Critical Habitat Assessment using IFC PS6 Criteria

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Introduction

The International Finance Corporation (IFC) requires a client seeking funding for their proposed project to assess environmental and social risks using eight Performance Standards. Performance Standard 6 (PS6; IFC 2012a) and the associated Guidance Note 6 (GN6; IFC 2012b) focus on the protection and conservation of biodiversity. In most cases, the required conservation outcome under PS6 is no-net-loss of biodiversity value achieved using the "like-for-like" or better principle of biodiversity offsets. However, when a project occurs in critical habitat (CH) supporting exceptional biodiversity value, a net gain in biodiversity value is required.

CH identification is required by PS6 to manage risks and avoid, mitigate, and offset impacts to areas with high biodiversity value including: 1) habitat of significant importance to Critically Endangered (CR) and/or Endangered (EN) species; 2) habitat of significant importance to endemic and/or restricted-range species; 3) habitat supporting significant global concentrations of migratory species and/or congregatory species; 4) highly threatened and/or unique ecosystems; and/or 5) areas associated with key evolutionary processes. CH exists independent of a project and can be identified without reference to a project; a project may be proposed in CH, but the CH is present under baseline conditions and is not defined by the size of the project footprint, or other project effects. CH should be determined on a case-by-case basis according to the concepts of irreplaceability and vulnerability.

In this paper we describe our approach for identifying CH under the five criteria outlined in PS6 and GN6 (IFC 2012b) at the species, ecosystem and landscape levels of biological organization using examples from two different projects. The analyses were completed as part of impact assessments, although not definitely required for funding for either project. Further we identify the benefits and applications for the project when CH is mapped spatially.

Methods

CH was identified during the baseline stage of the ESIA following the three-step approach (Paragraph 66, GN6; IFC 2012b).

1. Stakeholder Consultation and Initial Literature Review

A literature review was completed in consultation with relevant authorities, academic and other scientific institutions, taxonomic specialists, and other recognized external experts. In-field consultation and desktop research was undertaken to understand the biodiversity values present in the vicinity of project areas, identify existing conservation concerns, and identify gaps in existing knowledge.

2. In-field Data Collection and Field Verification of Existing Information

Field data were collected to describe and map diversity, distribution, abundance and habitat associations of aquatic and terrestrial flora and fauna including species on conservation concern (including species new to science). Field data were collected by taxa specialists over multiple seasons for both projects.

3. Critical Habitat Determination

CH was identified by delineating spatial units of analysis, screening biodiversity features (i.e., at the species, ecosystem and landscape scales), and evaluating the distribution of CH.

Spatial Units of Analysis

Critical Habitat Area of Analysis

CH is only relevant to a development project if it can be impacted by that project. Consequently, a Critical Habitat Area of Analysis (CHAA) for each project area was identified as an ecologically relevant area surrounding and including the anticipated extent of project influence on biodiversity. The CHAA was used as the geographical extent to screen biodiversity features to be assessed for CH. CH was only identified and mapped at the CHAA scale as potential project effects are limited to this spatial extent.

Discrete Management Unit

A Discrete Management Unit (DMU) is an area with a clearly demarcated 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 (GN6, paragraph 65). The DMU represents the scale at which CH is assessed using the quantitative thresholds identified in GN6 for Criteria 1-3. The delineation of a DMU can vary depending on the species, subspecies or biodiversity feature of concern. For example, a small, rare ecosystem (e.g., vegetation community) may be an appropriate DMU for a locally endemic plant species; however, not appropriate for a wide-ranging fauna species.

DMUs were evaluated on an individual basis and assigned for a species or feature using ecological and political boundaries. For most features, the DMU was the same spatial extent as the CHAA because of marked differences in biodiversity management practices across jurisdictional boundaries.

Screen Biodiversity Features

Biodiversity features were screened at the species, ecosystem and landscape levels.

Species Level

Criterion 1 is triggered by species listed as CR or EN on the International Union for Conservation of Nature (IUCN) Red List, and nationally/regionally listed species assessed using similar criteria. Where uncertainty was present, a precautionary approach was applied and species were assigned a higher threat level. Species not listed as CR or EN were included under Criterion 1 if compelling evidence indicated that the threat level was high enough to warrant a potential CH designation based on the intent of PS6.

Criterion 2 is triggered by habitats of significant importance for endemic or restricted-range species. IFC quantitative definitions (paragraph 80, GN6: IFC 2012b) were used to define restricted-range species. Global extent of occurrence was used to define range and was determined using IUCN data (IUCN 2013), existing literature, and consultation with taxonomic specialists.

Criterion 3 is triggered by migratory and/or congregatory species occurring in the CHAA. All migratory or congregatory species were screened to determine if the CHAA contained irreplaceable and/or extremely vulnerable habitats used either periodically or consistently. Migratory birds were identified using information from BirdLife International (2013) and other species were identified using information from IUCN listings (IUCN 2013) and other published literature.

Ecosystem Level
Criterion 4 is triggered by ecosystems that are threatened, house unique assemblages of biome-restricted species, or are recognized for high conservation value, including protected areas. Where data permitted, quantitative categories and criteria from Rodriguez et al. (2011) were applied to evaluate ecosystem status. Ecosystems considered CR or EN were identified as CH, and ecosystems rated as VU were evaluated on an individual basis through consultation with experts. Ecosystems with unique assemblages of species or of high conservation value were evaluated based on field data, literature and consultation.

