

Common Guidance for the **MANAGEMENT & MONITORING** of  
**HIGH CONSERVATION VALUES**



A good practice guide for the adaptive  
management of HCVs



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## Background to this document

In 2013, the High Conservation Value (HCV) Resource Network published a practical user manual for general interpretation and identification of HCVs, known as the **Common Guidance for HCV Identification**. That document was prompted by the updated HCV definitions (FSC 2012a.) and the increasing uptake of the HCV approach in various certification contexts (e.g. forestry, palm oil, soy). Following on from the 2013 publication, the HCV Resource Network has now compiled this updated guidance on management and monitoring of HCVs, to be used as a companion to the identification guidance.

### Purpose of this document

This document provides general guidance for the management and monitoring of HCVs. It builds on earlier guidance documents produced by Proforest (2008 a and b), a working paper by Timothy Synnott (2012), and on consultation with HCV experts and interested stakeholders.

The various examples in the document are meant to provide illustrations of different management and monitoring strategies and prescriptions used by production companies in the field. However, the effectiveness of those prescriptions and strategies is not evaluated or verified by the HCV Resource Network, nor does the HCV Resource Network endorse those companies whose examples are used in this document. The text provides general guidance applicable at the global level. Managers are encouraged to seek sector-specific and certification scheme-specific guidance when available. Management contexts are unique and often require that responses be adapted on a case-by-case basis.

### Intended users of this document

The primary audiences for this document are resource managers and HCV assessors. Conformity Assessment Bodies (certification bodies) and auditors could also find the guidance useful. However, this document is not intended to be directly audited against (such as a standard would be), but rather it is a guidance document, which provides good practice recommendations.

The HCV Resource Network encourages the use of this document and would welcome feedback about its practical application, to inform future versions. Please send comments or queries to [info@hcvnetwork.org](mailto:info@hcvnetwork.org)



Formed in 2006, The HCV Resource Network is a charter-based organisation composed of a network of members, including representatives from producer companies, NGOs, research organisations, auditors and other practitioners, who share a mission to conserve outstanding and/or critical environmental and social values, as part of responsible natural resource management. The HCV Resource Network is governed by a Management Committee composed of environmental and social NGOs, private sector representatives, and multilateral organisations. For more information visit [www.hcvnetwork.org](http://www.hcvnetwork.org)

This document is organised into four main parts:

- **Part 1:** Introduction and overview of HCV management and monitoring.
- **Part 2:** HCV management: elements of a management plan and setting up a management system.
- **Part 3:** HCV monitoring: is management effective?
- **Part 4:** Adaptive management for HCVs: using the results of monitoring to improve management.

# Acronyms and Abbreviations



ALS	Assessor Licensing Scheme (of the HCV Resource Network)
a.s.l	Above sea level
FPIC	Free, prior and informed consent
FSC	Forest Stewardship Council
GIS	Geographic Information System
HCV	High Conservation Value
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
MoU	Memorandum of Understanding
MU	Management unit
NTFP	Non-timber forest product
P&C	Principles and criteria (e.g., of the FSC)
PA	Protected area
RSPO	Roundtable on Sustainable Palm Oil
RTE	Rare, threatened or endangered (referring to species or ecosystems)
SLIMF	Small or low-intensity managed forest
SOP	Standard operating procedure
TNC	The Nature Conservancy
WCS	Wildlife Conservation Society
WHO	World Health Organization
WWF	Worldwide Fund for Nature (World Wildlife Fund)
ZSL	Zoological Society of London



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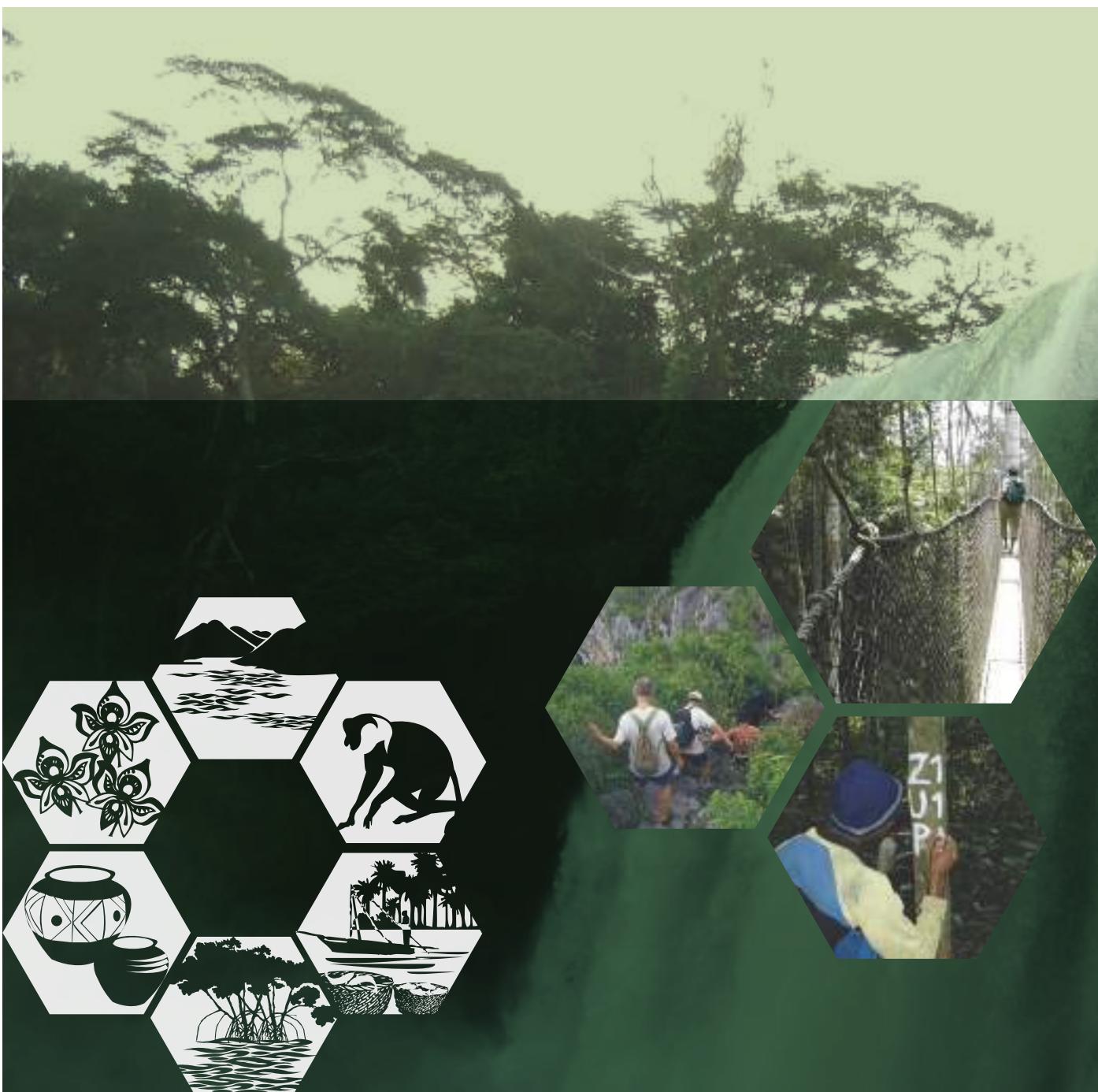
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# Introduction

Part 1 provides an overview of the High Conservation Value (HCV) approach which aims to maintain and/or enhance six defined values and the steps in the HCV process including identification, management and monitoring. **Since the Forest Stewardship Council (FSC) first developed the HCV approach in the late 1990s, it has been used to identify and manage outstanding and/or critical environmental and social values in production landscapes.** HCV is now widely used in certification standards (forestry, agriculture and some aquatic systems) and more generally in production and sourcing policies and conservation planning. In recent years, members of the HCV Resource Network, HCV practitioners, and other interested parties have expressed growing concern that the HCV approach has not been applied consistently across different natural resource sectors or geographies.

Given that the global HCV definitions have been recently amended as part of the revision of the FSC Principles and Criteria (P&C) v. 5.0 in 2012, and that the HCV approach is being adopted by ever more and diverse initiatives, now is an important time to take stock of current guidance and provide an update. This document does not intend to completely replace existing guidance documents, but it provides guidance on the updated HCV definitions. Practitioners should also seek guidance specific to the sector and/or certification scheme in which they are operating (see Annex 1).

## 1.1 The High Conservation Value approach

An HCV is a biological, ecological, social or cultural value of outstanding significance or critical importance. The six categories of HCVs<sup>1</sup> are :

### The Six High Conservation Values

#### HCV 2 Landscape-level ecosystems and mosaics, and IFL

Large landscape-level ecosystems, ecosystem mosaics and Intact Forest Landscapes that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.

#### HCV 1 Species diversity

Concentrations of biological diversity including endemic species, and rare, threatened or endangered species (RTE), that are significant at global, regional or national levels.

#### HCV 6 Cultural values

Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.



#### HCV 3 Ecosystems and habitats

Rare, threatened, or endangered ecosystems (RTE), habitats or refugia.

#### HCV 4 Ecosystem services

Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.

#### HCV 5 Community needs

Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or indigenous peoples.

<sup>1</sup> FSC P&C v 5.0 2012.

Application of the above HCV definitions in practice, requires a certain set of interpretations and underlying assumptions that we refer to as the HCV approach. Most notably, this includes:

- Use of the precautionary approach
- Understanding of wider landscape context
- Understanding of how to interpret “significant” and “critical” when identifying HCVs

The HCV approach has been applied principally to land-based production practices such as forestry and agriculture. These sectors are the primary focus of this document, but the basic guidance is applicable to other sectors (e.g. aquaculture). HCV is usually applied in management units (MUs) that have previously been identified as suitable for production activities. However, we acknowledge that development frequently takes place without the benefit of a comprehensive land use plan and in these cases application of the HCV approach is certainly positive, but it must be accompanied by other safeguards such as respect for legality and tenure rights. The HCV process is not a substitute for more comprehensive land use and landscape planning and we recommend that it be applied alongside, and ideally after, a wider planning exercise has taken place.

Good management practices should be the norm across any MU, especially within a certification scheme. Throughout this document, both production activities and management activities are used to indicate the day-to-day operations of the management Organisation<sup>2</sup> (e.g. as relates to agriculture or forestry). **For HCVs, good management practices require additional safeguards or protective measures to ensure their long-term maintenance, particularly if there is a risk of disturbance from activities in logging concessions, agricultural plantations, or other production sites.** This involves concerted efforts to identify HCVs, through good quality assessments, and to maintain and/or enhance HCVs through greater attention to designing and implementing appropriate management activities, and through monitoring those measures for their effectiveness.



<sup>2</sup> This document will use the term Organisation, to mean the person or entity (family, community, cooperative, government, corporation, concession holder, etc.) who is responsible for the management and monitoring of HCVs.

**Box 1: What does it mean to maintain and enhance HCVs?**

**The overall aim of HCV management is to maintain and, where possible enhance significant and critical environmental and social values as part of responsible management.** In this case “maintain” is always a minimum requirement, while “enhance” is often an optional extra.

To maintain an HCV, the HCV must be conserved over time. This can be through various conservation measures such as strict protection and mitigating threats. **The main idea is that the quality of the HCV (what makes a value significant or critical) does not degrade or reduce over time.** The word “enhance” indicates that the Organisation is expected to take measures to improve the quality of existing HCVs. There may be exceptions to the optional nature of enhancing HCVs, for example, in Scandinavian forestry, where forest fires are part of the natural disturbance dynamics of boreal forests and a substantial number of plant and animal species are dependent on burnt wood. Many of those species are currently endangered, because the forest fires are efficiently extinguished. Thus, HCVs can be enhanced by prescribed burning of sites nearby or inside HCV areas. Such burnings are required both in the Finnish and Swedish FSC standards.

**An Organisation is also expected to restore HCVs and other values that have been impaired by negative impacts caused by the Organisation.** However, the Organisation is not necessarily obliged to restore HCVs that were affected by factors beyond its control, for example by natural disasters; impacts on aquatic systems due to hydrological changes outside the MU; by climate change; by previous organisations; or by the legally authorized activities of third parties (such as public infrastructure, mining, hunting, or settlement). The Organisation is also not obliged to restore HCVs that may have existed at some time in the historic past.



## 1.2 Steps in the HCV process

The HCV process should involve the assessment of HCVs, the development and implementation of management strategies and prescriptions for their maintenance and/or enhancement and finally, monitoring and adaptive management, where needed, sufficient to ensure the long term conservation of the HCVs.

During the HCV process, the Organisation will have the ultimate responsibility to identify and ensure adaptive management of HCVs in their MUs. However, the task for HCV identification may be shared or led by third party HCV assessors, contracted by the Organisation. This may depend on requirements of different certification schemes and the availability of capable HCV assessors within the Organisation. **Where the Organisation lacks in-house expertise on assessment and management planning, outside expertise should be sought.**

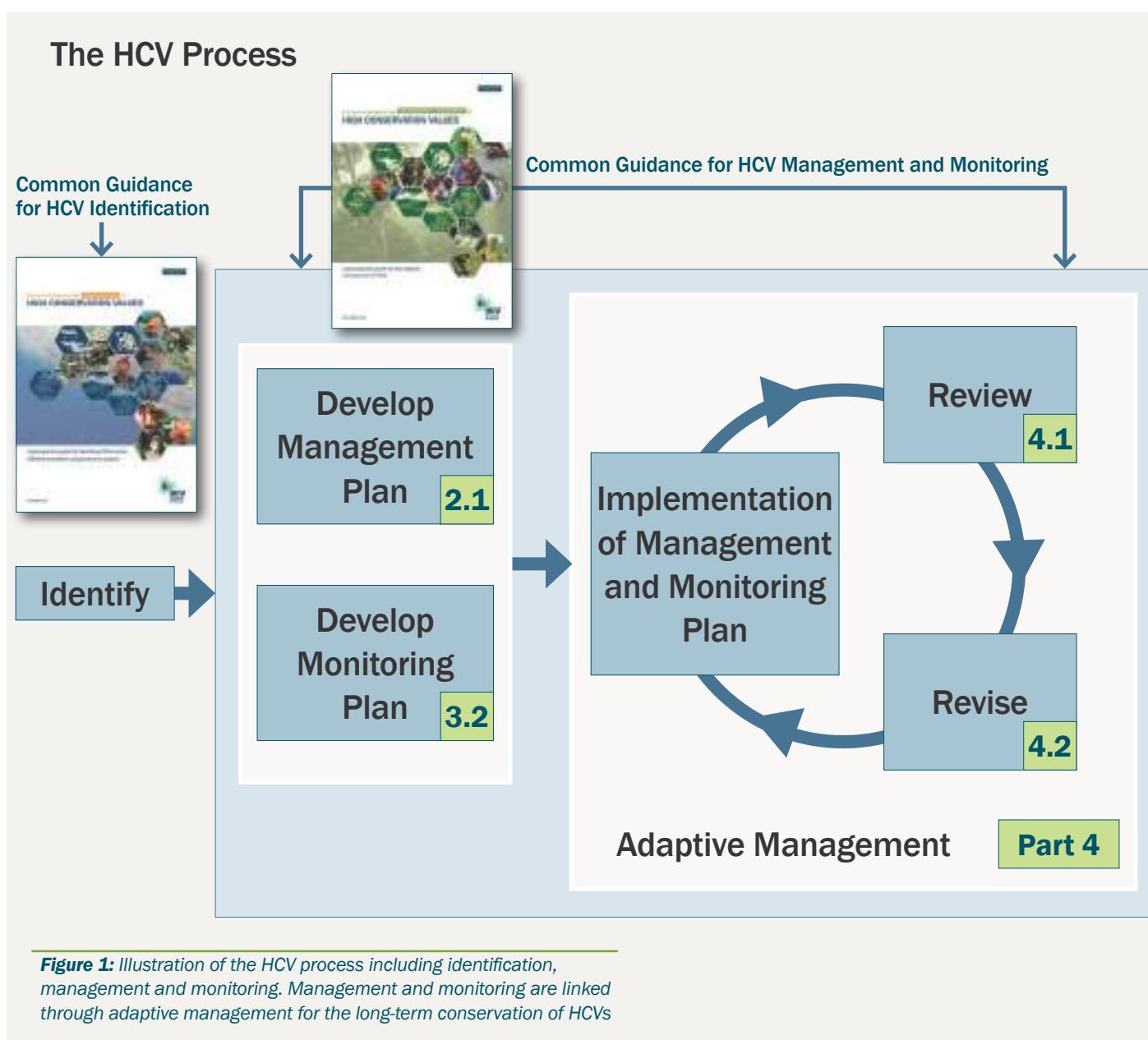
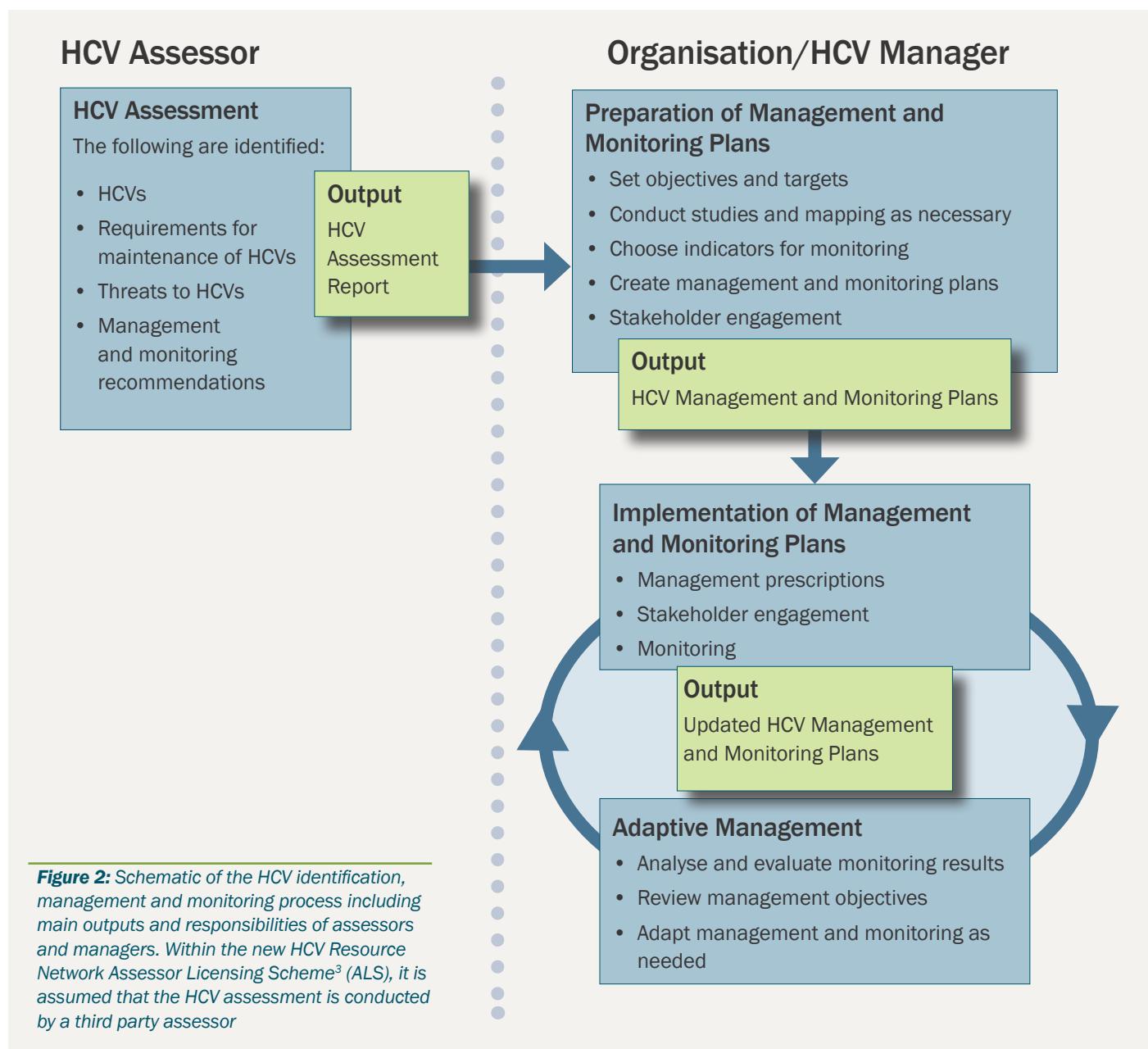


Figure 2 illustrates the different steps of the HCV process from the assessment (identification) to management and monitoring (for adaptive management), along with the outputs of various stages such as the assessment report and management plan. The figure also distinguishes between the role of the HCV assessor and the HCV manager (or the Organisation), however depending on the context, the HCV assessor may be someone from within the Organisation or a third party consultant.



