# Guidance Note 6

## Biodiversity Conservation and Sustainable Management of Living Natural Resources

January 1, 2012

Guidance Note 6 corresponds to Performance Standard 6. Please also refer to Performance Standards 1–5 and 7–8 as well as their corresponding Guidance Notes for additional information. Information on all referenced materials appearing in the text of this Guidance Note can be found in the Bibliography.

## *Introduction*

***1. Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The requirements set out in this Performance Standard have been guided by the Convention on Biological Diversity, which defines biodiversity as "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 a part; this includes diversity within species, between species, and of ecosystems."***

***2. Ecosystem services are the benefits that people, including businesses, derive from ecosystems. Ecosystem services are organized into four types: (i) provisioning services, which are the products people obtain from ecosystems; (ii) regulating services, which are the benefits people obtain from the regulation of ecosystem processes; (iii) cultural services, which are the nonmaterial benefits people obtain from ecosystems; and (iv) supporting services, which are the natural processes that maintain the other services.[1]***

***3. Ecosystem services valued by humans are often underpinned by biodiversity. Impacts on biodiversity can therefore often adversely affect the delivery of ecosystem services. This Performance Standard addresses how clients can sustainably manage and mitigate impacts on biodiversity and ecosystem services throughout the project's lifecycle.***

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[1] *Examples are as follows: (i) provisioning services may include food, freshwater, timber, fibers, medicinal plants; (ii) regulating services may include surface water purification, carbon storage and sequestration, climate regulation, protection from natural hazards; (iii) cultural services may include natural areas that are sacred sites and areas of importance for recreation and aesthetic enjoyment; and (iv) supporting services may include soil formation, nutrient cycling, primary production.*

GN1. The requirements set out in Performance Standard 6 and the interpretation of those requirements as provided in this Guidance Note are guided by the Convention on Biological Diversity (CBD) including the CBD's Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets.[GN1] As emphasized by the Biodiversity for Development Program of the CBD, biodiversity loss can result in critical reductions in the goods and services provided by the earth's ecosystems, all of which contribute to economic prosperity and human development. This is especially relevant in developing countries where natural resource-based livelihoods are often prevalent.

GN2. The definition of ecosystem services provided in paragraph 2 of Performance Standard 6 is derived from the Millennium Ecosystem Assessment.[GN2] All four categories of ecosystem services (provisioning, regulating, cultural and supporting services) are recognized in this Performance Standard. Performance Standard 6 recognizes that sustainable development cannot be achieved if either biodiversity or ecosystem services are lost or degraded by development efforts. While recognizing that these two dimensions are inextricably linked, Performance Standard 6 provides separate client requirements for biodiversity and ecosystem services. This is in part because biodiversity management involves expertise and scientific knowledge found mainly in the community of practice of ecologists and conservation biologists, while the implementation of assessment, mitigation and management programs

[GN1] Revised and updated biodiversity targets for the 2011–2020 Strategic Plan for the Convention on Biological Diversity; Decision X/2 of the tenth Conference of the Parties (COP-10).

[GN2] This website houses the Millennium Assessment reports, including *Ecosystems and Human Well-being: Opportunities and Challenges for Business and Industry* (2006), with links to full and synthesis reports as well as graphic resources, presentations, and videos and other useful resources. http://www.maweb.org

for ecosystem services often require the expertise of social specialists and other specialists (for example, agronomists, geologists, hydrologists and hydrogeologists, soil and erosion control specialists, water management specialists, etc.) and direct engagement with Affected Communities.

GN3. Biodiversity and ecosystem services are especially relevant to sectors that develop living natural resources as commodities, such as agriculture, forests, fisheries, and livestock. Sustainable management practices for many such sectors have been codified in internationally-recognized standards. For this reason, additional requirements are provided for companies involved in the primary production of living natural resources as commodities.

## *Objectives*

- ***To protect and conserve biodiversity.***
- ***To maintain the benefits from ecosystem services.***
- ***To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.***

## *Scope of Application*

***4. The applicability of this Performance Standard is established during the environmental and social risks and impacts identification process. The implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the client's Environmental and Social Management System (ESMS), the elements of which are outlined in Performance Standard 1.***

***5. Based on the risks and impacts identification process, the requirements of this Performance Standard are applied to projects (i) located in modified, natural, and critical habitats; (ii) that potentially impact on or are dependent on ecosystem services over which the client has direct management control or significant influence; or (iii) that include the production of living natural resources (e.g., agriculture, animal husbandry, fisheries, forestry).***

GN4. The application of Performance Standard 6 is established during the social and environmental risks and impacts identification process. General client requirements for this process are provided in paragraphs 7–12 of Performance Standard 1, and accompanying guidance is provided in paragraphs GN15–GN28 of Guidance Note 1. The risks and impacts identification process should include scoping of potential issues relating to biodiversity and ecosystem services. Scoping may take the form of an initial desktop analysis and literature review, including a review of regional studies and assessments, the use of global or regional screening tools such as the Integrated Biodiversity Assessment Tool (IBAT) and field reconnaissance. Scoping for ecosystem services may also take place through consultation with Affected Communities as part of Stakeholder Engagement requirements outlined in paragraphs 25–33 in Performance Standard 1 and its accompanying guidance (see paragraphs GN91–GN105 in Guidance Note 1).

GN5. The risks and impacts identification process will vary depending on the nature and scale of the project. At a minimum, the client should screen and assess the risks to and potential impacts on biodiversity and ecosystem services in the project area of influence, taking into account the following: (i) the location and scale of project activities, including those of associated facilities; (ii) its supply chains (as required in paragraph 30 of Performance Standard 6); (iii) the project's proximity to areas of known biodiversity value or areas known to provide ecosystem services; and (iv) the types of technology that will be used (e.g., underground mining versus open pits, directional drilling and multi-well pads versus high-density single well pads, air cooled condensers versus wet cooling towers, etc.) and efficiencies of the proposed equipment. Performance Standard 6 will not be applicable where no known risks to biodiversity

and ecosystem services, including risks related to potential knowledge gaps, are identified through this screening.

GN6. With respect to ecosystem services, Performance Standard 6 will in most cases apply when the (main) direct beneficiaries of such services are the Affected Communities, as defined in paragraph 1[GN3] of Performance Standard 1. Performance Standard 6 will not apply in instances where a client, through its project, does not have direct management control or significant influence over such services; such as regulating ecosystem services where the benefits of such services are received on a global scale (e.g., carbon storage or climate regulation). Impacts on this scale are covered as part of the risks and impacts identification process in Performance Standard 1 and some additional guidance is provided in paragraphs GN31–GN35 of its accompanying Guidance Note. Client requirements for Greenhouse Gas emissions are described in paragraphs 7 and 8 of Performance Standard 3 and in paragraphs GN16–GN26 of its accompanying Guidance Note.

GN7. Regarding living natural resources, Performance Standard 6 will apply for all projects involved in the primary production of such resources.

## *Requirements*

***General***

***6. The risks and impacts identification process as set out in Performance Standard 1 should consider direct and indirect project-related impacts on biodiversity and ecosystem services and identify any significant residual impacts. This process will consider relevant threats to biodiversity and ecosystem services, especially focusing on habitat loss, degradation and fragmentation, invasive alien species, overexploitation, hydrological changes, nutrient loading, and pollution. It will also take into account the differing values attached to biodiversity and ecosystem services by Affected Communities and, where appropriate, other stakeholders. Where paragraphs 13–19 are applicable, the client should consider project-related impacts across the potentially affected landscape or seascape.***

***7. As a matter of priority, the client should seek to avoid impacts on biodiversity and ecosystem services. When avoidance of impacts is not possible, measures to minimize impacts and restore biodiversity and ecosystem services should be implemented. Given the complexity in predicting project impacts on biodiversity and ecosystem services over the long term, the client should adopt a practice of adaptive management in which the implementation of mitigation and management measures are responsive to changing conditions and the results of monitoring throughout the project's lifecycle.***

***8. Where paragraphs 13–15 are applicable, the client will retain competent professionals to assist in conducting the risks and impacts identification process. Where paragraphs 16–19 are applicable, the client should retain external experts with appropriate regional experience to assist in the development of a mitigation hierarchy that complies with this Performance Standard and to verify the implementation of those measures.***

GN8. Paragraphs 6–8 refer to the completeness of the risks and impacts identification process once it has been determined that Performance Standard 6 applies to a particular project. The risks and impacts identification process may take the form of an Environmental and Social Impact Assessment (ESIA) and should be ongoing as part of the Environmental and Social Management System (ESMS). The scope of the assessment will depend on the nature and scale of the project and sensitivities in terms of biodiversity attributes and ecosystem services. With respect to biodiversity, clients should refer to good practice

[GN3] Further guidance on this definition is provided in paragraph GN92 of Guidance Note 1.

guidelines and other relevant reference documents on biodiversity assessment and management, some of which are provided in the Bibliography. With respect to ecosystem services, clients should refer to paragraphs GN126–GN142, which provide guidance on the assessment of ecosystem services and describe the Ecosystem Services Review (ESR) process.

GN9. As part of the ESIA, baseline studies should be conducted for the relevant biodiversity attributes and ecosystem services. Baseline studies should comprise some combination of literature review, stakeholder engagement and consultation, in-field surveys and other relevant assessments. The extensiveness of the baseline will vary depending on the nature and scale of the project. For sites with potentially significant impacts on natural and critical habitats and ecosystem services, the baseline should include in-field surveys over multiple seasons and conducted by competent professionals and external experts, as necessary. In-field surveys/assessments should be recent and data should be acquired for the actual site of the project's facilities, including related and associated facilities, and the project's area of influence.

GN10. Baseline studies should be informed by a literature review and initial desktop analysis. The extent of the literature review will depend on the sensitivity of the biodiversity attributes associated with the project's area of influence and the ecosystem services that may be impacted. Literature reviews could comprise a number of sources such as peer-reviewed journals, regional assessments, national or regional planning documents (e.g., the National Biodiversity Strategy and Action Plan (NBSAP) and Local Biodiversity Action Plans (LBAPs)), existing assessments and studies in the project site and its area of influence, web-based data such as information provided in the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, landscape prioritization schemes including systematic conservation planning assessments and plans, and masters/doctoral theses, among others.

GN11. Depending on the nature and scale of the project, existing spatial data and landscape mapping may form part of the literature review and initial desktop analysis. This is especially important for project sites in natural and critical habitats. This includes land classification and land use maps, satellite imagery or aerial photographs, vegetation type and ecosystem maps, topographical and hydrological mapping such as watersheds and interfluvial zones. Numerous regional ecosystem mapping efforts have been completed or are currently underway by academic and governmental institutions, intergovernmental organizations, and nongovernmental organizations (NGOs) (e.g., United Nations Environment Programme-World Conservation Monitoring Centre (UNEP-WCMC); Ocean Data Viewer;[GN4] UN Food and Agriculture Organization (FAO) Forest Resource Assessments; The Nature Conservancy; NatureServe (Terrestrial Ecosystems Map for South America); Global Forest Watch; Conservation International; BirdLife International; Integrated Biodiversity Assessment Tool (IBAT); International Union for Conservation of Nature (IUCN); Group on Earth Observation (GEO) Global Earth Observation System of Systems (GEOSS); etc.). This information can directly inform the ESIA and any related assessments of landscape integrity, resource development and management analyses, ecosystem services valuations, and reporting and prediction of environmental trends.

GN12. Stakeholder engagement and consultation is one of the key means to understanding impacts on biodiversity and identifying appropriate responses to such impacts. The ESIA or any follow-up biodiversity/ecosystem services-related assessment will be expected to take into account the differing values attached to biodiversity and ecosystem services by Affected Communities. This is especially relevant when projects may affect ecosystem services of relevance to Indigenous Peoples.[GN5] For

[GN4] UNEP-WCMC's mapping tools for protected areas are provided in paragraph GN114 and additional resources are provided in the Bibliography.

[GN5] See Performance Standard 7 and Guidance Note 7 for requirements for Indigenous Peoples.

ecosystem services, this process will form part of the ESR and is described in paragraphs GN135–GN142. Regarding biodiversity, the client should consider the differing values attached to particular biodiversity attributes by relevant local, national and international stakeholders. Biodiversity will be viewed differently depending on the stakeholders and will vary from region to region. Note that for critical habitat, the biodiversity values that must be considered, at a minimum, are made explicit in paragraph 16 of Performance Standard 6. Stakeholders with whom to consult include Affected Communities, governmental officials, academic and research institutions, recognized external experts for the biodiversity attributes of concern, and national and international conservation NGOs, as appropriate. Together, the literature review, stakeholder engagement and consultation and in-field surveys/ assessments should establish a core set of "biodiversity values," which would form the basis of impact analysis and the definition of mitigation and management measures. The same is true for ecosystem services, although the ESR will largely inform that process.

GN13. For some projects, biodiversity values and ecosystem services associated with a site might be numerous, and clients would benefit from the prioritization of such features. Biodiversity and ecosystem services can be prioritized along two axes: (i) based upon the number of spatial options left where conservation can occur (i.e., spatial limitation or the feature's *irreplaceability*); and (ii) based on the time available for conservation to occur before the feature is lost (i.e., temporal limitation as caused by threats to the feature in question, which will provide an understanding of its *vulnerability*). These concepts can be applied to both biodiversity and ecosystem services. For example, a sacred lake may hold particularly unique significance for local communities, one patch of forest may provide a type of fiber or medicinal plant found nowhere else, a low ridge in the land may provide singular flood control, a species may be endemic to a single site or an ecosystem may be singular in the landscape. These are all spatially-limited biodiversity values/ecosystem services, in that they are relatively irreplaceable in the landscape. The concept of threat or vulnerability is equally applicable: the probability of a species being lost in a defined time as measured by lists of threatened species such as that of IUCN, the speed of loss of an ecosystem service such as pollination or flood regulation, and the continuing erosion of an Indigenous People's culturally valued site due to in-migration are all examples of time limitations or threats. The relative importance with respect to conserving the feature as part of project operations could therefore be determined by its status in terms of these two axes: its *irreplaceability* in the landscape/seascape and its *vulnerability* in being able to remain there.

GN14. Paragraph 6 lists a number of threats to biodiversity and ecosystem services that the client should consider as part of the ESIA and its ESMS. Other threats may also be considered depending on the regional/local context. The client should provide an accurate account of threats, including regional level threats that are relevant to the project site and its area of influence. The client should describe any pre-existing threats and the extent to which the project might exacerbate them. An analysis of threats should be used to inform the impact assessment. For example, if illegal bushmeat hunting or timber extraction is ongoing, would project-induced access further this situation?

GN15. The ESIA should spell out project-related direct, indirect and residual impacts on populations, species and ecosystems and on ecosystem services identified in the baseline studies. Direct impacts might include habitat loss and disturbance (noise, light, land or shipping traffic), emissions and effluents, alterations of surface hydrology and land forms, edge effects and forest gaps, loss of provisioning ecosystem services or access to such services, degradation of regulating, cultural and supporting ecosystem services, etc. Indirect impacts might include the accidental introduction and spread of invasive species, project-induced access by third parties, in-migration and associated impacts on resource use. Mitigation and management measures should then be defined to address all impacts identified as adverse to biodiversity or ecosystem services. Residual impacts are significant project-related impacts that might remain after on-site mitigation measures (avoidance, management controls, abatement,

restoration, etc.) have been implemented. In critical habitats, any significant residual impacts must be mitigated using biodiversity offsets. It should be noted that a reliable determination of residual impacts on biodiversity needs to take into account the uncertainty of outcomes due to mitigation measures. This is especially relevant with respect to restoration and the client's ability to ensure adequate restoration of biodiversity and ecosystem services. Where there is significant uncertainty, the client should take a conservative approach in ascertaining the significance of residual impacts. Regarding cumulative impacts, the client is responsible for considering such impacts in line with paragraph 8 of Performance Standard 1 and as described in its accompanying Guidance Note.

GN16. Clients are expected to fully exercise the mitigation hierarchy, which is defined in the Objectives section of Performance Standard 1 and is further elaborated in paragraph 7 of Performance Standard 6 and in this paragraph (GN16). Performance Standard 6 places considerable emphasis on the avoidance of impacts on biodiversity and ecosystem services. This is reflected in the first sentence of paragraph 7. Avoidance of impacts is sometimes the only means to prevent irreplaceable loss of biodiversity and associated ecosystem services; the emphasis on avoidance in the mitigation hierarchy should thus be proportional to the irreplaceability and vulnerability of the affected biodiversity/ecosystem service as described in paragraph GN13. In order to implement the mitigation hierarchy with respect to Performance Standard 6, an assessment of project infrastructure and the existing landscape can inform the identification, screening and design of alternatives as a form of avoidance. Alternatives may include variations in the layout of the project facilities, alternative engineering and manufacturing processes and construction practices, the selection of different sites or routing of linear facilities, and selection of alternative suppliers through screening to identify those with appropriate environmental/social risk management systems. Secondly, once the preferred alternatives have been chosen, minimization of impacts may be possible through modifications to drainage systems, methods of road construction (for example to reduce dust and noise), the pattern of vegetation clearance, selection of different pollution abatement treatments, the implementation of erosion and sedimentation control measures, the construction of wildlife thruways (e.g., trench plugs or bridges in the case of linear infrastructure) and the layout of infrastructure. Minimization measures are elaborated on in paragraph GN46 with respect to natural habitats. Thirdly, where disturbance to biodiversity and ecosystem services has occurred, remediation may be possible in the form of rehabilitation[GN6] and restoration.[GN7] This may include vegetation rehabilitation (erosion control and facilitated natural regeneration of ecosystems); restoration of the original habitat type (where appropriate techniques are known or can be developed); and restoration of major ecosystem services, such as facilitated watercourse flow with dewatering water in the case of mining operations. Mitigations should be designed or reviewed by appropriate biological and engineering specialists to ensure that mitigation has been optimized in accordance with the hierarchy. For impacts on biodiversity, the mitigation hierarchy includes the use of biodiversity offsets.

GN17. As stated in paragraph 6 of Performance Standard 6, in natural and critical habitats clients should consider project-related impacts across the potentially affected landscape or seascape. Note that the term "landscape" includes freshwater aquatic habitats that exist within the overall landscape. The term "landscape/seascape" does not necessarily correspond to any one pre-defined unit of geographical space. It is a broadly defined term that might correspond to an ecoregion, a biome, or any other

[GN6] Rehabilitation is defined as the stabilization of the terrain, assurance of public safety, aesthetic improvement, and return of the land to what, within the regional context, is considered to be a useful purpose. Revegetation may entail the establishment of only one or a few species. Rehabilitation is used interchangeably with the term "reclamation" in this Guidance Note.

[GN7] Restoration is defined as the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. An ecosystem has recovered when it contains sufficient biotic and abiotic resources to continue its development without further assistance or subsidy. It would sustain itself structurally and functionally, demonstrate resilience to normal ranges of environmental stress and disturbance, and interact with contiguous ecosystems in terms of biotic and abiotic flows and cultural interactions.

ecologically significant unit of space on a regional level (i.e., not site-specific). In some cases the "landscape/seascape" unit might be defined in terms of an administrative or territorial boundary or a particular zoned area within international waters. In either case, the intention of the requirement is that clients identify project-related impacts, especially those on habitat connectivity and/or on downstream catchment areas, outside the boundaries of the project site. Landscape/seascape analysis is a fundamental step in determining ecologically-appropriate mitigation options that align with broader conservation efforts in the region. Such analyses support decision-making as to whether impacts should be avoided or are appropriate for offsets, and support the selection and design of a mitigation strategy, including offset mitigation, that contributes to regional-level conservation goals rather than solely site-level impacts. Landscape/seascape analysis does not necessarily imply in-field data collection outside the project site. Desktop assessment, including mapping exercises and consultation with regional specialists, can help the client understand its project site in the context of the greater landscape/seascape. This type of analysis is especially important in preventing the degradation and fragmentation of natural habitat, especially from cumulative impacts.

GN18. Large-scale and complex projects that involve significant risks and impacts across multiple biodiversity values and ecosystem services would benefit from applying an "ecosystem approach" to understanding the environment in which the project is located. As described by the Convention on Biological Diversity, the ecosystem approach is "*a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.*" The CBD defines "ecosystem" as a "*dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit*." This definition does not specify any particular spatial unit or scale. Instead, the CBD advises that scale of analysis and action should be determined by the problem being addressed. Performance Standard 6 also takes a similar approach when defining "habitats."

GN19. The ecosystem approach focuses on the relationship between components and processes in an ecosystem. It acknowledges that the many components of biodiversity control the stores and flows of energy, water and nutrients within ecosystems, which provide resistance to major perturbations. Knowledge of ecosystem structure and function contributes to an understanding of ecosystem resilience and the effects of biodiversity loss and habitat fragmentation. The ecosystem approach acknowledges that functional biodiversity in ecosystems provides many goods and services of economic and social importance (i.e., ecosystem services). This approach should be considered when developing the risks and impact identification process, which often analyzes impacts in isolation from one another and prescribes mitigation measures in the same manner. Clients should consider implementing integrated, innovative and real-time approaches to assessing the *socio-ecological* environment, especially for large-scale and complex projects with significant unique, multiple and/or diverse environmental and/or social impacts.

GN20. An essential element in the ecosystem approach, and a client requirement defined in paragraph 7 of Performance Standard 6, is the adoption of adaptive management practices. The premise of adaptive management is that ecosystem management must involve a learning process, which helps to adapt methodologies and practices to the ways in which these systems are being managed and monitored. For the private sector, adaptive management is a concept that should be rooted in the client's ESMS. As is often the case in determining the risks to and impacts on biodiversity and ecosystem services, data gaps exist even after a sometimes lengthy data collection period or due to changing conditions. The client's mitigation strategy is designed based on what is known at the time of completion of the ESIA or additional studies. While the client's mitigation strategy should be designed to the best of the client's abilities, and should take a risk-averse approach that explicitly accommodates uncertainty about outcomes of mitigation measures, flexibility should also be built into the client's ESMS so that the client's mitigation

and management approach can be adapted based on new findings. New findings may arise from the client's monitoring program or from independent sources. In either case, the client has the responsibility to update its approach to continually improve upon the existing management of biodiversity, ecosystem services and living natural resources.

GN21. Clients are responsible for identifying competent professionals able to identify biodiversity values and ecosystem services and propose appropriate mitigation options. The range of specialists is large, and the necessary skillsets will vary. For example, ecologists with regionally-specific experience, biologists with expertise in a specific taxon, and evolutionary or landscape biologists might be suitable for the identification of certain biodiversity values. Biodiversity management specialists who are familiar with the relevant industry (e.g., extractive industries versus forestry and other agribusiness specialists) will bring a different skillset in terms of identifying mitigation options in line with current good international practices in the sector. A single project may need to work with various specialists to adequately characterize its environment and a mitigation strategy. Ecosystem services assessment may require several specialists, depending on the service in question (e.g., soil and erosion control specialists, geologists and hydrologists, agronomists, rangeland ecologists, specialists in the economic valuation of natural resources, resettlement and social specialists with expertise in natural resource-based livelihood, etc).

GN22. For projects located in critical habitat (including legally protected/recognized areas), clients must ensure that external experts with regional experience are involved in the biodiversity and/or critical habitat assessment. If habitat is critical due to the presence of Critically Endangered and Endangered species, recognized species specialists must be involved (for example, including individuals from IUCN Species Survival Commission Specialist Groups). In areas of critical habitat, clients should consider establishing a mechanism for external review of the project's risks and impacts identification process and proposed mitigation strategy. This is especially relevant where uncertainty is high, where potential impacts are complex and/or controversial and/or where no precedent exists for proposed mitigations (such as some types of offsets). Such a mechanism would also promote the sharing of good international practice between projects and improve transparency in decision-making.

