Inter-American Development Bank

Guidance for Assessing and Managing Biodiversity Impacts and Risks in Inter-American Development Bank Supported Operations

Watkins, Graham; Atkinson, Rachel; Canfield, Eloise; Corrales, Denis; Dixon, John; Factor, Seth; Hardner, Jared; Hausman, Heidi; Hawken, Iona; Huppman, Reed; Josse, Carmen; Langstroth, Robert; Pilla, Ernani; Quintero, Juan; Radford, Greg; Rees, Colin; Rice, Dick; Villalba, Alberto

Environmental Safeguards Unit (VPS/ESG)

TECHNICAL NOTE Nº IDB-TN-932

November 2015

Guidance for Assessing and Managing Biodiversity Impacts and Risks in Inter-American Development Bank Supported Operations

Watkins, Graham; Atkinson, Rachel; Canfield, Eloise; Corrales, Denis; Dixon, John; Factor, Seth; Hardner, Jared; Hausman, Heidi; Hawken, Iona; Huppman, Reed; Josse, Carmen; Langstroth, Robert; Pilla, Ernani; Quintero, Juan; Radford, Greg; Rees, Colin; Rice, Dick; Villalba, Alberto

November 2015

Inter-American Development Bank

Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library

Guidance for assessing and managing biodiversity impacts and risks in Inter-American Development Bank supported / Graham Watkins editor.
p. cm. — (IDB Technical Note ; 932)
Includes bibliographical references.
1. Environmental impact analysis—Latin America. 2. Ecosystem services—Latin America. 3. Biodiversity—Latin America. 4. Protected areas—Latin America. I. Inter-American Development Bank. Environmental Safeguards Unit. II. Series.
IDB-TN-932

JEL code: Q56, Q57, N56

Keywords: Biodiversity, Ecosystem Services, Environmental Assessment, Protected Areas, Natural Habitats

http://www.iadb.org

Acknowledgements

This paper is based on comments and products from, in alphabetic order, Rachel Atkinson, Eloise Canfield, Denis Corrales, John Dixon, Seth Factor, Jared Hardner, Heidi Hausman, Iona Hawken, Reed Huppman, Carmen Josse, Robert Langstroth, Ernani Pilla, Juan Quintero, Greg Radford, Colin Rees, Dick Rice, Alberto Villalba, and Graham Watkins.

Table of Contents

Tables, Figures, and Boxes

Acronyms

AZE	Alliance for Zero Extinction
BAP	biodiversity action plan
BMAP	biodiversity monitoring and assessment program
CBA	cost-benefit analysis
EA	environmental assessment
EIA	environmental impact assessment
EISA	Electron Investment, S.A.
ESMP	environmental and social management plan
ESMR	environmental and social management report
ESS	environmental and social strategy
GCI-9	ninth General Capital Increase
IBA	important bird area
ICE	Instituto Costarricense de Electricidad
ICIM	Independent Consultation and Investigation Mechanism
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	key biodiversity area
LAC	Latin America and the Caribbean
NGO	non-governmental organization
NPV	net present value
PIC	Caracol Industrial Park
ROW	right of way
TOR	terms of reference

Glossary of key terms

Alliance for Zero Extinction site: site identified by an alliance of 88 non-governmental biodiversity conservation organizations where species evaluated as endangered or critically endangered under the IUCN Red List criteria are restricted to single remaining sites

Avoidance: actions taken to modify the spatial or temporal design of an operation to protect biodiversity features from impacts

Biodiversity [biological diversity]: the variability among living organisms from all sources, including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems (Convention on Biological Diversity)

Biodiversity features: the suite of species, natural communities, ecosystems, ecosystem services, and ecological processes within the direct and indirect area of influence of a project

Compensation: set of actions that lead to measurable conservation outcomes, designed to compensate for residual biodiversity impacts that arise from the activities of an existing or new operation and that remain after appropriate avoidance, minimization, and rehabilitation measures have been implemented

Critical natural habitat: existing protected areas, areas officially proposed by governments for protection, or sites that maintain conditions that are vital for the viability of the aforementioned areas; also, unprotected areas of known high conservation value

Cumulative impacts: impacts on key biodiversity features (valued ecosystem components related to biodiversity) generated by the combined effects of all past, present, and reasonably foreseeable projects, regardless of who has built or financed the other projects

Degradation: the modification of a critical or other natural habitat that substantially reduces its ability to maintain viable populations of its native species

Environment impact assessment: the process of identifying, predicting, evaluating, and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made

Environmental assessment: a generic term covering various types of assessment processes, such as environmental impact assessment, strategic environmental assessment, sociocultural analysis, environmental analyses, and environmental audits

Important bird area: an area recognized as being globally important habitat for the conservation of bird populations because it holds significant numbers of one or more globally threatened species, is one of a set of sites that together hold a suite of restricted-range species or biome-restricted species, or has exceptionally large numbers of individuals of migratory species or of a species that congregates

Important plant area: natural or semi-natural sites exhibiting exceptional botanical richness and/or supporting an outstanding assemblage of rare, threatened, and/or endemic plant species and/or vegetation of high botanic value

Indirect impacts: impacts on the environment that are not a direct result of the operation, often produced away from or as a result of a complex pathway; sometimes referred to as second- or third-level impacts or as secondary impacts

Key biodiversity area: a globally important site that is large enough or sufficiently interconnected to support viable populations of the species for which it is important; areas are selected based on the presence of globally threatened species, the presence of restricted-range species, congregations of species that concentrate at particular sites during some stage in their lifecycle, and the presence of biome-restricted species assemblages

Key biodiversity feature: the suite of species, natural communities, ecosystems, ecosystem services, and ecological processes that are most important and most at risk within the area of influence of a project

Minimization: measures adopted to reduce the duration, intensity, or extent of impacts that cannot be completely avoided

Mitigation hierarchy: avoid negative environmental impacts; where impacts are unavoidable, apply measures to minimize impacts; for impacts that cannot be avoided or minimized, rehabilitate negatively affected areas; compensation or offsets should be implemented for any residual impacts after avoidance, minimization, and rehabilitation

Natural habitat: biophysical environments where the ecosystem's biological communities are formed largely by native plant and animal species and where human activity has not essentially modified the area's primary ecological functions

Offset: off-site projects intended to restore degraded habitats or prevent the degradation or loss of those habitats to compensate for an operation's residual impacts on biodiversity features that cannot be addressed through avoidance, minimization, and rehabilitation

Precautionary principle: where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation

Priority ecosystem services: ecosystem processes, goods, and values that provide benefits to human communities and that may be significantly and adversely affected by an operation or upon which the operation has significant dependence

Protected area: a clearly defined geographical space that is recognized, dedicated, and managed through legal or other effective means to achieve specific long-term conservation objectives

Rehabilitation: measures taken to replace or reverse degradation of ecosystems impacted by the operation

Set aside: an area of habitat within the project footprint where impacts on habitats have been avoided

Significant conversion: the elimination or severe diminution of the integrity of a critical or other natural habitat caused by a major long-term change in land or water use

Valued ecosystem component: Any part of the environment that is considered important by the proponent, public, scientists, and government involved in the cumulative environmental and social impact assessment process. Importance may be determined on the basis of cultural values or scientific concern

Section I: Introduction

1. Safeguarding biodiversity and ecosystem services in Bank operations

1.1. The purpose of this document is to provide clients—borrowers, project sponsors, and executing agencies—of the Inter-American Development Bank with guidance, in accord with Bank safeguard policies, to address the impacts of projects and programs on biodiversity. This document is a work in progress based on the safeguard policies of the Bank and best practices in the assessment and management of the impacts of development on biodiversity; it is a dynamic document that will be updated based on experiences in implementation.

1.2. Countries in Latin America and the Caribbean (LAC) are home to some of the world's richest biodiversity. Biodiversity provides multiple benefits to people through ecosystem services such as providing food, shelter, and clean water and air; mitigating the impacts of storms, floods, and other natural disasters; supporting disease and pest control; and maintaining landscapes and seascapes for spiritual fulfillment and tourism. The Bank recognizes that the biodiversity wealth of LAC countries provides a comparative development advantage over other regions and that this wealth needs to be maintained as a basis for long-term sustainable development.

1.3. LAC countries are experiencing rapid growth and transformation. Major drivers for these changes include improved infrastructure and increased trade in non-renewable natural resources and agricultural products. Much of this new development is occurring in frontier areas—areas that have previously experienced low levels of development and that contain much of the rich biodiversity of the region. Development projects undoubtedly provide economic and social benefits but may also have adverse impacts on biodiversity and can disrupt the delivery of ecosystem services.

1.4. The Bank's strategy under the ninth General Capital Increase (GCI-9) requires the Bank to work to reduce poverty and inequality and to promote sustainable growth in LAC—with a focus on addressing the needs of less developed and smaller countries and fostering development through the private sector. Under GCI-9, the Bank has set priority actions in five areas:

- Social policy for equity and productivity.
- Infrastructure for competitiveness and social welfare.
- Institutions for growth and social welfare.
- Competitive regional and global international integration.
- Protection for the environment, response to climate change, promotion of renewable energy, and food security.

1.5. In the context of these priority actions, the Bank has established a biodiversity and ecosystem services program, to work with partners to integrate the economic value and importance of biodiversity and ecosystem services into strategic economic sectors, invest in the conservation of priority ecosystems in LAC, strengthen and foster improved environmental governance, and promote private sector investment opportunities fostering innovation in environmental planning and protection.

1.6. With the above in mind, this document provides guidance for clients to help them comply with Bank safeguard policy requirements as they relate to biodiversity and ecosystem services. It details information and procedural approaches for clients and the consultants who prepare environmental assessments (EAs) and management plans to ensure that they address impacts on biodiversity and ecosystem services. The guidance applies to Bank operations, loans, grants, and guarantees for specific projects or defined programs.

Box 1: Genus of snails extinct in the wild as reservoir inundated its sole habitat

Problem: In the midst of the controversies over the construction of a major hydroelectric dam, a little-known genus of snail slipped toward almost inevitable extinction. The project's environmental impact assessment (EIA) had failed to find the snails, which lived in the rapids in one particular stretch of the Paraná River, just upstream from the dam. As a result, when the presence of the snails became known, attempts to prevent their extinction had to be devised without the extensive prior planning that is required for hydroelectric dams.

The project: The 3,200 megawatt (MW) Yacyretá Hydroelectric Project, located on the Paraná River between Argentina and Paraguay, was financed with a series of Bank loans, including US$130 million to address the environmental and social issues that had led to widespread criticism of the project. Construction began in 1983, and the first hydroelectric turbine began operation in 1994.

Impact upon critical natural habitat: In 1993, as the reservoir was beginning to fill, biologists from the Argentine Museum of Natural Sciences found large numbers of snails of the genus *Aylacostoma* in the already-disappearing rapids. The specimens corresponded to five morphological types, three of which represented species previously identified when they became known to science in the early 1950s. The remaining two types were identified just before their habitat was inundated. During preparation of the EIA, it had been assumed that plants or animals in these particular rapids also occurred in similar habitats elsewhere in the Paraná. But while this section of rapids was not a unique habitat, it was critical to these particular snails. The genus is oviparous: instead of producing large numbers of eggs and larvae that are dispersed in river currents or by birds, its young are born as miniature adults, and begin life grazing for algae on the shells of the parent. For this reason, the population never dispersed to other rapids in the river. Nor could the *Aylacostoma* snails survive in the new reservoir. The algae on which they feed require a rocky bottom with abundant sunlight and swift-flowing, oxygen-saturated water—conditions not found when the rapids were covered with 10 meters of water. *Aylacostoma*'s three species are now Red Listed by the International Union for Conservation of Nature (IUCN) as extinct in the wild.

The snail problem is partially addressed: With financing from Yacyreta Binational Entity, which manages the hydroelectric project, aquariums were designed to meet the needs of the snails for their survival and reproduction. Subsequent reintroductions have showed promising results.

Lessons learned: Although the snails had been present in large numbers, the short time frame allotted to the EIA proved to be insufficient to undertake biodiversity baseline studies to determine their existence and establish that they represented the sole population. Extended baseline studies carried out prior to the EIA would have increased the likelihood of finding the snails as well as solutions. In addition, since even extensive studies can fail to identify all species of interest, the project should have included funding and institutional arrangements for ongoing monitoring and adaptive management. This project was completed before the development of the Bank safeguard policies, but it is indicative of the biodiversity risks associated with development projects.

Biodiversity-relevant Bank policies

1.7. Bank-financed projects must comply with the biodiversity elements in the Bank's environmental and social safeguard policies, including the Environment and Safeguards Compliance Policy (OP-703, approved in 2006), the Involuntary Resettlement Policy (OP-710, approved in 1998), the Indigenous Peoples Policy (OP-765, approved in 2006), and the Disaster Risk Management Policy (OP-704, approved in 2007).

1.8. The Environment and Safeguards Compliance Policy includes directives and instructions on the precautionary principle, screening, EAs, and harmonization of donor activity, and it focuses on the management of the potential impacts and risks of projects on biodiversity and ecosystem services.

1.9. The Involuntary Resettlement Policy requires consideration in resettlement plans of the effects of a project on modifying access to natural resources and the consequent impacts on livelihoods (see p. 28, section IV.G. of the Involuntary Resettlement Operational Policy and Background Paper). It also requires that resettlement plans take into account environmental considerations and prevent or mitigate impacts on natural resources and ecologically sensitive areas at relocation sites (see p. 31, section IV.G. of the Involuntary Resettlement Operational Policy and Background Paper).

1.10. The Indigenous Peoples Policy requires mechanisms for appropriate consultation and the participation of indigenous people in decisions relating to natural resource management and benefit sharing from the use of natural resources (see p. 8 of the Indigenous Peoples Policy regarding territories, land, and natural resources). This measure is particularly relevant where access to natural resources such as biodiversity may be affected by a project, including in the design of biodiversity offsets. The policy includes specific safeguards for projects that may directly or indirectly affect the legal status, possession, or management of lands, territories, or natural resources that were traditionally occupied or used by indigenous peoples (see p. 8 of the Indigenous Peoples Policy regarding territories, land, and natural resources).

1.11. The Disaster Risk Management Policy requires consideration of the extent to which a project has the potential to exacerbate hazard risks to human life, property, the environment, or the project itself that might occur if the project led to changes in the ability of ecosystems to provide services. An example would be a project that affects mangroves, which play a key role in mitigating storm surge and flooding. Importantly, this policy draws attention to the need to consider climate change risks in projects. The Convention on Biological Diversity has recognized the interconnectedness of climate change and biodiversity. Biodiversity is affected by climate change, and climate change can exacerbate project impacts on biodiversity. Projects may also, by affecting ecosystem services that reduce climate change, reduce regional and national capacities to mitigate climate change.

1.12. Investment projects in agriculture, forestry, fisheries, and mining are governed by their respective productive sector policies (OP-721, OP-723, OP-724, and OP-725), in addition to the safeguard policies. The criteria for investments in agriculture incorporate the need to contribute to sustaining or improving the agricultural resource base and avoiding deterioration of the environmental factors on which the continuation of agriculture depends. The criteria for forestry investments include assessment and management of potential environmental impacts. The criteria for investment in fisheries include ensuring that projects do not negatively affect the conservation of natural resources. Finally, the criteria for mining sector investments include evaluating and managing environmental pollution and adverse ecological impacts of projects.

Box 2: Biodiversity-related safeguard requirements

The **introduction to the safeguards section B** of OP-703 includes the need to adopt a general precautionary approach to environmental impacts: *where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation*. The introduction also requires application of the mitigation hierarchy as follows: *avoiding negative environmental impacts; when impacts are unavoidable Bank financed operations require mitigation measures; and for impacts that cannot be fully mitigated, compensation or offsets should be implemented*.

Directive B1 states the need for both compliance with the Environment and Safeguards Compliance Policy and consistency with the relevant provisions of other Bank policies, including the Involuntary Resettlement Policy, the Indigenous Peoples Policy, the Disaster Risk Management Policy, and relevant productive sector policies.

Directive B2 states that *The Bank will also require the borrower for that operation to ensure that it is designed and carried out in compliance with environmental laws and regulations of the country where the operation is being implemented including national obligations established under ratified Multilateral Environmental Agreements.* This directive is particularly relevant where countries have defined specific mechanisms for the assessment of impacts to and management of biodiversity and ecosystem services. However, it is possible that the national or regional regulatory requirements may be less stringent than the Bank's requirements, necessitating studies and plans additional to those required by law.

Directive B3 notes that *All Bank-financed operations will be screened and classified according to their potential environmental impacts* and that *Bank operations will be classified according to their potential impacts so that the appropriate environmental assessment or due diligence requirements are selected for the operation.* In the case of a project that is considered by the Bank to raise complex and sensitive biodiversity concerns, the client will be expected to establish an advisory panel of experts to provide guidance for the design and execution of the project.

Directive B4 states the need for the Bank to identify and manage other risk factors that may affect the environmental sustainability of projects. These other risk factors may include weak environmental governance capacities of clients, the relationship between technical cooperation projects that finance feasibility studies for infrastructure projects that may have significant biodiversity consequences, issues such as the use of genetically modified organisms, and the impacts of associated facilities not financed by the Bank, such as access roads, power lines, and power plants or water treatment facilities that may be essential to the project.

Directive B5 states that the Bank requires the client to prepare *environmental assessments and associated management plans and their implementation.* The EA should be at a level of detail that is in accord with the potential impacts and risks of the project or program and be compliant with specified standards for these assessments as detailed in the guidelines to OP-703. Environmental impact assessment should include, *as a minimum: screening and scoping for impacts; timely and adequate consultation and information dissemination process; examination of alternatives including a no project scenario*. *The EIA should be supported by economic analysis of project alternatives and, as applicable, by economic cost-benefit assessments of the project's environmental impacts and/or the associated protection measures*. This directive also stipulates the requirements for environmental and social management plans (ESMPs), including the institutional basis, capacity building, timeline, budgets, consultation, and monitoring procedures required for successful implementation.

Directive B6 requires consultations with affected parties as part of the EA process. These consultations are critical to scoping biodiversity issues and in establishing frameworks for the implementation of key ESMPs relating to biodiversity, such as offset management plans.

Directive B7 notes that *The Bank will monitor the executing agency/borrower's compliance with all safeguard requirements stipulated in the loan agreement and project operating or credit regulations* and that *safeguard requirements, such as those in an ESMP must be incorporated into the project contract documents, its operating or credit regulations, or the project bidding documents, as appropriate, setting out as necessary milestones, timeframes and corresponding budgetary allocations to implement and monitor the plan during the course of the project*.

Directive B8 requires identification and assessment of transboundary issues. Biodiversity does not follow political boundaries, and a project may have impacts on neighboring countries' natural resources (e.g., biological corridors, coastal systems, rivers, and transboundary protected areas).

Directive B9 states that *The Bank will not support operations that, in its opinion, significantly convert or degrade critical natural habitats*. In addition, the Bank will not support projects involving significant conversion or degradation of natural habitats unless *(i) there are no feasible alternatives 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*. Directive B9 also indicates that *the Bank will not support operations that introduce invasive species.*

Directive B10 requires the Bank to avoid adverse impacts resulting from the production, procurement, use, and disposal of hazardous materials and to not finance projects involving toxic pesticides—as defined by the World Health Organization—except where adequate management capacity exists.

Directive B11 addresses pollution and requires clients to follow standards established by multilateral development banks. Severe pollution of waterways can lead to significant conversion of aquatic habitats, as described in Directive B9. This directive also addresses climate change mitigation.

Directive B15 states that *as a principle, the Bank will support convergence and harmonization efforts among the multilateral financial institutions, bilateral donors, and other private and public partners*. This principle is relevant, given the 2012 release of Performance Standards on Social and Environmental Sustainability by the International Finance Corporation (IFC); its Guidance Note 6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources) describes good practices for assessing and managing potential project impacts on biodiversity and related ecosystem services.

Managing biodiversity and ecosystem services in Bank projects

1.13. The most effective mechanism for managing potential impacts and risks to biodiversity and ecosystem services is through an EA taking into account the identification and management of potential impacts on and risks to biodiversity and ecosystem services.

1.14. Environmental assessments should:

- Identify and assess the potential positive and negative impacts and the risks of the project as related to biodiversity and ecosystem services.
- Analyze approaches to help avoid, mitigate, rehabilitate, and compensate for identified potential impacts and risks.
- Select and develop the most appropriate arrangements for managing impacts on biodiversity and ecosystem services.

1.15. The client's assessment and management of potential impacts and risks to biodiversity and ecosystem services is an iterative process with six major stages that are described in this Guidance document:

- Screening and classifying: Projects are screened to identify key potential impacts and risks; the project can then be classified based on its likely impacts—this classification will determine the most appropriate type of EA for the project.
- Scoping: Scoping incorporates initial stakeholder perspectives and involves a complete review of available information about the project's area of influence. The scoping process should identify key biodiversity and ecosystem service features and include an initial analysis of dependence and impacts on ecosystem services. Scoping should provide sufficient information for the client to develop detailed terms of reference (TOR) for the project EA.
- Biodiversity baseline studies: The TOR for biodiversity baseline studies is derived from the scoping process. Biodiversity baseline studies should be focused and relevant to understanding the key biodiversity features in the area of influence, including critical natural habitats and species of conservation importance. In many cases, biodiversity baseline studies are undertaken with incomplete scoping of key biodiversity and ecosystem service features. Under these circumstances, or in situations where new issues arise during project development, the Bank may require additional biodiversity studies to ensure compliance with its policies.
- Environmental impact assessment: The assessment of the direct, indirect, and cumulative impacts of the project on biodiversity and ecosystem services in the project's direct and indirect areas of influence is the basis for identifying measures to avoid, mitigate, rehabilitate, and compensate.
- Environmental management planning: Projects with significant potential impacts and risks for biodiversity should develop a biodiversity action plan (BAP) that incorporates the proposed management actions to avoid, mitigate, rehabilitate, and compensate for the potential impacts and risks for biodiversity and ecosystem services. The plan should also describe institutional arrangements for implementation, including those required for monitoring progress and for adaptive management.

- **Implementing, monitoring, and reporting on biodiversity management actions**: The proposed actions and their proposed outcomes described in the BAP should be monitored during implementation. The Bank will use client monitoring reports and periodic supervision missions as the basis for evaluation of compliance with its environmental and social safeguards.

1.16. Synchronizing the project's EA with the Bank project review and approval process can increase the likelihood of developing an environmentally sustainable project and can potentially reduce delays in project approval. Synchronization is particularly valuable in projects that present significant potential impacts and risks to biodiversity and ecosystem services and where additional in-depth biodiversity baseline studies and a BAP may be required to fully document and manage biodiversity potential impacts and risks. These studies and the agreed plans must be included in the proposal for operation development or the loan proposal presented to the board of directors.

