Chapter 6

HCS Forest Patch Analysis Decision Tree

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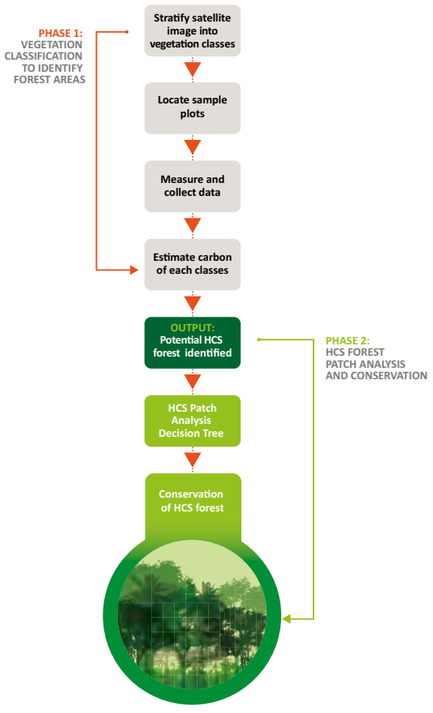
Introduction

Phase One of the HCS Approach uses satellite imagery and field plots to develop a map of potential HCS forest areas in a particular concession. In most landscapes, the HCS forest will be present in patches of various sizes and proximity, intermingled with any existing plantations or other land-uses. The HCS Approach uses a HCS Forest Patch Analysis Decision Tree to determine the importance of each patch and whether it needs to be included in the conservation plan, given its size, shape, and connectivity to other patches, riparian zones, peat areas, or High Conservation Value (HCV) areas. The Decision Tree also makes some allowances for the degree of forest cover in the landscape.

This chapter takes the reader through the Decision Tree, which is the second and final phase of the HCS Approach to land use planning in tropical landscapes which are proposed for agricultural development.

STEPS IN THE HCS PROCESS



Principles to incorporate into the Decision Tree

The previous chapter gave an overview of some of the conservation science literature on forest fragmentation. Incorporating that into an integrated planning approach to conserving HCV areas, peatlands, and areas important for community purposes results in the following principles for analysing the value of each HCS forest patch:

1. Ensure that areas which are part of an active subsistence food production cycle to meet the food security needs of local customary communities are enclaved from consideration as HCS forest (or for plantation development).
2. Prioritise large forest patches.
3. Prioritise conservation of primary and advanced secondary forest areas.
4. Prioritise forest patch shape that maximises the 'core area' of a patch and thus minimises the area of forest subject to degradation on the edges.
5. Maximise connectedness between patches in order to create corridors, linkages and stepping stones in the landscape.
6. Prioritise patches located away from threats and risk factors that might lead to degradation.
7. Ensure HCS forest conservation is integrated with HCV area protection, peat land areas and riparian zone protection and considers the landscape matrix in finalising conservation plans.
8. Ensure HCS forest areas for conservation have the Free Prior and Informed Consent (FPIC) of local customary communities and that communities are active participants and co-managers in the conservation of HCS forests.
9. Ensure the HCS forest conservation plan considers practical design and management issues for plantation development, including access and minimum planted block size and shape.

Definitions of high, medium, and low forest cover landscapes

A high forest cover landscape is defined as a landscape with a natural forest cover greater than 80%. A medium forest cover landscape is defined as a landscape with a natural forest cover of between 30 and 80%. Low forest cover landscapes have less than 30% natural forest cover.

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In high and medium forest cover landscapes, some additional assumptions can be made:

10. Focus on larger patches of forest (i.e. small patches are relatively less important in an area which already has relatively high forest cover).
11. The less fragmented the landscape, the less important any individual patch will be, and the more the focus moves to landscape-level forest conservation.

These principles have been incorporated preliminarily into the Decision Tree presented in this chapter. They also provide important context for creating the final land use plan for conservation and management in the concession.