GN23. Clients are encouraged to develop partnerships with recognized and credible conservation organizations and/or academic institutes. This is especially relevant with respect to potential developments in natural or critical habitat. Partnering organizations may bring regional experience in biodiversity management that multinational companies are often lacking. Partnering organizations may be helpful in identifying species specialists, in designing rapid assessment programs and biodiversity monitoring programs, in developing Biodiversity Action Plans (BAPs), or in managing relations with civil society groups and other local stakeholders.

***Protection and Conservation of Biodiversity***

***9. Habitat is defined as a terrestrial, freshwater, or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the non-living environment. For the purposes of implementation of this Performance Standard, habitats are divided into modified, natural, and critical. Critical habitats are a subset of modified or natural habitats.***

***10. For the protection and conservation of biodiversity, the mitigation hierarchy includes biodiversity offsets, which may be considered only after appropriate avoidance,***

***minimization, and restoration measures have been applied.[2] A biodiversity offset should be designed and implemented to achieve measurable conservation outcomes[3] that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity; however, a net gain is required in critical habitats. The design of a biodiversity offset must adhere to the "like-for-like or better" principle[4] and must be carried out in alignment with best available information and current practices. When a client is considering the development of an offset as part of the mitigation strategy, external experts with knowledge in offset design and implementation must be involved.***

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*[2] Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate avoidance, minimization and restoration measures have been taken.*

*[3] Measurable conservation outcomes for biodiversity must be demonstrated in situ (on-the-ground) and on an appropriate geographic scale (e.g., local, landscape-level, national, regional).*

*[4] The principle of "like-for-like or better" indicates that biodiversity offsets must be designed to conserve the same biodiversity values that are being impacted by the project (an "in-kind" offset). In certain situations, however, areas of biodiversity to be impacted by the project may be neither a national nor a local priority, and there may be other areas of biodiversity with like values that are a higher priority for conservation and sustainable use and under imminent threat or need of protection or effective management. In these situations, it may be appropriate to consider an "out-of-kind" offset that involves "trading up" (i.e., where the offset targets biodiversity of higher priority than that affected by the project) that will, for critical habitats, meet the requirements of paragraph 17 of this Performance Standard.*

GN24. In developing requirements for biodiversity, Performance Standard 6 is guided by and supports the implementation of applicable international law and conventions including:

- The Convention on Biological Diversity, 1992 (CBD).
- The Convention on the Conservation of Migratory Species of Wild Animals, 1979 (Bonn Convention).
- The Convention on International Trade in Endangered Species of Wild Flora and Fauna, 1975 (CITES).
- The Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1971 (Ramsar Convention).
- The Convention Concerning the Protection of World Cultural and Natural Heritage, 1972 (UNESCO World Heritage Convention).

GN25. A summary of good practice guidelines on integrating biodiversity into impact assessment and on biodiversity management is provided in the Bibliography. Clients should make use of such reference documents when project-related impacts on biodiversity are expected. The literature on this topic is vast and these references are indicative only. Extensive regional and sector-specific[GN8] guidance and case studies are widely available. Academic journals dedicated to environmental impact assessment are another rich source of information.

GN26. Paragraph 9 of Performance Standard 6 purposely provides a broad definition of habitats as geographical units (that include marine and freshwater aquatic areas as well as airway passages), which is clearly a departure from a classic ecological definition of habitat (i.e., the place or type of site where an organism or population naturally occurs). Modified, natural and critical habitat refers to the biodiversity value of the area as determined by species, ecosystems and ecological processes.

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[GN8] For example, see IFC's Guide to Biodiversity for the Private Sector for Sector-Specific Biodiversity Issues. Lessons from experience and case studies are also provided via this website.

GN27. In practice, natural and modified habitats exist on a continuum that ranges from largely untouched, pristine natural habitats to intensively managed modified habitats. In reality, project sites will often be located among a mosaic of habitats with varying levels of anthropogenic and/or natural disturbance. Clients are responsible for delineating the project site as best as possible in terms of modified and natural habitat. This determination is made based on the level of human-induced disturbance (e.g., presence of invasive species, level of pollution, extent of habitat fragmentation, viability of existing naturally-occurring species assemblages, resemblance of existing ecosystem functionality and structure to historical conditions, degree of other types of habitat degradation, etc.) and the biodiversity values of the site (e.g., threatened species and ecosystems, culturally important biodiversity features, ecological processes necessary for maintaining nearby critical habitats). When delineating modified and natural habitats, clients should not focus on the project site in isolation. The level of anthropogenic impact should be determined with respect to the greater landscape/seascape in which the project is located. In other words, is the project site (or parts of it) located in a disturbed area amidst an otherwise intact landscape? Is the project site (or parts of it) an island of natural habitat within a heavily disturbed or managed landscape? Is the project site located near areas of high biodiversity value (e.g., wildlife refuges, corridors or protected areas)? Or, is the project site located in a mosaic of modified and natural habitats that contain various degrees of biodiversity values of importance to conservation? The client should be prepared to define its project site in these terms as part of the risks and impacts identification process.

GN28. Both natural and modified habitats may contain high biodiversity values, thereby qualifying as critical habitat. Performance Standard 6 does not limit its definition of critical habitat to *critical natural* habitat. An area may just as well be *critical modified* habitat. The extent of human-induced modification of the habitat is therefore not necessarily an indicator of its biodiversity value or the presence of critical habitat.

GN29. As stated in paragraph 10 of Performance Standard 6, biodiversity offsets may be considered "*only after appropriate avoidance, minimization and restoration measures have been applied.*" The decision to undertake a biodiversity offset therefore would never be a substitute for the implementation of good management practices on the actual project site. Biodiversity offsets are only to be undertaken if significant residual impacts remain after all prior steps in the mitigation hierarchy have been fully assessed and implemented.

GN30. A biodiversity offset serves as a risk management tool for developers whose projects will have an impact on biodiversity. It involves an agreed set of conservation actions or "measurable conservation outcomes," which could demonstrate how biodiversity losses caused by the development project will be balanced by equivalent biodiversity gains. The offset may be implemented as one project or as several projects. In either case, the client is expected to quantify biodiversity losses and equivalent gains, as feasible. In cases where a quantitative approach is not possible, expert judgment is required to determine appropriate offsets depending on the nature and scale of the project. The actions for achieving biodiversity gains must be designed to deliver long-term "on-the-ground" conservation outcomes, usually at one or several offset sites located within the region but generally not within project boundaries. The outcomes need to demonstrate no net loss in biodiversity (or a net gain in critical habitats) relative to the project impacts and must be over and above existing conservation interventions. In footnote 3 of Performance Standard 6, the term "on-the-ground" is used interchangeably with "in situ." Another way of expressing this concept may be "in the field." These terms are intended to emphasize the importance of demonstrating measurable conservation outcomes that can be realized in the natural environment and on an appropriate geographic scale with respect to the particular biodiversity value in question. Providing training or capacity building or financing research would rarely, if ever, be considered a demonstrable outcome "on-the-ground." Note also that "in situ" should not be interpreted as on the "project site," but

rather "in the natural environment" and on an ecologically relevant scale with respect to the biodiversity value in question.

GN31. Actions to deliver no net loss/net gain conservation outcomes for a specific development project will include one or several of the three following interventions: (i) positive conservation management interventions, such as the restoration, enhancement, or arrested degradation of biodiversity components at suitable offset sites; (ii) where this has been demonstrated as feasible, the creation or reconstruction of an ecologically equivalent ecosystem and associated biodiversity values; and (iii) averted risk interventions which result in on-the-ground protection of biodiversity in an area demonstrated to be under threat of imminent or projected loss of that biodiversity (due to factors other than the development project in question). In addition, where socioeconomic and cultural uses of biodiversity (i.e., ecosystem services) are at issue, biodiversity offsets may include the provision of compensation packages for Affected Communities impacted by the development project and offset. Note that ecosystem services are covered in paragraphs 24 and 25 of Performance Standard 6, and compensation for ecosystem services is covered in Performance Standards 5, 7, and 8.

GN32. Key biodiversity offset design steps and elements include: (i) ensuring that the development project meets all applicable laws, regulations and policies pertaining to biodiversity offsets; (ii) establishing an effective process for Affected Communities to participate in designing and implementing the biodiversity offset; (iii) describing the project's scope and predicted impacts on biodiversity, applying and documenting the steps in the mitigation hierarchy to limit those impacts while taking into account various sources of uncertainty (e.g., restoration outcomes) and using defensible metrics that properly account for biodiversity to calculate residual impacts; (iv) within the context of the relevant landscape/seascape, identifying suitable opportunities (potential offset sites, activities and mechanisms) for achieving "like-for-like or better" biodiversity gains to balance the losses due to the development; (v) quantifying (using the same metrics as those used in the loss calculations) or, depending on the nature and scale of the project, taking a semi-quantitative approach with expert opinion to demonstrate that the required biodiversity gains to achieve a no net loss or net gain outcome, and selecting the preferred locations and activities to provide these gains; and (vi) setting the specific offset activities and locations in a biodiversity offset management plan to guide implementation. A good biodiversity offset design should meet internationally-recognized practices, such as the Principles on Biodiversity Offsets[GN9] developed by the Business and Biodiversity Offset Program (BBOP). BBOP and others have published sets of documents to guide biodiversity offset design and implementation.

GN33. Important elements for the successful implementation of a biodiversity offset, and for securing long-term conservation outcomes, include: clarifying the roles and responsibilities of all stakeholders; setting up the legal arrangements to secure the biodiversity offset site(s); developing a comprehensive biodiversity offset management plan; establishing appropriate financial mechanisms, such as a conservation trust fund or non-fund options, to ensure sufficient and sustainable financial flows to implement the offset and ensure that all necessary gains are delivered; and setting up a system for monitoring, evaluation and adaptive management for the implementation of the conservation outcomes required for the offset.

GN34. Depending on the nature and scale of the project, clients should consider identifying additional opportunities to enhance habitat and protect and conserve biodiversity as part of their operations. While net gains of biodiversity are a requirement in critical habitat (see paragraph 18 of Performance Standard 6), clients should also endeavor to implement additional measures in modified and natural habitats, for example, in modified habitat, the restoration of relevant biodiversity values or other habitat

[GN9] See http://bbop.forest-trends.org/guidelines/principles.pdf.

enhancement measures, such as the removal of invasive species. For natural habitats, an example might be the development of strategic frameworks with other companies and/or with the government through the design of joint mitigation measures. Clients might also opt to catalyze funding from third-party financiers for appropriate and integrated land use planning exercises by relevant government structures or partner in research programs with local universities. Such initiatives would need to be identified with the assistance of competent professionals. Clients developing projects in all habitats are encouraged to demonstrate their intentions and willingness to be good stewards of the environments in which they live through these and other innovative approaches.

GN35. Certain sectors, most notably agriculture and forestry, refer to High Conservation Value (HCV) areas when determining the conservation value of a land area or management unit. The HCV Resource Network, an internationally-recognized group that includes environmental and social NGOs, international development agencies, timber and forest product certifiers, suppliers and buyers, and forest managers, provides information and support on the evolving usage of HCV to ensure a consistent approach. The Network recognizes six HCV types, which are based on both biodiversity and ecosystem services. Because intrinsic biodiversity values of an area and human value (or anthropogenic value) in terms of ecosystem services are treated separately in Performance Standard 6, HCV areas do not directly correspond with definitions in Performance Standard 6 for modified, natural and critical habitat. For convenience however, each HCV type is outlined below along with guidance on its most likely corresponding Performance Standard 6 designation:

High Conservation Value Types and Performance Standard 6

| HCV Type | Performance Standards |
|---|---|
| **HCV 1:** Areas containing globally, regionally or nationally significant concentrations of biodiversity values | Critical habitat in most cases. See paragraphs GN55–GN112 for further guidance. |
| *HCV 1.1: Protected areas* | |
| *HCV 1.2: Rare, threatened or endangered species* | |
| *HCV 1.3: Endemic species* | |
| *HCV 1.4: Seasonal concentrations of species* | |
| **HCV 2:** Globally, regionally or nationally significant large landscape-level areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance. | Natural habitat, and may be critical habitat if areas contain high biodiversity values as identified in paragraph 16 of Performance Standard 6. |
| **HCV 3:** Areas that are in or contain rare threatened or endangered ecosystems | Critical habitat |
| **HCV 4:** Areas that provide basic ecosystem services in critical situations | Priority ecosystem services as defined by paragraph 24 of Performance Standard 6. See paragraphs GN126–GN142 for further guidance. |
| *HCV 4.1: Areas critical to water catchments* | |
| *HCV 4.2: Areas critical to erosion control* | |
| *HCV 4.3: Areas providing critical barriers to destructive fire* | |
| **HCV 5:** Areas fundamental to meeting basic needs of local communities | Priority ecosystem services as defined by paragraph 24 of Performance Standard 6. Client requirements defined in Performance Standard 5 are also applicable. See paragraphs GN126–GN142 for further guidance. |
| **HCV 6:** Areas critical to local communities' traditional cultural identify (areas of cultural, ecological, economic | Priority ecosystem services as defined by paragraph 24 of Performance Standard 6. Client requirements |

| HCV Type | Performance Standards |
|---|---|
| or religious significance identified in cooperation with such local communities. | defined in Performance Standard 8 are also applicable. See paragraphs GN126–GN142 for further guidance. |

GN36. Good practice guidance documents for HCV assessments are provided in the Bibliography.

> ***Modified Habitat***
> ***11. Modified habitats are areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition.[5] Modified habitats may include areas managed for agriculture, forest plantations, reclaimed[6] coastal zones, and reclaimed wetlands.***
>
> ***12. This Performance Standard applies to those areas of modified habitat that include significant biodiversity value, as determined by the risks and impacts identification process required in Performance Standard 1. The client should minimize impacts on such biodiversity and implement mitigation measures as appropriate.***
>
> [5] *This excludes habitat that has been converted in anticipation of the project.*
>
> [6] *Reclamation as used in this context is the process of creating new land from sea or other aquatic areas for productive use.*

GN37. Definitions of what constitutes a modified or a degraded area are variable and are sometimes pre-defined as part of a country's land-use regulations and concession licensing systems. Given the range of habitats in which projects take place, there is no prescriptive set of metrics for determining if an area is to be considered modified or not. The client should determine the level to which human-derived activities have modified the ecological structure and functions of the habitat and its naturally-occurring biodiversity. It is recognized that the term "naturally-occurring" is in itself imprecise, as some ecosystems, such as savanna landscapes that have evolved through the use of human-induced fires, call into question what could be considered "natural" or not. Again, no formula exists to determine *a priori* if a habitat's disturbance regime and species assemblages could be considered naturally-occurring. Decision-making of this type will vary from place to place and should be informed by competent professionals with reference to applicable land-use requirements and licensing systems.

GN38. The presence of modified habitat will trigger Performance Standard 6 only when "*areas of modified habitat…include significant biodiversity value, as determined by the risks and impacts identification proces*s" (paragraph 12 of Performance Standard 6). The reason for adding this caveat is two-fold. Firstly, Performance Standard 6 is designed to protect and conserve biodiversity (among the other objectives listed). Secondly, as almost any converted area could be considered "modified," without this specification the Performance Standard would be potentially triggered for almost any project regardless of the biodiversity value of the area.

GN39. Overall however, clients should endeavor to site project facilities, infrastructure and associated facilities on modified habitat rather than on natural habitat, and demonstrate this effort through the alternative analysis conducted during the risks and impacts identification process. As part of that process, the client is responsible for determining if biodiversity attributes associated with the modified habitat might be considered "significant biodiversity values." Significant biodiversity value (or conservation value) is a general term meant to capture biodiversity attributes that might have intrinsic value as determined by scientific consensus (e.g., riparian areas, umbrella species) or cultural value (fauna or flora species of

significance to local communities). Some modified habitats might contain high biodiversity values or areas that trigger a critical habitat designation, such as ancient hedges in European agricultural landscapes, tembawang rubber plantations in Kalimantan or relict riparian areas in flyways for migratory species. In either case, biodiversity values shall be assigned based on scientific merit or values as attributed by relevant stakeholders such as local communities, government authorities and NGOs.

GN40. In managed landscapes such as agricultural and forestry areas, clients will often be responsible for conducting a High Conservation Value (HCV) assessment as required by many voluntary standards (e.g., Forest Stewardship Council (FSC), the Roundtable for Sustainable Oil Palm (RSPO), the Better Sugarcane Initiative (Bonsucro), or the Sustainable Agriculture Network (SAN)), which would identify biodiversity values in addition to important ecosystem services.

GN41. Paragraph 12 requires that clients minimize impact to identified biodiversity values and implement mitigation measures "*as appropriate*." Mitigation measures vary considerably and the stringency of the mitigation will depend on the biodiversity value in question. Mitigation measures might take the form of fencing or other physical controls, erosion and sediment control measures, effluent treatment, light and noise reduction, or habitat restoration. It is important to consider that modified habitats vary greatly in their significance for biodiversity conservation. At one extreme are many modern agricultural landscapes, particularly large-scale expanses of monoculture crops, that harbor relatively few species in general and none of conservation interest. At the other end of the spectrum are agricultural or agro-forestry systems that provide important surrogate habitats to many wild species, including some of conservation concern. For example, shade coffee and cacao plantations, when grown under a relatively dense tree canopy of diverse height and species composition, harbor many forest-based animal and plant species. These species include some that likely could not survive without this modified habitat; a case in point is the threatened Pink-legged Graveteiro (*Acrobatornis fonsecai*), a bird of shaded cocoa cultivation in a small area of northeast Brazil where the original native forest is mostly gone. On the other hand, coffee grown under open sun or minimal shade typically contains very little biodiversity. Similarly, some types of rice cultivation serve as surrogate wetlands for many birds and other aquatic species, while other kinds of rice production systems do not contribute to biodiversity conservation. In those agricultural or other modified habitats of some biodiversity significance, mitigation measures should be implemented "*as appropriate*" in order to maintain or enhance these biodiversity values.

GN42. Footnote 5 of Performance Standard 6 raises the question of "*for how much time does habitat degradation have to occur before it is considered a 'modified' habitat*?" In other words, if the area was substantially modified only in the last year, would it be considered a modified habitat? Habitat will be considered modified if it has existed in such condition for an extended period of time and is not otherwise likely to be returned to a natural state. Habitat will not be considered modified if the client's own activities were responsible for substantially modifying the habitat in anticipation of lender financing. Similarly, a previously intact habitat only recently impacted by unsustainable land use practices by third parties would not result in a modified habitat designation. Natural disturbances such as forest fire, hurricane or tornado affecting a natural habitat would also not lead to a modified habitat designation. Also, as relevant to the Sustainable Management of Living Natural Resources section of Performance Standard 6, Performance Standard 6 will respect cut-off dates for the conversion of natural habitat as established by internationally-recognized voluntary standards, such as FSC and RSPO.

***Natural Habitat***

***13. Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition.***

***14. The client will not significantly convert or degrade[7] natural habitats, unless all of the following are demonstrated:***

- ***No other viable alternatives within the region exist for development of the project on modified habitat;***
- ***Consultation has established the views of stakeholders, including Affected Communities, with respect to the extent of conversion and degradation;[8] and***
- ***Any conversion or degradation is mitigated according to the mitigation hierarchy.***

***15. In areas of natural habitat, mitigation measures will be designed to achieve no net loss[9] of biodiversity where feasible. Appropriate actions include:***

- ***Avoiding impacts on biodiversity through the identification and protection of set-asides;[10]***
- ***Implementing measures to minimize habitat fragmentation, such as biological corridors;***
- ***Restoring habitats during operations and/or after operations; and***
- ***Implementing biodiversity offsets.***

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*[7] Significant conversion or degradation is (i) the elimination or severe diminution of the integrity of a habitat caused by a major and/or long-term change in land or water use; or (ii) a modification that substantially minimizes the habitat's ability to maintain viable populations of its native species.*

*[8] Conducted as part of the stakeholder engagement and consultation process, as described in Performance Standard 1.*

*[9] No net loss is defined as the point at which project-related impacts on biodiversity are balanced by measures taken to avoid and minimize the project's impacts, to undertake on-site restoration and finally to offset significant residual impacts, if any, on an appropriate geographic scale (e.g., local, landscape-level, national, regional).*

*[10] Set-asides are land areas within the project site, or areas over which the client has management control, that are excluded from development and are targeted for the implementation of conservation enhancement measures. Set-asides will likely contain significant biodiversity values and/or provide ecosystem services of significance at the local, national and/or regional level. Set-asides should be defined using internationally recognized approaches or methodologies (e.g., High Conservation Value, systematic conservation planning).*

GN43. As described in paragraph GN37 in the section on modified habitats, there are no prescribed metrics available to identify what constitutes a natural habitat. The determination of natural habitat will be made using credible scientific analysis and best available information. An assessment and comparison of current and historic conditions should be conducted, and local knowledge and experience should be utilized. Natural habitats are not to be interpreted as untouched or pristine habitats. It is assumed that the majority of habitats designated as natural will indeed have undergone some degree of historic or recent anthropogenic impact. The question is the degree of impact. If the habitat still largely contains the principal characteristics and key elements of its native ecosystem(s), such as complexity, structure and diversity, than it should be considered a natural habitat regardless of the presence of some invasive species, secondary forest, human habitation or other human-induced alteration.

GN44. Significant conversion or degradation of natural habitat will not take place unless the client is able to demonstrate that all three requirements in paragraph 14 have been undertaken and the company has demonstrated that its proposed activities comply with land-use and licensing regulations. The first bullet point is that no viable alternatives exist for that project on modified habitat (within the region). This is especially relevant to agribusiness projects where it might be feasible in some cases to site the project on heavily modified and degraded lands rather than in areas that have recently been deforested or on other forms of natural habitat (e.g., tropical savanna). In these cases, a well-developed locations alternative

analysis should be conducted to explore potential viable options for development on modified habitat. The term "viable" includes, but is not limited to, technically and financially feasible alternatives. This analysis will in most cases be in addition to the alternative analysis included as part of the risks and impacts identification process. It should be a considerably more in-depth analysis than what is typically included in an ESIA, and should provide specifics on alternatives in the landscape for developing the project as well as the breakdown of cost increases for developing modified versus natural habitat.

GN45. The second bullet point in paragraph 14 is with respect to stakeholder engagement and consultation. If a project has the potential to result in significant conversion or degradation of natural habitats, relevant stakeholder groups must be engaged as part of a rigorous, fair and balanced multi-stakeholder dialogue. Client requirements for stakeholder engagement are described in Performance Standard 1 and related guidance can be found in Guidance Note 1. Stakeholders should specifically be engaged with respect to (i) the extent of conversion and degradation; (ii) the alternatives analyses; (iii) biodiversity and ecosystem services values associated with the natural habitat; (iv) options for mitigation, including set-asides and biodiversity offsets; and (v) identification of additional opportunities for biodiversity conservation (see paragraph GN34). Clients must keep a record of such stakeholder engagement and consultation activities and demonstrate how viewpoints have been reviewed and integrated into the project design. Stakeholders should include a diverse set of opinions, including scientific and technical experts, relevant authorities/agencies responsible for biodiversity conservation or the regulation/management of ecosystem services, and members of the national and international conservation NGO community, in addition to Affected Communities.

GN46. The third bullet in paragraph 14 again emphasizes the importance of demonstrating implementation of the mitigation hierarchy. General guidance on the mitigation hierarchy is provided in paragraph GN16; however further guidance is provided here with respect to the implementation of on-site mitigation measures as a means to minimize habitat degradation, which is of particular importance to operating in natural habitats. With respect to on-site mitigation, the types of possible measures are numerous and are often best identified by environmental engineers, erosion control and reinstatement specialists in addition to biodiversity management specialists. Overall, clients should seek to minimize habitat degradation by adhering to a footprint minimization principle throughout the project life-cycle. Habitat degradation is one of the most significant potential direct threats to biodiversity associated with projects involving significant land development. In addition to footprint minimization, the client should implement appropriate ecological restoration strategies, including physical reinstatement and rehabilitation and revegetation (or restoration) planning and methods, at the earliest possible stage in project planning. The basic principles should include (i) protection of topsoil and restoration of vegetation cover as quickly as possible after construction or disturbance; (ii) reestablishment of original habitat to its preconstruction/pre-disturbance conditions; (iii) minimization measures including management controls and workforce education; and, (iv) where native species (especially protected species) cannot be retained *in situ*, consideration of conservation techniques such as translocation/relocation. On-site mitigation measures should be included in a Biodiversity Management or Ecological Management Plan (see Annex A for guidance).