<sup>3</sup> In 2014 the HCV Resource Network will launch a licensing scheme aimed at third party HCV assessors, known as the HCV Resource Network Assessor Licensing Scheme (ALS). As part of the ALS, the HCV Resource Network seeks to provide more guidance on the required content of the HCV assessment report. See <http://www.hcvnetwork.org/als> for more details.

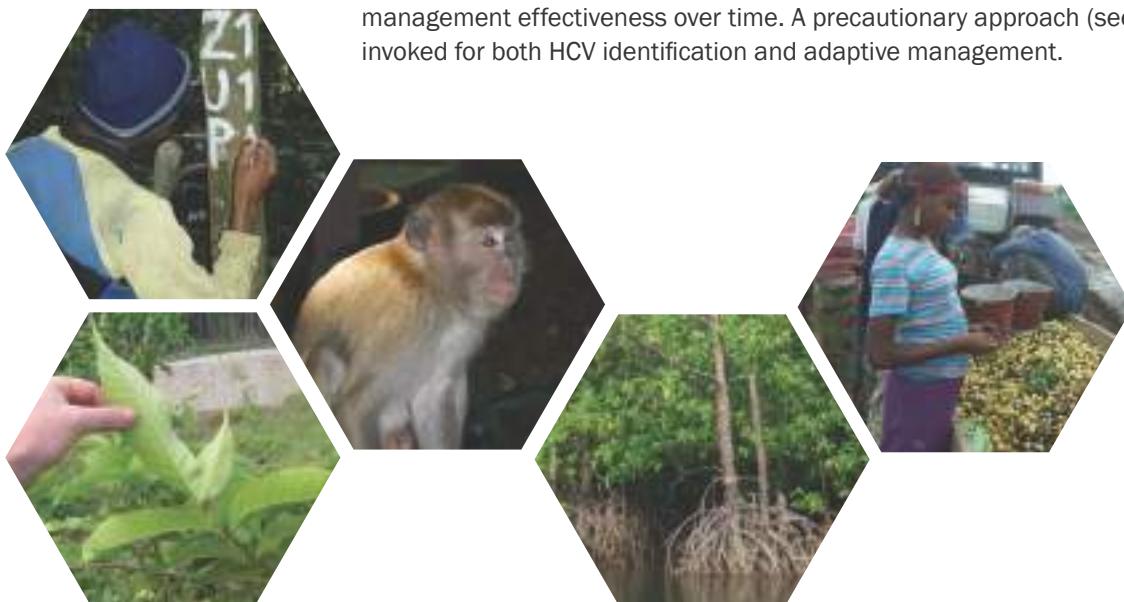
### 1.2.1 | Identification: The HCV assessment

The overall objective of the HCV assessment process is to evaluate the social and environmental characteristics of a site and its wider landscape, in order to identify any HCVs that may be present. HCV assessments should be conducted by experts with relevant skills and training and a good understanding of the HCV approach.

Once HCVs have been identified as present or potentially present, the assessor<sup>4</sup> should provide an explanation of the kinds of requirements necessary to maintain the HCVs, identify threats to their persistence, and provide management and monitoring recommendations. HCV assessments should result in clear conclusions on the presence or absence of values, their location, status, and condition, and should provide information on areas of habitat, key resources, and critical areas that support the values. This will most likely be in the form of a report, but for smaller, first party assessments; outcomes of HCV assessments may be incorporated directly into a management plan. In the case of third party assessments, the report is to be shared in its entirety with the Organisation. Then depending on the certification scheme or whether or not the assessment is conducted as part of the HCV Resource Network ALS there may be different requirements for public summaries and transparency. Whenever sharing the results of HCV assessments with a wider group, it is important to respect confidentiality and any sensitive information that could put HCVs at risk (e.g. location of rare species, location of local people's sacred sites, etc). The Organisation will use the HCV assessment report as a starting point for developing its management and monitoring plans. For more information on HCV identification, refer to Common Guidance for HCV Identification, (<http://www.hcvnetwork.org/resources/cg-identification-sep-2014-english>) which is available in several languages.

### 1.2.2 | Management and monitoring

The overall objective of HCV management is to maintain and/or enhance (see Box 1) HCVs over time. Together, management and monitoring are part of the adaptive management cycle (see Figure 1). Part 2 of this document will address HCV management in terms of management plan components and management strategies and prescriptions. Part 3 addresses monitoring including considerations for the monitoring plan and a selection of monitoring methods. Finally, Part 4 discusses how to use monitoring results to improve management effectiveness over time. A precautionary approach (see Box 3) should be invoked for both HCV identification and adaptive management.



<sup>4</sup> This stage is dependent on having good assessors, who are up to date with policy thinking and research into biodiversity, conservation management and relevant social sciences and human rights issues. In the HCV Resource Network ALS, the HCV assessor is expected to provide management and monitoring recommendations, even if general. However, it is also possible that recommendations come from within the Organisation or from other qualified third party experts.

### Box 2: Responsibility for HCV management in the wider landscape

The Organisation is primarily responsible for HCV management within its MU. However, some HCV management areas are designed to maintain an HCV both inside the MU and in the MU's area of influence in the wider landscape (e.g. HCV 4 water quality downstream of the MU). At the same time, maintaining HCVs in the MU can be dependent on management areas and prescriptions outside the MU (e.g. maintaining populations of wide-ranging HCV 1 species). HCV management areas may be much larger than the precise location of the HCV.

For these reasons, Organisations are responsible for engaging with neighbouring land managers and affected stakeholders to coordinate management plans and initiatives across the wider landscape. **Organisations are responsible for avoiding damage to HCVs in their MUs and for taking into account what is happening outside the MU, and engaging with neighbours to solve problems whenever possible. This can increase the likelihood of maintaining HCVs in the wider landscape.** In cases where engagement with neighbouring stakeholders does not stop damage to an HCV outside the MU, the Organisation would need to consider the feasibility of increasing the resources devoted to HCV maintenance inside the MU to counteract this.

### Box 3: Precautionary management

During the HCV assessment, when there are credible and reasonable indications that an HCV is present, the Organisation should assume that it is present and should take the appropriate decisions for management and monitoring.

The HCV Resource Network follows the FSC approach, as follows: “The precautionary approach requires that when the available information indicates that management activities pose a threat of severe or irreversible damage to the environment or a threat to human welfare, the Organisation will take explicit and effective measures to prevent the damage and avoid the risks to welfare, even when the scientific information is incomplete or inconclusive, and when the vulnerability and sensitivity of environmental values are uncertain” (FSC 2012b<sup>5</sup>).



<sup>5</sup> Based on Principle 15 of Rio Declaration on Environment and Development, 1992, and Wingspread Statement on the Precautionary Principle of the Wingspread Conference, 23-25 January 1998.



# HCV management



**The overall aim of HCV management is to maintain and, where possible, enhance significant and critical environmental and social values as part of responsible management.** This requires sufficient understanding of the HCVs present and then the formulation and implementation of a sound HCV management plan. HCV assessments provide management recommendations that are often quite general, such as maintain population of species X, or ensure continued availability of non-timber forest product (NTFP) Y for a local community. In other cases recommendations might be more specific in terms of proposing concrete management prescriptions. **Recommendations from HCV assessments need to be transformed into specific management objectives and targets in the Organisation's management plan.**

## 2.1 Developing an HCV management plan

**The package of management planning documents must be sufficiently comprehensive and detailed to ensure it can be effectively communicated and implemented, whilst being no more detailed than is necessary** (FSC P&C 2012). The level of detail required will depend on the scale, intensity and risk (see Box 4) of the production activities. Different certification schemes may also require different levels of detail in management plans.

### Box 4: Defining scale, intensity and risk

**Scale:** A measure of the extent to which a production activity or event affects an environmental or social value or a MU, in time or space. An activity with a small spatial scale occurs over a small area, and an activity that occurs infrequently (i.e. at long intervals) has a ‘small temporal scale’.

**Intensity:** A measure of the force, severity or strength of a production activity or other occurrence affecting the nature of the activity’s impacts.

**Risk:** The probability of an unacceptable negative impact arising from an activity in the MU combined with its seriousness in terms of consequences.

Definitions adapted from FSC P&C V 5.0 (2012) glossary

**It is the responsibility of the Organisation to take the findings and recommendations from the HCV assessment and incorporate these into a management plan aimed at maintaining and/or enhancing the HCVs.** This includes allocation of sufficient resources to implement, monitor and, where necessary, adapt the plan during operations.

### Box 5: Important elements of an HCV management plan

- A** Description and location of each HCV present
- B** Establishment of baseline data
- C** HCV management objectives and targets
- D** Assessment of threats to HCVs
- E** Consultation with stakeholders and experts
- F** Development and implementation of effective management strategies
- G** Development and implementation of a monitoring plan
- H** Adaptive management strategies, based on monitoring results

A good management plan should include the following<sup>6</sup>:

- A Description and location of each HCV present:** This includes consideration of the wider importance of the HCV, and the significant or critical nature of the HCV at the appropriate scale. Maps are needed showing the location of HCVs and HCV management areas (see 2.2.1). The Organisation needs to delineate HCV management areas sufficient for the maintenance of each HCV and secure these prior to any production activities.
  - B Establishment of baseline data:** Baseline data is needed before management starts – this will feed into the monitoring process. **Without baseline information, it is impossible to know if management activities are effective.** “Baseline” here usually refers to the situation at hand when an entity makes the assessment (i.e. the condition of the site before production activities start, in the case of new projects). Although in cases where restoration is a management aim, the baseline may refer to the condition of the site before degradation (e.g., if an area has been deforested and the management plan identifies the need to restore native forest, the baseline may be drawn from nearby higher quality forests).
  - C HCV management objectives and targets:** General objectives for maintaining the six HCV categories, can be derived from the HCV definitions. For example, the overall management objective for HCV 1 is to maintain significant concentrations of endemic and RTE species<sup>7</sup>. However, for each HCV identified during the assessment, the Organisation needs to set more specific management objectives to maintain the value. Targets are usually shorter term and should be expressed quantitatively if possible, to understand rates of change from baseline conditions (FSC P&C 2012b). The Organisation must transform management objectives (e.g., preserve rare wetland habitat), into specific and measurable management targets (e.g., maintain X hectares of wetland in a healthy state within the MU and ensure that water quality and biodiversity do not decline there as a result of production activities). Where good baseline data are available, targets may be more specific. However, where less baseline information is available, managers should take a precautionary approach (see Box 3) and focus on broader targets such as habitat conservation.
  - D Assessment of threats to HCVs**
- Understanding threats to HCVs is a critical step in making management recommendations to maintain and/or enhance the values. The Organisation must conduct a threat assessment for the HCVs identified<sup>8</sup>. There are several methods available for threat assessment, and a sample is provided in Table 1<sup>9</sup>. Though these threat assessment approaches come mainly from a biodiversity conservation context, they are still useful and can be adapted for use with HCVs in production landscapes. The threat assessment approaches in Table 1 typically group threats according to the following categories:
- Indirect vs. direct threats:** The IUCN Classification Scheme lists all direct threats that are likely to be encountered, but indirect threats can be more complicated. For example, bushmeat hunting by local villagers may be a direct threat to an HCV 1 species, but indirect causes of this may include no available, affordable, or palatable alternative protein sources.
- Internal vs. external threats:** Threats to HCVs can have internal sources, from the Organisation’s own operations (e.g. road building, habitat fragmentation, pollution, conversion), or external sources (e.g. encroachment, illegal logging and hunting, armed conflict, poor governance).

<sup>6</sup> This does not intend to provide a strict template for a management plan, but rather to remind the Organisation of the kinds of issues to consider.

<sup>7</sup> Synnott *et al.* 2012.

<sup>8</sup> Threat assessment may be done by a third party HCV assessor as well.

<sup>9</sup> The HCV Resource Network does not endorse a certain approach over others.

The Organisation and the HCV assessor (if using a third party assessor) should gather different perspectives and recommendations on threats and management options during stakeholder consultations. The Organisation should use the threat assessment, as outlined in the HCV assessment report, as a starting point. **It is the responsibility of the Organisation to ensure that the threat assessment is complete and especially that all internal threats have been adequately identified.**

THREAT ASSESSMENT METHOD OR APPROACH	SCOPE AND CONTEXT
<b>IUCN Threats Classification Scheme</b> A comprehensive and widely used approach for classifying the type of direct threats to species. It was jointly developed by the IUCN, WWF, TNC, ZSL, WCS and Birdlife in order to have a single unified classification system and builds on many of the approaches listed below. The current version can be found here: <a href="http://www.iucnredlist.org/technical-documents/classification-schemes/threats-classification-scheme">http://www.iucnredlist.org/technical-documents/classification-schemes/threats-classification-scheme</a> (Salafsky et al. 2008).	This scheme covers only direct threats to threatened species, but is applicable to habitats and ecosystems. It does not provide guidance on how to prioritise threats. Resources discussing definitions of direct threats and stresses are referenced here.
<b>Rapid Assessment and Prioritisation of Protected Area Management</b> Broad methodology for testing the effectiveness of a protected area (PA), but includes a threat (future) and pressure (past or present threat) prioritisation scheme based on their extent, impact and permanence (Ervin 2003).	Assessment of overall PA management, including threat prioritisation.
<b>Threat Reduction Assessment</b> A broad strategy developed to assess the effectiveness of conservation and development projects. It describes ultimate (indirect) and proximate threats (direct), and it also separates threats as either internal or external to the project. (Salafsky and Margoluis 1999).	Threat assessment for combined conservation and development projects.
<b>ZSL Threat Monitoring Protocol</b> The only protocol listed here that was developed specifically for use in a production context. It is intended for use by managers that are responsible for managing and monitoring HCVs, but also provides useful advice for assessors. Threats are defined according to their state and intensity (ZSL 2013).	Monitoring threats to HCV areas in oil palm concessions.
<b>Environmental Risk Assessment</b> A simple tool to assess the environmental impacts of smaller-scale forestry operations (e.g. community forests and SLIMFs <sup>10</sup> ). This tool is designed to minimise costs for low risk situations, where there are no reasons to expect that operations cause unacceptable environmental damage. The tool is not HCV-specific, but covers aspects pertinent to HCVs, such as threatened species (Synnott and Wenban-Smith 2009).	Risk assessment for FSC-certified forests

**Table 1:** Threat assessment approaches that can be used in the context of HCV management.

<sup>10</sup> Small or low-intensity managed forests.



### E Consultation with stakeholders and experts

Development of a management plan often requires both stakeholder engagement and consultation of external specialists, especially when the scale and intensity of production activities or external threats to HCVs are high. Where HCVs 1 - 3 are present it is important to consult with those who know the area well, including e.g. academic researchers and specialists working for government departments and environmental NGOs, along with other parties generally concerned with conservation of biodiversity and environmental values. Consultation should aim to build consensus on the management strategies to be adopted, ensure management activities are in line with current scientific knowledge of HCVs and threats, and consider conflicts that may arise from the management of different HCVs (see Box 6).

#### **Box 6: Identifying conflicts between the management of different HCVs**

In principle, all HCVs have equal status, but in practice, there can be conflicts between different HCVs, a common one being that between HCV 1 and HCV 5. In this case, there may be concentrations of globally important species (e.g. IUCN red-listed species, nationally protected species) that are also hunted as an important source of protein and/or income for local people. In cases such as this, there is no easy solution. It may be illegal to hunt these protected species, but law enforcement may be absent. The long-term solution would be for local communities to have alternative sources of income/protein, but an immediate ban on hunting could have unintended, negative outcomes. This particular problem may be best addressed by combining awareness campaigns with assistance for alternative sources of income and protein, and reinforcing with hunting patrols. Resolving conflicts such as this may take time and managers will need to adapt their response on a case by case basis.