Integrating information beyond HCS into the Decision Tree

As stated at the beginning of the toolkit, the HCS Approach integrates not just HCS forest but also a number of other areas for conservation. This includes the protection of HCV areas, peatlands, and areas important to communities' social and economic needs. Before the Decision Tree analysis can be completed, a mapping of data layers must be made which includes:

- Any **HCV areas**, including riparian zones within the concession and areas that are adjacent in the broader landscape, including for instance protected areas. At a minimum, an overview of HCV areas within 200 metres of the concession is necessary for using the Decision Tree, as 200metres is the standard distance used to assess connectivity of HCS forest patches to nearby conservation areas. The content of the HCV analysis, i.e. the High Conservation Values that were identified, especially HCV 1 - 4, will also be important at certain steps in the Decision Tree.
- A map of **peatlands**. As the peat soil maps that are currently available are imperfect, if peat soils are known to occur in the region then the concession management must also have a detailed identification procedure for peat of any depth, as well as converting this into spatial data (a map). While in practice some peatland forest areas may be identified as HCS forest, the current methodology is not calibrated for peatland vegetation types. The Decision Tree as it is currently formulated cannot be used to analyse peatland areas – a different set of attributes would need to be considered including hydrology. However, a peatlands map is still useful information for identifying forested peatland areas that may be potentially viable areas and that would be a high priority for protection; this information can be integrated into Step 12, conservation planning stage.
- A map of the **boundaries and customary land use of local communities**, created through a participatory exercise as outlined in Chapter 2 of this toolkit. In particular, gardens and future farm lands that are areas fundamental to meeting basic food needs[1] are completed and recorded on maps, both for communal lands and individually claimed and used areas. If these areas are located within the concession then they will be enclaved and excluded from HCS analysis and plantation development.
- Maps of any other areas that are **legally required to be protected**.

All of these areas will be enclaved and excluded from HCS analysis and plantation development, but it is nonetheless important to overlay them with the map of HCS patches in order to use the Decision Tree. If these analyses and mapping processes have not occurred, or if it is found during field visits that the participatory mapping or HCV studies were of poor quality, then the Decision Tree process will not be able to be finalised until the other processes are completed. Completion of the integrated land use plan in the Decision Tree requires all critical layers of information to be available. For example, it is necessary to ensure community garden areas are not classified as HCS forest, or that conservation planning optimises conservation area shape and connectivity.

Areas of community land that are identified as having HCS forest will be proposed for conservation as part of the integrated conservation plan for the concession. They will require FPIC negotiations and the support and participation of the communities to achieve conservation (similar to areas of HCV). Thus local communities with customary rights have the right to say no to their forest lands becoming a conservation area. However, the forest areas remain categorised as HCS forest.

Documenting the steps in the Decision Tree

Finally, each distinct step and decision taken in this process should be documented by the concession holder. The results must be transparent and available to be reviewed by external experts. The HCS Approach Steering Group is developing a quality control process to provide an expert review of the Decision Tree results. This will ensure the interpretations and decisions are in line with the full HCS process. The final conservation and land use plan must reflect the integrated planning approach which requires that habitat connectivity and the importance of each forest patch be assessed within the broader landscape.

"Gardens and future farmlands that are areas fundamental to meeting basic food needs….will be enclaved and excluded from HCS analysis-"

1. This shall provisionally be a minimum range of 0.5 to 4 ha per person living in the community depending on the local context.

The HCS Patch Analysis Decision Tree

The full Decision Tree is presented on the following page. Broadly, the Decision Tree provides a way to analyse the conservation value of each HCS forest patch based on the conservation principles outlined above, short-listing each patch for conservation ('indicative conserve' in the diagram) or development ('indicate develop'). Some patches may change categories or boundaries in the final stages of the decision-making process.

Each step in the Decision Tree will be detailed in this chapter. To illustrate the concepts, a simple stylised concession map (below) has been created with 17 HCS forest patches of varying size and shape.