GN47. As described in paragraph 15 of Performance Standard 6, in all areas of natural habitat, regardless of the prospects of significant conversion and degradation, the client should design mitigation measures to achieve "no net loss" of biodiversity, where feasible, through the application of various on-site and offset mitigation measures. "No net loss" is defined in footnote 9 of Performance Standard 6 as "*the point at which project-related impacts on biodiversity are balanced by measures taken to avoid and minimize the project's impacts, to undertake on-site restoration and finally to offset significant residual impacts, if any, on an appropriate geographic scale (e.g., local, landscape-level, national, regional).*" No net loss refers to the biodiversity values of interest associated with the particular project site and their

conservation on an ecologically relevant scale. This argument of scale is emphasized numerous times in the Performance Standard (e.g., footnote 3 (offsets), footnote 12 (critical habitat)) and several times in this Guidance Note. A variety of methods exist to calculate loss of identified biodiversity values and to quantify residual losses. Such methods would then need to be paired with an assessment to determine if losses could be compensated by gains made through mitigation measures, including offset mitigation. Appropriate methods and metrics will vary from site to site, and the client will need to retain competent specialists to demonstrate that no net loss could be achieved. Depending on the nature and scale of the project, as well as the extent of natural habitat, loss/gain calculations for determining offset mitigation may be substituted with expert judgment in determining the appropriateness of the offset.

GN48. Paragraph 15 then describes a series of potential mitigation measures that conform to the mitigation hierarchy but are of particular relevance to achieving no net loss in natural habitat. The first bullet identifies "set-asides," which are land areas, usually within the project site or in other adjacent areas over which the client has management control, that are "*excluded from development and targeted for the implementation of conservation enhancement measures*" (footnote 10). Set-asides are a common form of mitigation in the agribusiness and forestry sectors. The terminology is less familiar to mining and oil & gas operators, other industrial sectors (e.g., cement manufacturing and construction material extraction), and the housing and infrastructure development sectors. Set-asides may also be High Conservation Value (HCV) areas (see paragraph GN35). The set-aside terminology has been incorporated in the 2011 version of Performance Standard 6 to be more consistent with some forms of governmental legislation and with the many mature and evolving international voluntary standards, such as the Forest Stewardship Council (FSC) and the Roundtable for Sustainable Palm Oil (RSPO). Although other industrial/infrastructure development sectors do not typically subscribe to the set-aside terminology, their practice is essentially the same in that areas of relatively higher biodiversity value within the project site or concession area are avoided and set aside for conservation purposes.

GN49. Set-asides and biodiversity offsets are related but different concepts. Biodiversity offsets are intended to compensate for significant residual impacts, and must demonstrate no net loss, and preferably net positive gains of biodiversity. Set-asides are the equivalent to avoidance measures along the mitigation hierarchy and are sometimes prescribed by the government to be a certain percentage (e.g., 20 percent) of the land area to be converted. Unlike a set-aside, the design of a biodiversity offset would require practitioners to carry out an assessment to determine if the loss of biodiversity on-site is compensated by the gains in biodiversity at the offset site. See paragraph 10 in Performance Standard 6 and related guidance on offsets as provided in paragraphs GN29–GN33.

GN50. The second bullet of paragraph 15 of Performance Standard 6 places emphasis on the client's consideration of mitigation measures aimed at reducing habitat fragmentation. Habitat fragmentation is one of the most pervasive impacts to biodiversity in natural habitats and often leads to long-term habitat degradation due to edge effects, increased third-party access into previously undisturbed areas, and sometimes genetic isolation of fauna and flora populations. When a project is located in an expansive intact wilderness, the client should seek to define mitigation measures to limit fragmentation such as the design of wildlife corridors or other measures to help ensure connectivity between habitats or existing metapopulations. This requirement is also linked to the requirement in paragraph 6 of Performance Standard 6 on landscape/seascape level considerations (also see paragraph GN17). Landscape/ seascape level analyses would help the client to identify mitigation measures of value on a larger scale. Indirect impacts associated with induced third-party access can be especially detrimental to biodiversity and are related to the topic of habitat fragmentation. Clients developing linear infrastructures and/or access roads should, as a matter of priority, develop strict means to control third-party use of such areas. Mitigation measures should be fully discussed with both project construction and operations managers to ensure a coordinated and long-term approach. The government should be made fully aware of project

commitments as it may be interested in maintaining project access routes for public use after the construction phase and/or project decommissioning. Mitigation measures of this nature are best implemented through an Induced Access Management Plan.

GN51. With respect to the third bullet in paragraph 15 of Performance Standard 6, see relevant guidance in paragraph GN16 on habitat restoration. Both avoidance and habitat restoration are especially important in high carbon forested areas as well as in marine and coastal habitats that are vulnerable to the effects of climate change or which contribute to climate-change mitigation, such as mangroves, peatlands, tidal salt-marshes, kelp forests and seagrass beds.

GN52. Finally, with respect to the fourth bullet of paragraph 15 in Performance Standard 6, the implementation of biodiversity offsets is one important means by which the client may obtain no net loss of biodiversity in natural habitat. Guidance on biodiversity offsets is provided in paragraphs GN29–GN33. Where credible and relevant biodiversity offset/conservation banking schemes do exist, the client's investment in such programs could potentially meet offset requirements. Clients are expected to demonstrate the credibility and long-term viability of such initiatives, and all the same requirements defined in paragraph 10 of Performance Standard 6 for biodiversity offsets would also apply in these situations (e.g., like-for-like or better, measurable conservation outcomes demonstrated *in situ*, or on-the-ground, etc.).

GN53. Especially relevant, but not limited to, extractive industries, reclamation[GN10] funding mechanisms should be established by clients for projects located in natural habitats and characterized by potentially significant impacts due to their footprint, the footprint of their associated facilities, and related land conversion. The costs associated with reclamation and/or with post-decommissioning activities should be included in business feasibility analyses during the planning and design stages. Minimum considerations should include the availability of all necessary funds, by appropriate financial instruments, to cover the cost of reclamation and project closure at any stage in the project's lifetime, including provision for early or temporary reclamation or closure. Reclamation funding mechanisms are well-established in the mining industry and are described in Section 1.4 of the World Bank Group Environmental, Health and Safety (EHS) Guidelines for Mining. A similar mechanism should also be established when biodiversity offsets are implemented.

GN54. Biodiversity and ecology related mitigation measures should be captured in the client's ESMS. Where biodiversity offsets are part of the mitigation strategy or where other measures have not been fully incorporated into the client's ESMS, a Biodiversity Action Plan should be developed. See Annex A for further guidance.

***Critical Habitat***

***16. Critical habitats are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered[11] species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally***

*[11] As listed on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species. The determination of critical habitat based on other listings is as follows: (i) If the species is listed nationally / regionally as critically endangered or endangered, in countries that have adhered to IUCN guidance, the critical habitat determination will be made on a project by project basis in consultation with competent professionals; and (ii) in instances where nationally or regionally listed species' categorizations do not correspond well to those of the IUCN (e.g., some countries more generally list species as "protected" or "restricted"), an assessment will be conducted to determine the rationale and purpose of the listing. In this case, the critical habitat determination will be based on such an assessment.*

[GN10] See definition as provided in footnote 4 of paragraph GN16 of this Guidance Note.

***significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.***

*Critical Habitat Definition*

GN55. The critical habitat definition presented in paragraph 16 of Performance Standard 6 is in line with criteria captured from a wide range of definitions of priority habitat for biodiversity conservation in use by the conservation community and incorporated in related governmental legislation and regulations. Critical habitats are areas of high biodiversity value that may include at least one or more of the five values specified in paragraph 16 of Performance Standard 6 and/or other recognized high biodiversity values. For ease of reference, these values are referred to as critical habitat criteria for the remainder of this document. Each criterion is described in detail in paragraphs GN71–GN97. Critical habitat criteria are as follows and should form the basis of any critical habitat assessment:

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species
- Criterion 2: Endemic and/or restricted-range species
- Criterion 3: Migratory and/or congregatory species
- Criterion 4: Highly threatened and/or unique ecosystems
- Criterion 5: Key evolutionary processes

GN56. The determination of critical habitat however is not necessarily limited to these criteria. Other recognized high biodiversity values might also support a critical habitat designation, and the appropriateness of this decision would be evaluated on a case-by-case basis. Examples are as follows:

- Areas required for the reintroduction of CR and EN species and refuge sites for these species (habitat used during periods of stress (e.g., flood, drought or fire)).
- Ecosystems of known special significance to EN or CR species for climate adaptation purposes.
- Concentrations of Vulnerable (VU) species in cases where there is uncertainty regarding the listing, and the actual status of the species may be EN or CR.
- Areas of primary/old-growth/pristine forests and/or other areas with especially high levels of species diversity.
- Landscape and ecological processes (e.g., water catchments, areas critical to erosion control, disturbance regimes (e.g., fire, flood)) required for maintaining critical habitat.
- Habitat necessary for the survival of keystone species.[GN11]
- Areas of high scientific value such as those containing concentrations of species new and/or little known to science.

GN57. In general, internationally and/or nationally recognized areas of high biodiversity value will likely qualify as critical habitat; examples include the following:

- Areas that meet the criteria of the IUCN's Protected Area Management Categories Ia, Ib and II, although areas that meet criteria for Management Categories III-VI may also qualify depending on the biodiversity values inherent to those sites.
- UNESCO Natural World Heritage Sites that are recognized for their Global Outstanding Value.

[GN11] Defined here as a species that has a disproportionate effect on its environment relative to its biomass and whose removal initiates significant changes in ecosystem structure and loss of biodiversity.

- The majority of Key Biodiversity Areas (KBAs),[GN12] which encompass *inter alia* Ramsar Sites, Important Bird Areas (IBA), Important Plant Areas (IPA) and Alliance for Zero Extinction Sites (AZE).
- Areas determined to be irreplaceable or of high priority/significance based on systematic conservation planning techniques carried out at the landscape and/or regional scale by governmental bodies, recognized academic institutions and/or other relevant qualified organizations (including internationally-recognized NGOs).
- Areas identified by the client as High Conservation Value (HCV) using internationally recognized standards, where criteria used to designate such areas is consistent with the high biodiversity values listed in paragraph 16 of Performance Standard 6.

*Gradients of Critical Habitats*

GN58. There are *gradients* of critical habitat or a continuum of degrees of biodiversity value associated with critical habitats based on the relative vulnerability (degree of threat) and irreplaceablity (rarity or uniqueness) of the site. This gradient or continuum of criticality is true for all criteria as listed in paragraph 16 of Performance Standard 6. Even within a single site designated as critical habitat there might be habitats or habitat features of higher or lower biodiversity value. There also will be cases where a project is sited within a greater area recognized as critical habitat, but the project site itself has been highly modified.

GN59. In order to facilitate decision-making, numerical thresholds have been defined for the first three critical habitat criteria (i.e., CR/EN species; endemic/restricted-range species; migratory/congregatory species). The thresholds presented in this Guidance Note were obtained from globally standardized numerical thresholds published by the IUCN as Best Practice Protected Area Guidelines.[GN13] For this section, citations are kept in the body of the text for ease of reference.

GN60. The thresholds form the basis of a tiered approach, in that numerical thresholds are used to assign Criteria 1 through 3 to a Tier 1 or a Tier 2 critical habitat designation. A summary of the tiers with respect to the thresholds for each criterion is provided in the table that follows paragraph GN89. Paragraphs GN71–GN97 discuss each criterion with respect to the tiers in more detail. It should be emphasized that *both the thresholds and associated tiers are indicative and serve as a guideline for decision-making only*. There is no universally accepted or automatic formula for making determinations on critical habitat. The involvement of external experts and project-specific assessments is of upmost importance, especially when data are limited as will often be the case.

GN61. Both a Tier 1 and a Tier 2 habitat would qualify as critical but the likelihood of project investment in a Tier 1 habitat is generally considered to be substantially lower than in a Tier 2 habitat. Given the sensitivity of Tier 1 habitats, however, if a development is located in such a habitat, or a habitat of comparative importance for Criteria 4 and 5, it is considered unlikely that the client will be able to comply with paragraphs 17–19 of Performance Standard 6.

GN62. Regarding Criteria 4 and 5, internationally agreed numerical thresholds have not been sufficiently developed. While thresholds may be appropriate, especially for highly threatened and/or unique ecosystems (Criterion 4), international consensus on a single standard is currently lacking. There are

[GN12] Key Biodiversity Areas are nationally mapped sites of global significance for biodiversity conservation that have been selected using globally standard criteria and thresholds based on the framework of vulnerability and irreplaceability widely used in systematic conservation planning. See Langhammer, P. F. *et al*, 2007 in the Bibliography.

[GN13] See Langhammer, P.F. *et al*. 2007. *Identification and Gap Analysis of Key Biodiversity Areas: Targets for Comprehensive Protected Area Systems*. Best Practice Protected Area Guideline Series No. 15. IUCN, Gland, Switzerland.

efforts underway to develop such methods however and IUCN's Commission on Ecosystem Management is leading an initiative to put together criteria and categories for endangered and rare ecosystems.[GN14,GN15] Until these are more firmly established and readily accessible to a wide range of practitioners, best available scientific information and expert opinion would be used to guide the decision-making with respect to the relative "criticality" of a habitat triggered by these criteria. It is emphasized however that in the critical habitat determination process, *all criteria are equally weighed* in terms of potential compliance with paragraphs 17–19 of Performance Standard 6. There is no one criterion that is more important than another for making critical habitat designations or for determining compliance with Performance Standard 6. Tiered (Criteria 1 through 3) and non-tiered (Criteria 4 and 5) criteria are equally important in this regard.

*Determination of Critical Habitat*

GN63. Considering the breadth of ecosystems (e.g., forests, grasslands, deserts, freshwater and marine habitats), the various forms of critical habitat (e.g., habitats required for the survival of threatened and migratory species, areas containing unique evolutionary processes) and the range of species (e.g., benthos, plants, insects, birds, reptiles/amphibians, wide-ranging megafauna) covered under Performance Standard 6, specific methods for the assessment of biodiversity will inherently be project- and site-specific. Guidance Note 6 therefore does not provide methodologies for conducting biodiversity assessments. Instead, three broad-level steps are provided below to direct the client in designing the overall scope of a critical habitat assessment.

GN64. It should be emphasized that *relatively broad landscape and seascape units might qualify as critical habitat.* The scale of the critical habitat assessment therefore depends on the biodiversity attributes particular to the habitat in question and the ecological processes required to maintain them. *A critical habitat assessment therefore must not solely focus on the project site.* The client should be prepared to conduct desktop assessments, consult with experts and other relevant stakeholders to obtain an understanding of the relative importance or uniqueness of the site with respect to the regional and even the global scale, and/or conduct field surveys beyond the boundaries of the project site. These considerations would form part of the landscape/seascape analyses as referred to in paragraph 6 of Performance Standard 6 and in paragraph GN17.

GN65. For Criteria 1 through 3, the project should determine a sensible boundary (ecological or political) which defines the area of habitat to be considered for the Critical Habitat Assessment. This is called the "discrete management unit," an area with a definable boundary within which the biological communities and/or management issues have more in common with each other than they do with those in adjacent areas (adapted from the definition of discreteness by the Alliance for Zero Extinction). A discrete management unit may or may not have an actual management boundary (e.g., legally protected areas, World Heritage sites, KBAs, IBAs, community reserves) but could also be defined by some other sensible ecologically definable boundary (e.g., watershed, interfluvial zone, intact forest patch within patchy modified habitat, seagrass habitat, coral reef, concentrated upwelling area, etc.). The delineation of the management unit will depend on the species (and, at times, subspecies) of concern.

GN66. Three steps are outlined below to summarize the major methods that should be used to identify and characterize critical habitats. Note that the project type, its impacts and its mitigation strategy are irrelevant in carrying out Steps 1 through 3. The definition of the critical habitat and the impacts of a

[GN14] For further information see http://www.iucn.org/about/union/commissions/cem/cem_work/tg_red_list/

[GN15] See Rodriguez, J.P. *et al*. 2011. *Establishing IUCN Red List Criteria for Threatened Ecosystems*. Conservation Biology 25(1): 21–29; and Rodriguez, J.P. *et al*. 2007. *Assessing extinction risk in the absence of species-level data: quantitative criteria for terrestrial ecosystems*. Biodiversity and Conservation 16(1): 183–209.

particular project are two unrelated concepts. The definition of the critical habitat is based on the presence of high biodiversity values whether or not a project is to be undertaken in that habitat. Clients should not argue that they are not in critical habitat on the basis of the project's footprint or its impacts. For example, if the biodiversity value triggering the critical habitat designation is a regionally significant population of an Endangered reptile (Criterion 1), and the client is developing a windfarm in such critical habitat, the client would be in a critical habitat regardless of the impacts (or "non-impacts") of that windfarm. In either case, the client is responsible for recognizing the existing biodiversity values of the area in which it is located. The steps outlined below focus on this. The next step would be to develop an appropriate mitigation strategy. Guidance for this is found in paragraphs GN98–GN112.

Step 1 - Stakeholder Consultation/Initial Literature Review
**Aim**: To obtain an understanding of biodiversity within the landscape from the perspective of all relevant stakeholders.
**Process**: In-field consultation exercises and desktop research.

GN67. A substantive initial literature review and consultation with relevant stakeholders including established conservation organizations, governmental or other relevant authorities, academic or other scientific institutions and recognized external experts, including species specialists, is essential in determining if a project site is located in critical habitat. The stakeholder consultation/literature review should provide a sense of the biodiversity values associated with the project's area of influence. This step is similar to the guidance provided in paragraphs GN10–GN12 for the general client requirements for Performance Standard 6, but would be expected to be more rigorous for projects located in critical habitat. This stage of the assessment should not focus on whether biodiversity values actually qualify the area as critical habitat and/or if the project will have an impact on a particular biodiversity value. The focus of this initial stage should be to acquire an impartial understanding of the landscape/seascape with respect to biodiversity values. Note that critical habitat determinations should be made in alignment with existing landscape prioritization schemes for biodiversity conservation as established by the existing in-country network of conservation organizations, global conservation groups, academic institutions and/or the local/national government. Therefore, systematic conservation planning assessments carried out by governmental bodies, recognized academic institutions and/or other relevant qualified organizations (including internationally-recognized NGOs) should also be sought at this stage. These may provide information on threatened ecosystems, vegetation types and land classes.

Step 2: In-field Data Collection and Verification of Available Information
**Aim**: To collect field data and verify available detailed information necessary for the critical habitat assessment.
**Process**: Engage qualified specialists to collect field data as necessary both within and outside of the project area/discrete management unit.

GN68. Field biodiversity data may have already been acquired as part of the project's overall ESIA as described in paragraphs GN8–GN9. In cases where these data are inadequate or where quantified unaggregated data/metrics were not considered as part of the ESIA, the client should collect such data using a combination of methods, e.g., biodiversity baseline surveys, ecological research, expert consultation and data obtained from recent scientific literature and National Biodiversity Strategies and Action Plans (NBSAPs),[GN16] as available. Information should be gathered on species, habitats, ecosystems, evolutionary processes and ecological processes—both within the project's area of influence and also in the broader national, regional and global contexts, as relevant. Note that the data gathered as part of Step 2 might also be of use to the separate, but related topic of ecosystem services. Coordination

[GN16] See http://www.cbd.int/nbsap

and information-sharing with social specialists might be important for some projects, especially when Affected Communities engage in natural resource-based livelihoods. Regarding species, the client is expected to consult the current version of the IUCN Red List of Threatened Species, any in-country Red Data Books and Red Lists and best available scientific data.

Step 3: Critical Habitat Determination
**Aim**: Determine whether the project is situated in critical habitat.
**Process**: Analysis and interpretation of the desktop and field data collected.

GN69. Based on the broad pool of biodiversity data obtained as part of Steps 1 and 2, data and information should be screened using critical habitat criteria and thresholds, as appropriate. The analysis of such data should be conducted with the overall scope of determining the relative irreplaceability and vulnerability of any biodiversity values that trigger Criteria 1 through 5 on a scale that is ecologically relevant as made explicit in footnote 12 of Performance Standard 6 (see also paragraph GN13). Note that the scale on which critical habitat determinations are made might be different for each biodiversity value. With respect to Criteria 1 through 3, species data should be screened against quantitative thresholds. For example, in an assessment against Criterion 1, relevant information might include species threat status, size of population and range at global, national and project site level and the estimated known sites for the species. Given the paucity of scientific data available for species in many places around the world, especially for invertebrates and freshwater and marine species, expert opinion and professional judgment will be necessary to make final determinations with respect to the thresholds. The client will be required to consult with recognized species specialists who either have access to particular data or are qualified to make professional judgment on a species' likely distribution and occurrence, as well as with relevant agencies, institutions or organizations known to have reliable biodiversity information.

GN70. Through carrying out these steps, the client should be in a position to determine if the project is located in critical habitat based on identified high biodiversity values. Following this determination, which is independent of the project type or its mitigation strategy, the client should then demonstrate if and how the project might comply with paragraphs 17–19 of Performance Standard 6 over the long term given the suite of mitigation and management measures to be implemented. Guidance on paragraphs 17–19 is provided in paragraphs GN98–GN112.

***Guidance by Criterion***

Criterion 1: Critically Endangered and Endangered Species
GN71. Species threatened with global extinction and listed as CR and EN on the IUCN Red List of Threatened Species shall be considered as part of Criterion 1.[GN17] Critically Endangered species face an extremely high risk of extinction in the wild. Endangered species face a very high risk of extinction in the wild.

GN72. As described in footnote 11 of Performance Standard 6, the inclusion of species in Criterion 1 that are listed nationally/regionally as CR or EN in countries that have adhered to IUCN guidance,[GN18,GN19] shall be determined on a project-by-project basis. The same is true in instances where nationally or regionally-listed species categories do not correspond well to those of the IUCN (e.g., some countries more generally list species as protected or restricted), although in these cases an assessment might be

[GN17] Available at www.iucnredlist.org

[GN18] See http://www.nationalredlist.org/site.aspx

[GN19] IUCN. 2003. *Guidelines for Application of IUCN Red List Criteria at Regional Levels: Version 3.0*. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.

conducted on the rationale and purpose of the listing. In either case, this decision-making would take place in consultation with competent professionals.

GN73. The client should determine if the project site is located in a Tier 1 or Tier 2 critical habitat with respect to Criterion 1.

GN74. Tier 1 sub-criteria for Criterion 1 are defined as follows:[GN20]

- Habitat required to sustain ≥ 10 percent of the global population of an IUCN Red-listed CR or EN species where there are known, regular occurrences[GN21] of the species and where that habitat could be considered a discrete management unit[GN22] for that species.[GN23]
- Habitat with known, regular occurrences of CR or EN species where that habitat is one of 10 or fewer discrete management sites globally for that species.

GN75. Tier 2 sub-criteria for Criterion 1 are defined as follows:

- Habitat that supports the regular occurrence of a single individual of an IUCN Red-listed CR species and/or habitat containing regionally-important concentrations of an IUCN Red-listed EN species where that habitat could be considered a discrete management unit for that species.
- Habitat of significant importance to CR or EN species that are wide-ranging and/or whose population distribution is not well understood and where the loss of such a habitat could potentially impact the long-term survivability of the species.
- As appropriate, habitat containing nationally/regionally-important concentrations of an EN, CR or equivalent national/regional listing.

