

GUIDELINES for the IDENTIFICATION

of High Conservation Values in Indonesia (HCV Toolkit Indonesia)

By: The Consortium for Revision of the HCV Toolkit for Indonesia

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The Consortium for Revision of the HCV Toolkit for Indonesia set out in 2006 with the main task in revising and up date the Toolkit and improve its usefulness in Indonesia. The Consortium for Revision of the HCV Toolkit for Indonesia involved eight member organizations: Tropenbos International Indonesia Programme (TBI Indonesia), WWF Indonesia, The Nature Conservancy (TNC), Daemeter Consulting, the Indonesian Resource Institute (IndRI), Fauna Flora International (FFI), Conservation International (CI), and Rainforest Alliance.

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Foreword

HCV Identification Toolkit (2008)

Indonesia is world reknowned as home to the third largest tropical rain forest in the world, second only to Brazil and the Congo; a maritime state which also contains many other natural riches. It is also world reknowned for having an exceedingly high level of environmental destruction – increasingly high deforestation rates, increasingly damaged seas, increasingly turbid rivers, and increasingly polluted air. Until now, such issues of environmental destruction have not been well handled. There have been many initiatives by various groups – government, the private sector, NGOs and other civil society groups – to improve practices, policies and governance of natural resource management in Indonesia. Many people have been trained and now specialize in natural resource management, but this has not been sufficient to address the natural resource and environmental problems this country faces. Why is this? What else must we do to resolve this problem?

I am pleased to support the release of the revised Toolkit for Identifying High Conservation Values (2008) which has been co-developed by a consortium of independent organizations, including The Nature Conservancy (TNC), Worldwide Fund for Nature (WWF) Indonesia, Tropenbos International Indonesia Program (TBI), Daemeter Consulting, the Indonesian Resource Institute (IndRI), Fauna and Flora International Indonesia Programme (FFI), Conservation International (CI) and Rainforest Alliance. After reading this Toolkit – which was developed in an open and transparent manner involving various stakeholders, I am confident that this Toolkit will make a valuable contribution towards the management of areas of high conservation value - whether from environmental and biodiversity aspects, or from social and cultural aspects – in all sectors (forestry, plantation, water, mining and so on). This Toolkit asks us to redefine what we mean by the term conservation, and will help us to improve management of our natural resources.

This Toolkit will of course only be a small technical tool that is part of a larger effort to improve natural resource management in Indonesia. Identifying high

conservation values is an early step in this process. This step needs to happen in parallel with improvements in other areas such as governance of natural resource management, policies that support good governance and so forth. The most important factor in realizing success will be our genuine willingness to walk the talk. Surely we do not want to see our generation enshrouded in a future of environmental destruction, forests that no longer provide shade, lifeless seas, water that can no longer refresh and air pollution that endangers human lives.

Once again I congratulate this Consortium, which has worked hard to develop this Toolkit together with stakeholders throughout Indonesia. Your hard work is truly meaningful for the sustainability of all living things on the Earth, most especially in Indonesia.

Jakarta, 12 July 2008

Emil Salim

1. INTRODUCTION

1.1 The High Conservation Value Forest (HCVF) concept

The concept of HCVF (High Conservation Value Forest) emerged in 1999 as Principal 9 of the Forest Stewardship Council (FSC) standard for certified well-managed forest. The HCVF concept[1] was designed to help forest managers improve the social and environmental sustainability of wood production, through a two-step process: first, to identify areas inside or near the forest management unit (MU) with exceptionally important social, cultural, or environmental values, and, second, to implement a system of management and monitoring to guarantee these values will be maintained or enhanced. A fundamental principal of the HCV concept is that areas found to support high conservation values are not necessarily designated no-go protection zones where development is forbidden. Rather, the HCV concept requires that development be undertaken in a manner that ensures the maintenance of the values. In this regard, the HCV approach can be seen as a planning tool for helping society to achieve a rational balance between environmental conservation, social justice and economic development.

Although the HCV concept was originally designed for management of timber production forests ("HPH" in Bahasa Indonesia), the concept rapidly gained popularity in other contexts. Today, HCV is used for spatial planning at the national or provincial level in countries such as Bolivia, Bulgaria and Indonesia. In natural resource sectors such as plantations, HCV is used as a planning tool to minimize negative ecological and social effects from natural forest conversion. For example, the standard for certified sustainable oil palm developed by the multi-stakeholder Roundtable on Sustainable Palm Oil (RSPO) requires that development of new plantations post 2005 must avoid the conversion of areas needed to maintain or enhance HCVs present. The HCV concept has also gained traction in the financial sector, with some commercial lenders requiring HCV assessments as part of due diligence to assess loan requests in sectors with a history of negative impacts on the environment and local communities.

[1] The HCVF concept is often referred to as the "HCV approach" or the "HCV process" reflecting its wider use outside forestry and forests

The HCV concept has thus grown from a tool designed to improve the sustainability of wood production with attention to social, cultural and biodiversity issues, into a concept with broader implications for society. HCV is a means for private companies to realize their corporate commitments to engage in 'best practices', often beyond those required by national laws and regulations; for governments to undertake spatial planning that ensure the maintenance of fundamentally interdependent biological, social, and ecological values that require integrated management; and for progressive lenders to avoid making loans that promote environmental destruction or social collapse. This variety of HCV applications illustrates the versatility of the concept, a key feature of its popularity.

1.2 Development of the HCV Toolkit for Indonesia

In the early stages of development in 1999, the HCV concept was difficult to apply due to a lack of guidance from the FSC. In response to this problem, in 2003 the UK-based consultancy ProForest published a document called "High Conservation Value Forest: A Global Toolkit". This document provided a fuller explanation of the HCV concept and practical guidance for how to implement an HCV assessment, albeit in a generic format suitable for use globally. This Global Toolkit recommended that national interpretations, or country-specific Toolkits, should in turn be created to provide more detailed guidance for individual countries.

Guidelines for Indonesia were thus drafted at the end of 2003, representing the first national interpretation of HCV. The title of this document was "The Identification, Management and Monitoring of High Conservation Value Forest: A Toolkit for Forest Managers and Other Stakeholders". The Toolkit was created by a group of Indonesian and foreign stakeholders with experience in various aspects of forest certification and expertise in related fields, including social forestry, anthropology, conservation biology, forest ecology, vertebrate biology and forest production.

The Toolkit for Indonesia was a 'translation' of the Global HCVF Toolkit to the Indonesian context, produced through a series of workshops in Indonesia organized by Rainforest Alliance and ProForest. It was field tested and published as Draft 1 in August of 2003. The Toolkit encompassed components of the identification, management and monitoring of HCVF in Indonesia, and was planned for periodic revision and improvement based on the experiences of practitioners, the private sector, government and other stakeholders.

This original 2003 version of the HCVF Toolkit for Indonesia served a vital purpose, but overtime became increasingly difficult to use for the following reasons:

- The Toolkit was originally designed to support assessments in the context of FSC certification for responsible forest management. However, as time passed, the Toolkit became the de facto manual for HCV assessment in other sectors as well, including pulp and oil palm plantations, and for provincial- and District-level spatial planning. These applications required a different assessment approach beyond that outlined in the original Toolkit.

- Use of the original Toolkit by practitioners of various backgrounds demonstrated a lack of clarity and consistency in key concepts, definitions, and methods of evaluating HCV due primarily to:
  >> an inconsistent and unsystematic scope and spatial scale for evaluating various HCVs.
  >> adaptation of certain features of the Global HCVF Toolkit proved to be inappropriate for the Indonesian context[2].
  >> imperfections in the translation from English (the language used in the Global HCVF Toolkit) to Bahasa Indonesia (the language used in the original Indonesian HCVF Toolkit).

- Use of the HCV concept outside the FSC context is viewed by many as high risk, because the HCV process as defined in the original Toolkit did not provide adequate social safeguards, as required by other Principles of the FSC system.

- Broader use of the HCV concept in Indonesia has been controversial at times due to inadequate efforts to raise awareness and understanding about HCV among civil society. The original Toolkit was never approved by stakeholders involved in its planning and field testing, and, as such, its credibility in defining the HCV process has been questioned.

1.3 Revision of the HCV Toolkit for Indonesia

For these reasons, in late 2006 a consortium of HCV users in Indonesia set out to revise and update the Toolkit to improve its usefulness in Indonesia. The Toolkit revision was initiated and organized by a consortium of NGO partners under the coordination of the Indonesian Resource Institute (IndRI) and Daemeter Consulting, in partnership

[2] Substantial differences in nomenclature, classification, and terminology exist between Bahasa Indonesia and western languages, where the Global HCVF Toolkit originated.

with The Nature Conservancy (TNC), Tropenbos International Indonesia Programme (TBI Indonesia), The Worldwide Fund for Nature (WWF), Conservation International (CI), Fauna Flora International (FFI) and Rainforest Alliance. Financial support for the Toolkit revision was provided by several organizations, primarily TNC, United States Agency for International Development (USAID) and WWF.

The Toolkit revision was intended to (i) provide a logical structure and detailed explanation concerning the HCV concept and HCV methodology; (ii) provide useful definitions of important terms and phrases; and (iii) to clarify stages in the process of identifying HCVs, as well as rights and responsibilities of parties involved. It was agreed that special attention must be given to the following issues:

- the HCV concept embodied in the Toolkit must be refined to accommodate different sectors (aside from natural forest management) to enable general application of the concept.
- the revision process will be undertaken in Bahasa Indonesia to avoid unnecessary misunderstandings and confusion, as well as to promote active, wider participation.
- the revision must be carried out in a transparent fashion involving the broadest possible range of stakeholders in a public and accountable manner to obtain maximum understanding and support for the HCV process in its entirety, from identification to management and monitoring.

This revision was carried out in a participative fashion through a combination of monthly meetings of two working groups; larger stakeholder meetings in Jakarta, Sumatera, Kalimantan, and Papua; as well as internet-based discussions[3].

1.4 Goal of the revised HCV Toolkit for Indonesia

The revised Toolkit is meant to serve as a standard protocol for conducting HCV assessments in a manner that guarantees high quality, transparency and integrity of HCV applications. This is achieved by (i) explaining the required steps of an HCV assessment in clear and detailed terms, (ii) defining rights and responsibilities of parties involved, and (iii) providing guidelines concerning minimum standards of data collection to produce quality outputs in an efficient manner. The Toolkit has been written in a generic form to enable use in various sectors, including those of conventional wood businesses, oil palm or pulp plantations, mining and land use planning.

[3] The discussion and explanation of information in the revision process was done via email and two web sites. These are www.toolkitrevisionwg1.pbwiki.com for Working Group 1 and www.hcvfrevisiontoolkitwg2.pbwiki.com for Working Group 2.

The scope of the Toolkit is limited to identification of HCVs – it does not provide detailed information on HCV management or monitoring. The Toolkit does provide Management Recommendations of each HCV for consideration in the development of management plans through stakeholder consultation, but it does not provide a detailed recipe for how to manage and monitor each value. These needs will be covered in separate modules that make specific recommendations for each sector, in particular production forestry, oil palm and wood fiber plantations.

1.5 Using the Toolkit

This Toolkit is divided into eight chapters. Following the Introduction in Chapter 1, there are seven chapters arranged to reflect steps of an HCV assessment. Chapter 2 provides a glossary of important terms and concepts. Chapter 3 previews all of the revised HCVs. Chapter 4 explains the HCV process, including rights and responsibilities all parties, and includes a stepwise explanation of the full HCV process from preparation and identification through to management and monitoring. Chapter 5 provides definitions of the expression 'stakeholder' and what is meant by the concept of 'stakeholder engagement'. Chapter 6 describes work preparation and the types of data required for a field assessment. Chapter 7 outlines data collection priorities and describes methods for primary data collection in the field. Chapter 8 provides a detailed, step-wise explanation of methods for identifying and mapping HCV areas. A series of digital Appendices provides additional supporting information.

This Toolkit is organized into modules to enable flexibility for readers to reference sections of the document based on their needs and interest. However, it is recommended that any party who will conduct an HCV assessment read the Toolkit in its entirety to obtain a complete understanding of methods, data needs and analysis. Readers who wish to obtain a basic understanding of the HCV assessment process, but who do not have plans to do an assessment themselves, might read Chapters 1 to 5 only. Readers who are only interested in new definitions, recommendations, and criteria concerning revised HCVs may wish to read Chapter 3 only. HCV assessors with previous experience in conducting assessments can refer to Chapter 8 for detailed information on the revised values and their identification. It is hoped that this modular arrangement will increase flexibility of the Toolkit, while at the same time produce a logical document that is easily understood.

1.6 Members of the revision team

The Consortium for the Revision of the HCV Toolkit for Indonesia involved eight

member organizations: The Nature Conservancy (TNC), WWF Indonesia, Tropenbos International Indonesia Programme (TBI Indonesia), the Indonesian Resource Institute (IndRI), Daemeter Consulting, Fauna Flora International (FFI), Conservation International (CI), and Rainforest Alliance, in addition to a number of independent contributors. The revision process was coordinated by Gary Paoli and Aisyah Sileuw of Daemeter Consulting. Two working groups were formed to carry out the revision: Working Group 1 led by Philip Wells and Working Group 2 lead by Dicky Simorangkir until January 2008, followed by Petrus Gunarso until completion of the Toolkit in June 2008. A number of people contributed to the Toolkit by writing and/or editing text or providing data. These are: Gary Paoli, Philip Wells, Aisyah Sileuw, Dicky Simorangkir, Yana Suryadinata, Junaedi Samsudin, Indrawan Suryadi, Alfa Ratu Simarangkir, Deni Wahyudi, Petrus Gunarso, Kresno Dwi Santosa, Edi Purwanto, Prihandoko Sanjatiko, Sulistrya Ekwati, Ucok Sinaga, Ian Woxvold, Betsy Yaap and Titiek Setyawati.

In addition to those who participated in workshops and web-based discussions of the revision, many people contributed to the development of ideas via discussions with members of the revision team. These include Jonotoro, Patrick Anderson, Dodik Nur Rohmat, Semiarto Aji Purwanto, Marcus Colchester, Thomas Hidayat, Hendrayanto, Fergus Macdonald, Pete Wood, Fitrian Ardiansyah, Neil Franklin, Paul Hartman, Eli Lorenzo, Thomas Barano, Anwar Purnomo, Cam Webb, Bas van Balen, Mark Leighton, Jeff Hayward, Erik Meijaard, Doug Sheil, Nardiyono, Christopher Stewart, Neville Kemp, Darmawan Liswanto, Scott Stanley, Edward Pollard, Stephan Wulfraat, Arief Budiman, Purwo Susanto, Indra Plantasia, Art Klassen, Marc Hiller, Albertus Albert, Ian Singleton, Ben Jarvis, I.B.W. Putra, Desi Kusumadewi, Asril Darusamin, Kartini Susandi, Frank Momberg, Hasbillah, Iwan Djuanda, Susanto Kurniwan, Didik Prasetyo, David Cassells, Tom Maddox, Agus Salim, Perpetua George, Ruth Nussbaum, Rod Taylor and one person who wished to remain anonymous.[4]

The Bahasa Indonesia version of the revised Toolkit was translated into English by Antonia Gorog and Thomas Barano, with editing and oversight by Daemeter Consulting. A final review was performed by the revision consortium, as well as one reviewer who preferred to remain anonymous.

1.7 Acknowledgements

The Toolkit revision team wishes to thank and acknowledge numerous parties and organizations who made direct or indirect contributions to the revision process.

[4] Note it is the intention of the revision team to acknowledge the contributions of the above-mentioned persons to the revision process. The list of names, however, should not be construed to imply direct or indirect endorsement of the revised Toolkit by these parties.

Throughout the revision process, hundreds of participants provided their input and ideas to the revision team in meetings, workshops, discussion groups, email polls and commentary concerning earlier drafts of the revised Toolkit. These contributions came from too many parties to list individually; we are genuinely grateful for them all.

Funding for the Toolkit revision was provided primarily by three members of the revision team – TNC, WWF, and Tropenbos. Field tests of the first draft of the revision were carried out with support from PT. Erna Djuliawati. To promote continued improvement of the HCV Toolkit for Indonesia, the revision team welcomes feedback from readers, users or managers concerning any aspect of the revised document. Feedback can be emailed directly to Tropenbos International Indonesia Programme (TBI Indonesia) at tropenbos@telkom.net.

2. TERMINOLOGY AND ABBREVIATIONS

Agreement on the Arrangement of Forest Areas (TGHK) refers to an agreement among seven agencies at the national level concerning the designation and use of forest areas and other areas. Currently, revision to the forest use agreement (TGHK) is being integrated with the district-level (RTRWK) and provincial-level (RTRWP) spatial plans.

Basic needs are items or services required by humans to meet daily requirements for food, water, clothing, household tools and materials, firewood, medicine, education and livestock.

A **biotic community** is a group of organisms of the same or different species that share a local environment. Members of a community interact with features of their shared environment and with eachother either directly (e.g., via competition for nest sites) or indirectly (e.g., via competition for food).

Conservation Area (*Kawasan Konservasi*) in the Indonesian context refers to an area legally designated as a wildlife reserve, a nature conservation area, a game reserve or a protected forest.

Culture refers to a collective identity shared by a group of people or a local community with common values, ideas, beliefs, behavior, ceremonies or rituals, language, knowledge or material objects.

District-level spatial plan (RTRWK) refers to a document detailing a spatial plan (or land use classification) for guiding development planning and for controlling its implementation at the District level. This document serves as a compass giving direction to medium- and long-term development planning, spatial land use and oversight of implementation; aims to ensure integrity, relevance, and balance among sectors in the plan; and determines the location and function for investment.

Ecosystem refers to an ecological system comprising all organisms (biota) and the physical (abiotic) environment in which they live and interact. An ecosystem can be viewed as the community of all coexisting plants and animals and their physical environment, which together function as an interacting unit with mutually inter-dependent parts, functioning as a collective whole that in some cases cannot be separated.

Ecosystem services are biophysical services provided either directly or indirectly by an ecosystem and that are important for sustaining life, including humans.

The **Forest Stewardship Council** – FSC – is an international organization based in Germany that certifies responsible production of wood products in compliance with the FSC standard of sustainability. The FSC standard embodies 10 Principles and 55 Criteria.

Hak Pengusahaan Hutan – HPH – is Forest Concession. The right of the concession granted to pursue a series of forests and forestry business activities (harvesting, planting and protecting the forest as well as processing and marketing forest products) according the governments regulation. Forest management activities emphasize the process of extracting and transporting log from the forest (Wood Administration). Concessions granted by the Minister of Forestry to the state company, the regional companies or private companies

Habitat originates from the Latin word habitat meaning "to inhabit". Habitat is a component of an ecosystem or area that supports a combination and concentration of environmental conditions and characteristics sufficient to enable persistence of the species (i.e., survival and reproduction).

High Conservation Value (HCV) is an environmental, social or cultural attribute considered to be of exceptional importance at the local, regional or global level. Definition of these values and methods for identifying them are set forth in the HCV Toolkit for Indonesia.

High Conservation Value Area (HCVA) is an area that possesses one or more high conservation values.

High Conservation Value Forest (HCVF) is an area of forest that possesses one or more high conservation values.

High Conservation Value Management Area (HCVMA) is an area over which one or more forms of active management is undertaken to ensure the maintenance or enhancement of one or more high conservation values in the area.

Landscape refers to a geographic mosaic of interacting ecosystems (or sub-components thereof) whose spatial arrangement and modes of interaction reflect the influences of climate, geology, topography, hydrology, soil, the biota and human activities.

Local community refers to a group of people who live in the same area, interact with each other, and have a common interest/stake in the community and its surroundings. For practical purposes, in the context of HCV, a local community is a group of people who live in or near a forest area or other natural ecosystem, and who are part of the same communication network, share a common interest in the forest or other natural ecosystems nearby and have an identifiable connection to or association with the area.

A management unit (MU) is an area that has been formally designated for management by a company or community by virtue of a management permit issued by an authorized government body. Examples of such permits include (i) the right to use forest for the production of forest products (HPH, in Bahasa Indonesia) issued by the Forestry Department, and (ii) the right to explore feasibility and begin development of an area for oil palm plantation (Ijin Lokasi in Bahasa Indonesia) issued by the local government.

Minimum Viable Population (MVP) refers to the threshold number of individuals below which, under a given set of conditions, a population cannot persist and will decline over time toward extinction. The MVP concept is easy to comprehend in principal but very difficult to apply in practice, especially in Indonesia, where MVP parameters are sufficiently well known for only a few species, including the tiger, orangutan and elephant.

Population refers to all interacting members (individuals) of a species living in a defined area.

A **Protected Area** (Kawasan Lindung) in the Indonesian context is a legal status conferred upon local protection areas (eg coastal regions, riverine environments, areas near lakes/reservoirs and headwaters/upper reaches of a watershed), as well as wildlife refuges and cultural preserves that typically cover a much larger spatial extent (eg, terrestrial wildlife reserves, marine wildlife reserves and their waters, coastal mangrove areas, national parks, large forest parks, nature tourism parks, and areas important for cultural and knowledge preservation). Indonesian Protected Areas also include Protection Forests, peat lands with surface peat layers >3m deep and areas for water absorption.

Provincial-level Spatial Plan (RTRWP) refers to a document that outlines plans for spatial development and its control at the provincial level. As with the District-level

spatial plan (RTRWK), this document functions as a compass to direct long- and medium-term plans to promote integrity, relevance and balance among districts/cities of the province to achieve harmony among sectors in the development process; detail the location and function of investments; set forth strategic spatial plans at the provincial level; and integrate plans set forth at the district/city level.

The **Roundtable on Sustainable Palm Oil** (RSPO) is an international multi-stakeholder initiative concerned with promoting responsible development of the oil palm industry. RSPO promotes the production and use of certified sustainable palm oil through cooperation among members at different points along the supply chain, from producers to consumers, and by initiating a dialog among stakeholders to define credible, concrete and verifiable attributes of sustainability. RSPO has developed a standard for responsible palm oil that defines social, environmental and financial sustainability based on seven principals.

Spatial planning is a system for planning and controlling the use of space, as set forth in Indonesian law No. 29/2007.

Spatial arrangement (Tata Ruang in Bahasa Indonesia) refers to the structure and pattern of spaces. Spatial structure in human society includes the arrangement of settlements, the network of infrastructure and tools that support the social economy of a community, as well as its hierarchical structure. Spatial arrangement to support conservation in the Indonesian context includes the designation of spaces allocated for conservation and those allocated for culture (Indonesian law No. 26, 2007, section 1).

Viable population refers to a population represented by individuals of sufficient number, condition and gender to enable the population to persist indefinitely, or for a specified number of years or generations.

Watershed is a hydrological unit defined by topographical limits. It includes the tallest peaks where rainwater falls, the streams that channel rainwater downslope into larger rivers, the rivers representing tributaries to major rivers, and the mouth of the river that finally channels rainwater into lakes or the ocean. Depending on the topography of a region, a watershed might be classified into dozens or hundreds of sub-watersheds, sub-sub-watersheds and so forth.

3. HIGH CONSERVATION VALUE AREAS

3.1 High Conservation Values in Indonesia

A High Conservation Value Area (HCVA) is an area that possesses one or more high conservation values (HCV). The revised HCV Toolkit for Indonesia defines six (6) HCVs comprising 13 sub-values. These 13 sub-values can be classified into three categories:

(i) Biodiversity	HCV 1, 2 and 3
(ii) Ecosystem Services	HCV 4
(iii) Social and Cultural	HCV 5 and 6

HCVs 1-3 draw special attention to aspects of biodiversity present in a landscape of which the assessment area forms a part. Biodiversity is defined as the diversity of terrestrial and aquatic organisms and the complexity of ecological interactions of which biodiversity forms a part. HCV 4 aims to guarantee the continued provision of key environmental services affected directly or indirectly by management operations within a landscape. HCV 5 (Basic Needs) and HCV 6 (Culture) draw attention to areas (natural areas in the case of HCV 5) important to local communities, including their right to preserve or modify traditional lifestyles and cultures, especially those dependent on forest or other natural ecosystems. The areas (forested or not) referenced in HCV 5 and 6 are not necessarily defined by *ownership rights*, but in some cases are more broadly defined to include land use rights wherever they can be legitimately asserted. The assessment and documentation of these community rights are based on direct consultation with the community.

The revised HCVs for Indonesia are shown in Box 1. Note that to simplify the titles of HCVs 1, 2 and 3, the phrase "globally, regionally or nationally significant" has been removed. The definitions and criteria of the revised values, however, remain broadly consistent with the definitions of globally, regionally or nationally significant, as outlined in the Global HCV Toolkit. This change was made at the request of numerous stakeholders involved in the revision process, who considered the phrasing unnecessarily complex.

