin, biome)*.

This list of criteria will enable experts to choose subsets of criteria depending on the ecosystem's characteristics. For instance, species diversity will not vary significantly among highland lakes, whereas ecological function or provision of ecosystems services will vary significantly. Over the next year, experts for the different types of ecosystems present in Peru should be convened to complete a comprehensive characterization at the country level and to develop thorough and rigorous like-for-like or better criteria.

Although important progress has been made in certain areas of knowledge and regions of Peru, there is no up-to-date national level information system that encompasses the information (spatial and non-spatial) needed to apply these criteria comprehensively throughout the country. A preliminary assessment of best information available currently indicates that relevant biodiversity information in Peru at the national and regional (sub-national) level can be found in a variety of databases and publications, as outlined in Table 1 below, but this information is still limited compared to what is needed to develop effective like-for-like criteria.

UNALM, working with GIZ, identified different attributes that could be applied in the Peruvian high-altitude grasslands (*Puna, above 3500 masl*). As noted above, in that project, scientists identified three ecosystem attributes for that region: species richness and composition, stability of soil, and ecosystem function/integrity. These attributes were assessed against ten ecological indicators using published data of which the most recent is from 1999. This initial work illustrates the kind of attributes that could be developed for Peru as the basis for assessing condition, and as the basis for establishing both ecological equivalence and metrics. However this initial effort only focused on vegetation diversity and does not include other indicators related to other taxa (e.g. fauna) that are also key biodiversity elements for these altitudes.

(ii) Review of existing information for development of a classification system

Table 1 provides a list of the national data and maps available, and a sample of subnational ones, with a description of the extent, year of publication, source, scale and precision, and a preliminary comment on the pros and cons of these data for developing offset plans.

Table 1: Maps Available

Description	Extent	Source	Year	Scale	Precision	Observation
National Coverage						
Map of Peruvian Life Zones of Peru. 1976. Criteria: Holdridge System based on precipitation, Temperature, and EvapoTranspiration.	National Level	ONERN[6]	1995	1/ 1 000 000	1000 m	Classification based on altitudinal gradient only. Still used in Peru, but globally this classification system is not used anymore. We do not recommend using it—maybe only as background information.
Peru Forests Map. 1995. Criteria: Forest aspect and topography	National Level	INRENA[7]	1995	1/ 1 000 000	1000 m	May be used for historical analyses, but it was replaced by the 2000 map (see below).
Peru Forests Map. 2000. Criteria: Forest aspect and topography	National Level	INRENA	2000	1/ 1 000 000	1000 m	Provides forest types classification, with a forestry resource extraction perspective. It is widely used for forestry management plans. Resolution is too coarse, and maps created with physiographic criteria only, not including features such as floristic composition or climate zones. We do not recommend using this map.
National Forest Patrimony Map (Vegetation Layer). Criteria: geophysical, climate, vegetation structure and aspect, topography and distribution of vegetation.	National Level	MINAM[8]	2009	1/ 100 000	25 m	This is a good starting point, with 27 categories of vegetation types defined. However, finer categorization is required (for instance, Nature Serve identified over 70 ecosystem types for the Peruvian Amazon -see below), and it has not been thoroughly ground-truthed. Additionally, climatic attributes need to be incorporated in more detail. We recommend using this map as a reference starting point; however detailed baseline studies are needed to collect additional information before proposing an offset plan.
Map of terrestrial ecoregions of the world (Global 200)	National Level	Olson et al (Bioscience)	2001	1/1 000 000	1000 m	Too coarse resolution and freshwater systems are not included. Finer resolution maps (National Forest Patrimony or Map of Ecological Systems) are not nested within this map. May be used as a reference, but we do not recommend its use for offsets.
Red List of Species	National Level	IUCN[9]	2013	ND	ND	Distribution ranges can be downloaded, and they vary significantly in terms of scale and precision. Project baseline studies and EIAs should include thorough species analyses.
Annexes II and III CITES	National Level	CITES Convention[10]		NA (a list)	NA	For reference only.
Important Bird Areas - Peru	National Level	Birdlife International	2009	NA (list – map location)	NA	Location of 116 Important Bird Areas (IBAs) in the country

[6] Oficina Nacional de Evaluación de Recursos Naturales (ONERN)
[7] Instituto Nacional de Recursos Naturales (INRENA)
[8] Ministerio del Ambiente (MINAM)
[9] International Union for Conservation of Nature (IUCN)
[10] Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES Convention)

Sub National or partial coverage (illustrative examples)						
Map of Peruvian Yungas (Mountain Forest). Criteria: ecological systems defined by bioclimatic, geophysical, and vegetation structure and aspect.	National and Ecoregional Level (Yungas Peru)	CDC-UNALM[11]	2005	1/ 250 000	25 m	This map was the base for the Nature Serve and Comunidad Andina maps. See below.
Map of Ecological Systems of Peruvian and Bolivian Amazon. 2005. Criteria: bioclimatic, geophysical, and forest aspect	Peru and Bolívia Andes-Amazon	Nature Serve	2005	1/ 250 000	25 m	This is a better starting point than the National Forest Patrimony Map, although it does not have national coverage. It emphasizes heterogeneity of natural areas, and uses a stratified approach by area, convening experts for different types of ecoregions. Thus, attributes used to create these maps included geomorphological, hydrological, dynamics, floristic, and topographic attributes. We recommend exploring using the same team of specialists and methods to complete the map nation-wide.
Northern and Central Andes Map. Criteria: ecological units defined by a hierarchical classification of Andean ecosystems (on the basis of NatureServe original classification for Latin America)	Regional Level (Northern and Central Andes)	Comunidad Andina de Naciones	2009	1/ 250 000	25 m	This map covers the Peruvian Andes and Amazon region (Andes Xéricos, Yungas, Piedmont). Uses same classification system as Nature Serve, builds on their work. By combining this and the previous map, only the Peruvian coastal area and the marine would be missing. See above for further comments.
Nature Serve	Peruvian Amazon Basin	Nature Serve	2013	1/ 1 000 000	450 m	Covers the Amazon basin portion of Peru. Analysis made by basin; includes prioritization for biodiversity (based on irreplaceability), ecosystem services (water and carbon), endemic species, and threats. Further analysis is needed to understand its potential use.
Forest and Vegetation Map. Land cover spatial data used as input to elaborate the Ecological and Economic Zoning (ZEE) of Andes-Amazon regions in Peru. Illustrative examples include:	Regional Level (by Departments Peru)	MINAM	2005-2010	1/ 250 000	50 m	Departmental maps available for several Regions that have started their Ecologic and Economic Zonification (ZEE) process. Not all have used similar levels of details, ecosystem classification, and ground truthing. Level of confidence changes significantly among departments. These are reference maps, but we do not recommend using them in offsets processes.
- Madre de Dios Vegetation Map. Criteria: geophysical and vegetation structure and aspect	Madre de Dios Region	GOREMAD[12]	2010	1/250 000	50 m	
- Loreto Vegetation Map. Criteria geophysical, hydrology, and flooding pattern.	Loreto Region	IIAP[13]	2009	1/100 000	25 m	
- Ucayali Vegetation map. Criteria: geophysical, vegetation structure and aspect, geomorphology	Ucayali Region	WWF	2006	1/ 250 000	50 m	

[11] Centro de Datos para la Conservación - Facultad de Ciencias Forestales de la Universidad Nacional Agraria La Molina (CDC-UNALM)

[12] Gobierno Regional de Madre de Dios (GOREMAD)

[13] Instituto de Investigaciones de la Amazonía Peruana (IIAP)

Some of these maps and data may be used initially to develop a classification system, but they need to be complemented with other information layers that account for non-forest ecosystems, aquatic ecosystems, marine ecosystems, and other attributes such as provision of ecosystem services.

