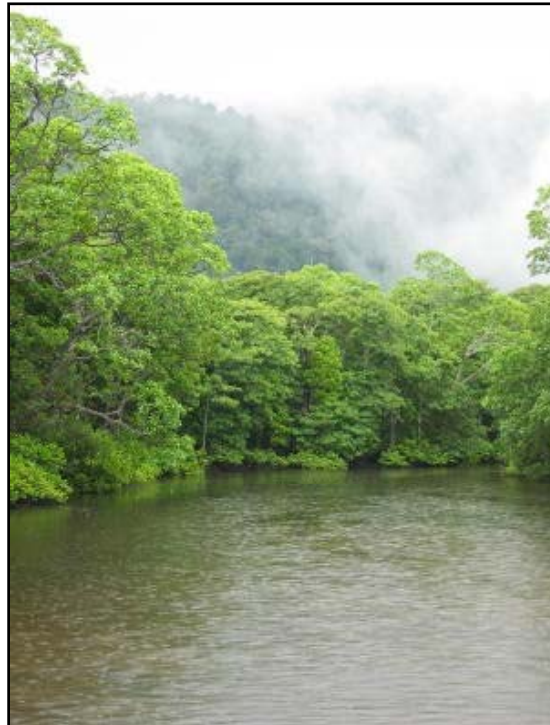


# **A Sourcebook for Landscape Analysis of High Conservation Value Forests**

**Version 1**



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## **Preface**

The concept of High Conservation Value Forests (HCVFs) is a relatively new one. It was born as a means to ensure that the most important forest values were correctly managed in the context of Forest Stewardship Council (FSC) certification, and hence in individual forest management units. The idea has, however, rapidly gained interest and credibility on a wider stage.

This sourcebook is a response to that. It provides guidance on how to use the HCVF concept at the landscape scale. Other tools and approaches exist for assessing what the most important biological, environmental and social values are within a landscape, so we also clarify the situations when a landscape-level HCVF analysis is likely to be preferred.

One of the strengths of the approach discussed here is that it can often be effective without gathering new field data (although this is more true for some elements than others). It thus forms a means of integrating existing information and analyses in a way that can provide added value to conservation efforts and sustainable forest management in specific landscapes.

Landscape HCVF analysis is embryonic, with only a handful of places where an analysis is in the planning or preliminary phases. We anticipate that this sourcebook will be a first step in providing guidance to groups who want to conduct and use landscape-level HCVF analysis, and that later versions will build on experiences, examples and lessons-learned of projects as they develop.

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# 1. Introduction

## 1.1. What are High Conservation Value Forests?

All forests contain environmental and social values, such as wildlife habitat, watershed protection and cultural significance. Where these values are considered to be of outstanding significance or critical importance, the forest can be defined as a High Conservation Value Forest (HCVF). Identifying these areas is the essential first step in developing appropriate management for them.

The HCVF concept was initially developed by the Forest Stewardship Council (FSC) for use in forest management certification. Under FSC certification, forest managers are required to identify any High Conservation Values (HCVs) that occur within their individual forest management units and manage them in order to maintain or enhance the values identified.

The key to the concept of HCVFs is the **identification and maintenance** of High Conservation Values (HCVs). The FSC's definition of HCVs encompasses exceptional or critical ecological attributes, ecosystem services and social functions<sup>1</sup>. These definitions are listed below, with an example for each.

*HCV1. Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia).*

e.g. presence of several globally threatened bird species together in a Kenyan montane forest

*HCV2. Forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.*

e.g. a large tract of Mesoamerican lowland rainforest with healthy populations of jaguars, tapirs, harpy eagles and caiman and most smaller species

*HCV3. Forest areas that are in or contain rare, threatened or endangered ecosystems.*

e.g. patches of a regionally rare class of freshwater swamp forest in an Australian coastal district

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<sup>1</sup> FSC Principles and Criteria. Document 1.2; revised February 2000. Available from [www.fscoax.org](http://www.fscoax.org)

*HCV4. Forest areas that provide basic services of nature in critical situations (e.g. watershed protection, erosion control).*

e.g. forest on steep slopes with avalanche risk above a town in the European Alps

*HCV5. Forest areas fundamental to meeting basic needs of local communities (e.g. subsistence, health).*

e.g. key hunting or foraging areas for communities living at subsistence level in a Cambodian lowland forest mosaic

*HCV6. Forest areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).*

e.g. sacred burial grounds within a forest management area in Canada

In summary, **a High Conservation Value Forest is the area of forest required to maintain or enhance a High Conservation Value.** An important implication of this definition is that management (e.g. harvesting) is not automatically precluded in HCVFs. However, any management that does take place must be compatible with maintaining or enhancing the identified HCV.

A HCVF may be part of a larger forest, for example a riparian zone protecting a stream that is the sole supply of drinking water to a community or a patch of a rare calcareous forest within a larger forest area. In other cases, the HCVF may be the whole of a large area of forest, for example when the forest contains several threatened or endangered species that range throughout the forest. Any forest type – boreal, temperate or tropical, logged or non-logged, natural or plantation can potentially be a HCVF, because HCVF designation relies solely on the presence of High Conservation Values within the forest.

The purpose of this sourcebook is to expand the concept of HCVF to the landscape level. This is a new approach and ideas and techniques will certainly develop over the coming years. The remainder of this introduction discusses some broad issues affecting when and how landscape-level analysis of HCVs might be used. Section 2 then sets out the main practical steps in the process. Section 3 gives a detailed breakdown of how these steps are conducted for each HCV and the elements of which they are composed. Finally Section 4 provides some guidance on the different players that can be engaged to produce the desired conservation results once a HCVF analysis has been completed.

## **1.2. The role of the HCVF concept at a landscape level**

### **1.2.1 Broad land-use and purchasing decisions**

It is increasingly realised that the HCVF concept is useful outside its original context, that of certification in individual forest management units (FMUs). This is because it:

- encapsulates a broad suite of the most critical forest attributes, including both ecological and social values, and enables them to be measured against a single, internationally agreed definition.
- is applicable anywhere in the world, which means that organisations with international interests can use it consistently.
- provides a direct link between the most critical forests and what should be done with them – the HCVs have to be maintained or enhanced.
- can often be applied rapidly using existing data sources. The approach suggested throughout this document is to use existing data, tools and approaches to identify and delineate HCVFs wherever possible.

As a consequence, the concept of HCVFs is now being applied, or its use being discussed, for a range of purposes:

- **Conservation and land-use planning.** Identifying HCVFs makes it possible to clarify conflicts with other land-uses and to resolve them by including the maintenance of HCVs in spatial plans and regulations. Landscape-level HCVF analysis can also inform decisions about protection and restoration, for example as part of an Ecoregion Action Plan or National Biodiversity Strategy.
- **Responsible purchasing.** Companies and organisations are increasingly aiming to exclude timber sourced from uncertified HCVFs as part of their environmentally and socially responsible purchasing policies. The HCVF concept is likely to be used increasingly by other natural resource and commodity sectors.
- **Investment.** Investors and donors often need to ensure that they do not fund unacceptable and damaging practises in critical forests covered by their current or proposed portfolios.

Conservation organisations can potentially use landscape level HCVF analysis in **conservation advocacy** to influence any of these three processes

The connection between all of these applications is that they operate at a scale that is much larger than that of an individual forest management unit. We use ‘landscape’ as a flexible term that covers a range of larger scales, ranging from a few adjacent management units up to an entire country or region. The common feature of these scales is that users of the analysis will be unable to conduct detailed inventories of each individual forest management unit to determine where HCVFs occur. For

example, it is impractical for an organisation that purchases timber products globally to conduct ecological surveys of all the forest management units from which it purchases, or could potentially purchase, wood products. What is needed is more general information that is spatially explicit wherever possible so that it can provide guidance.

### **1.2.2 Supporting certification**

Although identification of HCVs and HCVFs was originally designed to be done at the FMU level by individual forest managers seeking certification, in practice many forest organisations find it a very significant challenge. This is particularly a problem where there is a lack of expertise or resources and is very significant for small forest operations and community managed forests.

A landscape-level analysis can also support and build capacity for certification at the forest management unit level by supplying a broader perspective on some forest values. Three benefits for individual forest managers are:

- clear information about what HCVs are present, or are likely to be present, within their forest management units. They can therefore concentrate their survey and management efforts towards these values. This information will also be useful for certification auditors, who will be able to assess whether the forest manager is maintaining or enhancing the particular HCV.
- clarification of HCVs that can only be measured relative to a wider spatial context. For example, a forest manager may have already mapped the forest types within the forest management unit, but without reference to a wider context will not know whether these are threatened or endangered (HCV3). A second example is globally, regionally or nationally significant large landscape level forests (HCV2). A particular forest management unit may be all or part of a large tract of forest, but without understanding how rare or threatened such forests are it will not be possible to decide how *significant* that particular large landscape level forest is.
- Data on HCVs that are only meaningful on scales that are greater than the typical forest management unit. For example, the landscape may contain a suite of wide-ranging endangered mammals and so be defined as HCV1. Any given forest management unit may contain only small or transient populations of these animals, but the landscape analysis will reveal which forests are critical to maintaining this HCV within the landscape.

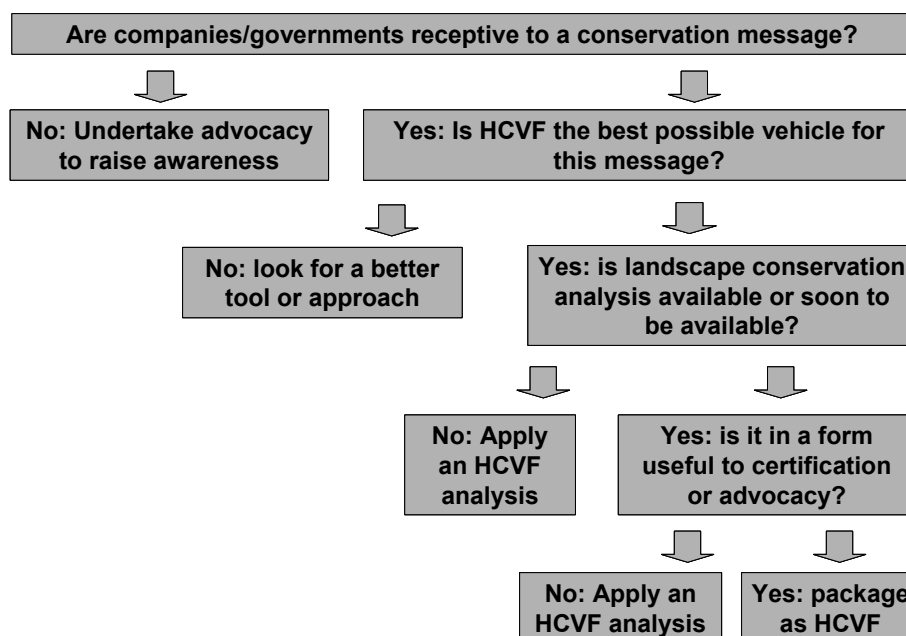
### ***1.3. When to use landscape HCVF analysis for conservation advocacy***

The HCVF concept is becoming known and ever more widely accepted throughout the world. It therefore resonates with many companies with international scope or who export forest products, even though they may be unclear as to exactly what constitutes HCVF. As discussed above, HCVF can also be used for conservation advocacy with land-use planners, investors and donors.

Landscape HCVF analysis will not usually be the only current or extant conservation planning assessment within any given landscape. The question then becomes when HCVF analysis will prove a useful addition to the conservation effort. This will generally be when:

- *time pressure* necessitates immediate action
- there are *specific certification and advocacy* issues
- there is an identified audience especially *receptive* to the HCVF concept

HCVF analysis is *always* useful in landscapes that have been identified as priority areas for encouraging sustainable forest management and forest management certification. The following decision tree is included to assist the decision on whether to use landscape HCVF analysis for *conservation advocacy*:



#### **1.4. An introduction to the process of landscape HCVF analysis**

The process that can be followed to undertake a landscape-level HCVF analysis is outlined here, as a guide to the structure of the rest of the sourcebook. A more detailed discussion of the process can be found in Section 2.