Box 1. The Revised High Conservation Values for Indonesia

HCV 1	**Areas with Important Levels of Biodiversity***
HCV 1.1	Areas that Contain or Provide Biodiversity Support Function to Protection or Conservation Areas
HCV 1.2	Critically Endangered Species
HCV 1.3	Areas that Contain Habitat for Viable Populations of Endangered, Restricted Range or Protected Species
HCV 1.4	Areas that Contain Habitat of Temporary Use by Species or Congregations of Species
HCV 2	**Natural Landscapes & Dynamics***
HCV 2.1	Large Natural Landscapes with Capacity to Maintain Natural Ecological Processes and Dynamics
HCV 2.2	Areas that Contain Two or More Contiguous Ecosystems
HCV 2.3	Areas that Contain Representative Populations of Most Naturally Occurring Species
HCV 3	**Rare or Endangered Ecosystems***
HCV 4	**Environmental Services**
HCV 4.1	Areas or Ecosystems Important for the Provision of Water and Prevention of Floods for Downstream communities
HCV 4.2	Areas Important for the Prevention of Erosion and Sedimentation
HCV 4.3	Areas that Function as Natural Barriers to the Spread of Forest or Ground Fire
HCV 5	**Natural Areas Critical for Meeting the Basic Needs of Local People**
HCV 6	**Areas Critical for Maintaining the Cultural Identity of Local Communities**

* Note the phrase "globally, regionally or nationally significant" has been removed from the titles of HCVs 1, 2 and 3 to simplify the titles. However, the definitions and criteria of the revised values remain broadly consistent with the definitions of globally, regionally or nationally significant as outlined in the Global HCV Toolkit.

3.2 Goals of Each HCV

HCV 1 Areas with Important Levels of Biodiversity

HCV 1.1 Areas that Contain or Provide Biodiversity Support Function to Protection or Conservation Areas

The system of protection and conservation areas in Indonesia covers an area greater than 22,200,000 hectares (PHPA 1999). All areas were designated with the objective of maintaining specific landscape features, e.g., ecological functions, biodiversity, water sources, viable populations of animals or a combination of these features. HCV 1.1 aims to help ensure that a protection or conservation area meets the specific objective(s) that motivated its establishment. If the MU (i) has a protection or conservation area within it, (ii) is thought to provide a biodiversity support function to a protection or conservation area nearby, or (iii) will undertake activities likely to affect the biodiversity conservation function of a protection or conservation area, then HCV 1.1 is present in the area. Management activities in the MU must ensure that these support functions are maintained or improved.

HCV 1.2 Critically Endangered Species

The purpose of HCV 1.2 is to identify Critically Endangered species that are present in a MU or nearby and likely to be affected by off-site impacts of the MU. Management action must be undertaken by the MU to protect each individual of such species.

Only species included on the IUCN Red List as Critically Endangered (CR) or that meet the criteria are considered under HCV 1.2. For such taxa, each individual is extremely important as a potential founder/progenitor of future generations, and for this reason the persistence of each individual is a shared societal responsibility. It should be stressed that HCV 1.2 management aims to guarantee (to the maximum extent possible) the survival of each individual of a CR species, whereas that of HCV 1.3 (see below) aims to ensure the persistence of viable populations through habitat protection.

HCV 1.3 Areas that Contain Habitat for Viable Populations of Endangered, Restricted Range or Protected Species

HCV 1.3 aims to identify habitat in or near a MU whose protection is required for maintaining viable populations of endangered, restricted range or protected species. Populations of species that must be considered in HCV 1.3 include all species identified

under HCV 1.2 (Critically Endangered), as well as species considered endangered or vulnerable by IUCN, restricted range (occurring on one island or part thereof, as appropriate) or protected by the Indonesian government.

The management aim of HCV 1.3 differs from that of HCV 1.2, in that the focus of 1.3 is to identify and manage viable populations, whereas that of 1.2 considers all individuals of CR species without reference to the associated population and its viability.

The viability of a population can be assessed based on knowledge of the number of individuals present in an assessment area, or by drawing inference given the potential carrying capacity of available habitat in the landscape of which the assessment area forms a part. The assessment of HCV 1.3 must be done with great caution to avoid concluding that a population is non-viable when in fact it is viable. If one or more individuals of HCV 1.3 species are known to occur in the assessment area, the population is assumed to be viable until analysis of field data demonstrates that the number of individuals and/or total extent or condition of habitat render the population non-viable.

HCV 1.4 Areas that Contain Habitat of Temporary Use by Species or Congregations of Species

The purpose of HCV 1.4 is to identify keystone habitats in a landscape used temporarily by groups of individuals or species. A few examples of keystone habitats are (i) breeding or nesting areas such as caves or wetlands used by bird species, bats, or reptiles; (ii) areas along important migration routes; or (iii) local wildlife corridors where individuals can move as needed among ecosystems as dictated by seasonal availability of food. Keystone habitats can also be refugia for particular species during long droughts, floods or fires. Habitats considered under HCV 1.4 share in common the trait that their disappearance would have a negative impact on wildlife populations in far greater proportion than expected given the extent of the habitat itself. If HCV 1.4 exists in a MU, management activities must guarantee that the function of these special habitats will persist and that access to these habitats will be maintained.

HCV 2 Natural Landscapes & Dynamics

HCV 2 aims to identify key ecological properties of large natural landscapes that must be maintained to ensure the persistence of natural ecological processes therein. This is achieved first by identifying large natural landscapes and second by developing

management to maintain the ecological interconnections and species movements critical to the function of natural areas.

The original HCV Toolkit recommended 50,000 ha as a minimum size criterion for a large landscape level forest under HCV 2. This threshold did not consider ecological type, shape of the area, or its potential importance to landscape function; landscape properties were considered indirectly. In the revised Toolkit, the 50,000 ha criterion is no longer used. Instead, HCV 2 aims to identify and protect natural landscapes that (i) possess a core area far from the landscape edge wherein natural processes can be sustained and (ii) have a diversity of natural ecosystem types and a high degree of connectivity among them across which the flow of materials, energy and organisms occurs freely.

HCV 2.1 Large Natural Landscapes with Capacity to Maintain Natural Ecological Processes and Dynamics

This HCV aims to identify and protect areas of a natural landscape where natural ecosystem processes occur and have the potential to persist for the long-term. The key to achieving this is the identification and protection of core area(s) within a landscape, which are essential for guaranteeing the continuation of ecological processes unperturbed by edge effects and fragmentation. The definition of a landscape with a core area is a forest block (or other natural landscape mosaic) with an internal core >20,000 ha surrounded by a natural vegetation buffer of at least 3 km from the forest edge. The management goal of HCV 2.1 is to guarantee that the core area and associated buffer zone are maintained as forest or other natural vegetation.

HCV 2.2 Areas that Contain Two or More Contiguous Ecosystems

Areas supporting a diversity of ecosystems support great numbers of species and have high capacity to sustain them for the long term. The maintenance of ecosystem types, especially those co-occurring within a single landscape, is a major goal of local conservation, because it guarantees the movement of species among ecosystems and the flow of materials and energy in the face of environmental changes like fluctuating food availability, extreme weather and changing climate. This HCV aims to identify landscapes that contain multiple ecosystem types, to protect their core areas and to maintain connectivity among these types.

HCV 2.3 Areas that Contain Representative Populations of Most Naturally Occurring Species

The persistence of a species in the long-term requires maintaining habitat of sufficient quality and extent for population viabilty. Although the area of habitat required to maintain a viable population varies greatly among species, it is a fact that large, unfragmented areas with a diversity of ecosystem types have higher potential to sustain a variety of species in the long term than areas that are small, fragmented and with few ecosystem types.

To identify areas that contain representative populations of most naturally occurring species, HCV 2.3 employs several proxies. These include landscapes with populations of higher predators of different taxa (e.g., tigers, leopards, and eagles) or low density far ranging species (e.g., orangutans and elephants) that require large areas to persist but are readily surveyed. HCV 2.3 has the objective of identifying landscapes with potential to sustain representative populations of naturally occurring species and ensuring that management activities maintain or enhance this potential. In the assessment of HCV 2.3, it is essential to consider areas outside the MU to understand potential interactions among populations of species and the ecosystems they depend upon inside and outside the MU.

HCV 3 Rare or Endangered Ecosystems

The objective of HCV 3 is to identify and delineate ecosystems within a landscape that are naturally rare (e.g. karst forest) or endangered because of changes in land cover caused by humans. Management actions should ensure that natural ecological processes throughout a rare or endangered ecosystem – especially distinctive features of it – are maintained.

To determine if an ecosystem is rare or endangered, an evaluation is made comparing the historical, current and expected future extent of the ecosystem within the physiographic region where it occurs. If within a single physiographic region an ecosystem has declined in extent by 50% or more, or if it is expected to decline by >75% under future scenarios of forest conversion, then the ecosystem is consider endangered under HCV 3. If, as a result of natural factors or human intervention, an ecosystem constitutes less than 5% of a physiographic region, then the ecosystem is considered rare under HCV 3. Although a large proportion of natural land ecosystems in Indonesia are forest ecosystems, other aquatic ecosystems such as lakes and open swamps or marshlands are also be considered.

HCV 4 Environmental Services

The purpose of HCV 4 is to identify areas important for the protection of hydrological function and maintenance of a watershed[5]. It is intended to protect both the quantity and quality of water, as well as prevent landslides, erosion, sedimentation and floods. HCV 4 also aims to control the spread of fires in forest or other areas.

HCV 4.1 Areas or Ecosystems Important for the Provision of Water and Prevention of Floods for Downstream Communities

Land use activities or forest use in a watershed often results in the degradation of land. Sometimes this causes a disturbance in the water cycle. The main parties that feel consequences of this degradation are downstream communities. Land cover consisting of forest in good condition functions to regulate water downstream. If a forest area is found to play a role in the production of clean water or to control flooding in downstream communities, then it possesses HCV 4.1.

In addition to watersheds and their downstream communities, there are several land and forest ecosystems that have extremely important hydrological function and require special attention. Such ecosystems referred to by HCV 4.1 include cloud forest, ridge line forest, riparian ecosystems, karst forest, and a variety of wetland ecosystems including peat swamp (especially swamp that is still forested), freshwater swamp, mangrove forest, lakes, and grass swamps. Ideally, HCV 4.1 areas would be protected from operations. However, if exploitation is carried out, then it must be managed in such a way that guarantees maintenance of the water catchment and its hydrological function.

HCV 4.2 Areas Important for the Prevention of Erosion and Sedimentation

Erosion and sedimentation have ecological and economic consequences important at the landscape scale. Surface erosion causes the loss of topsoil, which in turn decreases the productivity of the land. Morpho-erosion like landslides or the creation of ravines reduces the area of productive land, damages economic infrastructure and increases sediment loads. Under natural conditions, the rate of soil erosion is approximately equal to the rate of soil formation. In disturbed environments, accelerated erosion is extremely destructive and bears high cost in time and money to control it.

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[5] A watershed is a hydrological unit. It is an area defined by high land (often ridges) dividing two areas drained by different river systems, wherein rainfall flows downstream to small rivers and then to larger rivers and so on until it flows into a lake or the ocean. Depending on topography of an area, a watershed may be divided into tens or hundreds of sub-watersheds.

Among factors that affect erosion rates, those which can be fully controlled by humans are land cover and soil conservation practices. Natural forest land cover is much better than non-forest at reducing erosion levels, due in large part to a closed canopy, complex understorey and surface leaf litter protecting the soil.

HCV 4.2 areas are forest or other areas where surface erosion risk is deemed unacceptably high. Any operations carried out by management in HCV 4.2 areas must be done with extreme caution to avoid erosion or sedimentation.

HCV 4.3 Areas that Function as Natural Barriers to the Spread of Forest or Ground Fire

Forest fires in Indonesia are a serious problem yet to be fully resolved, though progress has been made. Forest fire events in 1982-1983 destroyed 2.4-3.6 million ha of forest in East Kalimantan. Since then, forest fires continue to occur in almost all regions of Indonesia, especially in Riau, Jambi, South Sumatera, Central Kalimantan and West Kalimantan in 1987, 1991, 1994, 1997-1998, and 2003[6]. It has become clear from these events that biophysical factors play an extremely important role helping to control fires.

Forested regions and wetlands can prevent the spread of fires and are critical landscape features in fire prone areas. An area with biota or other properties capable of deterring the spread of large scale forest or ground fires is considered HCV 4.3. Several natural forest types in good condition have this physical characteristic, as do some non-forest ecosystems such as deforested peat lands with a functionally intact hydrological system, freshwater swamp, other wetlands and green belts.

HCV 5 Natural Areas Critical for Meeting the Basic Needs of Local People

Humans require an assortment of items and services to meet their needs. Such needs can be separated into basic and supplementary items. A natural forest or other vegetation type that plays an important role in helping to meet the basic needs of a local community is considered HCV 5. Basic needs are defined as:

a. Food
b. Water

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[6] Data from the Indonesian Department of Forestry, 2003

c. Clothing
d. Materials for building and tools
e. Firewood
f. Medicines
g. Fodder for livestock

Many kinds of natural ecosystems, including forests, bring important benefits to local communities, and in some cases are the basis of local livelihoods. However, cash is also needed to meet needs that nature cannot provide (e.g. for tools, education, medical treatment etc.). The desire for cash frequently causes local communities to manage and use natural resources in a non-sustainable fashion. For this reason, HCV 5 includes a provision for natural resource exploitation with the purpose of obtaining cash if (i) the cash will be used to fill basic needs of the family, and (ii) there is an indication that exploitation is sustainable. Use of forests or other natural ecosystems for the purpose of making money at a commercial scale is outside the scope of HCV 5.

It should be stressed that areas considered HCV 5 and 6 (see below) are limited not only to areas over which communities claim ownership, but may also include areas where local people demonstrate traditional use rights as well As such, an area delineated as HCV 5 or 6 can be larger or smaller than area(s) claimed to be owned by a community – in fact, there can be no spatial connectivity at all. The assessment and documentation of local community use rights and ownership claims must be assessed as part of HCV 5 based on direct consultations with communities in their area.

HCV 6 Areas Critical for Maintaining the Cultural Identity of Local Communities

HCV 6 has the goal of identifying areas important for maintaining the cultural identity or unique characteristics of a local community. The inter-connections of a community with an area can take the form of ideas, concepts, norms, values, activities and activity patterns, as well as links to natural environments, resources or other objects that influence collective behavior and/or define a community's relationship with the area.

The term "culture" in the revised Toolkit refers to a set of beliefs and norms shared by a group of people or a community, and may encompass shared values, language, knowledge, as well as material objects. The term "local community" describes a group of people who live in the same area, interact with each other, and share a common interest and set of values. In practice, a local community in HCV 6 is a group of people who live in the same area, often with access to forest or other natural ecosystems, and

who share a communication network, views on natural resources, and a spiritual or ethical relationship with their shared surroundings.

"Cultural identity" refers to the identity that emerges from a group of individuals (a community) occupying a specific area. This identity is based on shared background and history, as well as shared interpretation of the local environment and natural resources. An area important for cultural identity is one to which the culture of local or traditional communities is tightly linked. Local communities often have a special knowledge or local wisdom regarding use of natural resources. They have norms, rules, or traditional laws linking their lives and their use of natural resources. They also demonstrate a tendency toward collective respect of ancestral norms regarding resource use. In such cases, the interaction between the community and the natural environment is a from of tradition, with the result that the two cannot be separated without disturbing the way people live and their balance with the environment.

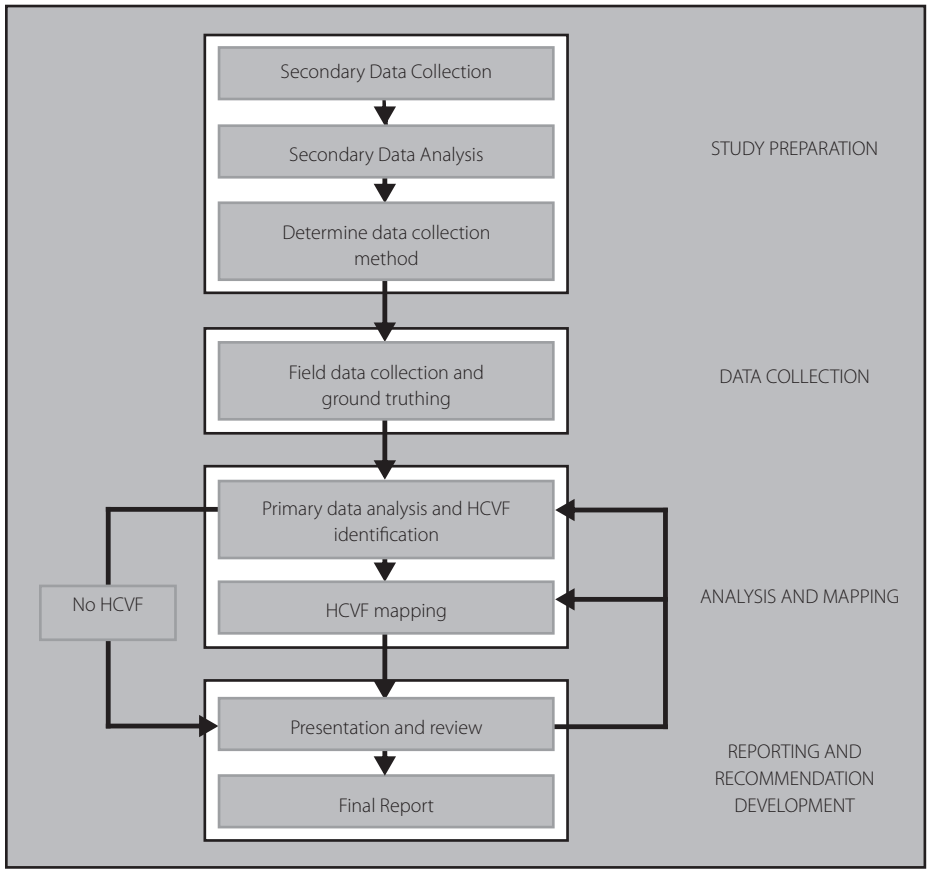
Wherever cultural identity of a community or sub-group thereof is linked to specific areas or landscape features, HCV 6 is present. Several examples of such groups include: Kasapuhan Ciptagelar in Banten; Samin in Central Java; Tengger in East Java; Anak Dalam, Orang Rimba, and Mentawai in Sumatera; Wana, Kampa, and Mori in Sulawesi; Dayak in Kalimantan; and Asmat and Dani in Papua.

4. THE HCV ASSESSMENT PROCESS

4.1 Overview

The HCV assessment process[7] is based on a series of steps that can be grouped into five major phases: Study preparation (preliminary assessment); Primary data collection; Analysis and mapping; Preparation of reports and recommendations; and Consultation with relevant parties regarding the outcome of the assessment (Figure 4.1).

Figure 4.1. Flow chart depicting the HCV assessment process.



[7] The phrase "HCV assessment process" used in this English translation refers to the process of HCV identification only, and does not include the steps of monitoring and management.

4.2 Study Preparation / Preliminary Assessment

Goals of the study preparation/preliminary assessment phase are to compile and analyze secondary data, and outline the approach and methods to be used for full assessment of an area. Compilation of secondary data refers to the gathering of pre-existing information (social, cultural, economic, biodiversity, biophysical etc.) concerning the area to be assessed. These data may take the form of research reports, statistical reports, demographic profiles, maps, on-line databases or audio-visual data among others. Such data will be pulled together from various sources, including the company representing the management unit, government bodies, academic institutions, NGOs, private organizations, local communities and the internet.

After available secondary data have been collected, the next step is to verify and analyze the data (including preliminary mapping of the assessment area and surrounding landscape). Data verification at this stage focuses mainly on checking the accuracy and validity of spatial information, including socio-cultural aspects of the area, such as maps of local communities and population densities. Data are analyzed to form a general picture of the study area and to assess the likelihood of different HCVs occurring in the area. These preliminary analyses are the basis for determining data collection methods in the field during full assessment. The final step in study preparation is to identify gaps in data needs and to develop methods for collecting primary data in the field. Field methods will need to be developed for collection of flora, fauna, and socio-cultural data, as well as verification of preliminary maps.

4.3 Primary Data Collection

Primary data collection refers to the collection of data in the field (i.e., study area). This is done using the methods decided upon in the Study Preparation phase. Primary data are the basis of all analyses and mapping that takes place in the steps that follow to produce a final report. Primary data collection also serves the vital purpose of crosschecking secondary data and ground checking the accuracy of preliminary maps.

4.4 Analysis and Mapping

Analysis and mapping represent the most critical phase in the HCV assessment process. At this stage, a comprehensive analysis of secondary and primary data is conducted to make judgment about the presence and distribution of HCVs. Mapping and related analyses cover physical and spatial features of the area, flora and fauna, and sociological

and cultural dimensions. Outputs from this analysis are used to identify areas containing one or more HCVs and map such areas using a geographic information system (GIS).

4.5 Preparation of Reports and Recommendations

During this phase, initial results of the full assessment are presented to relevant stakeholders in writing and verbally in meetings. Results from the field and subsequent analyses are presented to and discussed with stakeholders. As needed, corrections to data collection are made to improve accuracy of preliminary findings based on secondary and primary data (especially for socio-cultural dimensions). Findings from the initial report and consultations are then put forth in a draft final report detailing background of the study, goals, a description of the area assessed, methods, results of the study, discussion of HCVs present and threats to their maintenance and description management recommendations to maintain or enhance HCVs.

4.6 Peer Review

Peer review describes a process whereby a piece of intellectual work (in this case, an assessment report) is critically examined by an expert in the field of concern (other than the authors). In the academic world, peer review of a colleague's work is done to ensure that it meets expected standards of the discipline and follows general scientific rigor. The peer review of an HCV assessment report involves a multi-disciplinary analysis and therefore requires an individual or team of individuals with expertise in multiple areas. Examples of appropriate peer reviewers in Indonesia include HCV practitioners themselves, relevant experts from the Indonesian Institute of Sciences (LIPI), academic institutions and non-government organizations active field of the environment, biodiversity or sociology.

A peer review is done while the report is still in draft form so that the final report reflects peer review comments. This helps to ensure the report is comprehensive, factual, and meets accepted standards of the various disciplines covered in the report. In theory, peer review can also be conducted on a finished report, but generally this is done to assess alternative options for managing HCVs that have been identified in a report, not to critique its quality or content.

5. STAKEHOLDERS

5.1 Stakeholder Involvement in the Assessment

The HCV assessment process involves many parties in each stage, including government, the management unit (a company or a local group), local communities, the assessment team, private and non-governmental organizations (NGOs) and universities/research institutions. The involvement of multiple parties and perspectives is necessary, because each has different roles or responsibilities in the assessment and ultimately in management. This is described below and in Tables 5.1 and 5.2.

5.2 Government

The government plays an important legal role in the HCV assessment process as regulations, laws, and policies can influence both the actual assessment and implementation of the assessment results (by recognizing and permitting the resulting management recommendations). The government also has an important role in making necessary data available, especially in the study preparation phase when secondary data concerning physical and spatial aspects of the area; biodiversity; and social, economic and the cultural aspects of local communities are being collected.

5.3 The Management Unit (Company or Government)

The company, as the party with legal permission to manage a particular area, often functions as a main source for secondary data collection during the study preparation/ preliminary assessment phase. Some useful data sources obtained through them include information about the company operations, history and activities (i.e., the company profile); the environmental impact assessment (AMDAL in Bahasa Indonesia) and social assessment studies; reports from community development programs (e.g., Bina Desa in forestry HPH); and monitoring documents, research reports or assessments done previously by consultants, academic researchers, students or other organizations.

Officials and other staff of the MU are usually heavily involved during primary data collection in the field, to study the area's physical environment, flora, fauna, and

local social, economic and cultural characteristics. Company staff can participate as a member of the research team during data collection, for example, contributing data on physical conditions, flora and fauna, or playing a facilitative role during socio-economic and cultural data collection.

The MU also plays an important role during reporting, providing input on preliminary findings and, occasionally, interpretation. This input is usually provided once the initial full assessment results are presented to the company in a written report and live meeting.

Finally, companies are responsible for making available results of an assessment in a public and transparent fashion (either the full report or a public summary thereof), and implementing the report recommendations. The development of management and work plans to maintain or enhance any HCVs present in the MU also depends critically on input from the MU. In some cases the MU may even take the lead in developing such plans taking into account recommendations from the assessment team.

5.4 Local Communities

The term 'local community' refers both to people who live inside and around the assessment area as well as people in areas off-site that could be affected by management operations. The local community is actively involved in several stages of an HCV assessment, mainly in the collection of primary data and reviewing the results of the assessment to ensure accuracy (through presentation and discussion during public consultation). Some of the primary data from the field (floral, faunal, social, economic and cultural data) can be obtained through interviews and group discussions with the local community. Interviews and discussions with key individuals from local government (the sub-district head and staff), religious leaders (e.g., priests, Muslim scholars), district healthcare workers, midwifes, and a representative sample of people from different ethnic groups within the community or the community at large should be prioritized (and done in accordance with an approach set out during the pre-assessment phase). Local communities should also verify the assessment results and the management recommendations put forth by the assessment team. Assessment findings, especially those related to HCVs 5 and 6, should be accepted by the local community as a fair representation of reality.