Also at the site level, EIAs and a variety of scientific studies have produced biodiversity characterizations of several areas across the country, each one with its own approach to assessment and goals. As SENACE develops guidelines it will be imperative that it adopts a ***biodiversity-inclusive*** EIA, which should: (a) use biodiversity information to determine the biological or ecological sensitivity of a site, and (b) generate new biodiversity records about the site. The collection of this biodiversity data and baseline information is a requirement of the EIA process but there is no mechanism in place for the government to collect and make accessible the resulting data. MINAM is very interested in creating a database where the information from EIAs could be collected and made available to users. Under the draft offsets policy circulated in mid-2013, SINIA would be the key institution for the receipt of all baseline information, EIA data, and offset results. The SINIA would also include other biodiversity data generated by other institutions such as the Peruvian National Parks Service (SERNANP), the Research Institute for the Peruvian Amazon (IIAP) and the Forestry and Fauna Agency (DGFFS).

An international framework, the Global Biodiversity Information Facility (GBIF)[14], already exists for countries to use to publish and obtain data, and the GBIF publishes guidelines to aid countries a) develop best practices, protocols, standards and tools for the capture, archiving, and publishing of EIA-related biodiversity data; b) develop data-transformation tools to make EIA biodiversity data interoperable and exchangeable according to globally accepted standards; and c) facilitate the discovery and publication of EIA biodiversity data through local and global information systems, networks and data hosting environments. Peru could benefit from the development of appropriate guidelines and protocols to establish such an information system and explore linkages with the GBIF. These guidelines and approaches could also be applied by other countries in the region allowing compilation of a shared database of biodiversity information.

In Peru, most of the biodiversity measurements consider species' presence as the main criterion to calculate biodiversity indexes. At a site and countrywide level these indices can be examined at different levels: alpha (Shannon, Simpson) and beta (Jaccard, Sørensen) diversity; the latter compares species' communities (to consider habitat type as criterion). Nevertheless, in Peru species data are still limited. The Peruvian Red List provides information on endangered and threatened species. For some species, this includes geographical information (layers) with distribution

[14] http://www.iaia.org/publicdocuments/special-publications/sp7_web.pdf

information, but for others there is no spatial layer showing species' localities. This information is still at a coarse scale and specific studies are necessary to assess local species' distribution.

(iii) Basis for classifying the biodiversity types into classes of conservation significance

One basis for determining conservation significance is through a prioritization exercise to determine key areas and areas of high significance for conservation. Peru has undertaken such an exercise for its protected areas (PAs). For the preparation of the strategic plan for the national protected areas system (Protected Areas System Strategic Plan, 2009—in Spanish, Plan Director) a prioritization exercise was carried out at the national level to identify conservation areas that should be under a PA category. Many of the areas identified were converted into PAs, but some priority areas remain without any protection. In establishing the priorities, a biome classification, an ecoregion classification, along with expert opinion were used, and the following criteria were considered: under-represented ecoregions or ecological systems; areas previously prioritized (Protected Areas System Strategic Plan, 1999) that are not protected or are insufficiently covered; contribution to the protected area system's connectivity; and unique or important systems in terms of vegetation associations or species richness (Protected Areas System Strategic Plan, 2009, p.87). However, as explained in the Protected Areas System Strategic Plan, the identified conservation priority areas in Peru present different levels of detail, scale, and precision. Expert opinion guided this process and further research is needed to generate information where necessary and ultimately, it will be important to carry out a comprehensive, consistent analysis. The planning exercise to date has resulted in 133 proposed areas and 23 priority areas for biodiversity conservation. The prioritization maps are useful for projects that fall within the few selected priority conservation areas. However, for areas outside these, it does not provide much guidance. Further analysis is needed to assess the strengths of these classification and prioritization systems for their utilization in offset systems.

More recently, Nature Serve (2012) completed a prioritization exercise for the Watershed of the Andes (Tropical Andes), for the John D. and Catherine T. MacArthur Foundation. Within Peru, this covers the Amazon basin portion of the country. Here again, priorities were established using expert opinion combined with criteria such as biodiversity irreplaceability, threats to biodiversity, conservation costs, and conservation benefits. The information base consisted of maps produced at a 1:1,000,000 scale, still too coarse to be used for offset design, but these maps can provide a basis for discussion of conservation priorities for these watershed ecosystems.

Efforts to classify biodiversity information and establish conservation priorities are underway at different scales across the country. Several regional governments (Loreto, Cuzco, Apurimac, San

Martin, etc.) have completed conservation prioritization exercises aimed at developing their systems of regional conservation, including the proposal of new regional conservation areas. Furthermore, programs to address impacts of projects, such as the Southern Inter-Oceanic Corridor (PGSA CIV II in Madre de Dios, Cuzco and Puno) through an environmental and social management plan are under development. Under that program development of nine regional conservation areas with a total extent of one million hectares has been proposed.[15]

Given the lack of an adequate country-wide priority classification system, in the short term, project proponents should be required to develop thorough baselines, and offset systems should allow very little flexibility to trade one ecosystem type for another (see next section).

(iv) The degree of flexibility

A like-for-like-*or-better* design provides further flexibility while at the same time addressing a biodiversity priority. This involves 'trading up' that allows a match of a loss with a gain in a different kind of biodiversity, provided that it is of higher conservation significance than the loss. The idea of flexibility in terms of trading up, for example, has already been discussed at the level of Peruvian Government. SERNANP is currently discussing the concept of trading up to facilitate the protection of ecosystems that are underrepresented in the national protected area system through the creation of new conservation areas (as a result of offsets). This proposal is still in discussion and has not been implemented, and is based on the information provided in the Protected Areas System Strategic Plan. This can be important in assuring that high priority biodiversity can be protected in a timely maner.

Outside of PAs, in the medium/long term, it is still necessary to agree on the criteria and parameters to compare ecosystems and assign levels of conservation importance or priority. Development of these parameters is crucial, and should be developed as soon as it is feasible. Until this agreement has been reached, to avoid subjective and biased/incomplete decisions, any short term guidance should incorporate very limited flexibility in terms of trading up in the offsets system. Thus, trading up should, for the most part, be restricted so that it only occurs within the same ecosystem types. Exceptional circumstances could warrant greater flexibility to trade up in a different ecosystem, but should result after expert consultation, until such time that parameters are finalized.

[15] This is a USD 35 million program under the direction of MINAM with funding from the Development Bank of Latin America (CAF). In addition to financing the regional conservation areas, the program will finance landscape plans, economic and social zoning conservation businesses and strengthening the environmental capacity of municipalities and regional governments.

3. 'Metrics'

3.1 The concept of metrics

The basic purpose of a metric in NNL biodiversity offsetting is to ensure that the losses at the impact site are quantitatively balanced by gains elsewhere. The metric needs to be able to measure both biodiversity losses and biodiversity gains. As biodiversity is 'infinitely' variable, practical measurement depends upon classification and the use of surrogates. For this discussion, it is assumed that the metric will be of the quality by area type and that there will be provision for dealing with threatened species through the consideration of habitat in the like-for-like criteria.

These notes consider how a basic metric could be devised to operate in the short-term while work is undertaken on a more substantive metric as part of the medium-term strategy (e.g. five year plan).

It would be beneficial if the interim metric can be a simpler version of the ultimate metric so that the transition from one to the other is a logical progression as more information and capacity is developed.