GN76. In special circumstances, and through consultation with a recognized species specialist, the guidance provided for Criterion 1 may be extended to some subspecies. This determination would be made on a case-by-case basis and require rigorous consensus-based justification and not simply the opinion of a single taxonomist. This statement applies to Criteria 1 through 3.

[GN20] In terms of the definition of Tier 1 habitat, special consideration might be given to some wide-ranging, large EN and CR mammals that would rarely trigger Tier 1 thresholds given the application of the discrete management unit concept. For example, special consideration should be given to great apes (i.e., family Hominidae) given their anthropological and evolutionary significance in addition to ethical considerations. Where populations of CR and EN great apes exist, a Tier 1 habitat designation is probable, regardless of the discrete management unit concept.

[GN21] Regular occurrence: Occurring continuously in the habitat (e.g., physical residence), seasonally or cyclically (e.g., migratory sites) or episodic (e.g., temporary wetlands). Regular occurrence does not include vagrancies, marginal occurrence and historical records or unconfirmed anecdotal evidence, but it does include migratory species in transit. Adapted from definition of "regularly occurs" in Langhammer *et al*. (2007).

[GN22] As stated in GN65, a discrete management unit is defined as an area with a definable boundary within which the character of biological communities and/or management issues have more in common with each other than they do with those in adjacent areas (adapted from the definition of "discreteness" by the AZE). A discrete management unit may or may not have an actual management boundary (e.g., legally protected areas, World Heritage sites, KBAs, IBAs, community reserves) but could also be defined by some other sensible ecologically definable boundary (e.g., watershed, interfluvial zone, intact forest patch within patchy modified habitat, seagrass habitat, coral reef, concentrated upwelling area, etc.). The delineation of the management unit will depend on the species (and, at times, subspecies) of concern.

[GN23] Note that all AZE sites would automatically qualify as Tier 1 critical habitat per Criterion 1 as the AZE threshold is set at 95 percent of CR and EN species (in a discrete management unit). See Ricketts, T.H., *et al*. 2005. *Pinpointing and Preventing Imminent Extinctions*. Proceedings of the National Academy of Sciences - US. 51: 18497–18501.

GN77. Where estimates of the species' global population and/or local population are not available (or obtainable by reasonable means through an in-field assessment in the case of the local population), the client is expected to use expert opinion to determine the significance of the discrete management unit with respect to the global population. Surrogates of population size (e.g., extent of occurrence,[GN24] estimates of total area of known sites, estimates of area of occupied habitat) will be essential in this decision-making. This statement applies to Criteria 1 through 3.

GN78. Clients should always consult the IUCN Red List of Threatened Species; however, there are limitations of the Red List, especially for organisms other than mammals, birds and amphibians. Consultation with experts on the species in question is essential. Furthermore, the many endemic, restricted-range, and scientifically undescribed species that have not yet been evaluated by the IUCN are also relevant. Where such species could be affected by the project, clients may be expected in certain cases to recruit appropriate species specialists to evaluate the species using the Red List decision criteria. Those species found to meet the criteria for CR or EN species would be treated in critical habitat determinations and subsequent decisions as if they appeared in those categories on the actual Red List.

Criterion 2: Endemic and Restricted-range Species

GN79. An endemic species is defined as one that has ≥ 95 percent of its global range inside the country or region of analysis.[GN25]

GN80. A restricted-range species is defined as follows.

- For terrestrial vertebrates, a restricted-range species is defined as those species which have an extent of occurrence[GN26] of 50,000 $km^2$ or less.
- For marine systems, restricted-range species are provisionally being considered those with an extent of occurrence of 100,000 $km^2$ or less.[GN27]
- For freshwater systems, standardized thresholds have not been set at the global level. However an IUCN study[GN28] of African freshwater biodiversity applied thresholds of 20,000 $km^2$ for crabs, fish, and mollusks and 50,000 $km^2$ for odonates (dragonflies and damselflies). These can be taken as approximate guidance, although the extent to which they are applicable to other taxa and in other regions is not yet known.
- For plants, restricted-range species may be listed as part of national legislation. Plants are more commonly referred to as "endemic," and the definition provided in paragraph GN79 would apply.[GN29] Particular attention should therefore be paid to endemic plants of smaller countries which are likely, by definition, to be globally rarer and therefore of higher overall priority.

[GN24] Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g., large areas of obviously unsuitable habitat). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence). See the definition provided in IUCN (2001) Red List Categories and Criteria: version 3.1. IUCN, Gland and Cambridge.

[GN25] Note that "region" may also be a landscape/seascape or other sensible geographical unit within the country itself or in coastal and marine habitats.

[GN26] Definition provided above in footnote 24 of this Guidance Note.

[GN27] See Edgar, G. J. *et al*. 2009. *Key biodiversity areas as globally significant target sites for the conservation of marine biological diversity*. Aquatic Conservation: Marine and Freshwater Ecosystems. 18: 969–983.

[GN28] Holland, R.A., Darwall, W.R.T. and Smith, K.G. (In Review). *Conservation priorities for freshwater biodiversity: the Key Biodiversity Area approach refined and tested for continental Africa.*

[GN29] Plantlife International. 2004. *Identifying and Protecting the World's Most Important Plant Areas.* Salisbury, UK.

GN81. The client should determine if the project site is located in a Tier 1 or Tier 2 critical habitat with respect to Criterion 2.

GN82. The Tier 1 sub-criterion for Criterion 2 are defined as follows:

- Habitat known to sustain ≥ 95 percent of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species (e.g., a single-site endemic).

GN83. Tier 2 sub-criteria for Criterion 2 are defined as follows:

- Habitat known to sustain ≥ 1 percent but < 95 percent of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species, where adequate data are available and/or based on expert judgment.

GN84. Also see paragraph GN78 above with respect to data gaps in the IUCN Red List and endemic species.

Criterion 3: Migratory and Congregatory Species

GN85. Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem).

GN86. Congregatory species are defined as species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis; examples include the following:

- Species that form colonies.
- Species that form colonies for breeding purposes and/or where large numbers of individuals of a species gather at the same time for non-breeding purposes (e.g., foraging, roosting).
- Species that move through bottleneck sites where significant numbers of individuals of a species pass over a concentrated period of time (e.g., during migration).
- Species with large but clumped distributions where a large number of individuals may be concentrated in a single or a few sites while the rest of the species is largely dispersed (e.g., wildebeest distributions).
- Source populations where certain sites hold populations of species that make an inordinate contribution to recruitment of the species elsewhere (especially important for marine species).

GN87. The client should determine if the project site is located in a Tier 1 or Tier 2 critical habitat with respect to Criterion 3.

GN88. The Tier 1 sub-criterion for Criterion 3 are defined as follows:

- Habitat known to sustain, on a cyclical or otherwise regular basis, ≥ 95 percent of the global population of a migratory or congregatory species at any point of the species' life-cycle where that habitat could be considered a discrete management unit for that species.

GN89. The Tier 2 sub-criteria for Criterion 3 are defined as follows:

- Habitat known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent but < 95 percent of the global population of a migratory or congregatory species at any point of the species' life-cycle and where that habitat could be considered a discrete management unit for that species, where adequate data are available and/or based on expert judgment.
- For birds, habitat that meets BirdLife International's Criterion A4 for congregations and/or Ramsar Criteria 5 or 6 for Identifying Wetlands of International Importance.[GN30,GN31]
- For species with large but clumped distributions, a provisional threshold is set at ≥5 percent of the global population for both terrestrial and marine species.
- Source sites that contribute ≥ 1 percent of the global population of recruits.

Quantitative thresholds[GN32] for Tiers 1 and 2 of Critical Habitat Criteria 1 through 3

| Criteria | Tier 1 | Tier 2 |
|---|---|---|
| 1. Critically Endangered (CR)/ Endangered (EN) Species | (a) Habitat required to sustain ≥ 10 percent of the global population of a CR or EN species/subspecies where there are known, regular occurrences of the species and where that habitat could be considered a discrete management unit for that species.<br><br>(b) Habitat with known, regular occurrences of CR or EN species where that habitat is one of 10 or fewer discrete management sites globally for that species. | (c) Habitat that supports the regular occurrence of a single individual of a CR species and/or habitat containing regionally- important concentrations of a Red-listed EN species where that habitat could be considered a discrete management unit for that species/ subspecies.<br><br>(d) Habitat of significant importance to CR or EN species that are wide-ranging and/or whose population distribution is not well understood and where the loss of such a habitat could potentially impact the long-term survivability of the species.<br><br>(e) As appropriate, habitat containing nationally/regionally important concentrations of an EN, CR or equivalent national/regional listing. |
| 2. Endemic/ Restricted Range Species | (a) Habitat known to sustain ≥ 95 percent of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species (e.g., a single-site endemic). | (b) Habitat known to sustain ≥ 1 percent but < 95 percent of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species, where data are available and/or |

[GN30] See IBA global criteria in http://www.birdlife.org/datazone/info/ibacriteria

[GN31] See http://www.ramsar.org/cda/en/ramsar-about-faqs-what-are-criteria/main/ramsar/1-36-37%5E7726_4000_0__

[GN32] These thresholds are based on globally standardized numerical thresholds published by the IUCN as Best Practice Protected Area Guidelines. See Langhammer, P.F. *et al*. 2007. *Identification and Gap Analysis of Key Biodiversity Areas: Targets for Comprehensive Protected Area Systems. Best Practice Protected Area Guideline Series No. 15.* IUCN, Gland, Switzerland.

| Criteria | Tier 1 | Tier 2 |
|---|---|---|
| | | based on expert judgment. |
| 3. Migratory/ Congregatory Species | (a) Habitat known to sustain, on a cyclical or otherwise regular basis, ≥ 95 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle where that habitat could be considered a discrete management unit for that species. | (b) Habitat known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent but < 95 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle and where that habitat could be considered a discrete management unit for that species, where adequate data are available and/or based on expert judgment.<br><br>(c) For birds, habitat that meets BirdLife International's Criterion A4 for congregations and/or Ramsar Criteria 5 or 6 for Identifying Wetlands of International Importance.<br><br>(d) For species with large but clumped distributions, a provisional threshold is set at ≥5 percent of the global population for both terrestrial and marine species.<br><br>(e) Source sites that contribute ≥ 1 percent of the global population of recruits. |

Criterion 4: Highly Threatened and/or Unique Ecosystems

GN90. Highly threatened or unique ecosystems are those (i) that are at risk of significantly decreasing in area or quality; (ii) with a small spatial extent; and/or (iii) containing unique assemblages of species including assemblages or concentrations of biome-restricted species. Areas determined to be irreplaceable or of high priority/significance based on systematic conservation planning techniques carried out at the landscape and/or regional scale by governmental bodies, recognized academic institutions and/or other relevant qualified organizations (including internationally-recognized NGOs) or that are recognized as such in existing regional or national plans, such as the NBSAP, would qualify as critical habitat per Criterion 4. An example of a unique ecosystem would be one that occurs in very limited numbers in the region, such as the only lowland dipterocarp forest. An example of a highly threatened ecosystem would be one that is losing a high percentage of its area each year.

GN91. Highly threatened or unique ecosystems are defined by a combination of factors that determine their importance for conservation action. The prioritization of rare and endangered ecosystems employs similar factors to those used for the IUCN Red List of Threatened Species. The ecosystem prioritization factors include long-term trend, rarity, ecological condition, and threat. All of these values contribute to the relative biodiversity and conservation value of the particular ecosystem. IUCN's Commission on

Ecosystem Management is leading an initiative to put together criteria and categories for threatened ecosystems.[GN33,GN34]

GN92. For regional scale biodiversity conservation applications, ecosystems are classified and mapped at specific scales with a focus on vegetation structure and composition, land cover, and key abiotic factors. Data used to create these regional-scale ecosystem maps typically include vegetation and land use maps, and other driving environmental factors including climate, hydrology, geochemistry and landscape position (elevation and aspect).

GN93. To implement this criterion, the client must first conduct a substantive literature search and consult with established conservation organizations or other relevant authorities in the area of interest to secure a standardized ecosystem map for the region that includes the project site. If regional ecosystem mapping has not been conducted in the area of interest and/or depending on the nature and scale of the project type, the client could also use expert opinion to determine the significance, uniqueness and/or rarity of the ecosystem in question with respect to the national, regional and/or international scale.

Criterion 5: Key Evolutionary Processes

GN94. The structural attributes of a region, such as its topography, geology, soil, temperature and vegetation and combinations of these variables can influence the evolutionary processes that give rise to regional configurations of species and ecological properties. In some cases, spatial features that are unique or idiosyncratic of the landscape have been associated with genetically unique populations or subpopulations of plant and animal species. Physical or spatial features have been described as surrogates or spatial catalysts for evolutionary and ecological processes, and such features are often associated with species diversification. Maintaining these key evolutionary processes inherent in a landscape as well as the resulting species (or subpopulations of species) has become a major focus of biodiversity conservation in recent decades, particularly the conservation of genetic diversity. By conserving species diversity within a landscape, the processes that drive speciation, as well as the genetic diversity within species, ensures the evolutionary flexibility in a system, which is especially important in a rapidly changing climate.

GN95. This criterion therefore is defined by: (i) the physical features of a landscape that might be associated with particular evolutionary processes; and/or (ii) subpopulations of species that are phylogenetically or morphogenetically distinct and may be of special conservation concern given their distinct evolutionary history. The latter includes evolutionarily significant units (ESUs)[GN35] and Evolutionarily Distinct and Globally Endangered (EDGE) species.[GN36]

GN96. For illustrative purposes, some potential examples of spatial features associated with evolutionary processes are as follows:

- *Isolated areas* (e.g., islands, mountaintops, lakes) are associated with populations that are phylogenetically distinct.
- Areas of high *endemism* often contain flora and/or fauna with unique evolutionary histories (note overlap with Criterion 2, endemic and restricted-range species).

[GN33] For further information see http://www.iucn.org/about/union/commissions/cem/cem_work/tg_red_list/

[GN34] See Rodriguez, J.P. *et al.*2011. *Establishing IUCN Red List Criteria for Threatened Ecosystems*. Conservation Biology 25 (1): 21–29*;* and Rodriguez, J.P. *et al*. 2007. *Assessing extinction risk in the absence of species-level data: quantitative criteria for terrestrial ecosystems*. Biodiversity and Conservation 16 (1): 183–209.

[GN35] As defined by Crandall, K.A. *et al*. 2000. *Considering evolutionary processes in conservation biology*. TREE 15(7*):* 290–295.

[GN36] As defined by the Zoological Society of London (ZSL). http://www.edgeofexistence.org/index.php.

- Landscapes with high spatial *heterogeneity* are a driving force in speciation as species are naturally selected on their ability to adapt and diversify.
- *Environmental gradients*, also known as *ecotones*, produce transitional habitat which has been associated with the process of speciation and high species and genetic diversity.
- *Edaphic interfaces* are specific juxtapositions of soil types (e.g., serpentine outcrops, limestone and gypsum deposits), which have led to the formation of unique plant communities characterized by both rarity and endemism.
- *Connectivity* between habitats (e.g., biological corridors) ensures species migration and gene flow, which is especially important in fragmented habitats and for the conservation of metapopulations. This also includes biological corridors across altitudinal and climatic gradients and from "crest to coast."
- Sites of demonstrated importance to *climate change adaptation* for either species or ecosystems are also included within this criterion.

GN97. The significance of structural attributes in a landscape that may influence evolutionary processes will be determined on a case-by-case basis, and determination of habitat that triggers this criterion will be heavily reliant on scientific knowledge. In the majority of cases, this criterion will be triggered in areas that have been previously investigated and that are already known or suspected to be associated with unique evolutionary processes. While systematic methods to measure and prioritize evolutionary processes in a landscape do exist, they are typically beyond a reasonable expectation of studies conducted by the private sector. At the very least though, the client should be aware of what constitutes a "key evolutionary process" (i.e., landscape feature and/or subpopulations of species with unique evolutionary history) so that this aspect may be covered as part of its assessment through a literature search, complemented as needed by an in-field assessment.

***17. In areas of critical habitat, the client will not implement any project activities unless all of the following are demonstrated:***

- ***No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;***
- ***The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;[12]***
- ***The project does not lead to a net reduction in the global and/or national/regional population[13] of any Critically Endangered or Endangered species over a reasonable period of time;[14] and***
- ***A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.***

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[12] *Biodiversity values and their supporting ecological processes will be determined on an ecologically relevant scale.*

[13] *Net reduction is a singular or cumulative loss of individuals that impacts on the species' ability to persist at the global and/or regional/national scales for many generations or over a long period of time. The scale (i.e., global and/or regional/national) of the potential net reduction is determined based on the species' listing on either the (global) IUCN Red List and/or on regional/national lists. For species listed on both the (global) IUCN Red List and the national/regional lists, the net reduction will be based on the national/regional population.*

[14] *The timeframe in which clients must demonstrate "no net reduction" of Critically Endangered and Endangered species will be determined on a case-by-case basis in consultation with external experts.*

***18. In such cases where a client is able to meet the requirements defined in paragraph 17, the project's mitigation strategy will be described in a Biodiversity Action Plan and will be***

***designed to achieve net gains[15] of those biodiversity values for which the critical habitat was designated.***

***19. In instances where biodiversity offsets are proposed as part of the mitigation strategy, the client must demonstrate through an assessment that the project's significant residual impacts on biodiversity will be adequately mitigated to meet the requirements of paragraph 17***.

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*[15] Net gains are additional conservation outcomes that can be achieved for the biodiversity values for which the critical habitat was designated. Net gains may be achieved through the development of a biodiversity offset and/or, in instances where the client could meet the requirements of paragraph 17 of this Performance Standard without a biodiversity offset, the client should achieve net gains through the implementation of programs that could be implemented in situ (on-the-ground) to enhance habitat, and protect and conserve biodiversity.*

*Client Requirements in Critical Habitat*

GN98. The first bullet in paragraph 17 emphasizes the importance of seeking to avoid critical habitats entirely as the first means of demonstrating compliance with the mitigation hierarchy. This is required for any proposed project in critical habitat regardless of the size of its footprint.

GN99. The specific types of mitigation measures that are able to realize the objectives of paragraph 17 of Performance Standard 6 and the management strategy needed to implement such measures over the long term will inherently be case-specific. The selection of mitigation measures should factor in existing non-project related threats to biodiversity values (e.g., bushmeat hunting, agricultural encroachment, unsustainable cattle grazing, invasive species, overharvesting, climate change, etc.). See also paragraph GN14.

GN100. There are numerous factors involved in decision-making as to the client's ability to comply with paragraphs 17–19 of Performance Standard 6. Most predominant are the following:

(i) The relatively irreplaceability and vulnerability of the biodiversity values (see paragraph GN13);

(ii) The quality of the biodiversity assessment and/or critical habitat assessment;

(iii) The type of project;

(iv) The management capacity, commitment and track record of the client, including the comprehensiveness of its ESMS;

(v) The comprehensiveness of the client's mitigation strategy and consideration of biodiversity offsets;

(vi) The level of confidence in predictions and assurance of outcomes of measures in the mitigation hierarchy;

(vii) The timing of these measures in contexts of high risk and uncertainty;

(viii) The willingness of the client to engage external experts, advisory and/or other types of scientific panels;

(ix) The willingness of the client to establish effective, long-term strategic partnerships with the government, academic and research institutions, Affected Communities and/or internationally recognized conservation NGOs;

(x) The capacity of the host government; and

(xi) Degree of information uncertainty.

GN101. The second bullet of paragraph 17 is applicable to all high biodiversity values and requires "no measureable adverse impacts." The following definitions are provided:

- **Measurable**: identified using a quantitative or semi-quantitative biodiversity monitoring program throughout the project's life-cycle.

- **Adverse impacts**: project-related direct or indirect impacts that irreversibly alter the critical habitat in such a way as to substantially reduce the critical habitat's ability to support the identified biodiversity values and ecological processes.

- **Ecological processes**: biophysical processes (e.g., hydrologic regimes, local climatic regimes, soil chemistry/nutrient cycling, fires, floods and other natural disturbance regimes, herbivory, predation, ecological corridors, migration routes) necessary for the critical habitat to persist in the landscape or seascape for the long term.[GN37]

GN102. The client is responsible for demonstrating no measurable impacts on the biodiversity values for which the critical habitat was designated and *on the ecological processes supporting such values* as stated in the second bullet of paragraph 17 of Performance Standard 6. This requirement explicitly focuses on the biodiversity values for which the critical habitat was designated *as a means of emphasizing the importance of considering biodiversity values across an ecologically relevant scale*, including the landscape/seascape scale. All too often similar requirements have been interpreted as no measurable adverse impacts in the project site itself, which, in ecological terms is almost always a meaningless entity. *Hence, the intention behind the current language is to encourage projects to work with recognized external ecologists and species specialists in defining critical habitat based on the biodiversity values triggering that critical habitat designation*, not based on an imposed artificial project boundary in a landscape/seascape (i.e., the project site/concession area). In either case, the second bullet of paragraph 17 includes the ecological processes supporting those biodiversity values. The conservation of the ecological process necessary to maintain the critical habitat is clearly as important as the conservation of the individual values themselves. Furthermore, many biodiversity values are interdependent and cannot be conserved in isolation of one another.[GN38]

GN103. The third bullet of paragraph 17 is applicable to Criterion 1 only (CR and EN species). Projects will not lead to a net reduction in these species on the global and/or the national/regional scale. Net reduction is defined in footnote 13 of Performance Standard 6. Footnote 13 also provides insight on what is meant by "and/or," i.e., when compliance is determined on the scale of the global population and when it is determined on the national/regional scale. This depends on the species listing by which the critical habitat is determined in the first place. This is explained in footnote 11 of Performance Standard 6. In most cases, the habitat will be critical based on the global IUCN Red List, and in these cases, net reduction will be determined with respect to the global population. In instances where the habitat is determined to be critical for Criterion 1 based on the regional and/or national threatened species listing, the net reduction will be determined with respect to the regional and/or national population. Decision-making of this type must take place in consultation with competent professionals, including individuals from IUCN Species Survival Commission Specialist Groups.

[GN37] Note that ecological/biophysical processes are not to be confused with ecosystem services unless an identifiable group of persons is directly benefiting from that process as well.

[GN38] See the Ecosystem Approach described in paragraphs GN18 and GN19.

GN104. The third bullet of paragraph 17 also uses the terminology "over a reasonable period of time." This concerns the question of when the client is expected to be able to demonstrate no net reduction. The timeframe is inherently case-specific. It will depend on the type of species (and, importantly, its reproductive cycle) as well as the client's selected mitigation strategy (e.g., on-site protection measures versus translocation versus offset). It might also depend on the client's selection of monitoring indicators. The acceptable reduction in population should also not be interpreted as the survival of every individual on-site. Although this might be the case in some situations, for example for CR species nearing extinction in the wild, no net reduction is based on the species "*ability to persist at the global and/or regional/national scales for many generations or over a long period of time*" (footnote 13 of Performance Standard 6).

GN105. A biodiversity monitoring and evaluation program is a fundamental aspect of ensuring compliance with paragraph 17 and is a requirement of Performance Standard 6 as listed in the fourth bullet of this paragraph. The monitoring and evaluation program should be designed at two levels: (i) in-field monitoring of relevant biodiversity values (e.g., species, ecosystems); and (ii) monitoring of the implementation (and therefore effectiveness) of mitigation measures and management controls (as part of the client's ESMS). In some cases, the project should also monitor the status of ongoing threats in its vicinity such as bushmeat hunting and agricultural expansion. If a biodiversity offset(s) is part of the mitigation strategy, a separate program should be designed to monitor and evaluate the success of the offset program. The monitoring program should be quantitative or semi-quantitative and preferably statistically defensible. In some cases, such as tropical forests, it might be more practicable (and sensible) to use benchmarks instead of using a Before-After-Control-Impact approach as the heterogeneity of the landscape can make monitoring based on a pre-construction baseline difficult or impossible. In either case, the client is expected to develop a sensible set of indicators (metrics) for each biodiversity value and the ecological processes supporting those values. Indicators should be developed in consultation with external specialists and other relevant stakeholders. Acceptable ranges of variability should be established for each biodiversity value, which may be the actual attribute that renders the habitat critical (e.g., CR/EN species, migratory species) or proxies of those attributes (e.g., vegetation cover). Qualified external experts should be utilized to identify such thresholds. Measurable results that exceed identified thresholds over a set period of time indicate non-compliance with paragraph 17. For reference, see the Energy and Biodiversity Initiative's (EBI) publication, Biodiversity Indicators for Monitoring Impacts and Conservation Actions (2003).