5.5 Non-government Organizations (NGOs)

The involvement of NGOs as partners and observers should be encouraged as much as possible throughout the HCV assessment process. NGOs are involved in the study preparation phase as a source of secondary data, in the field work phase to facilitate primary data collection, in the report development stage as an active participant in public consultations to review assessment results and provide feedback, and overall to help ensure transparency of the assessment process and involvement of the widest possible range of relevant parties.

5.6 The Assessment Team

The assessment team comprises experts with skills in identifying HCVs. The job of the assessment team is to determine if an assessment area contains one or more HCVs, with reference to criteria put forth in this Toolkit. The primary responsibility is to conduct an assessment that is objective, transparent, understandable and accepted by the widest possible range of stakeholders involved. To the maximum extent possible, this involves a wide range of relevant parties during each phase. The assessment team must be neutral in its assessment and determination of HCVs, making decisions and recommendations in accordance with the facts discovered and avoid making subjective compromises with any of the parties involved.

It is the responsibility of the assessment team to: produce a comprehensive report concerning the area assessed; provide input to the company concerning the structuring of management plans for the area and provide clear explanation for the determination of HCVs deemed present or not; and ensure that input obtained from all parties during the stages of presentation, review and public consultation are incorporated into the final report. The assessment team is the most important party in the assessment process, functioning as a motor to drive each phase and a supervisor to ensure credibility of the process.

In the study preparation phase, the assessment team is the party responsible for the collection and analysis of secondary data for the purpose of forming a general picture of the area to be assessed, data that provide the basis for determining methods to be used when collecting primary data.

Primary data collection (during field work) is carried out and coordinated by the assessment team with the goal of identifying the current condition of the assessment area and verifying the secondary data previously collected, as well as preliminary

analyses based on these data. In this phase, the assessment team works side-by-side appointed company staff and the local community.

The analysis and mapping phase is the complete responsibility of the assessment team. In this phase, all available primary (and secondary) data are analyzed by appointed experts with guidance from this Toolkit (Chapter 8) and the leader of the assessment team. Results of the analysis are then put forth in maps with the help of mapping and GIS experts. Based on these outputs, the assessment team writes an assessment report that is presented to the company. In this phase, review(s) of the report provided by other parties (NGOs, universities/research institutions, and/or practitioners) is also conducted at this stage, with feedback incorporated into a final report. This final report details both assessment findings and recommendations for consideration in the company's effort to develop a management plan for maintaining HCVs present.

The final assessment report must be presented (in writing and/or in person) to stakeholders involved in the assessment process and made available to the general public to ensure transparency and public review of the assessment results.

It should be stressed that the assessment team does not have the right to make final determination the distribution of the HCV or to make definitive statements of what management is required to maintain or enhance HCVs present. Rather, the assessment team is one party to be involved in the development of HCV management plans after the report is complete and made available to the public. Management recommendations made by the assessment team should be seen as concrete inputs to the process, not necessarily the final word. Implementation of the HCV concept by a MU is voluntary, and as such the responsibility of the assessment team is limited to proper identification of HCVs and developing management recommendations, whereas the MU is responsible for management and monitoring with involvement from outside stakeholders including NGOs, local communities and/or government.

5.7 Universities and Research Institutions

Universities and research institutions can be involved directly or indirectly in the HCV assessment process. They may be involved as members of the assessment team, in the process of peer review, or by providing corrections and feedback during presentation and discussions of assessment results. Universities/research institutions can be involved indirectly as sources of secondary data (especially during the study preparation phase), by providing research reports, papers and theses/dissertation relevant to potential HCVs, the HCV assessment process and the area being assessed.

5.8 Public Consultation

The process and the results of a HCV assessment are put forth in a final report that must be approved through a public consultation and disseminated to all stakeholders. Transparency through broad dissemination of the assessment results is necessary in order to receive feedback from a broader group of stakeholders. Their feedback on the assessment results and recommendations given to the company about the creation of a HCV management plan is of particular importance.

Table 5.1. Stakeholder involvement in an HCV assessment

No.	Stakeholders	Involvement	Role
1.	**Governmnet Institution** 1. BMG 2. PPT Bogor 3. Bakosurtanal/Ditop/ Jantop 4. Baplan 5. Bakosurtanal, BPDAS 6. Local government, Provincial government 7. Provincial Bappeda 8. BKSDA, Dishut, research institutions 9. Dinsos, Dinas Pariwisata 10. BPS 11. Dishut, Distamben, Disbun, local government 12. Village office	Source of secondary data during Study Preparation/Pre-assessment phase	Provide data on 1. Climate/rain maps 2. Area/land system maps 3. Topography/ridge maps 4. Land cover maps 5. Watershed/hydrology maps 6. Administrative/social, economic and cultural maps 7. RTRWK/TGHK maps 8. Biodiversity maps 9. Social, economic and cultural data 10. Demographic and population statistical data 11. Government policy 12. Village livelihood data
		Presenting assessment results to the public	Provide input on the assessment results and draft report
2.	**Company undergoing assessment**	Initial assessment (Study Preparation/ Pre-assessment phase)	Provide data and resources for the assessment, such as company profile, Environmental Impact Assessment (AMDAL) or any of the company's community development reports.
		Field data collection	Assisting the assessment team in collecting field data (as part of the assessment team or as a facilitator).
		Presentation and review	To provide comments on assessment findings through review of the initial draft report.
		Result presentation to public	Provide assessment results in a transparent manner.
3.	**Community**	Field data collection	Provide information to the assessment team
		Result presentation to public	Provide input on the assessment results and draft report

No.	Stakeholders	Involvement	Role
4.	**Assessment Team**	Secondary data analysis	Producing a general picture of the assessment area
		Determining data collection methods	Select field assessment sites and methodology
		Field data collection	To gather field data to determine real conditions in the assessment area
		Analysis and mapping	To identify HCVAs, non-HCVAs, or potential HCVAs
		Develop final report	Document the assessment and its results
		Result presentation to public	Present assessment results in a transparent manner
5.	Non Government Organizations	Initial assessment (Study Preparation/ Pre-assessment phase)	Provide data
		Result presentation to public	Provide input on the assessment results and draft report.
6.	Universities/ Research Institutions	Initial assessment (Study Preparation/ Pre-assessment phase)	Provide data
		Presentation and review	Provide input on the assessment results and draft report
		Result presentation to public	Provide input on the final assessment report

Table 5.2. Stakeholders involved at each stage in the assessment

No.	Assessment Stages	Related Stakeholders					
		Government Institutions	Company undergoing assessment	Assessment Team	NGOs	Universities/ Research Institutions	Community
1	Study preparation						
	a. Initial assessment	✓	✓		✓	✓	
	b. Secondary data collection and initial mapping analysis			✓			
	c. Determining field data collection methodology			✓			
2	Field data collection		✓	✓			✓
3	Analysis and mapping			✓			
4	Report and recommendation development						
	a. Report presentation and review		✓	✓		✓	
	b. Final report development			✓			
5	Result presentation to public	✓	✓	✓	✓	✓	✓

6. PREPARING FOR HCV FIELD ASSESSMENT

The HCV field assessment requires careful preparation to ensure effective data collection activities in the field. The thoroughness, accuracy and quality of data collection depends on appropriate preparation.

Preparation for assessment activities in an area involves putting together an assessment team, collection of secondary data, preliminary analyses and mapping, preparation for direct stakeholder consultations in the field and outlining a plan for field data collection (Figure 6.1).

6.1 Assembling the Assessment Team

As explained in section 5.2, the assessment team comprises experts with the skill sets needed to identify HCVs in accordance with criteria outlined in this Toolkit. In general, team members cannot be chosen based on a uniform standard applied to all assessment sites, as the expertise required will differ with the conditions and size of the area being assessed.

At a minimum, the assessment team should have 5-6 members who are experts in flora, fauna, landscape ecology, biophysical environment (especially soils/geology and hydrology), sociology and culture/anthropology. In addition, depending on the type of MU operations (i.e., logging, plantations, mining), the assessment team should also include technical experts from appropriate fields as needed (e.g., peat management, GIS modeling etc.)

Although members of the assessment team may also originate from the MU isteld being assessed, outside HCV experts should also be commissioned to ensure objectivity and neutrality in the assessment. For example, independent consultants, academics, professors, researchers and NGOs with specialized expertise can be recruited. If available, community members with relevant expertise can also be recruited as members of the assessment team.

This team of experts can be aided by outside or local assistants to implement technical field activities over a broader area (e.g., sample collection).

6.2 Secondary Data Collection

Secondary data collection takes place early in the preliminary analysis. This step is extremely important because it provides an understanding of field conditions and also provides information that will shape methods to be used during the field assessment.

During this phase, pre-existing data concerning the study area are collected. These data include biophysical aspects of the area, biodiversity, ecosystem services, social and economic conditions and local culture. The data can be sourced from various documents obtained from the company, government, research institutions, universities, and NGOs, as well as from published literature and maps (especially maps based on the most recent Landsat images).

6.2.1 Biophysical Data

Biophysical data about the area can be obtained from various sources, among them are maps, research reports, documents outlining the MU setting/profile, and other supporting documents, like environmental impact assessment (AMDAL) reports. Map data are needed to provide a physical picture of the assessment area and can be obtained from various parties, including the MU, a number of government bodies, and consultants. Maps required include: biophysical maps; ecosystem maps; flora and fauna range maps; administrative maps (of the county, district, and province); socioeconomic maps; ethnic/cultural and linguistic maps; demographic, road, waterway, spatial planning, topographic, soil and land cover maps; and RePPProT maps. (A list of maps needed and their potential sources are listed in Table 6.1.) Other biophysical data concerning villages, climate and soils will also be needed.

Understanding the accuracy and resolution of available maps is an issue of special concern. Frequently multiple maps of a given variable/type are needed to compare data from different sources and to ensure that the most accurate data available are being used.

Table 6.1. Map requirements for HCV assessment at different mapping scales

No	Map Type	Landscape		Management Unit	
		Scale	Source	Scale	Source
Physical Data					
1	Climate/rain	1 : 250.000	RePPProT, BMG	1 : 250.000	BMG, PPT Bogor
2	Area/land system	1 : 250.000	RePPProT, PPT Bogor	1 : 250.000	PPT Bogor
3	Topography/slope	1 : 250.000	RePPProT, Bakosurtanal	1 : 250.000	Bakosurtanal / Field
4	Land cover/land use data	1 : 250.000	Landsat, Baplan, etc	1 : 250.000	Landsat, Baplan, etc
5	Hydrology/DAS	1 : 250.000	DEM-Nasa/Bakosurtanal, BPDAS	1 : 250.000	Image Radar / BPDAS
Legal Data					
1	RTRWP	1 : 250.000	Provincial Bappeda		
2	RTRWK			1 : 100.000	Regency Bappeda
3	IUPHH	1 : 250.000	Baplan	1 : 100.000	Regency Forestry Service
4	IUPHTI	1 : 250.000	Baplan	1 : 100.000	
5	Plantation	1 : 250.000	Provincial Plantation Service	1 : 100.000	Regency Plantation Service
6	Mining				
7	Industry				
Social Economic and Cultural Data					
1	Provincial Administration	1 : 250.000	Provincial Bappeda		
2	Regency Administration				
3	District Administration				
4	Housing Position	1 : 250.000	Profincial Transmigration Office		
5	Culture Map	1 : 250.000	Provincial Tourism Service		
Biodiversity					
1	Flora	1 : 250.000		variable	
2	Fauna	1 : 250.000		variable	

6.2.2 Biodiversity Data

Data concerning biodiversity can be gathered from various sources including the IUCN Redlist Data Book, CITES, Indonesian Government Law Number 7 of 1999, and several other relevant laws and regulations. It is also important to find and collect data from biodiversity researchers who have worked in the area prior to the HCV assessment. Many secondary data sources concerning HCVs 1-3 are also available in Digital Appendices associated with Chapter 8.

6.2.3 Ecosystem Services Data

Required data to assess ecosystem services (watershed protection, erosion, sedimentation, and capacity to act as a firebreak) can be obtained from reports detailing previous investigations and the supporting maps included in such reports. Maps and other data needed are those concerning annual rainfall for the area, waterways, watersheds, topography, geology, erosion potential, road systems, land cover, administration boundaries, culture and any supporting maps, such as those used for regional spatial planning. Some places to source such maps are listed in Table 6.2. These maps and other data will help provide a preliminary picture of ecosystem services, and threats to them, in the area to be assessed.

Table 6.2. Types and sources of map data for HCV 4

No.	Map Type	Resource
1	Topography/ Earth-surface	Bakosurtanal, Cibinong, Bogor
2	Geology	Geology development and research center (Puslitbang), Bandung
3	Land Map	Puslitan, Bogor
4	Hydro-geology Map	Environment Planning Geology, Bandung
5	Forest and water areas	Planology body, Ministry of Forestry
6	Potential fire	Directorate of Forest Fire, PHKA, Ministry of Forestry
7	Isohyets	BMG, Jakarta
8	Spatial planning	Province and regency
9	RLKT pattern	Balai Pengelolaan DAS/ Provincial Watershed Management Body
10	RTL RLKT	Balai Pengelolaan DAS/ Provincial Watershed Management Body
11	Erosion potential Map	Tropenbos International-Indonesia[8]

[8] For all regions in Kalimantan.

6.2.4 Socio-economic Information

Preliminary data needed to build a basic picture of the social and economic conditions of local communities can be gathered from several sources, including local government agencies and departments concerned with sociology and demography, regional statistics and development planning. Data that can be obtained from these agencies include regency statistics, rates, monographs of constituent districts, demography, and social, economic and cultural conditions of the districts. Reports and investigations by research groups, academic institutions and NGOs that are (or were) active in the area are other potential sources of socio-economic data. Data concerning a particular management unit (MU) may also be found in reports concerning regional potential and community development.

6.2.5 Local Culture Data

Data concerning local culture are generally extremely limited. If they exist, these data are usually available from local NGOs, research institutions or universities. At the District or Province level, such data can be obtained in departments concerned with culture, such and the local tourism bureau and development planning agency. Data about local community culture can also be obtained from reports describing research previously undertaken in the area by scholars, journalists or activists. Additionally, data sources that map and provide explanations of local language groups, like that produced by WWF Indonesia for West Kalimantan (WWF 2006) can also be useful.

6.3 Preparation for Analysis and Preliminary Mapping

Following the collection of secondary data, the next step is the to analyze the data and create a preliminary map used for designing the field research approach.

6.3.1 Preliminary Mapping of Biophysical Aspects

The goal of preliminary mapping is to obtain a general picture of the study area and an indication of HCVs potentially present to outline an approach for collection of field data. The spatial extent of the area that must be assessed for preliminary mapping extends beyond the MU to surrounding areas of the same landscape and/or watersheds connected to the MU. Maps produced at this stage in the analysis display the physical conditions of the area to be assessed.

An early step in the biophysical analysis is the identification of special ecosystems such as swamps, peat lands, karst, heath and mangrove forests (related to HCV 3 and 4); identification of protected forests or conservation areas and riparian forest (HCV 1.1 and 4.3); and prediction of erosion potential and land suitability (HCV 4.1-4.2). Several kinds of maps are created from these data, among them, a map of erosion potential levels, a watershed and land use stratification. As mentioned above, careful attention must be paid to map accuracy and maximum resolution of the data available.

6.3.2 Preliminary Mapping of Biodiversity Aspects

Preliminary analysis of biodiversity is done with the aid of maps describing biophysical features, such as ecosystem types, land cover (forest/non-forest), roads and waterways. Secondary data on flora and fauna and data concerning changes in land cover are extremely helpful for preliminary biodiversity mapping, enabling the team to predict the occurrence of plant and animal species in different parts of the assessment area. Based on these maps and predictions, assessors are better able to identify potential sampling locations and determine sampling methods to maximize effective. Several digital resources available with this Toolkit will help prepare for the biodiversity study (see Digital Appendices).

6.3.3 Preliminary Mapping of Environmental Services

The analysis of ecosystem services depends directly on biophysical analysis of the assessment area. Areas thought to provide important ecosystem services can be inferred based on maps of hydrology, waterways, watersheds, land cover, land suitability, erosion potential and distribution of human settlements. From these maps, the assessor can identify areas potentially important for provision of water, prevention of erosion and maintenance of other environmental services. These preliminary maps provide the basis for ground checking during the field research phase.

6.3.4 Preliminary Mapping of Socio-cultural Aspects

Preliminary description of social, economic and cultural aspects can be done by studying reports concerning local traditions, demography and statistics, as well as language and administrative maps. This analysis will provide a general picture of sociological and economic conditions of local communities in or near the assessment area. Preliminary mapping of the biophysical landscape (e.g., rivers and agricultural areas), as well as human settlements and infrastructure will aid assessors finding planning where to seek respondents for interviews during field work.

6.4 Preparing for Consultations with Stakeholders

This stage requires substantial planning, as HCV assessments involve many parties including local communities, government, the company and NGOs (see Chapter 5). Preparation is needed to obtain accurate data that can be documented in an accountable fashion. Preparation involves identifying parties that will participate in the HCV assessment, preparing documents, drafting a questionnaire that will be used, planning meeting content and discussions and arranging and advertising the timing of consultation activities. Transportation, especially in rural areas, can be an issue that requires special attention in order to maximize stakeholder participation when group meetings between communities in different places are being arranged.

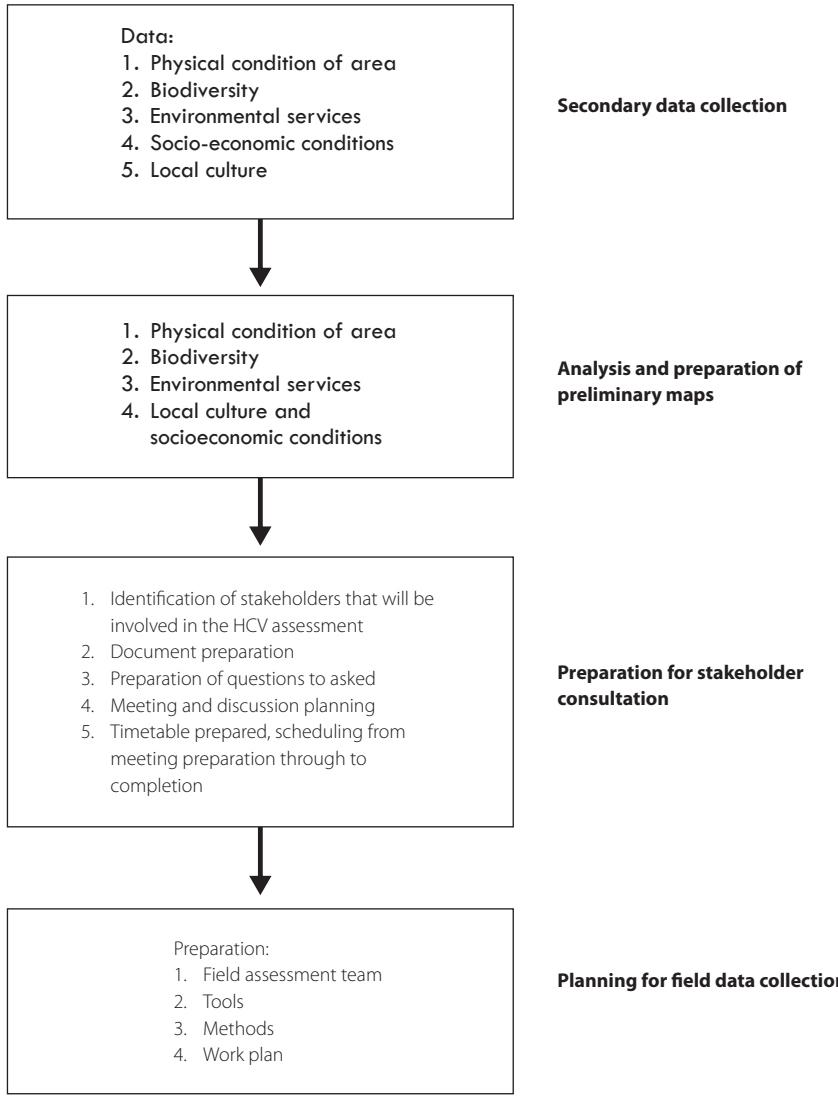
6.5 Planning for Field Data Collection

Fieldwork preparation follows completion of the Secondary Data Collection, Analysis and Preliminary Mapping stages. It involves determining the number and composition of team members that will go to the field; preparing travel and other logistics, such as accommodation and transportation; and arranging field assistants. Locations and methods for field data collection (including intensity of sampling) are also determined during this stage.

Preparation should involve all of the assessment team members. It is likely that each team member will use different sampling methods and will require different tools and instruments. For example, before going to the field, the socio-economic team should prepare questions to be used in interviews with local people, while the biodiversity experts should determine the methods they will use for sampling plants and wildlife and how to allocate time among locations for data collection. This should be relatively easy to accomplish with the help of the preliminary HCV maps created during the Preparation and Mapping phase.

Planning should be done far in advance of fieldwork. This will allow time for refining the approach and organizing logisitcs.

Figure 6.1. Study preparation stages



7. PRIMARY DATA COLLECTION AND ANALYSIS

Field data collection is preceded by a planning process to guide fieldwork in a directed and systematic manner. The primary reason for collecting primary data is to gather new information for improving the rigor of HCV identification. It also serves as an opportunity to ground check the accuracy of secondary data gathered during the Study Preparation phase.

As explained above, field data collection is carried out by an assessment team comprising several smaller teams, each representing different areas of expertise (or HCVs to be assessed). Generally, this larger team is made up of a landscape mapping team (whose tasks include assessing the physical environment), a flora team, a fauna team and a social/cultural team. The work of these smaller teams is integrated, although they collect data independently in the field. This integration occurs because many of the teams rely on the same data – e.g., data collected by the social/cultural team feeds into HCV 4.1 mapping by the GIS team and will also be useful to the biodiversity team assessing HCV 1.2 and 1.3.

Field data collection activities are described in brief below.

7.1 Mapping the Landscape

The landscape mapping team collects field data to verify secondary data, such as the location of main waterways, road systems, area boundaries, soil types/depth and topography. The team should conduct a thorough overview of the whole area being assessed through representative sampling. In addition, this team helps other teams to map and analyze the primary data they collect. The mapping and landscape team's role in helping other teams is displayed in Figure 7.1.

7.2 Faunal Assessment

Field collection of faunal data is done using rapid assessment techniques with the aim of determining the current diversity and status of wildlife in and around the study area. These activities involve both direct observation in the field as well as interviews and discussions with various parties, including local communities, the MU staff and other stakeholders with relevant knowledge.

The data collected should focus on describing habitat quality in and around the study area, wildlife species present and their distributions, the qualitative condition of wildlife populations where possible (for example, approximate number of individuals and evidence of recent reproduction), the locations of wildlife observations, species commonly hunted by local people, benefits of wildlife to local people and disturbances to wildlife populations.

Upon completion of field data collection, an analysis is done to provide a description of the faunal species present in different habitats in and around the MA, number of species and its relationship to land cover in the study area. Species of concern under HCV 1.2 and 1.3 are a necessary focus of this analysis. Analytical results in turn are used to determine the presence of relevant HCVs with reference to the revised Toolkit.