First the aims of the analysis must be defined and the boundaries of the landscape broadly identified. For each HCV or element of each HCV, potential sources of data are then identified, suitable data gathered and the methods of analysis planned. Next each part of the landscape is assessed in turn to decide whether it shows any one of the six defined HCVs (Sections 3). The presence of any one HCV is sufficient

for an area to be classed as HCVF. In areas where doubt remains, further data may be needed. Finally, Section 4 outlines some of the different players that can be engaged to produce the desired conservation benefit from analysing and mapping HCVFs. Two Appendices provide a case study of landscape HCVF analysis from Riau, Indonesia and further information on useful data sources, tools and approaches respectively.

Three of the stages described in this Sourcebook require introduction at this stage. As landscape-level HCVF analysis is a novel approach, these stages may be new to some readers and are pivotal to the process.

### **1.4.1 Defining HCVs**

One pivotal part of this process is defining HCVs. As discussed above, there are six HCVs. In order to be universally applicable to any forest type or location, they are necessarily generic. It is therefore necessary to develop an appropriate national or sub-national interpretation for use on the ground. A framework for doing this is being developed<sup>2</sup>, which breaks some of the HCVs into a number of separate elements that are more readily measured and assessed. A site that satisfies the criteria for any one element qualifies as HCVF. For example, HCV 4 (Critical services of nature) includes:

HCV 4.1 Unique sources of drinking water;

HCV 4.2 Forest critical to water catchments;

HCV 4.3 Forests critical to erosion control

and three other elements.

These elements are still generic, and so for each of them:

- one or more clearly measurable parameters need to be defined (i.e. what it is you are looking for)
- threshold levels must be set for each parameter, that describe what qualifies as a High Conservation Value (i.e. what constitutes 'critical' or 'significant').

This is discussed in more detail in Section 2.1.3.

### **1.4.2 The analysis process**

Wherever possible, landscape analysis of HCVFs should utilise existing information. There are many data sources that can be used for HCVF analysis. For example, forests critical to erosion control (HCV4.3) may already be defined on government maps. Certain HCVs may already have been assessed in the landscape through application of one or more of a range of tools and approaches. For example, a conservation organisation may have identified that a particular forest area provides critical habitat for significant concentrations of migratory birds (HCV1.4).

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<sup>2</sup> Jennings, S., Nussbaum, R, Judd, N and Synnott, T. (2003). Defining High Conservation Values at the national level: a practical guide. Open Review Draft. ProForest, Oxford, UK.

Where appropriate information is lacking, it may be possible to assess HCVs through analysing existing data sets. For example, large landscape level forests (HCV2) are readily identified through analysing satellite imagery.

Where neither existing analyses nor data sets are available, it may sometimes be necessary to collect new information. In this case, it may be necessary to apply one or more of the tools and approaches in order to generate this information. Section 3 provides examples of the types of tools, approaches and data sets that can be used to analyse each HCV in the target landscape.

### 1.4.3 Outputs

A range of outputs may be produced as a result of this process. For many users, the ideal output will be a map showing which forests are HCVF and which are not.

However, reality is more complex than this because:

- Each HCV must be considered. The presence or absence of some is relatively easy to map (for example, large landscape level forests - HCV2). Others will be less easy (for example, forests fundamental to the basic needs of local people - HCV5).
- Even where mapping might be possible in theory, the data may not be available (for example, concentrations of threatened species). In this case it may be possible to map potential HCVFs. In other cases it may be more appropriate to provide lists or guidance on how to identify the HCV.

The outputs of a landscape HCVF analysis are therefore likely to be a mixture of mapped and non-mapped outcomes (Box 2).

#### **Box 2 When is mapping likely to be possible? Some examples.**

Some elements may be easily mapped with existing information in most cases (e.g. protected areas)

Some will be easy in some cases, difficult in others (e.g. where a previous study has mapped erosion risk)

Some are likely to require new field data in most cases (e.g. distribution of areas crucial for subsistence food supplies)

## 2. Landscape HCVF analysis

### 2.1 Introduction

This section describes the process for assessing HCVFs within a landscape and highlights some of the key issues that are likely to occur at each stage of the project process. It sets out a process based on initial experience, but as assessing HCVFs at a landscape-level is a new endeavour, this will have to be developed and refined as more experience is gained.

There are some over-riding considerations that should guide any HCVF landscape analysis:

**Precautionary Approach** – by definition, HCVFs are of extraordinary or critical importance, and so underpinning all work on HCVFs is the guiding principle that if you're not sure whether a HCV occurs you must assume that it does until there is convincing evidence to the contrary.

**Maintaining and enhancing values** – one of the key concepts of HCVF is that all identified HCVs must be maintained or enhanced. Some HCVs can only be maintained or enhanced at the landscape level (e.g. populations of endangered animals that range widely). HCVF analysis and mapping reflect this and the use of landscape HCVF analysis (e.g. through conservation advocacy with land use planners) should aim to ensure that these values are maintained or enhanced within the landscape.

**Inclusivity** – another of the strengths of the HCVF concept is that it reflects a broad suite of the most critical and exceptional forest values within a landscape. All attempts should be made to assess each of the six types of HCV.

**Additionality** – HCVF landscape analysis does not make other conservation priority setting initiatives obsolete; instead it should be used to complement existing initiatives where a distinct advantage of the HCVF approach has been identified (see Sections 1.2 and 1.3). As set out in this Sourcebook, some new decisions and re-organisation of information may be necessary, but HCVF analysis should utilise all appropriate tools and data sets and conservation planning results.

**Clarity of purpose** – any successful conservation activity requires clearly defined aims and HCVF landscape analysis is no different. This is fundamental for deciding both where to conduct the analysis (defining the landscape) as well as what product you have to produce (e.g. an analysis for negotiation or a set of finished and non-negotiable maps).

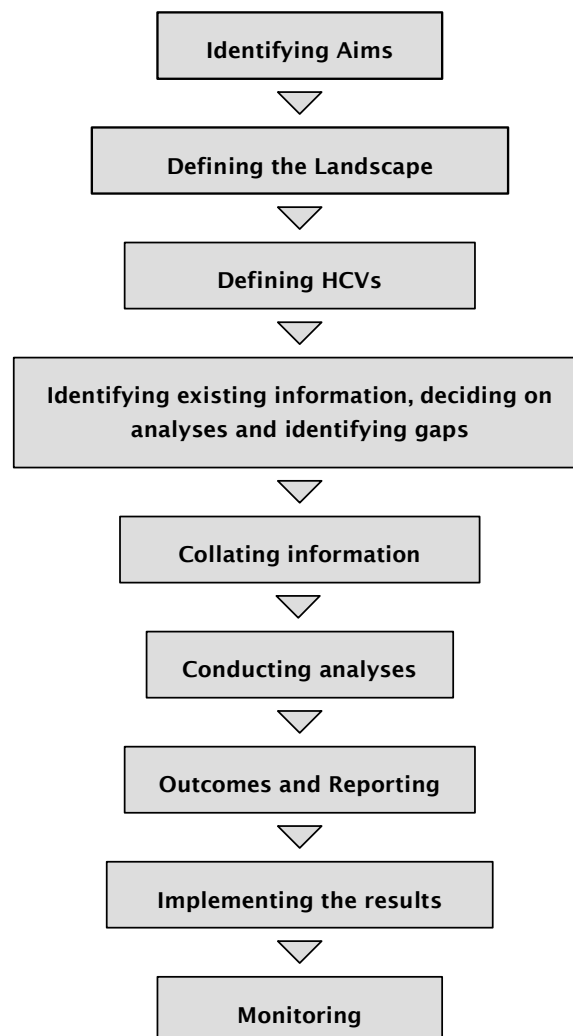
**Tie-in** – because the concept of HCVF comes from FSC certification, the way you interpret HCVF should be consistent with national or sub-national definitions and will draw part of its legitimacy from links to the FSC National Initiative. Where possible, landscape HCVF analysis should involve a representative of the National Initiative

**Data limitations** – due to scale or data issues, it will probably not be possible to produce a perfect analysis of HCVF within a landscape. This is not a problem, since

HCVFs are not cast in stone and available data and knowledge will change with time, as will the location and extent of HCVs. It is always advisable to be clear on each document or map that you are presenting an analysis based on the best current knowledge.

## **2.2 Project process**

Any conservation activity requires careful planning. The goals and objective must be clear before the work starts, and a planning framework must be used which ensures that all necessary steps are carried out whilst allowing feedback and modification of individual stages as the process develops. We do not intend to provide a comprehensive framework for conservation planning here: users of this guide should already be familiar and comfortable with one or more of the many frameworks that exist. However, irrespective of whether the main aims of the project are to support certification or for conservation advocacy and whether a preliminary or full mapping exercise is planned, some of the steps that will be needed are:



In practise, there is likely to be some feedback between these stages. We now consider each in turn and discuss key issues that affect each stage in more detail.

### **2.1.1 Identifying aims**

You will need to be clear on why the landscape-level HCVF analysis is necessary and who it is for; where the analysis should take place; what it hopes to achieve; who will do the work and who will participate in the process; and how the data will be collected and collated. Define the target audience for the landscape HCVF analysis and how the analysis will be used.

### **2.1.2 Defining the landscape**

The term ‘landscape’ as used in this sourcebook is necessarily vague. This is because the size and boundaries of each landscape selected for HCVF analysis will vary according to the precise reasons for wanting to work there as well as the scale of biological and social issues that are present. The frameworks used to define the landscape can be biological, geographical, political, economic or social<sup>3</sup>.

The size of the landscape selected will affect the spatial resolution of mapping as well as the precision with which each HCV (or HCV element) can be assessed. In a small landscape, it is more likely that HCVFs can be mapped with great precision. On the other hand, it will often be much more difficult to make decisions about how significant a value is if the frame of reference is small. By contrast, in very large landscapes, it will be relatively straightforward to decide how significant any given value is compared with the others present in the landscape, but, on the other hand, many HCVFs will be so small that it may not be possible or desirable to map them.

The boundaries of the landscape chosen should, wherever possible, take into account edge effects such as the importance of adjacent forests as habitat for endangered species or use of the forest by communities that live outside the boundaries of the landscape.

### **2.1.3 Defining HCVs**

As discussed in Section 1, the six HCVs defined by the FSC are necessarily generic and inclusive because they are designed to be applicable to any forest anywhere in the world. They therefore must be used as a basis for local definitions of HCVs. A framework for defining HCVs is currently being developed<sup>4</sup>, and this recognises that some of the generic HCVs are comprised of several separate elements. Landscape analysis and mapping of HCVFs will therefore need to consider not just the six HCVs, but each of these elements. These elements are described in detail in Section 3.

In order to map HCVFs within a landscape, it is necessary to have detailed definitions of each of the HCVs present. Ideally the definitions specify a clear parameter for measuring each element (e.g. by reference to an accepted national or international

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<sup>3</sup> Dudley, N. et al. (2003). A Manual on Forest Quality Assessment. WWF and IUCN, forthcoming.

<sup>4</sup> Jennings, S., Nussbaum, R., Judd, N and Synnott, T. (2003). Defining High Conservation Values at the national level: a practical guide. Open Review Draft. ProForest, Oxford, UK.

system, such as a list of threatened forest types) and also a threshold for each element, which specifies the criteria which have to be satisfied for an attribute to be designated a HVC. For example, HCV3 might be specified as 'any large mangrove forest' (where the forest type is the parameter and the threshold > 100ha), and HCV4.2 might be specified as 'forests that form the catchments for major reservoirs' (where the parameter is reservoir size and the threshold >5 km<sup>2</sup>).