FIGURE 1: **HYPOTHETICAL PLANTATION CONCESSION (ORANGE BOUNDARY).** HCS FOREST PATCHES ARE SHOWN IN LIGHT GREEN, WITH DARKER CORES

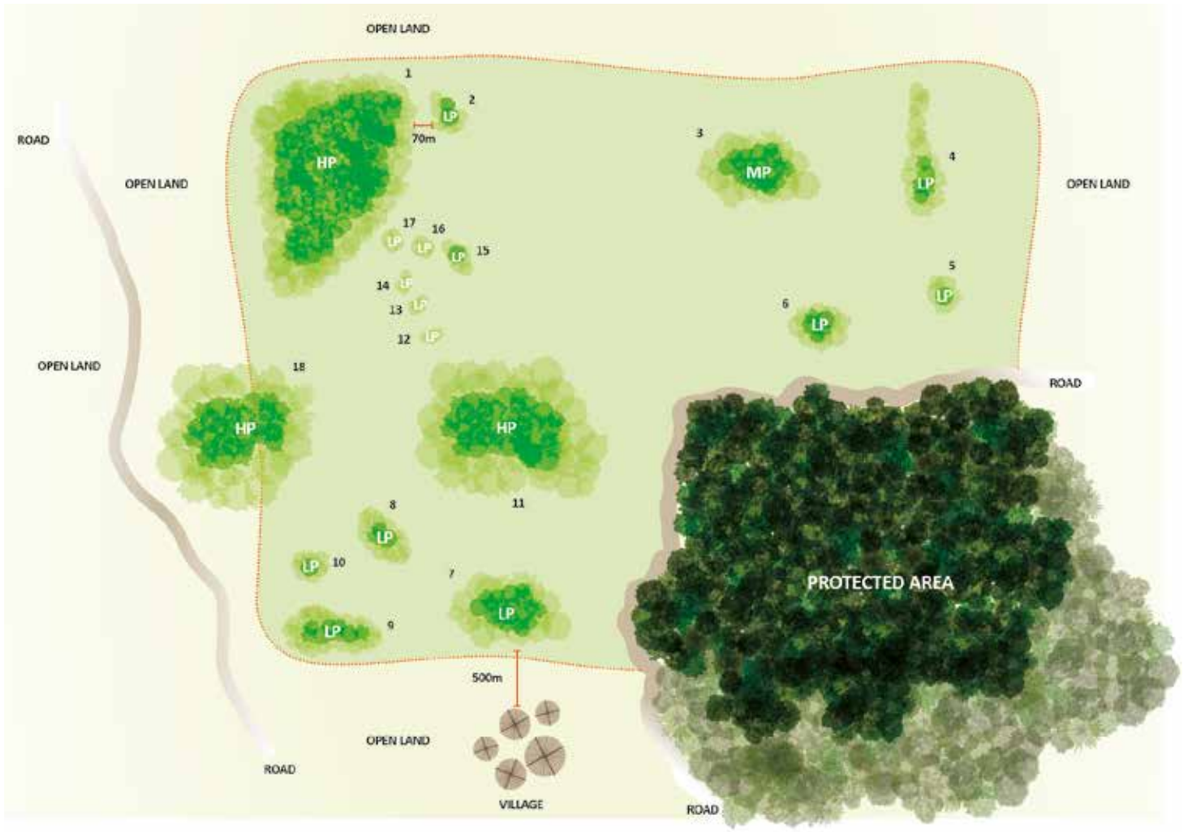

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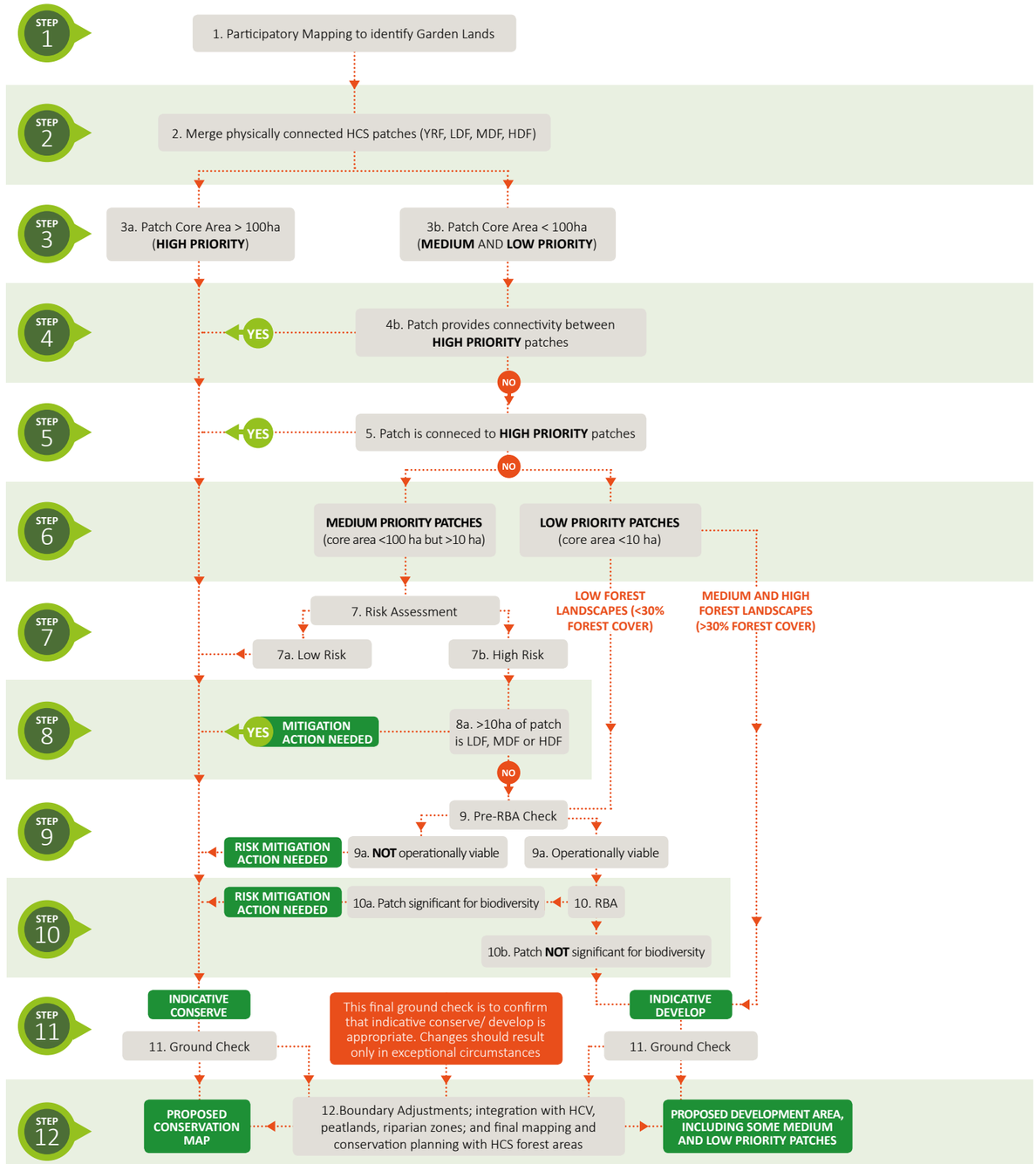
FIGURE 2: **HCS PATCH ANALYSIS DECISION TREE** (RBA = RAPID BIODIVERSITY ASSESSMENT)



The HCS Patch Analysis Decision Tree

STEP 1
Identify customary use areas, enclave community garden land and overlay HCV areas, peatlands and other areas of concern