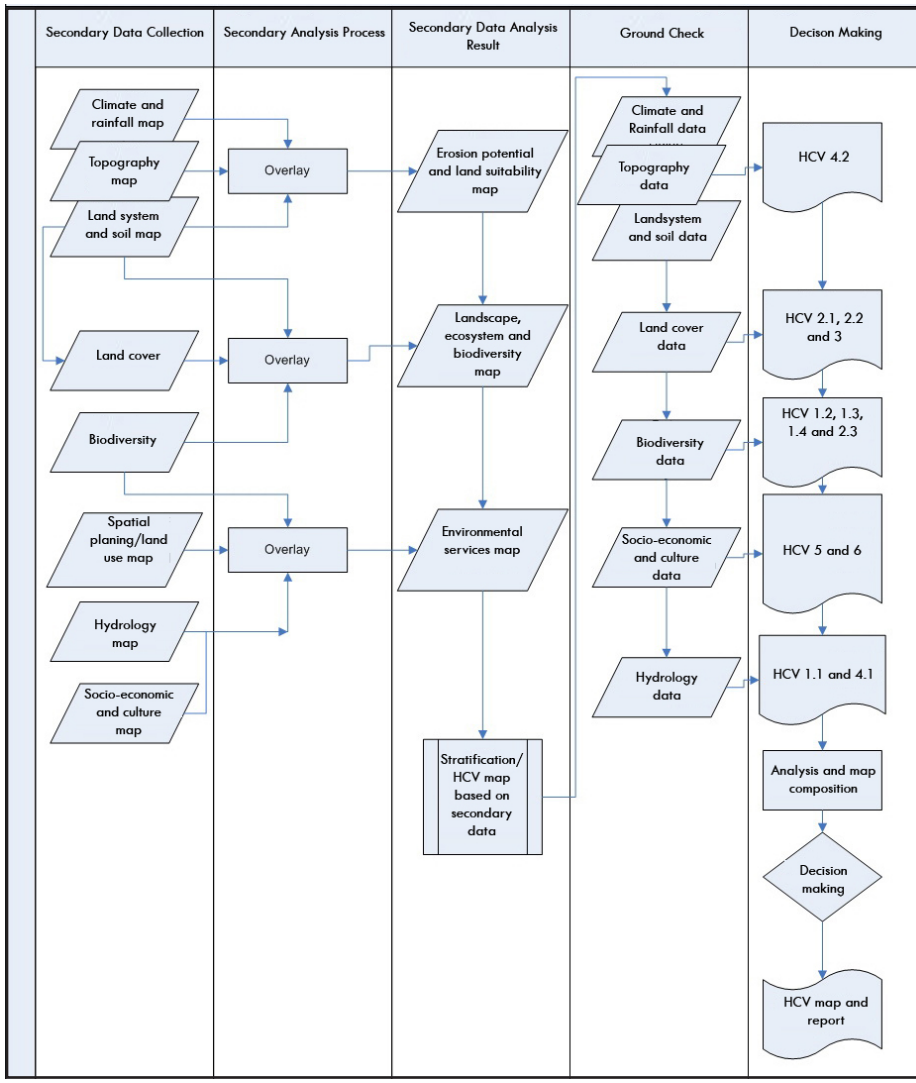
7.3 Vegetation Assessment

The flora team collects data in the field via interviews and direct observation. The data gathered are then used first to identify flora with special status as defined under HCV 1 – e.g., species protected by the Indonesian government or those considered threatened by IUCN. In addition, field data are analyzed to verify the results of preliminary mapping of ecosystems in the study area under HCV 3 and 4. Various quantitative analyses can be performed using traditional community ecological approaches, including those measuring forest structure, species density or species dominance in each ecosystem type.

7.4 Social, Economic and Cultural Aspects

The collection of field data relevant to HCV 5 and 6 relies heavily on interviews and direct observation. A structured set of questions is developed beforehand and used to guide the interviews. The information collected during interviews includes data on many subject, including (among others) local cultures and traditions, how local people meet their daily needs, their relationship with forest or other natural ecosystems and the relationship between local people and the MU. An analysis is conducted of these data to determine the level of local community dependence on the forest and other natural ecosystems for meeting basic needs and the importance of forest and other areas as a feature of cultural identity.

Figure 7.1. Flowchart displaying the process and steps taken to determine HCV presence



8. IDENTIFICATION OF HIGH CONSERVATION VALUES

8.1 HCV 1. Areas with Important Levels of Biodiversity

8.1.1 HCV 1.1 Areas that Contain or Provide Biodiversity Support Function to Protection or Conservation Areas

All protected areas and conservation areas in Indonesia were created with the aim of protecting culture, ecological functions (e.g., water provision) or biodiversity (e.g., viable populations of rare wildlife) or a combination of these aims. HCV 1.1 focuses on the management of protected areas or conservation areas within or near the MU that were established, at least in part, to maintain terrestrial and aquatic/marine biodiversity functions. If such areas exist within a MU, then HCV 1.1 is present. If such areas occur outside but near the MU, and the MU is thought to provide an important supporting function to the protected/conservation area (e.g., the MU acts as a buffer zone), then HCV 1.1 is present. Management activities in the MU must ensure that this biodiversity support function is maintained or enhanced. Both direct and indirect impacts, especially those related to infrastructure development and the improved access it brings, must be considered.

The management requirement of HCV 1.1 is to maintain the integrity of a protected area or conservation area within or near a MU and to ensure maintenance of all biodiversity support function(s) the MU may provide.

8.1.1.1 Secondary Data Collection

The variety of protected or conservation areas and examples of their characteristic functions are shown in Table 8.1.1. An outline of the secondary data required for the assessment of HCV 1.1 is shown in Table 8.1.2. It is necessary to create a map showing all protected or conservation areas that have been formally designated by the Indonesian government at the central, provincial, or district level (using TGHK, RTRWP and RTRWK maps, respectively), as well as conservation and protected areas that have been designated by local communities where they have use rights. Areas of peat swamp with a depth >3 m are also considered protected areas as ruled in Presidential Decision No. 32 (1990) and Law 80 (1999), but definitive maps for such areas are still lacking.

Table 8.1.1 The variety of protected and/or conservation areas in Indonesia based on SK Dirjen PHPA No. 129/1996; PP No. 68/1998; UU No. 41/1998; PP No. 34/2002 (source: Wiryono 2003)

Forest type	Area	Sub-area	Special attribute or other characteristics
Protected Forest	Nationally protected area	Protected forest area	Area serves to protect vital life support systems derived from key environmental services
		Peat land area	Area with peat layer > 3 m and managed for conservation purpose
		Watershed area	
	Local protected area	Sempadan coastal	
		Sempadan river	
		Sempadan lake	
		Water resource area	
	Prevention of natural disaster	Nature conservation	

Forest type	Area	Sub-area	Special attribute or other characteristics
Conservation Forest	Culture and nature conservation area	Wildlife Reserve	Unique features such as biodiversity. Habitat management to maintain unique qualities is to be implemented.
	Natural conservation area	National Park	Areas with natural ecosystem features. Managed based on zonation, with areas designated for research, science, education tourism and recreation.
		Forest Park	Areas designated for maintaining genetic and germ plasma diversity. Used for research, science, education, tourism and recreation.
		Nature Tourism Park	Primary function is nature tourism and recreation.
	Game Park	Hunting Area	For hunting & tourism
		Usage Area	
		Wild species conservation area	
		Other area	
Other Area	Local conservation area	Village conservation area	Area that had been appointed by local community as the conservation area with agreed local regulation and objectives.
	Cultural conservation area		Area that owns special culture. Appointed by government to be protected and kept.

Table 8.1.2 Secondary data resources for assessing HCV 1.1

No.	Map Type	Landscape		Management Unit	
		Scale	Resource	Scale	Resource
Bio-physical Data					
1	Riparian and/or lake side buffer zone			1: 25.000	GIS MU Team/ HCV4 Assessment Team
2	Forest cover map			1 : 50.000	GIS MU Team/ HCV Assessment Team
3	Ecosystem map			1 : 500.000	GIS MU Team/ HCV 3 Assessment Team/ various NGOs such as TNC, CI or WWF
4	Peat land distribution and depth	1 : 200.000	Deptan/ Wetlands International	1 : 200.000	Deptan/ Wetlands International
Legal Data					
1	RTRWP	1 : 250.000	Provincial Bappeda		
2	RTRWK				
3	TGHK	1 : 250.000	Baplan/ Department of Forestry	1 : 100.000	Regional Bappeda
Social, Economic and Cultural Data					
1	Village Protected Area			1 : 50.000	Regional Bappeda/ local community

8.1.1.2 Primary Data Collection

The main goal of primary data collection for HCV 1.1 is to confirm potential biodiversity support functions of the MU. This may be especially difficult to determine. Examples of ways this can be investigated are (1) consultations with local stakeholders to assess potential impacts of the MU on protected or conservation areas nearby, including those designated by local communities and (2) the determination of species, habitats, or ecosystems present in the MU that support a nearby protection or conservation area.

8.1.1.3 Analysis

1. Map the extent of forest cover and ecosystems in the landscape that encompasses the MU.
2. Map the extent of any protection or conservation area in or near the MU, including ones designated by local communities.
3. Determine whether the MU has potential to provide a biodiversity support function to protection or conservation areas inside or nearby the MU.
4. Determine the areas over which the MU is confirmed or likely to provide such supporting function.

8.1.1.4 Mapping

Any part of a MU that encompasses a protected or conservation area represents HCVA 1.1 and must be mapped as such. Any part of a MU that provides a biodiversity support function in a protected or conservation area (especially as a buffer zone) must also be mapped as HCVA 1.1.

8.1.1.5 Challenges and Opportunities for the Future

Creative and effective management of HCVA 1.1 can significantly improve the function of protected or conservation areas nearby without having to increase their effective size. Conversely, poor management of HCVA 1.1 can have dramatic negative impacts on these areas. For this reason, HCV 1.1 requires that the MU be considered within the larger landscape to identify on-site operational activities that might have off-site impacts. Examples of such effects include changes to the natural hydrology of an area (eg peat swamp dome) that can increase the risk of fire in other areas, even distant ones, as well as the development of infrastructure that creates access to a protected area that was previously isolated and, for this reason, effectively protected.

8.1.1.6 Management Recommendations

Off-site impacts from activities in a MU must be considered carefully in management of HCV 1.1. If it is thought that a MU functions to support biodiversity in a protection or conservation area, then the authority responsible for the MU must act with care to ensure these supporting functions are maintained. Off-site consideration of these two management issues is extremely important if the operations planned for the MU involve conversion of natural ecosystems to plantation forests or large-scale non-forest areas like coconut, oil palm or rubber plantations.

8.1.2 HCV 1.2 Critically Endangered Species

The aim of HCV 1.2 is to identify critically endangered species and sub-species that occur in or near the MU and that may be affected by operational activities. To the maximum extent possible management action must be undertaken to ensure protection of each individual of these species.

Critically Endangered species are considered to be very close to extinction, and for this reason each individual is important as a potential progenitor of new populations. All layers of society, including the management authority of a MU, bear a responsibility to take action to protect such species from extinction. Only species listed as Critically Endangered (CR) in the IUCN Red List or species that meet these criteria are considered under HCV 1.2.

The aim of HCV 1.2 differs from HCV 1.3. The latter aims to identify and preserve viable populations of certain species by protecting sufficient habitat to enable long term viability of these species. In contrast, HCV 1.2 acknowledges the importance of each individual of CR species, whether or not the population is considered viable at the time of the assessment. HCV 1.2 requires the MU make efforts to protect each individual, not just the population as a whole, through habitat protection and more intensive measures if needed, eg to prevent hunting or capture for commercial trade. It is important to note in management recommendations that, unlike in HCV 1.3, habitats of species identified in HCV 1.2 must be maintained even if the population is considered non-viable (see HCV 1.3 below).

8.1.2.1 Secondary Data Collection

Species Lists

A list of species of concern under HCV 1.2 in Indonesia is provided in Digital Appendix 1. Data preparation should begin by recording all species in the list that are known or suspected to inhabit the MU. It is also necessary to record the dependence of such species on different ecosystem types (eg kerangas versus non-kerangas, disturbed versus undisturbed forest), so as to estimate potential distribution of these species throughout the MU and surrounding landscape. These data will assist planning a survey method to confirm the presence of such species and if possible to estimate potential population sizes throughout the MU and landscape of which it forms a part.

Local Information

Information obtained from local people, the company, or other local organizations (eg NGOs or community institutions) regarding the presence of species in the assessment area can be used as supplementary data on HCV 1.2 species to guide survey methods.

8.1.2.2 Primary Data Collection

A census of representative areas of the MU is needed to confirm the presence of CR species in a landscape. Ideally the survey would also permit an estimation of population size. The survey should aim to identify preferred habitat and known geographic location of HCV 1.2 species through direct observation, audible detection, camera trapping or secondary signs. Interview data can also be extremely useful, but this will vary by species. Survey methods can be highly species specific. For sedentary species (plants), sample points within the MU can be selected based on ecosystem type and surveyed directly using plots or other rapid survey methods. To determine survey methods for mobile species, it will be necessary to hire directly or to consult with experts in related fields, especially in mammalogy, ornithology and herpetology. Survey areas should be chosen in advance based on known habitat requirements and distribution of ecosystem types with reference to HCV 3 (see below).

8.1.2.3 Data Analysis

Appropriate methods for data analysis will vary with species surveyed and the methods employed. The primary goal is to gauge the likelihood that HCV 1.2 species occur in the MU or the surrounding landscape. Careful consideration of sample effort,

reference to literature on habitat requirements/geographic range and consultation with experts is required before concluding a CR species considered potentially present is, in fact, absent from the MU. The basis for this decision should be well documented. A secondary goal is to estimate the number of individuals (population size) inhabiting the MU.

8.1.2.4 Mapping

Each individual of a CR species confirmed present constitutes HCV 1.2, and areas where they are recorded or considered likely to occur should be mapped as HCVA 1.2. For mobile species confirmed or likely present, areas of confirmed or likely habitat must be mapped as HCVA 1.2. Note that areas mapped as HCVA 1.2 must also be mapped as HCVA 1.3 if it is concluded that viable populations may be present.

8.1.2.5 Challenges and Opportunities for the Future

Future land use in areas outside of a MU must be considered in the assessment of HCV 1.2, as it has a direct impact on their long term persistence. This issue is extremely important for the management of CR species with large home ranges that likely move freely across the MU boundary, such as tigers and elephants in Sumatera or orangutans in Kalimantan. Information regarding current and future land use will be vital when management recommendations are being developed.

8.1.2.6 Management Recommendations

The management objective for HCV 1.2 is to promote continued survival of all individuals of all CR species confirmed or likely present in the MU. For sedentary species like plants, or wildlife species with limited mobility, the following are required: (i) habitat of sufficient extent to guarantee survival is delineated and protected and (ii) the ecological attributes of this habitat must be protected. For plants in the family Dipterocarpaceae, individuals of CR species found in the MU with a population greater than 100 adult individuals (>60 cm dbh) may be harvested in a limited fashion with the requirement that the MU creates a plan to manage populations of these species. For long-ranging wildlife species, several management options exist, including in-situ conservation through habitat protection, preserving migration across habitats inside and adjacent to the MU, and potential translocation if only a few individuals are present and there is no chance of growing the population or re-establishing connectivity with other populations in the landscape. Final decisions about the approach to be implemented should be agreed upon by stakeholders, including relevant government bodies with management authority. For example, to carry out translocation of protected

species, authorization must be obtained from the Director General of Forest Protection and Nature Conservation (PHKA, in Bahasa Indonesia). If there are putative viable populations of HCV 1.2 species, management recommendations put forth in HCV 1.3 must also be implemented.

8.1.3 HCV 1.3 Areas that Contain Habitat for Viable Populations of Endangered, Restricted Range or Protected Species

HCV 1.3 aims to identify and manage habitat in or adjacent to the MU for viable populations of species that are threatened, show restricted ranges or protected by the Indonesian government. Species considered under HCV 1.3 include:

- Species listed as endangered (EN) or vulnerable (VU) on the IUCN Red List
- Restricted-rage species found on only one island or part thereof
- Species protected by the Indonesian government under Law Number 5 (1990) and subsequent regulations derived from it
- Taxa listed in CITES Appendix 1 and 2[9]
- Viable populations of CR species considered under HCV 1.2

The aim of HCV 1.3 is to identify and manage viable populations of species listed above, while HCV 1.2 focuses on efforts to maximize survival of Critically Endangered individuals without regard to condition and size of the population as a whole (viability is not a pre-requisite for HCV 1.2). Population viability in HCV 1.3 is determined based on population size and the carrying capacity of habitat required by the species inside the MU and broader landscape of which it forms a part. The carrying capacity of a habitat is a product of its area and condition. Habitat quality is the ability of an area to meet requirements of a species for birth, survival and reproduction. If a habitat declines in extent and quality beyond a specific threshold, then an area may become insufficient to support a viable population. In such a situation, the area will not be considered HCV 1.3.

If one or more species of the type listed above are found within the MU or nearby areas affected by its operations, then populations of these species will be considered viable – meaning HCV 1.3 is present in the area – unless the populations are demonstrated to be non-viable based on scientific methods involving field surveys. In Indonesia, only a few species have been studied in sufficient detail to determine habitat and population viability thresholds (e.g., tigers, elephants and rhinos). As such, the HCV assessor must be very careful to avoid concluding a population is non-viable when, in fact, it is viable (see section 8.1.3.3 below).

[9] Species are listed in CITES Appendix I and II based on agreement among CITES members that populations in nature are endangered as a result of capture for international trade.

8.1.3.1 Secondary Data Collection

Species Lists

A list of species under HCV 1.3 in Indonesia has been compiled in Digital Appendix 2. Secondary data collection for HCV 1.3 begins with preparing a list of species confirmed or likely to be present in the MU and its surrounding landscape. Species conservation status as determined by IUCN (http://www.iucnredlist.org), CITES (http://www.cites.org), the Indonesian government and their endemicity status can be researched directly using primary sources, the above websites and Digital Appendix 2. For species confirmed or likely present that meet one or more criterion under HCV 1.3, notes should also be made about habitat requirements. These can be obtained from the literature or through consultation with relevant experts.

Habitat Definitions and Preliminary Mapping

The mapping activities at this stage in the assessment focus on mapping potential habitat of HCV 1.3 species. This includes, for example:

- Habitats or places that are known to be critical in the life cycle, e.g., the distribution of tree species in which a bird species nests or a breeding site for crocodiles
- Ecosystem types (see HCV 3) where HCV 1.3 species are commonly observed. This might include the entire ecosystem (e.g., gibbons considered potentially present throughout all lowland mixed dipterocarp forest in the area), or a smaller part thereof used infrequently (e.g., a 'sink' habitat, such as higher elevation ridges within lowland mixed forest)
- Habitats of species that represent prey for HCV 1.3 species, e.g. the habitat of deer eaten by various species of wild cat

Other habitats related to HCV 1.3 that could be affected by activities in the MU and that should be mapped and investigated during primary data collection are:

- Habitats upstream or downstream from the MU where activities of the MU could influence water quality or change water courses, with potential negative impacts on HCV 1.3 species (e.g., threatened or protected otter or fish species)
- Habitats of species that possess specific living requirements, especially places (e.g., caves or wetland areas), that could be affected by activities in the MU (see HCV 1.4).

Preliminary mapping of habitats is done in two stages:

1. Delineate the areas described above based on species confirmed or likely present in the MU
1. Expand the map to delineate such habitats throughout the surrounding landscape of which the MU forms a part, especially in areas that might be affected by activities in the MU (e.g., planned for conversion or logging)

Primary data collection during the Full Assessment will seek to verify accuracy of the preliminary mapping. For habitats that could not be mapped based on secondary data, wherever possible it is necessary to plan field surveys to map these habitats using direct observations in the field.

8.1.3.2 Primary Data Collection

The two main goals of primary data collection for HCV 1.3 in the field are (i) investigate the accuracy of preliminary habitat maps based on secondary data, and (ii) supplement the data concerning habitat requirements and population status of HCV 1.3 species thought to exist in or adjacent to the MU.

Checking the accuracy of preliminary maps can be done by sampling several areas within the MU and nearby areas. Field effort must also be made to identify special habitats (e.g., caves or wetland areas) that could not be mapped with secondary data during the preparation phase (due to lack of data). The kind of survey and level of effort required will depend on the species and habitats of interest, as well as availability of other high quality data.

Data collection concerning the distribution of species within a landscape, population status, and habitat requirements will require involvement of experts in related fields and consultations with the local community, relevant government agencies and organizations such as NGOs, universities or local nature lover groups.

8.1.3.3 Data Analysis

Habitat maps can be used to assess the viability of a population based on the estimated number of individuals given apparent carrying capacity of the habitat, using methods that involve (i) quantitative life history parameters already known or that can be estimated, or (ii) qualitative information based on multiple indicators (e.g., frequency of sighting, evidence of on-going reproduction, etc.). It is important to emphasize that the goal is to assess viability of a population at the landscape level including the MU, not just viability of the part of the landscape population inhabiting the MU.

- Where the data allow for a quantitative analysis, if the population is thought to have a > 70% chance of surviving 100 years, the population is considered viable and their habitat represents HCVA 1.3.
- If the life history of the species involved is not known, a qualitative analysis can be used. The analysis will involve searching for indicators or evidence of continued reproduction and estimating area of suitable habitat throughout the landscape sufficient for ≥ 30 individuals. If these criteria are met, the populations and their habitat represent HCVA 1.3.

To avoid mislabeling a viable population as non-viable, the Precautionary Approach requires attention be paid to the following:

- For species with a carrying capacity that fluctuates temporally, e.g., with the abundance of prey species, the peak estimate of carrying capacity should be used for viability analysis.
- For habitats in poor condition but that might be restored, the potential capacity of the restored habitat must be considered.
- If at the landscape level the habitat is fragmented, the section of habitat that lies in the MU functioning to support the landscape population must be considered a part of the 'landscape level' population.

8.1.3.4 Mapping

The habitats of HCV 1.3 species with viable populations must be mapped throughout the landscape, including the MU and surrounding areas bordering it. The areas thus delineated represent HCVA 1.3.

8.1.3.5 Challenges and Opportunities for the Future

Current and approved land use plans at the time of the HCV assessment must be used to identify habitats of HCV 1.3 species at risk of disappearing in the future. Also, it is necessary to consider current and impending threats and the presence of protection or conservation efforts to combat these threats at the landscape level to ensure the survival of the population.

8.1.3.6 Management Recommendations

If operational activities of a MU are predicted to have negative effects on the habitats of viable populations of species identified under HCV 1.3, then management recommendations must strive to protect or improve the quality and extent of these

habitats, and/or involve in-situ species protection if the species are to be harvested (e.g. protected or IUCN listed species in the genera Shorea or Dipterocarpus that are felled in logging operations).

Populations must be managed through the estimation of variables in a precautionary but realistic way, including variability of their natural carrying capacity and the likelihood of natural disaster. If operational activities of the MU require the direct management or in-situ protection of species to maintain population viability, then these measures must be implemented and adherence strictly enforced. If the life history of a species is known, then the area of habitat to be preserved must be sufficiently large to support a minimum of 100 individuals.

8.1.4 HCV 1.4 Areas that Contain Habitat of Temporary Use by Species or Congregations of Species

The aim of HCV 1.4 is to identify key habitats in a landscape where species or groups of species gather for limited periods. Several examples of such key habitats are:

1. Breeding or nesting areas for bird or bat species, e.g., caves or wetlands.
2. Places along primary migration routes.
3. Local wildlife corridors used by animals to move among different ecosystems in effort to track seasonally available foods.
4. Refugia for species at times of drought, flood or wildfire.

A trait shared in common by all habitats considered under HCV 1.4 is that their disappearance would have an impact on wildlife species many times greater than the area of the habitat itself would lead one to expect. If HCV 1.4 is identified in a MU, operations must be done in a manner to guarantee continued access to key habitats and maintenance or improvement of their function.

Species considered under HCV 1.4 are those that gather temporarily or repeatedly in or nearby one or more specific attributes of their habitat. Examples of such important species and habitats include:

- Caves used by bats or swallows.
- Lakes used by migratory birds.
- River-edge grasslands used for egg-laying by crocodiles.
- Salt licks used by various wildlife species.

- Sites with large sources of available food for frugivores (e.g., groves of Ficus trees or hemi-epiphytes).
- High density of trees with cavities or dead crowns used by birds for nesting.

Such habitat attributes must given specific attention in HCV management plans because they are sources of critically important resources for wildlife. They must be protected without exception.

8.1.4.1 Secondary Data Collection

Species List

Assessment should begin by preparing a table of species thought to be present in the landscape that tend to gather in or around particular habitat attributes. In this table, it is important to note the type of habitat where such species gather and whether or not the habitat will be sensitive to activities in the MU. It is also necessary to consider how these species access these attributes, e.g. by specific pathways or habitats, by flight or on the ground, and whether or not access to the attributes will be affected by activities in the MU.

Breeding and Nesting Sites

Some species, especially birds and bats, gather in large numbers at specific breeding and nesting sites. These locations might be used continuously, or they might only be used during certain periods. Species that tend to gather in large numbers at certain habitat attributes can be identified as a subset of the species list already compiled under HCV 1.3. Examples of locations HCV 1.4 taxa might use include lakes, marshlands, deep pools at the mouths of rivers, caves or nesting trees. Several kinds of wetlands can be identified from secondary data, but it will not likely be possible to map caves used by bats or birds; information on these attributes will require information from the local community and direct surveys. Although wetlands can be identified on maps, supplementary data is needed to ascertain whether or not a wetland area represents a gathering place for certain species. Such supplementary data can be obtained from BirdLife Indonesia (http://www.burung.org), Wetlands International Indonesia Program (http://www.wetlands.or.id/index.php), and various other sources (including the MU itself) to determine species periodically present and when they gather. Sites upstream or downstream from the MU that could be affected by MU operations must also be identified (e.g., the hydrology of open wetlands).