Where precise and detailed definitions of HCVs for the country or region have already been defined, these should be used to guide any landscape-level HCVF analysis. Many existing definitions of HCVs lack this degree of detail and so are not readily transferred to mapping processes, but even then, we recommend that where approved FSC definitions of HCVs occur these should be used as the starting point for any HCVF mapping. In this case, or where no definition exists at all, it will usually be desirable to define HCVs through a collaborative process. There are two ways of doing this:

- ***Produce definitions of each HCV at the outset.*** This process will often be expert-driven and should involve ecological and social experts. It should also include opportunities for input and buy-in from a wide range of stakeholder. At the landscape level, it will usually not be possible to conduct full community-level consultation and stakeholder input is more likely to include representatives from interest groups such as indigenous people's groups of community associations.
- ***Use analysis of the landscape to help define HCVs.*** The mapping process can in itself be crucial in helping to define HCVs within the landscape, because it entails examining the ecological and social values present within a wider context. For example, widespread conversion of peat swamp forest to plantation causes irreversible damage to the hydrology of peat swamp forest complexes. With this understanding, it will then be obvious that a buffer zone of peat swamp forest surrounding a protected area of this forest type will be needed in order to maintain the values within the protected area. In this case, there are strong grounds for concluding that the contiguous forest is HCVF. Defining HCVs within the landscape in this case is an iterative process, with the definition of HCVs being continually refined as more information and analyses become available.

In addition, defining some of the HCVs explicitly requires providing a context. For example, HCV2 concerns globally, regionally or nationally significant large landscape level forests. The target landscape may contain a large tract of intact forest, but it is unclear whether its size and condition are sufficient to constitute HCV2. Understanding a broader context (e.g. national or ecoregional), may show that land conversion and infrastructure development have severely reduced the number, extent and quality of large areas of contiguous forest. Patterns of resource use at this wider scale may also point towards a probable increase in degradation of this forest type within your landscape in the near future. In this case, there would be strong grounds for concluding that this forest area is HCVF.

The following table provides an indicative list of potential sources of data and information that can be used where it has been decided to define HCVs through spatial analysis.

### ***Tools for defining HCVs in the landscape***

<b>Tasks</b>	Provide the context to social and ecological values in the landscape necessary to define HCVs.
<b>Data sources</b>	WWF Global 200 ecoregions <sup>1</sup> Conservation International ‘biodiversity hotspots’ <sup>2</sup> Centres of plant diversity <sup>3</sup> Endemic bird areas of the world <sup>4</sup> Important Bird Areas <sup>5</sup> Topography and land use data Ecological, social-science and anthropological reference works etc.

Note: Numbers refer to the lists of further information on data sources in Appendix 2.

#### **2.1.4 Identifying existing information, deciding on analyses and identifying gaps**

The temptation will be to begin collating data immediately. This is likely to lead to a great deal of wasted effort unless you first have clear what it is that you want to analyse. For example, there would be no point in digitising data on tree species composition by annual logging coupes if you are defining forest ecosystems (HCV3) by broad forest type. This is why it is critical to define HCVs, as set out in Section 2.1.3.

For each HCV and HCV element it will be necessary to assess what sources of information are available, whether existing analyses are sufficient, whether the HVC can be analysed from existing data sets or whether new data needs to be gathered:

- Determine whether an assessment has been conducted that will provide information about the HVC or HCV element. Section 3 lists some of the tools and approaches that may have already been applied within the landscape and that can provide information on different HCV elements. For example, a conservation organisation may have already defined areas of forest that contain significant concentrations of threatened species.
- If no appropriate assessment has been conducted, determine whether data sets exist that will allow you to assess the HCV or HCV element. For example, if no assessment of large forest blocks has been conducted (HCV2), then satellite imagery will allow you to analyse this HCV. Section 3 lists some of the types of data sets that can be used to analyse each HCV element.

- Decide how to analyse this data. The degree to which data is analysed will be determined by a combination of the project aims, the quality of existing data and the resources available to the project.
- If no appropriate data sets exist, then it may be necessary to gather new data. The tools and approaches listed in Section 3 can potentially be used for this.
- When you have determined what information and analyses are necessary for each HCV or HCV element, you will also need to decide how to present the information. Again, this will be determined by the project aims, the quality of existing data and available resources.

### 2.1.5 Collating information

By this stage, you should be clear about what information you need and how you are going to analyse it. Relevant information should then be collated and digitised as necessary. In practise, the quality and quantity of data available will feedback into the preceding stages in the project process. Some of these data issues are highlighted in Section 2.1.6. Section 3 provides suggestions about relevant information sources for each HCV element.

### 2.1.6 Conducting the analysis

This will involve using the information and tools outlined in Section 3 to conduct an analysis of what and where HCVFs are within the landscape.

Any mapping exercise is dependent on the quantity and quality of spatially explicit information available. The same is true of analysing and mapping HCVFs within a landscape. In many, and perhaps most cases, the information available will be imperfect. It is likely that in most cases some of the available data and information will be available but some HCVs will have to be assessed using raw data (e.g. satellite imagery) or by collecting new information.

- **Incomplete data sets.** Some spatially explicit data on a given HCV may be available, but not for the whole of the landscape. However, lack of information may not mean that the HCV is absent from these areas. In this case, it would appear sensible to identify proxies or indicators that correlate with HCV presence in the areas for which data is available, and map these indicators as 'potential HCVF' in areas for which data is absent. Under the Precautionary Approach, the onus would therefore be on individual land managers to prove that their land *does not* contain this HCV.
- **Data not available.** Spatially explicit data may be available for some HCVs or HCV elements, but not for all. In this case, mapping and analysis should involve developing proxies or indicators that are likely to correlate with HCVFs. Again, when this can not be reliably done, responsibility would be transferred to

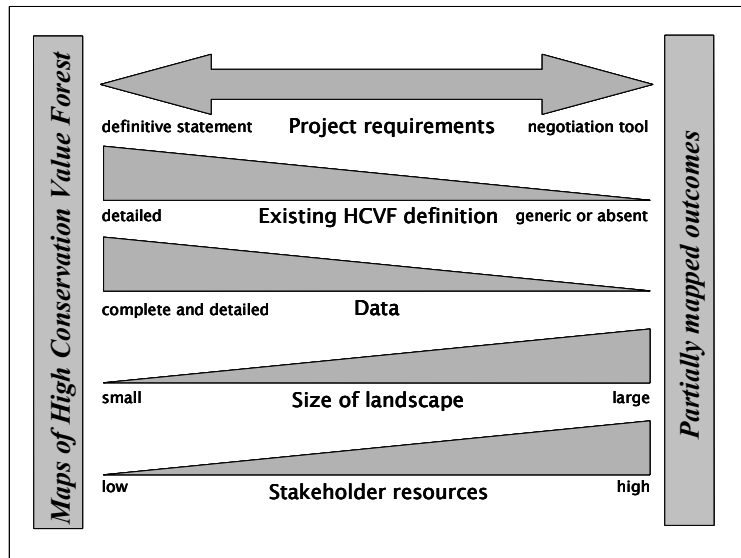
individual land managers to provide convincing evidence that the HCV does not occur, and if they are unable to do so it is assumed that it does.

- **Resolution.** Depending on the size of HCVFs relative to the landscape, mapping may not be the most appropriate form of communicating the location of HCVFs. Because HCVFs are defined as the forest required to maintain or enhance a HCV, some HCVFs may be very small. For example, a stream originating within a forest might be the only source of drinking water for a local community. This would therefore be a HCV under the definition of HCV4 (or HCV5) and the HCVF would be a riparian buffer zone. It might be that a buffer zone of 50 m width is perfectly adequate to maintain this water supply. If the landscape was, for example, 100,000 ha in size, then it would be perfectly reasonable to map this HCVF. If 8 million ha was being mapped, a simple description might be more effective in communicating the location and nature of the HCVF.

In addition to these issues of data quality and quantity, there are other factors that will determine the precision with which HCVFs can be mapped. These can be summarised as:

- Project requirements – definitive maps may be required, for example, if the purpose of the HCVF assessment is to influence spatial planning at a government level; other outcomes may be sufficient if the assessment is to be used as a negotiation tool with land managers.
- Existing definition of HCVs within the country or region – definitive HCVF maps will be easier to achieve if the definition is both specific and detailed.
- Size of landscape – in a small landscape, data acquisition and participation in the HCVF assessment process from a wide range of stakeholders are less likely to present a problem, and so definitive HCVF maps will be easier to achieve.
- Stakeholder resources – HCVF maps will be particularly important where stakeholders (and particularly land managers) have few technical or financial resources to identify HCVF for themselves. This might be the case where most forest is owned and managed by communities or by small landowners.

The factors that influence the choice between mapped and non-mapped outcomes are illustrated below.



## 2.1.7 Outcomes and Reporting

In practise, the HCVF landscape project is likely to result in a mixture of:

- Definitive HCVF maps – often the most desirable outcome, and easiest to achieve when comprehensive and detailed information and data exist. There is likely to be sufficient information about some HCVs to allow mapping in most landscapes. These include protected areas (HCV1.1) and large, landscape level forests (HCV2). Depending upon the landscape, other HCVs may also be relatively easy to map. For example, forests that contain significant concentrations of rare, threatened and endangered ecosystems (HCV1.2) may have already been identified by conservation priority setting exercises (see Section 3).
- Maps of potential HCVF maps – useful for delineating areas that definitely do not contain a given HCV and also for guiding stakeholders what HCVs they should look for where. Some HCVs will be harder to map definitively than others. For example, there may be insufficient time and resources to undergo the extensive stakeholder involvement that is required to define some HCVs (e.g. HCV 5 and 6), or the data necessary to delineate other HCVFs may be absent. In such cases, it may still be possible to map areas where there is a high probability that HCVs occur. For example, it may be possible to map indigenous areas, areas around communities and access routes (e.g. rivers) as potential HCVF because there is a strong likelihood that these areas would contain HCV5 and 6.
- Lists or guidance – where it is not possible to map definitive or potential HCVFs, information can usefully be presented as lists and guidance. There may well be cases where even mapping potential HCVFs is not feasible or useful within particular landscape. This may occur, for example, when a given HCVF is too

small to be mapped in a large landscape or when a HCV is known to occur within the landscape but there is insufficient data to determine which forests are likely to be necessary to maintain or enhance it. In these cases, HCVFs can still be described in text, for example, ‘all forests protecting streams that are used as the sole source of drinking water by local communities (HVC4)’ or ‘mangroves should be surveyed for seasonal concentrations of migratory birds, the presence of which would constitute a HCV (HCV1.4).’

The way in which the analysis is presented is important if the landscape HCVF analysis is to achieve its purpose. The presentation of results should reflect the aims of the project, its target audience(s) and how it will be used (see below).

The way in which these outputs are reported should also be given careful consideration. A combination of reports may well provide the ideal way of communicating the products of the landscape HCVF analysis, depending on the aims of the project, its target audience(s) and how it will be used, including:

- **Detailed technical report**, showing analyses and maps, detailing data sources, explaining the rationale of decisions made and highlighting the findings and recommendations for further work. This will provide the technical underpinning of HCVF work within the landscape.
- **Summary report**, highlighting major outcomes and including maps. This may be more useful than a detailed technical report for communicating with land managers and other stakeholders and for promoting the HCVF concept within the landscape and more widely.
- **Presentations**, useful for communicating in meetings with stakeholders in the landscape and for promoting the HCVF concept more widely.

### **2.1.8 Implementing the results**

Landscape analysis of HCVF is not an end in itself. It should only be done when a clear role for the analysis has been established and within the project, process or environment where the outcomes of the HCVF analysis will be applied to achieving real benefits to protecting, managing or restoring forest values. Section 4 outlines some of the key stakeholder groups that that can be engaged to produce the desired conservation once the HCVF landscape analysis has been completed.

### **2.1.9 Monitoring**

In addition, depending on the aims of the analysis and the way in which it will be used, there may be a need for a final stage in the project process – monitoring. Where possible, the HCVF analysis should be conducted and presented in a way that permits monitoring the project that is using HCVF analysis. This will vary according to the identified aims, but may include ‘internal’ monitoring (i.e., evaluating whether use of the HCVF analysis has had an impact on the landscape) or ‘external’ (i.e. evaluating the status of HCVFs within the landscape).