Both national and local level stakeholders may be important to consult for HCV 4. This may include experts in hydrology, flood prevention, erosion control and other environmental services. It would also include those stakeholders who are dependent on HCV 4 ecosystem services. Where HCVs 5 or 6 are present, there should always be consultation with the affected communities on the measures taken to maintain or enhance the values so that the approach is appropriate and has wide support.

The HCV management plan (or sections thereof) should be available for review by all those involved in the consultation process. For larger or higher impact operations, it is normally necessary to consult during the formulation of the draft management plan and then again to allow inputs to the plan before it is finalised. The Organisation should keep a record of consultations and their outcomes. This will be useful for the long-term management of HCVs and may also provide supporting evidence during audits.



**See Part 2.2**

**F Development and implementation of effective management strategies** that maintain and/or enhance the HCVs identified. Strategies chosen should be based on the results of stakeholder and expert consultation and the threat assessment process.

**See Part Three**

**G Development and implementation of a monitoring plan**

Monitoring is needed to evaluate the effectiveness of management strategies and prescriptions, and must be tied directly to management objectives. Ideally monitoring will commence before management activities are implemented, to establish baseline conditions and should include engagement with experts and affected and interested stakeholders.

**See Part Four**

**H Adaptive management strategies, based on monitoring results**, to ensure effective HCV conservation. The management plan needs to clearly lay out a process for using the results of monitoring to change management as needed.

## 2.2 Management strategies

In order to meet management objectives and targets, and maintain HCVs over time, specific management strategies need to be implemented. These are best separated into the following two categories:

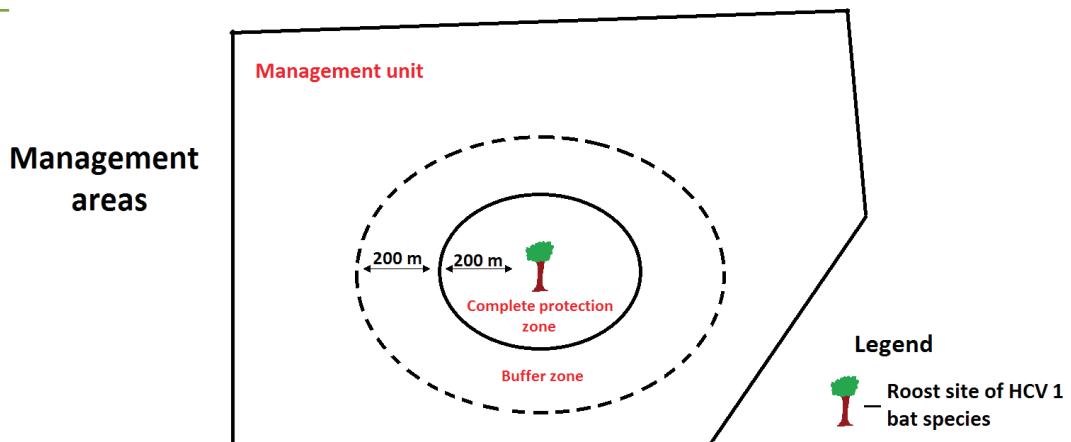
- 1. Spatial planning for management: An HCV management area is the defined area at a site or landscape scale for which appropriate management prescriptions must be implemented in order to maintain or enhance an HCV.** They can include areas typically called set-asides, conservation areas, core areas, nature reserves etc. where the objectives and planning decisions are explicitly aimed at HCVs, rather than (or in addition to) other values. Planning for HCV management can be usefully informed by elements of landscape ecology. Notably, the idea of a landscape mosaic consisting of patches (of e.g. habitat) arranged in a matrix (the predominant habitat or landcover), with elements that can be described as corridors, barriers, and edges<sup>11</sup>. Management areas include the specific sites containing HCVs as well as any sites, resources, habitats, refuges, or buffer zones, where specific management decisions or practices are essential for the long term conservation of HCVs. Management areas require specification on the management prescriptions (e.g. no hunting or logging, certain changes to silvicultural systems, nest boxes, restricted access etc.,) and boundaries of the areas over which the prescriptions are to be applied.
- 2. Management prescriptions: Management prescriptions are the specific management activities or practices required in each management area to ensure the maintenance of HCVs.** These typically include the prohibition of production activities, modification of production activities (e.g. reduced-impact logging) and threat control strategies (e.g. chemical and waste management practices). Some management prescriptions may need to be implemented across multiple management areas, such as hunting bans for HCV 1 species, whilst others may be limited to a single management area. In some cases, standard practices and policies (e.g. environmental and social good practice covered by standards such as the FSC or RSPO<sup>12</sup>) or national laws may provide enough protection for HCVs. In other cases, it will be necessary to identify additional prescriptions (safeguards) needed to maintain HCVs.

<sup>11</sup> <http://www.forestry.gov.uk/fr/INFD-6LEFPT>

<sup>12</sup> Roundtable on Sustainable Palm Oil.

The size and shape of the management area and the type of prescription will depend on the HCV concerned, the threats to the value and the ability of the Organisation to manage and mitigate these threats. As a general rule, more intensive production activities (e.g. in conversion contexts) will require larger management areas, and management prescriptions will tend to be more restrictive of production activities as proximity to HCVs increases (see Figure 3 for an example).

**Figure 3:** Examples of management areas and prescriptions for the maintenance of an HCV 1 bat species in a natural (non-plantation) forest concession



### Management areas

### Management prescriptions

#### Complete protection zone:

- No entry except for monitoring/patrol purposes
- No production activities

#### Buffer zone:

- Reduced-impact logging only outside bat breeding season
- No road construction
- No use of chemicals

#### Entire management unit:

- No collection/hunting of HCV 1 bat species
- No felling/removal of fruit trees (i.e. food sources for bat species)

Some HCVs are tied explicitly to a particular site (such as a burial ground, a source of drinking water, or a rare and localised habitat); some may be more loosely tied to a specific site (such as a breeding colony of endangered birds associated with a specific habitat, where both the colony and the preferred habitat may change with time); and some are widely and variably dispersed through the MU (such as ecosystem services, wide-ranging animals, and some NTFPs). **Understanding the scale over which HCVs occur is critical to developing effective management areas and prescriptions for maintaining them.**

**To ensure that HCV management areas and prescriptions are effectively implemented, it is vital that HCV management and monitoring is fully integrated in the overall management system, and that HCV teams coordinate and communicate fully with operations teams.**

## 2.2.1 | Management areas and prescriptions

**Below are the main types of management areas used in HCV management, and the typical management prescriptions associated with them.**

### Conservation areas: high level of protection

Protection of HCV 1 species concentrations and HCV 2 and 3 ecosystems may require some areas to be completely set-aside as conservation areas, with the management prescription to exclude all production activities. These are especially important in conversion contexts as most HCV 1 species would not persist in monoculture agricultural land or timber plantations. In conversion scenarios as fragmentation increases, values may become rarer over time; good management and monitoring is needed to better understand and prevent this phenomenon. For timber harvesting in natural forest, the need for conservation areas will depend on the intensity of timber extraction and on the HCV species present.

Conservation areas are of great importance for HCV species, habitats or ecosystems that are susceptible to disturbance (e.g. some aquatic ecosystems are particularly susceptible to siltation and pollution). In such circumstances, any extractive uses or production activities are likely to threaten the HCV and lead to its decline.

**The size, shape and location of conservation areas required will depend on the HCV, but conservation areas must be sufficiently large to remain ecologically viable and/or connect with similar areas.** It may be sufficient to set aside important sites for nesting or breeding of HCV 1 species, but if species are wide-ranging or are unable to persist in production areas then conservation areas may need to link to natural areas beyond the borders of the MU. If changes occur in the production activities, then changes may be needed in the size, shape, or location of conservation areas.

### Conservation areas: moderate level of protection

Some conservation areas (with their component ecosystem types and species assemblages) can tolerate, or may even thrive on, a moderate level of disturbance. Some ecosystems are naturally exposed to major disturbances and are reliant on them for the maintenance of characteristic species composition and vegetation structures (e.g. fire in Fynbos shrubland ecosystems). Some disturbances, natural or mimicked, are vital to many organisms; for example, most deciduous trees in non-montane boreal forests only regenerate on heavily disturbed sites. In these areas, modified or reduced-impact production activities may be used.

Reduced-impact management practices can be especially effective for management of natural and semi-natural forests<sup>13</sup> because many species are resilient to timber extraction, if the scale and intensity are moderate and the canopy cover is not significantly affected. Reduced-impact logging may be combined with conservation areas, or may in itself be sufficient to support viable populations of species. In agricultural situations, reduced impact production practices include shade-grown coffee, organic production and low intensity grazing regimes. Examples of management prescriptions in freshwater or marine situations include: seasonal fishing controls, restrictions on net size or bottom trawling, and temporary exclusion zones.

The examples listed above are not HCV-specific management prescriptions, but are designed to generally minimise adverse environmental impacts of production. Whilst these general measures may be effective for some HCVs, more targeted management prescriptions may be needed for other HCVs. For example, the retention of standing dead trees to protect woodpeckers, or live fruit trees to maintain chimpanzee populations.

<sup>13</sup> Non-plantation forestry.

In some cases, maintaining HCVs (especially HCV 1) may involve the use of nest boxes, fish ladders, salt licks, and artificial reefs. It is important that managers are aware of natural disturbance regimes and the resilience of ecosystems in their MUs when choosing management activities.

**Management prescriptions should be based on the best-available scientific knowledge of species' ecology, which can be obtained from existing literature or expert consultation. The management areas below may be managed for greater or lesser levels of protection and restrictions, depending on the context.**

### Habitat corridors

Habitat corridors are a specific type of conservation area designed to connect species' habitats both within a MU and between a MU and the wider landscape. The survival of many species will depend on the availability of suitable habitat both in the MU and in the wider landscape, especially for wide-ranging and large-bodied species. Therefore, it is vital that managers try to maximise connectivity within their MU, to allow habitat specialists that do not use or even cross production areas to move to other areas of suitable habitat. In conversion contexts, maximising connectivity will rely on habitat corridors because few forest-dependent species can persist in non-forest habitats. In such situations management prescriptions will typically include:

- Prohibition of production activities,
- Hunting bans,
- Threat control strategies, e.g. anti-hunting patrols

However, in semi-natural or natural forestry contexts it may be possible to maintain connectivity of the MU for some (disturbance-tolerant) species without prohibiting production activities, but by implementing reduced-impact production practices more widely across the MU.

**The location and size of corridors should take into account the availability and location of natural habitat outside the MU, and try to connect to key habitat areas.** Monitoring should be designed to measure the effectiveness of corridors, even if the Organisation is unable to exert direct control on how external areas are managed.

### Buffer zones

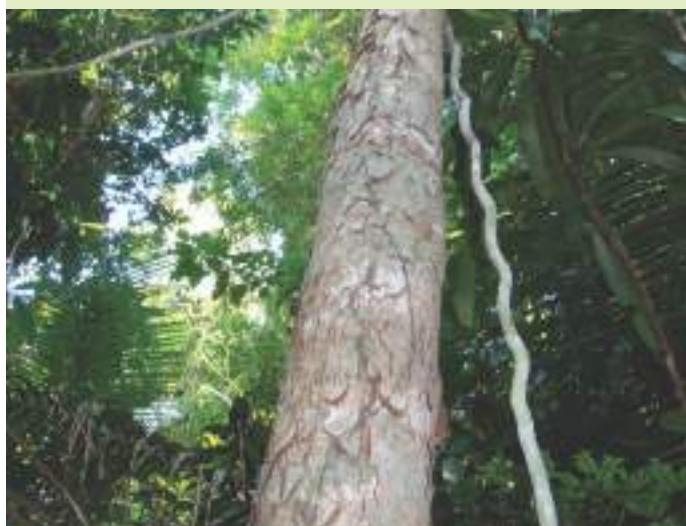
If threats from production activities can impact conservation areas then buffer zones may be required around conservation areas (HCV areas). **Buffer zones can vary greatly in scale depending on the management objective, but should be sufficient to protect against the impacts of production activities now and in the future. Buffer zones may be used outside of the MU around protected areas and conservation landscapes.** Inside of MUs, buffer zones may include zones along rivers and streams, lakes, nesting sites, rare ecosystem types, and even community use areas such as sacred sites. Freshwater habitats will frequently require a buffer zone around them to protect against disturbance and pollution. The management prescriptions required in buffer zones will vary depending on the HCV, but the level of protection is typically intermediate between those required in conservation areas and production areas.

### Example 1: Habitat corridors in eucalyptus plantations in the Mata Atlantica, Brazil

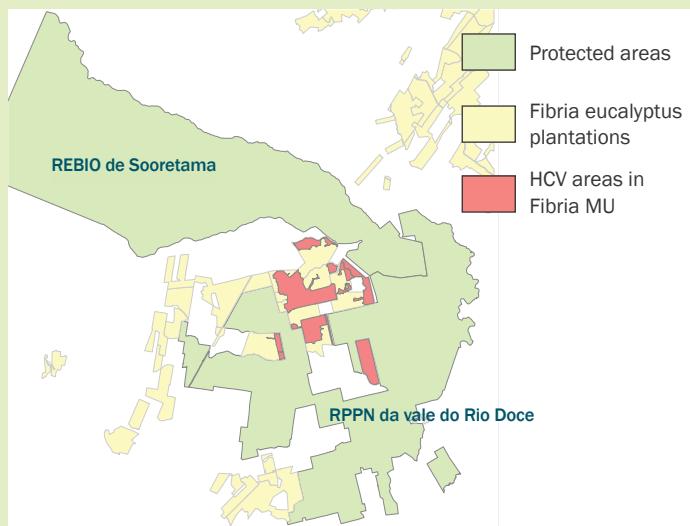
Brazilian company Fibria is a producer of eucalyptus pulp. In the states of Bahia, Espírito Santo and Minas Gerais, Fibria has 346,000 ha of FSC certified MUs that contain HCV conservation areas totalling 11,718 ha across 21 MUs (all FSC certified since 2012<sup>14</sup>). These HCV areas include those protecting threatened and endemic HCV 1 species (including endemic and IUCN red listed bird species: Red-billed curassow (EN), Hook-billed hermit (EN) and White-winged cotinga (EN), and plant species: *Caesalpinia echinata* (EN), *Couratari asterotricha* (CR) and *Eugenia arianea* (CR)) found in the highly threatened and HCV 3 Mata Atlantica (Atlantic rain forest). The HCV areas also qualify as HCV 2 by helping to maintain connectivity of the Mata Atlantica ecosystem in the wider landscape. In particular, Fibria's Mutum Preto and Recanto das Antas MUs provide important corridors between two

neighbouring protected areas. These corridors qualify as HCV 2 and are protected as legal reserves and HCV 2 areas.

The HCV conservation areas act as important corridors that enable key 'umbrella' species (those species whose protection indirectly guarantees the protection of a larger number of species, e.g. wide-ranging, disturbance-intolerant species), such as the Brazilian tapir, to persist across the wider landscape. Since 2011, Fibria staff have conducted patrols to prevent illegal hunting and logging and they started an environmental education programme for employees and local communities. Ongoing monitoring of biodiversity (vegetation, birds and mammals) and threats (e.g. damage from production activities, fire, illegal hunting and logging) will be used to inform adaptive management.



*Caesalpinia echinata*, an HCV 1 tree species



**Figure 4:** Map showing Fibria plantations and HCV areas that help to provide connectivity and corridors between neighbouring protected areas. Map courtesy of Fibria



Measuring an individual of *Aspidosperma polyneuron*, an HCV 1 tree species

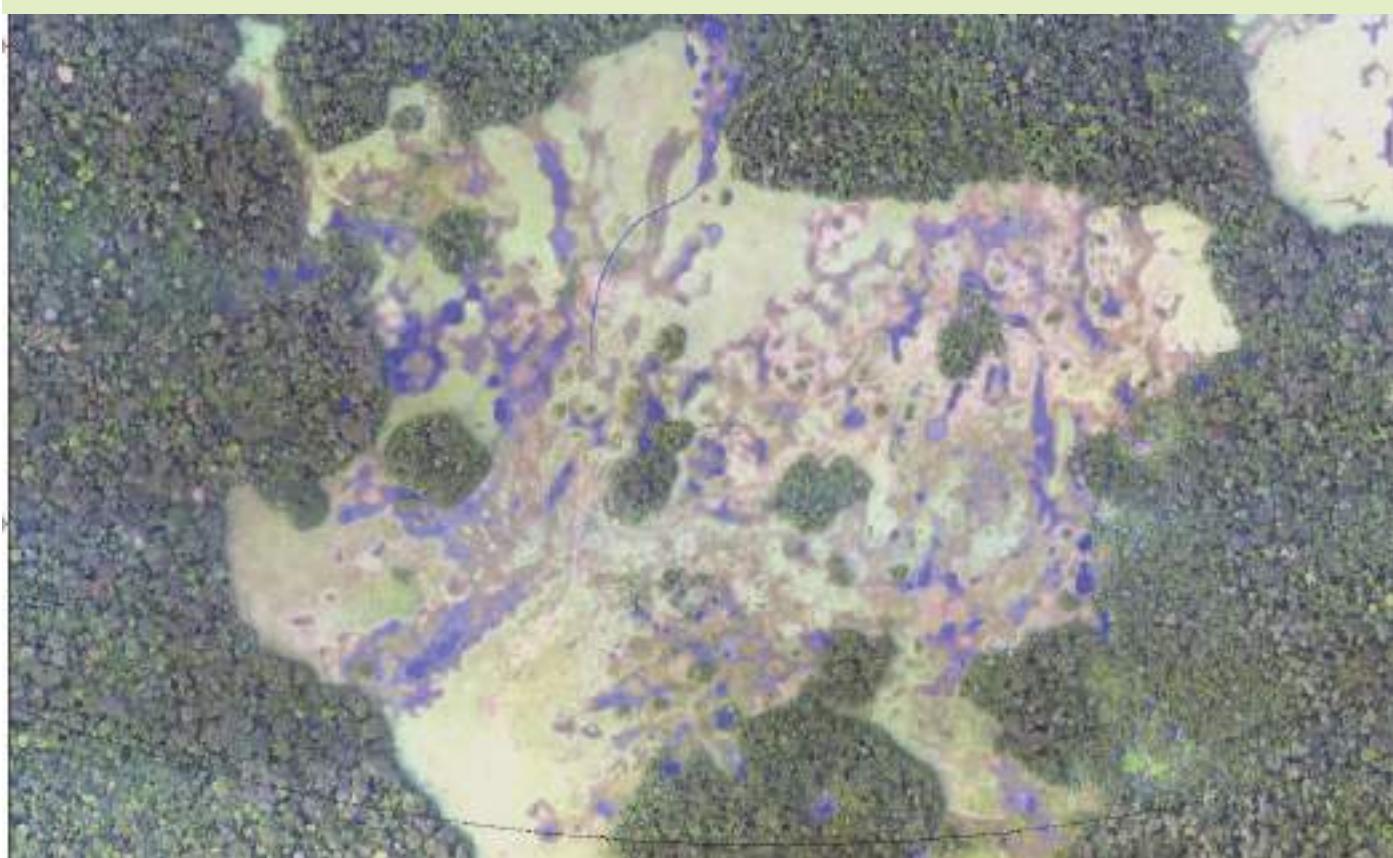


Environmental education programme for workers

**Example 2: Buffer zones around HCV 3 wetland ecosystems in an oil palm concession in Gabon**

Olam Palm Gabon's "Mouila Lot 1" concession lies at the edge of a vast forest-savannah mosaic landscape. The HCV assessment (summary available from the Olam website: <http://tinyurl.com/n3koz73>) showed that about 50% of the concession is suitable for sustainable oil palm plantations, but identified unique complexes of wetlands (lakes and ponds), rivers and seasonally flooded forests as HCV 3 ecosystems. The wetland areas were identified using LiDAR-derived Digital Elevation Model, vegetation surveys and aerial photography (see below). Olam commissioned subsequent hydrological research to support management decisions in these HCV 3 wetland areas. This research used satellite radar data to detect and classify permanent wetlands and seasonal flooding. A landscape "wetness index" was modelled using a Digital Elevation Model and daily precipitation data. Olam's team studied field conditions for more than a year to understand seasonal variations, flooding cycles and other wetland characteristics.