Migration Places

The East Asia Flyway used by migrant birds passes through a number of areas in Indonesia and in other countries that represent a stopping point or final destination for some birds. Supplementary information about this can be obtained from BirdLife Indonesia (http://www.burung.org/) or Wetlands International Indonesia Program (http://www.wetlands.or.id/index.php). Local information is also important to identify HCV 1.4 species potentially present and the time and places where they gather. Migration places upstream and downstream of the MU must also be identified, as activities in the MU can have negative impacts on these sites.

Corridors for the Movement of Animals Among Different Ecosystems

The long-term survival of frugivores depends on their ability to move freely in the landscape in their efforts to track seasonally available food. To do this, frugivores must be able to move among different ecosystem types. Examples are movements from swamp forest to dry land, or local migrations along the slopes of mountains through elevationally-zoned ecosystems (e.g., lowland forest to sub-montane forest and beyond). The movement of animals among ecosystems represents a partial explanation of the great density and diversity of vertebrate frugivores in many regions of Indonesia; Gunung Palung National Park in West Kalimantan is one example. Protecting the ability of wildlife to move among ecosystems is a priority in conservation strategies to manage several HCVs (e.g., HCV 1.2, 1.3, 2.3) and for this reason is acknowledged under HCV 1.4.

Refugia

Places that provide protection against disasters like drought, floods, and fires might be used only occasionally yet they are extremely important for survival of a population when such a disaster occurs. These areas represent places where mobile species might search for temporary protection, or where sedentary species survive disaster to recolonize damaged areas affected by the disaster. As with populations of species, whole ecosystems that are destroyed in such disasters can be entirely dependent on refugia for their restoration.

Because natural disasters occur infrequently, historical data are needed to identify existence of a refuge. To identify a place that protects wildlife in times of drought, knowledge is required about how surface water sources are maintained throughout dry periods in ENSO years. For example, some coastal water sources that may become

saline up to several kilometers inland during severe drought; in such cases, local sources of perennial freshwater serve as refugia.

Another example of refugia under HCV 1.4 might be core areas of large landscape forest blocks referred to in HCV 2.1 (see below). The history of burning "hot spots" in the 1997-1998 ENSO event obtained from sources such as NOAA's (National Oceanic Atmospheric Administration) Advanced Very High Resolution Radiometer (AVRR) satellites can be consulted at http://noaasis.noaa.gov/NOAASIS/gateway.html).

8.1.4.2 Primary Data Collection

Sites important for breeding, nesting and local or large-scale migration

Temporal nature of sites referred to in HCV 1.4 can render it impractical to collect primary data in the field. However, breeding and nesting sites and corridors among ecosystems might be surveyed. For habitat attributes of HCV 1.4 that are not expected to be sensitive to activities in the MU (for example, caves in rocky areas that are not to be exploited), it is sufficient to survey the area to identify locations of the attributes and record their coordinates. For habitats likely to be sensitive to activities in the MU (e.g., swamps or other open wetland examples) it is necessary to conduct ground surveys or GIS studies of the whole area in a 3-km buffer from the MU boundaries.

The collection of primary data related to movements of wildlife among ecosystems can be done together with primary data collection for HCV 2 and 3, which involves classification and mapping of ecosystem types within and near the MU. The primary goal is to identify transition areas between different ecosystems (ecotones), especially between swamp and non-swamp forest, and also the condition of forest in the transition zone between, for example, lowland and montane forest. In addition, the occurrence of wildlife species that are known to move among ecosystems in their search for food can be determined. These might include the tapir in Sumatera, several frugivorous species, e.g. primates (orangutan and gibbons), birds (hornbills and pigeons), bats (flying foxes) and several species of forest pigs.

Refugia

Natural disasters are unlikely to occur at the time field surveys, so firsthand observations of refugia can rarely be made. There are, however, some types of refugia that can be surveyed in the field, including borders between areas where fires have occurred in the past and where they have not. In general, the collection of field data associated with refugia is largely dependent on local information, especially those concerned with perennial water sources available during droughts.

8.1.4.3 Data Analysis

Sites important for breeding, nesting and migration

Places thought to be important for breeding, nesting, migration or as corridors must be delineated along with a buffer zone to ensure their continued function and to preserve access. The extent of a buffer zone needed will depend on the species, habitat attributes and modes of access to it (e.g., flight versus ground travel).

Refugia

Data on the potential for areas to be protected from drought, flooding and fires that can be obtained from secondary data sources should be assessed individually. Core areas identified as part of HCV 2.1 and as natural fire break under HCV 4.4 also merit consideration as potential HCV 1.4 sites.

8.1.4.4 Mapping

Each habitat that is used as a temporary gathering site for wildlife must be mapped within the MU and nearby areas potentially affected by its activities. This area represents HCVA 1.4.

8.1.4.5 Challenges and Opportunities for the Future

If HCV 1.4 is present in the MU and in separate areas nearby but outside, these areas will become the responsibility of the MU when operational activities can affect condition of the HCV areas outside. This is seen frequently with wetlands.

8.1.4.6 Management Recommendations

The entire area classified as HCVA 1.4 must be strictly protected and maintained to ensure its continued function and to preserve access.

Habitats that are important for breeding, nesting, and migration and that are set far apart from one another or that occur across ecotones, must be protected, along with buffer zones sufficient to maintain functions and (if required) connectivity among them. Examples are buffers around nesting trees, caves and lakes. Management of habitats deemed important as refugia for wildlife and that are deemed sensitive to disturbance (e.g., wetlands) should also follow management recommendations as outlined in HCV 3 (Rare or Endangered Ecosystems).

8.2 HCV 2. Natural Landscapes & Dynamics

8.2.1 HCV 2.1 Large Natural Landscapes with Capacity to Maintain Natural Ecological Processes and Dynamics

The objective of HCV 2.1 is to protect the ecological integrity of large intact landscapes where natural ecosystem processes have the potential to persist well into the future. A key element of the procedure to identify and protect core areas of large landscapes, which are defined as interior portions of remnant forest fragments wherein natural ecological processes remain unperturbed by disturbances commonly associated with fragmentation and deforestation (edge effects). Core areas are defined in the revised Toolkit as interior zones >20.000 ha in size surrounded by a forested (or other natural vegetation) buffer of (3) km from the forest edge. The management objective of HCV 2.1 is to guarantee that core areas and associated buffer zones are maintained and not fragmented by conversion into non-forest. HCV 2.1 therefore aims to protect the natural diversity of ecosystems, as well as the natural physical and biological interactions among them and their component species.

Criteria for natural landscape in HCV 2.1

A large natural landscape with capacity to maintain natural ecological function and dynamics is defined as a mosaic of natural ecosystems comprising (i) a core area of 20,000 hectares, where internal fragmentation is absent or relatively limited, and (ii) a vegetation buffer zone 3 kilometers from the forest border surrounding the core area.

These two criteria differ from the original HCVF Toolkit Indonesia (2003), which defined large landscape level forest under HCV 2.1 as any forest fragment larger than 50,000 ha, irrespective of size, shape and internal structure.

Past and future forest extent

Aside from mapping current vegetation cover in the landscape of which the MU forms a part, it is advisable to map past and future vegetation cover in the analysis of HCV 2.1. Such a map provides a much deeper understanding of current forest and biodiversity values, as well as threats to their conservation. For example, an forest area that recently diminished markedly in size is likely to contain very higher levels of remnant biodiversity, compared with fragments of similar size that have been isolated for longer periods. Understanding of past vegetation cover will also identify areas (and thus ecosystems) that have suffered vegetation losses in the recent past, which may help to set priorities for active management.

A landscape's past vegetation cover can be mapped using a geo-corrected version of the 1985 Government of Indonesia Peta Wilayah Lahan dan Hutan (Land and Forest Area Map) explained in more detail below under HCV 3, or mapped directly using earliest available Landsat imagery (c. 1970s). Future vegetation cover can be projected using spatial planning maps from the central government (TGHK), provincial (RTRWP) and district (RTRWK), which will indicate areas that are classified for conversion to non-forest, such as small-scale farming, pulp/wood plantation or oil palm.

An example of landscape definition and mapping as defined in HCV 2.1 is shown in Digital Appendix 3.

8.2.1.1 Secondary Data Collection

Secondary data sources are essential for assessing HCV 2.1. This preliminary analysis must be followed up, however, with fieldwork to ground truth remotely sensed interpretations with real condition in the field. Required secondary sources are those necessary to identify and delimit natural landscapes inside, nearby or potentially-affected by activities of the MU. These include:

1. Maps of forest and other natural vegetation cover preferably in 1985 or earlier.
2. Current forest and other natural vegetation cover and conditions based on satellite image interpretation and analysis.
3. Current spatial planning maps from central, provincial and regional governments.
4. Modified land system map (RePPProT) to assist with mapping of peat areas (including potential dome structures) and other non-forest ecosystems such as swamp or wetlands.
5. Other ecosystem maps (see HCV 3).
6. Watershed maps (DAS).

These geographical data layers must be processed using GIS software and mapped at a scale of at least 1:1,000,000 (preferably 1:500,000 or better) to describe existing landscape elements, potential relationships among them (e.g., water flows) and the potential presence of core areas and associated buffers. In general, mapping the 'current' vegetation cover and its condition must use satellite images that are no older than 12 months. However, in areas where forest cover change occurs more quickly (e.g., Riau Province in Sumatera) images should be no older than 6 months to map current land cover.

8.2.1.2 Primary Data Collection

HCV 2.1 assessment requires field data collection to confirm vegetation mapping based on secondary data, and condition of potential core areas. Direct consultations with government, NGO, and local stakeholders must also take place to assess current and future threats against HCV 2.1, especially those caused by existing spatial planning and infrastructure developments undertaken or planned by the MU. If spatial plans at different levels of government are contradictory (eg, between provincial and district plans), which is common in Indonesia, then consultation must be made to confirm which map will be used for threat analysis and management planning.

8.2.1.3 Data Analysis

Data analysis for identification of HCV 2.1 can be carried out in four steps:

1. Map current vegetation cover in the landscape including the MU.
2. Map mature vegetation cover in MU and throughout the surrounding landscape, paying special attention to definition of forest/natural vegetation boundaries, e.g. by defining boundaries between tall forest (or other natural vegetation) and degraded areas.
3. Test for and delineate occurrence of core area (>20,000 ha) after delineating a buffer zone (3 km) around the forest landscape of which the MU forms a part.
4. Consider possible scenarios of change to core area and buffer zone based on current official spatial plans.

8.2.1.4 Mapping

Plans for converting remaining natural forest to non-forest in the provincial spatial plans (RTRWP) or district spatial plans (RTRWK) represent the two major challenges to maintaining or strengthening HCV 2.1 in remaining large natural landscapes. Therefore, while assessing the contribution of a MU to the overall ecological integrity of a landscape, it is necessary to consider the future condition of surrounding areas currently vulnerable to conversion based on land use planning. Viewed from a different perspective, this challenge could be considered an opportunity for large, influential private sector entities to recommend revision of spatial plans to protect core areas and thereby promote better integration of environmental and development concerns in provincial- or district-level plans. This will aid private sector interests in their efforts to manage HCVA 2.1 outside the boundaries of the MU.

8.2.1.5 Challenges and Opportunities for the Future

Plans for converting remaining natural forest to non-forest in the provincial spatial plans (RTRWP) or district spatial plans (RTRWK) represent the two major challenges to maintaining or strengthening HCV 2.1 in remaining large natural landscapes. Therefore, while assessing the contribution of a MU to the overall ecological integrity of a landscape, it is necessary to consider the future condition of surrounding areas currently vulnerable to conversion based on land use planning. Viewed from a different perspective, this challenge could be considered an opportunity for large, influential private sector entities to recommend revision of spatial plans to protect core areas and thereby promote better integration of environmental and development concerns in provincial- or district-level plans. This will aid private sector interests in their efforts to manage HCVA 2.1 outside the boundaries of the MU.

8.2.1.6 Management Recommendations

The objective of HCV 2.1 management is simple: ecological integrity of the core area and buffer zone must be maintained, protected and improved.

To achieve this, the MU must avoid direct and indirect intrusions into the buffer zone forest surrounding the core. Examples of direct border intrusion would include intensive timber harvesting (e.g., using the TPTII system); natural forest conversion to plantation; and infrastructure development such as roads, canals, or campsites inside the core area and its buffer zone.

An example of indirect border violation is transformation of a natural ecosystem that is part of HCVA 2.1 through infrastructure development, which might in turn impact natural functions of the core area or increase risk of further border intrusions by other parties due to improved access. Two of the most common indirect border intrusions in Indonesia are (i) digging of drainage canals to dry peat land in or near the border of HCVA 2.1, which disrupts the buffer zone or the core area, and (ii) road building to access production forest for selected harvesting near the borders of HCVA 2.1, which in turn increases the risk of illegal logging or small holder agricultural expansion.

Indirect border intrusions into the buffer zone and/or core area within the management authority of the MU must not be allowed. Indirect border intrusions through infrastructure development are complicated in nature, but the MU bears at least partial responsibility to control this. On the one hand, most intact natural landscapes in Kalimantan and Sumatera remain intact because they are isolated and have limited transportation access. On the other hand, the MU must build infrastructure such as

roads to access management areas and transport products, even though this action will increase access to isolated areas forming part of HCVA 2.1. Furthermore, it is socially and politically difficult for a MU to restrict local communities to access company roads. The MU must, therefore, work proactively with local government and law enforcement to anticipate infrastructure development impacts on HCVA 2.1 and to design strategies to minimize these impacts.

8.2.2 HCV 2.2 Areas that Contain Two or More Contiguous Ecosystems

Areas supporting a variety of ecosystems types are capable of supporting higher levels of biodiversity and sustaining these levels over time. To maintain ecosystem diversity and its attributes is one basic goal of conservation planning, because it maintains the natural movement of species; flow of materials and energy between ecosystems; and increases forest resiliency to environmental fluctuations such as food availability for vertebrates, extreme weather patterns and longer term climate change. The objective of HCV 2.2 is to identify landscape areas containing a variety of ecosystem types and to ensure maintenance of their ecological integrity and continuity.

HCV 2.2 Criteria

A natural landscape with two or more contiguous ecosystem types is defined as an area containing:

- two or more adjacent ecosystems that share intact border(s), especially the transitional zone (ecotone) between various types of swamp and non-swamp, or kerangas and non-kerangas.

- forested mountain slopes covering various types of ecosystems distributed along elevation gradients, especially those including transitions from lowland forest to submontane and montane forest, each with their distinctive floristic associations and ecological dynamics.

8.2.2.1 Secondary Data Collection

Defining a landscape with two or more ecosystems requires various kinds of secondary data, including:

- Satellite imagery or other visual data such as aerial photography to map forest areas and their general condition.
- Modified land system map (RePPProT), and supporting geological and soil data to map ecosystem types (see HCV 3).
- Topographical maps (DEM) to assist ecosystem mapping.
- Watershed maps to assess potential impact of MU activities on upstream and downstream areas.

Secondary data analysis will produce a tentative ecosystem map for the landscape. Strengths and weaknesses of this map can be verified directly through field survey (ground check), high resolution satellite image analysis (SPOT or IKONOS) or low speed aerial survey.
Human-made elements in the landscape must also be mapped, because such areas can influence management decisions on the minimum size of the transition zones between ecosystems required to maintain functional relationships between natural ecosystems in the landscape. For example, the size required to maintain animal movements between two ecosystems could be smaller if these ecosystems also border mature resin tree gardens (e.g., in Sumatera) or mature fruit tree gardens (e.g., in Kalimantan), compared with ecosystems bordering degraded agricultural fields or grasslands.

8.2.2.2 Primary Data Collection

The main objective of field work to assess HCV 2.2 is confirmation of preliminary mapping of ecosystem distribution and condition based on secondary data. Assessment of the condition of transition zones (ecotones) between ecosystems, if they exist, and also anthropogenic vegetation types such as fruit gardens or agricultural areas should be a major focus. Evaluating the value of such habitat for biodiversity can be very important for developing management plans related to HCV 2.2 (e.g., by helping to retain connectivity across ecotones for certain taxa).

8.2.2.3 Data Analysis

Four components of analysis need to be performed to finalize assessment of HCV 2.2 based on data collected in the field:

1. Finalizing a map of ecosystem types through the MU and the landscape of which it forms a part.
2. Delimiting transitional zones between different ecosystems and assessing its natural condition, especially swamp and non-swamp in low stature or other types of forest along mountain ridges if they exist.
3. Confirm which ecosystems or parts thereof are potentially vulnerable to impacts of MU operations, directly or indirectly, especially in areas that represent ecotonal transition between ecosystems.
4. Assess threats to existing natural ecosystems and identify where deforestation has been or continues to be high, based on historical patterns of land cover change throughout the area.

8.2.2.4 Mapping

If the landscape including the MU contains two or more contiguous natural ecosystems as described above, then the transitional zone between these ecosystems defines HCVA 2.2. The extent of these ecosystems and the transition/ecotone between them must be mapped as clearly as possible.

8.2.2.5 Challenges and Opportunities for the Future

One of the most important challenges to managing HCV 2.2 is developing strategies to maintain ecotones when their location conflicts with operations planned by the MU itself or when such areas are being affected by off-site impacts beyond the direct or indirect control of the MU.

One major, future opportunity in relation to HCV 2.2 is to strengthen (increase) the connectivity and functional inter-relationship between natural ecosystems in or near the MU that have been cut off (or weakened), because portions of once natural ecosystems have been converted to non-forest or otherwise degraded. Restoring functional linkages between remnant natural ecosystems will contribute substantially to long-term conservation of biodiversity and natural ecosystem dynamics in the landscape.

8.2.2.6 Management Recommendations

If HCV 2.2 is identified inside the MU, then HCVA 2.2 must be protected and conditions maintained to sustain natural ecological processes, especially interactions among different ecosystem types.

If HCV 2.2 is present, and either (i) one or more of the ecosystems is considered rare or endangered under HCV 3, or (ii) the area has already been identified as important for management of another HCV in the area (eg, HCV 1.2 or 1.3), then sufficient areas of each ecosystem and transitional zone(s) between them must be maintained to co-manage these values.

If HCVA 2.2 occurs in a landscape that also meets criteria of HCV 2.1 – i.e., a large landscape with capacity to maintain natural ecological processes and dynamics – then at least 10,000 ha of each ecosystem, and the transitional zone(s) between them, must be maintained in the core area delimited under HCVA 2.1. If 10,000 ha of each ecosystem cannot be preserved in the core zone, because ecosystem extent is insufficient, or their spatial arrangement prevents it, then the largest possible area of each ecosystem and their transitional zone(s) must be preserved within the core area. These areas, in turn, define the High Conservation Value Management Area (HCVMA) for HCV 2.2.

It is critical to emphasize that, as with the identification of HCV 2.2, the spatial extent of analysis to develop a management plan for this value is not limited to the MU alone, but must also consider the condition of the broader landscape of which the MU forms a part.

8.2.3 HCV 2.3 Areas that Contain Representative Populations of Most Naturally Occurring Species

The objective of HCV 2.3 is to identify landscapes with a combination of attributes that permit maintenance of representative populations of most naturally occurring species and to guarantee that management practices inside the MU are sufficient to maintain or enhance these values.

A species' long-term viability in an area depends on maintenance of a minimum viable population (MVP). The size of the habitat required to maintain MVP varies widely among species, especially in a hyper-diverse tropical country like Indonesia. However, a large, non-fragmented area with diverse ecosystem types has a larger capacity to maintain a larger assemblage of naturally occurring species than does a smaller, fragmented area with limited diversity of ecosystem.

Assessment of HCV 2.3 uses a number of approaches (proxies), including minimum area needed to maintain the survival of top predator species (e.g., tiger, leopard or eagle), and testing for the existence of other diverse assemblages of species, or for presence of well known species that are easily recognizable, known to occur at low-

density and therefore require large habitat areas (e.g., orangutan or elephant). As with all other HCVs, assessment of HCV 2.3 requires the assessment team to look beyond the borders of MU into the landscape of which it forms a part to assess the potential importance of interactions between populations and habitats inside and outside MU.

HCV 2.3 Criteria

A natural landscape meeting one or more of the following criteria, merits consideration under HCV 2.3, on the grounds that representative populations of most naturally occurring species might be present:

1. Protected Areas identified as HCVA 1.1.
2. Areas identified as HCVA 2.1.
3. Large forest blocks that did not meet requirements of HCV 2.1, due to lack of a core zone as defined above.
4. Large forest blocks containing continuous forested ridges and slopes that span lowland to montane forest ecosystems.
5. Area proven to have a population of one or more top predators (e.g., tiger, clouded leopard or eagle) with evidence of ongoing reproduction.
6. Area that contains other populations of species known to require large habitat areas to survive, living naturally at low densities (e.g., orangutan or elephant).
7. Large forest areas that until recently met criteria HCV 5 under basic needs but no longer do so because of excessive hunting; such areas may have experienced local population extinctions, but they may also support representative populations, albeit at low numbers.

Primary data collection must be carried out in areas identified as potential HCVA 2.3 with the goal of confirming presence or absence of representative populations of most naturally occurring species.

8.2.3.1 Secondary Data Collection

Secondary data sources to support analysis of HCV 2.3 are the same as HCV 2.1, 2.2 and 3 (see below). The preliminary map created for these HCV can be used directly for pre-assessment of HCV 2.3 and for planning the fieldwork.

Preliminary mapping must be complemented with data on the full range of species that might exist in the MU and broader landscape of which it forms a part. Such data can be obtained from several sources, including Digital Appendices provided in

this Toolkit, by extracting species known for the island of concern and the ecosystem types present. To judge the likelihood of individual species occurrence in the landscape under assessment, data from the Appendices should be supplemented with data from other sources as required, including internet resources (especially range maps from the IUCN website), books or manuals, previous research reports or published papers and results from surveys conducted by the MU or consultants on their behalf in the vicinity.

This list of potential species present enables better planning for field data collection through direct observation and/or interview with local community members, and provides the basis for concluding whether or not representative populations of most naturally occurring species are present.

8.2.3.2 Primary Data Collection

Full assessment of HCV 2.3 must focus on evaluating the likelihood of occurrence of taxa on the list of species potentially present at the site (following 8.2.3.1 above), especially species considered to be valuable indicators of overall floristic or faunal diversity. Cross-checking accuracy of the classification of natural ecosystems and other landscape elements is also a priority.

Data collection must be conducted through direct observation using appropriate methods, along with discussion between members of the assessment team and local communities, local NGO representatives and MU personnel or government institutions in the area. Birds can be an especially valuable, time efficient indicator of ecological conditions (Gardner et al. 2008). In the case of HCV 2.3, if many bird species dependent on mature forest or other natural ecosystems are recorded at a site, this suggests the same may be true of other naturally occurring species. Assessing the presence of top predators and primates should also be a priority for field surveys.

8.2.3.3 Data Analysis

An area meeting one or more of the criteria listed under 8.2.3 is considered to be potential HCVA 2.3. Data analysis to confirm this must assess the extent to which the full assemblage of species potentially occurring in the area is, in fact, confirmed or likely to be present. The following steps are recommended:

1. Refer to the finalized map of ecosystem types, and forest cover and condition in the MU and surrounding landscape.

2. Assess the value as potential habitat for biodiversity of the MU and surrounding landscape based on ecosystem types present, their total extent and spatial contiguity, connectivity among valuable habitat areas and the level of hunting or other threats that would affect species presence.
3. Complete the list of species known or likely to occur in the landscape, attaching a special note for top predators and taxa chosen as indicator species, in particular those considered to be dependent on mature ecosystems in good condition. Compare this to the list of species potentially present in the area to see how well different taxonomic groups appear to be represented.
4. Consider the value of non-natural landscape elements as supporting habitat for biodiversity, such as farm, plantations, and heavily degraded forest lands, with special emphasis on the capacity of such areas to provide landscape level habitat connectivity among remnant natural ecosystems potentially important as sources of food or as refugia.

An area concluded to have representation of most naturally occurring species, especially top predators and taxa known to be dependent on mature ecosystems, and with reasonably intact landscape level habitat connectivity, must be considered HCV 2.3.

8.2.3.4 Mapping

All areas inside or near the MU considered to support landscape level persistence of representative populations of most naturally occurring species must be delineated as HCVA 2.3.

8.2.3.5 Challenges and Opportunities for the Future

HCV 2.3 is one of the most difficult HCVs to assess, because few species can be directly observed during the timeframe of a typical assessment, especially species that are rare, cryptic or otherwise difficult to observe (and in some settings this may apply to the majority of naturally occurring species). Therefore, in addition to the list of species confirmed and likely present, it is strongly advised to use a combination of indicators (proxies), such as the size and condition of natural ecosystems, the level of connectivity among habitat elements, the presence of key or sensitive wildlife species (especially top predators) and supporting information obtained from local communities.