### **3. Tools for analysing HCVs in the landscape**

Once the HCVs that occur in the target landscape have been defined, it is then necessary to assess where HCVFs occur. The following sections take each HCV in turn. For each of these, we:

- List and describe the elements that comprise the HCV.
- Note the task that has to be completed by the analysis.
- List potential sources of data that will be needed to assess HCVs and map HCVFs.
- List some of the existing tools and approaches that are likely to provide further information for assessing the HCV and mapping HCVFs.

The lists of data sources and tools are indicative rather than exhaustive and any one of them is likely to provide information that is useful. Some may not be suitable and other sources may be more relevant in any given landscape. These tools and approaches can be used in two ways:

- If they have already been applied within the landscape, then they should supply information that is useful for HCVF analysis
- Where HCVF analysis shows that there are serious gaps in information, one or more of the tools can be recommended as a follow up to a preliminary HCVF analysis.

Selected tools are described in more detail in Appendix 2.

Where gaps in information have been identified and appropriate tools for providing the information have been decided, a decision will have to be made about who is responsible for implementing these tools. Care should be taken to ensure that the information collected remains of a suitably high standard.

We assume that knowledge of GIS methodology, interpreting satellite imagery etc., is within the competence of the group conducting the analysis.

### **3.1 HCV1. Globally, regionally or nationally significant concentrations of biodiversity values.**

This HCV contains the following four elements:

#### ***HCV1.1 Protected areas***

Protected areas perform many functions, including conserving biodiversity. Protected area networks are a cornerstone of the biodiversity conservation policies of most governments and many NGOs and the importance of them is recognised in the Convention on Biological Diversity (CBD). Although the processes of selecting areas for protection have varied greatly in different countries and at different times, many are nonetheless vital for conserving regional and global biodiversity values.

#### ***HCV1.2 Threatened and endangered species***

One of the most important aspects of biodiversity value is the presence of threatened or endangered species. Forests that contain populations of threatened or endangered species are clearly more important for maintaining biodiversity values than those that do not, simply because these species are more vulnerable to continued habitat loss, hunting, disease etc.

#### ***HCV1.3 Concentrations of endemic species***

Endemic species are ones that are confined to a particular geographic area. When this area is restricted, then a species has particular importance for conservation. This is because restricted range increases the vulnerability of species to further loss of habitat etc, and at the same time the presence of concentrations of endemic species is evidence of extraordinary evolutionary processes.

#### ***HCV1.4 Critical temporal use***

Many species use a variety of habitats at different times or at different stages in their life-history. These may be geographically distinct or may be different ecosystems or habitats within the same region. The use may be seasonal or the habitat may be used only in extreme years, when, nevertheless, it is critical to the survival of the population. This component includes critical breeding sites, migration sites, migration routes or corridors (latitudinal as well as altitudinal) or forests that contain globally important seasonal concentrations of species. This element is included to ensure the maintenance of important concentrations of species that use the forest only occasionally.

### 3.1.1 Tools for landscape analysis of HCV1

<b>HCV1.1 Protected Areas</b>	
<b>Tasks</b>	<p>Protected areas will usually be HCVF. These should be defined in HCVF maps.</p> <p>Forests necessary to maintain the values within protected areas can also be HCVF (e.g. adjacent forests used by endangered species within the protected areas, forests that protect the hydrology of the protected areas, forests that act as migration corridors between protected areas). This will be particularly important when protected areas are severely threatened.</p> <p>Determine whether the protected area network adequately represents forest ecosystems at an appropriate scale (ecoregion, island, national). This will inform decisions about HCV1.2-4 and HCV3.</p>
<b>Data sources</b>	<p>Maps of existing and proposed protected areas, provincial spatial plans, land designation etc.</p> <p>Satellite imagery, recent forest cover and vegetation maps.</p>
<b>Tools and Approaches</b>	<p>WWF gap analysis<sup>9</sup></p> <p>Threat analysis<sup>10</sup></p>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

<b>HCV1.2 Threatened and Endangered species</b>	
<b>Tasks</b>	<p>Determine forest areas that support any Critically endangered species or significant concentration of other threatened species.</p> <p>In large, information poor landscapes it may be impossible to define areas where such species occur. In this case, the onus should be placed on all land managers to determine that an area does not contain either critically endangered species or concentrations of threatened or endangered species. The landscape analysis can guide forest managers towards which species are likely to be present and which forest types are most likely to contain them.</p>
<b>Data sources</b>	<p>Relevant legislation, CITES<sup>6</sup>, IUCN red data lists<sup>7</sup>, Red Data books, conservation priority setting initiatives, habitat maps, endangered species networks, scientific and conservation literature and organisations etc.</p>
<b>Tools and Approaches</b>	<p>Systematic conservation planning<sup>11</sup></p> <p>WWF Ecoregional vision workshop<sup>12</sup></p> <p>Landscape species indicators<sup>13</sup></p> <p>Five-S Framework<sup>14</sup></p> <p>Functional landscapes<sup>15</sup></p> <p>Rapid ecological assessment<sup>16</sup></p> <p>Population Viability analysis<sup>17</sup></p> <p>Bio-Rap Assessment<sup>18</sup></p> <p>Forest Quality Assessment<sup>19</sup></p> <p>Landscape Approach<sup>20</sup></p>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

<b>HCV1.3 Concentrations of endemic species</b>	
<b>Tasks</b>	<p>Determine forest areas where concentrations of endemic species are known to occur.</p> <p>In large, information poor landscapes it may be impossible to define areas where such species occur. In this case, the onus should be placed on all land managers to determine that an area does not contain concentrations of endemic species.</p>
<b>Data sources</b>	<p>Scientific and conservation literature and organisations, Endemic Bird Areas<sup>4</sup>, Important Bird Areas<sup>5</sup>, endangered species networks, habitat maps etc.</p>
<b>Tools and Approaches</b>	<p>Systematic conservation planning<sup>11</sup></p> <p>WWF Ecoregional vision workshop<sup>12</sup></p> <p>Landscape species indicators<sup>13</sup></p> <p>Five-S Framework<sup>14</sup></p> <p>Functional landscapes<sup>15</sup></p> <p>Rapid ecological assessment<sup>16</sup></p> <p>Population Viability analysis<sup>17</sup></p> <p>Bio-Rap Assessment<sup>18</sup></p> <p>Forest Quality Assessment<sup>19</sup></p> <p>Landscape Approach<sup>20</sup></p>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

<b>HCV1.4 Critical temporal concentrations</b>	
<b>Tasks</b>	<p>Define forest areas where critical temporal concentrations of species are known to occur. These include migration corridors, migration sites, and other areas that are critical to many species.</p> <p>In large, information poor landscapes it may be impossible to define areas where such species occur. In this case, the onus should be placed on all land managers to determine that an area does not contain critical temporal concentrations species.</p>
<b>Data sources</b>	<p>Important Bird Areas<sup>5</sup></p> <p>If the landscape is small, then local scientists, conservation organisations, land managers and local people are likely to be aware of any extraordinary or critical temporal concentrations of species. In large landscapes, many critical temporal forest resources will be too small to analyse and map (e.g. salt licks, some migration corridors).</p>
<b>Tools and Approaches</b>	<p>Systematic conservation planning<sup>11</sup></p> <p>WWF Ecoregional vision workshop<sup>12</sup></p> <p>Five-S Framework<sup>14</sup></p> <p>Functional landscapes<sup>15</sup></p> <p>Rapid ecological assessment<sup>16</sup></p> <p>Bio-Rap Assessment<sup>18</sup></p> <p>Forest Quality Assessment<sup>19</sup></p> <p>Landscape Approach<sup>20</sup></p>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

### **3.2 HCV2. Globally, regionally or nationally significant large landscape level forests.**

This part of the HCVF definition aims to identify those forests that contain viable populations of most if not all naturally occurring species. It also includes forests that contain important sub-populations of very wide-ranging species (e.g. wolverine, tiger, elephant) even though the sub-populations may not in themselves be viable in the long term. It includes forests where ecological processes and ecosystem functioning (e.g. natural disturbance regimes, forest succession, species distributions and abundance) are wholly or relatively unaffected by recent human activities. Such forests are necessarily large (tens of thousands of hectares) and will be less affected by recent human activities than other forests within the region. Such forests are increasingly rare and continue to be threatened throughout the world, through processes such as deforestation, forest fragmentation and degradation.

Nevertheless, the occurrence of large, natural forests differs greatly from country to country. In countries where there has been extensive forest conversion, there may be no forests that would be considered under this HCV. Alternatively, forests that are capable of maintaining most or all species may be so few that they are already well known and the working group has only to list or produce a map of them. However, some countries retain a relatively large proportion of forest cover and in such cases the working group will have to decide the extent to which patterns of historical and current use as well as current threats have reduced the ability of forests to support the natural array of species.

It is also worth emphasising that the forest considered under HCV2 is not necessarily confined to a particular administrative unit (e.g. forest management unit). This is because several contiguous administrative units of forest land may together form a significant large landscape level forest. An individual administrative unit can be a HCVF under HCV2 if it is whole or part of a significant large, landscape level forest.

### 3.2.1 Tools for landscape analysis of HCV2

HCV2 Significant large, landscape level forests	
<b>Tasks</b>	<p>Decide whether there are any forest areas of sufficient size and quality (e.g. fragmentation, degradation) that could potentially contain viable populations of most if not all naturally occurring species.</p> <p>Whether they are globally, regionally or nationally significant will depend on how rare or threatened such large areas of forest are.</p> <p>Define the boundaries of these significant large, landscape-level forests on maps where possible.</p>
<b>Data sources</b>	Satellite imagery, Global Forest Watch intact natural forest maps <sup>8</sup> , land designation maps, forest cover and vegetation maps.
<b>Tools and Approaches</b>	<p>Systematic conservation planning<sup>11</sup></p> <p>WWF Ecoregional vision workshop<sup>12</sup></p> <p>Landscape species indicators<sup>13</sup></p> <p>Five-S Framework<sup>14</sup></p> <p>Functional landscapes<sup>15</sup></p> <p>Population Viability analysis<sup>17</sup></p> <p>Forest Quality Assessment<sup>19</sup></p>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

### **3.3 HCV3. Rare, threatened or endangered ecosystems**

Some ecosystems are naturally rare, where the climatic or edaphic conditions necessary for their development are limited in extent. Recent processes, such as land conversion may have decreased their extent even further. Examples include montane forests in eastern Africa, cloud forests in Central America or riverine forests in semi-arid regions of Africa.

Other ecosystems have become rare through recent human activity such as conversion of natural ecosystems into agricultural or other land use. It is often these ecosystems that are the most threatened by continued anthropogenic actions.

This value is designed to ensure that threatened or endangered forest ecosystems, communities or types are maintained. These include forest types which were previously widespread or typical of large regions. They also include rare associations of species, even when the constituent species may be widespread and secure. These include:

- Associations (intact or not) that have always been rare (e.g. limestone forests in Indonesia; cloud forests of Central America; riverine forests in semi-arid regions of Africa).
- Intact ecosystems that are now rare or greatly reduced, even if previously widespread or typical of the region (e.g. lowland dipterocarp forest in Indonesia).
- Forests ecosystems, even if heavily disturbed or degraded, which are now rare or greatly reduced, and where intact examples are very rare (e.g. mangrove forest in parts of Indonesia)

In these cases, the HCV is the rare ecosystem itself, which may be all or part of the any particular forest. Native forest ecosystems or species assemblages that are characteristic of a region but are not rare or endangered should not be considered HCVFs under this part of the definition.