GN106. The biodiversity monitoring and evaluation program should be integrated into the project's overall ESMS. In this way, the results of the program can be explicitly linked to management actions, be they corrective or adaptive. This is also in line with Performance Standard 1, which emphasizes a "plan, do, check and act" management system. The client should ensure that results from monitoring are used to evaluate the effectiveness of its mitigation strategy. Paragraph GN20 describes the general Performance Standard 6 requirement of developing mitigation and monitoring measures through adaptive management. This is especially relevant to projects located in critical habitat.

GN107. In addition to the requirements in paragraph 17, in areas of critical habitat the client will be expected to demonstrate net gains (also known as "net positive gains") of the biodiversity values for which the critical habitat was designated, as stated in paragraph 18 of Performance Standard 6. Net gains are defined in footnote 15 of Performance Standard 6 and could be considered "no net loss *plus*;" therefore, the requirements defined for critical habitat build upon and expand those defined for natural habitat. The client's mitigation strategy, which will be designed to comply with paragraph 17 and to achieve net gains, must be described in a Biodiversity Action Plan (BAP). Where the client has prepared a sufficient Biodiversity (or Ecological) Management Plan (BMP) that adequately describes

on-site mitigation measures, the BAP could be reserved for describing how the client plans to achieve net gains. See Annex A for an explanation of the difference between a BMP and a BAP and for guidance on developing both. Net gains may be achieved through the biodiversity offset, and in instances where a biodiversity offset is not part of the client's mitigation strategy (i.e., there are no significant residual impacts), net gains would be obtained by identifying additional opportunities to enhance habitat and protect and conserve biodiversity (see also paragraph GN34). As described in footnote 15 of Performance Standard 6, net gains of biodiversity values must involve measurable, additional conservation outcomes. Such gains must be demonstrated on an appropriate geographic scale (e.g., local, landscape-level, national, regional) as determined by external experts. In other words, the "on-the-ground" and "like for like or better" requirements for biodiversity offsets also apply to other proposed measures for achieving net gains of relevant biodiversity values.

GN108. In general, projects with large, expansive footprints in either Tier 1 or Tier 2 habitats will find it difficult (or impossible) to comply with paragraph 17 of Performance Standard 6. With respect to project-related impacts in Tier 1 habitats for Criteria 1 through 3, most impacts are not considered to be offsetable. Impacts on critical habitat per Criteria 4 and 5 might also be very difficult (or impossible) to offset. In either case, this would be determined on a case-by-case basis.

GN109. Any offset attempted in critical habitat should be identified, designed and managed according to best international practice and be sustainable over the long term. If biodiversity offsets are part of the client's mitigation strategy, the client must demonstrate that the offset has the potential to compensate for significant residual impacts on the critical habitat. In order to do so, biodiversity offset gains should be quantified or semi-quantified using scientifically-sound metrics that accurately represent the biodiversity values at stake. When developing an offset for residual impacts in critical habitat, clients are advised to adhere to current, internationally recognized best practices. For example, the members of the Business and Biodiversity Offsets Program (BBOP) are the first to have developed a set of internationally-recognized Principles on Biodiversity Offsets.[GN39] The guidance on biodiversity offsets provided in paragraphs GN29–GN33 also applies to critical habitat.

GN110. Securing government buy-in, which at best would include a legally binding commitment, is extremely important in ensuring the long-term sustainability of biodiversity offsets. Engagement of the client with the broader, regional-level conservation goals of the host government will facilitate this process. An equally important element is an accurate assessment of the real costs required to effectively implement the offset(s) in the long term. A conservation financing assessment of offset operational and administrative costs should be undertaken for this purpose. The assessment should also factor in a range of market conditions such as inflation, fluctuations in exchange rates, analysis of the rates of return, investment yield and drawdown on funds if a capital investment in a fund is envisioned. As the exact costs of the offset will be difficult to estimate before it is fully designed, clients could also consider establishing an offset funding mechanism, which would be akin to the reclamation funding mechanism as described in paragraph GN53. Partnership with relevant credible organizations/authorities with scientific expertise in offset planning, design and management is highly encouraged.

GN111. The development of "aggregated offsets" is especially encouraged. Aggregated offsets are defined as measurable conservation outcomes resulting from coordinated actions designed to compensate for the combined residual adverse biodiversity impacts arising from more than one development project in a specific geographical area (after appropriate prevention and minimization measures have been taken). In areas where multiple private sector companies are operating in the

[GN39] See http://bbop.forest-trends.org/guidelines/principles.pdf.

same landscape associated with high biodiversity values (for example, when governments grant concessions to numerous companies in such landscapes), companies are encouraged to merge their efforts and develop joint (or "aggregated") offset programs. In such cases, offsets could be incorporated into existing landscape or regional planning.

GN112. Clients should be aware that, if local communities are not adequately engaged as part of offset selection and design, the establishment of a biodiversity offset could potentially result in adverse impacts on them, especially if their usage rights are not legally recognized. In these cases, the client requirements of Performance Standard 5 are applicable, as explicitly stated in footnote 7 of that Performance Standard. Clients should consult the Cost-Benefit Handbook[GN40] of the BBOP toolkit, which applies to this topic.

> ***Legally Protected and Internationally Recognized Areas***
> ***20. In circumstances where a proposed project is located within a legally protected area[16] or an internationally recognized area,[17] the client will meet the requirements of paragraphs 13 through 19 of this Performance Standard, as applicable. In addition, the client will:***
>
> - ***Demonstrate that the proposed development in such areas is legally permitted;***
> - ***Act in a manner consistent with any government recognized management plans for such areas;***
> - ***Consult protected area sponsors and managers, Affected Communities, Indigenous Peoples and other stakeholders on the proposed project, as appropriate; and***
> - ***Implement additional programs, as appropriate, to promote and enhance the conservation aims and effective management of the area.[18]***
>
> ---
>
> *[16] This Performance Standard recognizes legally protected areas that meet the IUCN definition: "A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values." For the purposes of this Performance Standard, this includes areas proposed by governments for such designation.*
>
> *[17] Exclusively defined as UNESCO Natural World Heritage Sites, UNESCO Man and the Biosphere Reserves, Key Biodiversity Areas, and wetlands designated under the Convention on Wetlands of International Importance (the Ramsar Convention).*
>
> *[18] Implementing additional programs may not be necessary for projects that do not create a new footprint.*

GN113. Paragraph 20 of Performance Standard 6 applies to legally protected areas that meet the IUCN definition, as provided in footnote 16 of Performance Standard 6, and "internationally recognized areas," which are areas of recognized importance to biodiversity conservation but are not always legally protected. Areas that will qualify as "internationally recognized" per Performance Standard 6 are explicitly defined in footnote 17. Performance Standard 6 adopts the terminology "internationally *recognized* area" instead of "internationally *designated* area," as "designated" is often used to describe protected areas that are designated by governments. In terms of international designations, conventions differ in their terminology (e.g., inscribed, adopted, designated, recognized, etc.), and therefore the more generic term "recognized" was deemed more appropriate.

GN114. If a project is located in or near a legally protected or internationally recognized area, the client should consult the following sources, which were developed by UNEP-WCMC.

- *World Database on Protected Areas.*[GN41] The World Database on Protected Areas (WDPA) is a global inventory of protected areas. Information is provided to the WDPA from national

[GN40] See http://bbop.forest-trends.org/guidelines/cbh.pdf.

[GN41] See http://www.protectedplanet.net.

governments, NGOs, international conventions and regional partners. It is managed and developed through collaboration between UNEP-WCMC and IUCN.

- *A to Z Areas of Biodiversity Importance.*[GN42] The A to Z is an online guide with detailed information for a number of recognized systems to prioritize and protect areas of biodiversity importance that fall into two main categories: areas under protected area frameworks that are supported by national or sub-national institutions as well as international conventions and programs, and global prioritization schemes that are developed by academic and conservation organizations.

GN115. With respect to mitigation, clients are expected to comply with requirements for natural or critical habitat, depending on the biodiversity values present in the legally protected (including areas officially proposed for protection) or internationally recognized area. This will be based on the client's risks and impacts identification process, including the ESIA, biodiversity assessment and/or critical habitat assessment. Within the list of recognized areas of high biodiversity value provided in paragraph GN57, legally protected areas with an IUCN Management Category of Ia, Ib and II, UNESCO Natural World Heritage Sites and Ramsar sites will be treated as critical habitat. Key Biodiversity Areas (KBA) that correspond to the definition of critical habitat per paragraph 16 of Performance Standard 6 will also be treated as critical habitat. Areas that meet IUCN Management Categories III–VI or other types of areas that are offered some type of legal protection, restriction and/or management (e.g., forest reserves) might also qualify as critical habitat if these areas support high biodiversity values as defined in paragraph 16 of Performance Standard 6. An assessment would be required to make this determination.

GN116. When projects are located in legally protected and internationally recognized areas, clients should ensure that project activities are consistent with any national land use, resource use, and management criteria (including Protected Area Management Plans, National Biodiversity Strategy and Action Plans (NBSAPs) or similar documents). This will entail securing the necessary approvals from the responsible government agencies, and consulting with protected area sponsors and Affected Communities, Indigenous Peoples and other relevant stakeholders. Note that stakeholder engagement and consultation is required for all projects located in legally protected and internationally recognized areas. The terminology "as appropriate" in the third bullet of paragraph 20 of Performance Standard 6 refers to the appropriateness/relevance of stakeholder groups to engage as part of this process. For internationally recognized areas that are not legally protected, clients would need to consult with the appropriate conservation agencies responsible for the designation. Client requirements for stakeholder engagement are described in paragraphs 26–33 of Performance Standard 1 and related guidance can be found in paragraphs GN91–GN105 of Guidance Note 1. Related client requirements are covered in Performance Standard 7 with respect to Indigenous Peoples and in Performance Standard 8 with respect to cultural heritage, and their accompanying Guidance Notes.

GN117. Projects proposed inside legally protected or internationally recognized areas should result in tangible benefits to the conservation objectives of that area, and clear conservation advantages should be gained by the presence of the project. This can be achieved through implementing programs that, for example, provide support for park management, address alternative livelihoods for Affected Communities, or support and/or carry out research needed for the conservation aims of the protected area. The only exception to this might be for projects that are not creating a new footprint (see footnote 18 of Performance Standard 6).

[GN42] See http://www.biodiversitya-z.org.

GN118. If no management plan exists for the protected or designated area, the client may want to consider supporting the development of one with the suitable government agencies and conservation organizations. This type of activity might also suffice as the "additional program" per the fourth bullet of paragraph 20 of Performance Standard 6 if developed and/or implemented in a way that involved endorsement by relevant stakeholders.

> ***Invasive Alien Species***
>
> ***21. Intentional or accidental introduction of alien, or non-native, species of flora and fauna into areas where they are not normally found can be a significant threat to biodiversity, since some alien species can become invasive, spreading rapidly and out-competing native species.***
>
> ***22. The client will not intentionally introduce any new alien species (not currently established in the country or region of the project) unless this is carried out in accordance with the existing regulatory framework for such introduction. Notwithstanding the above, the client will not deliberately introduce any alien species with a high risk of invasive behavior regardless of whether such introductions are permitted under the existing regulatory framework. All introductions of alien species will be subject to a risk assessment (as part of the client's environmental and social risks and impacts identification process) to determine the potential for invasive behavior. The client will implement measures to avoid the potential for accidental or unintended introductions including the transportation of substrates and vectors (such as soil, ballast, and plant materials) that may harbor alien species.***
>
> ***23. Where alien species are already established in the country or region of the proposed project, the client will exercise diligence in not spreading them into areas in which they have not already been established. As practicable, the client should take measures to eradicate such species from the natural habitats over which they have management control.***

GN119. An alien or non-native plant or animal species is one that is introduced beyond its original range of distribution. Invasive alien species are non-native species that may become invasive or spread rapidly by outcompeting other native plants and animals when they are introduced into a new habitat that lacks their controlling factors as determined by natural evolution. Invasive alien species are now recognized to be a major global threat to biodiversity and to ecosystem services.

GN120. The introduction of any alien species as part of the client's operations should be assessed for compliance with the existing host country regulatory framework for such introductions. The client will not intentionally introduce any new alien species (i.e., those that are not currently established in the country or region in which the project is operating) unless this is carried out in accordance with the existing regulatory framework, if such is present. If not, a risk assessment should be conducted on the invasiveness of the species, in coordination with competent professionals with knowledge of the particular species in question. Alien species of known high risk of invasive behavior shall not be introduced into a project site under any circumstances, even if such an introduction is not forbidden by the host country regulatory framework.

GN121. Despite the risk assessment and the existing regulatory framework, accidental introduction of invasive fauna and flora species are extremely difficult to predict. Clients should take all preventive measures designed to reduce the risk of transportation or transmission of invasive alien plant or animal species, pests and pathogens through their activities. In area where invasive species are known to pose a significant risk to natural and critical habitats, survey and review for such invasive species should be included in the client's pre-construction baseline and the potential spread of such species should be monitored throughout the life of the project. In these situations, a dedicated management plan should be

developed (e.g., Invasive Species, Pests and Pathogens Management Plan), which specifies preventative and mitigation measures such as inspection, washdown and quarantine procedures specifically designed to address the spread of invasive species. A management plan of this type is of particular relevance for projects located in critical habitats and where the spread of invasive species in such habitats poses a significant risk. Alternatively, and depending on the level of threat, mitigations could be included as part of the more general Biodiversity or Ecological Management Plan (see Annex A).

GN122. Preventative and mitigation measures are essential when the project includes a linear infrastructure, such as a pipeline, transmission line, road or rail development, as the right-of-way will likely traverse, and link, several habitats through one corridor, providing optimal means for a species to quickly spread through the region. In certain cases, and especially for projects operating in largely undisturbed habitats, clients should also include provisions in suppliers' contracts to prevent alien species from arriving in-country if cargo is transported from outside the country. This may include requirements for inspection and quarantine of containers and heavy equipment, as needed. Equipment should arrive "clean as new" to prevent risk of introductions.

GN123. With respect to the international shipping of goods and services, clients are expected to comply with appropriate obligations developed in the framework of the International Convention for the Control and Management of Ships' Ballast Water and Sediments Convention (the Ballast Water Management Convention). Clients should also refer to Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens, published by the International Maritime Organization (1997).[GN43]

GN124. In many cases, invasive species will have already been established in the region in which the project is located. In these cases, the client has the responsibility to take measures to prevent the species from further spread into areas in which it has not already been established. For example, in the case of linear infrastructure, invasive weeds might be spread into forested habitats, especially if the forest canopy is not able to reestablish itself (due to maintenance of the right-of-way for operational purposes). This is exacerbated if opportunistic agricultural or logging activities further widen the right-of-way, thereby facilitating spread. In these cases, the client is expected to determine the severity of the threat and the mode of spread of that species. The situation should be monitored as part of the overall ESMS, and the client should seek effective mitigation measures in coordination with local and national authorities.

GN125. Living Modified Organisms (LMO) can also be considered to be alien species, with similar potential for invasive behavior as well as potential for gene flow to related species. Any new introduction of such organisms should be assessed with due regard to the Cartagena Protocol on Biosafety.

***Management of Ecosystem Services***

***24. Where a project is likely to adversely impact ecosystem services, as determined by the risks and impacts identification process, the client will conduct a systematic review to identify priority ecosystem services. Priority ecosystem services are two-fold: (i) those services on which project operations are most likely to have an impact and, therefore, which result in adverse impacts to Affected Communities; and/or (ii) those services on which the project is directly dependent for its operations (e.g., water). When Affected Communities are likely to be impacted, they should participate in the determination of priority ecosystem services in accordance with the stakeholder engagement process as defined in Performance Standard 1.***

[GN43] See http://globallast.imo.org/868%20english.pdf.

> ***25. With respect to impacts on priority ecosystem services of relevance to Affected Communities and where the client has direct management control or significant influence over such ecosystem services, adverse impacts should be avoided. If these impacts are unavoidable, the client will minimize them and implement mitigation measures that aim to maintain the value and functionality of priority services. With respect to impacts on priority ecosystem services on which the project depends, clients should minimize impacts on ecosystem services and implement measures that increase resource efficiency of their operations, as described in Performance Standard 3. Additional provisions for ecosystem services are included in Performance Standards 4, 5, 7, and 8.[19]***
>
> [19] *Ecosystem service references are located in Performance Standard 4, paragraph 8; Performance Standard 5, paragraphs 5 and 25–29; Performance Standard 7, paragraphs 13–17 and 20; and Performance Standard 8, paragraph 11.*

GN126. Performance Standard 6 defines ecosystem services as "*the benefits that people, including businesses, obtain from ecosystems*" (paragraph 2), which is in line with the definition provided by the Millennium Ecosystem Assessment.[GN44] As described in paragraph 2 and footnote 1 of Performance Standard 6, ecosystem services are organized into four major categories:

- *Provisioning ecosystem services* include *inter alia* (i) agricultural products, seafood and game, wild foods and ethnobotanical plants; (ii) water for drinking, irrigation and industrial purposes; (iii) forest areas which provide the basis for many biopharmaceuticals, construction materials, and biomass for renewable energy.

- *Regulating ecosystem services* include *inter alia* (i) climate regulation and carbon storage and sequestration; (ii) waste decomposition and detoxification; (iii) purification of water and air; (iv) control of pests, disease and pollination; (v) natural hazard mitigation.

- *Cultural services* include *inter alia* (i) spiritual and sacred sites; (ii) recreational purposes such as sport, hunting, fishing, ecotourism; (iii) scientific exploration and education.

- *Supporting services* are the natural processes that maintain the other services such as (i) nutrient capture and recycling; (ii) primary production; (iii) pathways for genetic exchange.

GN127. Performance Standard 6 also recognizes the importance of The Economics of Ecosystems and Biodiversity (TEEB) initiative, a long-term study that draws on expertise from around the world to evaluate the costs of the loss of biodiversity and the associated decline in ecosystem services worldwide. The TEEB initiative defines ecosystem services as "*the direct and indirect contributions of ecosystems to human well being*." TEEB also makes references to the concept of natural capital in that, from an economic point of view, the flows of ecosystem services can be seen as the dividend that society receives from natural capital, and that maintaining stocks of natural capital allow the sustained provision of future flows of ecosystem services, and thereby help to ensure enduring human well-being.

GN128. Ecosystem services are indeed services because there is an identified (human) beneficiary (i.e., the user). Ecosystem services are related to biophysical processes in the environment, but until there is a person or group of persons benefiting from the process, it is not a service. The beneficiary might be on the local, regional or even global scale. For example, wild foods and freshwater collected by local communities accrue benefits to users on a local scale; the capacity for ecosystems to reduce damage

[GN44] Millennium Ecosystem Assessment, Ecosystems and Human Well-being: Opportunities and Challenges for Business and Industry (2006).

caused by natural disasters such as hurricanes and tornados might benefit recipients of such services on the regional scale (as well as the local scale); and intact forests that capture and store carbon dioxide and regulate climate benefit recipients of such services on the global scale.

GN129. In recent years, a variety of reports, guidance documents, mapping tools and toolkits have been developed as resources to support the application of these concepts. A large body of literature on Payments for Ecosystem Services (PES) has existed for many years but is not directly applicable to Performance Standard 6 and is therefore not referenced in this Guidance Note. Client requirements are focused on the mitigation of impacts on ecosystem services and the benefits that ecosystem services might bring to companies rather than on the economic valuation for such services. If PES schemes exist in or near areas where clients are doing business, the client should be aware of them in accordance with any existing regulatory framework and/or other ongoing initiatives.

GN130. Guidance documents and tools for consideration of ecosystem services other than PES have been developed. Some are more oriented towards policy-making, regional planning, education and awareness, while others may be useful in private sector field applications. Clients should make use of relevant and appropriate guidance documents and mapping tools when ecosystem services are a key focus of the project, while recognizing that not all tools have been robustly tested in private sector project applications. Specific tools may be appropriate for different stages of the project's life-cycle, and multiple tools could be used in combination with one another to integrate the ecological and social considerations of ecosystem services into assessment, mitigation and management planning.[GN45] A list of resources (descriptions for each tool/document) relevant to ecosystem services under Performance Standard 6 is provided in the Bibliography. They include, among others, the following:

- *The Corporate Ecosystem Services Review: Guidelines for Identifying Business Risks and Opportunities Arising from Ecosystem Change* (2008) developed by the World Resources Institute (WRI), World Business Council for Sustainable Development (WBCSD) and Meridian Institute.

- *Ecosystem Services Review for Impact Assessment* (2011) developed by WRI.

- *Ecosystem services guidance: Biodiversity and ecosystem services guide and checklists* (2011), developed by International Petroleum Industry Environmental Conservation Association (IPECA).

- Related documents and toolkit of the *Natural Value Initiative* (NVI), an initiative of Flora and Fauna International, UNEP-Finance Initiative, Nyenrode Business University, the Dutch Association of Investors for Sustainable Development and the Brazilian Business School FGV.

- Related reports of TEEB, including *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature* (2010).

GN131. Degradation and loss of ecosystem services can pose operational, financial and reputational risks to project sustainability. In terms of risk, ecosystem services can generally be grouped as follows: (i) those that might potentially pose a risk to clients if project-related impacts are incurred on such services; and (ii) those that present an opportunity for clients in that there is a direct dependence on such services for the client's business operations (e.g., water in hydropower projects). Furthermore, ecosystems are increasingly recognized and protected under legal and regulatory frameworks. Some

[GN45] For example, see the Business for Social Responsibility (BSR) reports listed in the Bibliography, which provides an assessment of specific tools.

countries have included ecosystem services within legislation at the national and provincial level. Clients should be familiar with such legislation in the countries in which they are working.

GN132. Ecosystem services is a transdisciplinary topic; hence, it is covered under a number of the Performance Standards. With respect to provisioning and cultural ecosystem services, it is the community of practice of social development specialists (notably resettlement specialists and livelihood restoration specialists) and cultural heritage specialists who are most familiar with the assessment and evaluation of this topic; this is especially true given the importance of stakeholder engagement and consultation. On the other hand, biodiversity management specialists and environmental engineers might be the best placed to evaluate technical mitigation options for regulating ecosystem services. In either case, ecosystem services are a *socio-ecological* topic, which require collaboration between the client's environmental and social specialists. As already stated in paragraph GN21, a single assessment may require any number of specialists, depending on the service in question; these include soil and land capability and soil erosion control specialists, geologists and hydrologists, agronomists, rangeland ecologists, specialists in the economic valuation of natural resources, land use planning and resettlement specialists with expertise in natural resource-based livelihood, livelihood restoration specialists and cultural anthropologists.

GN133. The concept of ecosystem services is covered in Performance Standard 4 (Community Health, Safety and Security), Performance Standard 5 (Land Acquisition and Involuntary Resettlement), Performance Standard 7 (Indigenous Peoples) and Performance Standard 8 (Cultural Heritage). Performance Standard 3 (Resource Efficiency and Pollution Prevention) is also relevant in terms of ecosystem services on which the client's business operations are dependent (i.e., the section on Resource Efficiency; paragraphs 6–9). A summary table is provided in Annex B to demonstrate the integration of this topic throughout the Performance Standards and the relation to Performance Standard 6.