1.17. The Bank and the client have different roles and responsibilities for actions during the six stages of the Bank project cycle. (See Table 1.)

Table 1: Bank requirements for managing biodiversity during project cycle

Project stage within Bank	Minimum client information required by the Bank	Bank actions and documents produced
Project preparation -screening and classification	▪ Project location and description and initial project screening that identifies biodiversity features and how they are likely to be affected	▪ Assess project location overlap with known areas of critical natural habitat or key biodiversity features ▪ Bank prepares safeguard screening form and safeguard policy filter, identifies potential impacts, and categorizes the project
Project preparation – scoping	▪ Client project scoping identifying the impacts on biodiversity features that are likely to be most significant ▪ EA TORs	▪ Bank reviews available information (which may include the EA or the TORs for the EA) and prepares the environmental and social strategy (ESS), which considers potential impacts, describes the due diligence process, and indicates any required additional studies and plans
Project preparation – due diligence	▪ Client EA, including, as required, biodiversity baseline studies and BAP ▪ Client completes additional studies and plans required by the Bank	▪ Bank publicly discloses the client EA report through its website before due diligence mission ▪ Bank undertakes environmental and social due diligence in accord with ESS to identify any areas of noncompliance with policy and prepares the environmental and social management report (ESMR), which describes the key impacts, assesses their significance, and presents an agreed approach to management
Finalization of project documentation	▪ Client reviews and agrees to environmental and social conditions incorporated into loan proposals and the ESMR	▪ The EA and additional studies should ensure there is a clear understanding of the significance of all key adverse impacts ▪ Bank publicly discloses agreed ESMR and any additional studies or management plans ▪ The management plans should be agreed and demonstrably sufficient (e.g., commitment and capacity exists for implementation) to manage all key adverse impacts
Project approval		▪ The loan proposal and ESMR are presented to the Board of Executive Directors for approval

Project legal agreements	▪ Client reviews and agrees to environmental and social conditions in loan contract	▪ Bank drafts environmental covenants for loan contract based on agreed conditions in the ESMR
Project implementation	▪ Client implements environmental and social conditions in loan contracts	▪ Bank reviews environmental and social monitoring reports and undertakes supervision missions to ensure ongoing compliance with loan contract conditions and Bank policy
Project completion and reporting		▪ Bank confirms compliance with safeguard policies and determines lessons learned

Box 3: Hydroelectric project in Panama reinforces the need to present to the Board of Executive Directors assessment and management plans for key biodiversity impacts prior to project approval

Problem: A project to build two hydroelectric plants set off civil society protests and an official complaint to the Bank's Independent Consultation and Investigation Mechanism (ICIM). The complaint focused on the project's environmental impact and the cumulative impacts of the large number of additional plants being built or planned for the same river. The project established the need for the borrower to undertake crucial assessments and develop management plans for biodiversity to be presented to the Bank board of directors before project approval.

The project: The Pando-Monte Lirio Hydroelectric Power Project's two hydroelectric power plants are being built on the Chiriquí Viejo River in Panama's western province of Chiriquí. The project is being financed by a Bank loan for US$40 million approved in 2009, with additional participation from the International Finance Corporation. It is being built by Electron Investment, S.A. (EISA).

Risk and potential impact: The project will divert about 90 percent of the river's average annual flow into 26 kilometers (km) of tunnels over a stretch of river totaling 51.5 km. The reduction of flow and the two dams will impact migratory fish within the river and reduce available aquatic habitat important for the IUCN Red Listed Neotropical River Otter. These threats would be compounded by a series of additional hydroelectric projects along the same river that were in construction or planning.

Documents presented to the board: The ecological flow assessment and cumulative impacts assessment were insufficient to effectively assess impacts, and the submission did not include feasible management plans to address the impacts. Nevertheless, the Bank went ahead with the original timetable for project approval after EISA agreed to correct the study's shortcomings in line with subsequent project milestones, including first disbursement. To correct the shortcomings, the Bank subsequently ensured completion of a satisfactory ecological flow analysis and management plan and provided a US$490,000 technical cooperation grant for studies and a pilot watershed management plan for the Chiriquí Viejo River to be carried out by Panama's National Environmental Authority.

Lessons learned: The project demonstrated the need to analyze development in a context that is defined by ecological realities rather than project footprint boundaries. It also pointed out opportunities for the Bank to better exploit synergies between its public and private sector portfolios, in which public sector investments would strengthen national capacities for environmental management, such as addressing cumulative impacts of hydropower development. Finally, the board-approved action plan to respond to the ICIM case included that prior to presenting an operation for approval by the Board of Executive Directors, the Bank must have the following: a clear understanding of the nature and magnitude (significance) of all key adverse environmental and social impacts and risks; impact management strategies addressing all key adverse impacts and risks that meet applicable Bank policy requirements and have been agreed with the borrower and other relevant parties (if any); and a demonstration of commitment and capacity by the borrower and other relevant parties (if any) to implement the agreed management strategy, as well as a demonstration that resources for its implementation have been secured.

SECTION II: SCREENING AND SCOPING PROJECTS

2. Screening and classifying projects

2.1. Screening serves as a preliminary assessment by the client of the significance of potential impacts and risks of a project and begins the process of determining the level of environmental planning and management required. Most national regulations require a client to complete project screening that will usually yield a classification by the regulatory agency of the project's potential impacts and risks. The Bank also screens and classifies projects that are presented for financing.

Project screening by the client

2.2. The initial assessment of a project's potential impacts on biodiversity and ecosystem services is based on the project type and location.

2.3. Project types. The following types of project have the potential to have complex and potentially significant negative direct, indirect, regional, or cumulative impacts:

- Infrastructure, such as new roads, railways, major waterworks, airports, and ports.
- Natural resource extraction and distribution, such as mines and oil and gas pipelines.
- Large-scale agriculture.
- Industrial projects, such as cement plants, industrial parks, chemical plants and pulp mills.
- Energy generation and distribution through hydroelectric dams, power generation plants, and transmission lines.

2.4. Biodiversity impacts from these kinds of projects include land use change, land cover change, habitat fragmentation, emissions and effluents that affect habitats, and the introduction of invasive species. These projects will invariably require an EIA.

2.5. On the other hand, projects with minor reconstruction, rehabilitation, or limited construction or that provide technical assistance are likely to cause only local and short-term negative impacts and may only require a brief EA or environmental analysis.

2.6. Project location. Projects located in, or that may have impacts on, habitats that are considered to be key biodiversity features invariably will require an EIA. See Table 2 in Chapter 5 for characterization and examples of key biodiversity features that may be affected by projects.

2.7. The precautionary approach should be adopted for projects proposed in locations that are known to be environmentally sensitive or where there is an indication that people depend on the ecosystem services derived from the area.

Project screening and classification by the Bank

2.8. Projects supported by the Bank fall into one of three categories:

- **Category A projects** have significant negative environmental or social impacts or have profound impacts on natural resources. Category A projects will require an EA—normally an EIA including specific management and compensation plans, as required. If the project has significant impacts on biodiversity or ecosystem services, the plans should include a BAP.
- **Category B projects** are likely to have only local and short-term negative environmental or social impacts, for which management measures should be readily available. These projects will require in most cases an environmental and social analysis focused on addressing the issues identified during the screening process.
- **Category C projects** are not likely to have negative environmental or social impacts and do not require environmental or social analysis beyond screening and scoping. However, such projects may require safeguard measures or have monitoring requirements.

2.9. For Bank screening and classification, the client should provide the following information:

- Geo-referenced location of the project footprint, including associated facilities, incorporated into a map of the area that covers geographical features. This information can be presented to the Bank as latitude and longitude coordinates, ArcGIS shape file, or a Google Earth file (see Annex A for additional guidance on Bank requirements for geo-spatial data for projects).
- Description of the site for the project, including reference to any special environmental or social characteristics of the area such as ecologically important or sensitive ecosystems or species and natural areas that people depend on. The site description should include consideration of land ownership and a history of land use in the area.
- Description of the main elements of the project. This should include a status update and timetable for the project and a determination if the project is green field (without any previous facilities) or an expansion-rehabilitation. The project description should include any "associated facilities," such as access roads or transmission lines that are essential for the project to function, even though they may not be financed by the Bank. This information may be available in EA documents or in business plans prepared for the project.
- Description of any prior environmental and social assessment requirements or studies for the project. The client should send the Bank electronic copies of environmental and social assessments—including screening reports, scoping reports, TORs, EA reports, or management plans—and indicate who in the client's organization is responsible for follow-up on environmental and social management issues.
- EAs are frequently completed or under way when projects are presented to the Bank. Consequently, screening will advance based on these documents and any additional available information.

3. Analyzing project alternatives

3.1. Consideration of alternatives to a project should begin during the initial screening of a project, though completion of the analysis of alternatives will require additional information. It is difficult to overestimate the importance of a post-hoc analysis of alternatives as a mechanism to avoid impacts on biodiversity and ecosystem services.

3.2. The “alternatives” to a project are the different ways in which the need and purpose for implementing the project can be achieved. The Bank favors alternatives that lead to the avoidance of negative environmental impacts particularly as they relate to natural habitats. Directive B5 of OP-703 requires examination of alternatives, including, to the extent applicable and feasible, a “no project” scenario.

3.3. Directive B9 of OP-703 indicates that, wherever feasible, projects should be sited on lands already converted rather than in natural habitats. Consequently, the alternatives analysis should be particularly rigorous when a project is likely to have significant biodiversity and ecosystem service impacts. The Bank will only support a project that results in the significant conversion or degradation of natural habitats if it there are no feasible alternatives acceptable to the Bank and if a comprehensive analysis demonstrates that the overall benefits from the project substantially outweigh the environmental costs.

3.4. The most comprehensive approach to rigorously exploring and evaluating reasonable project alternatives is through incorporating biodiversity concerns into strategic sector planning and national or regional land use planning. This is particularly the case when there are potential alternative locations or approaches to meeting the needs and purpose of the project. The Bank therefore strongly encourages prior strategic sector planning linked to strategic environmental assessment and coherent approaches to regional land use planning when considering projects.

3.5. The analysis of alternatives associated with EAs has two major purposes:

- Identify potential, feasible alternative project options that would substantially achieve the objectives of the proposed project or its components.
- Evaluate the feasible options based on stakeholder criteria to agree on a final project strategy that will result in the cost-effective achievement of the objectives while minimizing environmental and social impacts.

3.6. The analysis of alternatives should consider those that deliver the same or similar project objectives or that meet the needs and purpose of the project. Alternatives can include:

- Changing demand—e.g., rather than producing more energy with a new power plant, reduce energy losses nationally.
- Using other inputs and supply—e.g., using wind power or other generation options in the place of hydroelectric power to avoid the impact of a dam and reservoir.

- Alternative activities—e.g., improving public transport rather than increasing road capacity to improve access to a city center.
- Alternative locations—e.g., avoiding important biodiversity areas and developing projects in lands that are already converted through improved regional planning or by routing linear infrastructure such as transmission lines around protected areas.
- Different designs or processing technologies—e.g., minimizing wastes or improving efficiency to reduce impacts, using run-of-the-river hydropower to allow for fish migrations, using directional drilling to install underground pipelines, or incorporating wildlife passages in road construction.
- Alternative timing—e.g., modifying the timing of flows from a reservoir or the operating schedules for transport systems based on an understanding of the reproductive or migratory behavior of wildlife.

3.7. Consultation and public participation are key elements in advancing the analysis of alternatives. Project alternatives should be introduced into discussions with stakeholders during the scoping process. Key stakeholders include relevant government agencies, civil society organizations, and local communities that may be affected by the proposed project. Consultations should focus on determining the potential alternatives and ensuring a full understanding of their potential impacts and risks.

3.8. The project alternatives analysis should present reasonable alternatives that deliver the same or similar project objectives or that meet the needs and purpose of the project and that are feasible in a national, regional, and local context. For each alternative, the analysis should compare and evaluate each proposed option through design, construction, and operation in terms of stakeholder-agreed criteria. These criteria may include the land, operational, and management requirements; natural resource demands, such as for water or materials; design, construction, and operation schedules; consistency with local, regional, and national planning; extent and magnitude of direct, indirect, and cumulative impacts; physical, institutional, and organizational requirements; compliance with national legal and Bank policy requirements; and the capital and recurrent costs of the project and associated management measures.

3.9. The alternatives analysis should present a summary of qualitative and quantitative information for each proposed option against the decision-making criteria. In situations where the environmental and social impacts are similar among proposed options, then technical and economic factors will generally determine the final option. When identification of the preferred option is difficult, a systematic approach based on ranking, rating, scaling, and weighting of the criteria may be more appropriate. The final alternatives analysis should include a clear rationale and justification for selecting the proposed project option and design, including general management options.

Box 4: Identification of transmission line impacts leads to alternative routing

Problem: The route for a transmission line project proposed to the Bank for funding presented significant risks for critical natural habitat.

The project: The transmission line will carry electricity from the Yacyretá Hydroelectric Power Plant, on the Paraná River between Paraguay and Argentina, to metropolitan Asunción. The original project to build transmission lines to Asunción was prepared for Bank financing in 1996, together with an environmental impact assessment. However, the project did not go forward, nor did the government acquire the right of way (ROW) needed to route the transmission lines. In 2011 the Paraguayan government again presented the project for Bank financing.

Risk and potential impact: The project was classified as Category A after the Bank determined that the ROW originally proposed for the transmission line would result in the loss of 1,000 hectares of Atlantic forest, one of the most vulnerable ecosystems in South America. The project would also pose potential risks to bird species. An EIA was prepared to examine alternative routes that would minimize habitat destruction as well as avoid populated areas.

Study proposes route with lower impact: The EIA analyzed each of four alternative transmission line routes. One of the routes would pass through the watershed of Ypacaraí Lake and the buffer zone of the Ypacaraí National Park, which provides ecosystem services for local people. Two other routes would pass through habitats of endemic species that live in mountainous areas. The route recommended by the study was the longest, but it avoided protected, cultural, and populated areas. The Bank also requested the adoption of new practices for preparing the ROW that would minimize impact on habitats, such as limiting clearing to areas directly under the power lines and removing only taller trees. The project will also minimize soil disturbance to reduce colonization by non-native species. Deforested areas would be compensated for by planting native species in other areas using seedlings produced by nurseries, municipalities, non-governmental organizations (NGOs), and schools. Although the route selected will avoid forested areas, it does cross endangered wetlands and grasslands habitats. A biologist studied potential threats to endemic and other bird species and determined that these species normally do not fly high enough to risk collision with the transmission lines. In fact, the ROW will preserve grassland habitat by preventing the entry of agriculture and invasive grass species. The study of alternatives also examined the impact of the transmission line where it crosses the Paraguay River, used by birds as a migratory route. Non-governmental groups will monitor the frequency of collisions with the lines, and markers will be placed in the transmission lines to alert birds and bats.

Lessons learned: The study of alternatives demonstrated that a comprehensive analysis can reduce environmental impacts and project costs. The cheapest alternative from an engineering standpoint was the shortest route. However, the resulting social and environmental impacts would have aroused considerable opposition, resulting in potentially expensive delays. While the study of alternatives delayed the operation's submission to the Bank's Board of Executive Directors, the longer route ultimately chosen was probably the most economically and environmentally viable.

4. Preparing a cost-benefit analysis

4.1. The need for a comprehensive cost-benefit analysis (CBA) in a project should be identified early in the screening process. Early identification can help ensure that the analysis contributes to decision making. Category A projects, and projects with significant impacts on natural habitats, will invariably require a comprehensive CBA.

4.2. The purpose of the CBA is to demonstrate that the overall benefits from the project substantially outweigh the environmental costs. This analysis consists of an economic valuation that analyzes the generation of economic benefits and costs from a project by comparing the discounted flows of benefits and costs over a prescribed time horizon. If possible, this analysis should be integrated within the overall CBA for the project.

4.3. A comprehensive CBA expands the standard CBA for a project by incorporating monetized estimates of the environmental costs and benefits. It includes the costs from any negative environmental and social externalities and the benefits from any positive environmental and social externalities. Economic externalities occur when a project has an impact on individuals who are not part of the decision-making process. If a factory produces emissions that affect people outside of the project boundaries, or a dam affects people's use of a river downstream, then an externality exists. Externalities can be negative or positive. Negative externalities may be addressed by avoiding their production or by compensating for them with actions that either negate the externality or internalize it.

4.4. The following data are required to complete a comprehensive CBA:

- Time horizon for the project.
- Discount rate.
- Monetary values of the project benefits and costs for each year.

4.5. Numerous economic valuation techniques can be used to monetize externalities. Choosing the most appropriate one will depend on the type of externality, available data, resources and time available for the analysis, and the capacities of the analyst. Although each project is unique, environmental economists agree that particular valuation techniques are more appropriate for valuing specific environmental goods and services. (See Figure 1.)

4.6. Economic valuation is easier when an environmental externality results in a change in production for a good or service for which it is possible to measure market prices. Examples of externalities that are relatively easy to measure include changes in the production of natural resources or ecosystem services, air and water pollution that affect human health and productivity, the costs of alternative production or of management actions, and the costs of recreational uses of the environment. It is more difficult to measure externalities that affect biodiversity or pristine habitat values, cultural or historical values, or human life. Genetic values and the loss of value associated with species extinction are particularly difficult situations in which to apply economic valuation.

4.7. The Bank requires that the comprehensive CBA be completed by an environmental economist or by economists with experience in addressing environmental issues. Such experience is critical because decisions as to what externalities to include or exclude and which economic valuation techniques to apply can have substantial consequences for the results of the analysis. Equally important is that the person responsible for the CBA is involved in the project from the design stage. The draft CBA should be peer-reviewed by at least one environmental economist.

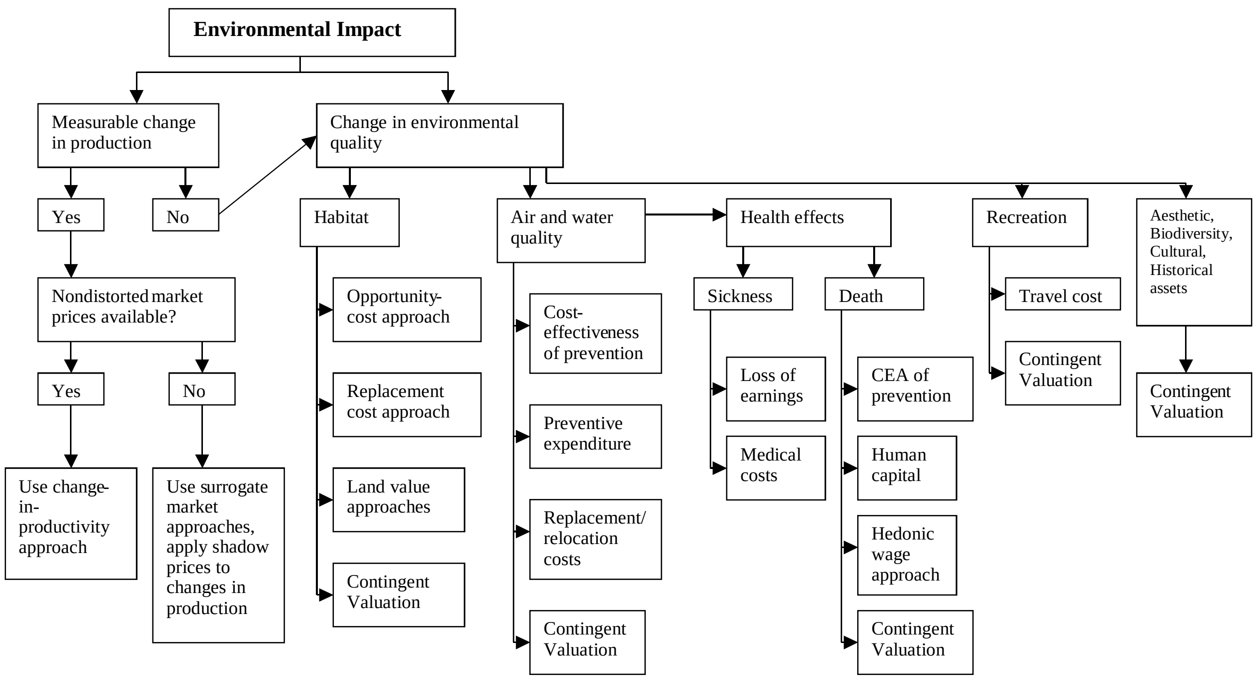

Figure 1: Flow chart to match valuation techniques to types of environmental externalities

Box 5: Comprehensive cost-benefit analysis in Costa Rican project confirms benefits outweigh costs

Problem: The Reventazón Hydroelectric Project will provide substantial benefits to Costa Rica but at the cost of eliminating the last remaining free-flowing section of the Reventazón River and of having impacts on a biological corridor. The Bank sought to determine if the overall benefits from the project–environmental expenditures as well as economic returns–outweighed the environmental costs.

The project: The project is located in the lower Reventazón River, downstream from three existing hydroelectric projects. Financing includes US$298 million in Bank loans. The works consist of a 130-meter-high dam that will create a 6.9-sq-km, 8-km-long reservoir and a 4.2 km river diversion between the dam and powerhouse. The plant will have a generating capacity of 305 MW. The project is being carried out by the Instituto Costarricense de Electricidad (ICE), the national power company.

Risk and potential impact: The project was prepared using a standard CBA that evaluated the project as a financial investment; it analyzed project outputs and benefits into the future and discounted them to determine if the present value of benefits exceeded present costs. The project's classification as Category A required ICE to prepare an environmental impact assessment to comply with Bank environmental policy directives. Directive B.5 requires that the EIA include a comprehensive cost-benefit analysis of the project's environmental and social impacts that take place beyond the project time horizon. The project would result in the significant conversion of the Reventazón River—a natural habitat. The Bank therefore conducted a comprehensive CBA to quantify in dollar terms the environmental losses that the Reventazón project would incur, principally the loss of the free-flowing aquatic habitat and the impact on the biological corridor, as well as the impact on downstream habitats.