The concession map with the potential HCS forest areas must also include other data that spatially delineates areas to be enclaved (e.g. community subsistence garden areas) or protected. This includes: community protected areas, HCV areas (separated by HCV 1-3, HCV 4 and HCV 5-6), peatlands and areas that cannot be developed due to government regulation or company commitments. The garden/farm lands and community economic use areas (such as rubber or cocoa plantations) are removed from consideration as potential HCS forest and thus not processed further via the Decision Tree. The other areas are included for information only, to show the full mosaic of already-protected/protectable areas in relation to any potential HCS forest areas. Step 12 will fully integrate HCS patches with HCV areas and other areas to be conserved.

There are also considerations to be made outside of the concession. Any large HCS forest areas indicated in satellite imagery, and any known HCV areas – for instance protected areas – that are identified within 200 metres of the concession borders are also considered in the Decision Tree process.

This allows the user to properly assess patch size and to take landscape-level connectivity opportunities into account when assessing each patch. In the sample concession, the existing Protected Area is an HCV area which borders the concession and will need to be taken into consideration in the Decision Tree process.

STEP 2
Extract all HCS forest classes and merge physically-connected patches

High Density Forest (HDF) areas through to Young Regenerating Forest (YRF) areas identified in Phase One are extracted from non-HCS classes to form one HCS layer, while maintaining the distinctions regarding type of class (HDF, MDF, LDF or YRF) for consideration later in the Decision Tree. Where HCS patches are phyically connected to each other they are merged to form one patch.

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STEP 3
Identify patch core and prioritise patches

Each HCS patch can now be assessed according to the conservation science principles outlined in Chapter 5 of this toolkit. The HCS forest patches are first assessed for their core area, using an internal (negative) buffer of 100 metres. This is the primary filter for selecting patches for conservation, because patches with a larger core area will be more viable in the long term as they have fewer edge effects.

The larger the patch core, the higher the likelihood there is to be able to maintain or recover its ecological function as a forest, including conserving carbon and biodiversity values. Patches are therefore prioritised accordingly:

3a. A patch that contains a core of more than 100 ha of HCS forest is considered **High Priority (HP)** and will be marked for conservation. HCS forest patches that extend outside the boundaries of the concession are assessed for their full size irrespective of the concession boundary, and are also considered High Priority patches if their core area is greater than 100 ha and at least 10 ha of patch core area are within the concession.

3b. A patch that contains a core of 10 – 100 ha of HCS forest is considered **Medium Priority (MP)**, and a patch that contains a core less then 10ha of forest is considered **Low Priority (LP)**. Both will be further assessed for connectivity between High Priority patches (Step 4) and proximity to large patches (Step 5).

STEP 4
Connect High Priority patches

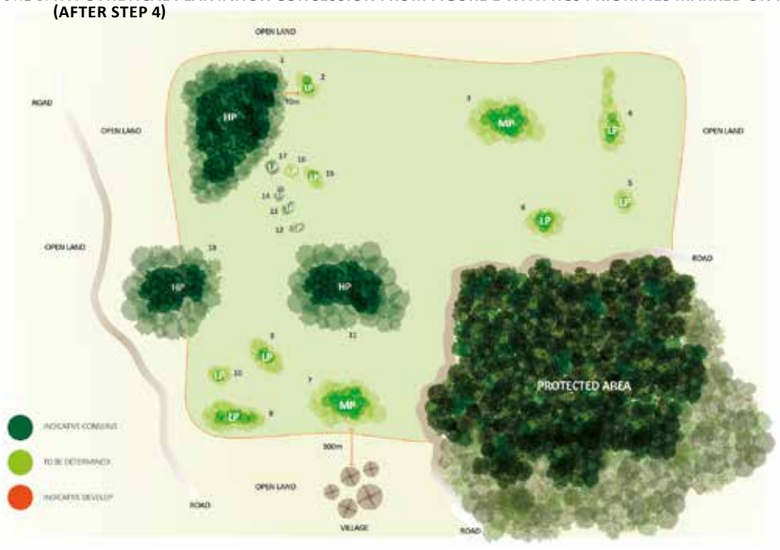
Connectivity is important to facilitate dispersal of fauna and flora between patches and therefore the medium to long-term viability of the forest. The first step is therefore to identify any **Low** and **Medium Priority** patches that create connectivity between **High Priority patches**.