Using this knowledge as a guide, Olam deployed trained buffer zone teams to classify wetlands in the field, based on surface area, depth and vegetative characteristics, according to a written SOP. The buffer zone teams worked block by block in target wetland areas identified from satellite imagery, to mark out and map wetlands. Isolated larger lakes ( $> 1,000 \text{ m}^2$ ) and lake complexes (several permanent small lakes  $< 1,000 \text{ m}^3$  connected to each other or to a larger lake, via seasonal marshes) were designated as conservation areas where no production activities permitted. These are protected with a 30-50 m buffer zone depending on size. Isolated ponds  $< 1,000 \text{ m}^3$  were retained as water reservoirs to be used during production; they may be modified or deepened according to need and their banks will be re-vegetated after clearance. Shallow seasonal floods  $< 1 \text{ ha}$  unconnected to permanent lakes or rivers may be drained for planting or converted into water reservoirs as appropriate, on advice from the site Environment Manager and operations team.



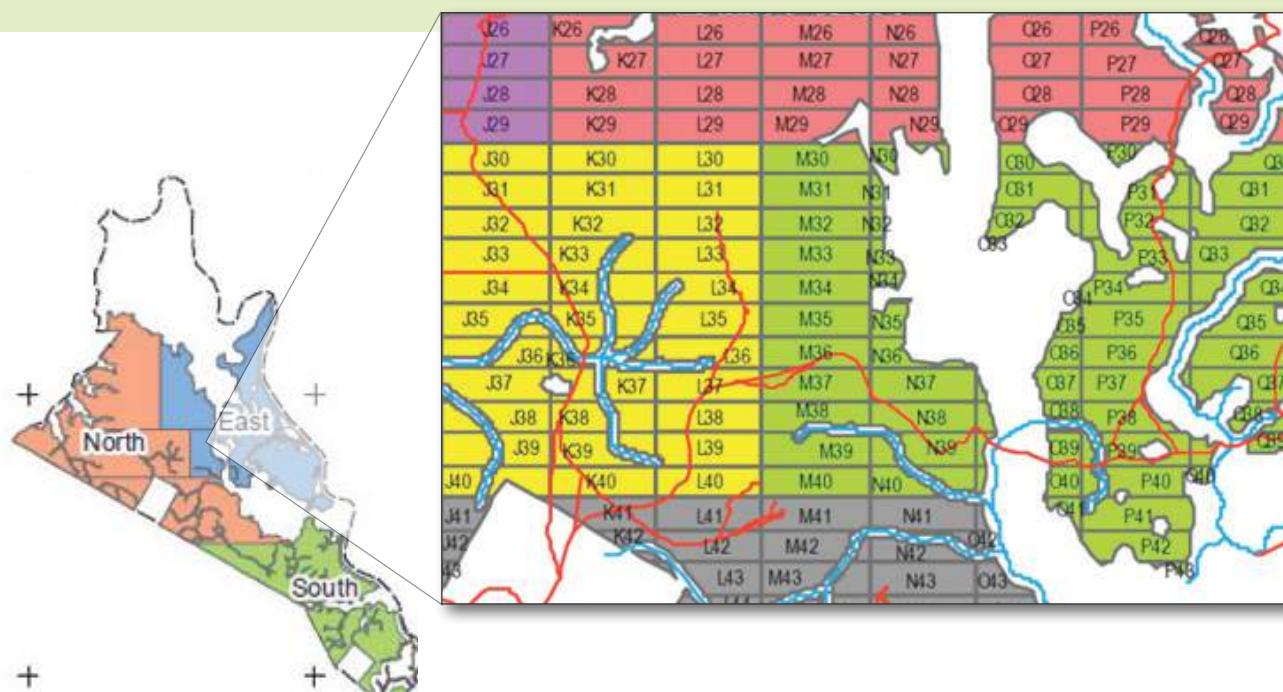
*Aerial photo of seasonally flooded savanna within the main HCV area in the Northwest of the concession, at the beginning of the wet season (Sept/Oct 2011), showing clusters of lakes, ponds and seasonal wetlands*

Coordination between the buffer zone and land clearance teams is a critical feature of the environmental management system. Training was organised and Olam encouraged regular communication between the teams, including joint teams and weekly planning meetings to ensure that buffer zone limits were understood and respected, and any errors were quickly detected and corrected.

Land preparation in these sensitive conditions requires a combination of excellent information, clear operating procedures, training, communication and teamwork. Effective cooperation preserves the integrity of the HCV 3 ecosystems, and the additional buffer zones enhance habitat connectivity for the wildlife that inhabits the core HCV areas and surrounding landscape. Through this process, the plantable surface area is reduced; however, the effort to protect natural wetlands has major economic benefits, reducing the risk of flooding in planted areas, and the need for drainage construction and maintenance. There are also less tangible ecosystem service benefits: more water is retained in the landscape, which may increase humidity, reduce fire risks and enhance yields through the dry period.



*Large permanent lake (> 2,000 m<sup>2</sup>), requiring a 50 m wide buffer*



**Figure 5:** Map showing HCV 3 set aside areas in Mouila Lot 1. White areas show HCV areas, riparian buffers and wetland areas. Blue lines are rivers. Map courtesy of Olam Palm Gabon. The wide white stripe running down the middle of the concession is the conservation corridor between the central lowland area and northern seasonally flooded area

### Community-use areas

**Maintenance of HCV 5 and 6 values requires that people have access to essential resources and that the quality of those resources does not deteriorate or degrade.**

**This usually involves zoning of community-use areas where certain harvesting and use activities are permitted.** For Organisations, the management prescriptions required are similar to those for conservation areas. For instance, streams and rivers used as fishing grounds must not be polluted by the Organisation's activities (e.g. sedimentation, road runoff, chemical contamination). If people are going to continue harvesting certain NTFPs or to hunt non-protected species, they must have continued access to these resources and there must be sufficient areas managed in such a way as to support sustainable resource use. It is important for the Organisation to collaborate with the dependent community to mitigate and manage threats to the HCVs.

For certain HCV 6 sites, such as waterfalls, caves, burial grounds, or other sacred sites and monuments, adequate protection of the site is especially important. This may be done by setting aside the site for community use, with potential buffer areas around the sites for additional protection. It is important to understand that the exact location of some areas may be secret and therefore management strategies should be sensitive to this and it may be inappropriate for non-community members to enter the site. It also may be inappropriate to erect signs and fences or to take photographs of such areas. The management details will need to be discussed with the appropriate community members or cultural experts.



### Example 3: : Community use areas in an oil palm plantation in Kalimantan, Indonesia

Wilmar International is one of the largest oil palm producers in Indonesia and Malaysia. PT Mustika Sembuluh (PT MS) is a subsidiary company of Wilmar in Central Kalimantan, Indonesia and manages a 19,449 ha oil palm plantation in East Kotawaringin District. PT MS was the first of Wilmar's subsidiaries in Kalimantan to receive RSPO certification (2010)<sup>15</sup>.

The PT MS MU contains HCV areas totalling 1,530 ha of which 149 ha are classified as HCV 5 and 6 areas, helping to meet the basic needs of, and safeguarding sites of cultural significance to, local communities. To ensure appropriate management of the HCV 5 and 6 areas, Wilmar signed a Memorandum of Understanding (MoU) with the local communities. The MoU outlines clear management prescriptions for Wilmar, such as the exclusion of plantation activities from HCV areas (this is written into SOPs) and the need to request permission from the communities to enter HCV areas for purposes other than HCV monitoring. PT MS conducts annual information sessions with communities to describe the details in the MoU, increase awareness about HCVs in the MU, explain which animal and plant species are protected and how HCVs are monitored.

**These HCV 5 and 6** areas are divided into four management areas that protect the following HCVs:

**HCV 5 areas (124.23 ha)** used to meet villagers' subsistence needs, and to provide them with a basic income. These areas are used to harvest bamboo, rubber, fruit and rattan. As part of an FPIC process, PT MS have



Floral surveys of HCV areas

also negotiated with villagers to zone areas used for farming (paddy fields, cassava and fruit crops).

**HCV 6 area (4.8 ha)** Balai Keramat (hallowed hall) and Tiang Pantar (bridge to heaven) are protected in a community-use area that is clearly demarcated with signs indicating community ownership.

**HCV 5 & 6 area (0.2 ha)** containing a village gravesite and important NTFPs that are used for subsistence purposes by the villagers. The main NTFPs harvested are jungle rubber (*Dyera costulata*), Damar (*Agathis dammara*) and bamboo.

With permission from the local communities, PT MS conducts monthly operational monitoring of the HCV 5 and 6 areas. The aims of this monitoring are to ensure that plantation activities do not encroach on or damage the HCV areas, that community areas do not expand into plantation areas and to monitor threats, such as illegal forest clearance or encroachment by workers or external parties. Observations, including GPS coordinates, are recorded and follow up action is decided on close consultation with the local communities. During monitoring patrols, sightings of wildlife and GPS coordinates are also recorded to feed into monitoring of HCVs 1-3.

To ensure that HCVs 5 and 6 are maintained over time, PT MS has an adaptive management plan. Rapid assessments of all HCV areas are conducted every six months, as part of strategic monitoring, to identify land use or habitat changes.



Balai Keramat (hallowed hall), HCV 6 site

<sup>15</sup> Correct as of time of publication.



### Policies on HCV 5 and 6 resources

It cannot be expected that all cultural values will be identified during HCV assessments, especially if there are as yet unexcavated archaeological materials. For this reason, it is necessary to have safeguards in place in case such materials are found during development and operations. It is good practice to have a policy in place for cultural values and sites that may be “discovered” once operations have already begun. An example of guidance on so called “chance finds” can be found in the IFC Performance Standards (IFC. 2012 (January). [http://www.ifc.org/wps/wcm/connect/Topics\\_Ext\\_Content/IFC\\_External\\_Corporate\\_Site/IFC+Sustainability/Sustainability+Framework/Sustainability+Framework+-+2012/Performance+Standards+and+Guidance+Notes+2012/](http://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/IFC+Sustainability/Sustainability+Framework/Sustainability+Framework+-+2012/Performance+Standards+and+Guidance+Notes+2012/).

In some cases it may be possible for the Organisation and affected communities to decide on viable alternatives to HCV 5 and HCV 6 resources. If a management prescription calls for substitution of an HCV with other options, these need be appropriate. Substitution or replacement may not always be permitted, and it is important to check the requirements of the relevant standard. However, where it is acceptable, replacement can take any number of forms. For example, micro-development projects may replace income that was obtained from NTFP harvest and sale or water pumps could provide water that was previously obtained from streams and rivers.

**Any decisions about HCV substitution must be taken as part of a Free Prior and Informed Consent (FPIC) process, and the implementation and results must be monitored to ensure that the alternative resource is indeed equivalent to or better than the original value.** In many cases, particularly with HCV 6, substitution will be impossible: sites of historical, cultural or spiritual significance cannot usually be “replaced”. However one example of HCV 6 substitution comes from Mexico, where an ethnic group relied on feathers from endangered birds for ceremonial purposes. It was possible to replace the feathers from wild birds with feathers collected from a sanctuary for captive endangered birds. In this way, people were able to continue practicing their cultural beliefs without threatening the wild bird populations.

If a company causes damage to HCVs 5 and 6 during the course of its operations, it is responsible for compensating those affected communities. The mechanism and form of compensation should be determined through a community engagement strategy and should draw upon FPIC principles (see Annex 1 for resources).

### Community engagement

Early and consistent communication is key to good management and prevention of conflicts. The Organisation should have a capable social team and/or seek assistance from outside experts as needed. Many certification standards require some kind of community engagement strategy and this should include measures for:

- Culturally appropriate, non-technical communication
- Identifying representatives, including of minority and vulnerable groups
- Ensuring that local people have sufficient time to digest HCV assessment results and to participate in the preparation of management and monitoring plans, where they are affected
- Ensuring that local people are adequately compensated for their time and or expertise
- Using FPIC principles for consultation, negotiation and decision making
- Ensuring it is clear who has access to which resources. Access agreements should be negotiated through FPIC, documented and monitored.

To comply with some of the above recommendations, it will be necessary for HCV information (at least summaries of assessment reports, management plans, and monitoring plans) to be available in languages understood by affected stakeholders. This is likely to be the official language of the country, but resources permitting, translation into local languages, widely read by local communities or their representatives, is ideal.

Representatives from the affected communities should be included in management and monitoring activities (see 3.1.4 for more detail on participatory monitoring). For example, in conversion contexts, community representatives should accompany land clearing teams to ensure that no mistakes are made regarding boundaries of local people's land.

## 2.3 Conditions for maintaining HCV 1 - 6

The previous section provided a general overview of commonly used types of management areas and management prescriptions. This section now provides an overview of the general conditions required to maintain each of the six HCV categories with examples of the sort of management areas and prescriptions that can be used.



### 2.3.1| Maintaining HCV 1: species concentrations

Species conservation is the primary focus of HCV 1. The main requirements for HCV 1 species' concentrations are **size and quality of habitat** and maintenance of **species associations** or **ecosystem processes**. These requirements will vary depending on **life history characteristics** of different species.



#### Habitat size and quality

HCV 1 management areas should protect areas that support significant concentrations of RTE or endemic species and aim to maintain or enhance population viability. This can be achieved by protecting suitable habitat that provides food or nutrients, water, and breeding/reproductive requirements. Species may have different habitat requirements at different times of year, and this must be taken into account for management. For example, species may carry out seasonal migrations to use specific habitats for breeding or feeding. Non-migratory species can also rely on sparsely distributed habitats or resources for crucial but infrequent use. For example, salt or clay licks are essential for species such as macaws, tapirs, gaur and forest elephants.

It is vital to consider habitat quality as well as size. For example, boreal woodland caribou in Canada are wide-ranging species that require large areas of habitat, but this habitat must also be relatively undisturbed. Cumulative disturbance by roads, clear-cuts and other human infrastructure can threaten caribou survival, therefore, large areas of high-quality habitat are needed to maintain the species.

#### Species associations

Some species are dependent on other species for their survival or reproduction. Examples of such mutualistic associations include the dependence of plant species on certain pollinators or seed dispersers, and the dependence of freshwater pearl mussels (red listed in a number of countries) on Salmonides – the mussel larva spends some of their time attached to the gills of salmon or trout. The nature of these mutualisms means that even with large high quality habitat, the species is unlikely to survive unless the species it depends on is also present. Therefore, it is important that management strategies for HCV 1 species maintain any crucial mutualisms.

Neither HCV assessors nor managers can be expected to be aware of all species mutualisms, which often requires in-depth knowledge of species' life history. However, HCV assessment reports should provide guidance on this where possible and managers should seek advice from relevant experts when developing management plans. In some cases, the use of a precautionary approach and the protection of sufficiently large and high quality habitat may be sufficient to maintain species associations.

### Life history characteristics

Certain life history traits make species more vulnerable to decline: such as being habitat or diet specialists; having low reproductive rates; being exceptionally vulnerable to disturbance; being highly susceptible to introduced diseases or invasive species; or having a high market value, which encourages over-hunting. Some organisms depend on 'temporal connectivity'. Insects (many species of beetles, flies, and others) that use fresh fire-sites are a good example: they can fly very long distances and they are good at detecting suitable habitat from afar – thus they do not need physical connectivity. However, as many of these only use freshly burned trees – some only for the first season – they need new fire-sites more or less on an annual basis within 'a larger landscape' (e.g. a radius of 10-100 km depending on species). Where this is no longer happening (through lightning or prescribed burning) these species disappear.

Another example, is two species of fire-adapted geranium which are found in the boreal Palearctic. Their strategy is not about physical dispersal – instead their seeds may lie dormant for hundreds of years before they wake up and germinate – in exactly the same place where they flowered centuries ago - stimulated by the heat of a fire.

For an example of management areas and prescriptions for maintaining HCV 1 see Table 2.