The study's conclusion: The comprehensive CBA drew on existing data to identify the project's major environmental impacts and estimate their costs, taking into account the management measures contained in the EIA. The study found that the proposed management plan to rehabilitate and maintain connectivity in the biological corridor at the tail of the reservoir will cost US$2.7 million over the period 2013–2015, with an annual recurring cost thereafter of US$445,000. Similarly, changing this section from a free-flowing river to an impoundment will be offset by preserving a comparable river system at a cost of US$2.66 million in 2013–2015, and then US$780,000 annually thereafter. The comprehensive CBA calculated a net present value (NPV) for the project of US$96.85 million. A second NPV calculation that includes the cost of impacts, but not the benefits from mitigating them, drops the NPV calculation down to US$88.99 million. The standard CBA approach found a NPV of US$115.16 million. The differences between the three NPV results are small. The reason is that several potentially large environmental costs that normally occur in hydroelectric projects, such as substantial resettlement, were avoided.

Lessons learned: The Bank's comprehensive CBA, conducted ex post, confirmed the benefits from the project. In general, however, comprehensive CBAs should be carried out ex ante to help identify opportunities for avoiding environmental impacts and to reduce the risks of costly modifications in project design at a later stage. In projects that have significant impacts on natural habitat, the Bank requires an ex-ante comprehensive CBA.

5. Scoping for biodiversity and ecosystem service issues

5.1. Under many national legislative regimes, clients are required to undertake a scoping process as a prelude to developing the EA. Scoping can help to focus the EA activities toward addressing the most significant issues associated with a project; scoping is an important step in effectively managing project impacts on biodiversity.

5.2. Project scoping undertaken by the client serves two major purposes:

- Identifying potential environmental and social impacts of the project.
- Preparing the TOR for the EA, focusing on the most significant issues.

5.3. Effective scoping should include reconnaissance of the project area with a multidisciplinary team. The team should review the project feasibility studies, project alternatives, and existing biodiversity and ecosystem services information available for the project area of influence.

5.4. Scoping should be participatory and involve consultations with stakeholders, including local communities that may be affected by the project, specialists with environmental and social expertise in the area, local government representatives, civil society organizations, and regulatory agencies. The scoping report should demonstrate that the client has made efforts to achieve consensus with stakeholders on the approach to the EA TORs and the focus of the biodiversity baseline studies.

5.5. Scoping begins with a summary document that has the following information: project description, including the magnitude, timing, and frequency of activities; project alternatives; project location; area of influence; preliminary analysis of potential environmental and social impacts, including their spatial and temporal scale; and a description of the approach to public consultation. This document is the basis for discussions and can be combined with matrices or checklists (see Annex B) to focus the TOR for the EA on critical issues.

5.6. The final scoping report should identify key biodiversity features, including the priority ecosystem services in the area of influence, and should describe project potential impacts and the risks for them. It should also identify relevant information gaps in knowledge, as well as any project-specific studies needed to understand potential impacts on biodiversity and ecosystem services.

5.7. The scoping report and TOR for the EA should define the need and scope of the biodiversity and ecosystem services baseline studies, including proposed methodologies and sampling regimes, and should establish the focus for the assessment and management of impacts on biodiversity and ecosystem services.

Identifying and analyzing priority ecosystem services

5.8. During scoping, the client should identify priority ecosystem services in the area of influence that may be affected by the project or that may be important for attaining the development objectives of the project within a framework of sustainable development. Priority ecosystem services are defined as ecosystem processes, goods, and values that provide benefits to human communities and that may be significantly and adversely affected by the project or upon which the project has a significant dependence. (See World Resources Institute: *Ecosystem Review for Impact Assessment: Introduction and Guide for Scoping* and *Weaving Ecosystem Services into Impact Assessment*; and, IFC Performance Standards Guidance Note 6 for additional guidance.) In most projects, these services will focus on carbon, water, and biodiversity.

5.9. The Bank recognizes and safeguards the role of natural habitats in providing the ecological services required for sustainable human development—provisioning benefits, regulating services, cultural services, and supporting services—and in supporting the functional integrity of ecosystems. OP-703 refers to such ecological services as recharging aquifers, sustaining fisheries, and maintaining mangroves or other ecosystems that help prevent or mitigate natural hazards and sustain natural assets.

5.10. Projects can affect the delivery of services to other beneficiaries and also benefit from ecosystem services. The degradation of services caused by a project can represent a legal, operational, financial, and reputational liability for clients. There is a prevailing trend toward the inclusion of ecosystem service values in decision making in the public and private sectors, but this is not manifested in individual project management. Understanding the costs and benefits of the relationship between projects and ecosystem services is an important element in good decision making for the Bank, as recognized in OP-703.

5.11. The analysis and description of ecosystem services can be undertaken through qualitative, quantitative, and monetary approaches that provide complementary information. Qualitative reviews identify the range and extent of services as well as the beneficiaries and users, and they document flows of services from source to sink. Quantitative assessments focus on the material and energetic flows in an ecosystem and provide numerical estimates for the flows and distribution among beneficiaries. Monetary valuations estimate the cash value of a service using standard environmental economics methodologies such as direct use valuation, avoided costs, alternative costs, or willingness to pay valuation methods.

5.12. Where a project is likely to affect the delivery of ecosystem services to beneficiaries or directly depends on ecosystem services, the client should undertake a qualitative review of ecosystem services during scoping. This should be participatory and occur in parallel with the scoping process for a project. It should involve the beneficiaries, particularly local communities and indigenous people, as well as relevant environmental and social technical specialists.

5.13. The qualitative review of ecosystem services should document the sources, flows, and beneficiaries (including the project) for ecosystem services that are relevant in the project's area of direct and indirect influence. It should also determine the beneficiaries' degree of dependence on the services, describe the recent trends in delivery of the service (including determining the drivers of change), and describe the potential changes and their magnitude that may occur due to the project. The qualitative review should take into account non-local beneficiaries of services and should include non-instrumental and non-material services.

5.14. The ecosystem services review report should include this information as well as identify the key social, operational, financial, regulatory, and reputational impacts on and risks to ecosystem services that are related to the project. The client should also apply the mitigation hierarchy and identify actions required to minimize the impacts of the project on the identified ecosystem services.

5.15. Where there are likely to be significant impacts, the Bank requires the client to undertake a qualitative review of the form similar to the Ecosystem Services Review Template of the IFC's Guidance Note 6 and the Ecosystem Service Review for Impact Assessment document from the World Resources Institute. The Bank encourages, but does not require, the client to use more sophisticated analysis tools, including ARIES , InVEST , and MIMES, that can model ecosystem service flows and project impacts and can present results in a palatable format for decision making.

Laying the groundwork for biodiversity baseline studies

5.16. As part of the process to establish the TORs for the EA, the client should:

- Decide on the spatial extent of the study area.
- Review available information and consult with stakeholders.
- Identify the key biodiversity features, including priority ecosystem services.
- Define the significant potential impacts and risks associated with the project.

5.17. Investing time and resources in designing the TORs for the biodiversity baseline study will ensure the efficient use of resources and application of effort so that the studies are focused on the most important ecological features, impacts, and risks instead of haphazardly amassing information that may have little relevance.

5.18. If a project is in early development, the client should provide the Bank with the results of scoping and the proposed TOR for the biodiversity baseline studies before beginning work. This will give the Bank an opportunity to identify any potential gaps in the proposed work. A checklist for reviewing the content of the TOR and the final report for biodiversity baseline studies is provided in Annex C.

5.19. Establishing an appropriate biodiversity baseline for a project is an iterative process. As the biodiversity baseline study proceeds, additional information may arise that requires more in-depth studies of a particular species or habitat. For example, a species new to science may be found in the direct area of influence that will require additional surveys outside of the area of influence to be able to assess the significance of impacts and risks.

Defining the spatial scope for biodiversity baseline studies

5.20. The biodiversity baseline study area should include those areas likely to be affected by the project and by facilities supporting the project. The initial spatial scope for baseline studies may need to be refined in the case that information gathered during the study requires additional studies to determine the conservation status of a species or habitat or to understand the significance of impacts and risks.

5.21. The most important impacts of a project on biodiversity may occur indirectly through increasing resource use pressures by establishing new access routes, changing population pressures on resources by attracting people to work in a new area, providing equipment that may be deployed over a large area, or affecting migratory systems that may modify the ecology of distant areas. The definition of the area of indirect influence should take into account key indirect potential impacts.

5.22. Similarly, the areas affected through cumulative impacts may extend well beyond the project's direct and indirect areas of influence.

5.23. If it is likely that a project will require a biodiversity offset, it will be important to include the proposed offset sites in the biodiversity baseline study area.

5.24. In some cases, the biodiversity baseline study area should also include sites that can serve as comparative controls or references for monitoring project impacts over the long term.

Reviewing and assessing available information on biodiversity and ecosystem services

5.25. The client should synthesize available knowledge on biodiversity in the area of influence, based on a review of available literature, databases, and unpublished studies, as well as consultation with key regional and international species and habitat specialists.

5.26. This initial assessment should include:

- Review of any existing EAs or other studies relevant to the area of influence.
- Description of the biogeographic and landscape settings of the area of influence.
- Identification of species with IUCN Red List categories of near-threatened, vulnerable, endangered, or critically endangered likely or known to be present in the area of influence.
- Identification of key biodiversity features within the area of influence of the project.
- Identification of existing threats to the key biodiversity features, including ecosystem services—drivers of habitat or biodiversity loss and trends.
- Identification of relevant experts, including NGOs, institutions, and individual researchers.
- Identification of key social stakeholders (affected communities).
- A list of references and data sources used.
- Discussion of the reliability of information and gaps in existing information.

5.27. To most effectively identify sources of available information, the client should consult with biodiversity specialists and local stakeholders. Biodiversity specialists may come from universities or regional research and management organizations, conservation NGOs, and government authorities. Local stakeholders include local communities and organizations, conservation organizations, and local government authorities who live or work in the area. The Bank requires consultations with indigenous peoples if a project is likely to have impacts in an area of traditional use or on their lands and territories. In Category A projects, the Bank requires meaningful consultation and recommends that the first consultation occur during the scoping phase of the EA process.

5.28. The initial consultations should:
- Increase access to information and data regarding biodiversity in the area of interest.
- Help prioritize the most important biodiversity features (including ecosystem services).
- Help identify the potential impacts and risks of greatest concern to stakeholders.
- Help develop a consensus with local stakeholders on the scope of the biodiversity assessment.

Identifying key biodiversity features that may be affected by the project

5.29. Key biodiversity features are summarized in Table 2.

Table 2: Characteristics and examples of key biodiversity features in LAC countries

Characteristics of key biodiversity feature	Examples in LAC
Existing or proposed national protected areas	Madidi National Park in Bolivia; Proposed Three Bays Marine Protected Area in Haiti; Wai Wai Community Owned Conservation Area in Guyana
Areas that have been recognized under international conventions, such as Ramsar sites, World Heritage sites, and Biosphere Reserves	Panama Bay Ramsar Site; Galapagos World Heritage Site; Pantanal Biosphere Reserve
Irreplaceable habitats that have been recognized through national or international conservation prioritization, e.g., important bird areas (IBAs), endemic bird areas, important plant areas, key biodiversity areas (KBAs), Alliance for Zero Extinction (AZE) sites	Caroni Swamp IBA in Trinidad; Lesser Antilles Endemic Bird Area; Yapacana National Park AZE site in Colombia; Cordillera del Condor KBA (also an AZE) in Ecuador
Areas with high probabilities of finding range-restricted endemic species or species that are genetically isolated and may be important for evolutionary change	Island habitats; isolated habitats on tepuis, inselbergs, and escarpments; Andean Piedmont rivers and streams; montane forests; high-elevation herbaceous and shrub habitats, including *bofedales* and *paramo*; caves in limestone and karst areas
Migratory routes supporting migratory species	Central Americas Flyway; Amazonian longitudinal and lateral fish migrations; Cauca basin fish migrations to and from the Cienegas; Central American freshwater fish and shrimp migrations

Vulnerable habitats subject to historical and recent degradation, loss in coverage, and fragmentation	Mangrove forests; salt marshes; dunes; turtle nesting beaches; sea grass beds; Caribbean coral reefs; Atlantic forest; Choco-Darien forest; tropical dry forests; freshwater wetlands such as the Pantanal, Llanos, *várzea* forests, *igapó* forests, and *bofedales*
Terrestrial, aquatic, and marine biological corridors to ensure genetic connectivity	Meso-American Biological Corridor; Caribbean Biological Corridor; Paso de la Danta Biological Corridor in Costa Rica
Important spawning or breeding areas, or where individuals of particular species aggregate or congregate	Black grouper spawning in Belize; Flamingo congregation in Laguna Colorada, Bolivia
Large landscapes or seascapes with minimal human influence and contiguous undisturbed habitat	Guiana Shield; Chaco; Amazonia; Sea Flower Marine Protected Area
Areas important for ecosystem services, including carbon, water, wildlife, and fisheries	Panama Canal watershed; indigenous territories that are critical for wildlife and fishing

6. Identifying critical natural habitats

6.1. The client should evaluate the presence of critical natural habitats in the area of influence of the project against the criteria for such habitat described in the environment and safeguards compliance policy. *Critical natural habitats are: (i) existing protected areas, areas officially proposed by governments for protection or sites that maintain conditions that are vital for the viability of the aforementioned areas; and (ii) unprotected areas of known high conservation value*.

6.2. The policy details that *Existing protected areas may include reserves that meet the criteria of the IUCN Protected Area Management Categories I through VI; World Heritage Sites, areas protected under the RAMSAR Convention on Wetlands; core areas of World Biosphere Reserves; areas in the UN List of National Parks and Protected Areas.*

6.3. The policy also details that *Areas of known high conservation value are sites that, in the Bank's opinion, may be: (i) highly suitable for biodiversity conservation; (ii) crucial for critically endangered, endangered, vulnerable or near threatened species listed as such in the IUCN Red List of Endangered Species; and (iii) critical for the viability of migratory routes of migratory species.*

6.4. This section details how to determine if an area is likely to be considered critical natural habitat. The Bank will make any final determination as to which habitats are considered to be critical natural habitat.

6.5. Several tools are available that map critical natural habitats and that can be used to overlay project areas of influence with known critical natural habitat. These tools include the Inter-American Development Bank's decision support system , the Integrated Biodiversity Assessment Tool , Protected Planet , IUCN Red List species maps , and Infonatura. These tools build on datasets that describe protected areas (e.g., World Database on Protected Areas), KBAs, Alliance for Zero Extinction sites, and critical terrestrial ecosystems (Natureserve and The Nature Conservancy).

Protected areas

6.6. IUCN Protected Areas Management Categories I through VI are critical natural habitat. These areas may be registered under regional or national legislation or recognized under international treaties, such as World Heritage Sites, Ramsar sites, or core areas of biosphere reserves. Indigenous or local community protected areas are also considered critical natural habitat.

6.7. In addition, areas that have entered an official process to establish protection are critical natural habitat. Examples include areas that have been proposed for protection by government agencies but that have not yet been legally finalized or areas that have been included as priorities for conservation in government-supported studies.

6.8. Areas that provide important services for the maintenance of existing or proposed protected areas are likely to be considered as critical natural habitats by the Bank. Examples include watersheds that maintain flows to a protected river system and biological corridors that maintain connectivity between protected areas.

High conservation-value areas

Habitats crucial for species on the IUCN Red List

6.9. Sites that are crucial for species listed by the IUCN Red List as critically endangered, endangered, vulnerable, or near-threatened are considered critical natural habitat. The first step in making this determination is by documenting the IUCN Red List species in the area of influence. Most birds, mammals, and amphibians have been evaluated, though the majority of plants, fish, and reptiles have not been evaluated yet.

6.10. For species categorized as near-threatened, vulnerable, endangered, or critically endangered, the client should analyze how crucial the site is for that species, based on an understanding of the habitats and populations of the species in the project's area of influence and globally. Some threatened species are wide-ranging, and the site may not be crucial for them; the other extreme would be a threatened species that is endemic to the site (found only in this area) or one that depends on this specific site to reproduce, feed, or move through. To determine how crucial the site is for species survival, the abundance of the species should be documented over time and space.

6.11. New range records of threatened and near-threatened species should be verified by qualified species specialists. It is not uncommon for inexperienced consultants to misidentify species in the field and erroneously report threatened species that are not actually found on the site.

6.12. Once a determination is made that threatened or near-threatened species occur in the project area of influence, the biodiversity baseline studies need to gather information to determine whether any habitats can be considered crucial for the species in question. Key questions may include:

- Would the loss of the habitat result in an increased level of vulnerability for the species?
- Would the project lead to impacts that would place this species at a higher level of risk?
- Would the project lead to long-term declines in populations of the species?

Box 6: Correction of erroneous endangered bird species sighting prevented needless costs and delays

Problem: The EIA for a Bank-financed natural gas pipeline reported sightings along the future ROW of the white-bellied cinclodes (*Cinclodes palliates*), which the IUCN Red Lists as "critically endangered."

The project: The Peru LNG Project consists of a 408-km natural gas pipeline through the Andean highlands, a liquefied natural gas plant on the coast of Peru south of Pisco, and a marine terminal. The project is being carried out by a consortium led by Hunt Oil, SK Energy, Repsol, and Marubeni Corporation. The Bank helped finance the US$3.8 billion project with a US$400 million loan and a US$400 million syndicated loan raised from commercial banks, both signed in 2008.

Risk and potential impact: *C. palliates* inhabits high-altitude bogs from 4,430 meters to the snowline at about 5,000 meters. Its primary threat is habitat destruction from mining activities, peat extraction, and overgrazing. The IUCN describes the bird as rare and localized, with a total population of less than 300 individuals. The EIA reported two sightings of *C. palliates* along the planned RoW, one in the summer in a sedge swamp at one sampling site and the second in the winter in another sedge site. If the sightings were accurate, they would have triggered the identification of these habitats as critical natural habitats within which the Bank could not support significant conversion or degradation. The sightings triggered a series of additional studies, possibly the need to reroute the pipeline, and associated construction delays.

Conclusion: It appeared probable that the EIA reports of the bird were inaccurate. A major survey carried out from 2008 to 2011 found the bird confined to a 40 km strip in the high Andes directly east of Lima, while the pipeline is far to the south. Other searches had failed to find any evidence of the species between Ayacucho and Huancavelica; the latter is an area crossed by the pipeline where the IUCN says that bird had previously been "incorrectly reported." The bird's absence from the RoW area was further supported by ECOAN—a Peruvian conservation NGO and a partner of the American Bird Conservancy. A Peruvian biodiversity consultancy contracted by Peru LNG that conducted a biological survey along the entire length of the RoW failed to find the bird despite careful examination of the two sites reported in the EIA. Nor has the bird been reported during the ongoing biological monitoring being led by the Smithsonian Institution. These additional studies supported the contention that the initial observations were incorrect.

Lessons learned: Additional existing information about the bird species led to questioning of the quality of the initial biodiversity baseline data; additional studies with qualified personnel indicated that the species was not present in the pipeline RoW. Although costly and time-consuming, these additional studies prevented substantial expenditures that may have been required to mitigate impacts on critical natural habitat. The experience reinforces the importance of high quality baseline data to evaluate the presence of critical natural habitat and the need to compare that data with other–possibly conflicting–information.

Habitats crucial for endemic range-restricted species

6.13. Sites that support presumed endemic range-restricted species are considered to be critical natural habitat as high-conservation value areas unless it can be demonstrated that the presumed endemic range-restricted species have geographical ranges over substantial areas.

6.14. It is not uncommon for a biodiversity baseline survey to find specimens of a species that has only recently been described by scientists or that has not yet been named. These records should be confirmed by qualified taxonomic specialists in that species group. In some cases, the new species may be endemic to the site where it was found and have a very restricted distribution. Because very little information is available about new species—descriptions may be based on fewer than 20 individuals—the species is unlikely to have been evaluated by IUCN, but it may have characteristics that match those of a near-threatened, vulnerable, endangered, or critically endangered species.

6.15. The criteria for determining if a species is endangered include assessment of the present known geographic range and an understanding of its history of population fragmentation, declines, or threats. For example, IFC PS6 defines a range-restricted vertebrate species as one with a geographical range of less than 50,000 sq km; IUCN criteria for a vulnerable species are those with a geographical range of less than 20,000 sq km and demonstrated population fragmentation, declines, and threats.

6.16. New species are particularly likely to be found when sampling plants, invertebrates, freshwater fish, amphibians, and lizards. These "new" species—new to science, that is—are likely to be more widely distributed than where they have been found. However, the client needs to demonstrate that the distribution of potentially endemic species extends to suitable habitats (habitats that can support the species over the long term) outside of the area of influence to be able to evaluate if the project will adversely affect the habitat crucial for the survival of this species.

6.17. For any species that is new to science or not yet categorized by IUCN, the client should present analysis as to how threatened the species is and how crucial the area is for that species. If sufficient information is available, the analysis should apply the logic of the IUCN Red List. If there is insufficient information, then the client should apply the precautionary principle. Analyses of these presumed endemic range-restricted species should address each one, case by case, providing information about its ecology, distribution, abundance, and levels of threat as well as describing the level of confidence regarding existing knowledge. Ecological and taxonomic specialists should be consulted for species determinations and for information on species biology. The analysis will often require expansion of targeted surveys for these species to habitats outside of the area of influence of the project. There is a high possibility that a newly discovered and described species is neither endemic nor range-restricted and that the "known" distribution is an artifact of insufficient sampling throughout the species' range—but this must be demonstrated rather than assumed.

6.18. If specimens have not been identified to species level and are reported as “sp.,” “cf.,” or “aff.,” the client should explain why these specimens could not be determined to species level and describe the steps that will be taken to determine if the population represents a new species. In the absence of such an explanation, the Bank will assume that a species that is not yet named to species level is a new range-restricted species.

Habitats crucial for the viability of migratory routes of migratory species

6.19. A site that is crucial for the viability of migratory routes of a species is considered critical natural habitat. Migratory species cyclically, and predictably, move from one geographical area to another. Linear infrastructure projects such as roads, transmission lines, and pipelines as well as projects designed to take advantage of nature’s flows, such as wind and hydroelectric energy projects, can create barriers to these movements. Infrastructure may cut across migratory paths and create a barrier to movements, while wind farms and hydroelectric dams may affect the movements of birds and fish along flight paths or rivers. Similarly, a project that is situated in or near major areas of congregation of species, such as breeding or feeding areas, can disrupt the movements of animals.

6.20. The biodiversity baseline studies should determine the extent to which migratory species depend on the habitats that may be affected by a project. Sampling should be undertaken during anticipated peak migration times, and this information should be used to estimate the relative importance of the habitat for migrations compared with other routes. In the case of wind farms and hydroelectric dams, specific detailed additional studies may be required to understand migratory movements and the impacts of projects on these movements.

Habitats that are highly suitable for biodiversity conservation

6.21. A habitat that is identified as a priority for conservation as determined by regional, national, or international processes is considered critical natural habitat. Mangrove forests, Atlantic forests, *bofedales*, coral reefs, and other important endangered habitats are often protected by national laws. These kinds of habitats are likely to be considered by the Bank to be critical natural habitat.