GN134. Client requirements in Performance Standard 6 for ecosystem services are applicable only when the client has "direct management control or significance influence" over such services. Therefore, ecosystem services whose beneficiaries are at the global scale, and sometimes the regional scale,[GN46] are not covered under Performance Standard 6. These include regulating ecosystem services, such as carbon storage or climate regulation, where the benefits of such services are received on a global scale. Project-related impacts on ecosystem services where the client does not have direct management control or significance influence will be assessed per Performance Standard 1.

GN135. As described in paragraphs GN4–GN6, the risks and identification process will include a scoping for ecosystem services, which should primarily take place through literature review and consultation with Affected Communities as part of the Stakeholder Engagement process outlined in Performance Standard 1. Stakeholder engagement is covered under paragraphs GN91–GN105 of Guidance Note 1. Of particular relevance to ecosystem system services is engagement with poor and vulnerable communities, especially Indigenous Peoples (see related ecosystem services requirements in Performance Standard 7). Particular emphasis should also be paid to engaging with women as they are some of the most likely users of natural resources. Where potentially significant project-related risks to ecosystem services are identified, clients will be responsible for identifying priority ecosystem services. Priority ecosystem services are defined in paragraph 24 of Performance Standard 6 as (i) those services on which project operations are most likely to have an impact and, therefore, which result in adverse impacts

[GN46] Performance Standard 6 requirements could apply to ecosystem services whose beneficiaries are at the regional scale as projects with very large footprints could cause impacts on regional level ecosystem services (e.g., large wetlands or coastal areas required for natural hazard mitigation). The client, through the application of mitigation measures, may be determined to have significant influence over such services.

to Affected Communities; and/or (ii) those services on which the project is directly dependent for its operations (e.g., water). Priority ecosystem services should be identified using a systematic review and prioritization (paragraph 24 of Performance Standard 6). For the purposes of this Guidance Note, this process is referred to as an Ecosystem Services Review (ESR).[GN47]

GN136. For the purposes of Performance Standard 6 implementation and the ESR, ecosystem services are categorized as two types:

- **Type I**: Provisioning, regulating, cultural and supporting ecosystem services, over which the client has direct management control or significant influence, and where impacts on such services **may adversely affect communities**.

- **Type II**: Provisioning, regulating, cultural and supporting ecosystem services, over which the client has direct management control or significant influence, and on which **the project directly depends for its operations** (examples of this type of ecosystem service are provided below in paragraph GN142).

GN137. Where a project is likely to have an impact on ecosystem services, the ESR should screen for all Type I and Type II ecosystem services in the project site and its area of influence and prioritize ecosystem services based on the following: (i) the project's likelihood to have an impact on the service; and (ii) the project's direct management control or significant influence over that service.

GN138. Type I ecosystem services will be considered priority, under the following circumstance:

- Project operations are likely to result in a significant impact on the ecosystem service;
- The impact will result in a direct adverse impact on Affected Communities" livelihood, health, safety and/or cultural heritage; and
- The project has direct management control or significant influence over the service.

GN139. Type II ecosystem services will be considered priority under the following circumstance:

- The project directly depends on the service for its primary operations; and,
- The project has direct management control or significant influence over the service

GN140. For Type I ecosystem services, the ESR must be conducted as part of a participatory stakeholder consultation process. Social specialists will be the primary agents conducting this consultation, and requirements are defined in paragraphs 25–33 of Performance Standard 1; related guidance can be found in paragraphs GN91–GN105 of Guidance Note 1. As part of the ESR, the client should consider the following:

- Review the nature and extent of ecosystem services in the project site and its area of influence
- Identify the condition, trends and external (non-project) threats to such services
- Distinguish the beneficiaries of such services
- Assess the extent to which the project depends upon or may impact identified services

[GN47] The ESR terminology was developed by the World Resources Institute (WRI) in its Corporate Ecosystems Service Review publication (2008). The use of this term in this Guidance Note is not meant to be an exact duplication of WRI's application of this term. WRI's ESR method is one of several recommended methods that clients may choose to utilize to assess this topic.

- Assess the significance of the services in terms of livelihoods, health, safety and cultural heritage
- Identify the associated key social, operational, financial, regulatory and reputational risks
- Identify courses of action and mitigation measures which can reduce identified risks.

GN141. For **Type I** ecosystem services determined to be priority services, clients will implement the mitigation hierarchy to avoid impacts, and if impacts are unavoidable, clients will minimize them and implement mitigation measures to maintain the "*value and functionality of priority services*" as stated in paragraph 25 of Performance Standard 6. Considering the significant variation in mitigation measures that could be implemented to achieve this objective, mitigation measures are not detailed in this Guidance Note. They should be identified with the relevant environmental and social specialists. Note that compensation requirements with respect to natural resource-based livelihoods and access to natural resources are provided in Performance Standard 5. Clients are expected to demonstrate implementation of the mitigation hierarchy, in terms of avoidance, minimization and restoration, before compensation is considered.

GN142. For **Type II** ecosystem services determined to be priority services, clients should minimize impacts on ecosystem services and implement measures that increase resource efficiency of their operations as stated in paragraph 25 of Performance Standard 6. This requirement refers to actions that clients can implement within the natural environment to maintain the services that ecosystems provide to business operations. For example, maintaining vegetation along forested slopes might increase dam reservoir capacity and power output for hydropower projects; protecting mangroves or other nearshore ecosystems that provide juvenile habitat to fish and other aquatic species might benefit fisheries and other aquaculture operations; protecting coral reefs and other marine resources would improve the recreational value of coastal resources of importance to the tourism industry. All of these actions are means of optimizing the company's reliance on provisioning, regulating and cultural ecosystem services. The requirements are related to, but different than, those contained in Performance Standard 3, which cover resource efficiency for energy and water consumption as part of project design and production processes (i.e., "in-house" efficiency measures).

***Sustainable Management of Living Natural Resources***

***26. Clients who are engaged in the primary production of living natural resources, including natural and plantation forestry, agriculture, animal husbandry, aquaculture, and fisheries, will be subject to the requirements of paragraphs 26 through 30, in addition to the rest of this Performance Standard. Where feasible, the client will locate land-based agribusiness and forestry projects on unforested land or land already converted. Clients who are engaged in such industries will manage living natural resources in a sustainable manner, through the application of industry-specific good management practices and available technologies. Where such primary production practices are codified in globally, regionally, or nationally recognized standards, the client will implement sustainable management practices to one or more relevant and credible standards as demonstrated by independent verification or certification.***

GN143. Primary production is defined for the purpose of this Performance Standard as being the cultivation of plants and animals for human or animal consumption and use, both in the wild or in a cultivated situation. It includes: all types of forestry, whether in natural forests or in plantations, as well as non-timber forest products which may be harvested from natural forests; all types of agriculture, including both annual and perennial crops and animal husbandry, including livestock; and both wild and capture

fisheries including all types of marine and freshwater organisms, both vertebrate and invertebrate. This scope is intended to be broad enough to cover all cases where living natural resources are being managed by the client for the public's benefit.

GN144. The overriding principle is that clients who are involved in these activities are required to manage the resource in a sustainable manner. This means that the land or water resource maintains its productive capacity over time, and that agricultural and aquacultural practices do not degrade the surrounding environment. Sustainable management also ensures that people who are dependent on these resources are properly consulted, enabled to participate in development, and share equitably in the benefits of that development.

GN145. Paragraph 26 of Performance Standard 6 states that sustainable management will be achieved through the application of industry-specific good management practices and available technologies. Depending on the industry sector and geographic region, there is a range of such resources which should be consulted. These focus largely on environmental and occupational health and safety aspects, although social aspects are increasingly being addressed. The EHS Guidelines, and IFC's Good Practice Notes and related publications are a useful initial source of references for clients. Such industry-specific guidance is very dynamic and new materials are being published regularly. A diligent internet search will reveal a range of useful and up-to-date sources. Two exceptional sources for updates on standards and management practices include the International Trade Centre's Standards Map[GN48] and Practitioners Network.[GN49]

GN146. In recent years a number of industry sectors have developed and/or adopted formal environmental and social sustainability standards which incorporate good environmental and social practice. Adherence to such formal standards, which incorporate principles, criteria and indicators specific to the needs of a sector or geographic region, can then be subject to independent audit and verification of compliance. In the forestry sector, sustainable forest management standards include those developed by the Forest Stewardship Council (FSC), as well as a range of national forest standards (e.g., Sustainable Forestry Initiative (SFI) in the United States; Canadian Standards Association Sustainable Forest Management Standard (CSA); *Programa Brasileiro de Certificação Florestal* (CERFLOR) in Brazil; *Sistema Chileno de Certificación de Manejo Forestal Sustentable* (CERTFOR) in Chile; etc.). The Sustainable Agriculture Network (SAN) was created in 1992 and is now applied across many high value crops. More recently commodity-specific multi-stakeholder initiatives have been developed such as the Roundtable on Sustainable Palm Oil (RSPO). Implemented in 2008, RSPO has standards based on their Principles and Criteria for the production of palm oil, and there are comparable initiatives currently under development in other commodity sectors (sugar cane, cotton, soy, etc.). If a sector has in place an "appropriate" (as defined below) environmental and social sustainability standard, Performance Standard 6 requires that clients apply that standard and obtain independent verification or certification and that they are in conformity for all operations which they own directly or over which they have management control.

GN147. Paragraph 26 also makes explicit that, "*where feasible, the client will locate land-based agribusiness and forestry projects on unforested land or land already converted*." This requirement should be implemented in conjunction with paragraph 14 (first bullet) of Performance Standard 6 (see natural habitats), which requires clients to demonstrate that there are "*no other viable alternatives within the region…for development of the project on modified habitat.*"

[GN48] See www.standardsmap.org.

[GN49] See www.tradestandards.org.

***27. Credible globally, regionally, or nationally recognized standards for sustainable management of living natural resources are those which (i) are objective and achievable; (ii) are founded on a multi-stakeholder consultative process; (iii) encourage step-wise and continual improvements; and (iv) provide for independent verification or certification through appropriate accredited bodies for such standards.[20]***

[20] *A credible certification system would be one which is independent, cost-effective, based on objective and measurable performance standards and developed through consultation with relevant stakeholders, such as local people and communities, Indigenous Peoples, and civil society organizations representing consumer, producer and conservation interests. Such a system has fair, transparent and independent decision-making procedures that avoid conflicts of interest.*

GN148. While a large number of standards have been proposed, many of these lack adequate coverage of relevant sustainability issues, or may lack the ability to be independently and uniformly applied. For a standard to be appropriate for use, it should:

- Be objective and achievable—based on a scientific approach to identifying issues, and realistic in assessing how these issues can be addressed on the ground under a variety of practical circumstances.
- Be developed or maintained through a process of ongoing consultation with relevant stakeholders—there should be balanced input from all relevant stakeholder groups, including producers, traders, processors, financiers, local people and communities, Indigenous Peoples, and civil society organizations representing consumer, environmental and social interests, with no group holding undue authority or veto power over the content.
- Encourage step-wise and continual improvement—both in the standard and its application of better management practices, and require the establishment of meaningful targets and specific milestones to indicate progress against principles and criteria over time.
- Be verifiable through independent certifying or verifying bodies—which have defined and rigorous assessment procedures that avoid conflicts of interest, and are compliant with ISO guidance on accreditation and verification procedures.

GN149. In general, standards which conform to the ISEAL[GN50] Code of Good Practice for Setting Social and Environmental Standards will be consistent with the above requirements.

GN150. Performance Standard 6 requires external verification or certification to an appropriate voluntary standard as a way of providing additional assurance that clients are adequately addressing environmental and social sustainability issues. While requiring external verification or certification of sustainable resource management (if an appropriate standard exists), Performance Standard 6 does not endorse any particular standard as meeting its requirements, since standards can change in both content and application on the ground over time. Standards are considered for application on a case-by-case basis, making a determination of whether the standard and its external verification or certification system are generally consistent with the above requirements.

GN151. Verification or certification to multiple standards may be unnecessary if one standard covers the key issues, but clients may choose to become certified to a number of standards, depending on their own needs for risk management, complexity of their supply chains, and the demands of their target markets.

[GN50] See various ISEAL good practice documents at: http://www.isealalliance.org/code.

Clients are encouraged to select standards which meet the requirements outlined above and help them minimize environmental and social risks.

GN152. Where there is a lack of a single comprehensive standard and criteria for a particular commodity, Performance Standard 6 allows for the verification or certification to a combination of standards which cover relevant biodiversity and ecosystem services aspects and may be combined with other standards that cover other environmental and social issues such as occupational health and safety, social and labor issues, product quality and environmental management.

> ***28. Where relevant and credible standard(s) exist, but the client has not yet obtained independent verification or certification to such standard(s), the client will conduct a pre-assessment of its conformity to the applicable standard(s) and take actions to achieve such verification or certification over an appropriate period of time.***

GN153. In cases where there is a relevant standard, but the client has not yet achieved verification or certification, clients are required, in the early stages of project design, to undertake a pre-assessment or gap analysis of conformity with the selected standard, carried out by a suitably experienced practitioner, to indicate areas where the client needs to develop materials and procedures and improve practice, prior to scheduling a formal compliance audit for verification or certification. The pre-assessment will form the basis of an action plan to address those issues, with an appropriate timeline. In agreeing to an appropriate timeline for achieving conformance with standard(s) as well as appropriate verification or certification, the nature and scale of the client's operations and the client's human resource capabilities should also be considered.

> ***29. In the absence of a relevant and credible global, regional, or national standard for the particular living natural resource in the country concerned, the client will:***
>
> - ***Commit to applying good international industry operating principles, management practices, and technologies; and***
> - ***Actively engage and support the development of a national standard, where relevant, including studies that contribute to the definition and demonstration of sustainable practices.***

GN154. Where a relevant standard has not yet been developed, or a national interpretation of a generic global standard has yet to be approved for use in a specific geographic region or country, clients are required to operate in the spirit of internationally-accepted good industry practices (as referenced in paragraphs GN145 and GN146 above) which are likely to be incorporated into the standard. The intent is that clients would use this period to prepare for eventual verification or certification in the future. Further, clients are expected to actively engage in the development process for a relevant standard, to the extent appropriate to the nature and scale of their operations. Such participation could include, among others, hosting and/or participating in local workshops, or pilot field testing of specific requirements which are planned for inclusion in the standard. When the standard is developed, clients will apply for and achieve verification or certification to that standard, for all operations which they own directly or over which they have management control.

> ***Supply Chain***
>
> ***30. Where a client is purchasing primary production (especially but not exclusively food and fiber commodities) that is known to be produced in regions where there is a risk of significant conversion of natural and/or critical habitats, systems and verification practices will be adopted as part of the client's ESMS to evaluate its primary suppliers.[21] The systems and verification practices will (i) identify where the supply is coming from and the habitat***

***type of this area; (ii) provide for an ongoing review of the client's primary supply chains; (iii) limit procurement to those suppliers that can demonstrate that they are not contributing to significant conversion of natural and/or critical habitats (this may be demonstrated by delivery of certified product, or progress towards verification or certification under a credible scheme in certain commodities and/or locations); and (iv) where possible, require actions to shift the client's primary supply chain over time to suppliers that can demonstrate that they are not significantly adversely impacting these areas. The ability of the client to fully address these risks will depend upon the client's level of management control or influence over its primary suppliers.***

[21] *Primary suppliers are those suppliers who, on an ongoing basis, provide the majority of living natural resources, goods, and materials essential for the core business processes of the project.*

GN155. Clients may purchase food, fiber, wood, animals, and animal products, and related commodities for further processing or trade, while not being directly involved in the growing or harvesting of such products. In addition, such products may pass through several intermediaries before being acquired by clients. Clients should be aware that there may be substantial reputational risks to their involvement in such supply chains where significant negative impacts on biodiversity have been identified in the production of these products.

GN156. Negative concerns and impacts include areas and situations where there has been significant conversion of natural and critical habitat as defined in paragraphs 13 and 16, respectively, of Performance Standard 6.

GN157. Clients involved with processing or trading of such commodities should develop and implement appropriate policies and procedures as part of their ESMS to identify their supply chains risks, and to assess their operational and reputational exposure to such risks. Clients should have appropriate quality assurance and traceability systems which allow them to identify with accuracy the source and origin of their products. Such traceability or chain-of-custody systems should be adequate to allow the client to eliminate products or suppliers who do not meet their policies and procedures and pose risks to biodiversity.

GN158. In situations where such concerns are identified, clients will identify ways to address them and reduce their risks, in a manner commensurate with their degree of control and influence over their supply chain. In particular, clients should identify their primary suppliers, who, on an ongoing basis, provide the majority of the living natural resources, goods and materials essential for the core processes of the client's business.

GN159. Clients should work with those primary suppliers to encourage and assist them in identifying where risks and concerns arise in their supply chains, and if possible, in identifying where and how those primary suppliers can work to prevent significant conversion and/or degradation of natural and critical habitat and secure sustainable management of living natural resources through the application of industry-specific good management practices and available technologies. As part of their ESMS, clients should develop and implement or adopt monitoring tools, metrics and methods to measure ongoing performance of primary suppliers, where relevant.

GN160. Where there are appropriate certification and verification systems in place for sustainable natural resource management in the country of origin, clients are encouraged to consider the procurement of certified product and demonstrated certification or verification under a credible chain-of-custody scheme relevant to the commodity or product in question.

## Annex A

### Developing a Biodiversity Action Plan/Biodiversity Management Plan

Where biodiversity values of importance to conservation are associated with a project site or its area of influence, the preparation of a Biodiversity Action Plan (BAP) and/or a Biodiversity Management Plan (BMP)[1] provides a useful means to focus a project's mitigation and management strategy. The development of a BAP/BMP might be required under a company's own biodiversity policy, or International Finance Institutions (IFI or "Lenders") might request a BAP/BMP to help demonstrate compliance with Lender standards. Other parties, such as government agencies, conservation organizations or Affected Communities, might also be interested in the development of a BAP/BMP to address a specific topic of concern.

A stand-alone BAP/BMP sends a clear message to stakeholders not only on a company's selected mitigation strategy, but also on its working philosophy and its ability to operate responsibly in areas of known conservation value. Companies might also opt to incorporate biodiversity-related mitigation and management measures into other, more general, Environmental Management Plans or Action Plans. The risk in this case is that commitments might appear less evident or buried among many others, and possibly be less focused. The development of a BAP is a Performance Standard 6 requirement when operating in critical habitats and should be developed when operating in natural habitats. A BMP is highly encouraged in both. A BAP/BMP may also be useful in modified habitats if biodiversity values of importance to conservation are associated with those areas.

Development of Biodiversity Action Plan

In general, a BAP consists of any number of biodiversity-related actions that need to be carried out by a company to fulfill the needs of a particular requirement, request or expectation (e.g., Lender compliance, legal requirement, stakeholder concerns). BAP are often developed when there are information gaps in a project's ESIA or its ESMS. Gaps that are frequently encountered with respect to biodiversity management include the following: (i) insufficient or inadequate baseline data (often due to time and/or seasonal constraints during baseline collection); (ii) inadequate or non-existent processing of data in a manner that clearly defines high biodiversity values; (iii) inadequate engagement and consultation with stakeholders, especially with external specialists; (iv) substandard consideration of impacts and lack of quantified impact analysis; (v) inadequate identification of mitigation measures, including those needed to mitigate significant residual impacts; and, (vi) inadequate or non-existent monitoring procedures. Whatever the case, the function of the BAP is to identify corrective action measures and a framework for their implementation.

A BAP might also serve as a means to demonstrate leading practice for those companies that choose to go beyond compliance. In this case, additional opportunities for conservation identified in consultation with relevant stakeholders could also be implemented through a BAP.

One of the most important elements of a BAP is the definition of its overarching goal, supported by a set of objectives. For example, if the purpose of a BAP is to mitigate significant residual impacts in critical habitat, the goal might be to design a biodiversity offset that achieves net gains of relevant biodiversity values, and the objectives would spell out how that goal is to be achieved. A BAP should not include a lofty goal with the motive of moving project activities forward or placating external stakeholders. The goal/objectives should be realistic and based on measurable targets. Each objective should outline a

[1] May take many names, including Ecological Management Plan (EMP) or Flora and Fauna Management Plan.

series of actions and include completion indicators or monitoring targets, and the responsible party and a timeframe. All of the above should be developed in consultation with relevant stakeholders, including government, external specialists, local/international conservation organizations and Affected Communities.

Considerable guidance is available on the development of BAPs for the public sector, but these are of limited value to the private sector. The International Petroleum Industry Environmental Conservation Association (IPIECA) provides one working example,[2,3] but there are relatively few other publically available guidance documents on this topic. This is partially due to the fact that the private sector is vast, and the overall purpose of the BAP is inherently context and project-specific. Even within the same company, project conditions and assessments will vary considerably, and the BAP will be used to respond to different needs. Furthermore, the terminology "BAP" is not well-defined for private sector purposes, and there is no one widely recognized, cross-sectoral framework for its development (as there is, for example, with a Resettlement Action Plan).

Development of Biodiversity Management Plan

The BMP is developed when the baseline, impact assessment and proposed mitigation measures are adequate and the only remaining issue is to collate such information into one implementable and auditable Management Plan. The Plan should spell out the mitigation measures, parties responsible for their implementation (e.g., company, contractor, government), monitoring requirements and the monitoring schedule (e.g., weekly, monthly, biannual). Like any other Environmental or Social Management Plan, the BMP should be integrated into the company's ESMS and not remain an outlier to the system. See *Integrating Biodiversity into Environmental Management Systems* published by the Energy and Biodiversity Initiative for reference.[4] In the case of biodiversity offsets, the Management Plan might take the form of a more elaborate Implementation Plan, and external expertise would be required for its development (especially as offsets are often managed by third parties). See the *Biodiversity Offset Implementation Handbook* developed by the Business and Biodiversity Offsets Program (Forest Trends, 2009) for reference.[5]

There is a difference between the monitoring requirements included in a BMP and a Biodiversity Monitoring and Evaluation Program. The former is standard operating practice for all Management Plans in that monitoring requirements for the *implementation of mitigation measures* are defined within the Plan. For projects with significant, diverse and unprecedented impacts key performance indicators are often defined for each Plan as the basis for monitoring. However, a Biodiversity Monitoring and Evaluation Program is a different concept and a technical discipline within the field of conservation biology. The monitoring of biodiversity does not lend itself well to standardized methods, such as those defined for air quality, noise or wastewater monitoring. Biodiversity Monitoring and Evaluation programs (for use in private sector field applications) require the development of metrics to monitor, for example, the

[2] *A Guide to Developing Biodiversity Action Plans for the Oil and Gas Sector* (2005).
See http://www.ipieca.org/publication/guide-developing-biodiversity-action-plans-oil-and-gas-sector.

[3] See also discussion papers by Maguire, S., *et al*. 2010. *Developing a Biodiversity Action Plan Through an Integrated Phased Approach*. Society of Petroleum Engineers (SPE) International Conference on Health, Safety and Environment (HSE) in Oil and Gas Exploration and Production, 12-14 April 2010, Rio de Janeiro, Brazil; Paper no. 127208-MS (describes experience from Peru LNG Project, Hunt Oil); and Croucher, T. and Dholoo, E. 2010. *To BAP or not to BAP? Challenges and Opportunities in the Adoption of Biodiversity Actions Plans for the Oil and Gas Sector*. SPE International Conference on HSE in Oil and Gas Exploration and Production, 12–14 April 2010, Rio de Janeiro, Brazil; Paper no. 127133-MS.

[4] http://www.theebi.org/products.html See also *Biodiversity Management Systems: Proposal for the integrated management of biodiversity at Holcim Sites*. IUCN, Gland, Switzerland (2010) for an example from the cement sector. http://cmsdata.iucn.org/downloads/biodiversity_management_system___final.pdf

[5] http://bbop.forest-trends.org/guidelines/.

persistence of a particular species in the landscape/seascape or the succession of fauna and flora communities with respect to project-related disturbance. Given the diversity of species and ecosystems, the development of accurate metrics will always require the expertise of specialists. Like the BAP, fundamental to a Biodiversity Monitoring and Evaluation Program is the definition of a goal and its objectives. For private sector field applications, the goal/objectives should always be linked to measuring biodiversity values *with respect to project-related impacts*. See *Biodiversity Indicators for Monitoring Impacts and Conservation Actions* published by the Energy and Biodiversity Initiative for reference.[6]

Given the complexity of natural (and many modified) habitats, biodiversity management needs to be considered within the context of adaptive management. Companies should evaluate findings from monitoring programs and adapt management and mitigation responses as necessary to more effectively ensure the protection of the biodiversity values in question.