Initial thoughts

At this time, there is considerable uncertainty about the approach for determining and establishing offsets in Peru. This includes questions about what biodiversity information is available, how biodiversity importance is identified and classified, what types of gain are recognised and what time and resources are available for the offset transaction. As a result, it is not possible to say, "here is a metric." However, it is possible to canvas some possibilities for further discussion.

An important step will be the development of a classification system of natural vegetation in the country. This could be done on region-by-region basis starting with those areas where development is mostly likely to occur first (e.g. based on license/concession applications). This process would involve the following:

1. Identify the type and the area of the vegetation lost, as part of the environmental baseline. If there is more than one vegetation type impacted, identify the type and area for each. (See the classification system discussed above under 'like-for-like.)
2. Estimate the quality of the vegetation lost. This could be done in a rudimentary way as follows:
    - Vegetation condition is estimated by inspection and classified on a simple scale such as 'degraded', 'good', or 'pristine'. In the absence of a comprehensive series of benchmarks, this classification would be done against a 'pristine' reference site for the vegetation type specifically identified as part of this application.

- The landscape context of the impact site would also be estimated on a three-step scale as 'isolated', 'connected' or 'continuous'.

The quality score would then be calculated by adding the condition and context scores as shown in Table 2. Note that the condition score can combine with any context score giving a range of quality scoring from 0.2 to 1.0:

Table 2. Quality Scores based on condition and landscape context

	Condition Scores	Degraded (0.2)	Good (0.5)	Pristine (0.8)
Landscape Context Scores	**Isolated (0)**	0.2	0.5	0.8
	Connected (0.1)	0.3	0.6	0.9
	Continuous (0.2)	0.4	0.7	1.0

3. The loss at the impact site is then calculated as the area x quality. For example, if a project gets developed on land that is classified as pristine and connected the quality score would be 0.9 (0.8 for pristine and 0.1 for connected). If the impact area covers 50 hectares, the loss is calculated to be 45 habitat hectares (50 hectares X 0.9). However, if the impact occurred on a site of good condition and is continuous, the quality score would be 0.7 (0.5 for good and 0.2 for continuous) and the loss calculated at 35 habitat hectares.

Some short guidelines would be written to assist with the assessment of the condition and context classifications. BBOP has developed important guidelines on metrics and currencies (BBOP 2012).

At the offset site(s), the gain depends upon the commitments put in place for the management and protection of the site. It is assumed that offset sites will be based on existing natural vegetation (of varying initial levels of condition). With a quality by area metric, the gain can result from increases in the condition score or from avoiding future declines in condition. It is suggested that three categories of commitments (Box 3) be recognised for the estimation of gain:

Box 3. Three categories of commitent

Security:	Increases in the legal security of the site enhancing its protection
Maintenance:	Foregoing existing entitled activities that cause damage or decline of the condition of the vegetation or habitat
Improvement:	Positive actions to restore the vegetation or habitat

Generally these three types do not all occur together on the same site. The usual combinations are security and maintenance, and security and improvement.

The accuracy and sensitivity of the gain calculation depends upon the degree of detail to which these commitments are specified. Calculation of the gains – the level of benefits gained from specific management practices – is the result of expert opinion rather than hard science and will depend on the response of different ecosystems to change in management practices, as well as to levels of threat. For example, establishing a new protected area should result in averted biodiversity loss if managed appropriately. The management gain from this protection would be the state of the site under protection versus its state under business as usual. The gains from management will depend on the level of threat to the site without protection.

As mentioned earlier, the determination of gains will require the work of professionals who will apply their expertise to develop the scoring based on the benefits from the management commitments. Fortunately, years of experience from the Victoria offset program provides notional values of gain. Table 3 demonstrates the typical expected average score for gains per hectare resulting from specific offset commitments based on the experience in Victoria. As Peruvian experts build and refine the system, these numbers may increase or decrease, but order of magnitude changes are not anticipated. Thus, the scores in Table 3 can be used as indicative scores and applied to determine offset requirements as demonstrated in the calculations below:

Table 3: Gain scores

Offset Commitment	Typical expected score gain/hectare
Create a high level protected area	0.2
Enter into a permanent legal protection agreement	0.1
Forego existing use rights such as grazing and timber removal	0.1
Restore the site through revegetation with original species, pest and weed control	0.1

Associated with this table would be documentation including guidelines for processes such as protected area establishment, and templates for offset management plans related to site maintenance and restoration.

When the commitments for the offset have been agreed, the total gain per hectare can be used to determine the area of the offset site required to achieve NNL as follows (Box 4):

Box 4.

Loss at impact site = gain at offset site

$Area_{impact} \times quality\ score = Area_{offset} \times gain\ score$

so,

$$Area_{offset} = \frac{Area_{impact} \times quality\ score}{Gain\ score}$$

Typically, this results in offset areas three to five times the area of the impact site. We can follow the example from above where a pristine, connected site of 50 hectares is impacted and the loss is calculated at 45 habitat hectares. If we assume that a new PA will be created the gain would be assigned a value of 0.2 according to Table 3. The offset area would be area x quality (45) divided by gain score (0.2). The offset would thus be 225 hectares, or about five times the impact area. In the second example discussed above (good and continuous) with a quality score of 0.7, the area for the offset would be 175 hectares.

In summary the steps required to establish an interim metric of the type discussed above would be:

- Develop a natural vegetation classification system for the country based on existing information or information developed over time (preferably ecological)
- Develop quality scores as in Table 2 and the associated guidelines
- Develop the gain scores as in Table 3 and the associated guidelines and templates

It would be reasonable to require the developer to retain suitably qualified personnel to undertake the site assessments of the impact and offset sites and to prepare the details of the offset proposal for submission to the regulator.

3.2 Basis for the development and use of metrics in Peru

Table 1 demonstrates the limited information, based on the information available to the authors in December 2013 that is available for Peru in terms of ecosystem classification at a national scale. However, for the identification of an equivalent ecosystem in a region, it is possible in the short term to use localized information such as the National Forest Patrimony map produce by MINAM, scale 1/ 100,000 for the national level, or the information produced by Nature Serve for the Amazon and smaller scale maps developed by certain regional governments. As part of the first request for licenses, MINAM could include a step to include the involvement of experts to identify benchmark sites in those ecosystems where the projects will take place. It is anticipated that some of the first projects will be sites in the highlands and benchmarks for affected ecosystems could be developed at an early stage in the process. The information developed by the UNALM would contribute to this benchmarking process.

Given the current situation regarding data and the need to create a system of metrics in the near to medium term, this report has identified several illustrative steps to develop a metric, including the following:

1. Develop the natural vegetation classification system (and associated maps and databases) based on the like-for-like criteria listed above (ecological function, provision of ecosystem services, biodiversity, and vicinity), at a scale of 1:100,000. While this is developed, developers' baseline studies and EIAs will have to produce this information on a case-by-case basis, following a set of guidelines by MINAM. Building requirements for data collection should occur as part of the EIA and Offset Plan requirements for all projects that must conform to the policy once it is passed.
2. Define priority attributes and benchmarks for these attributes that would serve as a reference to quantify the condition of each biodiversity type or ecosystem type. There are no nationally predefined lists of attributes or features that define the condition or quality of the different ecosystem types. Individual researchers and institutions have made some progress for certain ecosystem types, but this has not been 'made official' by MINAM or other government sectors nor has that work been extensive in terms of its geographic coverage. For instance, some incipient work has been undertaken and can be built on to create the required priorities as indicated below:
    - The UNALM study determined for high-altitude pastures a set of attributes that include vegetation composition, soil stability, and biological integrity; for each attribute indicators were defined
    - For aquatic ecosystems, key attributes would include, among others, fish and macro-invertebrate species composition, biological integrity, and ecological function. WCS

has begun some work on the identification of some of those attributes, such as hydrological connectivity for fish migrations, sedimentation patterns, and other environmental variables that are at the basin scale. Additional work is required to develop the appropriate classification of aquatic ecosystems, including defining water types and physical and chemical characteristics of the rivers and other water bodies and to develop appropriate measurements and tools to support the SEIA and offsets implementation.