GENERAL HCV MANAGEMENT OBJECTIVE <sup>16</sup>	EXAMPLE OF SPECIFIC HCV MANAGEMENT OBJECTIVE	EXAMPLE OF MANAGEMENT TARGETS	MANAGEMENT STRATEGIES	
			AREAS	PRESCRIPTIONS
<b>HCV 1</b> • "Significant concentrations of endemic and RTE species are maintained or enhanced." • "The sites and resources on which these concentrations depend are maintained, including critical temporal resources such as sites for roosting, breeding, hibernation, shelter and migration."	Maintain population of Critically Endangered western lowland gorillas in the MU	<ul style="list-style-type: none"> <li>Maintain 3,000 ha of gorilla habitat</li> <li>Maintain (seasonal) use of HCV set aside by two family groups</li> <li>Zero gorillas hunted in HCV set asides</li> <li>Gorilla population stable or increasing, with no sign of serious disease</li> </ul>	Conservation area of 3,000 ha, bordering contiguous forest habitat in neighbouring MU	<ul style="list-style-type: none"> <li>No entry except for monitoring purposes</li> <li>No human activities or infrastructure (e.g. production activities, hunting)</li> <li>Regular anti-hunting patrols</li> </ul>
			Buffer zone of 500 m width around conservation area	<ul style="list-style-type: none"> <li>Reduced-impact logging only</li> <li>No road construction, only minimal impact skid trails</li> </ul>
			Entire management unit	<ul style="list-style-type: none"> <li>No hunting of gorillas or other HCV 1 species</li> </ul>

**Table 2:** Examples of management objectives, targets and strategies for the maintenance of HCV 1 gorilla population in an MU

<sup>16</sup> From Synnott *et al* 2012.



### 2.3.2 | Maintaining HCV 2: large landscape and ecosystem values

HCV 2 focuses on far broader values than HCV 1, extending interest from concentrations of species to whole ecosystems, although from a management perspective many of the same actions may be required, such as maintaining habitat and landscape connectivity as well as species composition and vegetation structure.

Decisions on HCV 2 management should be based on careful consideration of the MU's position in the wider landscape. For example, if a MU borders or is surrounded by PAs, or contains or borders large landscapes (e.g. Central African Regional Programme for the Environment (CARPE) landscapes and Intact Forest Landscapes<sup>17</sup>) there is a very strong indication that HCV 2 is present. Development should only proceed if HCV 2 can be maintained and then operations should proceed with particular caution and in collaboration with the management of neighbouring MUs or conservation priority areas.

#### Large size and connectivity

Large landscape level ecosystems (HCV 2) are defined as ecosystems that are sufficiently large and undisturbed to support viable populations of the majority of naturally occurring species. The management aim for conserving HCV 2 is to maintain large ecosystems, and the viable species populations that they support. In some cases, MUs may be large enough to maintain HCV 2 areas on their own, whilst in smaller MUs, maintaining HCV 2 will rely on retaining connectivity with areas in the wider landscape. Supporting populations of wide-ranging and apex predators will require the protection of sufficiently large, connected and/or high quality areas of habitat. This includes minimizing threats such as hunting to these species, and ensuring they have sufficient prey resources.

Similarly, the maintenance of natural ecosystem processes, such as mass fruiting or migrations, can depend on maintaining connectivity. This generally means leaving corridors of native vegetation through MUs to connect with ecosystems outside: the corridors must be wide enough to provide secure passage of animals and movement of plant species through natural seed dispersal. Wide-ranging species or apex predators that also classify as HCV 1 may be protected using similar management strategies (e.g. habitat corridors).



<sup>17</sup> <http://www.intactforests.org/>

### Species composition and vegetation structure

An ecosystem may still qualify as HCV 2 even if a few key species are missing, as long as its characteristic vegetation structures and ecological processes are retained. For example, large areas of continuous forest in the Amazon are heavily hunted by indigenous populations, and commonly hunted species may become locally extinct despite the forest being otherwise undisturbed. Also, introduced diseases can eliminate certain species without irreparably upsetting the rest of the ecosystem.

HCV 2 does not imply that the ecosystem is totally unaffected by humans – a virtual impossibility to find – but that it still contains important natural values. Ecosystems such as many in the European Mediterranean or many African savannahs have been managed by humans for millennia but still contain important values that can be threatened by changes in the management regime. Examples of HCV 2 management areas and prescriptions are listed in Table 3.

GENERAL HCV MANAGEMENT OBJECTIVE <sup>18</sup>	EXAMPLE OF SPECIFIC HCV MANAGEMENT OBJECTIVE	EXAMPLE OF MANAGEMENT TARGETS	MANAGEMENT STRATEGIES	
			AREAS	PRESCRIPTIONS
<b>HCV 2</b> <ul style="list-style-type: none"> <li>“The significant ecosystems and mosaics with viable populations are maintained or enhanced.”</li> <li>“Their large size and connectivity are maintained.”</li> <li>“They are not fragmented.”</li> <li>“No species are lost as a result of management activities.”</li> </ul> 	Maintain connectivity for large mammals in boreal forest ecosystem	<ul style="list-style-type: none"> <li>Maintain 1 km wide corridor of HCV 2 ecosystem in MU (connected to larger HCV 2 ecosystem outside the MU)</li> <li>No fragmentation of HCV 2 conservation areas</li> <li>Core areas/corridors used by target mammal species</li> </ul>	1 km wide habitat corridor connecting key HCV 2 habitat on either side of MU  Entire or major part of management unit	<ul style="list-style-type: none"> <li>No entry except for monitoring purposes</li> <li>No human activities or infrastructure (e.g. production activities, hunting)</li> <li>Regular anti-hunting patrols</li> </ul> <ul style="list-style-type: none"> <li>Set aside substantial no-logging core area(s) with buffer zones</li> <li>Use logging and other management practices reflecting natural disturbance regimes</li> <li>Standard Operating Procedures (SOPs) for road building and access</li> </ul>

**Table 3:** Example of management objectives, targets and management strategies for maintaining HCV 2 in a natural forest timber management unit.

<sup>18</sup> From Synnott *et al* 2012.

#### Example 4: Threat assessment and management recommendations for HCV 1 and HCV 2 in a timber plantation in Chile

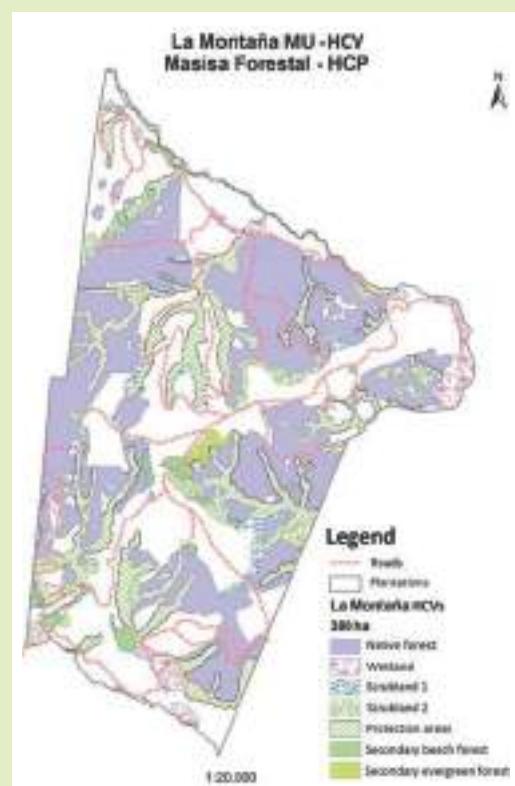
Masisa, a Chilean forestry company, produces timber from FSC-certified (since 2012)<sup>19</sup> plantations in Chile, Brazil, Argentina and Venezuela. The La Montaña MU of pine and eucalyptus plantations in Chile's Los Ríos region covers 648 ha. This includes HCV areas covering 381 ha which contain HCV 1 and 2 areas of Valdivian temperate rainforest, Laurifolia forest, wetlands and coastal forest. The HCV 2 areas enhance connectivity to larger forest areas in the surrounding landscape. Table 4 provides a summary of the threats and management recommendations Masisa developed based on consultation with WWF-Chile.

THREATS	MANAGEMENT RECOMMENDATIONS
Introduction of invasive species (e.g. Cape Broom and rabbits)	<ul style="list-style-type: none"> <li>Identify presence and location of invasive wildlife in MU</li> <li>Remove invasive species of flora and fauna</li> </ul>
Grazing by cattle	<ul style="list-style-type: none"> <li>Install signs prohibiting grazing in HCV areas</li> <li>Install fencing around regenerating forest and areas with protected species</li> <li>Community consultations to define community access to pasture land</li> <li>Community education on threats posed by livestock</li> </ul>
NTFP harvest (berries, nuts, medicinal plants)	<ul style="list-style-type: none"> <li>Community consultation to define collection zones.</li> <li>Education on negative impacts of overharvesting</li> </ul>
Extraction of timber resources	<ul style="list-style-type: none"> <li>No harvest of native tree species by company or illegal loggers</li> </ul>
Hunting, including of the endangered Pudu <sup>20</sup>	<ul style="list-style-type: none"> <li>Install signs prohibiting hunting in MU</li> <li>Community education on conservation and importance of wildlife</li> </ul>
Forest Fire	<ul style="list-style-type: none"> <li>Establish fire management plan that provides sufficient resources for timely control</li> <li>Establish fire control agreement with National Forest Corporation and other national institutions</li> <li>Community outreach and training on fire prevention, and early warning responses</li> </ul>
Fragmentation by logging roads	<ul style="list-style-type: none"> <li>Develop specifications for roads based on their location within MU and in relation to HCV areas</li> <li>Internal staff training on road planning</li> <li>Reduce road density</li> </ul>

**Table 4:** Threat assessment and management recommendations for Masisa's La Montaña MU in Chile



A pudu being rehabilitated after having been rescued from a forest fire by Masisa staff



**Figure 6:** Map of Masisa's La Montaña management unit in Chile. Pine and eucalyptus plantations shown in white and HCV areas in other colours according to habitat type. Map courtesy of Masisa Chile

<sup>19</sup> Correct at time of publication.

<sup>20</sup> A species of tiny deer, photo top right.



### 2.3.3 | Maintaining HCV 3: rare, threatened or endangered habitats or ecosystems

While HCV 2 refers to large, continuous landscape-scale ecosystems, HCV 3 concentrates on more discrete habitat types. For many HCV 3 sites, the crucial element may be the size and/or age structure, or unusual species composition, of a given ecosystem or habitat. **For HCV 3 ecosystems the Organisation is required to maintain the characteristic ecological processes and any unique attributes of RTE sites.** In many cases, the extent of ecosystems is clearly delimited by geology or soil type and this can guide the size of management areas.

Some HCV 3 ecosystems may be highly localised and only found under certain specialised conditions, which means they may be naturally fragmented. For these ecosystems disturbance is likely to be a particular threat. For example, Maputaland-Pondoland montane shrublands in eastern South Africa have a dry, seasonal climate and are restricted to river valleys on deep, well-drained soils. Vegetation consists of mainly evergreen plants that form a low and closed canopy of shrubs and vines. These bushlands are threatened by clearance and overgrazing, which destroy the vegetation structure. Therefore, their management may focus on protecting the habitat as a conservation area and preventing encroachment. On the other hand, some ecosystems are dependent on long-standing land use practices, including certain regimes of grazing and burning in grassland or woodland and water management. In many cases HCV 3 habitats or ecosystems will require complete protection in a conservation area as the management response.

In many cases habitats and ecosystems occur as highly fragmented remnants of a previously more extensive ecosystem, which has been reduced through decades or centuries of human activities, or climate change (e.g. Pleistocene relicts). The ecosystem functionality in this case may already have been severely compromised. However, these fragments may be significant for biodiversity: for example, the Atlantic Forest of Brazil and Argentina is extremely fragmented and covers only 7% of its historical range, yet the remaining fragments support 20,000 species of plants (50% of which are endemic) and ~1,600 species of birds, mammals and amphibians (~20% of which are endemic) (Critical Ecosystem Partnership Fund 2011). When planning production activities in an area where HCV 3 fragments exist, a conservation plan should be developed to preserve the fragments, halt the processes leading to their degradation or destruction, and aim to restore the functionality of the ecosystem. Examples of HCV 3 management areas and prescriptions are listed in Table 5.



GENERAL HCV MANAGEMENT OBJECTIVE <sup>21</sup>	EXAMPLE OF SPECIFIC HCV MANAGEMENT OBJECTIVE	EXAMPLE OF MANAGEMENT TARGETS	MANAGEMENT STRATEGIES	
			AREAS	PRESCRIPTIONS
<b>HCV 3</b> • “RTE ecosystems and habitats are maintained, with no increase in their extinction risks.” • “No RTE ecosystems or habitats are lost or damaged as a result of management activities.” • “RTE ecosystems and habitats retain their distinctive characteristics, including species composition and structure.”	Maintain Mata Atlantica forest in the MU	<ul style="list-style-type: none"> <li>Maintain 300 ha of HCV 3 ecosystem</li> <li>Maintain stable population of black-fronted piping guan and mantled hawk (indicator bird species)</li> </ul>	Conservation area of 300 ha	<ul style="list-style-type: none"> <li>No entry except for monitoring purposes</li> <li>No human activities or infrastructure (e.g. production activities, hunting, NTFP collection)</li> <li>Regular anti-hunting patrols</li> <li>Installation of artificial nest boxes for HCV 3 indicator species</li> </ul>
			Buffer zone of 20 m width around conservation area	<ul style="list-style-type: none"> <li>No production activities or hunting</li> <li>NTFP collection allowed under sustainable quotas</li> <li>Regular anti-hunting patrols</li> </ul>
			Entire management unit	<ul style="list-style-type: none"> <li>No hunting of HCV species</li> <li>Strict quotas and seasons for hunting of non-HCV species</li> <li>SOPs for road building, riparian buffer protection</li> </ul>

**Table 5:** Example of management objectives, targets and management strategies for maintaining HCV 3 in a eucalyptus plantation.



<sup>21</sup> From Synnott et al 2012.



### 2.3.4 | Maintaining HCV 4: critical ecosystem services

Ecosystem services qualify as HCV 4 if they are required in critical situations. The loss of these services can lead to loss of human life, and loss or damage of property and livelihoods. HCV 4 management areas most commonly include areas required for flood prevention, coastal protection, water filtration, erosion control and fire prevention.

**Managers are responsible for ensuring that their operations do not undermine essential ecosystems services inside or outside the MU.**

If an MU is upstream of communities that rely on water from that catchment for basic needs, or if this value would be jeopardized by increased risk of flooding or other disturbances (e.g. mudslides), then production activities should be designed with the utmost caution, especially where clearing of natural vegetation is involved. In high risk situations, hydrologists, soil scientists, and other experts should be consulted in the development of a management plan, and conversion may only be possible if substantial safeguards are put in place (e.g. large riparian buffers, no conversion on steep slopes). Alternatively, in a non-conversion forestry context fewer safeguards may be required, assuming the intensity and scale of timber extraction is low. **In general, stream disturbances should be avoided to the greatest extent possible. Any production activity will affect streams, but good management practices can at least reduce impacts.**

Management of HCV 4 requires a wide range of management activities, a sample is presented here and in Table 6:

- Implement SOPs for road construction and river crossings that prevent sedimentation of waterways
- Maintaining natural vegetation on steep slopes, shorelines and riversides to mitigate against flooding and storm surge
- Ensuring that operations such as ploughing, timber extraction or planting do not take place at times of high wind or rainfall to minimise erosion
- Controlling agrochemical use in watersheds
- Preventing pollution in freshwater lakes and streams to maintain fish populations for local fishing communities.

GENERAL HCV MANAGEMENT OBJECTIVE <sup>22</sup>	EXAMPLE OF SPECIFIC HCV MANAGEMENT OBJECTIVE	EXAMPLE OF MANAGEMENT TARGETS	MANAGEMENT STRATEGIES	
			AREAS	PRESCRIPTIONS
<b>HCV 4</b> • “Management activities do not increase the risk of damage to ecosystem services, nor their vulnerability to severe weather conditions.”	Avoid damage to downstream water quality cause by plantation establishment	<ul style="list-style-type: none"> <li>• Establish riparian buffers according to river width</li> <li>• No significant changes to quantity and quality of water flowing from the catchment</li> <li>• Maintain compliance with WHO water quality standards</li> </ul>	Riparian buffers <sup>23</sup> : <ul style="list-style-type: none"> <li>• 10 m for streams &lt; 5 m wide</li> <li>• 50 m for rivers 5-20 m wide</li> <li>• 100 m for rivers &gt; 20 m</li> </ul> Entire management unit	<ul style="list-style-type: none"> <li>• No chemical use</li> <li>• Sustainable fishing permitted</li> <li>• No production activities</li> </ul> <ul style="list-style-type: none"> <li>• No planting on slopes &gt;25°</li> <li>• Terracing on land between 15-25°</li> <li>• Retain ground cover except for 2 m circle around palm base</li> <li>• Fertiliser use policy</li> <li>• Chemical use policy</li> </ul>

**Table 6:** Example of management objectives, targets and management strategies for maintaining HCV 4 in an oil palm plantation

<sup>22</sup> From Synnott *et al.* 2012.

<sup>23</sup> Please note these buffer widths are only indicative. Managers should refer to guidance provided by certification schemes and national legislation.



### 2.3.5 | Maintaining HCV 5: community needs

HCV 5 covers basic needs of indigenous and local people which are supplied by natural ecosystems. Examples of HCV 5 resources can include hunting and fishing grounds, NTFPs, medicinal plants and building materials. What constitutes basic needs in a given situation is open to interpretation from the HCV assessment team, affected communities and interested stakeholders, but as a general rule the perspective of the affected community is most important.

#### **One of the outcomes of the HCV assessment should be the identification of HCV**

**5 resources and sites through participatory mapping.** Only those areas used more communally (e.g. forest resources, water, NTFPs, sacred sites) would normally be considered HCVs. Individual property (e.g. fallows, planted trees, crops, houses) should be managed according to relevant national laws (e.g. many countries have compensation values recommended for crops, houses and other personal property) and principles of FPIC<sup>24</sup>. If communities rely on land or water inside an MU for their basic needs, the HCV approach assumes that they have *de facto* rights and should not be deprived of these. However, it may be possible for people to negotiate with the Organisation about access and use rights to different sites and resources through a process of FPIC. For example, one outcome of FPIC may be to excise community areas from the production permit area (MU), or communities may decide to take compensation in exchange for a reduction or complete removal of user rights, or there could be a negotiated compromise for production activities and community use to co-exist. Once this is determined, the Organisation should set management objectives and targets in collaboration with affected communities.

Management of HCV 5 will be based largely around negotiating access for traditional practices such as collection of NTFPs, often through zoning arrangements, although sometimes there will also need to be agreements about protecting particular species such as medicinal plants, food plants or fodder crops. Specific management areas and prescriptions may include those listed in Table 7.