[6] http://www.theebi.org/products.html.

## Annex B

**References to Ecosystem Services in Other Performance Standards**

| Performance Standard | Paragraph Number | Reference and Relation to Performance Standard 6 |
|---|---|---|
| **1** | Paragraph 8/ first bullet | With respect to the definition of the project's area of influence, indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent are to be accounted for. |
| **4** | Paragraph 8 | Describes the client's responsibility to take into account the project's potential direct impacts on priority ecosystem services that may result in adverse health and safety impacts to Affected Communities. Ecosystem services are limited to provisioning and regulating services. Client requirements link back to paragraph 25 in Performance Standard 6. |
| **5** | Paragraph 1/ footnote 1 | Footnote explains that natural resource-based livelihoods are considered "livelihoods" per Performance Standard 5. |
| | Paragraph 5/ third bullet | Notes that Performance Standard 5 applies when economic displacement caused by project-related restrictions on land use and access to natural resources causes a community (or groups within a community) to lose access to resource usage. |
| | Paragraph 5/ footnote 9 | States that the term "natural resource assets" as referred to in Performance Standard 5 are equivalent to the ***provisioning ecosystem services*** terminology of Performance Standard 6. |
| | Paragraph 27 | Describes general client requirements for economically displaced persons who face loss of assets or access to assets, which includes natural resource assets. |
| | Paragraph 28/ second bullet | Describes additional client requirements for livelihood restoration for persons whose livelihoods are natural resource-based livelihoods and where there are project-related restrictions on access to natural resources, i.e., these would be considered ***priority provisioning ecosystem services*** of relevance to ***Affected Communities*** per Performance Standard 6***.*** |
| **7** | Paragraph 11/ footnote 5 | States that the term "natural resources and natural areas with cultural value" as referred to in Performance Standard 7 are equivalent to the provisioning and cultural ecosystem services terminology in Performance Standard 6. |
| | Paragraph 13/ footnote 6 | States that the term "natural resource assets" as referred to in Performance Standard 7 is equivalent to the ***provisioning ecosystem services*** terminology of Performance Standard 6. |
| | Paragraph 14 | Describes client requirements if the client proposes to locate a project, or commercially develop natural resources on lands traditionally owned |

| Performance Standard | Paragraph Number | Reference and Relation to Performance Standard 6 |
|---|---|---|
| | | by, or under customary use of Indigenous Peoples. |
| | Paragraph 14/ footnote 9 | States that the term "natural resources and natural areas of importance" as referred to in Performance Standard 7 is equivalent to ***priority ecosystem services*** as defined in Performance Standard 6. This footnote is slightly different than footnote 5 in that it states that where impacts on natural resources and natural areas of importance trigger client requirements in Performance Standard 7, ***they will be considered priority ecosystem services*** per Performance Standard 6. |
| | Paragraph 16/ footnote 13 | Describes client requirements with respect to impacts on critical cultural heritage for Indigenous Peoples. Footnote 13 explains that this includes "natural areas with cultural and/or spiritual value," which would be considered ***priority cultural ecosystem services*** per Performance Standard 6. |
| **8** | Paragraph 3 | Explains that "unique natural features or tangible objects that embody cultural values" (such as sacred groves, rocks, lakes and waterfalls) is covered under Performance Standard 8 (unless these are cultural sites of Indigenous Peoples in which case they are covered under paragraph 16 of Performance Standard 7). "Unique natural features or tangible objects that embody cultural values" are equivalent to the ***cultural ecosystem services*** terminology used in Performance Standard 6. |
| | Paragraphs 11 and 12 | Describes the client requirements for "Replicable" and "Non-replicable" cultural heritage. Cultural ecosystem services that meet definition 3(ii) of paragraph 3 in Performance Standard 8 will be covered by the requirements in paragraphs 11 or 12, as appropriate. The definitions of "Replicable" and "Non-replicable" cultural heritage are provided in footnotes 3 and 5 of Performance Standard 8. |
| | Paragraph 11/ footnote 4 | Describes client requirements for "Replicable" cultural heritage and includes the mitigation hierarchy as it applies to Performance Standard 8. These requirements place emphasis on "maintaining or restoring any ecological processes needed to support (the cultural heritage)." The "ecological processes" term is essentially equivalent to ***priority regulating ecosystem services*** as defined in Performance Standard 6. |

## Annex C

### Example Ecosystem Services Review Template

Below is an illustrative example of an Ecosystem Services Review (ESR) template. In general, ESR procedures are nascent and dynamic, and the following offers a potential framework. Type I priority services would depend on the Degree of Impact, Relevance to Affected Communities and Degree of Management Control. Type II priority services would depend on the Degree of Dependence (on project operations) and the Degree of Management Control.

| Ecosystem Service | Degree of Impact (Type I) | Degree of Dependence (Type II) | Relevance to Affected Community (Type I) | Degree of Management Control (Type I/II) |
|---|---|---|---|---|
| **Provisioning** | | | | |
| Crops | | | | |
| Livestock | | | | |
| Capture fisheries | | | | |
| Aquaculture | | | | |
| Wild foods | | | | |
| Timber and other wood fiber | | | | |
| Other fibers (e.g., cotton, hemp, silk) | | | | |
| Biomass fuel | | | | |
| Freshwater | | | | |
| Genetic resources | | | | |
| Biochemicals, natural medicines, and pharmaceuticals | | | | |
| **Regulating** | | | | |
| Air quality regulation | | | | |
| Global climate regulation | | | | |
| Regional/local climate regulation | | | | |

| Ecosystem Service | Degree of Impact (Type I) | Degree of Dependence (Type II) | Relevance to Affected Community (Type I) | Degree of Management Control (Type I/II) |
|---|---|---|---|---|
| Water regulation | | | | |
| Erosion regulation | | | | |
| Water purification and waste treatment | | | | |
| Disease regulation | | | | |
| Pest regulation | | | | |
| Pollination | | | | |
| Natural hazard regulation | | | | |
| **Cultural** | | | | |
| Sacred or spiritual sites | | | | |
| Areas used for religious purposes | | | | |
| **Supporting** | | | | |
| Nutrient capture and recycling | | | | |
| Primary production | | | | |
| Pathways for genetic exchange | | | | |

# Annotated Bibliography

## International Agreements

Several of the requirements set out in Performance Standard 6 relate to standards set by the following international agreements:

CMS (Convention on Migratory Species) Secretariat and UNEP (United Nations Environment Programme). 1979. "Convention on the Conservation of Migratory Species of Wild Animals" CMS Secretariat, Bonn, Germany, and UNEP, Nairobi. http://www.cms.int/index.html. Known as the Bonn Convention, this intergovernmental treaty strives to conserve terrestrial, marine, and avian migratory species; their habitats; and their migration routes.

IMO (International Maritime Organization). 2004. "International Convention for the Control and Management of Ships' Ballast Water and Sediments Convention." IMO, London. http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships'-Ballast-Water-and-Sediments-(BWM).aspx. This convention is intended to prevent the spread of harmful aquatic organisms carried by ships' ballast water from one region to another.

IUCN (International Union for Conservation of Nature). 1975. "Convention on International Trade in Endangered Species of Wild Fauna and Flora." IUCN, Gland, Switzerland. http://www.cites.org. This international agreement is aimed at ensuring that international trade in specimens of wild animals and plants does not threaten their survival.

Ramsar Secretariat. 1971. "Convention on Wetlands of International Importance, especially as Waterfowl Habitat." Ramsar Secratariat, Gland, Switzerland. http://www.ramsar.org. This intergovernmental treaty provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

Secretariat of the CBD (Convention on Biological Diversity). 1992. "Convention on Biological Diversity." Secretariat of the CBD, Montreal. http://www.cbd.int/. The convention was developed from agreements adopted at the 1992 Earth Summit in Rio de Janeiro. CBD is an international treaty to sustain the diversity of life on Earth. The convention's three main goals are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources.

———. 2000. "Cartagena Protocol on Biosafety to the Convention on Biological Diversity." Secretariat of the CBD, Montreal. http://www.cbd.int/biosafety/default.html. This protocol is a supplement to the Convention on Biological Diversity. Its objective is to ensure the safe handling, transport, and use of living modified organisms resulting from modern biotechnology that may have adverse effects on biological diversity or cause risks to human health.

———. 2011. "Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization to the Convention on Biological Diversity." Secretariat of the CBD, Montreal. http://www.cbd.int/abs. This international agreement aims to share the benefits that arise from the use of genetic resources in a fair and equitable way, including by appropriate access to genetic resources and transfer of relevant technologies. The Nagoya Protocol will be open for signature by parties to the convention from February 2, 2011, to February 1, 2012.

UNESCO (United Nations Educational, Scientific, and Cultural Organization). 1972. "Convention Concerning the Protection of World Cultural and Natural Heritage." UNESCO, Paris. http://whc.unesco.org/en/conventiontext. Known as the World Heritage Convention, this international agreement aims to identify and conserve the world's cultural and natural heritage. Its World Heritage List contains sites of outstanding cultural and natural value.

**Biodiversity Conservation and Management**

The following resources provide guidance and other references relevant to biodiversity conservation and management:

*Biodiversity Action Plans*

For guidance on the development of biodiversity action plans, see the following resources:

Croucher, Toby, and Erica Dholoo. 2010. "To BAP or Not to BAP? Challenges and Opportunities in the Adoption of Biodiversity Actions Plans for the Oil and Gas Sector." Paper 127133-MS presented at the Society of Petroleum Engineers International Conference on Health, Safety, and Environment in Oil and Gas Exploration and Production, Rio de Janeiro, April 12–14.

IPIECA (International Petroleum Industry Environmental Conservation Association). 2005. "A Guide to Developing Biodiversity Action Plans for the Oil and Gas Sector." IPIECA, London. http://www.ipieca.org/publication/guide-developing-biodiversity-action-plans-oil-and-gas-sector.

Maguire, Simon, Carolina Casaretto, David Vexler, Richard Kingham, and Scott Rolseth. 2010. "Developing a Biodiversity Action Plan through an Integrated Phased Approach." Paper 127208-MS presented at Society of Petroleum Engineers International Conference on Health, Safety, and Environment in Oil and Gas Exploration and Production, Rio de Janeiro, April 12–14.

*Biodiversity and Environmental Impact Assessments*

For guidance on biodiversity and ecological impact assessments, see the following resources:

CMS (Convention on Migratory Species) Secretariat and UNEP (United Nations Environment Programme). 2002. "Convention on the Conservation of Migratory Species of Wild Animals: Resolution 7.2—Impact Assessment and Migratory Species." CMS Secretariat, Bonn, Germany, and UNEP, Nairobi. http://www.cms.int/bodies/COP/cop7/proceedings/pdf/en/part_I/Res_Rec/RES_7_02_Impact_Assessment.pdf.

IEEM (Institute of Ecology and Environmental Management). 2006. "Guidelines for Ecological Impact Assessment in the United Kingdom." IEEM, Winchester, U.K. http://www.ieem.net/ecia/EcIA%20Approved%207%20July%2006.pdf.

Energy and Biodiversity Initiative. 2003c. "Measuring Impacts and Actions on Biodiversity." In *Integrating Biodiversity Conservation into Oil and Gas Development*, 43–46. Washington, DC: Energy and Biodiversity Initiative. http://www.theebi.org/pdfs/ebi_report.pdf. This document and chapter give further information on measuring biodiversity values with respect to project-related impacts.

Ramsar Secretariat. 2007. "Ramsar Handbook for the Wise Use of Wetlands, Volume 13: Impact Assessment." Ramsar Secretariat, Gland, Switzerland. http://www.ramsar.org/pdf/lib/lib_handbooks2006_e13.pdf.

———. 2008. "Ramsar Convention on Wetlands, Resolution X.17, Environmental Impact Assessment and Strategic Environmental Assessment: Updated Scientific and Technical Guidance." Ramsar Secretariat, Gland, Switzerland. http://www.ramsar.org/pdf/res/key_res_x_17_e.pdf.

Secretariat of the CBD (Convention on Biological Diversity). 2006a. "Biodiversity in Impact Assessment: Background Document to Decision VIII/28 of the Convention on Biological Diversity: Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment." CBD Technical Series 26, Secretariat of the CBD, Montreal. http://www.cbd.int/doc/publications/cbd-ts-26-en.pdf.

———. 2006b. "Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment." Decision VIII/28, Secretariat of the CBD, Montreal. http://www.cbd.int/doc/decisions/cop-08-dec-28-en.pdf.

Slootweg, Roel, Asha Rajvanshi, Vinod Mathur, and Arend Kolhoff. 2009. *Biodiversity in Environmental Assessment: Enhancing Ecosystem Services for Human Well-Being*. Cambridge, U.K.: Cambridge University Press.

Treweek, Jo. 1999. *Ecological Impact Assessment*. Oxford, U.K.: Blackwell Science.

World Bank. 2000. "Biodiversity and Environmental Assessment Toolkit." World Bank, Washington, DC. http://go.worldbank.org/QPXINZOES0.

*Biodiversity Management Systems*

For guidance on the development of biodiversity management systems, see the following resources:

Energy and Biodiversity Initiative. 2003. "Integrating Biodiversity into Environmental Management Systems." In *Integrating Biodiversity Conservation into Oil and Gas Development*. Washington, DC: Energy and Biodiversity Initiative. http://www.theebi.org/products.html.

Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety. 2010. "Corporate Biodiversity Management Handbook." Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety, Berlin http://www.bmu.de/english/nature/downloads/doc/46144.php. This publication offers businesses a practical tool for implementing a biodiversity management system. For more information, visit the Biodiversity in Good Company Initiative, http://www.business-and-biodiversity.de.

IUCN (International Union for Conservation of Nature). 2010. *Biodiversity Management Systems: Proposal for the Integrated Management of Biodiversity at Holcim Sites*. Gland Switzerland: IUCN. http://cmsdata.iucn.org/downloads/biodiversity_management_system___final.pdf. The Holcim Group–IUCN Independent Expert Panel developed this system. This comprehensive document was prepared for the cement sector but is of relevance to biodiversity management in all sectors.

*Partnerships*

The following sample documents on partnerships between biodiversity conservation organizations and the private sector are provided for the mining, oil and gas, and cement industries:

Holcim. 2010. "Partnership for Biodiversity: Making Biodiversity Part of Business." Jona, Switzerland, Holcim. http://www.holcim.com/holcimcms/uploads/CORP/partnership_for_biodiverstiy/index.html

ICMM (International Council of Mining and Metals). "Work Programs: Resources for Partnerships." ICCM, London. http://www.icmm.com/mpd/resources.

IPIECA (International Petroleum Industry Environmental Conservation Association). 2006. *Partnerships in the Oil and Gas Industry*. London: IPIECA. http://www.ipieca.org/publication/partnerships-oil-and-gas-industry.

*Other Resources*

American Bird Conservancy. 2011. "Alliance for Zero Extinction." American Bird Conservancy, Washington, DC. http://www.zeroextinction.org. The Alliance for Zero Extinction (AZE) is a global initiative of biodiversity conservation organizations that identifies sites in critical need of protection and safeguarding to prevent imminent species extinctions. Information on AZE sites, species, and selection criteria is available at Taylor H. Ricketts, Eric Dinerstein, Tim Boucher, Thomas M. Brooks, Stuart H. M. Butchart, Michael Hoffmann, John F. Lamoreux, John Morrison, Mike Parr, John D. Pilgrim, Ana S. L. Rodrigues, Wes Sechrest, George E. Wallace, Ken Berlin, John Bielby, Neil D. Burgess, Don R. Church, Neil Cox, David Knox, Colby Loucks, Gary W. Luck, Lawrence L. Master, Robin Moore, Robin Naidoo, Robert Ridgely, George E. Schatz, Gavin Shire, Holly Strand, Wes Wettengel, and Eric Wikramanayak, 2005, "Pinpointing and Preventing Imminent Extinctions," *Proceedings of the National Academy of Sciences* 102 (51): 18497–501.

BBOP (Business and Biodiversity Offsets Program). Homepage. Forest Trends, Washington, DC. http://bbop.forest-trends.org. The BBOP guidelines and principles establish a framework for designing and implementing biodiversity offsets programs and for measuring their conservation outcomes. Numerous publications, guidance, and references are available on biodiversity offsets and related topics through BBOP's online library and toolkit. See also BBOP, 2005, "BBOP Phase One: Overview, Principles, Interim Guidance, and Supporting Materials," BBOP, Washington, DC, http://bbop.forest-trends.org/guidelines, and BPOP, n.d., "Principles on Biodiversity Offsets," BBOP, Washington, DC, http://bbop.forest-trends.org/guidelines/principles.pdf.

BirdLife International. Homepage. BirdLife International, Cambridge, U.K. http://www.birdlife.org. BirdLife International is a global partnership of conservation organizations that focuses on conservation of birds, bird habitats, and global biodiversity. BirdLife International makes available data on endangered bird species and important bird areas (IBA) through its publications and online database. For IBA criteria, see BirdLife International, "BirdLife International Data Zone," BirdLife International, Cambridge, U.K. http://www.birdlife.org/datazone/info/ibacriteria.

Bishop, Joshua, Sachin Kapila, Frank Hicks, Paul Mitchell, and Francis Vorhies. 2008. *Building Biodiversity Business*. London: Shell International; Gland, Switzerland: International Union for Conservation of Nature. http://data.iucn.org/dbtw-wpd/edocs/2008-002.pdf. This publication covers various sectors, such as forestry, agriculture, and carbon.

Conservation International. 2011. "RAP Tool Kit." https://learning.conservation.org/biosurvey/RAP/Toolkit/Pages/default.aspx#. The RAP (Rapid Assessment Program) Tool Kit provides information, resources, and tools related to rapid biodiversity assessment.

Earthwatch Institute (Europe). 2011. "Business and Biodiversity Resource Centre." http://www.businessandbiodiversity.org/index.html. This site provides a wealth of sector-specific resources on biodiversity management.

Edgar, Graham J., Penny F. Langhammer, Gerry Allen, Thomas M. Brooks, Juliet Brodie, William Crosse, Naamal De Silva, Lincoln D. C. Fishpool, Matthew N. Foster, David H. Knox, John E. McCosker, Roger McManus, Alan J. K. Millar, and Robinson Mugo. 2009. "Key Biodiversity Areas as Globally Significant Target Sites for the Conservation of Marine Biological Diversity." *Aquatic Conservation: Marine and Freshwater Ecosystems* 18 (6): 969–83. This publication discusses key marine biodiversity areas.

Energy and Biodiversity Initiative. 2003a. "Deciding Where to Work." In *Integrating Biodiversity Conservation into Oil and Gas Development*, 38–42. Washington, DC: Energy and Biodiversity Initiative. http://www.theebi.org/pdfs/ebi_report.pdf.

———. 2003b. "Good Practice in the Prevention and Mitigation of Primary and Secondary Biodiversity Impacts." Energy and Biodiversity Initiative, Washington, DC. http://www.theebi.org/pdfs/practice.pdf.

Food and Agriculture Organization (FAO) of the United Nations. Homepage. FAO, Rome. http://www.fao.org. FAO specializes in agriculture, forestry, and fisheries.

———. 2010. *Global Forest Resources Assessment 2010*. Rome: FAO. http://www.fao.org/forestry/fra/en. The assessment is based on data provided to FAO by countries in response to a questionnaire.

———. 2011a. "Biodiversity for a World without Hunger." FAO, Rome. http://www.fao.org/biodiversity. FAO's biodiversity webpage provides information on biodiversity aspects in food and agriculture, including issues related to agro-ecosystems and biotechnology.

———. 2011b. "National Forest Monitoring and Assessment—NFMA." FAO, Rome. http://www.fao.org/forestry/nfma/en. This website provides links to information on the current status of forest resources and their changes over time from FAO's global and national forest assessment and monitoring programs.

GEO (Group on Earth Observations). Homepage. http://www.geoportal.org/web/guest/geo_home. GEO coordinates the international efforts to build a Global Earth Observation System of Systems (GEOSS). Its website offers access to a wide array of instruments and systems for monitoring and forecasting global environmental change, including a single internet access point for existing global databases and portals. For more information on GEOSS, visit http://www.earthobservations.org/geoss.shtml.

GISP (Global Invasive Species Programme). Homepage. GISP, Nairobi. http://www.gisp.org. GISP was established in 1997 to address global threats caused by invasive alien species and to support the implementation of Article 8(h) of the Convention on Biological Diversity. GISP's website contains links to databases and related information on invasive species.

HCV (High Conservation Value) Resource Network. Homepage. HCV Resource Network, Oxford, U.K. http://www.hcvnetwork.org. This site's resource center provides guidance, manuals, tools, and studies for assessing high conservation value areas. Visit http://www.hcvnetwork.org/resources for more information.

Holland, Robert A., William R. T. Darwall, and Kevin Smith. Forthcoming. "Conservation Priorities for Freshwater Biodiversity: The Key Biodiversity Area Approach Refined and Tested for Continental Africa." *Biological Conservation*.

IAIA (International Association for Impact Assessment). Homepage. IAIA, Fargo, ND. http://www.iaia.org. IAIA provides a variety of resources on the impact assessment process. See also the IAIA Wiki site, which provides a variety of information on biodiversity, ecosystems and ecosystem services, and impact assessment consideration and approaches: http://www.iaia.org/IAIAWiki/(X(1)S(50zqs2rmrpdcul55maeul545))/Default.aspx?Page=biodiv&NS=&AspxAutoDetectCookieSupport=1.

———. 2005. "Biodiversity in Impact Assessment." Special Publication Series 3, IAIA, Fargo, ND.

IBAT (Integrated Biodiversity Assessment Tool). Homepage. https://www.ibatforbusiness.org. IBAT is a joint project of BirdLife International, Conservation International, International Union for Conservation of Nature, and United Nations Environment Programme's World Conservation Monitoring Centre. IBAT allows users access to information on biodiversity and ecosystems, including high-priority sites for conservation, such as protected areas and key biodiversity areas.

ICMM (International Council on Mining and Metals). Homepage. ICMM, London. http://www.icmm.com. Within ICMM's environment work program is sector-specific information on biodiversity management, including its landmark publication and other discussion papers on biodiversity offsets. See http://www.icmm.com/biodiversity.

———. 2006. *Good Practice Guidance for Mining and Biodiversity.* London: ICMM.

———. 2010. *Mining and Biodiversity: A Collection of Case Studies—2010*. London: ICMM.

IFC (International Finance Corporation). 2007. "Environmental, Health, and Safety Guidelines for Mining." IFC, Washington, DC. http://www1.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/risk+management/sustainability+framework/sustainability+framework+-+2006/environmental%2C+health%2C+and+safety+guidelines/ehsguidelines.

———. 2011. "A Guide to Biodiversity for the Private Sector: Why Biodiversity Matters and How It Creates Business Value." IFC, Washington, DC. http://www1.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/publications/biodiversityguide. This online guide is designed to help companies that are operating in emerging markets to better understand their relationship to biodiversity issues and how they can effectively manage those issues to improve business performance

and to benefit from biodiversity. It provides a useful source of sector-specific biodiversity management issues.

IMO (International Maritime Organization). 1997. "Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens." IMO, London. http://globallast.imo.org/868%20english.pdf. These voluntary guidelines provide relevant authorities with guidance on ways to improve ballast water management and to prevent the introduction of unwanted aquatic organisms and pathogens.