### 3.3.1 Tools for landscape analysis of HCV3

HCV3 Rare, threatened or endangered ecosystems	
<b>Tasks</b>	<p>Define which ecosystems or forest types are threatened or endangered. Where possible, define these on maps.</p> <p>The effective protection given to forest types through the national or regional protected area network, as well as the threats to these forest types, should all be taken into account.</p>
<b>Data sources</b>	Satellite imagery, land designation maps, forest cover and vegetation maps.
<b>Tools and Approaches</b>	<p>WWF Gap assessment<sup>9</sup></p> <p>Threat analysis<sup>10</sup></p> <p>Systematic conservation planning<sup>11</sup></p> <p>WWF Ecoregional vision workshop<sup>12</sup></p> <p>Landscape species indicators<sup>13</sup></p> <p>Five-S Framework<sup>14</sup></p> <p>Functional landscapes<sup>15</sup></p> <p>Rapid ecological assessment<sup>16</sup></p> <p>Population Viability analysis<sup>17</sup></p> <p>Bio-Rap Assessment<sup>18</sup></p> <p>Forest Quality Assessment<sup>19</sup></p> <p>Landscape Approach<sup>20</sup></p> <p>Representing ecological communities in ecoregion conservation plans<sup>21</sup></p>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

### **3.4 HCV4. Forest areas that provide basic services of nature in critical situations.**

All forests provide some services of nature, such as watershed protection, stream flow regulation or erosion control and these services should always be maintained under good management. In most forests the consequence of a breakdown in these services is relatively minor. In some cases, however, their failure would have a serious catastrophic or cumulative impact. For example, a forest that forms a large proportion of the catchment area of a river that has a high risk of damaging and destructive flooding downstream may be critical in preventing flooding and would be considered a HCV. It is this type of situation that HCV4 attempts to identify.

Since there is a range of separate ecosystem services, this value has been subdivided into five elements:

#### ***HCV4.1 Unique sources of drinking water***

One of the basic services of nature that forests can provide is drinking water supplies to communities or other settlements. Where the forest protects and maintains water supplies for people or communities who have no alternative sources of drinking water, then this will always be critical. This element could alternatively be considered under HCV5.

#### ***HCV4.2 Forests critical to water catchments***

Forests play an important role in preventing flooding, controlling stream flow and regulating water quality. Where a forest area constitutes a large proportion of a water catchment, it is able to play a critical role in maintaining these water quantity and quality. The greater the importance of the water catchment, in terms of flooding or drought risk or water usage, the more likely it is that the services provided by the forest are critical and that the forest is a HCVF.

#### ***HCV4.3 Forests critical to erosion control***

A third basic service of nature that forests provide is terrain stability, including control of erosion, landslides, avalanches and downstream sedimentation. All areas suffer some degree of erosion and many are also prone to a degree of terrain instability, but often the extent or risk of these is very low or the consequences minor. In some cases, though, forests protect against erosion, landslides and avalanches in areas where the consequences, in terms of loss of productive land, damage to ecosystems, property or loss of human life, are severe. In these cases, the ecosystem service provided by the forest is critical, and it is these that should be designated HCVFs.

#### ***HCV4.4 Forests providing barriers to destructive fire***

Fire is a part of the natural dynamics of many forest ecosystems, such as boreal forests in Canada or eucalypt forests in Australia. Mostly these fires are small and pose no great threat or risk. However, forest fires, whether started by natural causes or by humans, can sometimes develop into destructive, uncontrolled fire that can be

a serious risk to human life and property, economic activity, or to threatened ecosystems or species. A HCV under this element includes forest that naturally acts as a barrier to fire in areas that are prone to fire where the consequences are potentially severe.

### ***HCV4.5 Forests with critical impact on agriculture or fisheries***

All forests affect local microclimate and wind. Where forest areas are close to agricultural land, these effects can sometimes be critical to maintaining agricultural production. The effect of forest on maintaining agricultural production will vary according to climate and topography, spatial configuration of agricultural land and forest as well as crop types. Similarly, some forest areas are critical to maintaining fisheries (e.g. many mangrove forests and riparian forests). The consequences of loss of agricultural or fisheries production will also depend on the social and economic circumstances, with, for example, subsistence agriculturalists being particularly vulnerable to any loss of production. This element of HCV4 aims to identify forests that are critical to maintaining agricultural and fisheries production.

## **3.4.1 Tools for landscape analysis of HCV4**

<b>HCV4.1 Unique sources of drinking water</b>	
<b>Tasks</b>	Define and where possible map unique sources of drinking water. This will usually not be possible in a very large landscape.
<b>Data sources</b>	Legislation, official designations (e.g. community watersheds), vegetation maps, satellite imagery, topographic maps, environmental protection experts.
<b>Tools and Approaches</b>	Forest Quality Assessment <sup>19</sup>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

<b>HCV4.2 Forests critical to water catchments</b>	
<b>Tasks</b>	Define and where possible map forests critical to water catchments.
<b>Data sources</b>	Legislation, official designations (e.g. protection forests), vegetation maps, satellite imagery, topographic maps, environmental protection experts.
<b>Tools and Approaches</b>	Forest Quality Assessment <sup>19</sup>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

<b>HCV4.3 Forests critical to erosion control</b>	
<b>Tasks</b>	Define and where possible map forests critical to erosion control.
<b>Data sources</b>	Legislation, official designations (e.g. protection forests), vegetation maps, satellite imagery, topographic maps, environmental protection experts.
<b>Tools and Approaches</b>	Forest Quality Assessment <sup>19</sup>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

<b>HCV4.4 Forests providing barriers to destructive fire</b>	
<b>Tasks</b>	Define and where possible map forests providing barriers to destructive fire.  This element is confined to a small number of environments worldwide and so will be absent from many landscapes.
<b>Data sources</b>	Local wildfire specialists.
<b>Tools and Approaches</b>	Forest Quality Assessment <sup>19</sup>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

<b>HCV4.5 Forests with critical impact on agriculture or fisheries</b>	
<b>Tasks</b>	Define and where possible map forests providing critical protection to agriculture and fisheries.  Forests with critical impact on agriculture will often be too small to map in large landscapes.  Mangrove and riparian forests are the ones most likely to be critical to fisheries.
<b>Data sources</b>	Legislation, official designations (e.g. protection forests), vegetation maps, satellite imagery, topographic maps, social and agricultural production experts.
<b>Tools and Approaches</b>	Forest Quality Assessment <sup>19</sup>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

### **3.5 HCV5. Forest areas fundamental to meeting basic needs of local communities.**

The definition of HCVFs recognises that some forests are essential to human well-being. This value is designed to protect the basic subsistence and security of local communities that are derived from forests - not only for “forest-dwelling communities”, but also for any communities that get substantial and irreplaceable amounts of income, food or other benefits from the forest.

Employment, income and products are values that should be conserved if possible, without prejudice to the other values and benefits present within the forest. However, HCVs do not include excessive extraction, even when communities are currently economically dependent on it. Nor do they include the excessive application of traditional practices, when these are degrading or destroying the forests and the other values present in the forest.

A forest may have HCV status if local communities obtain essential fuel, food, fodder, medicines, or building materials from the forest, without readily available alternatives. In such cases, the High Conservation Value is specifically identified as one or more of these basic needs.

The following would not be considered HCVs:

- Forests providing resources that are useful but not fundamental to local communities.
- Forests that provide resources that could readily be obtained elsewhere or that could be replaced by substitutes.

HCV5 applies only to basic needs. For example, for a community that derives a large part its protein from hunting and fishing in forests where there is no alternative source of meat or fish, the forests would constitute a HCVF. Another forest, where people hunted largely for recreational purposes (even if they did eat their catch) and where they were not dependent upon hunting, would not constitute a HCVF.

Over time, a value may grow or decline, with changing community needs and changes in land use. A forest, which was previously only one of many sources of supply, may become the only, or basic fundamental source of fuel wood or other needs. Conversely, needs may decline and disappear with time.

### 3.5.1 Tools for landscape analysis of HCV5

<b>HCV5 Forest areas fundamental to meeting basic needs of local communities</b>	
<b>Tasks</b>	<p>Define forest areas fundamental to meeting the basic needs of local communities.</p> <p>Consider communities that live outside the boundaries of the landscape but that use forests within.</p> <p>Mapping HCV5 may be difficult without a full consultation process due to conflicting rights and tenures.</p> <p>In the absence of comprehensive data, potential HCV5 forests may be approximated by buffering around villages and points of access if local resource use patterns are known (e.g. some communities may be known to rely on forests within a 5 km radius of the villages or within 10 km of rivers).</p> <p>In large landscapes, this may be difficult to map. Mapping of settlement locations may provide a useful guide to areas where HCV6 is more likely to occur.</p>
<b>Data sources</b>	<p>Land use and tenure maps, local social scientists and anthropologists, indigenous peoples' organisations, past and present development aid projects.</p>
<b>Tools and Approaches</b>	<p>Rapid Rural Appraisal<sup>22</sup></p> <p>ODA Participatory Forest Assessment<sup>23</sup></p> <p>The Landscape Approach<sup>19</sup></p> <p>Forest Quality Assessment<sup>20</sup></p> <p>Resource Assessment of non-wood forest products<sup>24</sup></p> <p>Integrating Nutritional Concerns into Forestry Projects<sup>25</sup></p>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

### **3.6 HCV6. Forest areas critical to local communities' traditional cultural identity.**

As well as being essential for subsistence and survival, forests can be critical to societies and communities for their cultural identity. This value is designed to protect the traditional culture of local communities where the forest is critical to their identity, thereby helping to maintain the cultural integrity of the community.

A forest may be designated a HCVF if it contains or provides values without which a local community would suffer a drastic cultural change and for which the community has no alternative. Examples of HCVF under this part of the definition would include:

- Sacred groves in India, Borneo and Ghana
- Forests used to procure feathers of the Argus Pheasant used by Dayak communities in Borneo in headdresses for important ceremonies.
- Forests in the Brazilian Amazon that are used by extractivist communities (such as rubber tappers) as the sole or main source of economic activity.

### 3.6.1 Tools for landscape analysis of HCV6

<b>HCV5 Forest areas critical to local communities' cultural identity</b>	
<b>Tasks</b>	<p>Define forest areas critical to local communities' cultural traditional identity.</p> <p>Consider communities that live outside the boundaries of the landscape but that use forests within.</p> <p>Mapping HCV5 may be difficult without a full consultation process due to conflicting rights and tenures and where communities are unwilling to communicate their cultural heritage.</p> <p>In the absence of comprehensive data, potential HCV5 forests may be approximated by buffering around villages and points of access if local resource use patterns are known (e.g. some communities may be known to rely on forests within a 5 km radius of the villages or within 10 km of rivers). Buffer around villages and up rivers</p> <p>In large landscapes, this may be difficult to map. Mapping of settlement locations may provide a useful guide to areas where HCV6 is more likely to occur.</p>
<b>Data sources</b>	<p>Land use and tenure maps, lists of sacred groves or sacred burial sites etc., local social scientists and anthropologists, indigenous peoples organisations etc., past and present development aid projects.</p>
<b>Tools and Approaches</b>	<p>Rapid Rural Appraisal<sup>22</sup></p> <p>Participatory Forest Assessment<sup>23</sup></p> <p>Forest quality assessment<sup>19</sup></p> <p>The Landscape approach<sup>20</sup></p>

Note: Numbers refer to the lists of further information on tools and approaches in Appendix 2.

## **4. Using the landscape-level HCVF analysis**

The previous section dealt with the process of analysing and mapping HCVFs within the target landscape. However, mapping HCVFs is not an end in itself and you should be clear on what you want to achieve and how you want to achieve it. This section examines some of the different players that can be engaged to produce the desired conservation benefit from analysing and mapping HCVFs.

### **4.1 Local communities**

As discussed in Sections 1.4 and 2.2 above, some involvement of community associations and other such organisations is a vital component in definitively mapping HCVFs. Once the maps or other outcomes of the analysis have been produced there may be a need to engage local communities or their representatives as part of use of the analysis in land use planning etc. This is because local communities will often be the people most affected by degradation or loss of HCVF, and because communities are one of the key stakeholder groups involved in the reform of policies and practices needed to maintain these forests.

We do not attempt to provide details on how to conduct community consultation here, as there is already considerable guidance on this topic. However, there are some points that need consideration:

- Identify types of communities that use the landscape and which are likely to have social or culturally defined HCVs. Examples would include indigenous people, forest-dependant communities, etc.
- Identify community organisations that can be thought to represent these groups.
- Irrespective of the motive for conducting the landscape HCVF analysis, it will often be the land managers who actually conduct the detailed consultation with local communities.
- Where there is a history of poor relationships between land managers and local communities, third-party facilitation may be required to build up mutual trust between land managers and local communities.