GENERAL HCV MANAGEMENT OBJECTIVE <sup>25</sup>	EXAMPLE OF SPECIFIC HCV MANAGEMENT OBJECTIVE	EXAMPLE OF MANAGEMENT TARGETS	MANAGEMENT STRATEGIES	
			AREAS	PRESCRIPTIONS
<b>HCV 5</b> • “The sites and resources that are fundamental for satisfying basic necessities are maintained or enhanced.”	Manage collection of NTFPs by local people in and around the MU	Sustainable harvesting of agreed NTFPs, maintained through zoning and monitoring	Community use area	<ul style="list-style-type: none"> <li>Community representatives accompany clearance teams when establishing boundaries of community use area</li> <li>No entry by Organisation staff except for monitoring purposes</li> <li>No production activities</li> <li>NTFP collection at sustainable levels</li> <li>Regular patrols in collaboration with community to control illegal encroachment</li> </ul>
			Entire management unit	<ul style="list-style-type: none"> <li>Access trails maintained regularly</li> </ul>

**Table 7:** Example of management objectives, targets and management strategies for maintaining HCV 5

<sup>24</sup> FPIC refers to the right of indigenous peoples and local communities to give, withhold or withdraw consent to those activities that would affect their rights. Please see Box 13 in the Common Guidance for HCV Identification for more information.

<sup>25</sup> From Synnott *et al.* 2012.



### 2.3.6 | Maintaining HCV 6: cultural values

Cultural values cover everything from historical sites to sacred values or traditional management practices. Some HCV 6 values are likely to be covered in existing legislation (such as protection of historical sites, archaeological finds) while others are difficult to identify and complex to manage (such as sacred natural sites). As with HCV 5, the HCV assessment allows for the identification of these values through participatory mapping, but it is then the responsibility of the Organisation to follow up with management strategies. Depending on the context, people may be opposed to any disturbance of an HCV 6 site or resource, or they may decide to negotiate compensation for reduced access. Once this determination is made, the main objective is to maintain the value of the site for local people. In the case of cultural or spiritual values, sensitive local liaison is particularly important; for some groups identifying the location of their sacred sites may be problematic so sensitivity in discussions is particularly important.

The management responsibility for maintaining HCV 5 and 6 is very different from the first four HCV categories. It is important to understand that resources and livelihood activities identified as fundamental for basic needs may very well change over time as the social, ecological and economic context of an area changes. For example, a group of villages who rely on rivers for their household water use and obtain a significant amount of their dietary protein from wild animals may over time obtain water and protein from other sources if new water infrastructure comes to the area and if other sources of protein are widely available. It is important to understand that peoples' values and practices should be respected and be allowed to change at a pace the community or group is comfortable with. The exception to this is when community livelihood practices go against national laws (e.g. hunting of protected species), in which case the need for alternatives will be much more urgent. Responding to these changes over time is an important part of adaptive management.

Examples of HCV 6 management areas and prescriptions are listed in Table 8.



GENERAL HCV MANAGEMENT OBJECTIVE <sup>26</sup>	EXAMPLE OF SPECIFIC HCV MANAGEMENT OBJECTIVE	EXAMPLE OF MANAGEMENT TARGETS	MANAGEMENT STRATEGIES	
			AREAS	PRESCRIPTIONS
<b>HCV 6</b> • “The sites and resources that are of national significance or critical local importance are maintained or enhanced.”	Protect archaeological remains within an MU	Archaeological remains conserved and surrounded by a buffer zone to ensure adequate protection	Archaeological conservation area	<ul style="list-style-type: none"> <li>Archaeologists accompany clearance teams when establishing boundaries of conservation area</li> <li>No entry by Organisation staff except for monitoring purposes</li> <li>No human activities</li> <li>Patrols to ensure no encroachment</li> <li>Boundary fence established around area</li> </ul>
			Buffer zone	<ul style="list-style-type: none"> <li>No production activities</li> <li>Community subsistence activities permitted if low-impact and sustainable</li> </ul>
			Entire management unit	<ul style="list-style-type: none"> <li>‘Chance finds’ policy implemented: all new discoveries of critical importance protected adequately</li> </ul>
			General	<ul style="list-style-type: none"> <li>Organisation staff and local community engagement about archaeological importance and protection</li> </ul>

**Table 8:** Example of management objectives, targets and management strategies for maintaining HCV 6



<sup>26</sup> From Synnott et al. 2012.



The overarching purpose of monitoring is to determine whether HCV management strategies are being implemented and management objectives are being met (i.e. are HCVs being maintained?). Monitoring results can provide managers with up-to-date information on the HCVs for which they are responsible, and serve as a basis for management intervention or adjustment of management plans. **One of the general and on-going objectives of monitoring is the gradual build-up of information about the site and the HCVs present. This means that overtime, managers are able to continuously improve and build upon past experience.** Monitoring does not always require comprehensive biodiversity and social surveys, but should use appropriate indicators to assess whether HCVs are being maintained and whether management activities are effective. Indicators need to be efficient, consistent, standardised and repeatable (see section 3.1.1). Consistent, standardised monitoring is especially important to understand whether perceived changes in an HCV are genuine (e.g. a population increase), or an artefact of a change in monitoring (e.g. change of staff to someone who is better at spotting species). Monitoring data should be recorded and stored in a centralised database, as it will be useful for analysing long-term trends in HCVs. However, it should be noted that monitoring specific HCVs does not always reveal the cause of observed changes in an HCV.

### 3.1 Types of monitoring

Understanding the reason(s) for a decline in HCV status can help managers to understand which management activities may not be working effectively, and what management changes are necessary to reverse the decline. For this reason it is also important to monitor the effectiveness of management activities and threats to HCVs.

An HCV may be declining, or a management strategy may be ineffective because of a number of reasons, including:

- **Practical barriers to management implementation.** Management strategies may have a strong theoretical evidence base, but may be challenging to implement on the ground. For example, no-fishing zones have the potential to reverse declines of threatened fish species, but may be hard to enforce in areas with high rural population densities.
- **Poor implementation of management strategies.** Even the most robust management strategies can be ineffective if poorly implemented. For example, a conservation area is unlikely to effectively maintain an HCV unless it is combined with patrols to prevent illegal or restricted activities.
- **New or changing threats/conditions.** Management strategies that are effective at one point in time may not always be effective. For example, changes in the wider landscape, such as an influx of migrant workers to a nearby development may lead to increased pressure on resources in the MU. The Organisation cannot be held responsible for all changes due to threats that are beyond its control (e.g. climate change).

These challenges can make it difficult to distinguish between a decline in an HCV due to weak implementation of management strategies, vs. a change due to (well implemented but) ineffective management strategies. Therefore, it is essential to monitor:

1. The implementation of management plans (**operational monitoring**)
2. Whether HCVs are being maintained by current management plans (**strategic/effectiveness monitoring**), and
3. Threats to HCVs (**threat monitoring**).

### 3.1.1 | Operational monitoring

#### **Operational monitoring evaluates whether management plans are being implemented.**

This covers all management prescriptions (e.g. SOPs) across the MU, including but not limited to HCV management, and allows managers to monitor operational compliance. Examples include, monitoring of SOPs relating to road construction, harvesting operations, waste management and maintenance of HCV area boundaries. Operational monitoring should be carried out frequently enough to uncover areas of concern to be followed up by more targeted monitoring, for example, evidence of a polluted waterway that could be followed up by more detailed water quality analysis.

### 3.1.2 | Strategic/effectiveness monitoring

#### **Strategic/effectiveness monitoring aims to assess whether HCVs are being maintained by current management plans.**

It aims to assess whether management objectives and targets set out in the management plan are being met, and whether management prescriptions are effective in maintaining the HCVs. Unlike operational monitoring the focus is on monitoring HCVs rather than operational procedures. Strategic monitoring focuses on assessing longer-term trends in the status of HCVs and, therefore, tends to be conducted less frequently than operational monitoring but typically requires more time-consuming techniques and analysis. Examples of strategic monitoring techniques include flora and fauna surveys and community interviews. Data collected during strategic monitoring can be supplemented by less standardised data from operational monitoring or opportunistic observations.

The schedule of strategic monitoring will depend in part on the vulnerability of the value being monitored and the cost of monitoring. For example, the presence of a concentration of endangered animal species that is at great risk from poaching may need considerable, regular monitoring patrols. However, this may be costly and require support from external conservation organisations or government. Methods for strategic monitoring, and the use of indicators are discussed in section 3.1.2.

### 3.1.3 | Threat monitoring

**Threat monitoring aims to assess any changes in threats to HCVs.** This should monitor internal and external threats identified during the initial threat assessment process and assess whether new threats have developed. Threat monitoring can involve targeted monitoring of threat indicators (e.g. water quality monitoring) in HCV management areas, threats recorded opportunistically during operational monitoring and interviews or discussions with people “causing” the threat (e.g. plantation workers responsible for spraying pesticides). Data from threat monitoring can also be supplemented by more informal observations made during operational monitoring (see Table 9).



EXAMPLE OF HCV	OPERATIONAL MONITORING	STRATEGIC MONITORING	THREAT MONITORING
<b>HCV 1</b> mammal population present in riparian forest areas in MU	Regular monitoring patrols to: <ul style="list-style-type: none"> <li>Maintain HCV area boundaries</li> <li>Ensure no pesticide application or chemical dumping in or near riparian buffer zones</li> <li>Prevent hunting</li> </ul>	<ul style="list-style-type: none"> <li>Annual species population surveys (e.g. individuals)</li> <li>Habitat quality surveys (e.g. food plants present)</li> </ul>	<ul style="list-style-type: none"> <li>Hunting monitoring patrols (more targeted, extensive than operational monitoring)</li> <li>Local hunter interviews</li> <li>Opportunistic observations of hunting indicators (from operational/ strategic monitoring)</li> </ul>
<b>HCV 2</b> large landscape level forest	Annual remote sensing and ground patrols to confirm that road management plan is correctly implemented	<ul style="list-style-type: none"> <li>Remote sensing to confirm no increase in deforestation, or fragmentation</li> </ul>	Monitor threats to landscape size and connectivity: <ul style="list-style-type: none"> <li>Development plans in the wider landscape</li> <li>Migration trends</li> <li>Encroachment into corridors</li> </ul>
<b>HCV 3</b> ecosystem in conservation area	Regular monitoring patrols to maintain HCV area boundaries	<ul style="list-style-type: none"> <li>Annual vegetation surveys (indicator species surveys, vegetation structure measurements)</li> </ul>	<ul style="list-style-type: none"> <li>Encroachment/logging monitoring patrols</li> <li>Invasive species monitoring using survey data from strategic monitoring</li> </ul>
<b>HCV 4</b> forest on steep slopes for erosion control	Regular monitoring patrols to: <ul style="list-style-type: none"> <li>Maintain HCV area boundaries</li> <li>Prevent forest/vegetation clearance on slopes</li> </ul>	<ul style="list-style-type: none"> <li>Soil erosion monitoring (e.g. surface run-off tests)</li> <li>Monitoring sedimentation levels</li> <li>Surveys of vegetation structures key to preventing erosion (e.g. ground cover, tree cover)</li> </ul>	<ul style="list-style-type: none"> <li>Operational monitoring of HCV 4 forest quality and extent</li> <li>Frequency of violent storms</li> <li>Cases of illicit clearing</li> </ul>
<b>HCV 5</b> area used for NTFP collection by local community	<ul style="list-style-type: none"> <li>Regular monitoring patrols to maintain HCV area boundaries</li> <li>Community interviews to assess company compliance with management plan/ prescriptions</li> </ul>	<ul style="list-style-type: none"> <li>Community interviews on collection patterns and level of resource dependence</li> <li>Species/habitat surveys to assess abundance levels of collected NTFPs</li> <li>If NTFPs are used for basic income –surveys on livelihood status can be conducted</li> </ul>	<ul style="list-style-type: none"> <li>Community interviews on collection intensity or evidence of external commercial collectors</li> <li>Surveys of NTFP species to quantify abundances</li> <li>Opportunistic observations of commercial collection by non-community members</li> </ul>
<b>HCV 6</b> sacred natural site within MU <sup>27</sup>	Regular monitoring to ensure that the site has not been disturbed	<ul style="list-style-type: none"> <li>Interviews with faith leaders to determine if the site value has been maintained</li> </ul>	<ul style="list-style-type: none"> <li>Checking that workers are aware of the site value and location and the need to treat the area with respect</li> </ul>

**Table 9:** Examples of different types of HCV monitoring

<sup>27</sup> This assumes that the sacred site is not a secret. In cases where the exact nature and location of sacred sites cannot be disclosed to the Organisation, culturally appropriate management decisions should be made in consultation with local people.

## 3.2 Developing an HCV monitoring plan

A monitoring plan should describe in detail what is being monitored, how it will be monitored, the personnel involved in monitoring and their roles, when and where monitoring will be conducted and the process for reviewing monitoring data (see Box 7 for more details). Monitoring plans should be derived from management objectives. For example, if a management objective is to maintain or enhance a population of an HCV 1 species, then monitoring should assess whether this significant population is being maintained. Specific management objectives and targets should be used to define appropriate monitoring indicators.



### Box 7: Important elements of an HCV monitoring plan

- A** Choosing indicators
- B** Baseline data and launching the monitoring plan
- C** Roles and responsibilities for monitoring
- D** Involving stakeholders and experts in monitoring
- E** Choosing monitoring techniques
- F** Plans for the regular review of monitoring data, capturing effects of any threats/risks to HCVs and effects of management prescriptions

**It is important that monitoring plans are scientifically robust, standardised and repeatable, while using resources (time and money) efficiently.** An efficient monitoring plan should assess whether HCVs are being maintained, using as little time and money as possible, without compromising quality. Extensive and time-consuming monitoring may be unnecessary unless there is a good reason to believe that the scale and intensity of production activities is threatening the maintenance of an HCV.

The scale and intensity of production activities can indicate potential risks posed to HCVs. As a general rule, monitoring should be proportionate to the risks posed to an HCV (see Box 4). Frequency and intensity of monitoring will depend on the HCV concerned. For example, maintaining a population of a long-lived HCV 1 tree species is unlikely to require annual population censuses, whereas short-lived, more mobile animal species may require more frequent monitoring of population trends.

### 3.2.1 | Choosing indicators

Indicators should be chosen strategically and directly tied to management objectives and targets. When developing a monitoring plan, it is worth investing resources to identify effective indicators, because poorly chosen indicators can be difficult or expensive to monitor, and can fail to reveal important changes in the status of the HCV.

*SMART*<sup>28</sup> is often used as a mnemonic for the important characteristics of a good indicator. Although the exact terms may vary, the FSC uses the following for monitoring compliance:

- **Specific:** accurately refer to a single HCV;
- **Measurable:** specify thresholds that are measurable at a reasonable cost;
- **Achievable:** should not require excessive technical, financial or resource inputs;
- **Relevant:** focussed on achieving HCV management objectives;
- **Tangible:** defined clearly and free from subjective elements.

<sup>28</sup> Alternative definitions use Time-bound in place of Tangible and the addition of 'e' (i.e. e-SMART) to include Economic (Schulte-Herbrüggen *et al.* 2012).



Indicators may be specific to operational, strategic or threat monitoring, or may be used across all of these monitoring types. Operational indicators tend to be straightforward to define based on the SOPs they are monitoring. Conversely, HCVs and threats can be measured in multiple ways, making it especially important to have clearly defined indicators. Identifying useful indicators can be done in consultation with experts, NGOs or relevant literature. In some cases, indicators may have been identified or suggested during HCV assessments.

Indicators can be direct or indirect. **Direct indicators measure the status of the HCV itself and the progress toward the management objective, whilst indirect indicators are proxies that can be used to assess the status of an HCV** (e.g. measures of the conditions required to maintain an HCV, such as habitat quality for an HCV 1 species). Direct indicators for strategic monitoring of HCVs can include, for example, direct observations of HCV 1 species, measurements of habitat quality (e.g. canopy cover, extent of damage for HCV 2 and 3), water quality parameters (HCV 4) and the quantity of forest products collected by a community (HCV 5). For threat monitoring, direct indicators could include the encounter rate of poaching signs (e.g. snares and traps, poaching camps, and spent bullet cartridges) per kilometre walked, threats to freshwater species from increased pollution, or disruption of breeding success in terrestrial species due to disturbance during logging operations. Indirect indicators can include, the presence and distribution of roads as an indicator of forest fragmentation, the extent of suitable habitat and key resources (e.g. nesting sites) for species, or the price of NTFPs in local markets (HCV 5). Those keystone or indicator species that provide useful information about trends in ecosystem health or that are indicative of certain ecosystem types, could also be indirect indicators for HCV 2,3 and 4 (e.g. plant species strongly associated with ecosystems or habitat types, or pollution-sensitive macro-invertebrates as indicators of ecologically healthy aquatic ecosystems).

### **3.2.2 | Baseline data and launching the monitoring plan**

**Whenever possible, monitoring should start before management activities are implemented to establish baseline conditions and should include engagement with experts and affected and interested stakeholders.** Baseline conditions provide a reference level against which subsequent monitoring data can be compared to evaluate whether HCVs are being maintained. Therefore, wherever feasible, monitoring plans should use similar methods, sampling frequencies and intensities to those used during baseline surveys, so that results are comparable. Baseline data can come from HCV assessments, and as production activities proceed, organisations should select data or indicators relevant to management and monitoring objectives.

Time lags may occur between production activities and the impacts on HCVs. Ongoing monitoring is vital for assessing trends in HCVs including identifying potential declines. Ongoing monitoring need not always be labour-intensive, as even carefully recorded observations from daily patrols can be used to assess HCV status.

### **3.2.3 | Roles and responsibilities for monitoring**

HCV monitoring can be carried out internally by organisation staff or in collaboration with external experts, such as academics or NGOs. Monitoring social HCVs (HCV 4-6) should always be done in consultation with community representatives. **The overall responsibility for the monitoring plan should belong to a named senior manager of the Organisation, who will ensure that data are properly collected and analysed, and that results are used for adaptive management.**

Managers need to be aware of both their internal capacity to conduct HCV monitoring, and the costs and complexity of monitoring, in order to determine the amount of outside assistance required. Some HCVs, such as concentrations of critically endangered species, are likely to need periodic surveys by experts. Conversely, routine patrols of illegal logging can typically be conducted by staff. Managers should also consider whether external groups have the expertise needed to help or whether there is greater technical expertise within the Organisation. For example, local NGOs may have mammal experts but no botanical expertise, which a timber company may have internally.