An important step in the process will be to convene pools of experts on each ecosystem type to identify the lists of attributes and quantify their condition in order to build these elements of like-for-like metrics and complete the classification above with its associated layers of information.

3. For species, experts should agree upon a finite, prioritised list of species for which habitat metrics alone (i.e. changes in condition x area of the species' habitat) will not be a good enough proxy for changes in the species' population due to project impacts and offset gains. For these 'species of concern,' a separate species metric may need to be developed and more information regarding the distribution of those species would need to be collected. An effective approach would involve carrying out studies at the population level (i.e. assessments of relative abundance or actual population counts). Since many of the species would be included as part of the overall habitat assessments, the separate species metric is not expected to affect a large number of species.
4. Further investigation is also needed about spatial aspects (e.g., patch size, connectivity, etc.) of conservation effectiveness to generate data that can be used in the offset metric. Currently there are no official systems in Peru to do this. SERNANP is starting to work out these aspects for the PA system only, but this needs to be done at a national scale. Universities and conservation NGOs have developed methodologies than can be used for this purpose.

In the short-term, this will be a learning process where MINAM could promote, through a set of pilot projects and case studies, a group of experts working with specific companies that need to comply with the new policy. The work would combine a set of knowledge based on available information, field assessments (e.g. baseline studies), as well as on the proposed criteria (above sections) and apply the proposed metric for the specific ecosystem and specific impacts to determine where a gain in biodiversity can be achieved through an offset process. This will involve identifying the big projects that will be developed, the ecosystems that will be affected, and any species of concern. MINAM would work with NGOs, research organizations and universities to create an expert team to initiate classification and development of benchmarks, and provide guidance to companies regarding

the collection of biodiversity information as part of the EIA process. MINAM, its expert team, and the companies will work together to apply the above outlined process and the initial metrics to determine company offset requirements.

4. Road map for implementation of offsets policy under SENACE

The above sections have described core aspects of the exchange rules required for implementing the guidelines in order to ensure 'ecological equivalence' (done so through the 'like-for-like or better' approach) and the metrics needed to measure loss and gain. However, this cannot take place in a vacuum and there is a need for additional complementary legal documents to ensure the establishment of a functioning national offset system ranging from institutional aspects to capacity building and awareness raising.

Box 5. Managing Offset Issues Risks.

1. Understanding what is offsetable: Identifying what and what cannot be offset by ensuring adequate data and analysis in the field and policies to determine if a project that will impact critical habitat should go forward.

2. Ensuring sufficient detail in the system of metrics and adequacy of field studies to ensure ecological equivlence – that there is an exchange of like for like or better.

3. Assessing additionality and leakage issues : Any offset should protect biodiversity that would not have been protected otherwise and should ensure that activities creating biodiveristy loss are not displaced to somewhere else.

4. Exploring the role of protected areas in offsetting in light of additionality issues. An assessment of the sufficency of financing and the management effectiveness of PA systems should be considered when considering averted loss offsets and the role that PA's can play.

5. Adequate legal and financial mechanisms need to be in place to ensure long-term conservation outcomes are assured. Pressures by companies to invest too little or for government to accept inadquate compensation needs to be avoided.

6. Addressing the lack of capacity : There needs to be an investment in capacity to manage and implement an offset system.

7. Ensuring no lag time between habitat damage due to project and no net loss or a net positive impact from the offset in order to prevent temporal losses that may not be adequately compensated.

8. An adequate system of monitoring needs to be in place. Achieving NNL will require that project results feed into an adapative management mechanism that addresses implementation over the long time. An effective regulatory mechanism, including a third-party auditor or watchdog will be important to ensure success.

In developing the system of offsets in Peru, it is important for MINAM and its partners to consider the risks associated with offsets and to build a robust system to deliver no net loss. This is particulary important in Peru which contains areas of high terrestrial and aquatic biodiversity, especially in its Andean-Amazon region and tropcial forests. At the same time, the complexity of the biodiveristy makes achieving no net loss more challenging. Consequenlty the collection of essential baseline data and the establishent of appropriate metrics and indicators is essential to the success of achieving NNL and avoiding the criticism that offsets merely allow companies a license to trash. This report outlines a process to specifically address those concerns and risks and propose short and medium term steps to create the systems and build the capacity necessary to implement a framework where the mitigiation hierarchy is employed and programs are designed to offset residual impacts and deliver long-term conservaton results. The accompanying text box (Box 5) outlines some of those risks that the proposed system will need to address.

4.1 Introduction to a proposed road map for implementation of offsets policy in Peru

As indicated in section 1.3 the Government of Peru, through the creation of SENACE and the development of policies and norms to establish and implement environmental compensation and biodiversity offsets within the EIA system, is defining a new and very important role for the national environmental authority, MINAM. That role is directly linked to the growing investments in infrastructure, energy, and extractive industry in the country and implies some new and important challenges and roles for MINAM. Success will depend on a significant transformation of existing institutional arrangements as well as strengthening the technical, administrative and financial capabilities within MINAM, in relation to the sectors, authorities and ministries with whom it shares responsibilities for environmental assessment, and with the regional and local authorities within the context of decentralization and local environmental management. Moreover, it will require effective coordination with the private sector and with civil society and more active participation in regional and global exchanges related to the development of policies, standards, mechanisms and capabilities related to the development of EIA policy and biodiversity offsets.

4.2 Analysis of the actual processes in MINAM to develop an improved EIA and offset system in Peru

Building an effective EIA system under MINAM with SENACE, as the agency that will approve and certify the strategic as well as project- level EIAs, and integrating the policy for offsets within that system represent essential ingredients for the success of both SENACE and MINAM's efforts to achieve NNL in biodiversity and ecosystems functions. MINAM and SENACE will face at least three important political and institutional challenges:

1) Build a consistent and balanced inter-ministry system with key entities, such as the Ministry Of Energy and Mining (MINEM), Ministry of Transport and Communications (roads and infrastructure; MTC), Ministry of Agriculture and National Water Authority (Agriculture and forests, irrigation, water, fisheries; MINAG-ANA), Ministry of Economy and Finance (financial strategies and conservation markets; MEF), among others.

2) Re-structure and mainstream MINAM´s institutional, technical and financial systems, developing new roles, capacities and resources to guarantee sustainability and cost efficiency of EIA and Offset activities. It will imply significant changes and improvements in MINAM's Vice Ministries of Strategic Development of Natural Resources and Environmental Management; General Directions of Assesment, Valuation and financing of the Natural Patrimony, Territorial Planning, Biodiversity, Policies Norms and tools and specialized instances such as the SINIA, IIAP, SERNANP, SEIA, and the Agency for Environmental Assesment and Control (OEFA), among others.

3)Build an effective decentralization process with regional and local governments to articulate the processes of EIA and offsets with planning and territorial management.