### **4.2 Forest managers engaged in certification**

Forest management companies are likely to be the focus of HCVF work where supporting forest management certification has been identified as a major motive for conducting HCVF analysis (Section 1.5). In this case, the forest managers will do much of the detailed work, such as defining and managing HCVs 5 and 6 through consultation and participation with local communities and delineating the other HCVFs. The landscape HCVF analysis should provide a wider perspective for assessing HCVs beyond the boundaries of an individual forest management unit. It will also provide detailed guidance on what HCVs they should be looking for and where and how they should be looking for it.

Some of the key points in engaging forest management companies with the HCVF concept are:

- Identify forest companies who are interested in SFM, or who are already engaged with certification
- Meet with the appropriate people within these organisations. It will probably be most appropriate to meet with both high level company managers as well as the forest managers who will be responsible for implementation
- Where there is a Forest and Trade Network producer group, you can work closely with the group and its co-ordinator to engage group members
- Discuss with the companies that, in order to achieve SFM or FSC certification they are required to identify HCVF within their FMUs. If their FMUs do contain any HCVF, they are also required to manage them in such a way as to maintain or enhance the HCVs.

### **4.3 Other land management companies**

Where conservation advocacy has been identified as a major motive for landscape HCVF analysis, a broader range of land managers may become the focus for HCVF work. Examples include forest management companies who are not interested in certification, such as commodity plantation companies (e.g. oil palm) or mining companies.

- Identify companies that are susceptible to the HCVF message. These will often be companies that sell products to international purchasing companies.
- Meet with the appropriate people within these organisations. It will probably be most appropriate to meet with both high level company managers as well as the forest managers who will be responsible for implementation
- Discuss with them that, in order to re-assure their customers or pressure groups that they are responsible producers, they should not be degrading any HCVFs.
- The spatial analysis of HCVF can support their efforts towards responsible production by helping to define where the greatest possibility lies that their production or management plans risk degrading HCVFs and by defining what they should be doing to identify and manage HCVF within their administrative land units.

### **4.4 Purchasing companies**

Where conservation advocacy has been identified as a major motive for landscape HCVF analysis, it will be vital to engage companies that purchase products from the target landscape. Such companies will have considerable leverage on land managers within the landscape and so can support efforts to identify and maintain HCVFs within the landscape. HCVF landscape analysis can provide a safeguard for

purchasers as well as investors to ensure that they are not contributing to the degradation or destruction of some of the world's most important forests. These will often be companies who sell to the international market, since they have to respond to customers and pressure groups from around the world. This might include companies that trade in timber products or oil palm.

- Identify companies that are purchasing products from the target landscape and who you believe are susceptible to the HCVF concept. These will often be identified through finding out who relevant land managers sell their products to, particularly where you have evidence that these companies are degrading or destroying HCVFs.
- Provide briefing to your organisation and partner organisations internationally on the degradation of HCVFs by land managers who sell to the purchasing companies. This will allow engagement at many levels within the purchasing organisation.
- Discuss with them that, in order to re-assure their customers or pressure groups that they are responsible purchasers, they should not be purchasing from areas where there is a risk that HCVFs are being degraded.
- Discuss with them ways of influencing the activities of the land managers. The landscape HCVF analysis will provide a key tool that can be used as leverage to influence the purchasing companies and the land managers who supply them.

#### **4.5 Other stakeholders**

To gain a wider buy-in to using HCVF as a means of improving management of environmental and social values within the landscape it will be necessary to engage a wider range of stakeholders:

- Identify other stakeholders, such as civil society groups, that are likely to have an interest in ensuring the maintenance of environmental and social values.
- Depending on the type of group, these groups should be involved in consultation and consensus building on what are the HCVs within the landscape and how they should be managed. They may also be able to provide information or data that will assist in defining HCVFs within the landscape.

#### **4.6 Land use planners**

There is a real opportunity to ensure the maintenance of HCVs by incorporating HCVFs explicitly into land use planning. Where land use plans are being developed:

- Identify the planning processes that are important within the landscape
- Discuss the concept of HCVF with key land use planning officers and explore ways of incorporating the spatial analysis and/or HCVF maps into planning processes.

- Work with them to make sure that decisions and consultation made at a local scale are fed into landscape planning processes.

# Appendix 1. Case study – preliminary spatial analysis of biological HCVFs in Riau.

## INTRODUCTION

The following presents a summary of a preliminary analysis of HCVFs in Riau, Sumatra, Indonesia. This summary is limited to biological HCVFs (HCVs 1-3) and concentrates on the results of the analysis and the recommended further actions. A selection of the maps and analyses produced are presented. The full document is titled '*A Preliminary High Conservation Value Forest Assessment for WWF in Riau*' and was produced by Dr. James Jarvie (consultant), Ketut Deddy (consultant) and Dr. Steve Jennings (ProForest) on behalf of WWF.

Riau was selected as a focus for HCVF work because of the potential for conservation gains through HCVF advocacy. Several large land managers within the province are known to be degrading and destroying large areas of natural forest. These companies sell products (particularly pulp fibre) to international companies who are susceptible to pressure from conservation groups and from their own customers.

The initial analysis of HCVF in Riau was based on satellite imagery and available literature. The objectives were to:

- Demonstrate where known HCVs exist
- Document the information used
- Highlight the threats to those HCVs
- Show where the precautionary approach should be applied
- Identify the gaps that need to be filled to accept or refute advice based on the precautionary principle
- Provide a framework for continuing dialogue among stakeholders interested in Riau HCVF

Each HCV is broken in elements, reflecting local conditions and needs and following the framework provided by Jennings et al. (2002)<sup>5</sup>.

### ***Data sources and quality***

Satellite imagery since 1985 was collected along with numerous GIS coverages concerning existing land use, topography and land system and forest type. Two problems have been identified with these data:

1. The data set is patchy across the province. For example, survey teams have recorded conflicts between people and elephants (and thus elephant presence noted). Where the surveys teams have not gone, no data are available.
2. Whereas large forest blocks are easy to pick out, there is rarely reliable information about forest quality and habitat distribution.

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<sup>5</sup> Jennings, S., Nussbaum, R, Judd, N and Synnott, T. (2003). Defining High Conservation Values at the national level: a practical guide. Open Review Draft. ProForest, Oxford, UK.

As discussed in the following HCV analysis, two solutions to data patchiness and paucity have been selected. The first is use of the precautionary approach, especially concerning rare and endangered species. The second is the use of proxies to make assumptions about forest integrity. For example, if a large forest block has a lack of gaps, roads, large distances from settlements and no obvious fragmentation then it is assumed to be largely intact.

## Scoping

Riau is a province in central Sumatra, a little over 8 million ha in size. Sumatra, Borneo and Peninsular Malaysia comprise most of one bioregion, Sundaland, whose lowland forests are dominated by trees of the family Dipterocarpaceae. Across this entire area, which includes territories of three countries, most lowland forest habitats have been badly degraded or converted to agriculture or tree plantations. Riau is principally a lowland province. The eastern part is dominated by swamp forest, growing on a peat foundation > 2 m deep. In the middle, non-swamp, lowland forest used to predominate. Much of this has now been cleared.

Riau retained much of its forest cover until the last twenty years; that remaining is estimated to be 3.8 million ha, 47.5% of the province. This cover is of varying quality but there is insufficient ground truthed data to be able to estimate the extent of different forest quality classes.

Table 1 shows the extent of remaining forest based on analysis of LANDSAT satellite imagery.

**Table 1. Remaining forest types by area in Riau**

Forest type	Area (ha)
Lowland dry forest	990,384
Mangrove	205,305
Peat forest (< 2 m)	669,450
Peat forest (> 2m)	1,939,019
Submontane forest	13,815
<b>Total</b>	<b>3,825,945</b>

Estimates of the rate of deforestation in Riau vary, with World Bank appearing to accept over 70,000 ha per year (Aden, Dore et al. 2001)<sup>6</sup>. The World Bank has found that industrial land managers have been largely responsible for the loss of forest in Riau. Conversion affects land beyond that directly impacted, with significant effect. The most important in Riau is caused when peat-based forest is converted to oil palm or fibre crops like *Acacia*. The land is drained and the pH of the soil changed. Drying affects the drainage of the wider landscape, which in some cases includes protected areas, and fire becomes a new hazard.

<sup>6</sup> Aden, J., G. Dore, et al. (2001). Indonesia: Environment and natural resource management in a time of transition. Jakarta, World Bank.

## HCV 1 ANALYSIS

*HCV 1 Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia)*

### **HCV1: Element 1 - protected areas**

**Information sources:** Government of Indonesia information on protected areas; Nature Conservation Web Site; REPPROT land designation maps; WCMC data sets; Provincial spatial plans; Satellite imagery; Field reports; World Bank reports.

**Findings:** There are 16 protected areas (Figure 1) with a combined area of 531,600 ha. A further 20 areas are classified as *hutan lindung* (protection forest) which cover 428,100 ha. Together, the protected areas and *hutan lindung* cover < 10% of land cover and the following forest types (Table 2):

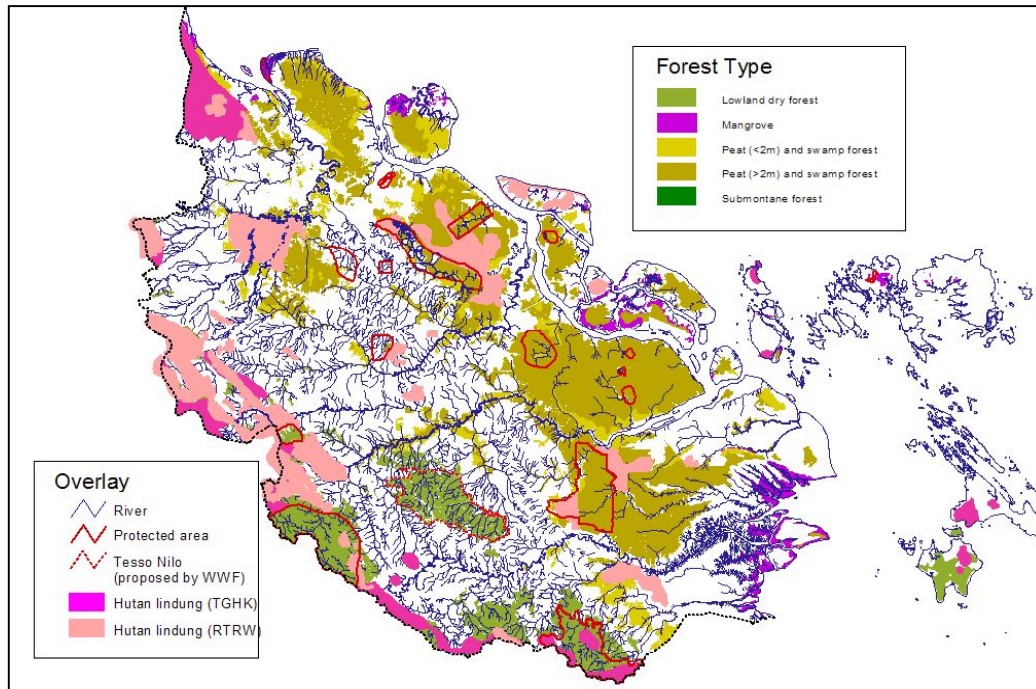
**Table 2. Forest areas under protection in Riau**

Forest type	Area protected	Riau total	Protected as % of total
Lowland forest	400,480	990,384	40.44
Mangrove	4,350	205,305	2.12
Peat (< 2 m)	84,000	669,450	12.55
Peat (> 2 m)	238,550	1,939,019	12.30
Sub-montane	2,700	13,815	19.54
<b>Total forest</b>	<b>730,080</b>	<b>3,817,973</b>	<b>19.12</b>