6.22. Approaches to conservation prioritization are generally based on measures of vulnerability—the likelihood that a site will be exposed to external factors to which it is sensitive—and irreplaceability, which involves the potential of the site to contribute to the global conservation of its biodiversity features. The majority of regional and national protected areas, World Heritage Sites, Ramsar sites, and biosphere reserves meet the two criteria of high vulnerability and irreplaceability. In addition, AZE sites, important plant areas, KBAs, and IBAs are defined based on these values. Areas that are highly suitable for biodiversity conservation may also have been identified as such through regional or national priority setting processes or because they are high conservation value areas based on international standards and criteria: areas with substantial endemism, threatened and endangered species, or that are refugia; large landscapes with viable populations of naturally occurring species; areas that contain rare, threatened, or endangered ecosystems, that provide critical ecosystem services, that meet the needs of local communities, or that are critical to traditional cultural identity.

6.23. It is important to recognize that many countries in Latin America and the Caribbean have not yet established criteria for defining areas highly suitable for biodiversity conservation. There are also many remote locations where there is insufficient biodiversity information to apply priority-setting criteria. In these areas, biodiversity baseline studies may provide the only available information on biodiversity, and clients should apply commonly used criteria for identifying high conservation values to a site to determine if it should be considered as highly suitable for biodiversity conservation. These criteria should include the maintenance of key evolutionary processes, which include, inter alia, genetic connectivity (e.g., biological corridors), endemism (e.g., isolated islands, habitat patches, and mountain tops), high species richness, and species refugia.

Box 7: Additional studies show that transmission line poses significant risks to flamingo movements

Problem: The Bank received a request to fund a geothermal project in Bolivia in a protected area used by large numbers of flamingos, including the Andean flamingo (*Phoenicoparrus andinus*), listed on the IUCN Red List as vulnerable.

The project: The geothermal project is to be located in the southeast of the Department of Potosí, an arid, high-altitude region. The project's transmission line would run north from the plant, traversing the Eduardo Avaroa Natural Wildlife Reserve and also crossing the flight path used by the flamingos for daily feeding activities.

Risk and potential impact: The Bank classified the project as a Category A operation because of its potential to cause significant negative environmental impacts. The project also triggered directive B.9 of the Bank's Environment and Safeguards Compliance Policy, which states that the Bank will not support operations that significantly degrade critical natural habitats. The EIA that the borrower prepared prior to making its financing request to the Bank did not provide sufficient information to gauge the project's impact on the habitat and migratory routes of the flamingos—in particular, the potential risk that significant numbers the flamingos could die as a result of collisions with the transmission line. In fact, scientific data of this level of detail did not exist.

Additional studies: As a result, the Bank financed an in-depth research program that documented the flamingos' population dynamics, ecology, and flight patterns. The research found that some 75,000 birds were present in the area. Most numerous were the small James flamingo (*Phoenicoparrus jamesi*), numbering 64,465, followed by the Andean flamingo, with a total of 8,892, and the Chilean flamingo (*P. chilensis*), with 1,772 birds. The latter species is listed on the IUCN Red List as "near threatened." With their 20–30 year life span and long reproduction period, even slight changes in adult mortality–such as that caused by collisions with transmission lines–could jeopardize the long-term sustainability of the bird. The study also documented the birds' daily flights patterns, which take them across the path of the proposed transmission line to feed at some 30 small lakes and wetlands. The researchers found that each feeding area contains different species of algae and diatoms the flamingos need to meet their nutritional requirements. The data presented by the study on flamingos' flight patterns and the risk of increased mortality due to the location of the transmission lines led to the conclusion that the project may pose significant impacts to critical natural habitat. The Bank is therefore exploring potential alternatives.

Lessons learned: The experience demonstrates that EIAs prepared by borrowers may be inadequate and thus require additional studies. The early involvement of the Bank in project preparation can help to identify critical information gaps and to get additional studies under way early on during preparation. Some studies may take up to two years, particularly when gathering data on long-lived species.

SECTION III: BIODIVERSITY BASELINE STUDIES

7. Preparing biodiversity baseline studies

The scoping report should identify key biodiversity features, including priority ecosystem services in the area of influence, and describe project potential impacts and risks for these features and services. It will therefore guide the EA's biodiversity baseline studies by indicating where additional information on key biodiversity features may be needed to permit a more complete understanding of impacts. It will also ensure sufficient information to develop environmental management plans to avoid, mitigate, rehabilitate, or compensate for those impacts. Further guidance can be found in Good Practices for the Collection of Biodiversity Baseline Data

7.1. Contrary to popular belief, the purpose of a biodiversity baseline study for an EA is not to undertake a biological inventory in order to provide comprehensive lists of species. From the perspective of the Bank, the purpose is to provide sufficient and focused information that when coupled with the project design can help provide answers to the following questions:

- What are the key biodiversity features in the area of influence?
- Have all the key biodiversity features been identified?
- How will the project affect each identified key biodiversity feature?
- What are the baseline conditions of the key biodiversity features in the area of influence that can be monitored over the lifetime of the project?
- Will the project significantly affect critical natural habitats or natural habitats?
- What is the potential to avoid impacts on key biodiversity features?
- If the project may lead to significant conversion or degradation of natural habitats, are there potential options for, as appropriate, minimizing habitat loss and establishing and maintaining an ecologically similar protected area that is adequately funded, implemented, and monitored?

7.2. The TOR for biodiversity baseline studies should therefore include the need to:

- Identify, characterize, and document the key biodiversity features in the area of influence for which the potential impacts and risks are to be assessed.
- Provide sufficient information to plan management actions required to mitigate, or compensate for, project impacts.
- Produce standardized data on biodiversity indicators that will serve as the baseline against which to compare monitoring data acquired during project implementation.

7.3. The Bank may require additional biodiversity information or biodiversity studies to evaluate compliance with its policies. These studies could include providing information on species ranges outside of the area of influence of the project to determine if an area is crucial for IUCN Red Listed species or endemic range-restricted species. This information will allow a determination about whether a habitat should be considered as critical natural habitat or whether it will not result in significant conversion of critical natural habitat. In some cases, the additional studies may include the information required to develop appropriate management plans, such as ecological flow analyses or assessments of the efficacy of management measures. The client should consider including the Bank early enough in the process of development of the TOR for the biodiversity baseline studies so that any additional Bank requirements can be incorporated.

7.4. The TOR for the biodiversity baseline studies should cover the following areas:
- Background information from the screening and scoping.
- Stakeholder engagement processes.
- Field survey methodologies and field team composition.
- Databases, data presentation formats, and mapping.
- Baseline indicators for monitoring.
- Assessment of the completeness and limitations of the results of the study.

7.5. A model TOR for biodiversity baseline studies is included as Annex D.

Background information for biodiversity baseline studies

7.6. Background information evaluated during scoping should be presented as part of the baseline studies. This should include the project description and maps and should provide a summary of the area of influence for the project, the results of the preliminary review of available information, the results of the initial stakeholder identification and analysis, identification of the key biodiversity features, and identification of the key questions for the assessment.

Stakeholder engagement in biodiversity baseline studies

7.7. Stakeholder engagement is required during the scoping process, and the biodiversity baseline studies should include a description of the consultation process initiated during screening and scoping. Stakeholder engagement is critical to fully understand biodiversity values, and local knowledge can provide important insights into the critical issues related to biodiversity in the area.

Field survey methodologies and team composition

Requirements for sampling design and levels of effort

7.8. Biodiversity baseline studies are not biodiversity inventories but are focused analyses of the most important biodiversity issues relevant to the project identified during scoping. It is impossible as well as impractical to document all biodiversity within the area of influence of a project.

7.9. Most baseline studies and most IUCN Red List evaluations focus on higher plants and vertebrates; this taxonomic bias occurs despite over 78 percent of known species being neither higher plants nor vertebrates. Biodiversity baseline studies use plants and vertebrates as proxies for the many other species in an area—mainly insects and other invertebrates.

7.10. Sampling designs for biodiversity baseline studies should be focused spatially and temporally on critical biodiversity issues and key biodiversity features within the chosen study area. The sampling effort should be sufficient to answer the key questions identified during scoping.

7.11. Sampling to detect endangered and range-restricted species is required where projects are likely to have broad-scale irreversible impacts on habitats—for example, in hydroelectric dams, large-scale mining, agricultural land conversions, or major road projects. When potential range-restricted species are detected, there will be a need for additional effort to provide sufficient information to understand the potentially significant impacts of the project. This may include extending surveys to areas outside of the original biodiversity baseline study area to understand the broad distribution of new species and undertaking ecological and genetic analyses to understand population dynamics.

7.12. Specimen collection is critical when sampling is intended to document endangered or range-restricted species. Specimens—whole bodies, skins, tissue samples, herbarium samples, and/or genetic material—are keys to ensure correct identification of species. Voucher photographs or sound recordings may be sufficient in the case of species that are well known and where there is minimal likelihood of identification error.

7.13. For the description of habitats, vegetation sampling should be sufficiently representative to ground-truth habitat maps developed from aerial photography or satellite imagery. As far as possible, all relevant habitat types should be sampled. Where feasible, vegetation sampling should overlap soil sampling points to allow for extrapolation of information across broad areas. Sampling should be stratified—based on the key biodiversity features—and random within strata.

7.14. Sampling locations (observations, points, transects, and quadrats, among others) should be geo-referenced with low-error GPS devices. The baseline report should incorporate maps of sampling locations overlain on habitats of interest to assess sampling effort within particular habitat types.

7.15. Sampling should occur at the times when key biodiversity features are most likely to be observed. For example, birds are more active at dawn and dusk, sampling for migratory species should occur when migrations are ongoing, amphibians are often only observable during the wet season, fish species are most readily encountered when water levels are at their lowest, and many plant specimens can only be identified when in flower. In most circumstances, biodiversity sampling will have to take place throughout the year to cover the varying likelihood of finding different organisms in different seasons. It is impractical to consider undertaking a biodiversity baseline study in less than six months; such studies will frequently take more than a year to complete.

7.16. The client should identify specific sampling field methodologies on the basis of:

- The types of data required to address the questions identified during scoping.
- The types of taxonomic groups and habitats to be sampled.
- Logistical constraints and limitations to field activities.

7.17. The selection of taxa will vary according to the site and habitat conditions. In some cases, taxa that may not normally be sampled or covered in EIAs, such as invertebrates, may be important where these are critical indicators of biodiversity, such as in aquatic ecosystems, hyper-arid deserts, or tropical forests where there are known indicator groups.

7.18. Online sources of generally accepted biodiversity sampling methodologies include Conservation International's RAP Tool Kit and ABC Taxa's *Volume 8: Manual on Field Recording Techniques and Protocols for All Taxa Biodiversity Inventories and Monitoring*.

Description of field methods

7.19. The baseline study report should document methods, dates, lists of stakeholders and experts consulted, team composition and qualifications, and any other information that will allow reviewers and the general public to understand the baseline study process including, among other items:

- Names and affiliations of fieldworkers carrying out the surveys.
- Names and affiliations of people who identified the species.
- Names and affiliations of external specialists or experts consulted.
- Supporting documentation on consultations and interviews with local stakeholders.
- Specific dates of surveys at each sampling site for each taxonomic group.
- Specific locations and layouts of surveys and sampling points.
- Equipment used for each of the samples.
- Indices of sampling intensity (e.g., number of person days).

Team composition

7.20. The client should ensure that teams for biodiversity baseline studies incorporate habitat or taxonomic specialists, including ecologists (community ecology, vegetation, forestry, or botanical specialists as required by the proposed studies) and taxonomists (in botany, ornithology, mammalogy, ichthyology, entomology, or herpetology as required by the proposed studies).

7.21. Biodiversity baseline field crews must incorporate people with demonstrated capacities for field identification. The misidentification of species—illustrated by, for example, species lists that include massive range extensions—can reduce confidence in the results of biodiversity baseline studies and, in some cases, may cause significant project delays.

Planning and logistics

7.22. Fieldwork in remote areas often requires significant logistical support for transport, food, shelter, health and safety, and security. Biodiversity baseline studies often require regional and national permits (for fieldwork, specimen collection, and specimen export) and local permission when fieldwork will take place on community-owned or -managed lands. Planning fieldwork can therefore add considerably to the time required to implement biodiversity baseline studies, which should be taken into account in the overall project timetable.

Databases, data presentation, and mapping

7.23. The TOR should specify, to the extent possible, the database, data presentation, and mapping requirements. Database requirements should include ensuring consistency with regional and national requirements for data management and providing data in accessible electronic formats that can permit data sharing. The species databases should include, among other things, species nomenclature (scientific and local names), species origination, threatened status, habitat associations, and comparative abundance. For key species, the biodiversity baseline studies should result in distribution and abundance maps, habitat requirements, and historical population trends. Habitat databases should include historical analysis of habitats and habitat change, including the drivers of change. Lastly, habitats should be defined and mapped.

Baseline indicators for monitoring

7.24. The TOR should specify the requirement for identifying response variables and establishing the baseline indicators for monitoring changes in biodiversity over time through project construction, operations, and post-closure. These should include suitable indicators describing the state of critical resources, ecological processes, habitats, and species. Indicators should be readily measurable, and the monitoring regime should be able to provide sufficient information to detect substantive changes in parameters over appropriate time periods for project construction and implementation.

7.25. Establishing a biodiversity baseline for monitoring may need to include sampling in "control areas" that are outside of the area of influence but that can be compared with affected areas and used for monitoring broader-scale changes that are unrelated to the project.

Assessment of the study's completeness and limitations

7.26. The TOR should incorporate the need for analysis and discussion of the sufficiency of the information derived from the studies to meet the requirements of the precautionary principle. This analysis should include an assessment of the information gaps that need to be filled in the future, along with technical assessments of the completeness of surveys—for example, through accumulation curves to demonstrate their effectiveness. Documenting limitations may include an indication that survey conditions—weather or other logistical constraints—were not optimal for fully recording habitats or species or that, at the time of report preparation, species had not been identified with sufficient certainty. This section of the baseline study should document how the gaps will be filled and the limitations overcome during the development of the project and should clearly identify any risks associated with decision making based on incomplete information.

7.27. An objective of biodiversity baseline studies is to document the key species and habitats present in the area of influence, which may be affected by the project. This requires sampling with a particular focus on habitat types that are rare or that may support endangered or endemic range-restricted species. Sampling should be demonstrated to be sufficient—through species accumulation curves, expert knowledge, or equivalent approaches—to minimize the risk of missing a rare endangered or range-restricted species.

7.28. Additional biodiversity studies may be required by the Bank to evaluate compliance with policies. These may include:

- Evaluating the ecology, distribution, and abundance of rare and endangered species, including range-restricted endemic species and IUCN Red Listed species that may be affected by the project. These studies may require particular field ecology and taxonomic expertise and use specific sampling methodologies. They may include the need to document the distribution of species to determine how crucial the affected habitat is to that species.
- Modeling the impacts of a project on ecosystems—for example, analysis of ecological flows for projects that modify flow regimes in rivers. These studies often require specific expertise, and the Bank may require the use of standardized modeling approaches.
- Demonstrating the effectiveness of management measures, such as measures to reduce bird collisions in aerial transmission lines, fish ladders to permit migrations, or shifts in operation timing to reduce bat and bird mortality in wind farms. These studies may take place during the operational phase of a project and be used as the basis for adaptive management, or, in the case of untried management measures, they may be required before project implementation.

7.29. Biodiversity baseline studies and management plans may need to be supplemented by other studies to understand the potential impacts and risks for particular sectors and project types. For example:

- Hydroelectric projects result in fundamental changes in the hydrology and limnology of rivers, with consequent changes in water flows and quality above and below the dam. Additional studies include gathering the data needed to model water flows and quality and determining the sufficiency of residual flows to maintain aquatic and riparian habitats. Ecological flow analysis and ecological flow management plans are often required in the EA of hydroelectric projects.
- New roads in frontier areas can also benefit from an improved understanding of the potential indirect impacts on habitats resulting from the influx of people; models can be used as the basis for developing management plans to control access and minimize these impacts.
- Transmission lines, pipelines, and new roads may require additional analysis of the barrier and fragmentation impacts of linear infrastructure.
- Wind farm projects may require specific migration and flyway analyses in addition to assessments of collision risks to birds and bats.

7.30. The need for any additional biodiversity studies should ideally be identified early in the screening and scoping so that they can be incorporated into the BAP and any required biodiversity baseline studies can be completed.

Box 8: Species new to science require additional studies to understand their distribution and ecology

Problem: The baseline aquatic fauna surveys conducted for a hydroelectric project found several apparently range-restricted fish species that were new to science, and, as such, the habitats for these species were considered to be critical natural habitat. Additional studies were required to determine the ranges and habitats of these species and so determine the Bank requirements for the borrower to mitigate impacts of the project on habitats.

The project: The Chaglla Hydroelectric Project in Peru consists of a substantial dam and a 406-MW power plant on the Huallaga River in the department of Huánuco. The project is being financed with the help of a US$150 million Bank loan approved in 2011.

Risk and potential impact: The general description of fish species in the project area contained in the EIA raised questions regarding the vulnerability of several species that were new to science in the catfish genera *Chaetostoma* and *Astroblepus*. It is not unexpected that hydroelectric projects on rivers with steep elevation gradients in the Andean Piedmont would encounter range-restricted and potentially locally endemic fish species. Frequently, baseline studies in isolated river systems will find species that are new to science.

Additional studies: There was insufficient information in the EIA to determine if the project would result in significant conversion or degradation of critical natural habitat. Consequently, the Bank requested a series of additional studies to clarify the taxonomy, distribution, habitats, life history, ecology, and migratory movements of these species. These studies included detailed taxonomic assessments based on measurements and genetics as well as distribution surveys outside of the project's area of influence.

Study conclusions: Based on the studies' findings, it was concluded that the correctly identified new species in the genera *Chaetostoma* and *Astroblepus* were broadly distributed in other sections of the river system outside of the area of influence and that the distribution within the area of influence was restricted to tributaries that would be minimally impacted. Nevertheless, the project's environmental management plan will protect the tributaries and ensure that the main river affected by the project can still serve as a conduit for these species.

Lessons learned: Areas that have not been subjected to extensive scientific studies often require the collection and analysis of additional data, frequently outside of the area of influence, to determine the range of new species and their habitat requirements in order to ascertain that significant conversion or degradation of critical natural habitat will be avoided and to design effective management measures.

SECTION IV: ASSESSING BIODIVERSITY IMPACTS

8. Assessing project impacts and the risks to biodiversity

8.1. The approach to assessing impacts on biodiversity should be determined through scoping. The approach should be commensurate with the potential impacts and risks of the project and associated facilities and with the environmental, biodiversity, and social characteristics of the project area and its area of influence. Annex E is a checklist for reviewing assessments of project impacts on biodiversity and ecosystem services. Further guidance can be found in Good Practices for Biodiversity Inclusive Impact Assessment and Management Planning.

8.2. Impact assessment should evaluate potential impacts and risks for key biodiversity features and ecosystem services and should begin the process of identifying management and compensation measures in accordance with the mitigation hierarchy.

8.3. The assessment should focus on the interactions between project activities, processes, and products and the key biodiversity features in the project area and its area of influence. Common examples of project impacts on biodiversity include loss and fragmentation of habitats; changes in air and water quality from emissions, effluents, and sedimentation; changes in micro-climate; and the introduction of invasive species.

8.4. The impact assessment should:

- Describe key activities, processes, and products of the project and project alternatives.
- Describe key biodiversity features in the area of influence.
- Identify, assess, and evaluate direct, indirect, and cumulative potential impacts and risks on key biodiversity features, including estimating the magnitude of the potential impacts and the risk, based on the likelihood of the impacts.
- Describe methodologies used, including how impact significance is determined.
- Initiate the identification of management measures.
- Identify residual impacts and needs for compensation to achieve no net loss (defined as “no overall reduction at the relevant ecological scale in size, quality, or viability of the key biodiversity features affected by the project”).
- Establish a matrix of the project components and their impacts, management measures, and institutional requirements for implementation.
- Determine any risks of significant conversion and degradation of critical natural habitat.

Identifying direct and indirect impacts on biodiversity

8.5. Direct biodiversity impacts generally occur in the footprint of the project—the area that will be occupied by project facilities or otherwise directly affected by the project, where current land uses will no longer be feasible. Direct impacts can be visualized by overlaying the project footprint on key biodiversity features, using a geographical information system.

8.6. Indirect biodiversity impacts occur beyond the project footprint or in a timeline beyond construction and initial implementation of the project. For example, in road construction and industrial park projects, the impacts may result from induced immigration and new settlements that will occur once the road and industrial park are established and functioning. In many cases, these impacts may extend well beyond the project's area of influence, be of greater magnitude, and last for longer than the direct impacts of construction of a road or industrial park.

8.7. Annex F provides a table of the potential impacts typically associated with different types of projects. Additional lists of sector-specific impacts can be found in the World Bank Group Environmental, Health, and Safety Guidelines and in the *Guidance Document on Biodiversity, Impact Assessment and Decision Making in Southern Africa* compiled by the Southern African Institute for Environmental Assessment.

8.8. The client must ensure that direct and indirect changes in air, water, soils, and land are tracked for their impacts on key biodiversity features. Downstream impacts from a hydroelectric dam may be seen as changes in river flow rates and water chemistry; these physical and chemical changes will have consequences for downstream aquatic and terrestrial biodiversity. Similarly, social impacts, such as people being displaced by a project to another area, may have impacts on the key biodiversity features of their new location.

Identifying cumulative impacts on biodiversity

8.9. Cumulative impacts are generated by the combined effects of all past, present, and reasonably foreseeable projects on key biodiversity features (or valued ecosystem components related to biodiversity), regardless of who has built or financed the other projects. Clients will need to understand other development activities occurring in the area, or planned to occur, to identify cumulative impacts. Such impacts can include other initiatives that will contribute to economic growth and that, when associated with the project, will result in measurable environmental change.

8.10. Cumulative impact assessment is frequently overlooked in projects. This occurs, in part, because of the difficulty of mitigating cumulative impacts from the standpoint of a particular project or client, who may see the management of these impacts as a regional or national government responsibility. While it may be most effective for cumulative impacts to be addressed over a landscape, regional, or national scale through strategic environmental assessments or regional planning initiatives, clients are still required to incorporate a cumulative impacts assessment within the overall EA process.