Status of EIA in Peru

In the recent international expert workshop (May 2012) and in the regional offset meeting (July 2013), the Minister and Vice Minister of Environment indicated that the current EIA system faces a number of constraints and implementation gaps. Upon evaluation of a sample of 300 of the 2359[16] EIAs carried out between 2001 and 2011, 85% were inadequate. They did not consistently follow the terms of reference for the specific evaluation of direct, indirect and cumulative impacts on biodiversity and ecosystems and the social and environmental management plans proved to be inadequate in terms of mitigating the negative impacts generated by the project under evaluation.

This situation shows that despite two decades of progress in EIA experiences with many learned lessons, the increase in quality and quantity of professional skills, technical and scientific capacities, institutionalization of the environmental assessment under MINAM, and actual development of policies and standards of strategic dimension and high international standards (such as environmental compensation), there remain substantial deficiences and material weaknesses in EIA governance management mechanisms, exacerbated by the challenges posed by the growth and concentration of large-scale investments.

[16] Informe MINAM- Vice Ministro de gestión Ambiental, Mayo 2012 - Taller Internacional de expertos

Among the most important issues identified by MINAM, SPDA, WCS, FT and other institutions while designing the norms for environmental compensations (offsets) and providing support to improvements in the EIA system, we consider the following to be of most importance:

- **Policy and Institutional issues**
    - Process of decision making on the EIA occurs predominantly at a sectoral jurisdiction, and the priority criteria are based principally on promoting the investments with low effective participation of MINAM.
    - Overlapping mandates and competencies with multiple legal and procedural regimens with respect to environmental assessment.
    - Tensions and conflicts of interest with regional and local governments arising from the absence of effective policies for local government participation in decision making, limited coordination among the parties, and lack of effective transfer of mandates and responsiblities coupled with inadequate resources and capacities, to consistently integrate EIA and offset planning into regional land plans.
    - Limited formal mechanisms for inter-ministry coordination. Current practice is focused on the technical review of EIAs which stresses the different sectoral interests and does not allow adequate consideration of necessary scientific and technical baselines for an efficient and effective review of EIAs.
    - There do not exist still the mechanisms and capacity for strategic, financial and economic planning, such as evaluation of of alternative financing mechanisms (e.g. environmental compensation funds, conservation banks like Habitat Banking, PES, and others) to guarantee financial sustainability of actions and programs to mitigate and offset impacts over the long term, and achieve no net loss of biodiveristy and ecosystem function.

- **Institutional and technical capabilities**
    - There does not exist yet the scientific and technical capacity necessary to analyse and render opinions on the scope of the EIA assessment and specifically, on the design and timing of the mitigation and environmental compensation plans necessary to demonstrate the application of mitigation hierarchy and NNL of biodiversity and ecosystems.
    - An importrant challenge is the integration within MINAM to build capacities and resources from the Vice-ministries, the principal departments (Valuation, Land Use

Planning, Biodiversity, SEIA, OEFA, etc.), and specialized institutions such as the SINIA and IIAP

- Addititional challenges include providing consistent support and follow-up throughout the entire EIA and Offset process with the project developers. This needs to take place from the early stages of project design - from the assessment of potential impacts of the proposed project during the pre-feasiblity stage, to later stage actions including the development and compliance with updated EIA guidelines that assure adequate scientific baselines, the review and oversight of the methodlogies and the metrics employed to determine total and net residual impacts after application of the mitigation hierarchy in order to determine appropriate offsets, and to support the entire process of fiscalization, monitoring, and environmental audits.
- A central theme in the process involves the establisment of mechanisms for social participation and transparency as part of the EIA process. In the past, socio-environmental conflicts have raised levels of distrust among social actors, and the private sector regarding the effectiveness of the EIA processs to support the conservation of the natural patrimony and to contribute to equity in the distribution of benefits and costs related to large investment projects. It must be said that the current administration of MINAM has made great strides in the areas of transparency and conflict resolution, thereby building greater confidence among the parties involved.

4.3 Proposed road map for developing MINAM and SENACE institutional capacities for the development of EIA and offset policy

The report has identified important actions that MINAM should consider in building an effective EIA system and successfully implementing its offset policy. Table 4 provides a suggested road map for operationalizing the policy and establishing this national offset system in Peru by recommending short, medium and long term actions for the key elements that need to be taken into consideration. These ideas are provided to promote a discussion with MINAM to determine the most appropriate way forward. That discussion would need to focus on prioritization of actions and the development of a more detailed action plan and budget toward achieving the outcomes outlined in the table.

Table 4. Road Map for Policy Implementation

Element of strategy/objective	Short term (i.e. within 1 year, by when SENACE takes over)	Medium term (2 year-5 years)	Long term (after 5 years)	Responsibility
Component 1 Legal Framework – Policy and Regulations				
1.1 Ensure policy approval	Work with MINAM to establish a goal for the timing of passage of the offset policy before the end of the first quarter of 2014. Hold meetings with Ministry and undertake redrafting as required to have it ready for release			SPDA and WCS in coordination with the other NGOs and Task Force members and key MINAM actors
1.2 Make progress on any identified/observed gaps in the policy and in the complementary legal documents	Recommend and implement revisions of the policy (for improvement and to fill gaps, especially on market mechanisms) Undertake technical meetings with MINAM-SENACE to present options for complementary legal documents or other instruments to ensure effectiveness of the policy	Build role for a task force to assess lessons learned and support their incorporation into the policy Recommend additional revisions of the policy Address any implementation issues that result from an evaluation of the policy in practice Complete any complementary legal documents and norm adjustments to the policy and update as needed based on assessments carried out by a task force	Assess whether update is required based on lessons learned	SPDA, WCS, FT – working group or task force includes organizations such as TNC, CSF, CIAM, PNUD, CI, WWF, GIZ, among others Some funding available from Moore to support the process in year 1
1.3 Establish guidelines that support implementation of the policy	MINAM-SENACE develop guidelines to ensure that information required for offsets is included as part of the EIA process MINAM finalizes guidelines for the design and implementation of the	More comprehensive guidelines available, covering: terrestrial, freshwater, marine offsets; illustrated with experiences from case studies; covering aggregated as well as single offsets.	Guidelines will likely need to be updated periodically to correspond with continuous improvement and changes in practice and approach.	MINAM SENACE and SINIA (for protected area issues) SPDA, WCS, FT, and other stakeholders

	environmental compensation plan, including key components- the criteria of like-for-like or better and the process to develop and improve metrics including identification of areas where impacts will occur to determine benchmarks and collecting data on key biodiversity features Develop guidance on how the PA system will interact with offsets policy Create guidelines on Planning, Monitoring and Enforcement of Offsets Develop criteria to determine no-go areas and how decisions regarding impacts in critical areas will be made.	Refine guidelines in relation to compensation in particular as it relates to incentive measures for conservation/restoration on private land along with payments for ecosystem services.		
1.4 Make progress toward coordinated planning efforts for EIA and offsets with regional and local governments with regard to their land use plans, environmental zoning and environmental management plans.	Design strategy with regional governments to put in place a mechanism to ensure effective consultation between the national and regional governments on EIAs and offset planning through meetings and workshops Policy on role of regional governments developed on EIAs and offsets developed.	Clear mandates and responsibilities have been transferred to regional and local governments regarding EIAs and offsets and linked to land management priorities Start development of process to put in place mechanisms for carrying out strategic environmental impact assessments.	Monitor effectives of decentralization policy and undertake changes as required	MINAM, SENACE, Regional Governments, Regional Amazonian Governments platform (CIAM), NGOs and local stakeholders
Component 2. Development of Institutional and Financial Mechanisms to Support Implementation of EIA and Offsets				
2.1 Design and implement institutional development process for SENACE	Provide technical assistance to MINAM and SENACE to design institutional, administrative, technical	Continue implementation of the institutional development plan to support the capacity of MINAM-	Undertake stock taking and implement needed changes based on experiences	MINAM Departments (Valuation, Environmental Management), SENACE,