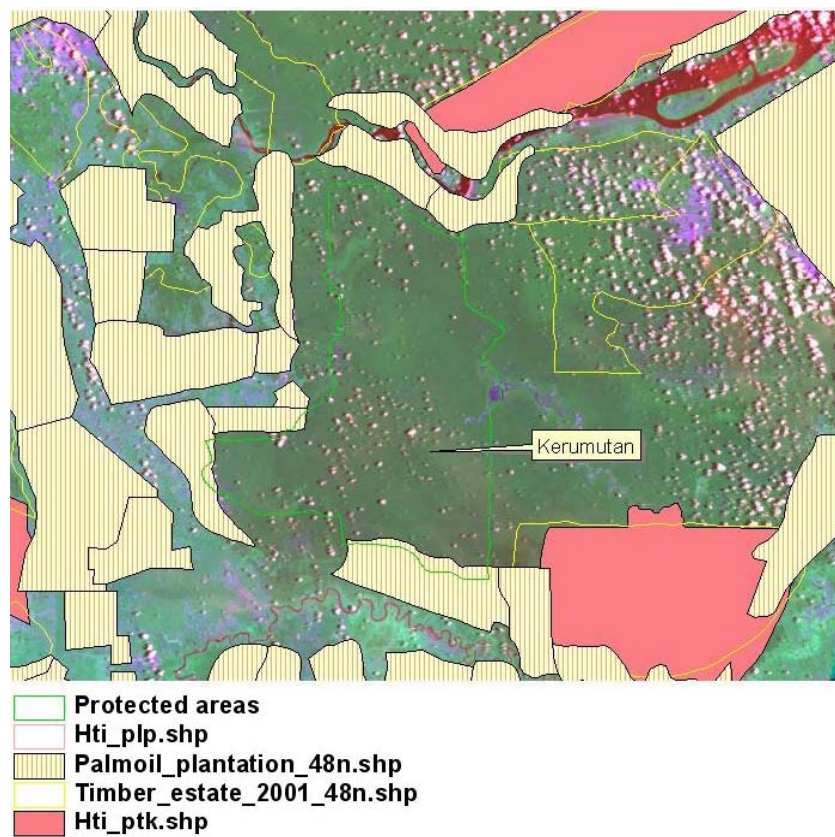
**Threats:** No significant area protects flat, non-peat forest, the very forest type that has been the most pressured and converted by loggers, fibre and palm oil developers. Satellite imagery indicated that all protected areas are under threat.

Kerumutan Nature Reserve, a wet peat forest, serves as an example of the threats that face almost all protected areas and *hutan lindung*. Figure 2 combines land use plans and satellite imagery. It shows the extreme threat to the national reserve's hydrology posed by plantation and logging operations (which will dry out adjoining land, thus lowering the water table in the reserve) as well as actual incursions into the reserve.

**Figure 1. Forest types and protected areas in Riau.**



**Figure 2. Threats to Kerumutan Nature Reserve.**



**Outcome:**

- Protected areas are HCVs and any protected area in thus HCVF.
- All protected areas are threatened and are being degraded.
- On paper, protected areas protect small fractions of each forest type and in reality they protect even less. Until this situation changes forest managers elsewhere in Riau cannot rely on protected areas to maintain the biodiversity of the province; their responsibility to do so thus increases.

**Recommendations for further work:**

- Using the HCVF data set, companies with a past, present or future role in degrading protected areas can be surveyed. This information will be useful in lobbying. Rapid ground surveys of damage indicated in satellite imagery are also advised, to confirm those responsible.
- A major gap in the data set is the poorly known distribution of forest types in Riau and their condition. This should be addressed. With this information a “state of the forest” monitoring database could be set up to understand threat trends to protected areas and the habitats they represent. This could be used to lobby and campaign for better forest protection.
- Forest managers usually have AMDAL (environmental impact assessments) that are generic and focus only within their borders. Expansion of company AMDALS to cover likely impacts to this HCV outside their boundaries should be encouraged. This should be particularly stressed for any company involved in draining land.

***HCV1: Elements 2/3/4 Concentrations of threatened or endangered species, concentrations of endemic species and critical temporal concentrations of species***

**Information sources:** Government of Indonesia law on protected species; CITES; IUCN red data lists; WWF surveys; Ecology of Sumatra; international organisations and experts; endangered species networks; other scientific literature; habitat maps; various ecoregional concepts.

**Findings:** Information on species distribution is scattered. Various species lists for protected areas are available but the consistency of these is unclear and the data cannot be extrapolated to nearby forests not under protection. Some data on flagship species in certain areas for certain times are available from WWF. These also cannot be reliably extrapolated to the province.

There is an almost total lack of information on plants, insects and other biota. It appears that most taxonomic investigations in the region throw up new and sometimes endemic species. At the large landscape level these attributes are not mapped.

**Outcome:**

- The HCV elements are present, yet cannot be effectively mapped. The precautionary approach is therefore invoked. It is recommended that all forest areas are assumed to contain concentrations of threatened or endangered species, concentrations of endemic species and critical seasonal concentrations of species.
- The onus of demonstrating that an area *does not* contain any of these elements should be the responsibility of land managers. Demonstration would require identifying the forest habitats under management control, their distributions and conditions, and then showing that concentrations of relevant species are not there.

**Recommendations for further work:**

- It would be impossible to fill in the data gap for all species in the short term. The focus should be on:
  - Establishing which areas have been identified in previous conservation priority setting exercises. These should be considered as HCVFs in the absence of detailed species distribution data.
  - Use of the precautionary approach to shift responsibility onto land managers to demonstrate that the HCV elements do not exist.
- Exceptions may arise for certain species of critical importance to the organisation for other uses, such as identifying concentrations of threatened flagship species when lobbying for a protected area.

**HCV 2 ANALYSIS**

*HCV 2 Forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance*

**Information sources:** Government of Indonesia information on protected areas; Nature Conservation Web Site; REPPROT land designation maps; WCMC data sets; Provincial spatial plans; Satellite imagery; Field reports; World Bank reports.

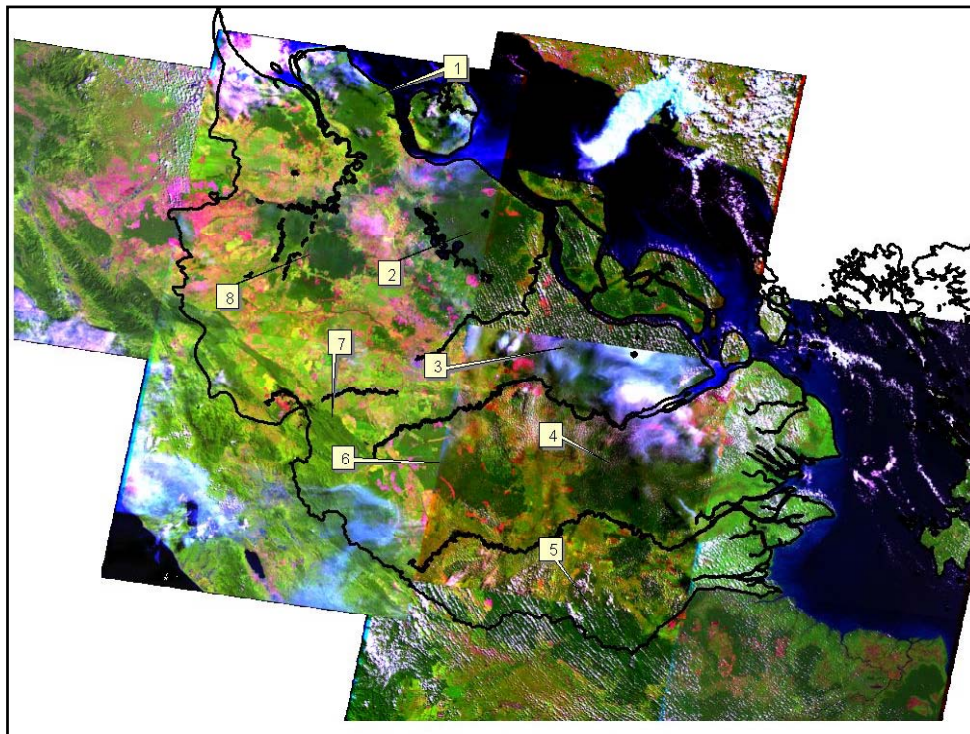
**Findings:** Satellite images give a good overview of where large areas of forest remain, their size, and disturbance via proxies like roading and settlement and industrial development. Eight large natural forest areas (Figure 3) are indicated with various habitats and levels of disturbance. In summary these are:

**Table 3: Forest blocks in Riau**

No.	Putative forest type	Disturbance
1	Peat swamp	Long established plantations and timber concessions
2	Peat swamp	Until recently very little disturbance; now being actively cleared for plantations. Remaining protected areas in this forest block likely to suffer from drainage of surrounding landscape
3	Peat swamp	Roads and plantations – some areas appear relatively undisturbed
4	Peat swamp	Until recently relatively undisturbed, now threatened by plantations and timber concessions. There are major drainage threats. The area includes the important Kerumutan reserve, which already has incursions that appear to be both for logging and plantation conversion. Kerumutan will likely suffer from drainage of the surrounding landscape.
5	Sub montane	Severe illegal logging widely believed to be a serious issue.
6	Lowland	Tesso Nilo landscape; badly fractured by logging roads and poor logging practices in the past, yet with strong potential for recovery. Illegal logging and conversion threats severe.
7	Peat swamp	Fractured landscape yet with relatively large blocks of submontane forest; appears threatened by conversion and illegal logging.
8	Peat swamp	Severe logging and conversion pressure.

The biggest short-term threat to remaining blocks is licensed industrial conversion. This is underway in all lowland areas and seems likely to continue or increase since demand for fibre in Riau vastly exceeds available capacity.

**Figure 3. Remaining large forest blocks in Riau.**



**Thresholds:** There are no data to indicate whether these forest patches are able to support most or all naturally occurring species. Whereas the imagery can highlight forest blocks, there is insufficient resolution and ground truthed sites to indicate the habitats, their distribution and level of disturbance. Thresholds will have to be judged through consensus of internationally acceptable opinion on the basis of available data.

**Outcome:**

- There are eight forest blocks in Riau that should be seen as possessing this HCV under the precautionary principle.
- It is unclear which of these blocks have a chance for survival if simply left, which of them may require restoration and which are effectively doomed.

**Recommendations for further work:**

- Ground-based assessments for each of these blocks are urgently needed.
- The highest priority forests are blocks 2 and 4. Each of these was until recently undisturbed yet now faces clearance. Tesso Nilo already has attention. Other lowland areas are more disturbed. The peat swamp should receive priority attention because that is where licensed industrial conversion is already taking place.

## **HCV 3 ANALYSIS**

*HCV 3 Forest areas that are in or contain rare, threatened or endangered ecosystems*

**Information sources:** Literature; Satellite imagery.

### ***HCVF3: Element 1 – the extent of each ecosystem within the country and region***

**Findings:** Forest cover and loss across Sumatra from 1900 to 1997 is summarised by physiographic type in Table 4.

**Recommendations for further work:**

- Wide scale figures such as these can be used to demonstrate forest loss and focus instead on what still exists, and how to lobby for its conservation.

**Table 4: Forest loss by physiographic type (from Holmes, 2000)**

Physiographic types	Gross area	Assumed forest cover in 1900	Area with forest cover in 1985	Approx. area with forest cover in 1997	Estimated reduction in forest area since 1985
Alluvial	12,985,100	10,000,000	7,413,500	5,613,500	1,800,000
Lowland plains	18,240,900	16,000,000	5,559,700	2,168,300	3,391,400
Hills & mountains	15,030,000	14,000,000	10,539,900	9,039,943	1,499,957
<b>TOTAL</b>	<b>46,256,000</b>	<b>40,000,000</b>	<b>23,513,100</b>	<b>16,821,743</b>	<b>6,691,357</b>

### ***HCV3: Element 2 – how well each ecosystem is effectively secured by the protected area network***

**Findings:** Table 2 shows the forest types covered by the protected area network. However, given the level of incursion into protected areas and the general lawlessness surrounding conservation areas, no ecosystem should be seen as secured by the protected area network.