8.11. Cumulative impacts are pervasive and have important consequences for biodiversity. Biodiversity impact assessments need to examine the combined and incremental effects of the project and other projects on the key biodiversity features identified in the biodiversity baseline studies. Examples include cascades of hydroelectric dams on single rivers or distributed within a single watershed, resulting in the loss of functionality of the watershed or river in terms of supporting native species and maintaining migratory routes; multiple mineral and hydrocarbon concessions in a region that result in multiple access routes, habitat conversion, and contamination of waterways; multiple wind farms focused on a particular area, reducing the viability of bird migratory routes through cumulative mortality; multiple linear projects, such as parallel roads, transmission lines, and pipelines augmenting barriers and habitat fragmentation; and investments that are elements in the establishment of growth poles, such as an industrial park associated with housing and roads.

8.12. General guidance on cumulative impact assessment can be found in the following documents:

- International Association for Impact Assessment, Impact Assessment Wiki, *Cumulative Effects Assessment and Management*.
- Canadian Environmental Assessment Agency, *Cumulative Effects Assessment Practitioners' Guide*.
- European Union, *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions*.
- U.S. Environmental Protection Agency, *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*.
- International Finance Corporation *Good Practice Note on Cumulative Impact Assessment and Management Guidance for the Private Sector in Emerging Markets*.

Box 9: Identifying and managing indirect and cumulative impacts on critical natural habitats

Problem: The Caracol Industrial Park (PIC) is intended to lay a foundation for development in the northeast of Haiti following the country's catastrophic 2010 earthquake. The PIC is situated close to ecologically important coastal and marine habitats. Given the urgency at that time, the government and the project's bilateral and multilateral donors did not perform sufficiently detailed analyses of the cumulative and indirect impacts of the new development, including its potential to further degrade coastal and marine habitats that were already highly stressed.

The project: The Bank is helping to finance the industrial park with grants totaling US$200 million. The project is located on 250 hectares of government-owned land west of the northern coastal city of Cap-Haïtien. As many as 40,000 workers could be employed at the facility in coming years.

Threats to marine and coastal habitats: The project aims to spur development by providing employment while drawing large numbers of new residents from the overcrowded capital. But this additional population growth will put more pressure on marine and coastal habitats. These habitats include the Bay of Caracol, with 3,900 hectares of mangrove forest, sea grass beds, and coral reefs; the Bay of Fort Liberté, with an additional 450 hectares of mangroves and sea grass beds; and Lagon-aux-

Boeufs, a brackish lake of 450 hectares recognized as an IBA. The whole area is part of the Caribbean Biological Corridor, proposed as a KBA, and has been identified by the government of Haiti to become a protected area, the *Parc Nationale de Trois Baies*.

Cumulative and indirect impacts: At present, these areas are being degraded through mangrove destruction, overfishing, and poor solid waste management. The Bank supported a cumulative impact assessment to look at the impacts of the PIC and a series of additional investments in housing and infrastructure that identified population growth and changes in water management as posing significant risks for the proposed protected area.

Mitigating impacts: The assessment identified the establishment of an effective marine protected area as a critical measure to manage the indirect and cumulative risks of the PIC. The Bank is working with the government of Haiti and the U.N. Development Program to help build institutional capacity, undertake baseline studies, and support initial engagements with stakeholders that will lead to the establishment of the protected area.

Lessons learned: Indirect and cumulative environmental impacts should be identified and management measures specified early on in project planning; cumulative impact assessment is particularly important in transformational projects situated in or near critical natural habitats. Frequently, establishing effective management measures will require working with governments to build institutional capacity and support the advancement of establishing protected areas.

Identifying and managing the impacts of invasive species

8.13. Directive B9 of OP-703 makes specific reference to invasive species and indicates that the Bank will not support projects that introduce invasive species. The potentially devastating impact of invasive species is not immediately apparent and as such is emphasized in this guidance.

8.14. An invasive species is one that is introduced to a new location (ecosystem or area, rather than country) where it does not occur naturally (i.e., non-native, non-indigenous) and that causes or has the potential to harm biodiversity, the environment, economies, or human health. Invasive species have the capacity to spread rapidly, outcompeting native species, when they are introduced into a new habitat. Genetically modified organisms can be invasive species and should be evaluated on a case-by-case basis.

8.15. The Bank will not support projects that introduce invasive species, either intentionally or accidentally. Intentional introductions can occur through projects involving biofuels (e.g., *Leucaena leucocephala*, pale acacia), forage grasses (e.g., *Imperata cylindrica*, blady grass), aquaculture products (e.g., *Oreochromis mossambicus*, Mozambique tilapia), forestry (e.g., *Pinus pinaster*, cluster pine), and landscaping and rehabilitation (e.g., *Lantana camara*, shrub verbena). Accidental introductions can occur through movements of soils, ballast, or filler materials contaminated with organisms or through attachment of organisms to boats, airplanes, trucks, and cars. These can result in the distribution of weeds, insect pests, pathogens, and diseases. Projects can also spread invasive species to new areas directly or indirectly by creating conditions that permit movements (e.g., opening new terrestrial and aquatic corridors).

8.16. The Bank does not permit the introduction of invasive species, which may include hybrids and cultivars, that are officially prohibited by a country or that are recorded as invasive under similar conditions (e.g., similar climate, ecosystem, and soil type) where there is no proven method to control the invasion. Nor will the Bank permit use of a species that a risk assessment has indicated is likely to be invasive. For many species, risk assessments have already been carried out, and this information is readily available from online databases of publications (e.g., the global compendium of weeds). If the risk of a particular species is not known, the client should assess the risk through expert opinion, taking into account the behavior of similar related species and considering the sensitivity of the area.

8.17. The client should establish measures to minimize the risk of accidental introduction of invasive species. These measures may include procedures such as inspection, quarantine, early detection, and chemical treatments that lower the risk of invasive species being transported to the site directly or indirectly when mixed with other materials. For projects that establish linear infrastructure that cuts across multiple habitat types—such as pipelines, transmission lines, and roads—the client should ensure the implementation of measures to minimize the risk of species moving from one habitat to another.

8.18. Clients are also expected to comply with international obligations for the management of invasive species, such as those in the International Convention for the Control and Management of Ships' Ballast Water and Sediments (the Ballast Water Management Convention).

8.19. Where an invasive species is already established in the project area of influence, the client should take precautions to avoid its introduction beyond the area of influence, including instituting management and monitoring plans to control or eradicate the species. Any such plans should be developed with specialists in invasive species management for the protection of biodiversity.

8.20. For invasive species being used for agricultural purposes, the client should demonstrate that containment is feasible during cultivation, transportation, and processing and that eradication of the species is feasible when the project terminates. The management plan for an invasive agricultural species should include cultivation practices that minimize risks of escape, along with monitoring and emergency response actions in case of escape beyond the area of influence.

Evaluating the significance of biodiversity potential impacts and risks

8.21. A biodiversity impact is the effect of an action, process, or event on a biodiversity feature. The concept of risk incorporates the likelihood of an impact occurring in addition to understanding the magnitude of the impact on the biodiversity feature.

8.22. Biodiversity features can be described in terms of their irreplaceability and vulnerability. Irreplaceability relates to the number of sites or the geographic extent where the feature is present; if a species occurs only at a single site, then that feature would be highly irreplaceable. Vulnerability relates to the sensitivity of the feature to threats and depends on existing and future threats to that feature; a vulnerable biodiversity feature is one that has experienced rapid loss over recent history.

8.23. Evaluating biodiversity risk therefore requires an understanding of the spatial and temporal severity of the impact, the irreplaceability and vulnerability of the biodiversity feature, and the likelihood of an impact occurring.

8.24. Qualitative evaluation of potential impacts and risks should build on an understanding of the potential direct and indirect interactions among the activities of the project and the key biodiversity features in the project area of influence. In situations where there is insufficient information on biodiversity features, expert opinion may be needed to inform the assessment.

Quantitatively assessing the significance of biodiversity impacts

8.25. Quantitative approaches to biodiversity impact assessment estimate the magnitude (extent and duration) of impacts on key biodiversity features. Biodiversity risks can be evaluated by incorporating measures of likelihood and measures of irreplaceability and vulnerability.

8.26. The magnitude of an impact could be quantified using spatial or temporal measures such as:

- The number of individuals of a particular species that will be affected.
- The number of hectares of habitat lost.
- The number of patches of habitat lost.
- The length of river habitat lost.
- The duration or reversibility of the impact.

8.27. The magnitude of an impact may be presented as an absolute (e.g., number of hectares) or a relative (e.g., site-specific, localized, widespread, or global impact) measure of the scale of impact.

8.28. The irreplaceability of a biodiversity feature could be quantified using:

- The number of individuals of a particular species that survive today.
- The area of habitat occupied by a particular species or habitat type.
- The number of patches of remaining habitat type or occupied by a species.

8.29. The vulnerability of a biodiversity feature could be quantified using:

- The decline in the number of individuals of a particular species.
- The percent change in area of habitat occupied by a particular species or habitat type.
- The percent change in the number of patches of remaining habitat type or occupied by a species.
- The reasonably modeled future change in numbers of individuals, area of suitable habitat, or number of patches of habitat.

8.30. Quantitative models can be used to project estimated biodiversity impacts. For example, population habitat viability analysis models have been developed for endangered species that synthesize data on a species and its habitats to predict future trends and responses to interventions. Models have also been developed to predict land use changes resulting from the indirect impacts of infrastructure development and to estimate the risks of collision risks with wind turbines for birds and bats. These models are only as useful as the data that are available for the model—more often than not, the data to populate models at the project scale are insufficient for accurate impact prediction. However, the Bank encourages the use of models to predict future biodiversity impacts if sufficient and quality data exist to support these models.

8.31. Detailed quantitative assessments may be required in situations where extremely sensitive and well-studied species or habitats may be affected by a project. Examples include the development of ecological flow analyses using physical habitat simulation and instream flow incremental methodology where a project may affect critical or natural habitats by modifying water flows. The Bank requires application of the precautionary approach and management measures in cases where there are insufficient data to specify impacts.

8.32. The likelihood of an impact occurring could be quantified by estimating the probability of an event occurring within a specified time and spatial scope.

Using ranked assessments to determine significance

8.33. Because quantitative data are often limited and ecological interactions are poorly understood, impact assessments may rely on categorical ranking to approximate the likelihood and magnitude of impacts.

8.34. The magnitude of an impact can be ranked in terms of where the impact falls on a spectrum from being site-specific with minimal direct impact on a biodiversity feature to having an extensive impact that affects the entire feature. Similarly, the magnitude can be categorized from being of short duration or readily reversible (e.g., the temporary conversion of a vegetation strip that will be rehabilitated within two months) to being a permanent change (e.g., replacement of a coral reef with a dock). The potential for successful minimization or rehabilitation measures should be taken into consideration in determining the significance of an impact.

8.35. Semi-quantitative approaches to estimating the significance of risks include ranking of the magnitude of an impact against the likelihood of the impact occurring in a matrix (see Table 3, adapted from Adrian R. Bowden, Malcolm R. Lane, and Julia H. Martin, *Triple Bottom Line Risk Management: Enhancing Profit, Environmental Performance and Community Benefit*, John Wiley & Sons, Inc., 2001).

8.36.

Table 3: A semi-quantitative approach to ranking risks: magnitude and likelihood of impacts

Likelihood	Magnitude				
	Immaterial impact: Site-specific and reversible in less than a month	**Minor impact**: Localized and reversible in less than six months	**Moderate impact**: Localized and reversible in less than two years	**Major impact**: Extensive but reversible in two years or irreversible and localized	**Catastrophic impact**: Irreversible and extensive; entire feature permanently affected and viability lost
Almost certain: expected to occur	M	H	E	E	E
Likely: probably will occur	M	H	H	E	E
Possible: might occur under some circumstances	L	M	H	E	E
Unlikely: may occur at some time	L	L	M	H	E
Rare: only in exceptional circumstances	L	L	M	H	H

Risk levels: L=low, M=moderate, H=high, E=extreme

Box 10: Examples of biodiversity risk categorization

Extreme risk: A project plans to strip-mine 1,560 hectares of ultramafic deposit in an area with scrubby savanna vegetation distinct from the surrounding tall forests. This habitat was found to harbor two micro-endemic plant species known only to occur on this outcrop. The magnitude of eliminating this habitat would be catastrophic, since the entire known habitat for these plants would be permanently altered, and their extinction would be almost certain.

Moderate risk: A project plans to construct and operate a 25-turbine wind farm in the area where extensive grazing and agriculture have significantly modified the natural habitat. After four seasons of baseline bird monitoring, there were no known threatened species of birds or significant migratory activity in the area. The magnitude of the collision risks for birds, in general, was rated as insignificant, since only an extremely small proportion of the regional populations of these species would be affected. However, the individuals of some bird species are likely to collide with turbines during the lifetime of the project. While this impact was considered as a moderate risk, the client and the local authorities were encouraged to consider cumulative impacts if additional wind farms were to be constructed in the area.

Low risk: A project will construct a temporary construction-phase truck access route that will pass within 200 meters of a nesting area of an endangered bird species using this habitat between November and March. However, the construction and use of the access route will only take place in May through September. The road corridor will be permanently closed and the habitat rehabilitated after use. Given that the project is using temporal avoidance, the magnitude of the impact is considered minor, and an actual impact is considered unlikely.

8.37. The description of the likelihood and magnitude of impacts and the category of risk should be adapted to the situation of a particular biodiversity impact assessment, taking into account the project type and its environment. Descriptions of likelihood and magnitude are almost always based on professional judgment, given that the data to quantify likelihood and consequence are lacking in most circumstances. In all cases, risk categories and their descriptions should be clearly defined and be as objective as possible so that reviewers can repeat the assessment with similar outcomes.

8.38. When determining the magnitude of an impact, the scale of impact should be considered with reference to the scale of the affected biodiversity feature and should incorporate an understanding of the irreplaceability and vulnerability of the feature. For a locally endemic species or highly localized habitat type, a site-specific or localized impact may be catastrophic, while the same impact on widespread species may be insignificant.

8.39. Extreme-risk and high-risk biodiversity impacts should be considered “significant” and require specific management and monitoring in the BAP. Low-risk and moderate-risk biodiversity impacts should be mitigated.

8.40. The key to effective biodiversity impact assessment is to efficiently allocate resources to ensure the effective management of the greatest biodiversity risks.

Quantitative thresholds for significant conversion or degradation of habitat

8.41. The client should, through the impact assessment process, define or reference any established and internationally accepted approaches that are being used to decide on criteria and standards for thresholds for determining the significance of impacts.

8.42. Determining the significance of an impact will depend on the characteristics of the impact, including its magnitude (duration, spatial extent, reversibility, timing, frequency, and potential for management), and the biodiversity feature affected (irreplaceability and vulnerability). The importance of the impact will be determined by public interest, local and national values, legal requirements, and social acceptability. The Bank recognizes that determining the significance of an impact is often context-specific, and it adopts a pragmatic approach to the assessment and evaluation of significance that draws on experience and expert opinion. Determining if a project causes significant conversion or degradation.

8.43. The impact assessment should determine if a project is likely to result in significant conversion or degradation of either critical natural habitats or natural habitats. The Bank definition of significant conversion is *the elimination or severe diminution of the integrity of a critical or other natural habitat caused by a major, long-term change in land or water use. In both terrestrial and aquatic ecosystems, conversion of natural habitats can occur as the result of severe pollution. Conversion can result directly from the action of a project or through an indirect mechanism (e.g., through induced settlement in the vicinity of a mining project or along a new road).* Degradation is defined as *the modification of a critical or other natural habitat that substantially reduces the natural habitat's ability to maintain viable populations of its native species*.

Significant conversion or degradation of critical natural habitats

8.44. The Bank defines critical natural habitat spatially—as an existing or proposed protected area, sites that support the viability of existing or proposed protected areas, or unprotected areas of high conservation value. These areas may be contiguous blocks or may be distributed in patches through a landscape or seascape or over several rivers in the case of sites that are critical for the viability of the routes of migratory species. There are also circumstances under which critical natural habitats may be temporally dynamic, e.g., seasonal pools or flooding areas. Assessing whether a project will cause significant conversion or degradation of critical natural habitat therefore requires an understanding of the spatial and temporal nature of the affected critical natural habitat.

8.45. Significant conversion or degradation of critical natural habitat occurs when there is a long-term major or catastrophic change in the habitat. The determination of significance is relative to the spatial dimensions and characteristics of the critical natural habitat. The likelihood of significant conversion or degradation of a habitat will increase in habitats that are less replaceable or more vulnerable and where impacts are more extensive, less reversible, and more likely to occur.

8.46. It is particularly important in the case of critical natural habitat to determine the potential for significant impacts resulting from cumulative effects. Areas of critical natural habitat may be defined as such because they are the last remaining patches supporting endangered species whose endangerment results, or has resulted, from the loss of habitat caused by other projects.

8.47. Among the multilateral financial institutions, it has proved impractical to set threshold measures (e.g., percentages or areas) to determine significant conversion or degradation of critical natural habitat. This is because the determination of significance depends on the characteristics of the affected biodiversity feature, the spatial and temporal magnitude of the impact, and the likelihood of occurrence of the impact. It is clear that the permanent conversion of 30,000 hectares of a 300,000-hectare strict nature reserve (an IUCN Category Ia protected area) would be considered as significant conversion of critical natural habitat. It is similarly clear that the loss of any part of the last remaining 5 hectares of unique forest habitat that is crucial for an endemic frog species would be considered significant conversion of critical natural habitat.

8.48. Clearly, the determination of significance depends on biodiversity feature, magnitude of impact, and likelihood of impact. Consequently, significant conversion or degradation of critical natural habitats will be determined on a case-by-case basis, with the Bank making the final determination.

Significant conversion or degradation of natural habitats

8.49. The Bank defines natural habitats spatially as sites that provide critical ecological services and ensure the functional integrity of ecosystems. This definition implies that natural habitats generally occur over broader spatial scales than critical natural habitats.

8.50. The determination of significant conversion or degradation of natural habitats therefore depends on absolute measures of the impact. In practice, most determinations of significant conversion relate to long-term elimination of extensive areas of habitat (e.g., loss of 5 sq km of terrestrial habitat or 5 km of river) or the loss of the capacity of an extensive area of natural habitat to provide ecological services, ensure functional integrity, or maintain viable populations of its native species. Again, the Bank will determine if a project will result in significant conversion of natural habitat.

Box 11: Additional information to demonstrate that conversion of critical natural habitat was not significant

Problem: A petrochemical project in southern Mexico could proceed even while affecting critical natural habitat for the critically endangered cycad *Ceratozamia miqueliana*. This cycad is a relatively common house plant which is threatened through overharvest and habitat loss. The significance of the affected area in ensuring the species' survival was studied by documenting *C. miqueliana* populations throughout its historic range.

The project: The Etileno XXI project is situated eight kilometers southeast of the city of Coatzocoalcos in Mexico's southern state of Veracruz. The complex will produce polyethylene, an input for plastic manufacturing. The project is being financed with the help of a US$300 million Bank non-sovereign guarantee loan complemented by a syndicated B loan of approximately US$300 million. The Bank approved the operation in 2012.

Risks and potential impact: *C. miqueliana* originally occurred across Mexico's southeast states of Veracruz, Tabasco, and Chiapas, but today is thought to exist only in fragments of habitat in three localities. In all, 95 percent of the cycad's original habitat has been eliminated, mostly through conversion to pastures and coffee plantations. As a result, *C. miqueliana* is Red Listed by IUCN as "critically endangered." *C. miqueliana* was found on the 109 hectares of the project site, 79 hectares of which will be affected by construction. This habitat was considered by the Bank as critical natural habitat because it was crucial for the survival of this critically endangered species. However, anecdotal information suggested that this species was found in many locations not recorded in the Red List assessment. The Bank therefore requested an additional study to update understanding of the status of *C. miqueliana* throughout its range.

The findings: A team of biologists visited 14 areas where the species had been reported. They confirmed that the species persists in areas where it was presumed to have become extinct. The results confirmed that populations continue to exist on at least 8,250 hectares of forested areas across three states—much more habitat than had been identified in the Red List assessment. The study also recorded healthy populations of the species in the Jaguaroundi Ecological Park, which constitutes the largest known concentration of remaining *C. miqueliana* habitat in Mexico. The study provided sufficient information for the Bank to conclude that the project would not cause a significant conversion or degradation of critical natural habitat. The client also transplanted all individuals from the affected area to a protected area and established a new 100-hectare reserve of similar habitat for the conservation of this species to compensate for any habitat loss. An additional 30 of the original 109 hectares will be protected on the project site.

Lessons learned: The study demonstrated the value of understanding the distribution of an endangered species throughout its range–not just on project sites–as a way of providing the information to demonstrate that a project will not result in significant conversion or degradation of critical natural habitat. In this particular case, the cycad was well suited to transplantation and had demonstrated history of transplants and propagation – ensuring the feasibility of the offset option.

SECTION V: COMPENSATION

9. Implementing the mitigation hierarchy

9.1. The biodiversity-inclusive impact assessment should provide the basis for establishing avoidance, minimization, and rehabilitation measures, based on the mitigation hierarchy (see Figure 2), to be incorporated into the BAP.

Figure 2: The mitigation hierarchy

9.2. Addressing biodiversity impacts in a landscape or seascape only through project EAs often proves inadequate; biodiversity conservation is complex and subject to many contributing factors. Often the most significant impacts on biodiversity are indirect or cumulative in natures that are more difficult to plan for and manage through an EA process.

9.3. Critical decisions likely to affect key biodiversity features are often taken at the policy or sector level rather than during project preparation. These decisions include establishing national and regional policies and land use plans that may set aside areas and habitats as protected areas or establish the location for project development. Strategic environmental assessments of sector development that may cause biodiversity impacts are important tools to establish the groundwork for addressing habitat loss and connectivity impacts. These assessments can support better integration of project, land use, and biodiversity planning, and drive inter-agency coordination. A strong recommendation of the Bank is that projects likely to have significant biodiversity impacts should be prepared in the context of effective land use planning and with the application of strategic environmental assessments.

Management measures

9.4. There are many potential measures to avoid, mitigate, and rehabilitate impacts on biodiversity. Selection of the most appropriate measures will depend on the project impact, affected biodiversity features, and the broader ecological, institutional, and organizational context for the project (see Table 4 for examples).