	and financial components of the EIA system, including the program for offsets based on a gap analysis Carry out a series of meetings and workshops to define the institutional development plan Define technical units that support appropriate data collection and baselines, implementation of biodiversity offsets including development of metrics, environmental management plans and supervision/monitoring Identify technical support and training needs.	SENACE with adjustments as necessary based on lessons learned Provide continued technical support and training to specialized units		SINIA SPDA, WCS, FT and other technical assistance. Some initial funding available through Moore Foundation
2.2 Develop inter-ministry coordination through MINAM - SENACE, to foster effective planning and manage licenses, offsets areas, etc.	MINAM-SENACE work with the line ministries to set up a mechanism for a coordinated approach for project approval during the transition period Develop terms of reference for a biodiversity inclusive EIA that include biodiversity components that can be used by projects Assess the roles and responsibilities of regional governments and develop mechanisms for coordination to ensure effective implementation of offsets	Complete the transition and ensure transfer of all the mandates and capabilities for EIA and environmental compensation to MINAM and SENACE SENACE completes and implements its system of intersectoral coordination and effective collaboration, and integration with MINAM departments for effective planning and management of the EIA process and for offset plans.	Monitor and ensure that system is operating effectively	MINAM (SINIA, Directions, OEFA-SEIA) SENACE, Ministries, CIAM, NGO's (SPDA, FT, WCS, etc.)
2.3 Institutional and	Set up registry for the early offsets	Check and improve the registry for	Financial mechanisms in place	MINAM, Conservation Trust

Financial Mechanisms and SEA	under the system. Undertake a gap analysis to figure out what legal, administrative, financial and other steps would be needed to establish conservation banking as a means of offset implementation in Peru. Quick review to check planning proposal pipeline to see whether any regionally clustered development anticipated merits an SEA that integrates NNL. Analyse and develop the guidance and the financial mechanisms necessary to ensure that funding for offsets is directed to meet conservation objectives and that funding is guaranteed. As part of this process identify potential institutions to implement offset financing. Meet with financial institutions and trust funds to discuss potential financing mechanisms that could be employed to ensure delivery of NNL and NPI	offsets. If aggregated offsets are seen as an important part of delivering NNL in Peru, address some of the gaps identified in the gap analysis started in Year 1 (e.g. agreements, covenants, trust funds, policy on sale and trade in credits, liability, insurance, improved land use planning. Work on a regional NNL SEA (or NNL aggregated offsets) if one or more situations merit it. Ensure that financial mechanisms are operational working effectively; identify improvements or additional mechanisms to meet needs. Explore effectiveness of financial mechanisms and determine whether new options need to be developed Ensure government or a designated third-party can provide proto-brokering services until a true broker(s) is set up as part of an early or developing market scheme	to ensure effective long-term operations of offsets Feasibility of establishing a standards-based conservation banking market undertaken NNL SEAs standard for regional developments with significant cumulative impacts on biodiversity	Funds, Banks, NGOs.
Component 3. Establish the Technical and Administrative Framework and Capacity for the Design and Implementation of Offsets				
3. 1 Undertake Pilot	Seek up to 5 willing volunteer projects	Results of initial pilot projects	Take stock of lessons learned	MINAM, local governments,

Projects	(start with individual offsets), preferably of different scales and in different sectors to implement the new policy. Provide guidance to companies with regard to data collection processes, benchmarking, and application of interim metrics to begin to put the policy in place MINAM and partners undertake a review of project proposal pipeline to determine whether any regionally clustered development anticipated that would merit and SEA that would merit a more aggregated approach to offsets.	inform development of the policy and guidelines and inform MINA-SENACE of the extent of the technical, administrative and financial requirements to implement the EIA and offset policy and standard Based on mapping and planning begun as part of data analysis start aggregated offset pilot(s). Monitor the pilot for delivery of offsets/NNL	from pilots; Analysis of feedback from regulated offsets, leading into continuous improvement of the Policy and Guidelines. Continue monitoring of offsets	companies and third parties (monitoring/auditing). TA provided by NGO's (e.g. Forest Trends, WCS, etc).
	MINAM SINIA establish a program of work to prepare a more comprehensive, consistent and readily available set of maps and data to support impact assessments, offset design & implementation, conservation banking, and landscape level planning achieving a scale of 1:100,000. MINAM/SINIA build adequate capacity to ensure effective functioning of GIS data center to manage spatial and other data for design and implementation of offsets SINIA develops a first portfolio of	Build and introduce a more comprehensive, consistent and readily available set of maps and data to support scoping for the development and screening/analysis of impact assessments, offset design & implementation, conservation banking, and landscape level planning. Benchmarks in place as the basis of metrics (terrestrial, with prioritised rolling approach to freshwater and marine). Improve on metrics based on	Comprehensive data and mapping system in place at an appropriate scale for all ecosystems. Updated regularly to incorporate new GIS datasets and spatial and temporal analysis models and related software Standardized data collection established and accessed by users	MINAM, SENACE SINIA, MINAG-ANA, Universities, NGOs (e.g. WCS, TNC, WWF, CI, among others)

	priority areas for environmental compensation for the priority ecosystems in the country, to guide the compensation plans SINIA develop a first vulnerability and risk map for the priority ecosystems in the country to identify natural and critical habitats and species that are under severe threat and that will be modified if no additional conservation and protection measures are implemented MINAM with support from scientists and experts begins to prepare benchmarks as basis of metrics and begin to employ interim metrics based on the quality and quantity guidance in this report. MINAM to convene experts for the different types of ecosystems present in Peru to complete a comprehensive characterization of ecosystems at the country level and to develop thorough and rigorous like-for-like or better criteria Create a system that SINIA can implement for the long-term capture of EIA data including standardizing its collection to assess and update on a permanent basis the state of biodiversity information Begin to develop the system for collection and sharing of biodiversity	experiences gained in the field and through use of data Data collection and management system operational SINIA completes the coordination with regional and local governments to define compatibility between the portfolio of conservation areas and the management of the territory by regional and local authorities. On an on-going basis, SINIA refines and updates the risk/vulnerability maps for ecosystems and support the EIA and offset process and demonstration of additionality for conservation measures within compensation plans.		

	data (see GBIF) at a national and regional level			
3.3 Development of technical and scientific institutional capacities for EIA and offsets process including capacities for assessing models of aggregated, cumulative impacts and alternative scenarios	Ensure terms of reference for EIAs are biodiversity-inclusive to ensure adequate data for the integration of the offsets policy: for example in the case of impacts on Andean Amazon basins and wetlands models for sedimentation and mercury, fish migration, hydrological dynamics among others, should be included MINAM -SENACE will develop and implement a 1st set of guides and support material with methodology and metrics to identify inevitable net impacts on biodiversity and ecosystems as part of EIA process. MINAM will develop and implement a 1st set of guidelines for the design and implementation of the environmental compensation plan, including the criteria of like-for-like or better and the metrics to determine gains and losses on the field	MINAM will have developed the comprehensive guidelines for the design and implementation of the environmental compensation plan, including the criteria of like-for-like or better and the metrics to determine gains and losses on the field	MINAM will have developed the necessary institutional technical and scientific capacities, and effective cooperation networks with groups of experts, academic and scientific institution to effectively support the EIA and offsets process in complex ecosystems	MINAM, SENACE SINIA, MINAG-ANA, Universities, NGOs (e.g. WCS, TNC, WWF, CI, among others)
3.4 Ensure adequate capabilities within SENACE to support implementation of the offset policy	Review the organizational and administrative needs of SENACE to determine roles and responsibilities and organizational required to ensure adequate review, approval and monitoring of offset plans Set up registry and cadastre for early offsets within SENACE	Ensure adequate system in place to support transition of EIAs and offset planning to appropriate department in SENACE Refine and update the registries		MINAM, SENACE, SPDA, WCS, FT