#### **Recommendations for further work:**

- Use this finding to refute attempts to justify conversion of Riau forest on the basis of there being sufficient land under protected area status.

### ***HCV3: Element 3 – the threats to these ecosystems***

Overall forest loss in Riau is put by various estimate in the range of 72,000 – 150,000 ha per year and broken down as follows:

**Table 5: Rates of deforestation in Riau (RePPPProt forest types) from Holmes (2000)**

Forest type	RePPPProt (report)	RePPPProt (mapped)	Present cover	Forest lost	% of each type lost	% of total lost
Mountain	0	0	0	0	0.0	
Hill	1,300	12	12	0	0.0	
Lowland	1,279,800	1,374,334	910,693	463,641	33.7	25.5
Logged	493,300	487,294	230,738	256,556	52.6	14.1
Calcareous	15,200	4,910	4,876	34	0.7	0.0
Riverine	30,200	26,401	19,602	6,799	25.8	0.4
Swamp	359,600	321,253	145,161	176,092	54.8	9.7
Peat	3,512,800	3,416,588	2,581,752	834,836	24.4	45.9
Coastal	500	111	68	43	38.7	0.0
Tidal	243,800	185,342	104,294	81,048	43.7	4.5
	<b>5,936,500</b>	<b>5,816,245</b>	<b>3,997,196</b>	<b>1,819,049</b>	<b>31.3</b>	<b>100.0</b>
Non-forest	3,915,000	4,000,316				
	<b>9,851,500</b>	<b>9,821,561</b>				

*RePPPProt report = measurements as reported by RePPPProt (mainly 1985 imagery)*

*RePPPProt (mapped) = measurements made on the RePPPProt map digitized by consultant*

*Present cover and forest loss as derived from MoFEC 1999 map*

The proposed spatial plans for Riau appear to put practically all *hutan lindung* into production. Over >400,000 ha are lowland and submontane forest are thus threatened with extirpation.

**Outcome:**

- Loss to all ecosystems types is severe and ongoing.
- Threats arise from industry, government and illegal logging.
- As deforestation continues, so the values of any HCVs among forest blocks in Riau rises and the certainty of values indicated by the precautionary principle becomes clearer.

**Recommendations for further work:**

- A monitoring system should be put in place that allows real-time evaluation of the impacts of threats.
- A clear communication system should be place between monitors and lobbyists/campaigners to highlight what is being lost and where. The HCVF framework should be used to communicate what types of damage are being caused and to what.
- Existing conservation priority setting exercises could be overlaid on forest type to define which of the threatened forest types are likely to be critical to maintaining each forest type in Riau.

## Appendix 2. Sources of information

### Selected internationally available data sources for HCVF Analysis

N <sup>o</sup> .	Data	Description	Source and Contact	HCV
1	WWF Global 200 ecoregions	Globally important ecoregions defined on the basis of species richness; endemism; higher taxonomic uniqueness; extraordinary ecological or evolutionary phenomena and global rarity of the major habitat type.	<a href="http://www.panda.org">http://www.panda.org</a> <a href="http://www.worldwildlife.org">http://www.worldwildlife.org</a> <a href="http://www.nationalgeographic.com/wildworld">http://www.nationalgeographic.com/wildworld</a>	Scoping
2	CI 'hotspots'	Conservation International 'hotspots' are areas that contain outstanding levels of endemism and that have suffered high levels of habitat loss.	<a href="http://www.conservation.org">www.conservation.org</a> <a href="http://www.biodiversityhotspots.org">http://www.biodiversityhotspots.org</a>	Scoping
3	Centres of plant diversity	Some of the most important sites for plants worldwide.	<a href="http://www.iucn.org">http://www.iucn.org</a> <a href="http://www.nmnh.si.edu">http://www.nmnh.si.edu</a>	Scoping
4	Endemic bird areas	A detailed account of the world's 218 Endemic Bird Areas (EBAs) - priority sites for bird and general biodiversity conservation.	Alison J. Stattersfield, Michael J. Crosby, Adrian J. Long and David C. Wege (1998). <i>Endemic Bird Areas of the World</i> . BirdLife International. <a href="http://www.birdlife.net">http://www.birdlife.net</a>	Scoping HCV1.3
5	Important bird areas	Maps and lists of Important Bird Areas. Current level of coverage varies between regions and in countries within regions.	<a href="http://www.birdlife.net">http://www.birdlife.net</a>	Scoping HCV1.3 HCV1.4
6	CITES	Species covered by CITES	<a href="http://www.cites.org">http://www.cites.org</a>	HCV1.2
7	IUCN red data lists	Species listed by category of threat.	<a href="http://www.iucn.org">http://www.iucn.org</a>	HCV1.2
8	Global Forest Watch	Intact Natural Forests defined as roadless areas of forest > 50,000 ha	<a href="http://www.globalforestwatch.org">www.globalforestwatch.org</a>	HCV2

## Tools for HCVF Analysis

N <sup>o</sup>	Toolkit	Description	Source and Contact	HCV
9	WWF gap analysis	System for identifying gaps in protected area networks, using a land classification system based on enduring features as a way of approximating to original vegetation.	Tony Iacobelli, Kevin Kavanagh and Stan Rowe (1994); <i>A Protected Areas Gap Analysis Methodology</i> , WWF Canada. <a href="mailto:tiacobelli@wwfcanada.org">tiacobelli@wwfcanada.org</a> <a href="http://www.wwfcanada.org">http://www.wwfcanada.org</a>	HCV1.1 HCV3
10	Threats analysis	Threat analysis methodology developed to help identify key issues during ecoregion surveys	<a href="mailto:Jason.Clay@wwfus.org">Jason.Clay@wwfus.org</a> <a href="http://www.worldwildlife.org">http://www.worldwildlife.org</a>	HCV1.1
11	Systematic conservation planning	Data driven, 9-stage process to identify conservation sites: scoping, stakeholders, goals, data, targets, reviewing existing protected areas, selecting additional areas, implementation, M&E Portions	Bob Pressey; <i>Systematic Conservation Planning. Draft in preparation.</i> <a href="mailto:bpressey@ozemail.com.au">bpressey@ozemail.com.au</a>	HCV1.2 HCV1.3 HCV1.4 HCV2
12	Ecoregional vision workshop	Generic explanation of ecoregion conservation, including various assessment methodologies including explanation of the experts' workshop to provide an overview of biodiversity importance and to identify priority conservation areas and targets	Eric Dinerstein et al (2000); <i>A Workbook for Conducting Biological Assessments and Developing Biodiversity Visions for Ecoregion-Based Conservation</i> , WWF US. <a href="http://www.worldwildlife.org">http://www.worldwildlife.org</a>	HCV1.2 HCV1.3 HCV1.4 HCV2
13	Landscape species indicators	Developed by the Wildlife Conservation Society for planning through use of ecologically functioning populations of a suite of landscape species Part of the Living Landscapes.	Eric Sanderson, Wildlife Conservation Society. <a href="http://wcs.org">http://wcs.org</a>	HCV1.2 HCV1.3 HCV2
14	The Five-S Framework System	Developed by The Nature Conservancy for planning and target setting, based around five elements: systems, stresses, sources, conservation strategies and measures of success.	Anon (2000); <i>The Five-S Framework for Site Conservation</i> , [2 volumes], The Nature Conservancy, Washington DC <a href="http://nature.org">http://nature.org</a>	HCV1.2 HCV1.3 HCV1.4 HCV2 HCV3
15	Functional landscapes concept	Methodology that complements that 5-S framework (see above) by providing a guide for the scale of intervention at any particular location	Karen Poiani and Brian Richter (no date); <i>Functional landscapes and the conservation of biodiversity</i> , TNC <a href="http://nature.org">http://nature.org</a>	HCV1.2 HCV1.3 HCV1.4 HCV2 HCV3
16	Rapid Ecological Assessment	Methodology for rapid assessment of biodiversity at ecoregion level.	Gina Sedaghatkish (1999); <i>Rapid Ecological Assessment Sourcebook</i> TNC; Roger Sayre et al (2000); <i>Nature in Focus: Rapid ecological assessment</i> , TNC and Island Press. Jeff Parrish: <a href="mailto:jparrish@tnc.org">jparrish@tnc.org</a> <a href="http://nature.org">http://nature.org</a>	HCV1.2 HCV1.3 HCV1.4
17	Population viability analysis	Methodology for assessing the viability of populations of species within protected area systems and elsewhere.	Morris, William et al (1999); <i>A Practical Handbook for Population Viability Analysis</i> , TNC <a href="http://nature.org">http://nature.org</a>	HCV1.2 HCV1.3 HCV2
18	The Bio-Rap Assessment method	Methodology developed for the World Bank.	Nix, H A et al (2000); <i>The BioRap Toolbox: A National study of biodiversity assessment and planning for Papua New Guinea</i> , Report to the World Bank	HCV1.2 HCV1.3 HCV1.4

N°	Toolkit	Description	Source and Contact	HCV
19	Forest quality assessment	Landscape-level assessment of forest quality based around indicators divided into three sets of criteria: authenticity, environmental benefits and social and economic benefits. Can be either expert-driven or participatory and can be either a status or trends report	<i>Manual on Forest Quality Assessment</i> , WWF and IUCN, forthcoming Contact: Nigel Dudley: <a href="mailto:equilibrium@compuserve.com">equilibrium@compuserve.com</a>	HCV1.2 HCV1.3 HCV1.4 HCV2 HCV4 HCV5 HCV6
20	The Landscape Approach	An assessment and negotiation approach based around a 7 stage process: target setting, stakeholder analysis, identification of landscape(s), assessment of performance and potential of landscape, reconciliation of different needs, implementation and M&E	Stewart Maginnis, William Jackson and Nigel Dudley [editors] (forthcoming): <i>Guidelines for the Development of a Landscape Approach to Forest Conservation</i> , IUCN and WWF, Gland <a href="mailto:equilibrium@compuserve.com">equilibrium@compuserve.com</a>	HCV1.2 HCV1.3 HCV1.4 HCV2 HCV3 HCV5 HCV6
21	Representing ecological communities in ecoregion conservation plans	Guidelines developed by The Nature Conservancy Applied widely in the USA	Mark Anderson et al (1999); <i>Guidelines for Representing Ecological Communities in Ecoregion Conservation Plans</i> , TNC <a href="http://nature.org">http://nature.org</a>	HCV3
22	Rapid Rural Appraisal	Well-tested system for working with rural communities to obtain a relatively rapid overview of their needs, desires and priorities	Messerschmidt, Donald A (1995); <i>Rapid Appraisal for Community Forestry</i> , IIED, London <a href="http://www.iied.org">http://www.iied.org</a>	HCV5 HCV6
23	Participatory Forest Assessment	Detailed book with many case studies outlining methods and experience relating to working with local communities in assessment of their forest resources	Carter, Jane (1996); <i>Current Approaches to Participatory Forest Resource Assessment</i> , Overseas Development Institute, London; <a href="http://www.odi.org.uk">http://www.odi.org.uk</a>  Davis Case, D'Arcy (1990); <i>The Community's Toolbox</i> , FAO, Rome. <a href="http://www.fao.org">http://www.fao.org</a>	HCV5 HCV6
24	Resource assessment of non-wood forest products	Methods and principles for assessing non-wood products in forests	Jennifer Wong, Kirsti Thornber and Nell Baker (2001); <i>Resource assessment of non-wood forest products: experience and biometric principles</i> , FAO, Rome. <a href="http://www.odi.org.uk">http://www.odi.org.uk</a>	HCV5
25	Integration of nutritional concerns into forest management	Guidelines for working with local communities to identify their major nutritional needs and to plan how these can be incorporated as much as possible within forestry projects	Ogden, Cynthia L (1991); <i>Guidelines for Integrating Nutrition Concerns into Forestry Projects</i> , Community Forestry Field Manual FAO, Rome. <a href="http://www.odi.org.uk">http://www.odi.org.uk</a>	HCV5