### 3.2.4 | Involving stakeholders and experts in monitoring

#### Local stakeholders

Where appropriate and feasible, local communities can be actively engaged in monitoring. This helps to access information that would not otherwise be available (e.g., local people often have a more accurate understanding of numbers of a wild species than outside experts) and also helps to keep the process of HCV management transparent and builds trusts between local communities and managers.

Monitoring of HCVs 5 and 6 should check whether the level of dependence on HCVs has changed over time and whether resources are being harvested sustainably by communities. Monitoring HCVs 5 and 6 needs to be culturally appropriate and may require input from social NGOs. It is essential that monitoring results be communicated to communities, especially if they are not directly involved in monitoring. Community-based monitoring need not be used solely for monitoring HCVs 5 and 6. Involving local communities in biodiversity monitoring can make use of traditional knowledge of flora and fauna.

#### Experts

Monitoring of HCVs 1-3 may require specialist ecological, botanical or zoological knowledge. If internal expertise is lacking then consultation with experts when developing a monitoring plan is recommended. Consulting experts early on can help to design a cost-effective monitoring process and avoid expensive remediative action. In some cases it may be beneficial, and cost-efficient in the long term, to organise monitoring training of internal staff by relevant experts. As monitoring data are collected, the results should be communicated to experts, who can help to interpret findings and inform adaptive management decisions.





### 3.3 Monitoring techniques

Once appropriate indicators have been chosen, managers need to define monitoring techniques. Appropriate monitoring techniques should be efficient, and informed by management objectives and indicators.

#### 3.3.1 | Monitoring patrols

Patrols can be informal or carefully designed, they can cover entire HCV management areas or be targeted for certain values or threats. More informal, ad hoc patrols may not always be sufficient to comprehensively assess the status of HCVs, but they provide useful information when combined with more strategically collected data.

Data management tools such as the Spatial Monitoring and Reporting Tool (SMART) can be used to analyse and interpret these different types of monitoring data (see section 4.1 for more details). The following information should be recorded during patrols.

- What was seen and details of the sighting e.g. species, sex, age, abundance, size, behaviour (if possible). If it is a sign of an HCV species or damage that threatens an HCV then the type (e.g. footprints, animal rubbings or scratch marks, shotgun cartridges, people encountered) and age of the sign (i.e. X hours old, X weeks old) should be recorded
- Where it was seen, e.g. geographic coordinates, vertical location in the vegetation, characteristics of vegetation/habitat at location
- When it was seen, i.e. the date and time of day
- Photographs if possible.

#### 3.3.2 | Faunal and floral surveys

In situations where there are major threats to species, then surveys should be the main type of strategic monitoring. If species surveys were undertaken in HCV assessments, this can form a baseline. Species surveys should be needed less frequently than monitoring patrols. They require standardised and repeatable methods so that species abundances or other measures can be reliably estimated and compared over time and space. Ideally, monitoring should aim to maximise sampling effort by having multiple repeat samples from multiple areas, days and seasons. In the case of HCV 2 and 3, practical budgetary and time constraints require that managers carefully select a small number of indicators which, if present, suggest that the ecosystem as a whole remains healthy. Plants tend to be relatively straightforward to sample, but identification can require expert botanical knowledge.

Monitoring HCV 1 animal species can be challenging because of the diversity of life histories and mobility of many animals. Managers should ensure that monitoring takes into account daily and seasonal variations in species activity. Examples of specific monitoring techniques can be found in Annex 2.

Alternatively, rather than monitor species directly, forest managers (particularly smallholders and communities) may find it more feasible and cost-effective to monitor structural composition and absence of threats, assuming that forests that maintain their overall health and integrity also retain most of their fauna and flora. A simple methodology for such monitoring, the Forest Integrity Assessment tool, is currently being developed and field tested by the HCV Resource Network.



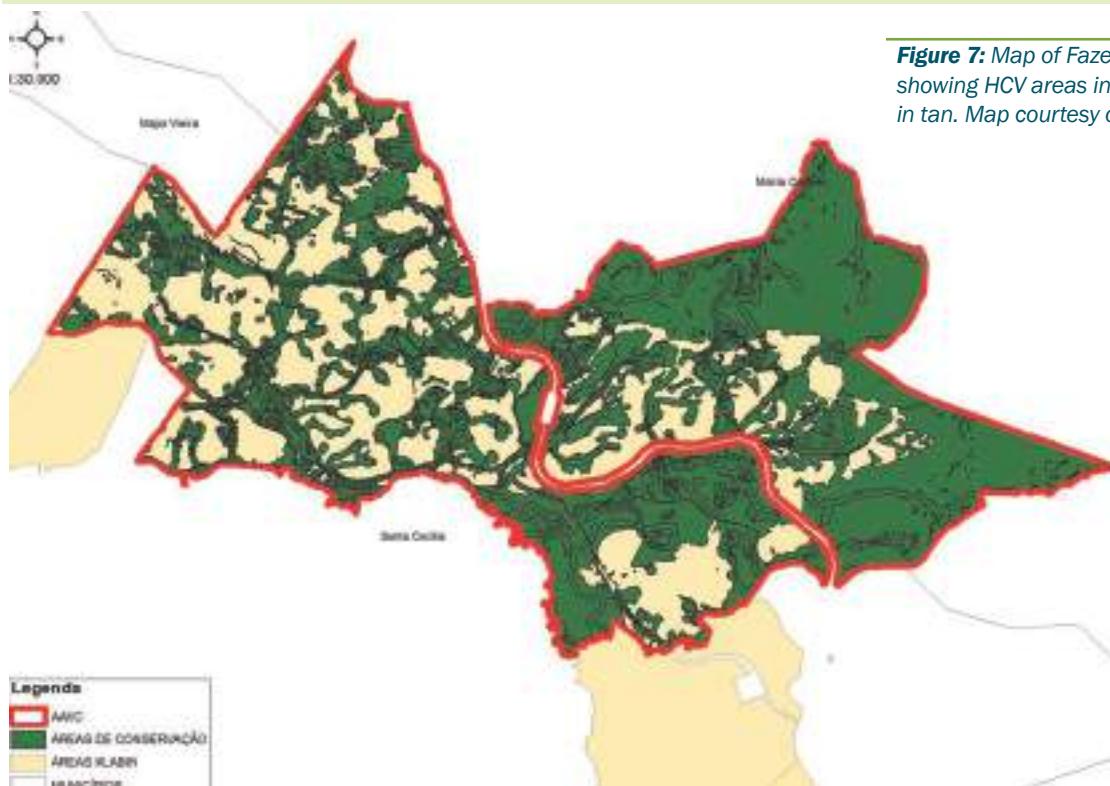
### Example 5: Vegetation and mammal monitoring in forest plantations, in Brazil's Araucaria forest

Brazilian company Klabin has large areas of FSC-certified pine and eucalyptus plantations in Southern Brazil (Parana and Santa Catarina states). The Fazenda Palmital do Areião MU (FSC-certified since 2004<sup>29</sup>) contains HCV areas that protect HCV 3 Araucaria moist forest, which is only found at altitudes greater than 500 m a.s.l in southern Brazil and Argentina. The HCV areas also protect HCV 1 plant species found only in Araucaria forest, such as critically endangered *Araucaria angustifolia* and endangered *Cedrela fissilis*.

In 2011, in collaboration with mammalogists and botanists from the Universidade do Estado de Santa Catarina, Klabin implemented a monitoring programme for plants and mammals to assess the effectiveness of HCV areas. The plan is to monitor vegetation every five years for at least 12 consecutive months (to cover flowering and fruiting seasons) focusing on the HCV 1 species listed above, as well as other indicator species of Araucaria forest, such as *Podocarpus lambertii* and *Ocotea porosa*. Mammals will be monitored every two years for 12 months using camera traps focussed on sampling indicator species of the habitat such as oncillas (small-bodied forest cats associated with montane forests).



Camera trap photo of an oncilla, taken in the Fazenda Palmital do Areião MU



**Figure 7:** Map of Fazenda Palmital do Areião MU, showing HCV areas in green and plantation areas in tan. Map courtesy of Klabin

<sup>29</sup> Correct at time of publication.

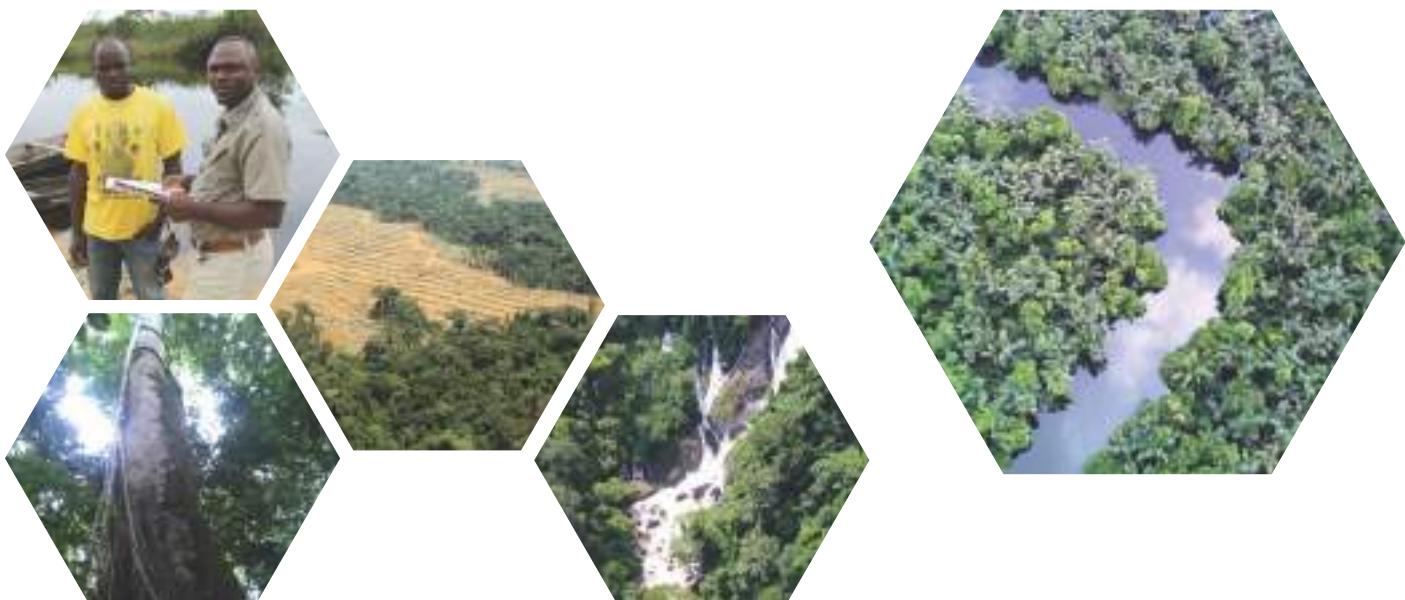
### 3.3.3 | Remote sensing

Remote sensing (including both aerial photography and satellite images) is very useful for monitoring HCVs 2 and 3, and can also be used to monitor the habitat of HCV 1 species and sometimes the status of HCV 4 ecosystem services (e.g. status of soil erosion). There are now a number of freely-available online tools that can be used to monitor changes in forest cover (e.g. Global Forest Watch). The FSC is also developing a tool for monitoring and mapping FSC-certified forest operations, called Transparent Forests (<https://ic.fsc.org/transparent-forests.552.htm> and see Annex 1).

Organisations should also consider conducting their own monitoring using higher resolution imagery where possible. For example, high-resolution images can be used to identify habitat clearance and small scale disturbances such as logging or fires. A large range of remotely-sensed data is available for different purposes, varying in resolution and cost (see Annex 1). For example, Landsat 8 data (15-30 m resolution) are useful for assessing changes in land cover and are free to download (<http://landsat.usgs.gov/>) allowing managers to assess almost real-time changes in HCV management area size. Other higher resolution imagery must be purchased, but can be used to directly record animal sightings and estimate population sizes. For example, orang-utan nests can be recorded from aerial photographs and these data can be used to estimate the size of breeding populations.

When used to monitor HCVs 2 and 3, satellite imagery or land cover data can measure changes in the size of the HCV area and, in some circumstances, the quality of the ecosystem. For example, higher resolution aerial photography or LiDAR data is not free, but can be used to monitor disturbances such as illegal logging. Even freely available Landsat imagery can be used to monitor vegetation quality and structure, which can be used to assess habitat quality and threats such as fire risk.

The extent to which satellite imagery can be used to detect changes in ecosystem health varies greatly between ecosystems and is changing all the time. Therefore, analyses of remotely sensed data should be followed up by ground-truthing. For example, if GIS<sup>30</sup> data suggest that an area of forest has been disturbed and that the canopy opened, then a monitoring team should visit the site to assess whether the disturbance is of natural or anthropogenic origin, and to make sure that the GIS data have been interpreted correctly.



<sup>30</sup> Geographic Information System.

### 3.3.4 | Techniques for monitoring ecosystem services

Monitoring techniques will vary greatly depending on the HCV 4 ecosystem service involved and could include, for example, analysis of water quality, soil cover, dust storms, flooding frequency, damage to coastal communities, or abundance of fish stocks. Erosion control and protection against fire are two of the more common HCV 4 services, so we describe techniques for monitoring them in greater detail here, and list examples of monitoring techniques for other HCV 4 ecosystem services in Annex 2. There are many standardised procedures for assessing fire risk, which include monitoring rainfall and temperature patterns using on-site weather stations or remotely sensing data and field measurements of combustible material (e.g. dead wood, leaf litter). The risk status should be regularly updated based on these measurements.

The effectiveness of erosion controls can be monitored by measuring water quality and sediment loads in the catchments where the controls are situated. Measurements should be compared to baselines where available. However, these measurements can readily be altered by climatic or external factors such as rainfall, season or upstream land uses. For these reasons sampling protocols should be standardised relative to these other factors where possible and interpretation of monitoring results may require input from hydrology professionals.

### 3.3.5 | Techniques for monitoring community values

Monitoring of HCVs 5 and 6 must be undertaken in a participatory way and should be part of the Organisation's policy of engagement with local communities, verifying:

- Whether the value is being maintained
- If the value is being sustainably harvested (e.g. hunting, harvesting of particular plant species, building timber extraction)
- The level of reliance on the value
- Condition of value (e.g. sacred grove).



### Interviews and group discussions

Interviews and focus group discussions should aim to identify whether HCVs are being maintained and used by communities. Care should be taken in devising appropriate, unbiased questions whose meaning is not lost in translation. Local or national NGOs who have experience working with the community, may have valuable knowledge of the community's culture and can help ensure that questions or interview approaches are appropriate. Interviews should be conducted with a wide cross-section of the community to ensure that different groups are represented regardless of age, gender or status. These interviews should happen at regular intervals to monitor changes in natural resource use or cultural values across seasons and over years.

### Participatory mapping

**Participatory mapping should<sup>31</sup> be conducted during all HCV assessments where local people have land, activities and resource claims which overlap with the MU. This often serves as a base for negotiation of HCV 5 and 6 areas through FPIC which, once established, need to be monitored.** Conducting participatory mapping is a useful way of obtaining spatial and even real-time data on resource use in HCV management areas. For example, community members can use GPS units or smartphones that can record data on resource use or cultural values. If the use of GPS units is too costly, then managers can consider organising joint mapping sessions with the Organisation and community members. HCV managers can then analyse the resulting data to assess whether the HCV is being maintained and to decide whether management changes are required. The use and interpretation of data collected using participatory methods should be based on on-going community consultation to ensure that the findings have been correctly interpreted. This is best formalized through a community engagement strategy.

### Triangulation

Data obtained from interviews and participatory mapping can be subjective and incomplete, and so it may be necessary to verify the findings with independent data sources, such as observations from monitoring patrols or consultation and studies from relevant experts. For example, interviews with community members may reveal concerns about river pollution that can be confirmed through water quality measurements or biotic surveys.



<sup>31</sup> In the new HCVRN assessor licensing scheme (<http://www.hcvnetwork.org/als>), assessors are required to show proof of participatory mapping.



# Adaptive Management

**There should be a management review of all monitoring results at least annually to assess progress in meeting management objectives, and if particular HCVs are not being maintained, alternative management strategies should be developed. The management plan should remain flexible to incorporate new information coming from the monitoring process.**

The need for adaptive management is especially important because Organisations rarely have complete knowledge of HCV distribution or management effectiveness prior to starting production activities, thus why it is important for the Organisation to practice precautionary management (see Box 3). A key component of adaptive management is for Organisations to strive for continuous improvement in their knowledge and management of HCVs (FSC 2012b). Management areas and prescriptions required can often be modified or refined over time based on lessons learned from monitoring.

Adaptive management is especially important when monitoring results show that the negative impacts of production activities are increasing. However, changes in the status of HCVs are not always a result of the Organisation's activities. **Monitoring should be designed to distinguish between the effects of internal activities and the effects of activities undertaken by third parties, as well as those unrelated to direct and local human activity, such as climate change.**

Some important questions to consider when reviewing management effectiveness are:

- What changes have taken place in the HCVs, and what caused them?
- Are the planned management strategies and prescriptions being implemented?
- Have the risks and threats facing HCVs changed?
- How effective are the management strategies?
- Are monitoring strategies effectively identifying threats to HCVs and changes in HCV status?

## 4.1 Reviewing results and objectives

Managers need to interpret monitoring data to decide what change in an HCV or indicator should lead to a change in management (i.e. to identify the threshold for management action). However, identifying this threshold can be difficult, therefore, the Organisation should be aware of the ability of the monitoring process to detect meaningful change and focus on using effective indicators. A solid understanding of indicators, and how they can be expected to vary over time and place, is critical for accurate data interpretation (e.g. understanding seasonal fluctuations in fish stocks, an indicator of HCV 5 fisheries). If the results of monitoring remain unclear it may be necessary to consult relevant experts for their interpretation and advice on the development of new, clearer indicators.

Interpretation of monitoring data can help to establish whether an HCV is declining because of weak management implementation, ineffective management strategies or new/increasing threats. This should be followed by determination of whether management changes are required.