IPIECA (International Petroleum Industry Environmental Conservation Association). Homepage. IPIECA, London. http://www.ipieca.org. Biodiversity is one of IPIECA's main focus areas. Sector-specific information on biodiversity management has been developed by the IPIECA–International Association of Oil and Gas Producers Biodiversity Working Group.

———. 2010. "Alien invasive species and the oil and gas industry: Guidance for prevention and management." IPIECA, London.
http://www.ipieca.org/sites/default/files/publications/alien_invasive_species.pdf.
This document delivers practical information to on-the-ground staff at onshore and offshore projects and operations, helping them to identify key issues and solutions and to embed active consideration of alien invasive species (AIS) from the earliest stages of the project.

IUCN (International Union for Conservation of Nature). 2003. "Guidelines for Application of IUCN Red List Criteria at Regional Levels: Version 3.0," IUCN Species Survival Commission, IUCN, Gland, Switzerland. This document provides guidance on the application of Red List criteria at the regional level.

———. 2011a. "About the Species Survival Commission."
http://www.iucn.org/about/work/programmes/species/about_ssc. This site includes information about the Species Survival Commission and its work, with links to publications and technical guidelines, as well as a specialists group directory and profiles.

———. 2011b. "Ecosystems Red List." IUCN, Gland Switzerland. http://www.iucn.org/about/union/commissions/cem/cem_work/tg_red_list. For information on the initiative to establish criteria and categories for threatened and unique ecosystems, see http://www.iucn.org/about/union/commissions/cem/.

———. 2001c. "Global Business and Biodiversity Programme." IUCN, Gland, Switzerland. http://www.iucn.org/about/work/programmes/business/bbp_aboutus. The Global Business and Biodiversity Programme was established to influence and support private partners in addressing environmental and social issues. The program's key priority, which is based on a strategy approved by the IUCN Council, is to engage the business sectors that have a significant impact on natural resources and livelihoods. Numerous related resources, including IUCN–private sector projects, can be found on IUCN's website.

———. 2011d. "The IUCN Red List of Threatened Species." http://www.iucnredlist.org. This site provides comprehensive data related to the risk of extinction and conservation status of plant and animal species.

———. 2011e. "Protected Area Management Categories." IUCN, Gland, Switzerland. http://www.iucn.org/about/work/programmes/pa/pa_products/wcpa_categories. This site summarizes the definitions of the six protected area management categories and contains links to full texts of the guidelines for protected areas management categories.

Langhammer, Penny F., Mohamed I Bakarr, Leon A. Bennun, Thomas M. Brooks, Rob P. Clay, Will Darwall, Naamal De Silva, Graham J. Edgar, Güven Eken, Lincoln D. C. Fishpool, Gustavo A. B. da Fonseca, Matthew N. Foster, David H. Knox, Paul Matiku, Elizabeth A. Radford, Ana S. L. Rodrigues, Paul Salaman, Wes Sechrest, and Andrew W. Tordoff. 2007. "Identification and Gap Analysis of Key Biodiversity Areas: Targets for Comprehensive Protected Area Systems." Best Practice Protected Area Guideline Series 15, International Union for Conservation of Nature, Gland, Switzerland. This publication discusses key biodiversity issues in general.

Miranda, Marta, Philip Burris, Jessie Froy Bincang, Phil Shearman, José Oliver Briones, Antonio La Viña, and Stephen Menard. 2003. "Mining and Critical Ecosystems: Mapping the Risks" World Resources Institute, Washington, DC. This publication was made in collaboration with the Environmental Science for Social Change and Papua New Guinea NGO Environmental Watch Group.

NatureServe. NatureServe database. NatureServe, Arlington, VA. http://www.natureserve.org/getData/LACecologyData.jsp. The website gives access to the completed, working classification of terrestrial ecological systems in Latin America and the Caribbean.

Plantlife International. 2004. "Identifying and Protecting the World's Most Important Plant Areas." Plantlife International, Salisbury, U.K. This publication discusses key plant biodiversity areas.

Ramsar Secretariat. 2009. "What Are the Criteria for Identifying Wetlands of International Importance." Ramsar Secretariat, Gland, Switzerland. http://www.ramsar.org/cda/en/ramsar-about-faqs-what-are-criteria/main/ramsar/1-36-37%5E7726_4000_0. This webpage gives overview of the criteria adopted for the identification of Ramsar sites.

Rodriguez, Jon Paul, Jennifer K. Balch, and Kathryn M. Rodriguez-Clark. 2007. "Assessing Extinction Risk in the Absence of Species-Level Data: Quantitative Criteria for Terrestrial Ecosystems," *Biodiversity and Conservation* 16 (1): 183–209.

Rodriguez, Jon Paul, Kathryn M. Rodriguez-Clark, Jonathan E. M. Baillie, Neville Ash, John Benson, Timothy Boucher, Claire Brown, Neil D. Burgess, Ben Collen, Michael Jennings, David A. Keith, Emily Nicholson, Carmen Revenga, Belinda Reyers, Mathieu Rouget, Tammy Smith, Mark Spalding, Andrew Taber, Matt Walpole, Irene Zager, and Tara Zamin. 2011. "Establishing IUCN Red List Criteria for Threatened Ecosystems." *Conservation Biology* 25 (1): 21–29.

Secretariat of the CBD (Convention on Biological Diversity). 2002. "Guiding Principles for the Prevention, Introduction, and Mitigation of Impacts of Alien Species That Threaten Ecosystems, Habitats, or Species." Decision VI/23 in the Sixth Conference of the Parties (COP-6) to the CBD, Secretariat of the CBD, Montreal. http://www.cbd.int/doc/decisions/cop-06-dec-23-en.pdf.

———. 2004a. "Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity." Secretariat of the CBD, Montreal. http://www.cbd.int/doc/publications/addis-gdl-en.pdf. These guidelines were developed as part of the CBD.

———. 2004b. "Akwé: Kon Guidelines." Secretariat of the CBD, Montreal. http://www.cbd.int/doc/publications/akwe-brochure-en.pdf. These guidelines were developed as part of the Convention on Biological Diversity.

———. 2004c. "Guidelines on Biodiversity and Tourism Development." Secretariat of the CBD, Montreal. http://www.cbd.int/doc/publications/tou-gdl-en.pdf. Also see the accompanying user's manual, *Managing Tourism and Biodiversity: User's Manual on the CBD Guidelines on Biodiversity and Tourism Development* (Montreal: CBD), http://www.cbd.int/doc/programmes/tourism/tourism-manual-en.pdf.

———. 2008a. "Biodiversity for Development Program." Secretariat of the CBD, Montreal. http://www.cbd.int/development. The program's website provides various materials on the role that biodiversity can play in poverty alleviation and development, including case studies and best practice documents.

———. 2008b. "'Biodiversity in Good Company' Initiative." Secretariat of the CBD, Montreal. http://www.business-and-biodiversity.de/en/about-the-initiative.html. This initiative was developed following Decision IX/26 in the Ninth Conference of the Parties (COP-9) to the CBD and is an initiative with international participation under the CBD. Various publications from the initiative are offered through the website.

———. 2010. "Aichi Biodiversity Targets." Secretariat of the CBD, Montreal. http://www.cbd.int/decision/cop/?id=12268. Revised and updated biodiversity targets are provided for the 2011–2020 Strategic Plan for the Convention on Biological Diversity, specifically Decision X/2 of the 10th Conference of the Parties (COP-10).

———. 2011a. "Ecosystem Approach." Secretariat of the CBD, Montreal. http://www.cbd.int/ecosystem. This webpage offers information on the CBD's Ecosystem Approach Program, including background, implementation guidance and case studies, and the "Ecosystem Approach Sourcebook."

———. 2011b. "National Biodiversity Strategies and Action Plans (NBSAPs)." Secretariat of the CBD, Montreal. http://www.cbd.int/nbsap. The website gives access to NBSAPs and related documents for the implementation of the CBD at the national level.

SER (Society for Ecological Restoration International). Homepage. SER, Washington, DC. http://www.ser.org. SER serves the field of ecological restoration by facilitating dialogue among restorationists, encouraging research, promoting awareness, contributing to public policy discussions, and promoting ecological restoration. The website offers numerous resources on ecological restoration.

SPE (Society of Petroleum Engineers). OnePetro database. SPE, Richardson, TX. http://www.onepetro.org. This multisociety library operated by SPE on behalf of participants allows users to search and purchase papers from organizations in the oil and gas sector in a single transaction. A search of the keyword "biodiversity" will reveal many related publications on biodiversity management in the oil and gas sector.

UNEP (United Nations Environment Programme) Finance Initiative. Homepage. UNEP, Geneva. http://www.unepfi.org. This program is a global partnership between UNEP and the financial sector. More than 190 institutions, including banks, insurers, and fund managers, work with UNEP to understand the impacts of environmental and social considerations on financial performance. Through peer-to-peer networks, research, and training, the UNEP Finance

Initiative carries out its mission to identify, promote, and realize the adoption of best environmental and sustainability practices at all levels of financial institution operations.

UNEP (United Nations Environment Programme)–WCMC (World Conservation Monitoring Centre). "A to Z Areas of Biodiversity Importance." UNEP-WCMC, Cambridge, U.K. http://www.biodiversitya-z.org. This online glossary contains detailed information for a number of recognized systems to prioritize and protect areas of biodiversity importance that fall into two main categories: (a) areas under protected area frameworks that are supported by national or subnational institutions and by international conventions and programs and (b) global prioritization schemes that are developed by academic and conservation organizations.

———. CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) Trade Database. UNEP-WCMC, Cambridge, U.K. http://www.unep-wcmc.org/citestrade/trade.cfm. CITES is a unique resource and currently holds more than 10 million records of trade in wildlife and 50,000 scientific names of taxa. More than 750,000 records of trade in CITES-listed species of wildlife are reported annually.

———. "Ocean Data Viewer." UNEP-WCMC, Cambridge, U.K. http://data.unep-wcmc.org. Developed by UNEP-WCMC, this website provides an overview and access to a range of data, including data from the World Database on Protected Areas and relevant conventions related to the conservation of marine and coastal biodiversity.

———. World Database on Protected Areas—Marine. UNEP-WCMC, Cambridge, U.K. http://www.wdpa-marine.org. Developed by UNEP-WCMC, the database is dedicated to providing the most comprehensive set of marine protected areas data available.

UNEP (United Nations Environment Programme)–WCMC (World Conservation Monitoring Centre) and IUCN (International Union for Conservation of Nature). "Protected Planet." UNEP-WCMC, Cambridge, U.K. http://www.protectedplanet.net. Developed by UNEP-WCMC and IUCN, Protected Planet is the new face of the World Database on Protected Areas, a joint initiative between IUCN and UNEP-WCMC. The website allows viewers to search in any language to find information about individual protected areas.

WBCSD (World Business Council for Sustainable Development) Cement Sustainability Initiative. Homepage. WBCSD, Geneva, Switzerland. http://www.wbcsdcement.org. The Cement Sustainability Initiative (CSI) is a global initiative of the leading cement producers to manage and minimize the impacts of cement production. Quarry rehabilitation is one of CSI's focus topics.

WWF (World Wildlife Fund) and World Bank. "Forests: WWF/World Bank Alliance." http://www.worldwildlife.org/what/globalmarkets/forests/worldbankalliance.html. WWF, Washington, DC. This website includes information on the identification and conservation of high conservation value forests and forest certification systems.

ZSL (Zoological Society of London). 2011. "National Red Lists." ZSL, London. http://www.nationalredlist.org/site.aspx. The website provides data on the conservation status of species at the regional and national levels.

ZSL (Zoological Society of London) EDGE of Existence Program. Homepage. ZSL, London. http://www.edgeofexistence.org/index.php. This program uses a scientific framework to identify the world's most evolutionarily distinct and globally endangered (EDGE) species. The

EDGE of Existence program is the only global conservation initiative to focus specifically on threatened species that represent a significant amount of unique evolutionary history. For more information on evolutionary processes and conservation concerns, see Keith A. Crandall, Olaf R. P. Bininda-Emonds, Georgina M. Mace, and Robert K. Wayne, 2000, "Considering Evolutionary Processes in Conservation Biology," *Trends in Ecology and Evolution* 15 (7): 290–95.

**Assessment and Management of Ecosystem Services**

Guidance, tools, and other references with respect to the assessment and management of ecosystem services include the following:

ARIES Consortium. Homepage. http://ariesonline.org. This site is developed by a consortium of groups that include the University of Vermont's Gund Institute for Ecological Economics, Conservation International, and Earth Economics, as well as experts at Wageningen University. The computer model and decision-support system aims to assist decision makers and researchers by estimating and forecasting ecosystem services provision and their correspondent range of economic values in a specific area.

BBOP (Business and Biodiversity Offsets Program). 2009. "Biodiversity Offset Cost-Benefit Handbook." BBOP, Washington, DC. This handbook addresses the management of biodiversity and the design of an offset primarily for the sustained yield of particular ecosystem services on which affected communities are dependent.

BSR (Business for Social Responsibility Environmental Services, Tools, and Markets Working Group). Homepage. http://www.bsr.org. BSR, San Francisco, CA. Reports include identification of a wide range of ecosystem services tools and in-depth assessments of key selected tools of particular relevance to the private sector.

IPIECA (International Petroleum Industry Environmental Conservation Association). 2011. "Ecosystem services guidance: Biodiversity and ecosystem services guide and checklists." http://www.ipieca.org/sites/default/files/publications/ecosystem_services_guidance_8.pdf. This document explains the relationship between biodiversity, ecosystem services and the oil and gas industry; it provides a set of checklists to help identify the main ecosystem service dependencies and impacts of oil and gas developments; and, it highlights key associated risks and opportunities for oil and gas companies, and provides guidance on potential measures for managing them.

Millennium Ecosystem Assessment. Homepage. http://www.maweb.org. This site houses the Millennium Assessment reports, including *Millennium Ecosystem Assessment, 2006*; *Ecosystems and Human Well-Being: Opportunities and Challenges for Business and Industry*; and links to full synthesis reports, graphic resources, presentations, and videos.

National Capital Project. "Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST)." National Capital Project, Stanford University, Stanford, CA. http://www.naturalcapitalproject.org. InVEST is a family of online planning tools developed by the Natural Capital Project, a joint venture of Stanford University's Woods Institute for the Environment, The Nature Conservancy, the World Wildlife Fund, and the University of Minnesota's Institute on the Environment. The tools are a decision-making aid to map and value ecosystem services and to assess the trade-offs linked to different natural resource management scenarios.

NVI (Natural Value Initiative). Homepage. http://www.naturalvalueinitiative.org. Flora and Fauna International, Cambridge, U.K. The initiative was created by Flora and Fauna International, the United Nations Environment Programme Finance Initiative, Nyenrode Business University, the Dutch Association of Investors for Sustainable Development, and the Brazilian Business School FGV. The initiative enables the finance sector to (a) evaluate how well the food, beverage, and tobacco sectors are managing biodiversity and ecosystem services risks and opportunities and (b) engage with companies in such sectors to reduce their risk exposure through the responsible management and harvesting of natural resources.

——. The NVI toolkit includes the "Ecosystem Services Benchmark: A Tool for Investors to Assess the Management of Biodiversity and Ecosystem Services Risks and Opportunities in Companies with an Agricultural Supply Chain," Flora and Fauna International, Cambridge, U.K. http://www.naturalvalueinitiative.org/content/003/303.php.

——. 2011. "Tread Lightly: Biodiversity and Ecosystem Services Risk and Opportunity Management Within the Extractive Industry." http://www.naturalvalueinitiative.org/download/documents/Publications/NVI%20Extractive%20Report_Tread%20lightly_LR.pdf.

Secretariat of the CBD (Convention for Biological Diversity). 2010. "International Conference on Biological and Cultural Diversity: Diversity for Development—Development for Diversity." Montreal, June 8–10. http://www.cbd.int/meetings/icbcd/. The conference aimed to bring together stakeholder groups of various backgrounds, including representatives of indigenous and local populations, to exchange knowledge and practices linking biological and cultural diversity. Various informational documents relevant to cultural ecosystem services, including sacred sites, are available on the conference's website.

———. 2011. "The Tkarihwaié:ri Code of Ethical Conduct to Ensure Respect for the Cultural and Intellectual Heritage of Indigenous and Local Communities—COP-10, Decision X/42." Secretariat of the CBD, Montreal. http://www.cbd.int/decision/cop/?id=12308. This code of conduct is relevant to cultural ecosystem services.

TEEB (The Economics of Ecosystems and Biodiversity). Homepage. TEEB, Geneva. http://www.teebweb.org. This site includes reports and resources for businesses, local and regional policies related to the evaluation of ecosystem services, the economic costs of biodiversity loss, and the costs and benefits of actions to reduce losses.

University of Vermont Gund Institute for Ecological Economics. Multiscale Integrated Models of Ecosystem Services (MIMES). Burlington, VT. http://www.uvm.edu/giee/mimes/. MIMES is a multiscale, integrated suite of models that enables understanding of the contributions of ecosystem services by quantifying the effects of varying environmental conditions derived from land use change. The models evaluate land use changes and subsequent effects on ecosystem services on global, regional, and local levels.

WBCSD (World Business Council for Sustainable Development). Homepage. WBCSD, Geneva. http://www.wbcsd.org. Ecosystems constitute one of the four key focus areas of the WBCSD. WBCSD argues the business case for the conservation of ecosystems. The site contains related publications on ecosystem services and discusses the business risks associated with the loss and degradation of ecosystems on which businesses depend.

WBCSD (World Business Council on Sustainable Development), IUCN (International Union for the Conservation of Nature), PricewaterhouseCoopers, and Environmental Resources

Management. 2011. "Guide to Corporate Ecosystem Valuation: A Framework for Improving Corporate Decision-Making." WBCSD, Geneva. The document defines corporate ecosystem valuation (CEV) as a process to make better-informed business decisions by explicitly valuing both ecosystem degradation and the benefits provided by ecosystem services. The document provides a set of screening questions for companies to determine the need to undertake a CEV as well as a basic methodology.

WRI (World Resources Institute), WBCSD (World Business Council on Sustainable Development), and Meridian Institute. 2008. "Corporate Ecosystem Services Review: Guidelines for Identifying Business Risks and Opportunities Arising from Ecosystem Change." WRI, Washington, DC; WBCSD, Geneva, Switzerland; and Meridian Institute, Washington, DC. http://www.wri.org/publication/corporate-ecosystem-services-review. This document provides a structured methodology that helps managers proactively develop strategies to manage business risks and opportunities arising from their company's dependence and impact on ecosystems. To date, the review is arguably one of the most relevant to the private sector in terms of conceptualizing ecosystem services and integrating this concept into environmental and social assessments.

——. 2011. "Ecosystem Services Review for Impact Assessment." http://www.wri.org/publication/ecosystem-services-review-for-impact-assessment. The Ecosystem Services Review for Impact Assessment (ESR for IA) provides practical instructions to environmental and social practitioners on how to incorporate ecosystem services throughout environmental and social impact assessment.

**Commodity Roundtables and Standards Setting Websites**

The following websites provide information on commodity roundtables and standards setting:

AWS (Alliance for Water Stewardship). Homepage. http://www.allianceforwaterstewardship.org. AWS aims to establish a global water stewardship program that will recognize and reward responsible water managers and users by creating opportunities for enhanced community standing and competitive advantage.

BAP (Best Aquaculture Practices). Homepage. BAP, Crystal River, FL. http://www.aquaculturecertification.org. This certification system combines site inspections and effluent sampling with sanitary controls, therapeutic controls, and traceability.

Bonsucro (Better Sugar Cane Initiative). Homepage. Bonsucro, London. http://www.bonsucro.com. Bonsucro is dedicated to reducing the environmental and social impacts of sugar cane production.

CERFLOR (Brazilian National Forestry Certification Scheme). Homepage. CERFLOR, Brasília. http://www.inmetro.gov.br/qualidade/cerflor.asp. CERFLOR is Brazil's autonomous national forest certification scheme.

CSA (Canadian Standards Association) International. Homepage. http://www.csa-international.org. CSA International provides product testing and certification services.

FSC (Forest Stewardship Council). Homepage. FSC, Minneapolis. http://www.fsc.org/. FSC promotes responsible management of the world's forests.

GAA (Global Aquaculture Alliance). Homepage. http://www.gaalliance.org. GAA is an international, non-profit trade association dedicated to advancing environmentally and socially responsible aquaculture and has developed the Best Aquaculture Practices certification standards.

GlobalG.A.P. Homepage. GlobalG.A.P., Cologne, Germany. http://www.globalgap.org. GlobalG.A.P. sets voluntary standards for the certification of production processes of agricultural products around the globe.

IFOAM (International Federation of Organic Agriculture Movements). Homepage. IFOAM, Bonn, Germany. http://www.ifoam.org. IFOAM promotes the adoption of systems based on the principles of organic agriculture.

International Trade Centre. "Standards Map." http://www.standardsmap.org. This online tool enables analyses and comparisons of private and voluntary standards. The map analysis tool can be accessed by all registered users.

ISEAL Alliance. "ISEAL Codes of Good Practice." ISEAL Alliance, London. http://isealalliance.org/code. ISEAL is the global association for social and environmental standards. Working with established and emerging voluntary standard systems, ISEAL develops guidance and helps strengthen the effectiveness and impact of these standards.

ISO (International Organization for Standardization). "Standards Development." ISO, Geneva. http://www.iso.org/iso/standards_development.htm.

Leonardo Academy. "Sustainable Agriculture Standard." Leonardo Academy, Madison. http://www.leonardoacademy.org/programs/standards/agstandard/development.html. See also the Leonardo Academy's Sustainable Agriculture Standard Reference Library at https://sites.google.com/a/leonardoacademy.org/sustainableag-referencelibrary/standards.

MSC (Marine Stewardship Council). Homepage. MSC, London. http://www.msc.org. MSC's fishery certification program and seafood ecolabel recognize and reward sustainable fishing.

PEFC (Programme for the Endorsement of Forest Certification). Homepage. PEFC, Geneva. http://www.pefc.org/. PEFC is promotes sustainable forest management.

Rainforest Alliance. "Standards for Sustainable Agriculture." Rainforest Alliance, New York. http://www.rainforest-alliance.org/agriculture/standards.

RSB (Roundtable on Sustainable Biofuels). Homepage. RSB, Lausanne, Switzerland. http://rsb.epfl.ch. RSB is an international initiative that brings together farmers, companies, nongovernmental organizations, experts, governments, and intergovernmental agencies concerned with ensuring the sustainability of biofuels production and processing.

RSPO (Roundtable on Sustainable Palm Oil). Homepage. RSPO, Kuala Lumpur. http://www.rspo.org. RSPO promotes the growth and use of sustainable oil palm products through credible global standards and engagement of stakeholders.

RTRS (Round Table on Responsible Soy Association). Homepage. RTRS, Buenos Aires. http://www.responsiblesoy.org. This multistakeholder initiative aims to facilitate a global dialogue on soy production that is economically viable, socially equitable, and environmentally sound.

SAN (Sustainable Agriculture Network). Homepage. SAN, San José, Costa Rica. http://sanstandards.org/sitio. SAN promotes efficient and productive agriculture, biodiversity conservation, and sustainable community development by creating social and environmental standards.

SFI (Sustainable Forestry Initiative). Homepage. SFI, Washington, DC. http://www.sfiprogram.org. SFI maintains, oversees, and improves an internationally recognized sustainable forestry certification program.

TSPN (Trade Standards Practitioners Network). Homepage, Eschborn, Germany. http://www.tradestandards.org/en/Index.aspx. TSPN's mission is to improve the effectiveness of initiatives that support developing-country capacity and participation in the development and implementation of trade-related social, environmental, and food safety standards and associated measures in agriculture, forestry and fisheries, with a focus on voluntary standards.

WWF (World Wildlife Fund). "Aquaculture Dialogues." WWF, Washington, DC. http://www.worldwildlife.org/what/globalmarkets/aquaculture/aquaculturedialogues.html.