8.2.3.6 Management Recommendations

If HCV 2.3 is determined to be present in the MU or the landscape of which it forms a part, the MU must strive to maintain its contribution to the landscape populations of these species. It is rarely the case that the MU has control over the entire landscape

mosaic, however, so in such cases the MU must be proactive about approaching government and other stakeholders to develop and implement a collaborative, landscape level HCV 2.3 management plan. This may require cooperation with spatial planning agencies and other parties with a direct influence on the size and connectivity of landscape elements. Many of the management recommendations discussed under HCV 2.1 also apply to HCV 2.3.

8.3 HCV 3 Rare or Endangered Ecosystems

8.3.1 Rare or Endangered Ecosystems

The objective of HCV 3 is to test for the occurrence of rare or endangered ecosystems in a landscape. An ecosystem may be rare or endangered because of natural factors limiting its extent (e.g., karst forest on limestone) or because of land cover changes or ecological degradation caused by humans (e.g., coastal kerangas forests throughout Kalimantan). A MU must manage such an ecosystem to ensure that natural ecological processes within it will be maintained, with priority given to unique, defining ecosystem attributes if they exist.

An ecosystem can be defined as the community of all plants and animals, and their physical environment, which together function as an interdependent, sometimes inseparable unit. Each ecosystem type has a different community, with different patterns of interaction between the biotic and physical environments. To maintain biodiversity in Indonesia, and to protect the full range environmental services that depend on it, a number of replicates of functioning ecosystem types must be protected and maintained. HCV 3 draws special attention to ecosystems that are rare or endangered as a means for setting priorities for management.

Two major criticisms of HCV 3 criteria in the original Toolkit for Indonesia (2003) were that (1) no justification for designating HCV 3 status of different ecosystems was provided, and (2) the old Toolkit did not take into account geographic variation in rarity, or endangered status – i.e., HCV 3 was not 'contextualized'. A revised method was developed to address these problems.

To decide whether an ecosystem is rare or endangered in a given region, a thorough assessment within biophysiographic regions of an island must be conducted, using a systematic process that compares past (historical), present and future expected extent of ecosystem types. A case study from West Kalimantan illustrating the new method for determining HCV 3 in the revised Toolkit is provided in Digital Appendix 4.

HCV 3 Criteria

In the revised Toolkit, an ecosystem is considered endangered if it meets one or more of the following criteria:

1. An ecosystem that has lost 50% or more of its original extent in the biophysiographical region where it occurs.
2. An ecosystem that will lose 75% or more of its original extent in the biophysiographical region where it occurs, based on the assumption that all areas currently allocated for conversion in existing spatial plans will be converted.

An ecosystem that fits the following criteria is considered rare:

3. A natural ecosystem that covers less than 5% of the remaining natural vegetation cover in the biophysiographical region where it occurs.

Ecosystem Mapping

HCV 3 requires systematic ecosystem mapping across a very wide area and in a manner that is comparable among sites and by different assessment teams. For practical purposes, medium-scale mapping that can describe biological diversity in a landscape is also needed. Due to limited knowledge and ability to map ecosystem types, a dataset describing the main physical factors that determine ecosystem distributions must be used as a proxy to delineate ecosystem types.

In Indonesia, the distribution of ecosystem types is defined by climate, soil/hydrological characteristics, human influences and landform features within a biogeographical unit. The RePPProT (Regional Physical Planning Programme for Transmigration) mapping program conducted by the Government of Indonesia in the 1980s defined and mapped 414 land systems in Indonesia that that describe topographical, geological, climate, and hydrological factors, as well as soil and resident species. RePPProT land system classes can be combined with land cover and topographical maps to create a map of ecosystem types, and to estimate their past, present and future extent as described in Tables 8.3.1 & 8.3.2 (for Sumatera and Kalimantan).

Table 8.3.1 Ecosystem types potentially present in RePPProT classes in Kalimantan and their status under HCV 3 using the Precautionary Approach.

Island	Elevation Zone	Map Type	RePPProT class where ecosystem type might be found	HCV 3 status based on Precautionary Approach	
				Rare	Endangered
Kalimantan	Lowland (0-500m)	Mangrove and intertidal swamp	KJP		X
		Coastal beach forest	PTG	X	X
		Riparian forest	SBG, BKN, BLI, MGH, KHY BKN, LWW, SBG		X
		Mixed dipterocarp forest on alluvium*	BWN#, KRU#, LWW, LHI		X
		Mixed or hill dipterocarp forest on sedimentary rock	MPT, MTL, PDH, TWB, TWH BTK, LPN†, PLN†, RGK,		X (<300 m)
		Mixed or hill dipterocarp forest on volcanic rock	SMD, TBA BPD, HJA, JLH, PLN, RGK†	X	X
		Mixed or hill dipterocarp forest on metamorphic rock	HJA, JLH, LNG, PLN, RGK, TWI		X
		Mixed or hill dipterocarp forest on igneous (granite)	PST		X (<300 m)
		Mixed or hill dipterocarp forest on old marine sediments	RGK, STB GDG, SST, LNG	X	
		Mixed or hill dipterocarp forest on basalt	GBJ, KPR, OKI	X	X
		Forest on ultrabasic rock$	BRW, BWN, KRU, PKU	X	
		Karst forest on limestone@	SGT, SPG, TDR		X
		Heath forest (kerangas)	MDW, SRM§, BRH§, GBT, SHD		X

* Lowland forest on alluvium occurs in many other RePPProT classes in association with rivers draining broad valleys with flat bottoms
# The dominant vegetation in this land system is kerangas but lowland mixed dipterocarp forest occurs locally on sediments
† Very limited extent due to conversion to non-forest
@ Extensive areas of limestone and karst forest are found in the Sangkulirang Peninsula of East Kalimantan.

Island	Elevation Zone	Map Type	RePPProT class where ecosystem type might be found	HCV 3 status based on Precautionary Approach	
				Rare	Endangered
Kalimantan	Lowland (0-500m)	Peat swamp	BKN, BLI, KHY, KLR, MGH, PMG, SBG†, TNJ		X
		Freshwater swamp	HY, KLR, TNJ† associated with KLR		X
		Grass and reed swamps	PMG	X	
		Open wetlands and lakes	- LHI, MPT, MTL, BRW, PDH	X	X
	Sub-montane (500 - 1000 m)	Sub-montane forest on limestone	BTK, BTA, LPN, OKI*, LNG		
		Sub-montane forest on other substrates	TDR, TWI, BPD, STB - BPD, BTK, MPT, BRW**, PDH, BTA, LPN, LNG**,		
	Montane (>1000 m)	Montane or cloud forest on limestone	STB, TDR**, TWI		
		Montane grass land on various substrates (>2000 m)	LPN, PDH	**X**	

* Lowland forest on alluvium occurs in many other RePPProT classes in association with rivers draining broad valleys with flat bottoms
# The dominant vegetation in this land system is kerangas but lowland mixed dipterocarp forest occurs locally on sediments
† Very limited extent due to conversion to non-forest
$ Extensive areas of forest on ultrabasic substrate are found in the Meratus Mountains and Pulau Laut of South Kalimantan
@ Extensive areas of limestone and karst forest are found in the Sangkulirang Peninsula of East Kalimantan.
ß Shallow superficial peat <100 cm
§ Shallow surface peat (< ca. 50 cm)
** This ecosystem type has limited extent within this landform class

Table 8.3.2 Ecosystem types potentially present in RePPProT classes in Sumatra and their status under HCV 3 using the Precautionary Approach.

Island	Elevation Zone	Map Type	RePProT class where ecosystem type might be found	HCV 3 status based on Precautionary Approach	
				Rare	Endangered
Sumatra	Lowland (0-500 m)	Mangrove and intertidal swamp	KJP		X
		Coastal beach forest	AKU	X	X
		Riparian forest	ANK, BKN, BLI		X
		Mixed dipterocarp forest on alluvium§	BKN		X
		Mixed or hill dipterocarp forest on sedimentary rock	AHK, BDD †, BRW, BYN		X
		Mixed or hill dipterocarp forest on volcanic rock	BBG, BBR, BMS, BTA, BTG, BTK		X
		Mixed or hill dipterocarp forest on metamorphic rock	BGA, BPD, DKP		
		Mixed or hill dipterocarp forest on indigenous (mainly granite)	BBR	X	X
		Mixed or hill dipterocarp forest on old marine sediments		X	X
		Mixed or hill dipterocarp forest on basalt	BMS, BTA	X	X
		Forest on ultrabasic rock			
		Karst forest on limestone	AWY*, BBD*, GBJ	X	X
		Heath forest (kerangas)	BRW		X
		Peat swamp	BBK, BLI ß, BLW ß, GBT		X
		grass and reed swamps	BKN, BLI	X	X
		Open wetlands and lakes	ACG		
	Sub-montane (500-1000 m)	Sub-montane forest on limestone			
		Sub-montane forest on other substrates	ANB †, BDD †	X	
	Montane (>1000 m)	Montane or cloud forest on limestone	AHK, ANB †, BBG, BBR, BDD †, BGA, BGI †, BMS †, BPD, BPP, BRW, BTA, BTG, BTK, BYN		
		Montane or cloud forest on other substrates (>2000 m)	BPD, BPP, BRW, BTA, BYN	X	

§ Lowland forest on alluvium occurs in many other RePPProT classes in association with rivers draining broad valleys with flat bottoms

† Very limited extent due to conversion to non-forest

* This extent of this ecosystem is limited within this landform class

ß Shallow superficial peat <100 cm

8.3.1.1 Secondary Data Collection

HCV 3 assessment begins with the collection of secondary data and the mapping of ecosystems within a landscape boundary delimited by:

1. Ecosystems inside the MU
2. Ecosystems within at least 3 km from MU boundaries
3. The extent of ecosystems upstream or downstream of the MU, where operational activities of the MU might affect the condition and quality of water, or could change water courses with associated negative impacts (see HCV 4)

Land System

The RePPProT land system map is used to delineate the potential distribution of ecosystem types across Indonesia. A modification of the RePPProT map, with less than 250 m spatial accuracy, has been prepared for Kalimantan and Sumatera in Digital Appendices 12 and 13. An ecosystem distribution map for Papua was created by Conservation International (CI) and can be obtained through the CI office in Jakarta.

Biophysiographical Unit / Physiographic Regions

A biophysiographical unit is as a combination between Physiographic Regions defined by RePPProT and Biogeographic Province Sub-unit as defined by MacKinnon (1997). Biophysiographic borders for Sumatera and Kalimantan were created by an analysis of a map created by overlay of RePPProT physiographic regions and biogeographic units (MacKinnon 1997); resulting maps and shapefiles for Kalimantan and Sumatera are provided in Digital Appendices 14 and 15.

Land Cover History

The past extent of ecosystems can be is estimated from the 1985 Forest and Land Cover map (GOI 1990) or other map of a similar nature. For natural non-forest ecosystems, it is best to use satellite imagery of a similar age. There are two different versions of the map that can be used: 1) issued by the Government of Indonesia, and 2) an adaptation map issued by the WCMC. For HCV 3 assessment, either (i) the official map published by the Government of Indonesia or (ii) Landsat imagery[10] where there is coverage for 1985 (or earlier) for the Biophysiographic Unit of the assessment area, must be used.

10 Historical Landsat imagery (back to c. 1975) is available for most of Sumatera and Kalimantan to map directly the historical distribution of forest cover. Historical forest cover maps more accurate than the GOI 1985 land cover map are begin produced for Kalimantan and eventually Sumatra. Contact Daemeter Consulting for further information and updates on progress or availability of such maps.

Current Land Cover

The current land cover must be defined using a classification from the most recent satellite imagery available. In a constantly changing landscape, the image must not be more than 12 months old. A third party land cover map can be used, but assessors must be able to defend and justify the map's accuracy and thoroughness and address these issues in the final report.

Future Land Cover

Future land cover prediction can be made using the official provincial spatial planning map (RTRWP) at the time of the assessment. To do this, the analyst assumes all areas currently allocated for conversion to non-forest will in fact converted.

Assessors must also review District level (RTRWK) and national spatial planning maps (TGHK) to consider potential impacts of future land use and vegetation cover change. Additional information from various stakeholders must also be obtained to gain opinions or views on future possibilities of current spatial planning (see section 8.3.2).

8.3.1.2 Primary Data Collection

During the full assessment, ground truthing of satellite imagery must be conducted to ensure ecosystem types and current vegetation cover is correctly classified. This can be done by sampling different land and ecosystem classes through visual inspection in the field, or through low altitude aerial survey if the area is large and budget permits. Differences between the initial classification/mapping and field observations must be noted and the classification amended accordingly.

Assessors must try as best as they can to approach all stakeholders to ensure that the current spatial plans accurately represent future conditions and to harmonize inconsistencies between national government, provincial, and regency plans, if they exist. Ultimate decision about which spatial plans are used for predicting future forest cover must be made explicit in the assessment report.

8.3.1.3 Data Analysis

Data analysis can be done using the Analytical Approach described in Table 8.3.3 or the Precautionary Approach described in Table 8.3.4.

Table 8.3.3 Decision tree to identify HCV 3 using the Analytical Approach within a specified Biophysiographic Unit of an island.

	Task / Question	Answer	Guidance
3.1	Place the assessment area within the Biophysiographic Sub-unit of the island where it occurs.		Proceed to 3.2
3.2	Map distribution of ecosystems within the Sub-unit at the finest resolution possible (see section 8.3.1).		Proceed to 3.3
3.3	Overlay historical forest cover for the entire Sub-unit using forest cover data from 1985 or earlier (see section 8.3.1).compute the total area for each ecosystem type in the Sub-unit. This is the "past extent" of ecosystems.		Proceed to 3.4
3.4	Overlay current forest cover for the entire Sub-unit on the ecosystem map using the most recently available forest cover data (see section 8.3.1 and compute the total area for each ecosystem type in the Sub-unit. This is "present extent" of ecosystems.		Proceed to 3.5
3.5	Compute the % area lost for each ecosystem in the Sub-unit by comparing past and present extent.		Proceed to 3.6
3.6	Question: Have any of the ecosystems declined in extent by ›50%?	Yes	HCV 3 present in the Sub-unit under Criterion 3.6; proceed to 3.7
		No	Proceed to 3.8
3.7	Question: Are any of these ecosystems present in the assessment area?	Yes	HCV 3 present in asessment area
		No	Proceed to 3.8

	Task / Question	Answer	Guidance
3.8	Overlay the current RTRWP on the map of present extent of ecosystems from Step 3.4, and make a "future forest cover map" based on assumption that areas classified as conversion forest will be converted to non-forest. This map represents the "future extent" of ecosystems.		Proceed to 3.9
3.9	Compare the past extent (from Step 3.3) and projected future extent of ecosystems in the Sub-unit and compute the % loss for each ecosystem.		Proceed to 3.10
3.10	Question: When the past and future extent of ecosystems is compared, do any of the ecosystems decline in extent by ≥75% under a scenario of full conversion?	Yes	HCV 3 is present in Sub-unit under Criterion 3.11
		No	HCV 3 not present
3.11	Question: Are any of these ecosystems present in the assessment area?	Yes	HCV 3 present is asessment area
		No	HCV 3 not present

Table 8.3.4 Decision tree to identify HCV 3 using the Precautionary Approach (i.e., when satellite imagery and supporting GIS data are insufficient to use Analytical Approach outlined in Table 8.3.3).

	Questions	Answer	Guidance	Examples/Criteria
3.1	Does one or more ecosystem(s) categorized as rare or endangered in Table 8.3.1 or 8.3.2 occur (i) within the MU, or (ii) outside the MU but possibly affected by its operations?	Yes	Possibly present within or near the MU; continue to 3.2	Karst forests in Kalimantan, peat forests in Sumatera, etc.
		No	HCV 3 not present	Grassland, shrubby re-growth on previously burned land
3.2	Do any of the ecosystems present constitute a form of peat land vegetation?	Yes	Continue to 3.3	Areas with surface layers of organic matter (peat) > 25 cm or more on average[11]
		No	Continue to 3.4	Areas with surface layers of organic matter (peat) < 25 cm or more on average
3.3	Has the peat land undergone drastic changes affecting natural hydrological processes to the point that restoration of such functions is impossible?	Yes	No HCV 3	Peat land that no longer supports distinctive natural vegetation and has been converted to agricultural land using an extensive network of drainage canals.
		No	Continue to 3.4	Peat land where some elements of natural vegetation remain and on wich a large system of drainage canals has not been established.

[11] Note this depth criterion is not a technical definition of peat land, but was chosen for consistency with ecosystem classifications based on RePPProT proxies (Table 8.3.1). Namely, the RePPProT class BRH (Barah) is classified as shallow surface peat because it includes terrain with peat depths up to c. 50 cm, even though shallow depths of c. 25 cm may also occur.

	Questions	Answer	Guidance	Examples/Criteria
3.4	Has land cover of the ecosystem been degraded so severely that it qualifies as 'unproductive land' as defined by Ministry of Forestry Decree of No. 21/pts/2001?	Yes	HCV 3 probably not present, but continue to 3.5	Amount of woody vegetation biomass is less than 5 m3 per ha; e.g., clear-cut forests or burned areas.
		No	HCV 3 present within or around the MU	Amount of wooden vegetation biomass is more than 5 m^3 per ha; e.g., ex-HPH forests that have not been clear cut or burned
3.5	Is it possible for the ecosystem to recover – given sufficient time – through natural processes of tree growth, succession and seed dispersal considering the following factors: (i) ecological attributes of the ecosystem, (ii) condition and status of surrounding land, (iii) current land use status and (iv) regional development planning?	Yes	HCV 3 is present within or around the MU	The ecosystem is degraded, but (i) exists on fertile soil, (ii) occurs close to natural forests with protected areas, and (iii) occurs in areas of low human population density with no large scale development plans.
		No	No HCV 3	The ecosystem is degraded and (i) exist on sandy infertile soil, (ii) is adjacent/ close to areas classified for conversion and (iii) occurs in areas of high human population density with large scale development plans (e.g., transmigration).

8.3.1.4 Mapping

Each ecosystem type (RePPProT land system) can be mapped based on secondary data sources described above, combined with satellite image interpretation and direct field observation. If an ecosystem is found to meet the criteria of rare or endangered, the entire extent of the ecosystem is HCVA 3. If the data and/or human resources available are inadequate to conduct an assessment using the analytical approach, as described in Table 8.3.3, the assessor can use a precautionary approach described in Table 8.3.4, with reference to the HCV 3 status of ecosystems described in Table 8.3.1 and 8.3.2. Note that the precautionary method is more conservative than the analytical method; larger areas will be classified as HCVA 3 using the precautionary approach.

8.3.1.5 Challenges and Opportunities for the Future

Current spatial planning for future land use is part of HCV 3 identification and assessment, even though it is uncertain what will occur in the future. Therefore, the assessor must consider various alternative scenarios when developing final recommendations to the MU regarding HCV 3 management.

8.3.1.6 Management Recommendations

Management prescriptions for HCV 3 must be sufficient to maintain ecological processes and any unique attributes of rare or endangered ecosystems within the MU or nearby and likely to be affected by off-site impacts of MU operations. The prevention of off-site impacts can be done partly by ensuring there are no changes to water courses and water quality/quantity from the MU, as well as by maintaining buffer zones where deemed necessary (e.g., where a MU is outside of but immediately adjacent to HCVA 3).

If a MU is part of a large natural landscape following criteria defined under HCV 2.1, rare and endangered ecosystems must be managed by:

1. Ensuring that a 20,000 ha area of the HCV 3 ecosystem is inside the core zone
2. If a 20,000 ha area does not exist, as much of the HCV 3 ecosystem as possible must be in the core zone.

If there are no core zones in the forest block (as defined in HCV 2.1) within which to delineate a management area for the ecosystem, then wherever possible a buffer zone around the HCV 3 ecosystem of at least 1 km must be delineated within which operational activities are kept to a minimum.

8.4 HCV 4. Environmental Services

High levels of damage to nature in Indonesia have made natural disasters commonplace. HCV 4 aims to address this problem by identifying areas important for protecting local hydrological function and watersheds and to prevent spread of forest or ground fire from fire prone areas.

The HCV 4 identification process takes place in four stages, which are highly dependent on biophysical data analysis using GIS.

- Stage 1 Compilation of Secondary Data.
- Stage 2 Initial Analysis and Mapping.
- Stage 3 Full assessment and Secondary Data Verification.
- Stage 4 Final Analysis and Mapping.

A description on data needed and method used in each stage of analysis are described below in Table 8.4.1.

Table 8.4.1. Description of data needed and methods used to identify HCV 4

Stage	Task	Data Type	Method
1	Secondary Data Compilation		
	• Existing basic and thematic maps gathered. Preferably in 1:50,000 scale • Sea shore, river and mountain positions (geo-corrected) • Other reports collected	• Climate/isohyets map • Land system map (RePPProT) • Soil maps • Topographic map (e.g. from SRTM) • River and watershed maps • RTRWP/K maps • Conservation area map besides the RTRW map • Concession border map • Road maps • Human habitation map • Natural disaster risk map • Fire hotspot map • Land cover (vegetation) map resulting from Landsat or SPOT analysis	Recommended map sources: • Bakosurtanal • Dit. Jen Geology Bandung • RePPProT (Ministry of Transmigration) • BMG • NASA • Bappeda Province and Regency
2	Secondary Data Analysis and Initial Mapping		
	Delineate protected areas from TGHK/ RTRWP/ RTRWK • Delineate areas that are considered important for protecting hydrological function – if a map of Kemampuan Lahan is available, areas with a score >175 using the GoI scoring method shudl be considered potentially important. • Predict erosion potential • Delineate riparian flood plains on river banks • Delineate important ecosystems for water planning management	• Data already collected in Stage 1	• Land potential map (peta Kemampuan Lahan) • Universal Soil Loss Equation for HCV 4.2 • Identify ecosystems based on RePPProT data, other ecosystem maps and/or Landsat or SPOT imagery in coordination with assessment team for HCV 3

Stage	Task	Data Type	Method
3	Primary Data Collection and Verification of Preliminary Assessment		
	• Verify the HCV map produced in Stage 2 (during secondary data analysis) • Ground check land cover/ land use and ecosystem type data • Ground check soil depth data • Collect rainfall data from the study area's rainfall/weather station • Measure soil depth in areas that are thought to protect watershed and prevent erosion	• All maps created in Stage 2 • Primary data collected to verify the HCV map resulting from Stage 2	• Measure soil depth in the field by topo-sequence (upper, mid, and lower slope) and in various type of soil or lithology (rocks) • Measure slope in areas where thought necessary • Confirm ecosystem types via ground truthing or aerial flyover • Collect all information available from the management unit that is of importance to the protection of environmental services
4	Final Analysis and Mapping		
	• Re-analyze using data available from ground checking in Stage 3 • Revise all inaccuracies in the map created in Stage 2 and create a final map	• All data collected in Stages 1-3	• Conduct an analysis according to the methods described for each HCV

8.4.1 HCV 4.1 Areas or Ecosystems Important for the Provision of Water and Prevention of Floods for Downstream Communities

Land use activities or forest use in a watershed often results in the damage or degradation of land. Sometimes this causes a disturbance to the water cycle. The primary stakeholders that feel consequences of this disturbance are downstream communities. Land cover of forest in good condition functions to regulate water downstream. If an area is found to play a key role in the provision of clean water or to control flooding in downstream communities, then it represents HCV 4.1.

In addition to watersheds and their downstream communities, there are several terrestrial ecosystems that have extremely important hydrological function and require special attention. The ecosystems referred to by HCV 4.1 include cloud forest, ridge line forest, riparian ecosystems, karst forest and a variety of wetland ecosystems including peat swamp (especially swamp that is still forested), freshwater swamp, mangrove forest, lakes and grass swamps as explained below.

Cloud Forest Ecosystem

Cloud forest or montane forest is sometimes referred to as moss forest. Because it is located far above sea level and is constantly covered with clouds and fog, the complex three-dimensional structure of this forest strips water from clouds and mist, which drips to the forest floor. The amount of water supplied to the forest floor through cloud stripping (net-precipitation) can be larger than rainfall in montane forests – greater than 20 percent higher in rainy season and 100 percent higher in dry season. Wherever there is a cloud forest, HCVA 4.1 is found.

Ridge Line Forest

A mountain ridge forest also has a cloud stripping function that can strip clouds and mist of water, which drips to the forest floor. In certain contexts, this forest has a very important role as a water source, especially at a local level.

Riparian Ecosystems

Riparian ecosystems, located along rivers, have a very important function as (i) filter to control erosion and prevent sedimentation of rivers, (ii) wildlife corridors between habitats, and (iii) a refuge for animals whose habitat is disappearing.