Table 4: Indicative examples of avoidance, minimization, and rehabilitation measures commonly applied in sectors affecting biodiversity

Sector	Avoidance	Minimization	Rehabilitation
Common to all sectors	Establish project within a broader biodiversity-inclusive land use planning context, avoiding critical natural habitats and situating on already converted lands; minimize footprint	Establish capacity building and environmental education programs for stakeholders; develop and apply contractor rules and specifications, including penalties for noncompliance; prohibit worker hunting and biodiversity collection	
Agriculture and livestock	Avoid use of prohibited pesticides	Maximize connectivity among habitats, e.g., riparian forest; set aside areas along water ways; maintain ecological buffers to cultivated areas; minimize construction and operation sedimentation and erosion through slope stabilization, slope vegetation, and retention; where possible, ensure independent environmental certification of extracted products or the application of best management practices, particularly with pesticide and fertilizer use; use integrated pest management; ensure use of wastewater treatment plants and watershed management; manage population influx risks; manage water demand and corresponding impacts on other users; control invasion of alien species	Rehabilitate vegetation along waterways
Mining		Minimize construction sedimentation and erosion through slope stabilization, slope vegetation, and retention; minimize indirect impacts through access control and strengthen natural resource use management (including establishing protected areas); control invasion of alien species; manage population influx risks; manage tailing dam contaminants; manage water demand and corresponding impacts on other users	Rehabilitate material source areas using native species; post closure plans to rehabilitate the site
Hydropower dams and reservoirs	Set in broader river basin planning context	Conserve watersheds; develop and apply contractor rules, including penalties for noncompliance; minimize downstream water flow and quality changes, e.g., through project design and operation that minimizes chemical changes and maintains natural flow regimes; establish ecological flow management plan; construct fish passages in	Rehabilitate material source areas using native species

		situations where this is feasible; minimize reservoir flooding area; minimize sedimentation and erosion through slope stabilization, slope vegetation, and retention; manage population influx risks; minimize rare and endangered species impacts through biodiversity rescue	
Water and sanitation	Minimize footprint	Conserve watersheds and buffering wetlands around water supply; reforest along waterways; manage and dispose of dredged material; manage water demand and corresponding impacts on other users	Rehabilitate buffer areas
Wind power	Consider migration routes for birds and bats in siting; minimize footprint	Minimize bird and bat mortality from collisions and barotrauma; address cumulative impacts on migratory routes for birds and bats	
Ports, harbors, and coastal zone development	Avoid reefs, turtle nesting beaches, and mangroves and migration routes for marine and estuarine species	Protect shoreline—sea grass beds, reefs, turtle nesting beaches, and mangrove; manage dredging impacts on benthic and pelagic species; regulate ship discharges; address invasive species in ballast water; minimize construction sedimentation and erosion through slope stabilization, slope vegetation, and retention; manage population influx risks	Rehabilitate material source areas using native species
Linear infrastructure such as roads, railway lines, pipelines, and transmission lines	Consider migration routes when locating; design alignment to minimize direct impacts on biodiversity; minimize footprint	Maximize water connectivity through culverts and bridges; maximize faunal connectivity and minimize fragmentation through appropriately designed underpass and overpass crossings and minimizing right of way; where possible, ensure corridor sharing with other linear infrastructure; minimize barrier effects and mortality from collisions; minimize construction sedimentation and erosion through slope stabilization, slope vegetation, and retention; minimize indirect impacts from population influx through access control and strengthen natural resource use management (including establishing protected areas); control invasion of alien species	Rehabilitate material source areas using native species; rehabilitate edges along linear infrastructure using native species
Forest products	Locate plantations on lands already converted	Protect key biodiversity features; maintain ecological functions such as regeneration, nesting, feeding areas; where roads are involved, see measures for linear infrastructure; manage chemical, container, liquid, and other wastes; ensure management plans exist for resource extraction, including objectives and definition of sustainable off takes; Where possible, ensure independent environmental certification of extracted products or the application of best management practices; minimize ancillary damage to other species e.g., reduced impact logging; Manage impacts on other resource users and dependents	

Fisheries	Integrate activities in the context of regional fisheries management plans	Manage chemical, containers, liquids, and other wastes; Ensure management plans exist for resource extraction including objectives and definition of sustainable off takes; where possible, ensure independent environmental certification of extracted products or the application of best management practices; minimize ancillary damage to other species, e.g., by-catch; manage impacts on other resource users and dependents	

Compensating for residual impacts

9.5. Residual impacts are project-related impacts that might remain after the mitigation hierarchy has been applied, including avoidance and minimization. Should compensation be required, an assessment of residual impacts should be undertaken for each impact identified through the assessment process. For projects that affect critical natural habitat, the client should agree on measures with the Bank to compensate for any measurable non-significant residual impacts.

9.6. For projects in natural habitats that have significant residual impacts, the Bank will require the client to demonstrate that there are no feasible alternatives, that overall benefits from the project substantially outweigh the environmental costs, and that the mitigation hierarchy has been appropriately applied, including the establishment of compensation measures.

Approaches to compensation for residual impacts: biodiversity offsets

9.7. Biodiversity offsets cannot be used to compensate for significant conversion or degradation of critical natural habitats. In addition, there should be an offset or compensation for any residual (non-significant) impacts in critical natural habitats.

9.8. Biodiversity offsets are required in projects that will have residual impacts on natural habitat biodiversity features in the area of project influence after application of the mitigation hierarchy.

9.9. The client should demonstrate adherence to the mitigation hierarchy as the basis for establishing the biodiversity offset and should present an alternatives analysis that indicates that there are no feasible alternatives to the project. The EA should also clearly document that all feasible minimization and rehabilitation measures have been taken to minimize biodiversity impacts.

9.10. Once it is agreed that a biodiversity offset project is appropriate for compensation, the client has two options: a project implemented on private or public lands that restores degraded biodiversity features (a restoration offset) or a project that prevents the imminent degradation or loss of intact equivalent biodiversity features (an averted loss offset). Restoration offsets improve the condition of biodiversity features that are currently degraded or destroyed—provided that this does not result from past actions of the client. Averted loss offsets ensure that the degradation of intact biodiversity features is permanently prevented. The latter can be achieved by securing an area of habitat (or working with a public or private entity to secure the area) and funding its conservation management over the long term. When designing a biodiversity offset, it is often advantageous for the client to partner with private or public entities that have experience establishing and managing successful conservation projects.

9.11. The design of the biodiversity offset often requires additional information that may not have been included in the original biodiversity baseline studies. This information includes analysis of the biodiversity features across a broader landscape, including proposed areas for offsets that may be outside the project area of influence. Additional biodiversity studies may be required to better understand the taxonomy of species found in the area, the habitat dependencies of species in the area of influence, and use values of biodiversity.

9.12. In some cases, there may be gaps in information or uncertainty in the information available. Thus the client should apply the precautionary principle in the design of the offset, including deciding not to proceed until the required information is available or adopting an adaptive management approach to the offset.

9.13. The Bank requires that all offsets adhere to the following principles:

- Avoidance and minimization of impacts: Offsets are not intended to relieve clients of the requirements to avoid impacts on critical natural habitats and natural habitats or on biodiversity features. They should be designed to compensate for the anticipated residual impacts of a project after the client has demonstrated adherence to the mitigation hierarchy.
- Limits to what can be offset: Residual impacts cannot be compensated for by a biodiversity offset in situations of significant conversion or degradation of critical natural habitat.
- Landscape/seascape-level conservation: Offsets should be designed with consideration of the ecological processes and functions of the landscape in which the project and the offset are situated.
- Additionality: Only the gains in biodiversity features that would not otherwise have occurred in the absence of the offset project should be counted in the measures of success of the biodiversity offset. This gain, termed additionality, arises from either restoring currently degraded biodiversity features or from conserving intact biodiversity features that are under threat of degradation or loss. In both cases, the offset must not duplicate or replace an existing and adequately funded restoration or conservation project. In some cases, however, the Bank will accept support to an existing protected area, provided it can be demonstrated that the area is chronically underfunded and threatened with imminent degradation.
- Sufficient scale: The offset should be large enough to compensate fully for the project's residual impacts after application of the mitigation hierarchy. The offset type may define the scale that is most appropriate. For restoration offsets, it will take time to establish the biodiversity features that have been lost; working at a broader spatial scale may compensate for the longer temporal scale. For averted loss offsets, the spatial scale will be a function of the rate of loss that is being averted by conserving the area. An offset that creates or improves the management of a 100,000 hectare protected area that is being lost at a rate of 1 percent per year will generate only 1,000 hectares of offset credits every year even though the overall size of the offset will be 100,000 hectares. The Bank may require a larger offset when there is uncertainty about the ecological equivalence of the biodiversity features lost and those of the offset area, when there is a risk that the offset will simply displace negative impacts to other areas rather than absolutely reducing impacts, or when there are other uncertainties.
- In-kind or like-for-like offsets: An offset should be ecologically similar to the area affected by the project; similarity should be based on biodiversity

features, structure, function, and species diversity. The Bank may accept an offset that restores or conserves an area with greater biodiversity value than the area affected by the project. Such a "trade up" should be validated by demonstrating the greater conservation value through a technical assessment and stakeholder perception.

- Stakeholder participation: Any stakeholders who will be affected by the changes in land use that result from creating the offset must be fully engaged in the conceptual development and implementation of the offset. Stakeholder involvement should occur in a transparent and timely manner. This is particularly important when indigenous or other forest-dependent communities are involved; the client should demonstrate good-faith negotiations and agreement with indigenous peoples, establish mechanisms for their participation in the management of the area, and ensure that there is fair compensation for any losses and participation in any benefits derived from the offset.
- Of equal or greater duration than the project impacts: Offsets must be managed to provide biodiversity benefits for at least as long as the project impacts last. Sustained management over the long term requires continuity in legal authority and guaranteed availability of human and financial resources. Thus legal protection must be established, and funding must be identified to maintain offsets in perpetuity, such as through a trust fund or inclusion in the project finances. The funding should be contractually bound to achieving the performance objectives for which the offset was established. If clients propose pre-existing offset credits as compensation, these should comply with the same requirements.
- In place before the project impacts occur: To minimize the temporary loss of biodiversity in the landscape or seascape of the project, offsets should be established and functioning before the project impact occurs. Restoration offsets must be advanced to the point where it can be demonstrated that within a reasonable period the restored area will have similar ecological characteristics to the area that will be affected. Averted loss offsets should be formally established and operating at the start of project impacts, and the client should be able to demonstrate that the offset project will accumulate the required offset credits within a reasonable period after the project impacts occur. Establishing the offset early on in the implementation of the project also reduces the risk of failure due to lack of an institutional basis for the offset.
- No net loss for the project: The outcome of the biodiversity offset should be to compensate for all residual impacts of a project. The offset should help the project achieve no net loss of biodiversity, as demonstrated through significant impacts to critical natural habitats being avoided, all impacts to biodiversity features being avoided to the extent feasible, impacts being minimized where avoidance is not feasible, operational measures and best practice rehabilitation techniques being applied, residual impacts to biodiversity features being quantitatively or qualitatively measured, an offset design that complies with the principles established in this document, and monitoring that demonstrates the offset is achieving its performance objectives and that the measures demonstrate no net loss in biodiversity.

Box 12: Biodiversity offset to provide sanctuary for an endangered cycad in Mexico

Problem: A petrochemical complex in southern Mexico will be built on land that includes habitat for the critically endangered cycad *Ceratozamia miqueliana*. But instead of posing a threat to the cycad, the project will result in increased protection for the species' habitat through measures that include creation of a biodiversity offset that will more than compensate for the area of habitat removed.

The project: The Etileno XXI project is eight kilometers southeast of the city of Coatzocoalcos in Mexico's southern state of Veracruz. The complex will produce polyethylene, an input for plastic manufacturing. The project is being financed with the help of a US$300 million Bank non-sovereign guarantee loan complemented by a syndicated B loan of approximately US$300 million. The Bank approved the operation in 2012.

Risk and potential impact: *C. miqueliana* survives in remnant populations in three localities in the states of Veracruz, Tabasco, and Chiapas on the remaining 5 percent of its original habitat. The plant is Red Listed by the IUCN as "critically endangered." The presence of *C. miqueliana* on the project site triggered the B.9 directive of the Bank's environmental compliance policy, which prohibits the Bank from supporting operations that significantly degrade critical natural habitat.

No net habitat loss: A team of qualified biologists found 204 cycad individuals on the project site, where construction activities will eliminate 79 hectares of cycad habitat; an additional 30 hectares of habitat will not be affected. The cycads on the land slated for construction will be temporarily relocated to the nearby 960-hectare Jaguaroundi Ecological Park, which already contains some 1,000 *C. miqueliana* individuals. A nursery at the park will produce seedlings of the cycad and other native plants. The 30 hectares of unaffected cycad habitat on the project site will be protected as a conservation area. The habitat loss on the project site will be compensated by a 100-hectare area of similar plant composition and structure that will be managed as a biodiversity offset. The aim of the offset is to achieve no net loss of biodiversity and preferably a net gain. The offset will be planted with parcels of different compositions of species, including *C. miqueliana*, to determine which will best restore the natural ecosystem. A BAP for managing the offset will be designed in consultation with specialists and members of local communities, and the new area will be provided with legal protected status. A monitoring program will ensure that the individuals transplanted to the offset survive and that management activities meet their objectives. An educational center will offer classes and hands-on instruction for local people, particularly children.

Lessons learned: Planning for the offset early on in the project cycle allowed sufficient time for carrying out a survey of *C. miqueliana* populations on the project site and in the Jaguaroundi Park. The survey results will serve as a benchmark for determining that the project has resulted in no net loss of the endangered species' habitat and its biodiversity.

Section VI: Planning and Monitoring Biodiversity Actions

10. Developing a biodiversity action plan

10.1. Projects that have the potential to significantly affect natural habitats or critical natural habitats should prepare a BAP. The BAP should be integrated with, or directly reference, the project's EA and ESMP. Annex G is a checklist for biodiversity management and action planning for projects, and Annex H includes a model TOR for such a plan.

10.2. The purpose of the BAP is to document the client's approach and commitments to managing project impacts on biodiversity, including biodiversity-related requirements (legal, policy, and stakeholder commitments) and objectives (including conservation or protection of specific key biodiversity features or targets).

10.3. A BAP should include the following sections, as described in this chapter:

- Scope and objectives.
- Legal and policy framework.
- Delimitation of the spatial scope.
- Identification of key biodiversity features.
- Identification of impacts on biodiversity.
- Scientific gap analysis.
- Approaches to avoiding and mitigating the risks and impacts.
- Approaches to compensation for residual impacts (biodiversity offsets).
- Stakeholder engagement process.
- Implementation arrangements.
- Training and capacity building.
- Scheduling and budget.
- Monitoring, evaluation, and reporting.

10.4. To avoid duplication of effort, the BAP should exist as a separate management plan but can make reference to the relevant sections of existing ESMPs for the project.

Scope and objectives

10.5. The BAP should include a clear statement of its scope and objectives. It should have a stated goal of achieving no net loss to biodiversity and should clearly demonstrate through prescribed actions how this will be achieved.

10.6. The scope should define activities, plans, and programs and should indicate what the BAP does not address. It should also describe the relationship between the plan and other elements of the project´s environmental and social management system.

10.7. The objectives should include a statement of the overarching goal and a definition of what the BAP must achieve in terms of:

- Legal and policy requirements.
- Biodiversity conservation and protection requirements.

- Stakeholder commitments.

10.8. The goal and objectives should include clear links to the Bank's and other lenders' requirements, as defined in their policies and guidance.

10.9. Elements of the BAP will fill documented information gaps. These include undertaking additional surveys or assessments; designing and implementing additional actions needed to avoid, minimize, or rehabilitate impacts; undertaking stakeholder engagement; establishing a scientific review or technical advisory panels; and establishing compensation mechanisms.

Legal and policy framework

10.10. The BAP should include a summary of the legal and policy framework under which the project and its management system are to be developed. It should include references to relevant national and regional legislation, multilateral environmental agreements, Bank and other applicable lender policies, and the client's own environmental and social policies.

10.11. The legal and policy section should identify the requirements for biodiversity conservation, applicable aspects of a country's National Biodiversity Strategy and Action Plan as well as regional or local plans, and any national or local conservation planning and priorities of government entities relevant to the area of influence. If the project includes activities that will affect protected areas, this section of the BAP should include a complete discussion of the relevant legislation and management plans for those areas.

10.12. The relationships of the BAP to other plans and programs within the project's environmental and social management system should be described, as should the organizational structure implementing the BAP.

Delimitation of the spatial scope

10.13. This section should provide a justified spatial delimitation of the BAP. Ecologically relevant limits such as watersheds or eco-regional boundaries rather than political borders should be used to delimit the area. The plan area may consist of more than one discrete area if, for example, there are extensive areas of modified habitats between areas of biodiversity value. The BAP must include areas proposed for offsets and buffer zones, as necessary, to protect the biodiversity features of the offset areas or ensure the maintenance of connectivity. The spatial scope may thus differ from the project's area of influence.

Identification of key biodiversity features

10.14. This section should include a summary of the results of the biodiversity baseline studies for the project, emphasizing the key biodiversity features identified, including descriptions of natural habitats, critical natural habitats, and priority ecosystem services as well as the views and concerns of stakeholders. The summary should include identification of biodiversity resources of social, economic, and cultural importance to local communities, with particular emphasis on any indigenous peoples who may have rights to, traditional uses for, or dependence on these resources.

10.15. Baseline conservation status and trends of the key biodiversity features within the area of influence should also be described, identifying any existing threats and opportunities. The Bank recommends assessing threats using the IUCN–Conservation Measures Partnership's *Unified Classification of Direct Threats*, which provides a consistent and systematic basis for describing threats. In cases where offsets are proposed, baseline information on these areas should also be provided and serve to demonstrate ecological similarity (or higher biodiversity value if "trading up").

10.16. Where possible, quantitative metrics should be used to describe key biodiversity features. For species, metrics should estimate abundance and distribution. For habitats, the metrics should capture spatial area and quality and be sensitive enough to measure project impacts. Important ecosystem functions, such as the value of habitat for wildlife connectivity, should also be measured, especially if these functions are not captured well by the habitat metrics. For ecosystem services, the volume, quality, and market values should be estimated, if this information is available.

10.17. The metrics and description of status and trends provide a baseline against which future changes can be assessed, a background assessment of the multiple factors that may affect biodiversity in the absence of the project, and insight into the types of interventions for biodiversity offset management.

10.18. Any existing biodiversity strategies, eco-regional assessments (such as biodiversity hotspots or centers of plant diversity or endemism), rapid biodiversity assessments, rapid biodiversity inventories, and other studies relevant to the BAP should be summarized.

Identification of risks to and impacts on biodiversity features

10.19. A summary should be provided of the biodiversity impact assessment, focusing on the risks and impacts most relevant to achieving the goals and objectives of the BAP. A matrix of key biodiversity features, impacts, management measures, residual impacts, offsets and compensations, responsibilities, and ESMP references is an effective and efficient way to present this information. Where possible, project impacts and the benefits of biodiversity management should be measured and their significance rated in terms of their effects on the viability of biodiversity features.

10.20. There is also need to define the BAP in the context of the overall project ESMP, building the business case for the BAP and its activities and their role in risk management.

Scientific gap analysis

10.21. The BAP will typically include activities to clarify any scientific uncertainties. Gaps in information are very likely, particularly in tropical frontier areas where scientific knowledge may be lacking. They may include taxonomic uncertainty (e.g., specimens not identified to species level), gaps in baseline data on the abundance and distribution of species of concern, gaps in understanding of ecological processes, uncertainties regarding the significance of risks and impacts, and evaluation of the feasibility and effectiveness of proposed management measures.

Approaches to managing risks and impacts

10.22. The BAP must include a hierarchy of management actions, including avoiding impacts to biodiversity features, minimizing impacts wherever feasible, restoring affected features, and offsetting any remaining impacts after the other actions have been taken.

10.23. The BAP should describe the project's approach to the application of the mitigation hierarchy, which should apply to all phases of the project, including conceptualization, alternatives analysis, final design, construction, operations, abandonment, and reinstatement.

10.24. The BAP should outline, briefly describe, and reference the elements of the project's ESMP that are relevant to managing biodiversity impacts. It should describe the additional biodiversity-specific actions needed to ensure compliance with the project's biodiversity requirements and objectives. It should also describe the roles and responsibilities of the client, employees, contractors, and other parties with regard to managing and implementing the BAP.

10.25. The BAP can take the form of detailed programs, plans, and procedures, or it can reference the project documents where these are contained, such as the ESMP, contractor management plans, biodiversity management plans, ecological management plans, bio-restoration plans, or other relevant documents. The actions described in this section must be practical and appropriate in the relevant social, economic, and political contexts.

Stakeholder engagement process

10.26. Stakeholder consultations and collaboration with partners involved in local conservation is invaluable for biodiversity action planning and implementation. The BAP should describe its approach to stakeholder engagement, including:

- The consultation and engagement process during the scoping and development of the BAP, including identification of stakeholders.
- A summary of key concerns, interests, and recommendations received from stakeholders.
- Framework and action plan for ongoing stakeholder engagement.

10.27. Stakeholder engagement for the BAP should be coordinated and integrated with the stakeholder engagement activities required for the implementation of the project and other environmental and social management plans.

Implementation arrangements

10.28. The BAP must clearly identify the institutional and organizational framework, human resource requirements, and the source of financial resources required for implementation.

10.29. The BAP should also describe the alliances with other public and private organizations that will be required to achieve the defined goal and objectives of the plan. Typical partnership organizations will include government agencies, conservation organizations, research organizations, and consultancy groups with expertise in particular areas of biodiversity management.

10.30. In particularly sensitive projects, the client may want to create a panel of independent experts or a biodiversity steering committee to provide objective, credible, third-party guidance and oversight for BAP preparation and implementation. These panels or committees may include representatives from affected communities, especially where indigenous peoples are among the stakeholders.

Training and capacity building

10.31. The BAP should include a section that describes training and capacity building needs for implementation and identifies mechanisms to build the necessary skills and capacities. This section should also detail the needs and approach to training to improve understanding and implementation of components of the plan among project managers, staff, contractors, and sub-contractors, including construction workers.

Scheduling and budget

10.32. The BAP should identify the major milestones and include a schedule for their attainment. The schedule should include the following elements: consultation, management activities, biodiversity monitoring, action plan monitoring, review and evaluation, and reporting requirements. It should include a definition of roles and responsibilities and a detailed budget that estimates the costs of identified activities through the construction phase of the project, with a review of the BAP prior to the start of operations.

Monitoring, evaluation, and reporting

10.33. The BAP should include a section describing the project's approaches and plans for monitoring and evaluation, including definition of biodiversity response variables that measure effectiveness of management measures (including success of the offset) and can help monitor changes in key biodiversity features. These response variables may include area estimates of habitat cover, the presence or absence of species, key species abundance, mortality rates, and aquatic habitat quality indicators. The section should also describe the reporting schedule and mechanisms for involving stakeholders, including the Bank, government authorities, affected communities, and the general public. This section should also identify an approach to adaptive management based on the monitoring results.