Connectivity is defined as two patch edges within 200 metres of each other, measured from edge to edge. Any **Medium** and **Low Priority** patches which provide connectivity between **High Priority** patches are marked for conservation. Connectivity can be provided by multiple patches between High Priority patches. GIS 'aggregate' tools may be used to assist identifying connectivity.

Patches 17, 14, 13, and 12 in the sample concession are Low Priority, but also provide connectivity between High Priority patches 11 and 1. This means they are designated for conservation. Patches 15 and 16 are Low Priority and do not provide connectivity, so remain unclassified for the moment.

The figure below shows the sample concession map with the patches identified as High, Medium, or Low Priority based on the size of their core area. High priority patches and additional patches prioritized in Step 4 have been marked for conservation.

FIGURE 3: **HYPOTHETICAL PLANTATION CONCESSION FROM FIGURE 1 WITH HCS PRIORITIES MARKED ON PATCHES (AFTER STEP 4)**



7. http://cmsdata.iucn.org/downloads/en_iucn__glossary_definitions.pdf

The HCS Patch Analysis Decision Tree

STEP 5
Connect Medium and Low Priority patches to High Prority patches

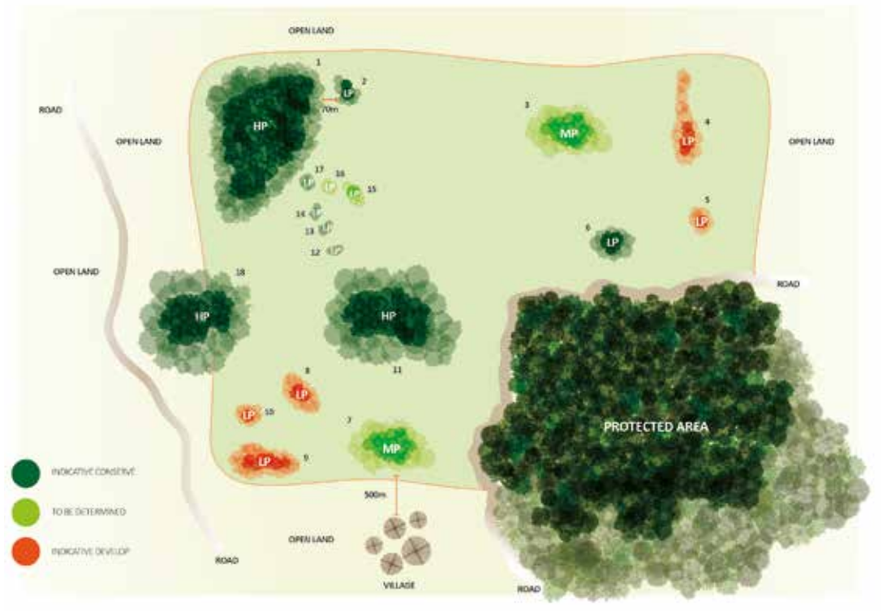
In this step, the following are marked for conservation: **Medium** and **Low Priority** patches that do not provide connectivity between **High Priority** patches but are connected to **High Priority** patches, (i.e. within 200 metres measured from patch edge to patch edge), and any large HCS or HCV forest areas adjacent to the concession. In the sample concession, patches two and six fall into this category.