Landscape Level
Criterion 5 applies to landscape-level features that can influence key evolutionary processes. Key landscape features such as unique topography that creates unique habitats and areas important for climate change adaptation were identified using literature review and through expert consultation. Criterion 5 also applies at the species level for "distinct species" which include those coined as "Evolutionarily Distinct and Globally Endangered" (EDGE) (GN 95 IFC 2012b; Zoological Society of London 2013). Species within the CHAA identified as EDGE species were evaluated for critical habitat on a case-by-case basis in consultation with appropriate experts.

Distribution of Critical Habitat
To identify CH and distinguish the relative challenges associated with implementing a project (e.g., Tier 1 vs. Tier 2 CH) using the quantitative thresholds defined for Criteria 1-3, the proportion of the global population occurring within a DMU must be estimated. A hierarchy of approaches was used to achieve this, from most to least preferred:

1. population estimates;
2. global area of occupancy;
3. global extent of occurrence; and
4. expert opinion.

Estimates of population size within a DMU were compared to global estimates, when available. When population data were unavailable, proportion of range extent was calculated to approximate population size, using area of occupancy or extent of occurrence. The area of occupancy is the area within the extent of occurrence that is truly occupied by a species, excluding cases of vagrancy (IUCN 2001). The global extent of occurrence is a boundary that encompasses all known, inferred or projected occurrences of a species (IUCN 2001). The proportion of the global extent of occurrence was the most commonly applied surrogate for population size. The number of DMUs present globally was also used as a surrogate for population size.

We applied a novel approach to CH identification by spatially mapping it within the CHAA. Identifying the presence of CH in a CHAA provides insight on the overall sensitivity of the area, however, it does not provide adequate detail to effectively apply the mitigation hierarchy and assess potential effects to CH. Spatial maps are very useful in evaluating effects to CH because they provide a means for quantifying effects.

CH should be defined spatially in an ecologically sensible manner specific to the biodiversity value for which the CH is designated, and cannot be focused solely on sampling points or on an entire study site, without appropriate support. Therefore, CH was delineated using the following approaches, from most to least preferred:

1. habitat association models derived from empirical data;
2. habitat association models derived from literature review and consultation with experts;
3. range maps or population locations derived from empirical data and/or expert opinion; or
4. entire CHAA identified as CH when uncertainty concerning range or habitat associations precluded more precise mapping.

The final products were maps developed individually for each biodiversity value triggering CH.

Applications for Critical Habitat Identification

Project Design

An integral part of PS6 is the application of the mitigation hierarchy. Spatial identification of CH at baseline provides the foundation for applying the mitigation hierarchy. Individual CH maps can be overlaid to build a constraints landscape which assists in guiding modifications to the project design in order to achieve a maximum level of avoidance. Similarly, CH maps can guide efforts to mitigate impacts to CH.

Impact Assessment

A spatially explicit description of CH can assist in focussing an impact assessment to meet PS6. The IFC states that projects occurring in CH must have a net positive effect, over a reasonable period of time, on the biodiversity value for which the CH was designated (paragraph 18, PS6; IFC 2012a). The requirement for projects located in CH to achieve net gains in biodiversity thus provides measurable targets against which the project can be assessed. We therefore apply a risk-based approach to assess project effects to determine the likelihood of conformance with IFC PS6 (i.e., the likelihood of achieving net gains).

The IFC states that it is unlikely that a project can comply with PS6 (paragraphs 17-19, PS6; IFC 2012a) if the project is located in Tier 1 CH. Here we argue that spatially explicit mapping of CH refines our understanding of impacts to biodiversity values triggering CH and allows a more comprehensive assessment of the feasibility of avoiding, mitigating and offsetting impacts and achieving net gains, even for Tier 1 biodiversity values.

Baseline CH maps were overlain with proposed project footprints, and non-footprint effects (e.g., noise, dust) considered, to evaluate project impacts to biodiversity values. Historic land-use trends for the project specific CHAAs were also used to assist in CH determination and evaluate magnitude of impacts. A risk-based approach was used to evaluate project effects on biodiversity values triggering CH including species, ecosystems and landscapes. The likelihood (likely, possible, unlikely) of achieving a net gain in CH was determined for each species, ecosystem and landscape based on:

- magnitude of the effect (e.g., change in population size, amount of habitat loss, number of occurrences affected);
- time frame required to reach a net gain of CH; and
- geographic extent of the effect.

For species triggering Criteria 1-3, population-level information is not typically available. Habitat was frequently used as a surrogate for populations to determine the magnitude of project effects on a given species. Residual impacts were evaluated at maximum extent of effects, including mitigation but before reclamation, as success of reclaiming CH is uncertain and requires monitoring to demonstrate effectiveness. Similarly, offset calculations were carried out without considering reclamation. Given that we provide spatially explicit descriptions of CH we can quantify amount of CH or proportion of population impacted and use these values to set measurable targets in biodiversity action plans. In some cases, the configuration of CH in the CHAA is such that a minimal amount of CH or no CH is actually affected by the project, highlighting the importance of defining CH spatially.

In consultation with species experts, we used the concept of species resilience, our understanding of current threats and our understanding of predicted project effects to determine the feasibility of offsetting project impacts and achieving net gains. We recognize that developing a project in Tier 1 CH represents significant risks for any project but feasibility of mitigating and offsetting impacts should still be assessed on a case-by-case basis. For example, effects to a species that does well in reclaimed or modified habitats are more likely to be successfully offset, even if in Tier 1 CH. Project effects to species undergoing declines due to unsustainable harvesting may also present higher likelihood of offsetting success if the primary source of decline can be alleviated or removed.

Recommendations were made for additional modifications to project design and footprints where net gains were not predicted. Closure plans were used as targets for achieving additional gains, and historic land-cover trends analyses informed decisions about which land cover types may successfully be reclaimed in the CHAAs based on past use and former ecological functions.

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Associated Presentation

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