Box 13: Peru LNG biodiversity monitoring and assessment program

Problem: A large-scale hydrocarbon exploitation project with numerous biodiversity implications developed and implemented a BAP that is providing lessons in protecting sensitive species and habitats over an extensive geographical area.

The project: The Peru LNG project consists of a 408-km pipeline that carries natural gas extracted from the Lower Urubamba region in Peru's southern Amazon to a liquefied natural gas plant and marine facility on the coast. The US$3.8 billion project was financed with the help of a US$400 million Bank loan and a US$400 million loan raised from commercial banks, signed in 2008.

Risk and potential impact: The pipeline right of way passes through a broad variety of habitats, including high Andean peat bogs (*bofedales*), critical as habitat for uniquely adapted species. The high biodiversity of the upper montane forest includes endemic range-restricted species of orchids and frogs. Semi-arid scrublands serve as habitat for rare bird species such as the rufus-breasted warbling finch (*Poospiza rubecula*). Riparian areas along the coast act as corridors and refuges for many sensitive species.

The biodiversity action plan: Formulation of the BAP began in the project's initial stages with an analysis of alternative pipeline routes and the EIA. Six additional activities gave it a multidimensional approach, as follows:

- An *ecological field survey* defined 14 landscape units along the ROW and described habitat types in each one. In the survey, a multidisciplinary team who walked the entire ROW determined species sensitivity based on conservation status, endemism, local community use, and mobility.

- *Ecological management plans* set forth specific management measures in the 14 landscape units, each of which constituted stand-alone field ecological action plans.

- A *biorestoration management plan* is revegetating the ROW. The long-term objective is to reestablish native vegetation and ecological processes and to recover pre-construction biodiversity.

- A *camelid management plan* was developed from data on camelid herds, water sources, and grazing areas gathered through workshops with over 630 community members.

- The *biodiversity monitoring and assessment program* (BMAP) is documenting the distribution and abundance of species and habitats along the ROW and marking the progress of biodiversity rehabilitation and other management measures. The new knowledge on local biodiversity will serve as the basis for research and monitoring protocols for sensitive species and habitats. The BMAP is led by the Smithsonian Institution's Center for Conservation, Education, and Sustainability. Collaborators include 50 researchers from 13 research institutions, many of them Peruvian.

- An *environmental investment program* is using environmental and social data developed by the BAP to capitalize on opportunities to conserve and improve natural resource use. The first program focused on improving the health of camelid populations

Lessons learned: The BAP is demonstrating the value of allowing sufficient time for scoping surveys, multi-season data collection, and the development of strategic collaborations. Use of a landscape perspective ensures that the requirements of species with large territories and broad-scale ecological processes are adequately considered. The BAP also illustrates the value of collaboration with an international research institution as a mechanism for transferring knowledge to Peruvian scientists and students and for providing opportunities for dissertation projects.

11. Monitoring biodiversity

11.1. Biodiversity monitoring provides information, over appropriate spatial and temporal scales, to measure project impacts on biodiversity features and to monitor the effectiveness of management measures.

11.2. The purpose of monitoring biodiversity is to measure response variables over time. Response variables are the indicators that will be measured and recorded during monitoring and should be identified during the biodiversity baseline studies. These response variables should reflect key biodiversity features in the area of influence of the project, such as, for example, the numbers of camera trap observations of jaguars over a month. The selected response variables should allow the client to:

- Describe trends of change and recognize unexpected or unforeseen changes to permit adjustment in management plans through adaptive management.
- Answer specific questions relating to response variables or factors affecting response variables—for example, to determine if specific management measures are having the desired effect. (Factors can be impacts from the project or applied measures.)

11.3. It is not possible, feasible, or necessary to monitor everything in the area of influence of a project; the focus of monitoring should be on key biodiversity features for which measures are being implemented and on indicators at population, species, habitat, or ecosystem service levels that allow tracking of ecosystem health.

11.4. This description of monitoring addresses only an understanding of the biological effects of impacts or the performance of management measures (outcomes and impacts) rather than actual delivery of the outputs and products of management plans.

11.5. Monitoring plans should be integrated with an adaptive management approach described in the BAP. This includes providing clear descriptions of proposed management actions that will be implemented should monitoring indicators supersede specified thresholds.

Planning biodiversity monitoring

11.6. Biodiversity monitoring and evaluation should be a program of work fully described in the BAP that indicates what response variables will be measured, when they will be measured, over what spatial scale, by whom, and how. It should also describe how data will be analyzed and used.

11.7. Biodiversity monitoring should be linked logistically and logically with other forms of monitoring—e.g., looking at water quality compliance at the same time as measuring changes in biodiversity response variables.

11.8. Monitoring should be appropriately financed and have enough competent staff with the requisite skills (including, as necessary, taxonomic specialists, ecological specialists, and individuals with expertise in data management and analysis who have been involved from the design stage) and sufficient equipment to ensure effective implementation. The plan should also describe the institutional and organizational arrangements, including capacity building needs.

11.9. The biodiversity monitoring plan should describe:

- Appropriate questions that monitoring will answer.
- A realistic design indicating the spatial and temporal dimensions of sampling, including control sampling as required.
- The factors whose impacts will be examined.
- The response variables that will be measured.
- The specific methodologies that will be applied to obtain measurements.
- How data will be collected, managed, and analyzed, including data quality controls.
- How the results of monitoring will be interpreted and presented to inform decisions.

Defining appropriate questions for monitoring biodiversity

11.10. The questions for biodiversity monitoring should be simple but specific enough to allow definition of the response variable that will be measured and to identify the factors that affect the response variable. The monitoring plan should demonstrate that monitoring can feasibly answer the questions posed.

11.11. The questions that are developed for biodiversity monitoring should be pertinent and specific. They should be related to understanding the most significant impacts on key biodiversity features and should ask how, what, where, and when rather than why. For example, what is the difference between bird collision rates with a transmission line in the dry season compared with the wet season? Or, how has the number of observations of large mammals on a new road changed over time? It is frequently not feasible to answer “why” questions.

11.12. Questions can focus on tracking potential unforeseen changes in key biodiversity features due to the development of the project. For example, how do the numbers of fish species change over time after the construction of a dam? Or, does the behavior of bats change before and after a wind farm has been constructed?

11.13. Questions can also focus on ascertaining specific answers on the effectiveness of management measures. For example, are more jaguars crossing a road at crossing points than in other areas? Or, is there a difference in the number of primates in the project’s set-aside areas compared with surrounding areas?

Box 14: Large-scale energy project and lessons on biodiversity monitoring

Problem: Two Bank-supported operations for large-scale hydrocarbon extraction and transport drew international criticism for their presumed impact on biodiversity and local populations. The challenge was to demonstrate that biodiversity protection and development can coexist. Part of this process was to create a long-term monitoring system that would provide data required for adaptive management of impacts.

The projects: The US$1.7 billion Camisea Project extracts and processes natural gas in the central Peruvian Amazon and transports it in 714 km of pipelines to a fractionation plant and marine terminal south of Pisco on the Peruvian coast and to Lima. The Bank helped to finance the project with loans of US$135 million in 2003. An additional US$5 million loan to the government of Peru financed institutional strengthening in environmental and social monitoring. The US$3.8 billon Peru LNG Project transports natural gas through a 408 km pipeline to a plant and marine terminal on the coast of Peru south of Pisco. The Bank helped finance the project with a US$400 million loan and a similar syndicated loan from commercial banks in 2008.

Risk and potential impact: The projects posed substantial risks to the region's biodiversity. The pipelines for the two projects cross three sensitive ecosystems. The fractionation plant is located in the buffer zone of the Paracas Bay National Reserve. Both projects established monitoring systems to provide data to measure impacts over the projects' lifetime as well as early warnings of changes.

Lessons in community monitoring: The project gained valuable experience in training local community members to carry out monitoring activities. More than 100 indigenous co-researchers in the Lower Urubamba area as well as along the pipeline route work alongside professional counterparts. The local participants enrich the monitoring process through their knowledge of the local environment. In pioneering community monitoring, Camisea would encounter challenges, particularly the need to ensure effective communication. Community monitors provided their reports to the Peruvian NGO Pronaturaleza, who then relayed these reports to the company for evaluation and decisions on necessary action. Very long periods would pass before the company's response got back to the community, causing a loss of credibility for the monitors.

Learning from Camisea: By hiring both the same construction company and NGO, Peru LNG built on Camisea's prior monitoring experience. It improved the community monitoring process by creating a new environmental management system establishing a monitoring web page. Peru LNG also simplified lines of communication between the community monitors and the company. The Peru LNG pipeline runs alongside the Camisea pipeline, facilitating joint monitoring activities in 128 sites during the wet and dry seasons along a corridor of three to seven km around the right of way. More than 50 researchers from 13 research organizations and universities participate in the monitoring activities, which are implemented in collaboration with the Smithsonian Institution. This collaborative effort builds capacity for Peruvian professionals on monitoring methods and applied ecological and conservation goals as well as for community monitors, who learn alongside their professional counterparts.

Designing biodiversity monitoring studies

11.14. Monitoring can measure changes in response variables over time in the same location or can compare differences between response variables at two or more distinct locations. The biodiversity monitoring design should describe the spatial distribution and number of sampling locations, the data to be collected, the frequency of data collection, and the period over which the monitoring will be carried out.

11.15. The appropriate temporal and spatial design of the study will depend on the question being asked and the response variables being measured. For instance, if the question relates to direct and immediate effects of construction and the effectiveness of management measures, then sampling should be carried out before, during, and after construction at intervals suitable to detecting changes. If the question relates to the effectiveness of an offset to protect jaguars, then the monitoring will be carried out over a very long time scale with a frequency consistent with the life history of jaguars.

11.16. Determining the causes of changes detected during monitoring can be confounded by other factors that also vary over time, such as seasons, climate, or factors outside the spatial scope of the project. The plan's design can account for this by monitoring these factors directly or by having suitable and parallel controls and carrying out appropriate statistical analysis. Establishing controls is important, as differences between two sites may result from factors that vary in space and that may be unrelated to the impact of a project, such as differences in soils or habitats or other anthropogenic pressures. An effective sampling design can attempt to control for additional sources of variation by minimizing the differences between the control and affected sites, by recording obvious differences between the sites, and by carrying out appropriate data analysis.

11.17. Changes in biodiversity may be slow, and there may be a substantial time lag between an impact and its consequences. The spatial and temporal scale of monitoring should take these issues into account.

Defining the sampling area

11.18. The monitoring design may compare measures of response variables before (the baseline) and after a project impact has occurred or management measures have been implemented, or it may compare measures of response variables at different locations: one that has experienced the impact and another that has not.

11.19. The monitoring design should describe the sampling area—e.g., forest block or stretch of river—through which sampling will occur. This area should be clearly defined in a way that is related to the question and the feature being measured. For example, if the question relates to changes in "rapids that support endemic fish species," then the sampling area will consist of the rapids within the areas of influence and beyond that provide suitable habitat for the endemic fish species. Samples are often not independent of each other due to connectivity in habitats, so the sampling design should ensure that non-independence of samples is accounted for by the analysis. Ensuring the independence of samples is important, for if background variation is not randomly distributed throughout the samples, monitoring results can be misinterpreted.

11.20. The spatial scale of monitoring will depend on the response variables that are being monitored—e.g., the scale for sampling population changes in tree frogs and jaguars will be different. The monitoring design should capture several different spatial scales—e.g., looking directly at changes in abundance of a species in habitat patches but also looking at broader trends of change in habitats at the landscape level.

Defining response variables

11.21. The monitoring design should describe the response variables that will be measured. Response variables can be quantitative or qualitative measures that provide a simple and reliable means to respond to the question being asked. These response variables and the approach to their measurement should be readily understood by stakeholders; the response variables should be easily measurable, and measures should be achievable within time and resource constraints, reliable in terms of repeatable measurements, and sensitive to changes.

11.22. Response variables can include direct counts of species abundance, species presence or absence, reproductive success, or area of habitat. In the case of impacts on rare and endemic species, indices of abundance can be used (e.g., monitoring tracks, sign, or nests). For very rare species, radio tracking may also be useful to determine the movements of individuals. To describe changes in habitat quality, the relative abundance of indicator groups such as butterfly, bird, beetle, and plant guilds may be used.

11.23. The Energy and Biodiversity Initiative provides extensive guidance on the selection of biodiversity indicators for monitoring impacts and conservation actions.

Defining factors that affect response variables

11.24. The monitoring design should describe the factors that will be studied through monitoring. The factors depend on the questions and will reflect the most significant impacts on key biodiversity features or the effectiveness of management measures for key biodiversity features. Under some circumstances, it may be that the factors will have different degrees of impact—e.g., examining the effects of different minimum flows from a dam to provide information for adaptive management.

Collecting, managing, analyzing, and evaluating data

11.25. Data collected from monitoring must be managed, analyzed, and evaluated. It is common for large amounts of raw data to be collected without any consideration of how to manage it in databases or how to process it into useful information for decision making.

11.26. The monitoring and evaluation section of the BAP should describe the procedure of data collection, data management, and data analysis (including approaches to statistical inference) as well as how the data will be presented (e.g., graphs, diagrams, or reports) and evaluated for decision making (including, where relevant, quantitative thresholds that define critical changes of biological significance).

11.27. Local community participation in data collection, management, analysis, and evaluation is an effective mechanism for community engagement and should be incorporated where possible.

Responding to information from monitoring

11.28. The information that a monitoring program produces should be made public to stakeholders, including local communities affected by the project, government agencies, biodiversity specialists, the team implementing the project, and its funders, in a form that is concise and readily understandable. These groups may be interested in different types of information. The government or project funders may be more interested in aggregated biodiversity measures, while local communities will be more interested in understanding how individual villages, or groups within a village, have been affected. In addition, information should be presented to different stakeholders in formats that are readily understandable, as otherwise it may not be accepted. The requirements of different stakeholders for information presentation should be incorporated into the biodiversity action plan.

11.29. The information derived from monitoring should feed into an adaptive management plan that describes management actions to be taken if monitoring documents that the indicators for critical response variables have superseded key thresholds.

Other considerations

11.30. Capacity building for local professionals and local community members as field biologists or para-biologists is an important element of long-term biodiversity monitoring programs.

11.31. Long-term financing for biodiversity monitoring should be sourced and indicated in the BAP.

Annex A: Acquiring spatial data for Bank-supported projects

Creating a map of a proposed project during the scoping process is one of the easiest ways to determine if there are likely to be environmental and social issues associated with the project. Unfortunately, maps are not uniformly available in project proposals, and even when they are they may not contain all the information needed to determine the potential impact of a project on nearby natural habitat areas. The Bank uses a spatial analysis tool called DSS for mapping the location of a project and determining if it overlaps with areas of critical natural habitat.

It is highly likely that most projects have already been mapped by the client, and the footprint and associate project components are available in a Geospatial Information Systems (GIS) or CAD format. This information should be provided to the Bank to avoid the inaccuracies that can arise from copying the extent of the project footprint from a pdf or jpeg file.

The following are **ideal** data formats that the Bank is currently able to incorporate into the DSS tool:

- ArcGIS Layer Package (.lpk)—A layer package is a single, convenient, ready-to-use file containing an ArcGIS Desktop map layer or group layer and the data it uses. This is the ideal way to receive project data since we are able to directly upload these types of files into the DSS. They can also contain multiple layers of information instead of receiving each dataset as an individual file.
- ArcGIS shape file (.shp)—Shape files are a simple format for storing the geometric location and attribute information of geographic features. Geographic features in a shape file can be represented by points, lines, or polygons (areas). This type of file will require the Bank DSS specialist to convert the file before it can be uploaded into the DSS, but this process is relatively quick. The projection or datum used to create the shape file should be clearly indicated when the data are given to the Bank (the current projection used is WGS 1984).

The following two **acceptable** data formats require additional time to convert to use in the DSS tool. Please provide these formats when the above formats are unavailable:

- GPS data files (.gpx)—this contains data captured with a GPS device. It can include points, tracks, and routes.
- Keyhole® Markup Language (.kml or .kmz)—KML is an XML grammar and file format for modeling and storing geographic features such as points, lines, images, and polygons. KML is typically used to visualize data with Google Earth.
- Geo-referenced DWG files from CAD packages will require conversion to shape file format and then additional conversion before uploading into the DSS.

If none of these formats are available, the minimum information that should be provided is the geographic coordinates for all parts of the project. This can be in degree, minute, second format, in decimal degrees, or even in UTMs (Universal Transverse Mercator).

If a project proposal or EIA contains a map, that map was most likely created using GIS. The information needed is most like already available, but it is critical to be specific when asking for data from consultants or contractors. When possible, it is advisable to include geo-referenced data as a deliverable output in the Terms of Reference for applicable contracts.

Annex B: Checklist for scoping biodiversity and ecosystem service impacts

Project phase	Potential effects on biodiversity and ecosystem services
Pre-construction	• Changes in land use due to modified access affecting habitats on site and in the area of influence of the project • Pre-construction land clearing causing direct habitat loss • Restrictions on land and resource access and uses for indigenous peoples or other public uses in project area of influence • River or coastal dredging to improve access depths • Investigative studies leading to habitat disturbance—e.g., seismic studies for oil and gas exploration
Construction	• Contamination of key habitats, waterways, and wetlands from erosion runoff, particulate emissions, effluents, or inappropriate chemical management • Increased local resource demands from labor camps and construction staff, leading to soil, water, habitat, and species impacts • Increased use of access roads affecting habitats through fragmentation and affecting public access to resources • New linear infrastructure such as transmission lines, docks, roads, or pipelines causing habitat fragmentation • Direct modification of aquatic and terrestrial habitats resulting from project construction—e.g., through reservoir filling or reduced flow sections in the construction of dams • Introduction of invasive species in moving plants for revegetating • Construction material extraction or deposit areas modifying key habitats
Operation	• Contamination of habitats, waterways, and wetlands from erosion runoff, particulate emissions, effluents, or inappropriate chemical management • Increased local resource demands from worker influx, leading to water, habitat, and species impacts and potentially affecting local uses • Increased use of access roads affecting habitats through fragmentation and modified public access to resources • Direct impacts on biodiversity—e.g., bird and bat collisions in wind farms and transmission lines or dams that block migratory routes • Changes in water quality affecting downstream habitats resulting from changes in hydrogeology and water chemistry in reservoirs • Unsustainable management of natural resources used for production, leading to habitat loss or reduced availability of the resource—e.g., unsustainable use of wood products leading to forest degradation or unsustainable fishing

Annex C: Review checklist for biodiversity baselines

Scope and objectives

- Does the baseline study clearly state its objectives?
- Does it make reference to applicable national law, international agreements, and Bank policies?

Review and assessment of available Information, focused on biodiversity and ecosystem services

- Does the baseline provide a synthesis and summary of current knowledge on biodiversity in the area of influence, based on review of available literature, databases, and unpublished studies, as well as on consultation with key regional and species specialists?
- Does the baseline study:
    - Review any existing environmental impact assessments or environmental and social impact analyses relevant to the project area of influence?
    - Discuss the biogeographic and landscape settings of the project area of influence?
    - Identify species with IUCN Red List categories of near-threatened, vulnerable, endangered, or critically endangered likely or known to be present in the project area of influence?
    - Identify sensitive or threatened habitats or ecosystem types?
    - Identify migratory species and key migration corridors?
    - Summarize information on protected areas or KBAs in the project area of influence?
    - Identify existing threats to biodiversity and ecosystem services?
    - Identify key social stakeholders (affected communities)?
    - Discuss the reliability and gaps in the existing information?
    - Identify relevant experts, including non-governmental organizations, institutions, and individual researchers?
    - List references and data sources used?

Delimitation of project area of influence and study area

- Does the baseline indicate the project area of influence?
    - Does the area of influence include associated facilities and transportation corridors?
    - Does the baseline study include the landscape or seascape in the area of influence?
- Does the baseline indicate areas outside of the area of influence that may serve as control or reference sites during monitoring?
- Does the baseline describe the methodology and criteria used to determine the project area of influence?
- Does the baseline describe and map the direct and indirect areas of influence?
- Whether considered direct or indirect, does the area of influence include areas subject to offsite impacts due to atmospheric emissions, discharges of

effluents, downstream impacts on water quantity and quality, noise generation, light pollution, disposal of solid wastes, and other relevant project effects?

Identification of potential critical natural habitats

- Does the scoping report identify the key biodiversity features known or anticipated to occur in the project area of influence?
- Does this identification build upon the screening process, the information review, the consultation process, and any site visits done during the screening or scoping study?
- Does the discussion of critical natural habitats answer the following three questions:
    - Might the area be considered **highly suitable** for biodiversity conservation?
    - Is the area **crucial** for species listed as threatened by the IUCN Red List?
    - Is the area **critical** for the viability of migratory routes of migratory species?

Consideration of stakeholder values and concerns

- Does the baseline identify ecosystem services and their beneficiaries, defined through consultation with experts, organizations, and communities?
- Have the key biodiversity features been defined through sufficient consultation with experts, organizations, and communities?
- Is there evidence of stakeholder consensus on the scope of the biodiversity baseline studies and impact assessment?
- Does the baseline provide a list of experts and stakeholders consulted and supporting evidence?

Maps and spatial data

- Does the report include maps sufficient to indicate:
    - The study area and the areas of direct and indirect influence?
    - The footprint of project elements?
    - Habitat types?
    - Any identified critical natural habitats, including any protected areas and internationally recognized areas of high biodiversity value?
    - Ranges of IUCN Red Listed species that overlap with the area of influence?
- Has the client provided the necessary geospatial data relevant to the project and associated facilities in an acceptable format (see Annex A)?

Methodology

- Does the baseline report describe the methodology, survey/fieldwork dates, sampling, list of stakeholders consulted, team composition and qualifications, and any other information that will allow reviewers and the general public to understand the baseline process?
- Does the sampling reflect the seasonality of the environment and biological processes? Did the sampling occur over a reasonable period of time?
- Has the sampling been designed to answer key questions?

- Do the fauna sampling units correspond to specific habitat types or vegetation units?
- Are all identified key biodiversity features sufficiently sampled?
- Does the methodology include a justification of the sufficiency of effort?