Medium Priority patches that do not have an immediate connectivity to **High Priority** patches, for instance patches three and seven in the sample concession, are reviewed in Step 8 (Risk Assessment). **Low Priority** patches that do not have an immediate connectivity to **High Priority** patches, for instance patches four, five, eight, nine, and ten in the sample concession, are shortlisted for development and reviewed in Step 12 (Integration and Conservation Planning).

The diagram below shows the sample concession at the end of Step Five, with most of the patches already classified.

"In low forest cover landscapes, small patches will have greater importance for conservation of carbon and biodiversity"

FIGURE 4: **RESULTS OF HCS DECISION TREE IN SAMPLE CONCESSION AFTER STEP FIVE**



STEP 6
Separate Medium and Low Priority Patches

All **Medium Priority** patches (i.e. those with 10-100ha core) which have not yet been designated for conservation are subjected to a risk assessment (Step 7).

Remaining **Low Priority** patches are assessed within the context of the landscape:

- In high forest cover landscapes, Low Priority patches are not analysed further nor short-listed for conservation. They are instead classed as 'indicative develop' and held for consideration during the final boundary adjustment and land use planning phase.
- In low forest cover landscapes, small patches will have greater importance for conservation of carbon and biodiversity. In this case, low priority patches move to a pre-Rapid Biodiversity Assessment check (Step 9).

STEP 7
Risk assessment

This step involves a risk assessment of Medium Priority patches which have not yet been identified for conservation. The risk assessment is based on the proximity of the forest areas to public roads, settlements, waterways used for navigation/transportation, and other anthropogenic activities such as mining, logging, or plantations. A set of buffers of two kilometres from settlements and one kilometre from other risk factors is placed in the map using GIS software to assess the indicative level of potential threat arising from human activities. We recognise that risks extend well beyond these distances, but this close proximity presents a 'high risk' of degradation or clearance. The risk classifications are:

7a. Medium Priority patches outside these high risk zones are identified as lower-risk and are marked as 'indicative conserve'.

7b. Medium Priority patches located inside these risk zones are identified as higher-risk and unlikely to be viably protected. They are further assessed in Step 8 (review of High/Medium/ Low Density Forest).

Where a patch is part high risk and part low risk, the risk classification is determined by the dominant level of risk.

Patch seven in the sample concession, which lies within one kilometre of a village, is an example of a high-risk patch.

STEP 8
Review of presence of LDF, MDF or HDF in Medium Priority patches

A review of presence of LDF, MDF, or HDF is performed for any Medium Priority, high risk patches identified in step 7b. If such a patch contains more than 10 hectares of core area of LDF, MDF or HDF, in other words not YRF but rather better-quality secondary forest, it is marked for potential conservation with mitigation measures to address the threat to these forests. Mitigation measures might include co-management with the local community, employing forest guards or 'guardians', and supporting incentives that place a value on the forest such as the harvesting of non-timber forest products or conservation compensation payments.

STEP 9
Rapid Biodiversity Assessment Pre-check

The steps described up to this point will have identified many patches which will need to be conserved and some which can be short-listed for development. For the patches which remain to be classified, a Rapid Biodiversity Assessment (RBA) will need to be conducted before short-listing them for development. A brief check (Pre-RBA) is carried out prior to the full RBA, in order to quickly disqualify areas inappropriate for development and avoid the need for a full RBA.

The aim of the Pre-RBA is to identify any impediments to development and operations, for instance excessive slope, as well as easily-identifiable characteristics which would indicate a need to conserve the area, for instance the presence of streams or permanently wet areas. The methodology for the pre-RBA is included in the Appendix.

Any areas found to have impediments are moved to either conservation (e.g. for riparian areas, swamp areas, steep slopes) or enclaved from development (e.g. for gold mining areas, community garden areas).

"The aim of the Pre-RBA is to identify any impediments to development and operations, as well as easily-identifiable characteristics which would indicate a need to conserve the area"

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The HCS Patch Analysis Decision Tree

STEP 10
Rapid Biodiversity Assessment (RBA)

The RBA is the final precautionary step for assessing Medium and Low Priority patches which have not yet been short-listed for conservation and would thus be indicated for development. The purpose of the RBA is to ensure that the patch does not contain important populations or habitat which were not identified in the HCV assessment but should nonetheless be conserved.