Ecologically, the size of a riparian ecosystem is defined by the size of a river's flood plain during the peak of a flood following normal rains. Legally, riparian ecosystems are protected from 50-100 meters (depending on the size of the river[12]) on both sides of a riverbank. HCVA 4.1 is found wherever a riparian ecosystems occur.

Karst Ecosystem

Karst ecosystems occur on limestone areas where weathering caused by rain water has develop unusual geological formations. Karst ecosystems are important not only for cave biodiversity conservation, but also for the protection of water resources. Limestone is relatively impermeable to water, but also causes water to flow through anticline cracks (strike joints, fractures, and fissures) and then gather in karst caves. Water quality in the cave depends on the condition of vegetation cover (forest) in the water catchment area. HCVA 4.1 is present where intact karst ecosystems are found.

Wetland Ecosystem

Several studies on small watershed areas (less than 25 km2) have shown that forest can only prevent floods where rainfall is < 100 mm/day. However, much of Indonesia experiences extreme rainfall with intensities exceeding this limit, which leads to floods. Because of this situation, wetland ecosystems, including swamp forest, peat swamps, mangroves, other swamps and lakes must be protected to maintian their function as a retarding basin. All wetland ecosystems that function as a retarding basin are considered HCVA 4.1.

8.4.1.1 Secondary Data Collection

The process required to identify HCV 4.1 begins with collection of various secondary data, as described in Table 8.4.2 below.

[12] Minister of Agriculture Decree No: 837/Kpts/Um/11/1980. No: 683/Kpts/Um/8/1961, and Presidential Decree No: 48/1983, on river sempadan buffer zone

Table 8.4.2. Secondary Data Collection for HCV 4.1.

Task	• Gather all previously collected maps (general and thematic) at a scale of 1:50,000 . • Delineate protected forest inside and around a concession area based on TGHK, RTRWP and RTRWK. • Delineate river buffers (which will serve as protected areas) on both sides of all rivers in the concession. • Delineate and identify any watersheds that provide clean water for downstream communities. • Create a land cover map. • For MUs that play an important role in the protection of hydrological function of a larger landscape, collect additional information on the area (from various thematic and base maps). • Map the extent of cloud forest, all swamp ecosystems, peat swamp forest (including those that are no longer forested), heath forest on peat soils, karst ecosystems, lakes, and mangrove ecosystems. • During the primary data collection phase, ground check preliminary mapping. The information collected will be used revise/correct the initial ecosystem and land cover map.
Data Type	• Spatial planning map (TGHK, RTRWP, RTRWPK). • Topography map (e.g. SRTM). • River and watershed map. • Human habitation map. • Soil map. • Slope map. • Climate/rainfall (isohyets) map. • Land system map (RePPProT). • Land cover map. • Any available ecosystem distribution maps (see analysis of HCV 3).

In creating/refining the ecosystem map that will be used in a assessment, it is recommended that the RePPProT land classification system be used for initial ecosystem mapping, as explained above in HCV 3 (Section 8.3). RePPProT land systems have associated ecosystem types commonly found in each class. RePPProT land systems and ecosystem types given special attention in HCV 4.1 are described in Table 8.4.3.

Table 8.4.3. Ecosystems that are important in HCV 4.1 classification and their relationship with various classes based on RePPProT.

Location	Ecosystem Type					
	Peat Swamp or Peat land	**Mangrove Swamp**	**Other Swamp**	**Riparian**[13]	**Karst Forest**	**Cloud Forest**[14]
Kalimantan & Sumatera	MDW, SRM, BRH, GBT, SHD, BRW, BBK, BLI, BLW	KJP	KHY, BLI, KLR, PMG, TNJ, BKN, ACG	ANK, SBG, BKN, BLI, KHY, MGH	GBJ, KPR, OKI, AWY, BDD, ANB	BPD, BTK, MPT, BRW, PDH, BTA, LNG, STB, LPN, TWI, TDR, AHK, ANB, BBG, BDD,BGI, BPD, BBR, BGA, BMS, BYN
Papua & Sulawesi	Contact CI for Papua and TNC for Sulawesi					

8.4.1.2 Primary Data Collection

During primary data collection in relation to HCV 4.1, it is most important to coordinate with the social team to assess a community's dependency on a watershed as a source of clean water. It is also useful to cross-check the accuracy of rainfall data collected from map sources compared to local data sources, including the MU. Meanwhile, for special ecosystems noted above, a ground check is needed to confirm the presence and extent of each ecosystem inside or near the MU. This verification is conducted by combining data from field observations, aerial survey and interpretation of aerial photography or

[13] In a small scale a riparian forest ecosystem exists on a river left and right banks.

[14] In general, in RePPProT classification a forest cloud is located higher than 1,000-1,200 m above sea level or more.

other high resolution satellite imagery. The impact of a MU's activities on the function of a watershed must be assessed at the landscape level, extending to areas outside of the MU if required by inter-connections among ecosystems, to decide which areas or ecosystems might experience off-site effects.

8.4.1.3 Data Analysis & Mapping

Stage 1. Overlay boundaries of the MU area using TGHK, RTRWK and RTRWP maps. Any area defined as Protected Forest (hutan lindung) designated as such to protect critical watersheds, are considered HCVA 4.1.

Stage 2. Delineate all watersheds and sub-watersheds inside and near the MU. All watersheds that provide clean water to downstream communities and potentially affected by MU operations are considered potential HCVA 4.1 (pending results of Step 3).

Stage 3. If, according to HCV 5 assessment, a downstream community is dependent on water from a river that flows from the watershed, the area will be considered HCVA 4.1.

Stage 4. To the maximum extent possible delineate all rivers inside the MU, and assign them buffer areas of a size defined by current regulations. The required size of river and surface spring buffers on forestry land is 50 m left-right side of a river < 30 m wide, 100 m left-right side for a river > 30 m wide and circle of 200 m radius around a spring. All river buffers become HCVA 4.1.

Stage 5. Using the ecosystem map developed for HCV 3, determine whether one or more ecosystems with an impact on hydrological cycles are present (see Section 8.4.1 and Table 8.4.3). If an HCV 3 ecosystem map is not available, the RePPProT map can be used as an indicative map of where these ecosystems are mostly likely to occur (see Table 8.4.3). If the MU has one or more of these ecosystems, the area encompassing these ecosystem (s) is considered HCVA 4.1.

Stage 6. The objective of this final stage is to develop land cover and land use maps based on field observations and interpretation of recent satellite imagery. The land cover map is vital for developing the HCV 4.1 management plan, because it can help assess (i) the importance of existing land cover for the continued provision of clean water from the watershed and (ii) the impact of the planned MU operations on these land cover types. The land cover map will also be useful in identifying HCV 4.2.

8.4.1.4 Management Recommendations

Water is a fundamental component of community livelihoods, because it is used for transportation, washing, drinking, farm irrigation and fisheries among others. Where a watershed area provides a continuous supply of water, the MU must implement management to ensure that upstream or downstream areas are not affected, and that watershed function is maintained. A sustainable water supply to downstream communities must be maintained.

8.4.2 HCV 4.2 Areas Important for the Prevention of Erosion and Sedimentation

Erosion and sedimentation have ecological and economic consequences important at a landscape scale. Surface erosion causes the loss of top-soil, which leads to decreasing land productivity. Morpho-erosion (such as landslides and ravines) reduce the area of productive lands, damage infrastructure, change a watershed's hydrology characteristics, and increase sediment loads, which causes eutrophication and silting-up of irrigation channels.

In Indonesia, the most important factors that affect erosion rates are rainfall, surface flow, slope, land cover and soil type. Two factors affecting the rate of erosion that can be fully controlled by humans are land cover and soil conservation practices.

Land with natural forest cover is much better at reducing erosion risk than land with other vegetation types due to its canopy, understorey and leaf litter protecting the soil.

In this context, HCV 4.2 occurs in areas that contain forest (or other natural vegetation types) in good condition that grow on land with high erosion potential, where high is defined as 180 t/ha/year or more if the vegetative cover is removed. Erosion potential can be estimated using the method explained below.

8.4.2.1 Secondary Data Collection and Premiliminiary Analysis

Assessing HCV 4.2 requires use of secondary data sources as described in Table 8.4.4.

Table 8.4.4. Secondary Data Collection for HCV 4.2

Task	• Analyze erosion potential levels. • Map areas with a high level of erosion potential (see threshold on Table 8.4.5). • Look for areas that have a potential for surface erosion and morpho-erosion, based on secondary data analysis and field survey. • Map areas prone to natural disasters and the buffers required for its prevention.
Data Type	• DEM (e.g., SRTM). • River and watershed map. • Soil map (1:250,000). • Soil depth. • Climate/Isohyets map. • Land system map (RePPProT). • Map of areas prone to natural disasters (Bakosurtanal). • Other relevant information, such as results from interviews with local community members, MU staff or other stakeholders .

An assessment of erosion potential can be done using a modification of the Revised Universal Soil Loss Equation (RUSLE) formula, excluding the Management (P) and land cover (C) factors, as follows

Erosion potential = R x K x LS

where R = rain erosivity factor, K = soil erodibility and LS = length of slope and slope factor. Erosion potential can be calculated and mapped using methods described below and following examples described in Appendix 5. The map developed using the RUSLE model, which is built on a DEM from SRTM data with resolution ~90m, must be considered an indicative map of areas with high erosion potential. A definitive map for direct application on the ground requires a DEM with ~10m resolution or direct field survey.

For Kalimantan, an erosion potential map with 1:250,000 scale is available and can be used as a first approximation of potential HCV 4.2 areas[15].
If an overlay of the MU's boundary with the erosion potential map indicates presence of an area inside the MU with high or very high erosion potential (see Table 8.4.5), the area is considered HCVA 4.2.

8.4.2.2 Primary Data Collection

Primary data collection for HCV 4.2 enables verification of results from the preliminary analysis of available secondary data. Field surveys should focus on areas identified (during previous stages of the assessment) as potential HCV 4.2 areas given estimated erosion potential. Secondary data requiring field verificaiton include slope, soil type and soil depth.

8.4.2.3 Data Analysis & Mapping

When necessary, the preliminary map must be revised to reflect insights provided by field work, in turn creating the final map for HCVA 4.2. Table 8.4.5 shows criteria for classifying erosion potential based on soil depth (cm) and estimated annual erosion levels (tons/ha/year). Where erosion potential is 'high' or 'very high' (red in Table 8.4.5), such areas are considered HCVA 4.2. A case study of HCV4.2 assessment is provided in Digital Appendix 5.

Table 8.4.5. Erosion potential assessment based on land depth and erosion estimation.

Soil Depth	Erosion Estimation				
	< 15	15 - 60	60 - 180	180 - 480	> 480
Depth (>90 cm)	Very low	Low	Medium	High	Very high
Middle (60-90 cm)	Low	Medium	High	Very high	Very high
Thin (30-60 cm)	Medium	High	Very high	Very high	Very high
Very Thin (<30)	High	Very high	Very high	Very high	Very high

[15] Developed by Tropenbos International Indonesia (petrus.gunarso@tropenbos.or.id)

8.4.2.4 Management Recommendations

Changes in land use, or land cover, and catchment area management will affect erosion and sedimentation levels, risking negative impacts on water quality and fish populations (a protein source) for downstream communities. To minimize the impact, an area's erosion potential can be used for initial guidance to develop spatial planning as part of an appropriate management system.

Examples of areas that must be carefully managed to reduce erosion risk include:

1. Extreme slopes, mountain ridges, and/or shallow top soils.
2. Soil with low surface permeability.
3. Areas with insufficient vegetation cover.

Areas with proper vegetation cover, such as forest or other vegetation, have a significant role in preventing erosion and sedimentation. Thus, maintaining vegetation cover in high erosion potential areas must be a high priority. When partial clearance or conversion is required by operations, other land management practices suitable for the prevailing conditions must be employed. In HCVA 4.2, maintaining the area as a natural ecosystem is the most effective and (at times) the most economical way to avoid erosion and sedimentation.

8.4.3 HCV 4.3 Areas that Function as Natural Barriers to the Spread of Forest or Ground Fire

Forest fires in Indonesia are a serious problem that, to date, have not been resolved. Forest fire events in 1982-1983 destroyed 2.4-3.6 million hectares of forest in East Kalimantan. Since then, forest fires continue to occur in almost all regions of Indonesia, especially in Riau, Jambi, South Sumatera, Central Kalimantan, and West Kalimantan in 1987, 1991, 1994, 1997-1998, and 2003[16]. It has become clear from these events that biophysical factors play an extremely important role controlling the spread of wild fires.

Forest or wetland areas can keep fires from spreading, and this confers very high value in fire prone areas. Densely forested regions and wetlands, when in good condition, have physical characteristics that make them resistant to fire, even during the dry season or during droughts related to the El-Nino phenomenon (like those in 1982/1983 and 1997). All such areas are potential HCVA 4.3.

[16] Data from the Indonesian Department of Forestry, 2003

Other areas that function as fire break or buffer zone[17] must also be protected, including e.g. intact peat swamp forest, other swamp forest types, open wetland/marshes other wetland ecosystem types, as well as green belts with various species of fire-resistant plants.

8.4.3.1 Secondary Data Collection

An HCVA 4.4 assessment begins the preliminary data collection and analysis as described below.

Table 8.4.6. Secondary Data Collection for HCV 4.4

Task	• Collect data on date, time and locations of fires that have occurred inside and around the assessment area. • Collect data on cause of the fires. • Collect data on hotspots from satellite imagery. • Map forest and land areas that are prone to fires. • Map ecosystems or other areas that have the potential to serve as breaks for forest and land fires. • Analyze past fire causation and how fire resistant. ecosystems are based on the above maps.
Data type	• Climate/isohyets map. • Topographic map. • Forest cover map. • Ecosystem map (see HCV 3). • Hot spot map. • Human habitation map. • Fire risk map from agencies involved in this issue[18].

[17] In conventional terms, a fire break refers to a denuded area that separates potentially combustible vegetation from sources of fire. But in the context of HCV 4.3, a natural fire break is an area of vegetation or other natural ecosystem that prevents spread of fire from fire prone 'source' areas to other areas nearby.

[18] Satkorlak forest fire disaster task force, forestry service (dinas kehutanan), BKSDA, Bappeda, several bilateral projects on forest and land fires (GTZ, USAID, DFAD)

Step 1. Using a GIS, create an overlay of the assessment area with human habitations, fire potential, fire hot spots and rainfall maps.

Step 2. From the resulting overlay, delineate areas inside and outside the MU that are close to or inside (i) hot spots, (ii) areas with local villages or settlements, especially local farming communities that use slash and burn farming, and (iii) based on the rainfall map, areas which experienced a dry season for two months or more, with the dry season defined by <100 ml of rain fall per month (long term average). These areas have a high fire risk and/or have previously burned.

Step 3. The map resulting from Steps 1 and 2 is overlaid with the land cover and wetland ecosystem map used in the HCV 4.3 assessment. From this overlay, areas that are thought to have the ability to keep forest and land fires from spreading are considered as potential HCV 4.4 areas. This map created during this preliminary analysis will be used to guide primary data collection, which is done to verify this initial map.

8.4.3.2 Primary Data Collection

The main goal of primary data collection is to verify the occurrence, status and fire risk history of areas considered potential HCV 4.4. This verification is conducted by combining data from field observations, local community interviews, information from related local government institutions, aerial surveys (if possible), and interpretations of aerial photography and high resolution satellite imagery.

8.4.3.3 Data Analysis & Mapping

Create a 1:50,000 scale final map which describes fire prone areas and areas that function as natural buffer zones to keep forest and ground fires from spreading. Such areas located outside but near the MU and also possibly vulnerable to disturbance from MU operations, are considered HCVA 4.3.

8.4.3.4 Management Recommendations

To avoid the spread of forest and ground fires, forest and land management must follow a zero burning principle and the MU must maintain land with good, intact vegetation cover. The MU, including HTI, HPH and palm oil plantations, has a legal obligation to develop a forest and land fire control unit[19]. In this way, careful management of vegetation cover and pro-active fire control, can make the MU a key player in preventing the spread of wildfires at a landscape scale.

[19] The obligation of forest concessions (HTI) and production forests (HPH) to establish a forest and land fire control unit is regulated under SK Ministry of Forestry (No.260/1995, No.123/2001) and followed up with technical regulations issued by the Dirjen of PHPA.

8.5 HCV 5. Natural Areas Critical for Meeting the Basic Needs of Local People

HCV 5 aims to identify areas serving the important function of sustaining local communities, by helping to meet basic needs. Provision of such needs can be direct (e.g., animal protein obtained from locally caught fish), or indirect, through the commercial sale of forest products (or other natural products) for cash used to purchase one or more basic need. Basic needs in the Toolkit are defined as:

a. Food.
b. Water.
c. Clothing.
d. Materials for the house and tools.
e. Firewood.
f. Medicine.
g. Livestock.

In principle, HCV 5 may be present at the spatial scale of a vast landscape (nomadic hunter gatherers) or at the level of an ecosystem (e.g., a flood plain forest and associated wetlands) or sub-component thereof (e.g., a river). Distinguishing between these spatial scales is of more than just academic interest because it helps to delimit the spatial extent over which a field assessment should be conducted and management plans must be developed to maintain or enhance the value. HCV 5 may be present at the landscape level, for example, defined by the distribution of sago palm throughout a forest concession, where sago is harvested following a spatio-temporal cycle that ensures landscape population viability. At the ecosystem level or a sub-component thereof, HCV 5 may be present in caves throughout a karst ecosystem managed for edible swallow nests, or in a grove of Koompassia excelsa trees used by honey bees to build nests.

There are two fundamental criteria for identifying HCV 5 areas important for meeting basic needs of local people:

1. A forest area or other natural ecosystem that provides important natural resources to a local community where such resources can not be replaced with readily available alternatives.

   An area is deemed important if it is used by one or more members of the community to meet subsistence needs in the absence of realistic alternatives or substitute materials. The threshold for important is defined as >50% of one or more basic need met by

the use of forest or another natural ecosystem (e.g., rivers or natural grassland). Access to communication and markets are important factors for determining whether a source for one or more basic needs is considered irreplaceable. An isolated community is likely to be extremely dependent on the forest or other natural ecosystems. A community with modern transportation and with ready access to communication and markets can more easily create a living through means other than forest use. It is, however, important to pay close attention to whether or not substitute materials are available to the local community in sufficient amounts, for long enough time periods, and at reasonable prices, both at the time of assessment and into the future. These issues must be researched carefully; if there is doubt, assume communities have no alternatives.

2. Natural resources that are used by local people in a sustainable manner, or that local people actively try to protect, use of which does not place undue pressure on the maintenance of other HCVs (e.g., critically endangered species under HCV 1.2).

   Methods of natural resource use must be sustainable and avoid excessive extraction to merit recognition under HCV 5. The application of traditional practices that are excessive and destroy the forest or endanger other HCVs is not permissible under HCV 5; e.g., excessive hunting of species close to extinction (HCV 1.2). In certain cases, the assessor must consult with experts in ecology to determine if such an interaction is taking place.

Criteria and Thresholds

The threshold of the important category is defined as 50% or more of one or more basic need provided by forest or some other natural ecosystem. HCV 5 does not set thresholds regarding the proportion of community members or community subgroups dependent on HCV 5 areas for basic needs. If one or more families, or a few families from one subgroup in a local community, are dependent on the forest, and their methods of using the forest are not excessive, then HCV 5 applies to those families.

8.5.1 Secondary Data Collection

As with other HCVs, the identification and assessment of HCV 5 also requires two phases: (i) a preliminary assessment and (ii) a full assessment. The preliminary assessment is heavily dependent on secondary data.

The availability of secondary data is important in the preliminary assessment because

these data will help determine the approach for collecting data in the field during full assessment. Secondary data that provide basic information regarding sociological, economic, and cultural aspects of a region usually take the form of statistical data, monographs, and reports or studies on socio-economic research in the region of concern. A precise analysis of secondary data will be beneficial for identifying locations that potentially serve to meet basic human needs before heading to the field.

The following table shows the phases of preliminary research that are done in the identification of HCV 5.

Table 8.5.1. Stages in the initial assessment of HCV 5.

Question	Information Sources	Guideline
1. Are there any communities located inside, nearby or on rivers, downstream from the Management Unit location?	• Landscape map of the MU • Administrative Map	1. If such a community is present, the pre-assessment can be continued. 2. If not, note why there aren't any, giving a complete enough explanation to justify how this decision was made.
2. Are there any local communities that use forest resources (including rivers) to meet their family needs?	• Most of this information will be available from the company (map of the area of operations, map of villages, maps attached to the company's community development reports. • Environmental impact assessment • Administrative map • Consultation with community leaders or respected members of the community • Consultation with local government • Consultation with NGOs that work with communities living near the forest • Consultation with the company • Research reports on local social, economic and cultural conditions	If the answer is yes, then continue on to question 3 below. If the answer is no, note why there aren't any, giving a complete enough explanation to justify how this decision was made.

Table 8.5.1. Stages in the initial assessment of HCV 5.

Question	Information Source	Guideline
3. Where are the forest resources located (including rivers) that are used to meet these family needs?	• Consultation with community leaders or respected members of the community • Consultation with local government • Consultation with NGOs that work with communities living near the forest • Consultation with the company • Research reports on local social, economic and cultural condition	The origin of resources used to meet family needs can be divided into two groups: 1. Local communities that only use forest resources from nearby forests 2. Local communities that use forest resources both from nearby forests and distant forests (on a landscape level)
4. If part or all of the landscape under consideration was exploited or converted, will it affect the availability of forest resources that are used by local communities to meet their family needs?	• Consultation with community leaders or respected members of the community • Consultation with local government • Consultation with NGOs that work with communities living near the forest • Consultation with the company • Research reports on local social, economic and cultural conditions	If the answer is yes, then the value is present on a landscape level. If the answer is no, then the value is present for a certain ecosystem or a component of that ecosystem.

If one or more dimension of HCV 5 is considered potentially present, its potential distribution at the level of a landscape, ecosystem or sub-component thereof must be plotted from secondary data (where possible). During field work, the assessor must search for more detailed information to determine if it is true that the area supports HCV 5 – i.e., provides needs that cannot be substituted. In addition, as much as possible, the assessor must gather data to delineate the extent of the HCVA.

8.5.2 Primary Data Collection

The full assessment will determine if an area has high conservation value or not in meeting the needs of local communities (on a family and/or community level). This phase always requires intensive consultation with the community directly linked to the assessment area as well as other local individuals, government agencies, and scientists or scholars who have previously conducted research in the area.

The full assessment of HCV 5 can be done in four steps:

Step	Task
1	Identify subgroups within the local community based on factors considered.
2	Identify the level of dependence of these subgroups on the forest.
3	Identify the availability of alternative resources for meeting family needs.
4	Assess whether or not the use of the forest or other ecosystems is being done sustainably and if its use is in conflict with other HCVs.

Step 1. Identify subgroups within the local community based on factors considered important, such as religion, socio-economic status, ethnic or cultural identity, and use of forest resources, to create a picture of the township (desa, in Bahasa Indonesia).

Many theories represent communities as homogeneous group, but in practice, in Indonesia a community can be extremely heterogeneous, comprising many different groups. Because of this, primary data collection must begin with the identification of subgroups based on ethnicity, religion, type of forest use, and other factors. This information can be obtained from the township head (kepala desa, in Bahasa Indonesia) or from other key informants. Table 8.5.2 below can be used to create a desa profile to help identify subgroups of the community based on important factors. If the location of a HCV is discovered in the preliminary study phase, the following steps will help determine if the area contains HCV 5.

Table 8.5.2. Sample data sheet that can be used to create a picture of a desa and its subgroups when assessing HCV 5.

No.	Township (desa) Name	Population (Male/ Female) Households Poor Households (%)	Village location in relation to the MU (enclave, overlapping, nearby)	Village environment within the MU (outside or inside forested areas)	Distance to neighboring township (desa) (upstream, downstream, distance to nearest pemukiman)	Source of income (farmer, fisherman, trader of timber or non-timber forest products, company employee, hunter)	Estimation of forest function for community in related to HCV 5 and 6 (cash, subsistence, water, etc)	mportant social institutions (Head of village, community leader, customary leader)	Social sub-groups estimation (village, culture, ethnic group, religion, migrant)
1.									
2.									
Etc.									

Each subgroup estimated to represent at least 10% of the total desa population must be interviewed separately, either through individual or group interviews.

The decision about whether interviews should be done individually or in groups will be dependent on characteristics of the community being studied. If a particular desa is relatively homogeneous – in, for example, ethnicity and livelihoods – then group discussions should be an effective choice for obtaining the information needed. In fact, in such a situation, group discussion becomes an effective forum for respondents to exchange ideas and provide accurate input collectively. Individual interviews must, however, always be conducted for those members of the community not represented in group discussions, for example, the village midwife and other female workers who tend to remain silent in group discussions dominated by men.