	Set up registry of consultants with offset design experience			
Component 4. Capacity Building & Awareness Raising				
4.1 Prepare regulators at national, departmental, local levels	Training courses for regulators designed and implemented • Applied course for regulators on how they should apply the Guidelines • Applied course on core concepts of (which can be run immediately while the detailed Guidelines are being developed)	Expanded training courses for regulators so they know: How to review applications for content quality: avoidance, minimisation, restoration and offset plans. How to administer the offset system, including how to monitor and enforce agreements.	Periodic training for regulators for new staff and on new methods and approaches.	SENACE with technical support from partners.
4.2 Build capacity of companies and consultants to determine offsets	Training courses for companies and their EIA consultants designed and implemented • Basic course on core concepts (which can be run immediately while the detailed Guidelines are being developed) • A more applied course on how to assess project biodiversity impacts and design mitigation measures including offsets in line with the Policy and Guidelines. • Applied course on the application of methods – determining loss and gain	• Continue training courses. • Consider developing more formal training course and exams for accreditation of certifiers (i.e. groups authorised to review whether projects and offsets comply with national law).	• Periodic training to upgrade skills • Assess the need and benefit of developing certification program for consultants/auditors based on creation of training modules	SENACE, MINAM, private consulting companies, environment staff of companies, line ministry and local government personnel.

4.3 Build awareness and capacity of those groups providing areas for offsets		Preparation of likely suppliers of compensation (such as protected areas, communities, landowners) for their roles Prepare information packs on the business case for offset suppliers (potential for discussing banking options) Prepare and offer training on Landowners' Management Agreements to owners as well as communities Develop plans for aggregation of offsets Explore development of standards for conservation banks, including assessment of feasibility, including pilot effort	Create greater public awareness around offsets and potential as land use management option (e.g. factsheets for potential suppliers,, web-based information showing opportunities, successes, credit prices etc.). Guidelines on conservation banking prepared Training and accreditation of conservation banks and credit suppliers where appropriate	Landowners, private sector, community organizations, protected areas (SERNANP)
4.4 Prepare and build capacity within the regional governments and municipalities on the EIA and offset process and role of SENACE	Regional workshops to better understand challenges for the implementation of the Policy in specific regions Identification of gaps and key issues that feed back into the gap analysis and adjustments to the policy	Identify training needs of regional governments with respect to their roles and responsibilities vis a vis offsets Design and implement relevant training programs.	Continue in-service training based on needs assessments	SENACE, local and municipal government leaders, MINAM, NGOs

4.5 Create public awareness around the concept of offsets	Develop public information leaflets, media articles, YouTube videos, advertisements/articles in industry journals etc. to draw people's attention to the new 'NNL' approach, the implications for them and sources of additional information.	Continued public awareness raising, including case studies from experiences in Peru, factsheets, and gradually web-based information on credit prices, transactions etc., obtained (subject to confidentiality) from the broker(s).	Develop targeted information to meet specific needs, such as credit availability for a banking system.	MINAM, SENACE
4.6 Establish global and regional learning and cooperation platforms	Regional exchanges and workshops on critical issues related to the design and implementation of offsets including: Integration of EIA and offsets, metrics, result of pilot projects, financial alternatives, and regional policy and transboundary impacts.	Create information exchanges across borders and explore harmonization of policies, regulations, standards and capacities in the region		SENACE, MINAM and NGO partners, international cooperation and platforms

5. Recommendations and conclusions

The following are recommendations that result from the technical and institutional analysis conducted by Forest Trends and the Wildlife Conservation Society under this funding from the Inter-American Development Bank.

1. **Assure adherence to the mitigation hierarchy**. With the establishment of SENACE and the passage of the policy for NNL, the government will have laid an important foundation for the protection of biodiversity. According to BBOP, **NNL** may be defined as the "point where biodiversity gains from targeted conservation activities match the losses of biodiversity due to the impacts of a specific development projects, so that there is no net reduction overall in the type and amount of biodiversity present, over space and time." Achieving NNL requires adherence to a mitigation hierarchy whereby companies first avoid, minimize and then compensate their impacts. Additional biodiversity gains can be obtained via efforts to restore ecosystems that are affected by the project. Offsets are employed for the residual impacts and are designed in such a way as to achieve NNL. The requirements for application of the mitigation hierarchy should be included in all guidance provided by MINAM or SENACE, including the terms of reference and guidance for EIAs, and for all projects that will reviewed by that agency. Requiring adherence to the mitigation hierarchy limits criticism that projects are given a "license to trash", reduces overall impacts, risks and costs to the companies, and complies with international best practice. Of key importance, compliance with the approach is important to avoid the risk of local protests against projects.

2. Adopt Like-for-like or Better Metrics. This study recommends that the government adopt a system of metrics reflecting international best practice. These are based on assessing impacts by looking at the area as well as the condition or quality of the ecosystem or habitat that is affected by the development and will support the objective of achieving no net loss. As indicated in this study the application of this approach requires a classification system for ecosystems as well as an assessment of ecosystem types to establish attributes and benchmarks against which to determine impacts and improvements in ecosystem condition. Much of this information does not exist or is available at too large a scale to allow an effective determination of the impacts on the ecosystem in question. In addition, many of the public references are out of date, with some of the available data sources dating from 40 years ago. The first attempt to classify and develop metrics for a specific ecosystem was undertaken by UNALM in 2013 and the approach is consistent with the recommendations made in this report.

The lack of an adequate country-wide priority classification system means that, in the short term, project proponents should be required to develop comprehensive baselines and design their offsets to result in an exchange of one type of biodiversity for the same biodiversity type. First mover companies – those companies that will be the pilot companies operating under the new policy – will need to carry out baseline studies and ensure that they hire the experts necessary to carry out the ecological studies required to employ the metrics. For many companies, especially those who are seeking financing from Equator Banks, the level of analysis required as part of putting this system in place differs little from the compensatory requirements of IDB safeguards and the offset requirements under PS6 for example. Many companies are already following this system. The proposed system of assessing impacts by area and quality of biodiversity affected could be applied by companies to help them meet their compliance requirements for NNL or a NPI. Developing the scientific criteria to make the metrics framework operational is an important step in the implementation of the policy.

At the same time the government should start, as is proposed through SINIA, to undertake the necessary steps to develop the data sources necessary to implement the system of metrics. Developing maps of ecosystems, working with experts to develop attributes against which to measure impacts, and developing more information on species of concern are essential for success in implementing the policy on offsets. A multi-year plan to map (e.g. scale 1 :100,000) and assess priority ecosystems should commence as soon as possible in 2014. In addition, MINAM and SENACE will need to create adequate terms of reference for baseline studies as part of the EIA and compensation systems, to ensure that adequate data are collected and that they will be collected and shared with the government to contribute to a comprehensive system of biodiversity data. An important step in the process will be to ensure that the terms of reference for EIAs include provisions to collect the baseline that can feed into national data needs.