More frequent monitoring may be needed if the status of an HCV is of particular concern and has the potential to decline very rapidly, for example, if there is evidence of illegal harvesting of the only known population of a critically endangered plant. Extra monitoring may cost more in the short term, but a proactive approach to adaptive management can save costs over time by avoiding the need to restore HCVs (or the costs of losing certification status).

Tools for using and analysing monitoring data for long-term management can greatly simplify the adaptive management process. *SMART*, as mentioned in section 3.3.1, is especially useful in adaptive management as it enables managers to measure, evaluate and improve the effectiveness of conservation activities (see Box 8). For example, it can help managers decide whether a measured increase in the abundance of an HCV species is created by changes in monitoring (for example change of staff to someone who is better at spotting species) or to an actual population increase.

### **Box 8: Spatial Monitoring And Reporting Tool (*SMART*)**

*SMART* is freely-available, open-source software designed to assist site-based conservation through improved monitoring and adaptive management. It was developed by a network of conservation practitioners with extensive experience in applied conservation work. *SMART* allows monitoring data to be collated, mapped and analysed. The software is designed to be user-friendly and was developed specifically for conservation managers. It uses monitoring data collected on the ground (e.g. using GPS units and field notes) and enables managers to:

- 1.** Collect and record monitoring data,
- 2.** Map and report findings,
- 3.** Evaluate findings, and
- 4.** Adapt or improve management and monitoring.

Manuals on how to use *SMART*, standardised protocols for data analysis, and training materials are freely-available online (<http://www.smartconservationsoftware.org/>).

One of the original aims of *SMART* was to monitor threats to wildlife such as poaching, but it can be used to monitor any threats to terrestrial, marine or aquatic ecosystems or species. It is now being used at 120 sites globally, including in oil palm plantations in Indonesia where it has been combined with ZSL's HCV monitoring protocol (Zrust *et al.* 2013).

This means that new management strategies should be designed to maintain the HCV in the face of any new threats or observed changes in the HCV. **As with initial management planning, adaptive management may require expert consultation, to help identify new strategies that can arrest the decline of the HCV.** In some cases, even the most comprehensive management and monitoring strategies may be insufficient to prevent a decline in an HCV (e.g. declines due to natural fluctuations, climate change or external influences). In such situations managers need to explain why a decline has occurred and what management and monitoring measures were put in place to try and prevent the decline.

## 4.2 Using monitoring results to improve management

Understanding the cause of a decline in an HCV can inform appropriate management changes. For example, the adaptive management response to a decline caused by weak management implementation may be to have stricter operational monitoring, whereas addressing new threats could require entirely new management strategies. Simply changing management strategies may not always be sufficient to maintain an HCV. For example, in cases where monitoring shows that production activities have caused a significant decline in an HCV<sup>32</sup> then rehabilitation strategies (e.g. forest restoration) should be implemented to restore the HCV to its baseline level.

It is highly likely that the status of HCVs and threats to them will continue changing over time, especially because there is often a lag period between disturbances and the response of ecological/biological processes. Likewise, socioeconomic contexts can also be expected to change over time. Therefore, to ensure HCVs are maintained over time, the adaptive management and monitoring process should continue throughout the lifetime of the production activities. This is especially important in high risk situations when HCVs and threats are changing rapidly, but should be carried out in all contexts in proportion to the scale, intensity and risk of threats to HCVs (e.g. intensity of production activities). Examples of useful resources and tools for adaptive management are listed in Annex 1.



<sup>32</sup> Depending on the severity of the decline, a certification body may issue a corrective action request or recommend that an Organisation's certificate is revoked.

### Example 6: Adaptive management of an HCV 1 species in Ontario, Canada

Mazinaw-Lanark Forest (MLF) is a 300,000 ha, publically owned, natural forest in south-eastern Ontario, Canada of which approximately 135,000 ha is managed as production forest by Mazinaw-Lanark Forest Inc. This production forest has been FSC certified since 2012<sup>33</sup>. The MLF is spread over about a million hectares, the adjacent lands are privately owned. The forest is made up of mixed coniferous and deciduous species and it contains wildlife that is uncommon in other parts of Canada, including several HCV 1 species. These include Blanding's turtle, which is listed as Endangered on the IUCN Red List and is protected under the Ontario Endangered Species Act (2007).

The main threats to Blanding's turtle come from development (e.g. agriculture and recreation) and road building, which cause habitat loss and fragmentation and direct turtle mortality from vehicle collision. Nest depredation by raccoons and foxes is also elevated along unpaved roads, because 1) predators use them as movement corridors and 2) Blanding's turtles often nest along roads where the sandy substrate is ideal nesting habitat. In comparison to agriculture, recreational development and road building, forest management activities, such as felling and timber extraction, pose little threat to turtles because they impact a relatively small area for a short period each year.

During the winter, Blanding's turtles hibernate in shallow lakes and wetlands. After hibernation, females disperse up to 2 km into the forest to find nesting spots and lay their eggs. The summer is then spent foraging terrestrially in the forest. Their mobile life history makes Blanding's turtle vulnerable to vehicle collision and egg predation in areas where roads overlap turtle habitat.

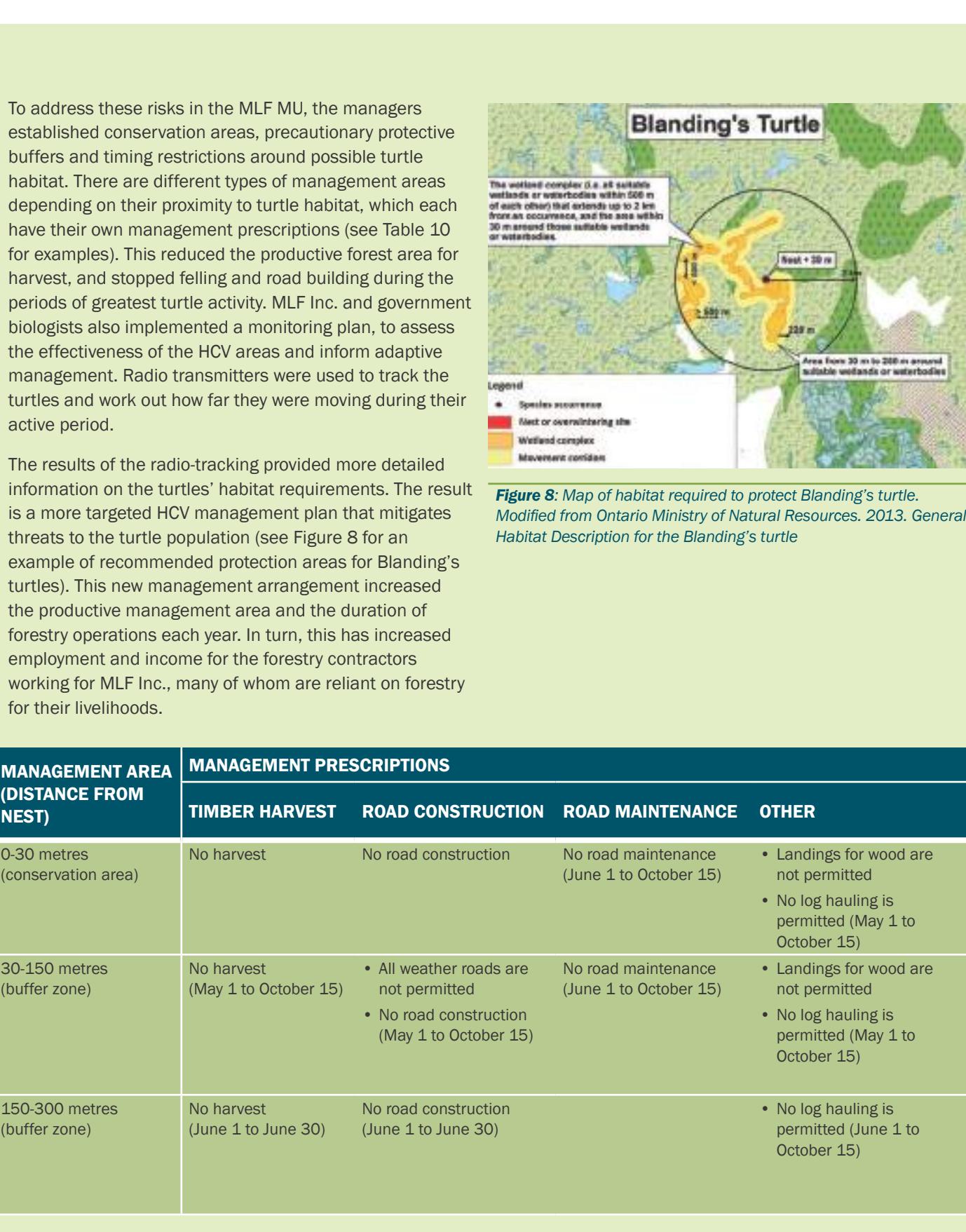


Blanding's turtle



Lake used by Blanding's turtles for hibernation

<sup>33</sup> Correct at the time of publication.



**Table 10:** Summary of management areas and prescriptions for the maintenance of HCV 1 Blanding's turtle populations in the MLF forestry MU, Ontario, Canada

# 5

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# Annex 1: Resources for HCV Management and Monitoring

## National guides

HCV national interpretations may provide some guidance on recommended methodologies for monitoring specific HCVs. See <http://www.hcvnetwork.org/resources/global-hcv-toolkits>

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## Oil palm

RSPO. Best Management Practice (BMP) Manuals on Peat [http://www.rspo.org/en/Peat\\_Best\\_Practice\\_Manual](http://www.rspo.org/en/Peat_Best_Practice_Manual)

Zrust, M., L. D'Arcy, S. Persey and D. Priatna, 2009. Discussion Paper: Standardising the Monitoring of HCV Values in Palm Oil Landscapes. Zoological Society of London, Indonesia. [http://rt10.rspo.org/ckfinder/userfiles/files/PC4\\_1%20Michal%20Zrust%20Presentation.pdf](http://rt10.rspo.org/ckfinder/userfiles/files/PC4_1%20Michal%20Zrust%20Presentation.pdf)

Zrust, M., L. D'arcy, L. Sadikin, A. Suhada, E. Hermawan, L. Leonald, Rudiyanto, S. Wahyudi, R. Amin, O. Needham and D. Priatna. 2013. HCV Threat Monitoring Protocol. Zoological Society of London, Indonesia. [http://www.sustainablepalmoil.org/files/2013/05/Threat\\_Monitoring\\_Protocol\\_FINAL-VERSION.pdf](http://www.sustainablepalmoil.org/files/2013/05/Threat_Monitoring_Protocol_FINAL-VERSION.pdf)

ZSL. (no date). A practical handbook for conserving High Conservation Value species and habitats within oil palm landscapes. [http://www.sustainablepalmoil.org/files/2012/10/Practical-Handbook\\_Indonesia\\_CC.pdf](http://www.sustainablepalmoil.org/files/2012/10/Practical-Handbook_Indonesia_CC.pdf)

#### **Forest fragmentation and ecological linkages:**

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#### **Remote sensing data resources:**

**Global Forest Watch**, for assessing changes in forest cover and threats to forests such as fires. <http://www.globalforestwatch.org/>

**Transparent Forests**, for monitoring and mapping FSC-certified forestry operations. <https://ic.fsc.org/transparent-forests.552.htm>

**Landsat 8** satellite imagery, inc. links for data downloads <http://landsat.usgs.gov/landsat8.php>

**Forest and Fire Monitoring & Forecast System (FIRECAST)**, a tool for monitoring disturbances such as fires. <http://firecast.conservation.org/>

Diva-GIS for free shapefiles <http://www.diva-gis.org/gdata>

**GOFC-GOLD sourcebook** for an excellent summary of different satellite imagery types and sources, and their uses in land-use monitoring. The document focuses on carbon emissions from land use change, but sections 2.1 and 2.2 provide useful summaries of data that can be used to monitor forest area changes and degradation:

**GOFC-GOLD. 2013.** A sourcebook of methods and procedures for monitoring and reporting anthropogenic greenhouse gas emissions and removals associated with deforestation, gains and losses of carbon stocks in forests remaining forests, and forestation. GOFC-GOLD Report version COP19-2, (GOFC-GOLD Land Cover Project Office, Wageningen University, The Netherlands).

**Natural Earth**, database of free vector and raster map data at 1:10 m, 1:50 m and 1:110 m scales. <http://www.naturalearthdata.com/>

**ASTER** Global Digital Elevation Model (ASTER GDEM), freely available digital elevation raster data. <http://www.jspacesystems.or.jp/ersdac/GDEM/E/4.html>

**Reverb:** NASA's Earth Observing System Data and Information System (EOSDIS), a GIS data search portal. [http://reverb.echo.nasa.gov/reverb/#utf8=%E2%9C%93&spatial\\_map=satellite&spatial\\_type=rectangle](http://reverb.echo.nasa.gov/reverb/#utf8=%E2%9C%93&spatial_map=satellite&spatial_type=rectangle) or see for a list of available 'land' dataset and portals: <https://earthdata.nasa.gov/data/data-tools>

**Commercial (not-free), high resolution satellite imagery:**

SPOT (20-2.5m resolution), <http://blackbridge.com/rapideye/products/index.html>

RapidEye (~6.5 m resolution), <http://www.astrium-geo.com/en/65-satellite-imagery>

**Adaptive management tools and resources:**

Spatial Monitoring And Reporting Tool (SMART) <http://www.smartconservationsoftware.org/>

The Nature Conservancy provides a range of tools and resources to help land managers evaluate the success of conservation projects and to aid adaptive management.

<https://www.conservationgateway.org/ConservationPlanning/Measures/Tools/Pages/tools-measures.aspx>

Of particular use may be the Viability, Management, Threat (VMT) Analysis Tool:

<https://www.conservationgateway.org/Files/Pages/viability-management-thre.aspx>

**Ecosystem services mapping and management:**

The Toolkit for Ecosystem Service Site-based Assessment (TESSA) is designed to help land managers identify, manage and monitor ecosystem services at the site level

<http://www.birdlife.org/datazone/info/estoolkit>



## Annex 2: HCV monitoring techniques

A large range of techniques can be used to monitor HCVs in the field, especially HCVs 1-4 where techniques required may be highly specialised depending on the HCV. Here we describe some of these methods.

### **Fauna and flora survey methods**

**Vegetation transects and permanent plots:** Surveys are typically conducted using fixed transects and/or permanent plots, to record the relative or absolute abundance, or percentage cover of HCV species or proxy species, or in some cases detailed monitoring of reproductive success (which may require knowledge of flowering/fruiting seasonality).

**Systematic transect walks** can be used to sample obvious animals and plants as well as threats and disturbances. Observers walk slowly and quietly along set routes and record sightings, calls, or signs of animals, including species, behaviour, size, age, abundance and sex if possible, and presence and abundance of plant species of interest. The timing and location of transect walks will depend on the target species groups. This is an effective way of sampling the most common species, but is time-intensive and hence costly.

**Point counts** are commonly used to sample presence and density of birds, and less commonly mammals. Observers stand at a particular location, usually at dusk or dawn when species are most active, and record sightings and calls of all observed birds over a given time period, along with sex, abundance and location if possible. Replicates should be sufficiently far apart to avoid sampling the same individuals multiple times. Point counts are an effective but time-consuming way of sampling bird species.

**Camera trapping**, a method for capturing wild animals on film when researchers are not present, is an effective way of recording the more elusive (particularly nocturnal) species in an HCV management area. For monitoring purposes cameras should be placed at key locations, such as watering holes, or placed strategically to record target species. Camera traps typically only produce presence/absence data, although for some larger species individual animals can be recognised based on their markings, size or other characteristics.

**Occupancy surveys** are used for sampling rarer species, recording the occurrence of species in different areas based on signs such as footprints or dung, or use of camera traps that aims to record presence or absence of species. This is cheap and technically easy, but time-consuming.

**Pitfall traps** can be used to sample small mammals, herpetofauna and insects. They consist of tubes or buckets of different sizes (depending to the taxa being sampled) that are buried into the soil and checked regularly. They are cheap and can be effective sampling methods, but identification often requires taxonomic training.

**Active searches** can be useful if managers are trying to locate particular individuals or nest sites, or if the locations of individuals are already known (e.g. for a critically endangered tree species). This strategy is also useful for less active or small insects and herpetofauna. These active sampling methods can be harder to standardise, because detection rates differ from person to person and depending on collector effort.

**Aquatic vertebrates** and invertebrates can be sampled by **live catching** using nets. Nets with different mesh size can target different species and age groups. The position of nets and frequency of collection (sampling effort) will affect results. External expertise may be required for identification.

Other strategies include **mist netting** for birds and bats (normally requires a license or permit), **nest counts** for great apes, **seining** for fish, and **box traps** for small mammals. All methods used should be non-invasive and humane.

### Ecosystem services monitoring techniques

HCV 4 ECOSYSTEM SERVICE	MANAGEMENT AREAS	MONITORING TECHNIQUES
Protection of water catchments for provision of clean water or fisheries, managing extreme flow events or downstream water quality/quantity	Intact floodplains, riparian buffers, areas of groundwater recharge	<ul style="list-style-type: none"> <li>Analysis of water quality</li> <li>Water flow measurements</li> <li>Surface run-off measurements</li> <li>Flood occurrence records</li> <li>Fish stock surveys</li> </ul>
Control of erosion of vulnerable slopes or soils	Steep slopes forested, riparian buffers	<ul style="list-style-type: none"> <li>Soil/ground cover measurements</li> <li>Waterway sedimentation measurements</li> </ul>
Fire prevention	Moist forest buffers, wetlands	<ul style="list-style-type: none"> <li>Remote sensing of fire risk and previous fires</li> <li>Ground measures of combustible material</li> <li>Fire frequency and distribution monitoring</li> </ul>
Protection against winds or other climate regulation	Forest areas	<ul style="list-style-type: none"> <li>Monitor wind damage</li> <li>Monitor frequency of extreme weather</li> </ul>
Pollination services provided by native pollinators from natural vegetation	Areas of natural vegetation	<ul style="list-style-type: none"> <li>Monitor pollinator species</li> <li>Monitor pollination rates</li> </ul>

## Annex 3: Examples and image credits

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A 'Pudu' being rehabilitated	Masisa (Chile)	27
<i>Oncilla</i> camera trap photo	Klabin	42
Blanding's turtle	Matt Mertins	50
Lake used by Blanding's turtles	Matt Mertins	50