Step 2. Identify the level of dependency of these subgroups on forest or other natural ecosystems

Communities living near forested areas meet their family needs from various sources. This includes the forest and other alternatives like agriculture, the sea, market places, government aid, community development programs sponsored by companies, or other third party groups, like NGOs and other independent groups.

The level of community dependence on the forest or other ecosystems in meeting basic needs can be seen from the percentage of these needs that are met through forest or alternative resources. For example: a family of 13 in desa X needs 100 kg of rice per month to live. Of this total volume of rice, the family obtains 50 kg from their own rice fields, 25 kg from Raskim (a government program that provides rice to the poor), and 25 kg from the local market, which they visit once a week. In this example, if a forest area does not provide carbohydrates to the family described and to the rest of the families in that desa, then that forest area does not possess HCV for meeting carbohydrate needs -- rice fields are the primary source. Based on agreement amongst various parties consulted throughout the process of revising this Toolkit, the following ranking of importance for forest or other ecosystems was agreed upon:

100%	If all needs are met by a single resource, the resource is regarded as *extremely important*, with a **score of 4**.
50-99%	If most needs are met by a single resource and few by others, the resource is regarding as *very important*, with a **score of 3**.
25-49%	If needs are met by several resources, each below 50%, the resources are regarded as *important*, with a **score of 2**.
10-24%	If needs are met from many sources, an individual source is considered of *minor importance*, with a **score of 1**.
0-9%	If needs are not met by the forest or other ecoystems, these sources are considered *unimportant*, with a **score of 0**.

In some cases, the percentage of needs met by the forest or another natural ecosystem is wrongly interpreted and used as the percentage of families from one desa that agree on the importance of a certain resource. For example, sub-group X from desa Y considers a river in that district to be a very important source of water, as they have no alternative source. However, sub-group Y represents only 20% of the total desa population. Does this river have important value in meeting water needs at the desa level? The answer is yes. Although those dependent on the river represent only 20% of the population of desa Y, the river is of utmost importance to them because they have no alternative source of water.

Another issue of importance is the strength and accuracy of the data gathered to assess the level of local dependence on particular resources. Triangulation is one common method used to improve the validity of data; to draw strong conclusions, more than one method of observation is needed. To do this, the same question is investigated with several different approaches, e.g., with individual interviews, group discussions, and secondary data from other sources if they exist.

Table 8.5.3 can be used as a guide for individual interviews or for group discussions. The most important issue during the data collection stage is to ensure that all levels of local society or all sub-groups of the desa are represented.

Step 3. Identify the availability of alternative resources for meeting family needs

Based on the ranking system above, further consultations will be needed for resources given a score of 2-4. These consultations will explore the availability of alternatives in greater depth.

The questions in Table 8.5.4 will help determine whether or not particular natural resources are important. This table provides indicators of whether or not the community has access to alternative natural resources. Each resource that has a score of 2 or more, and that has no alternative for even one family, is considered a HCV. The table is suggested as a reference; communities or assessors can adapt the model as needed.

Table 8.5.3. Identification of level of dependency on forest by sub-group.

Village and Sub-group (based on Table 8.5.2):								
	Needs	**Resource (score or %)***						**Explanation, remarks**
		Forest		**Areas outside of the forest**				
		Management Unit (MU)	**Other MU**	**Cultivated**	**Purchased**	**Aid**	**Other (e.g., from the ocean)**	
Food	Carbohydrate (rice, tapioca, etc.)							
	Animal protein (meat, fish)							
	Fruits, vegetables							
Water	For drinking and other daily needs							
Minerals	Clothes							
	House							
	Boat							
	Furniture, households tools, other tools							
	Fire wood							
Medicine								
Fodder for livestock								
Cash income for meeting subsistence level needs (e.g., selling honey, sandalwood, resin, etc.)								

*Note: To define resource percentage to meet basic needs, see scoring system and thresholds described previously in the text (Section 8.5.2).

Step 4. Assess whether or not the use of the forest or other ecosystems is being done sustainably and if its use conflicts with management of other HCVs

As stated above, HCV 5 does not encompass excessive extraction of natural resources in direct and irreconcilable conflict with other HCVs. The use of forest by a community, once identified, must be reasonably compatible with maintenance of other HCVs. An important issue here, that must be carefully determined, is the method by which a community uses the forest. If forest products are collected in an unsustainable fashion, then they do not represent HCV 5, except if the local community wishes to change this trend. If a community uses natural resources in a sustainable fashion, but the natural resource is endangered because of external factors, then the use of the forest by local people still constitutes HCV 5, and effort must be made to protect it from outside threats.

Table 8.5.4. Identifying the availability of alternative resources in meeting basic needs.

Village and Sub-group (based on Table 8.5.2):	
Question	**Guidelines**
1. Is forest or another natural ecosystem a significant source for meeting basic needs?	See forest value scoring for meeting basic needs in table 8.5.3. For needs with scores from 2-4, further research is required.
2. If the needs identified were not met by forest resources, would there be any alternatives?	Make a list of alternative resources. If there aren't any other alternatives, the natural resource is a HCV. If there are several alternatives, continue on to question number 3 in this table.
3. Is the alternative: • Available all year long? • In a capacity (and quantity) such that it can substitute resources from the forest or other natural ecosystems? • In a location that is easy to access	If the answer is 'no' to any of these questions, then the natural resource can not be substituted by an alternative. If the answer is 'yes' for all of these questions, continue on to question number 4 in this table.
4. Is the alternative available free of charge, or must it be purchased? (e.g., the money needed to purchase or pay for transport, the labor or the land to start a new agricultural activity?	If the alternative is free (e.g., medicine available for free in the village), then it is possible that the forest or other natural resources is not a HCV. If the alternative does pose a cost, continue on to question number 5.
5. If the alternative does pose a cost, can the community afford the cost? (e.g., Do they have enough money to pay for the cost, or do they have enough labor and land to contribute towards starting a new agricultural activity that will serve as an alternative?)	If the price is not affordable for community, the natural resource is categorized as very important and constitutes a HCV. If the alternative is affordable, and there is a possibility that the resource is not a HCV, continue on to question number 6.
6. Are there any changing trends regarding the community's dependency on this resource? For example, is their use of a river decreasing, or is their collection of forest products in decline? If there is a changing trend, is there an increase or a decrease? For example: Has the community started to invest in a substitution such as planting cash crops, raising livestock, etc.?	Where the level of importance of a natural resource is unclear but there is a community-wide declining trend in forest or other ecosystem usage, then this forest is no longer considered "very important", especially if the community is actively involved in developing an alternative resource, such as agriculture. The assessor's decision on such a matter must be well documented, with sufficient detail and logic to defend the decision.

Table 8.5.5. Evaluating sustainable forest utilization compatible with managing other HCVs.

Village and Sub-group (based on Table 8.5.2):	
Questions	**Guidelines**
List of resources from forest or other natural ecosystem that might be considered a HCV	See table 8.5.4
1. How long has the resources been used by the local community?	Forest that has been used for one or more generations is more likely to be used sustainably, unless there have been changes in extraction levels or supply level due to external factors. Continue on to question 2, regardless of the answer to this question.
2. Is the forest use tied to a growing market?	Forest use that is tied to a growing market, and not to local regulation (adat) is most likely unsustainable. Continue on to question 3, regardless of the answer to this question.
3. Does the community believe that they can continue using the forest resource in the future at the current extraction level?	If the answer is yes, and no reverse indications are shown from question 1 and 2, the resource is possibly being used sustainably. Use question number 4 to confirm this.

Village and Sub-group (based on Table 8.5.2):	
Questions	**Guidelines**
4. Does the resource supply seem to be decreasing over the past 5-10 years. For example, hunted animals are increasingly rare or wood supplies are increasingly distant from the village? According to the community, how long will the resource last before it runs out? Are the changes that are occurring caused by external factors or activities of the community itself, for example, increasing the extraction rate or expanding forest conversion?	If the resource supply is decreasing because of the community's own activities, and/or if they predicted that the resource will run out, then this resource may not be a HCV, unless the community is committed to changing this trend (see question 5). If there is no indication that resource the resource supply is decreasing, then there is a possibility that the forest is being used sustainably. Continue on to question 5.
5. Does most of the community feel concerned about the above trend or just a small minority?	If the answer is yes, then there is the possibility that the forest use can still be managed sustainably. Confirm with question number 6.
6. Is the community's use of this resource threatening any other HCV, such as endangered species?	In addition to consultation with the community and HCV assessment team members, this issue may also need to be discussed with an ecologist. If the answer is no, then the resource use is probably constitutes HCV 5. If the answer is yes, continue on to question number 7.
7. Does the community is hope, plan or feel willing to change this trend? Are there any regulations that can be implemented by the community to regulate use of this resource? Are the community members ready to accept these regulations, and/or implement existing regulations?	If the resource is decreasing or threatening another HCV, but the community is willing to do something to change this trend, then this value is still considered HCV 5. If not, it is possible that the use of this resource is not HCV 5.

8.5.3 Data Analysis

Forest or other natural ecosystems are determined to be very important (Step 2 in Section 8.5.2) if it is used by one or more members of a community to meet >50% of one or more basic needs. HCV 5 does not establish a threshold for what portion of the community or a sub-group thereof in order to qualify as HCV 5. If there is one family in a desa or dusun that depends on the forest, and such use is sustainable without placing undue threat to other HCVs, then it is considered HCV 5.

8.5.4 Mapping

The mapping of HCV 5 is quite difficult, but several aspects of it can be done. A number of examples include those that involve physical features of the land, for example water and fish protein sourced from a river, the distribution of honey trees that are easy to identify by their distinctive characteristics (Koompassia excelsa), or the distribution of ecosystems that are important habitat for wildlife species and serve as a source of protein a community.

The boundaries of desa and dusun that lie within and around the MU can also be mapped, as well as community use zones, if time and resources permit during the field study. There are a number of mapping tools for doing this, including participatory mapping, which if available is extremely useful to support HCV 5 management. Frequently, mapping can be done simultaneously with primary data collection. Such a task will require collaboration among assessors, the company and local communities. The company is responsible for postponing all high impact activities, for example, large-scale conversion to plantation or mining, until a map has been produced and accepted by local community demarcating HCV 5 management areas.

It is important to emphasize that agricultural areas, such as rice fields and vegetable gardens, are not formally included as part of HCV 5. This said, the assessor is responsible for mapping not only HCVA 5 but also agricultural areas, because these areas are extremely important for meeting basic needs of local communities. They are not considered HCV 5 because such areas do not represent forest or other natural ecosystems as intended by this HCV. Strictly speaking:

An area mapped as community agricultural land does not constitute an HCV 5 area as defined in the Toolkit, but it is no less important for meeting basic needs than areas identified as HCV 5 and must also be accommodated in spatial planning by the MU.

8.5.5 Challenges and Opportunities for the Futuree

Socio-economic benefits, in the context of HCV identification, are areas or ecosystems absolutely necessary for meeting the basic needs of a community. Meeting people's basic needs is an issue that is dynamic, changing through time. For example, it can change as the result of a growing population, communities moving to a different area or in response to other factors. For this reason, a HCV that has previously been identified can change as developments take place in the community. The dependence of local people on the forest or other ecosystems can increase or decrease in the future.

As a final step in the assessment process, the assessment team is responsible for presenting the results of their study to the local community to see if the findings are valid and if the decisions regarding the importance of their natural resources can be defended. It is best that one output of the presentation and discussion is a statement signed by the community, assessors, company, and witnesses reflecting community views on the assessment, even if such views are negative or constitute a formal rejection. If it is agreed that improvements or revisions to the assessment are needed, important points from this revision should be attached to the aforementioned statement. This feedback element of the assessment is extremely important and is considered a basic requirement in situations where an HCV assessment will be the basis for land clearing or the conversion of natural ecosystems in, for example, the pulp or oil palm sectors.

8.5.6 Management Recommendations

In many examples of natural resource management in Indonesia, direct impacts on sources of basic needs for local people are often disregarded. This issue leads to unavoidable conflict between company and community interests. Learning from previous conflicts of this nature, it is extremely important that HCV 5 areas critical for the provision of basic needs of local communities be identified and managed. These values can be found in natural forest areas that serve as a source of food to local people – e.g., wildlife that is hunted, fruits and the like – or as a source for meeting other needs like water, firewood and other fibers from forest products.

The management of HCV 5 areas requires coordination with other management strategies for managing other HCVs. For example, the MU can manage an area with high biodiversity value in an integrated manner such that it guarantees the availability of food and medicine for the local community. Also, with good management of HCV 4, the MU can guarantee the availability of water or other ecosystem services important for livelihoods of local people.

Great care in management will be needed if the MU intends to convert an area of forest critical for meeting basic needs and where few if any alternative are available. The MU must communicate and consult intensively with the local communities, who represent the primary users of the area, and with other relevant stakeholders. If agreement cannot be reached, then conversion may not be allowed without destroying the HCV 5 thus identified.

8.6 HCV 6. Areas Critical for Maintaining the Cultural Identity of Local Communities

HCV 6 concerns areas that play an important role in the traditional cultural identity of local communities; where a particular area is needed to fulfill their cultural needs. The relationship between a community and an area can be rooted in ideas, concepts, norms, values, activities, and activity patterns, as well as features of the environment/natural resources/objects. Together, these features form the basis of a collective behavior of a community and that define the relationship between a community and an area.

As with HCV 5, in principle HCV 6 may be present at vast spatial scales across a landscape, or at the level of an ecosystem or sub-component thereof. Examples of HCV 6 at the landscape level can be seen in the Baduy community of West Java and the Anak Dalam people of Riau. These communities have their own set of rules governing their relationship with large, complex landscapes. At smaller spatial scales of an ecosystems or sub-component, HCV 6 may be present as sacred forests, grave sites of ancestors or sites where traditional ceremonies are held in mature lowland rain forest.

8.6.1 Secondary Data Collection

The preliminary assessment of this HCV involves the collection of existing secondary data, such as reports from government agencies and NGOs or academic research papers. The gathering of secondary data and their preliminary analysis can provide information about locations or areas that might play an important role in the cultural identity of a local community.

Table 8.6.1 outlines one recommended approach for HCV 6 identification that will help increase the objectivity of the assessment, providing a means for structuring qualitative and quantitative data.

Table 8.6.1. Initial identification of areas important for maintaining cultural identity of local communities.

Steps	Task	Guidelines
1	To identify whether there is a forest area that is considered by community to be their customary/traditional land. Typical features of such communities include: a. Isolated communities (communities that live in areas with limited access to roads and telecommunication, communities that seldom interact with other communities) b. Communities where their livelihoods depend on the forest c. Communities that have communal laws that regulate the use of forest resources, which they rely on to meet their basic needs.	Local communities that have been living in a forested area over a long period of time usually constitute a traditional community. Traditional communities are usually very dependant on such a forested area and the natural resources it provides. Such communities often delineate traditional forest areas or ecosystems with local regulations and norms for regulating use that are passed down from generation to generation. Sources of information: Information is best collected through consultation with stakeholders such as: 1. Community leaders or respected members of the community 2. NGOs that study traditional communities, such as WARSI, National Alliance of Traditional Communities (AMAN), Dani Tribe Community Foundation, among others. 3. Local government institutions such as the Bureau of Statistics, Social Services, and provincial/ regional/city government). After identifying the presence of any communities that fit the description here in Step 1, continue on to Step 2.

Steps	Tasks	Guidelines
2	To identify locations (or areas) inside the forest area to which the local community has spiritual or physical connections	This information can be obtained from the local community, local government, NGOs, universities, and research institutions. Some examples of local communities that fit the intended description include: • West Java: Badui, Kasepuhan, and Naga communities • Central Java: Samin communities • East Java: Tengger communities • Sumatera: Anak Dalam, Mentawai, Orang Rimba, and Perantau Bugis-Makasar communities; Java, Sundanese, Balinese, Madura • Kalimantan: Basap Batu, Punun, Penan, and Iban communities; and all kinds of Dayak tribes • Papua: Asmat and Dani communities • Sulawesi: Wana, Kamba, and Tori communities After identifying the presence of communities that are described here in Step 2, continue on to Step 3.
3	To compile all of the information collected in Steps 1 and 2.	Mark all community areas (as described and identified in Steps 1 and 2) on a preliminary map. These areas should be seen as potentially important to the cultural identity of a community pending primary data collection. When an area considered ulayat (customary use right) is identified for a local community, further assessment is needed during the Full Assessment stage to decide whether the area is considered HCV 6 or not.

8.6.2 Primary Data Collection

A full assessment of HCV 6 is needed if the preliminary assessment indicates the occurrence of communities that depend on forest resources, or areas thought to be traditional use zones for a local community. If such information is found during the preliminary assessment, an assessment is needed to ascertain whether or not HCV 6 is present at the level of the landscape as a whole, ecosystems or a smaller sub-component thereof.

To ensure the objectivity of the assessment, it is best that data collection is done using the concept of triangulation, using at least three data sources and methods of collecting these data. Data resources for the assessment of HCV 6 should include: (a) information from the local community, including traditional leaders and community members; (b) information from research reports, historical documents, and any other available documents; and (c) information from an expert(s) or senior community member who knows the local culture. The key to the assessment of HCV 6 is intensive consultation with the local community in a manner that encourages active participation.

Primary data collection should involve the assessment of the distribution of traditional use areas if they exist or the distribution of the forest products that are important for meeting the cultural needs of the local community (e.g., specific species of tree for wood used in burial ceremonies). This will include examining the distribution of products used both collectively by the community and by individuals from the local community to meet their cultural needs.

Several indicators are useful for delineating the extent of the traditional use zones or the distribution of forest products that are important for meeting the cultural needs of the local community or individuals, for example:

- Zonation based on certain cultural rules. For example, a village area can be divided into areas that serve different purposes, like rice fields; fruit orchards; forest that provides materials for building and tools; forest that provides products like rattan, dammar, bird nests, and honey; protected forest; and open-use forest as seen in the Dayak Benuaq community in Mencimai, West Kutai.
- The distribution of archeological sites. This might include the distribution of forest sites with a historical connection to local communities, e.g., burial sites of ancestor, old villages, tanah ulen, traditional shelters, locations with certain historical value, temples, sacred places, etc.
- Places for local community rituals. Such sites might be traditional meditation places or locations for preparing materials needed for traditional ceremonies, such as those of the Dayak Benuaq people in Mencimai, Melak, West Kutai.

- The distribution of biological resources needed to fill cultural needs. This might be, for example, an area planted with yearly crops that are used in rituals, such as those of the Bahuma people in North Sulawesi or the Dayak Kanayatn in Sidas Jaya, West Kalimantan. This indicator refers specifically to the distribution of biological resources that are needed by the local community to fulfill its cultural needs.

This stage of the assessment can include the MU and outside experts, as well as the HCV assessment team. The team must consult intensively with local community members and traditional leaders.

The aim of primary data collection is to verify the preliminary data, and to determine whether or not an area is important for local traditions or culture. Other than identifying the existence of specific indicators, it can also be useful to identify the distribution and strength of these indicators, for example, low, medium, and high importance for cultural identity. These data will be used for the next stage of the assessment.

The identification of collective or individual behaviors at this stage will provide several landscape or ecosystem indicators that are important for local cultural identity in a particular area. Table 8.6.2 shows how these data can be arranged:

Table 8.6.2 Distribution of Ulayat or forest resources, at the landscape or ecosystem level, that are linked to fulfilling the cultural needs of a local community.

Indicator/ Sub Indicator *	Existence **	Quality/ Breadth ***	Importance and primary function ****
• Zonation based on cultural regulations: - land for rice cultivation - land for planting fruit trees - land for sourcing tools from wood or other forest products - forest use for harvesting wood products or other fibers - local protected forest, for example: tembawang	• Still exists/ no longer exists	• Low, medium, high / restricted, medium, broad	• Low, medium, high

Indicator/ Sub Indicator *	Existence **	Quality/ Breadth ***	Importance and primary function ***
• Archeology sites distribution: - ancestral grave distribution - temple distribution - sacred site distribution - etc.			
• Ritual activity distribution: - traditional forest for meditation - forest for ceremonies - etc.			
• Natural resources distribution for meeting cultural needs: - Distribution of wild pigs used in ceremonies - Distribution of hornbills (a cultural symbol) - etc.			

Note:

* These are example indicators for collective behavior of members of a community living around a forest. Real conditions must be sought in the field and the assessment done on the real conditions.

** For each indicator derived from the analysis (far left column) that has been confirmed by interviews with community members, community leaders, and/or other respected members of the community (e.g., tokoh adat), and supported by expert opinion, is it still present in the field? The answer here will hopefully be a clear yes or no. The assessment must also take quality of information sources into consideration.

*** Based on indicators derived from the analysis including feedback from local people and expert opinion, quality grades include low, medium and high; breadth of spatial distribution includes restricted, medium or broad. Levels of importance must be analyzed using appropriate indicators.

**** The assessment is conducted on content analysis with local figures and expert opinions.

Ecosystem sub-components relevant to HCV 6 can be organized in a more detailed fashion as in Table 8.6.3 below.

Table 8.6.3. Collective behavior of a local community in relation to forest resources that are linked to an ecosystem component forming part of cultural identity for a local community.

Indicator/ Sub Indicator*	Collective Behavior/ Object of Individual Perception **	Remarks
• Ceremonial site/ ritual that are conducted by a local community that have a relationship with nature	Examples • Ceremonial activity for defining annual crop areas in Sulawesi. • Seren taun ritual ceremony conducted post-harvest by Kasepuhan- Baten communities/ tribes • etc.	
• Local cultural sites/ temples/ ancestral villages	Examples • Ceremonial activities/ rituals conducted for ancestors • etc.	
Material items		
• Rocks, temples, sacred items • etc.	Example • Ritual activities tied to material objects in the area	
Species		
• Certain tree species, wild pigs, hornbills, species that are seen as having special values • etc.	Examples • The use of animal nails and teeth in decorating clothing (Dayak) • The use of a horn as a symbol of social status (Toraja and Bada) • Proudly using bark and seeds as accessories in traditional clothing (Bada tribe) • etc.	

Note:

* These are example indicators for collective behavior of members of a community living around a forest. Real conditions must be sought in the field.

** From all indicators/sub-indicators, a description of the kind of collective behavior practiced by a local community in relation to certain ecosystem components must be clearly defined. These collective behaviors are considered as perception object, which will be evaluated by members of the community in Step 3.

8.6.3 Data Analysis

HCV 6 can be identified in a MU based on results presented in Table 8.5.1, obtained from one or more of the following indicators:

- The local community acknowledges that they divide up the forest region near their village based on the role it plays in the community. An example can be seen in the Badui, who divide the forest into Leuweng awisan (reservoir area), leuweng tutupan (protected forest), leuweng titipan (forest for future use), and leuweng garapan (forest for multiple uses including conversion).
- It is apparent that within the landscape or ecosystem there are traditional areas of low, medium, or high use. This means that the level of use represents only supplemental information for mapping the area that will be used by the MU.
- Importance levels of forest as described by the local people

The analysis of HCV 6 data is qualitative, whether at the level of a landscape, ecosystem or sub-component. For this reason, the approach and methods used must support a qualitative analysis. The determination of a threshold becomes meaningless when the precautionary principal is applied in the assessment of HCV 6. Meeting cultural needs are a right of each person. Even if only a small part of a sub-group identifies an area as HCV 6, the area has high conservation value.

8.6.4 Mapping

An area that possesses values important for the cultural identity of a local community should be mapped using thematic maps with geographic coordinates, but original data collection and sketch mapping should involve local communities in a participative fashion. This is necessary to confirm accuracy of maps and precise location of important sites. This system of mapping will reduce likelihood of bias or disagreements that may occur in the absence of a participative aproach.

8.6.5 Challenges and Opportunities for the Future

Areas that possess cultural value for communities are often get overlooked in land use planning at national, local or even MU scales. We frequently hear of conflicts between local communities and companies that arise because an important cultural areas within the MU and has been damaged or desecrated. The delineation and protection of HCV 6 areas is considered a fundamental responsibility of the assessment team and its management must be taken seriously by the MU.

8.6.6 Management Recommendations

Learning from previous cases involving conflict between communities and companies (or other MU authorities), it is clear that the identification of HCV 6 is extremely important. Today, we frequently see the influences of modernity on lives of traditional peoples or local communities, to the point that traditional ceremonies are performed less frequently, and traditional beliefs are being lost. This trend should not be taken to suggest that such areas no longer have cultural value. Even if HCV 6 areas seldom used it still must be protected if communities consider it to be important.

A management unit must be extremely careful if they plan to convert forest areas that today or in the recent past contained areas important for meeting local cultural needs. The MU must communicate and consult intensively with the local community (as the primary users of the area) and with other relevant stakeholders before implementing their planned conversion.

Definitive maps of important cultural areas, as well as buffers required to protect them, must be produced and endorsed by local communities before conversion takes place.

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