3. Build Capacity Within MINAM, SENACE and with Service Providers. In addition to developing sources of data and information, MINAM and SENACE staff will require training in order to be able to apply the new policy, review compensation plans and ensure effective monitoring and enforcement plans are in place so that companies meet the no net loss requirements. Development of a training program to build staff capacity should be included as part of the overall implementation road map and ensure that staff and experts have the capabilities to begin implementing the new policy as soon as possible. Training for staff and experts would assist them to understand the long-term objectives, the requirements of an effective EIA, the application of the mitigation hierarchy, and the application of metrics and development of monitoring and enforcement plans. Moreover in order to help

ensure achievement of NNL, the Government will need to increase its GIS capabilities to support future analysis and monitoring. This will require building greater capacity in GIS while ensuring that adequate hardware and software are available to complete those tasks and that capacity and mechanisms are in place to adequately manage the data. The objective is that the staff and experts have the necessary tools to ensure that companies are in compliance with the implementation plans. Additional training should be provided to EIA providers so that they understand the policy and the various approaches required to ensure NNL. Companies normally hire consultants to undertake the EIAs and it will be important to have a cadre of consultants that are knowledgeable about the policy and its implementation. This training could form part of a medium term strategy of accreditation of EIA professionals who would be approved in the development of compensation plans for companies that need to comply with the policy.

4. Create an effective institutional framework Implementation success of the policy will depend on effective coordination within MINAM and across the different ministries and regions. Although SENACE will hold the responsibility for reviewing and approving Category III projects, it will need to rely on other agencies and departments within MINAM and beyond. The identification of roles and responsibilities among these departments will be important to ensuring the success of the program. Within MINAM, what will be the role of the Valuation Direction, and the Department of Impact Assessment *vis à vis* SENACE on the development of the guidelines and methodologies for all the metric required? It is clear that SINIA will be the organization responsible for the collection, integration, and maintenance of baseline and spatial analyses, but how will SINIA articulate with SENACE? Which departments and directives (Biodiversity, SERNANP, and Territorial Management) will work on the development of the spatial data and how will that be shared across the different departments? The development of an institutional road map should be done early on in the process to ensure that all roles and responsibilities are clear.

Several other challenges will arise. Although SENACE will be in charge of reviewing and approving the EIAs of the Category III projects, other projects, which could have an impact on priority biodiversity, may be approved by the sectorial Ministries. Once the information is developed by MINAM regarding priority areas, how will that information be disseminated across the different ministries and how will it affect the approval process? The development of more stringent EIA requirements for all projects in the country may need to be put in place to reduce impacts on priority ecosystems across the country. Such an approach would need to be coordinated with line ministries. MINAM will also need to ensure that their spatial data are shared across the Ministries and with EIA companies. Lack of coordination could result in the provision of licenses for

development in areas that have been designated for protection through an offset program. Having up to date information for areas that are not eligible for development as a result of their status as areas for conservation management will be important in aiding decision-making. Development of spatial plans that identify priority ecosystems, areas for conservation, and areas that are under development would be a positive result that could contribute to better conservation outcomes and protection of biodiversity. With effective spatial planning at a landscape level, the Peruvian Government could begin to designate areas within ecosystem types that could serve as offsets.

This coordination of information not only needs to occur within MINAM and across other ministries but also with regional governments, which are also charged with land use planning. Data sharing with regional governments and coordination of development and compensation plans will be essential to avoid conflicts and ensure that any new projects or land use designations are consistent with local and regional development efforts. This coordination needs to be built into the system of governance at an early stage if policy implementation will be successful.

The level of coordination required across these different entities is essential but there is time at this stage to begin the process – to put in place the key elements for success – prior to the date that SENACE becomes operational. Development of an effective strategy for achieving this coordination should be a priority in the coming year.

5. Create an Effective Strategy for No Net Loss. The recommendations included in this document are aimed at creating the conditions for achieving NNL. The recommendations are set out to develop the systems necessary to build a program in the medium and long-term to achieve the objectives of the compensation plan. The recommendations proposed in this report are simple and are aimed at getting the system started. However, as described above, this system needs to be strengthened with improved regulation, development of data that will allow companies and the government itself to determine loss and gain to biodiversity, improved spatial planning that can lead to better conservation outcomes and avoid land use conflicts, and to program of training that will result in cadre of training professionals both within and outside government who can implement the policy.

In addition, there are legal and financial issues that will be relevant to the success of the offset program and need to be considered at an early stage in the policy implementation process. In developing the road map it will be important to determine the role of the private sector (i.e. private landowners) in providing offsets. What mechanisms will need to be put in place to implement offsets on private land and guarantee the sustainability of their management? Another key question is, what will the role of communities and indigenous people in providing land for offsets be? Not all

offsets need to take place on public land or lead to the creation of a new state-managed protected area. Developing mechanisms that allow non-governmental organizations and actors to provide offsets can create important incentives for conservation.

Another area of attention will be the establishment of adequate financial mechanisms. Under best practice offset implementation, the institutional, legal and financial provisions for offsets normally last as long as the impacts last and in some cases are planned to last in perpetuity. For example, in the United States, offsets developed as part of mitigation banks establishing endowments to ensure the protection of biodiversity over the long term. As part of the development of the strategy for NNL, the time frame for the implementation of the offsets needs to be clear and should ensure that the project does indeed achieve NNL of biodiversity. The policy needs to be clear about this time frame.

Additionally, the financing mechanisms should be established. The offset plan needs to include a financing plan that guarantees the funds necessary to ensure the implementation of the management plan for the offset, covering the costs of infrastructure, management, and monitoring. Once that budget is established several elements need to be considered:

- Guarantees – many companies will want to pay on an annual basis to cover the costs of the offset. Since the payment will need to take place over a long time period (annual payments or annuities over multiple years), some guarantee will need to be in place to ensure that those payments are made, and if not, then the funds can be recuperated. The development of a performance bond or some type of insurance may be required to guarantee such payments.
- Accountability and Transparency – companies need to guarantee that they can deliver the conservation outcomes. That can be achieved through direct payments to implementing parties or through payments to a third party institution, such as a conservation trust fund (CTF) which can take charge of the payments and provide the company (and the government) with the required financial reporting. These CTFs can also oversee project implementation and monitoring. Peru has positive experience with private CTFs.
- Funding in Perpetuity - In some cases companies may decide to create a fund that will result in permanent funding for the offset. This fund could be created as part of the original investment, through bond funding, or over time from annual cash flows. An example of this is the case of the Fundación para la Conservacion del Bosque Chiquitano, in Santa Cruz, Bolivia, in the context of the Pipeline Santa Cruz- Bolivia - Cuiaba - Brazil. In this case the project owners (Ashmore, Shell) agreed with a group of institutions of civil society (WCS,

FAN, Universidad NUR) to develop an additional compensation strategy (additional to the EIA mitigation plan) to conserve in over the long term a dry forest landscape and created a conservation trust fund. The goal was to finance the Fund in perpetuity, with a goal to capitalize it with 15 USD million over a 15-year period, with contributions by the companies with in-kind support from the local counterparts and NGOs. Today, after 14 years, the Foundation has a capital fund of USD 12 million. The oil companies have resigned their positions on the board and the NGOs and civil society representatives have taken on complete responsibility for the administration of the revenue generated from investments and the financing of the long-term conservation and sustainable development in the landscape.

Experience to date indicates that permanent funds will be created primarily under a compliance regime, and built into mitigation banking requirements. Creating such requirements within a conservation banking system should form part of Peru's long-term offset strategy. However as the example above indicates, and based on emerging lessons in different parts of the world, even under voluntary, or lender-driven offset programs, companies are considering establishment of permanent funds to ensure long-term conservation of offset sites.

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