Results, analyses, and determination of critical natural habitat

- Does the report include lists of all species observed and include their current IUCN Red List categories? (All birds, mammals, and amphibians have been evaluated and should have a categorization. Most plants, invertebrates, fish, and "reptiles" have not been evaluated. Species not evaluated by IUCN should be indicated by an "NE," not left blank, so as to avoid confusion.)
- Does the baseline report assess key biodiversity features, including identifying relevant species and habitats and describing ecological processes and functions and the interrelations and interactions among the components of the ecosystem?
- Have all the species of conservation interest that were expected to be in the area been documented? Is there an assessment of the sufficiency of the sampling effort to indicate that where expected species are not found they are not likely to be found?
- For each species with an IUCN Red List category of near-threatened, vulnerable, endangered, or critically endangered and for species that have not been evaluated but that are likely to be in these categories, does the baseline provide discussion and additional information on the importance of the potentially affected habitats and populations relative to the their global habitats and populations?
- Are "new species" reported? If so, were additional studies performed or proposed to determine that these occur outside of the project area of influence?
- Are unidentified or unknown species reported? (These may be indicated by use of "sp.," "spp.," "aff.," or "cf." in species lists.) If so, does the report discuss which species, if any, are "endemic" or of "restricted range"?
- In the case of species requiring positive identification to determine the presence of critical natural habitat, was adequate evidence collected to support the identifications? (This could include photographs, sound recordings, tissue samples for DNA analyses, and partial (e.g., plants) or whole specimens (animals).)
- Does the baseline report discuss the presence of migratory and congregatory species and any habitats or areas of importance to these? (Congregatory species are those with large concentrations in specific location during some part of the annual cycle or their life cycle, such as waterfowl or wetland birds (e.g., flamingos in certain high Andean lakes).)
- If migratory or congregatory species are reported and there is a potential for impacts, does the baseline include sampling during migratory/congregation periods, or are existing data available?
- Does the baseline discuss the potential of the study area to have any areas recognized for unique assemblages of species, key evolutionary processes (including migratory or dispersal corridors), phylogenetic uniqueness, or significance for the population genetics of any species?

- Does the baseline make general conclusions about the presence of any areas that might be considered to be “highly suitable for biodiversity conservation” by the Bank, by national or local authorities, or by any group of stakeholders?
- Does the report discuss which species, if any, are of social, economic, or cultural importance to local communities?
- Does the baseline identify and describe the ecosystem services of the project area of influence as well as the beneficiaries of these services, including any indigenous peoples and other communities with uses of biodiversity features that could be affected by the project?

Indicators for Monitoring

- Does the baseline establish key biodiversity response variables and how they will be measured during monitoring of the construction, operation, and post-closure phases?
- Does the baseline study include initial measures of these response variables? If not, does it include a recommendation that these be obtained prior to start of construction?

Limitations, Gaps, and Uncertainties

- Does the baseline report clearly identify and fully discuss all the limitations, uncertainties, and data gaps?
- Are the uncertainties and gaps addressed through application of the precautionary approach that includes additional targeted studies, monitoring, and adaptive management to be developed as part of the environmental and social management plan and, when appropriate, the BAP?

Annex D: Model terms of reference for biodiversity baseline studies

Policy and guidelines

The Consultant shall develop the baseline study to provide compliance with the Inter-American Development Bank's Environment and Safeguards Compliance Policy ("OP-703") and will follow the guidelines provided by the Bank's Biodiversity Baselines Guidance Note.

General content

The baseline report should include at a minimum:

- Scope and objectives
- Area of influence and study area
- Review of existing information
- Identification of data gaps
- Field sampling approach and methodology
- Field sampling results
- Delineation of habitat categories (altered, natural, critical natural)
- Review of critical natural habitat criteria
- Identification of key biodiversity features
- Ecosystem services review and prioritization
- Details of expert and stakeholder consultations
- Qualifications of preparers and fieldworkers
- Species lists
- Coordinates of sampling unit locations

Scoping study

The Consultant will perform a scoping process that includes a critical review and gap analysis of the available information, determination of the project's area of influence and the baseline study area, identification of potential key biodiversity features and priority ecosystem services, and identification of the salient questions to be addressed by the impact assessment.

For especially complex or sensitive cases, the scoping process should include a site visit to obtain field data that will inform the design of sampling strategies and allow for consultation with local specialists and stakeholders.

Field studies

In light of the findings of the scoping study, the Consultant will develop detailed sampling designs and methodologies for field studies.

The field studies should include sampling during the appropriate range of seasonal conditions to ensure adequate representation of the different taxonomic groups.

The Consultant shall design field studies to collect data from representative areas of the entire project footprint and its areas of direct and indirect influence, to a level of detail proportionate to the key biodiversity features, ecosystem services, and significance of potential impacts.

Maps, with identification of natural habitats and lands already converted

The Consultant will prepare maps at appropriate scales that effectively display the spatial relationships of the project layout, footprint, areas of direct and indirect influence, study area, and key biodiversity features (including protected areas, key biodiversity area, etc.), including habitat units and areas identified as lands already converted, natural habitats, and critical natural habitats.

The maps should clearly demonstrate the adequacy of the sampling design in terms of providing broadly representative data from all habitat units over the area of influence and the study area.

Identification of critical natural habitats

Using the definitions in OP-703, the Consultant shall evaluate whether there are critical natural habitats within the area of influence. The Consultant should also identify any areas that may be considered critical habitats under IFC PS6 or by stakeholders adverse to the project.

This identification should err on the side of caution and provide the client with a fully informed position on any potential for critical natural habitat that may be argued by parties adverse to the project. The Consultant should bear in mind that identification of critical natural habitat in itself is not by any means an impediment to Bank financing, but rather that impacts to these habitats must be fully evaluated by the impact assessment in terms of the potential for significant conversion or degradation.

Identification of key biodiversity features

The Consultant shall identify and characterize the key biodiversity features, with a focus on information of importance for the impact assessment and the development of management plans. Key biodiversity features may include:

- Species listed as near-threatened, vulnerable, endangered, or critically endangered by the IUCN Red List or as requiring special consideration by national or local legislation
- Species considered endemic to the area of interest (may be listed by national or local legislation or expert assessments) or having geographically restricted ranges (to be defined by Consultant in consideration of international guidelines such as IFC PS6 or IUCN Red List Criteria)
- Migratory species or those that congregate where at least 1 percent of the global population is estimated to use or pass through the area of influence at some stage in their life cycle
- Species identified as new to science as a result of the biodiversity baseline studies
- Habitats and ecosystem processes supporting the species listed above

- Habitats that are considered by the Bank to be highly suitable for biodiversity conservation (to be determined in consultation with Bank specialists)
- Existing or planned legally protected areas and areas that maintain or support these (e.g., buffer zones)
- Unprotected areas recognized as having high conservation values as defined by OP-703 or as "internationally recognized areas" as defined by IFC PS6
- Any other biodiversity feature identified by stakeholders as meriting specific consideration in the impact assessment

Identification of priority ecosystem services

The Consultant shall identify priority ecosystem services in the context of the project in consultation with stakeholders in cooperation with social specialists (who may be part of the Consultant's team or others) and the client's social team.

The Consultant should follow international good practice for ecosystem services screening and ecosystem services review such as provided by IFC PS6 or the World Resources Institute.

Priority ecosystem services are those that the project has the potential to significantly affect, meaning that the quantity, quality, timing, or location of the services is affected, or services that the project depends on, meaning that the ecosystem service functions as an input or process for the project or enables, enhances, or influences environmental conditions required for successful implementation of the project.

Annex E: Checklist for review of biodiversity impact assessments

Scope and content

Does the impact assessment include:

- A description of the impact assessment approach and methodologies, with clear definitions of levels of significance?
- A brief summary of key project activities, processes, and products?
- A brief summary of the key features of biodiversity and priority ecosystem services?
- Identification, discussion, and valuations of impacts?
- Identification of management measures following the mitigation hierarchy?
- Identification of significant residual impacts and potential need for compensation and/or offsets?
- Discussion of cumulative impacts?
- A summary table/matrix of features/components, impacts, and management measures?

Identification of impacts

- Is the identification of impacts based on the interactions between the project and the biological environment, including direct, indirect, induced, and additive and synergistic cumulative impacts (e.g., through invasive species, habitat loss, contamination, overharvest, and climate change) on key biodiversity features and priority ecosystem services (including indirect impacts associated with impacts on surface and groundwater, soils, watersheds, and air sheds)?
- Are all of the key biodiversity features and priority ecosystem services identified by the biodiversity baseline studies, and are the activities and processes associated, directly and indirectly, with the project, as detailed by the project description section of the environmental assessment, adequately addressed?
- Does the impact identification consider all associated facilities, "offsite" facilities, and supply chain issues (e.g., sourcing of rock or fill materials)?
- Are impacts identified for each key biodiversity feature and priority ecosystem service described in the baseline report?
- Are impacts identified in the area of influence as defined in the scoping report and the baseline study?

Methods and approaches evaluating risks and impacts

- Is the assessment based on the description of the project (including alternatives) before the application of "additional" management measures so that residual impacts can be evaluated?
- Does the impact assessment, to the extent practicable, quantify the magnitude and extent of potential impacts and risks related to key biodiversity features and priority ecosystem services?
- Does the evaluation of impacts consider:

  - The consequence of the impacts based on their magnitude (degree of irreversibility) and extent (spatial scale)?
  - The risk of the impacts based on their likelihood (e.g., probability of occurrence) and consequence?
  - An alternative quantitative or semi-quantitative approach based on more appropriate criteria?
- Does the impact assessment define or reference established thresholds for significance of impacts based on internationally accepted criteria and standards?
- When significant impacts or losses are predicted, does the assessment include cost-benefit analyses that weigh biodiversity-related costs against environmental, economic, social, or other benefits of the project?
- Is the assessment supported by references to published studies and expert consultation?

Identification of management measures

- Are specific management measures identified for all significant adverse or negative impacts?
- For each impact, are management measures identified in accordance with the mitigation hierarchy, where avoidance (including selection of an alternative location or changes in design or operational parameters) is the favored approach?
- Does the report include a summary of impacts and their management measures in a matrix format, with reference to a specific plan, procedure, or section of the environmental and social management plan or BAP that describes how the management plans will be implemented?

Residual impacts and offsets to achieve no net loss

- Are residual impacts assessed for each impact identified, following the appropriate implementation of the mitigation hierarchy?
- If residual impacts are identified, are offsets proposed to achieve no net loss of natural habitats or net gains of critical natural habitats?
- If offsets are proposed, has the mitigation hierarchy been appropriately implemented, including consideration of alternative project locations and designs?
- Does the offset development process involve consultation with experts and stakeholders?
- In addition to being theoretically (i.e., ecologically) and technically (i.e., economically) feasible, is there evidence that the offsets are also politically (and socially) feasible?

Note on offsets

- The Bank will not finance projects that lead to significant conversion or degradation of critical natural habitats after the application of the mitigation hierarchy. This means that such impacts are *not* considered for offsets, and alternatives that will avoid these impacts must be sought.
- For projects affecting critical natural habitats that are *not likely* to result in significant conversion or degradation, the proposed management measures must be evaluated for their ability to fully mitigate the impacts.
- When only minor residual adverse impacts on critical natural habitats are likely, offsets may be explored to achieve no net loss or a net gain in the biodiversity values for which a critical natural habitat was identified.
- For projects in *non-critical* natural habitat, with significant residual impacts after application of the mitigation hierarchy *and* when alternatives and cost-benefit analyses have been performed, compensation and/or offsets will be required to achieve no net loss.

Significant conversion or degradation of critical natural habitat

- Does the assessment specifically address significant conversion and degradation of natural habitat and critical natural habitat, with clear definitions of the criteria applied for each key biodiversity value for which critical natural habitat was determined?
- Will the project's impacts lead to significant conversion or degradation of critical natural habitat? If so, the project is ineligible for Bank financing unless these impacts can be avoided.

Annex F: Checklist of potential biodiversity impacts

Potential factors causing impacts on biodiversity	Type of project									
	Agriculture and livestock	Mining	Oil and gas	Hydro-power	Thermal energy	Wind energy	Transmission lines	Roads & pipelines	Ports	Tourism
Habitat conversion, degradation, and fragmentation	X	X	X	X			X	X	X	X
Barriers to migratory species or species movement				X	X	X	X	X	X	
Direct wildlife mortality				X	X	X	X	X	X	
Air pollution, includes dust		X			X			X		
Light pollution		X	X			X		X	X	X
Noise pollution		X	X		X	X	X	X	X	X
Influx (roads, T-lines, and camps) increases access for natural resource extraction	X	X	X	X		X	X	X	X	X
Water contamination and sedimentation	X	X	X	X	X			X	X	X
High water requirement competing with natural systems	X	X			X					X
Introduction of invasive species, weeds, and pests	X	X					X	X	X	X
Specific biodiversity and ecosystem service challenges	Chemical contaminants	Habitat loss; tailing dam contaminants and groundwater depletion	Flaring and waste pit contaminants	Habitat loss above and below dam	Thermal impacts from cooling water	Risk of bat and bird collisions	Linear barriers and collisions	Linear barriers	Dredging affects benthic species; ballast water introduces invasive species	Solid wastes; buildings in sensitive habitats

Annex G: Checklist for biodiversity management and action planning

Scope and objectives

- Does the BAP include a clear statement of its scope and objectives?
- Is there a comprehensive statement of the BAP's overarching goal–what the BAP must achieve to be considered successful in terms of complying with the legal and policy requirements of the Bank and client, applying biodiversity conservation and protection measures, and ensuring commitments to stakeholders?

Legal and policy framework

- Does the BAP include a summary of the legal and policy framework under which the project and its management system are to be developed?
- Does the framework address applicable national and local legislation, multilateral environmental agreements, Bank policy, and the client's own environmental and social policies?
- Does the footprint of the project or its area of influence include protected areas or their buffer zones? If so, is there a complete discussion of the relevant legislation and management plans for these areas?

Delimitation of the BAP area

- Does the BAP include a justified delimitation of its area of application? This may extend beyond the area of influence of the project itself, especially when offsets or compensation are proposed.
- Does the BAP include areas proposed for offsets and buffer zones necessary to protect the values of the offset areas or provide for their connectivity?

Identification of key biodiversity features and priority ecosystem services

- Does the BAP provide a summary of the biodiversity baseline developed for the project, with a focus on the key biodiversity features and priority ecosystem services identified, including descriptions of the natural and critical natural habitat types present?
- Does the BAP identify biodiversity resources of social, economic, or cultural importance to local communities, especially considering any indigenous peoples who may have traditional uses of or dependence on these resources?
- Does the BAP provide a characterization of the baseline status and trends of the biodiversity and priority ecosystem services of the BAP area, identifying existing threats and opportunities?
- When offsets are proposed, does the BAP provide baseline information on the proposed areas to show equivalence of the offset areas (or higher biodiversity value if "trading up")?
- Does the BAP identify and discuss any protected areas, key biodiversity area, Ramsar sites, important bird areas, endemic bird areas, Alliance for Zero Extinction sites, biodiversity hotspots, centers of plant diversity, high conservation value areas, indigenous and community-conserved areas, or

other areas of recognized biodiversity value that may exist in its area of influence? (See Biodiversity A-Z for information on categories of areas of biodiversity importance and their business relevance.)

Identification of significant adverse potential impacts and risks

- Does the BAP provide a summary of the impact assessment, with a focus on the potential impacts and risks most relevant to the protection of biodiversity targets identified by the BAP?
- Does the BAP present a matrix of key biodiversity features, impacts, management measures, residual impacts, offsets/compensations, responsibilities, and environmental and social management plan (ESMP)/BAP references?

Scientific gap analysis

- Does the BAP include a summary of the scientific uncertainties and information gaps in the existing baseline and impact assessment?
- Does the BAP include activities that will clarify these gaps?

Approaches to management of potential impacts and risks (Management Plan)

- Does the BAP describe the project's approach to avoiding and mitigating impacts on and risks to biodiversity through the application of the mitigation hierarchy in all phases of the project, including its conceptualization, alternatives analysis, and final design in addition to its construction, operation, abandonment, and reinstatement phases?
- Does the BAP outline, briefly describe, and reference the relevant elements of the project's ESMP as well as describe the additional biodiversity-specific actions to ensure compliance with the Bank's biodiversity requirements and the BAP's objectives?
- Does the BAP describe the roles and responsibilities of the client, employees, contractors, and other parties for managing and implementing the BAP?

Compensation and offset strategy (if applicable)

- Does the BAP demonstrate that the mitigation hierarchy has been properly applied and that the offset is a potential means to bring a no-net-loss or positive biodiversity gain in situations where significant adverse impacts are likely after all feasible alternatives in project design and location have been considered and all feasible avoidance, minimization, and rehabilitation measures have been applied?
- Does the offset plan include a well-documented analysis of losses and gains and evidence that the proposed offset is technically feasible?
- Is the offset defined in terms of its desired outcomes and based on existing standards for offsets?
- Does the offset development process involve consultation with stakeholders, including all levels of relevant governmental authorities, affected communities, and conservation and species experts?

Stakeholder engagement

- Does the BAP describe its approach to stakeholder engagement, including:

- o A description of the consultation and engagement process during the scoping and development of the BAP, including identification of key stakeholders?
- o A summary of the key concerns, interests, and recommendations received during the consultations?
- o A framework and plan for ongoing stakeholder engagement during the life of the BAP?

Does the BAP stakeholder engagement plan show evidence of coordination with the client's community relations or social management group and consistency with the client's policies and Bank requirements?

Internal and external arrangements for implementation

- Does the BAP clearly identify client ownership, internal organizational frameworks, and sources of resources required for its implementation?
- Does the BAP indicate how the client will implement the BAP in collaboration with partner organizations or institutions with experience in assessing biodiversity features and ecosystem services, as well as with the participation of communities in the BAP area?

Schedule and costs

- Does the BAP contain a schedule and a budget estimate for the activities detailed?
- Does the schedule include:
    - o A consultation plan?
    - o Implementation of management actions per the ESMP?
    - o A biodiversity monitoring plan?
    - o A BAP review and evaluation plan?
    - o A reporting plan?
- Does the budget estimate consider:
    - o Costs of implementing "standard" management actions?
    - o Costs of implementing "incremental" management actions to meet biodiversity objectives?
    - o Costs of monitoring and evaluation programs?
    - o Costs of a consultation plan?
    - o Costs of any offset or compensation plans?
    - o Costs of reporting (including potential publications)?
- Does the BAP discuss the financial arrangements to ensure its viability, especially when offsets are proposed, identifying sources of funding?

Monitoring, evaluation, and reporting

- Does the BAP describe the project's approaches and plans for the monitoring and evaluation of key biodiversity indicators of the effectiveness of the management measures and trends in key biodiversity features and priority ecosystem services, including measures of offset success?
- Does the BAP specify reporting mechanisms for stakeholders, including the Bank, governmental authorities, affected communities, and the general public?

- Does the monitoring focus on indicators that are directly relevant to the key biodiversity features and priority ecosystem services that are targeted by the BAP?
- Are the indicators easy to measure and likely to provide relevant information about the effectiveness of the management measures?
- Does the BAP include a reporting schedule and discussion of the types of information, audiences, and media for the reports?

Annex H: Model terms of reference for biodiversity action plans

The Consultant shall follow the guidelines of the Bank's BAP Guidance Note.

The BAP should include the following elements:

- Scope and objectives
- Legal and policy framework
- Relationship of the BAP with the environmental and social management system (ESMS)
- Addressing of any outstanding environmental and social action plan or corrective action plan elements
- Summary of project description and impacts
- Summary of biodiversity baseline and identification of BAP targets
- Scientific gap analysis
- Actions to be carried out to achieve objectives, which may include
    - Minimization measures
    - Offsets
    - Compensation
- BAP management and administration
- Monitoring, indicators, and evaluation
- Reporting and publications
- Training and capacity building

The Consultant shall develop the BAP in cooperation with partner institutions, organizations, consultants, and communities, as necessary and appropriate.

The Consultant shall provide recommendations for engaging institutions, non-governmental organizations, researchers, communities, and other relevant stakeholders whose participation and collaboration will enhance the success of the BAP.

Scope and objectives

The Consultant should present the scope and objectives of the BAP, which should be developed in consultation with the client and stakeholders. The scope should include a statement and map of the BAP's geographic area of application. The objectives should be time-limited and allow for the identification of measurable indicators for their achievement.

Legal and policy framework

The Consultant should provide a detailed statement of the legal and policy framework relating to biodiversity and ecosystem services, including national and local (e.g., state, provincial, departmental, municipal, etc.) legislation, Bank and other lender policies, and the client's policies.

Relationship of the BAP with the environmental and social management system

The Consultant should design the BAP to be consistent with and complementary to the general environmental and social management plans and procedures of the project's ESMS. The BAP should fully describe the relationships and linkages between it and the ESMS.

Environmental and social action plan or corrective action plan elements

The Consultant should explain the relationship of the BAP with any outstanding environmental and social action plan or corrective action plan requirements.

Summary of project description and impacts

The Consultant should provide a description of the project for which the BAP is being developed and the impacts that the BAP is intended to mitigate, compensate for, or offset.

Summary of biodiversity baseline and identification of BAP targets

The Consultant should provide a detailed summary of the biodiversity baseline and the process and criteria developed to identify the key biodiversity features or priority ecosystem services that are to be addressed by the BAP. The identification of the BAP targets should include consultation with relevant experts and stakeholders.

Scientific gap analysis

The Consultant should perform a gap analysis of the information in the biodiversity baseline and the impact assessment to identify the need for additional studies and monitoring as part of the BAP.

Actions to be carried out to achieve objectives

The Consultant should design the actions to be carried out to achieve the objectives set out in the BAP, which may include some combination of management measures, monitoring, offsets, and possibly compensation (e.g., for loss of biodiversity resources used by local communities).

The management measures should be designed specifically to avoid and minimize impacts on key biodiversity features and priority ecosystem services, as well as to rehabilitate to baseline conditions as required. The BAP should provide implementable plans and procedures for these measures, with indicators to measure their success.

Offsets should be developed in consultation with specialists, governmental authorities, affected communities, and other relevant stakeholders to achieve technical and political feasibility.

BAP management and administration

The Consultant should describe the management and administrative structures and support required to successfully implement the BAP, including details on the roles, responsibilities, and skill sets of the various management and staffing positions required.

Monitoring, indicators, and evaluation

The Consultant shall prepare a detailed monitoring and evaluation program, including proposed indicators for measuring the effectiveness of the management actions implemented by the client as well as the effectiveness of the BAP in achieving its objectives.

Reporting and publications

The Consultant should propose a reporting policy and schedule for the BAP, including the types of media to be used and the types of popular and academic publications that are anticipated to result from the BAP.

Training and capacity building

The Consultant shall include requirements for training and capacity building that reflect an understanding of the needs and capabilities of the client, local governmental authorities, contractors, and local stakeholders with influence on biodiversity and the management of ecosystem services.