The RBA relies heavily on a pre-existing HCV assessment in order to know which are the relevant rare and threatened species and habitat. If an HCV assessment has not been done, it should be concluded before or during the RBA. It may be the case that the field work done during the RBA finds important HCVs which were not captured in the HCV assessment; this could trigger a review of the HCV assessment if the indication is that the original HCV was not done properly.

The purpose of the Rapid Biodiversity Assessment is to determine if any of the following elements are present in the patch:

1. Species which are:
   - 1.1. On the IUCN Red List as Near-Threatened, Threatened, Endangered, or Critically Endangered
   - 1.2. Listed under the CITES convention
   - 1.3. On any national or regional list of rare, threatened or endangered species
   - 1.4. Identified in the HCV assessment as being of concern.
2. Habitat that would normally host one of the species listed under point 1, even if the particular species was not observed during the HCV or the RBA itself;
3. Any concentrations of, or habitat of, regionally or locally rare or uncommon species, or simply representative areas that contain concentrations or combinations of local species and their habitat; and
4. Rare habitat as identified in the HCV assessment.

The RBA is not a full biodiversity assessment of all plants and animals in the patch, but rather a focused assessment of whether important species and habitat are found in the patch. The assessment should be conducted by qualified biodiversity assessors and experts, using appropriate sample techniques based on the species of concern, which may vary according to whether mammals, birds, flora, reptiles or invertebrates are relevant. There is no one prescribed methodology for the RBA; the Zoological Society of London has developed a toolkit that includes guidance on undertaking RBAs in oil palm landscapes which will be relevant for many HCS assessments[2].

If the RBA does not identify any of the values listed above, the forest patch may be developed (Step 10b of the Decision Tree in Figure One). If there are high biodiversity values present they will move to the HCV protection process if they also qualify as HCV1-3, or if non-HCV the areas are conserved unless there are fundamental viability issues (e.g. isolation, proximity to risk, small size). This latter process can be incorporated into the final conservation planning process, following advice from appropriate experts including local community representatives.

STEP 11
Ground check

Even after the satellite imagery analysis, forest sampling, and RBA, some important areas can be missed, especially if the quality of the paticipatory mapping was poor. So having already performed the previous steps, a final ground check needs to be performed to:

1. Provide an additional check of any potential HCS forest areas for conservation and exclude from HCS areas any community orchards, plantations or gardens not previously identified.
2. Check the location and boundaries of any community protected areas, and then incorporate them into final conservation plans.
3. Check other development constraints to areas marked 'develop' such as mining activities, or other situations unfavourable for plantation development, for instance riparian zones, flooded areas, steep slopes, and unsuitable soils including peatlands.

The ground check can be done using a combination of low-level fly-overs or drones, and walk-throughs in the concession.

All photos: Courtesy TFT ©

2. Imanuddin, S. P., D. Priatna, L. D'Arcy, L. Sadikin and M. Zrust (2013). 'A practical toolkit for identifying and monitoring biodiversity in oil palm landscapes', Zoological Society of London, available at: https://www.hcvnetwork.org/resources/folder.2006-09-29.6584228415/ZSL%20Practical%20Toolkit%20for%20identifying%20and%20monitoring%20biodiversity%20within%20oil%20palm%20landscapes.pdf, last accessed 14 December 2014.

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STEP 12
Integration and conservation planning: Boundary adjustments; integration with HCV, peatland, and riparian zones; and final mapping and conservation planning with HCS forest areas

In this final step, potential conservation areas are evaluated from a landscape perspective. This ensures connectivity of patches, corridors between forest areas, (including those outside of the concession), stepping stone forest patches to provide connnectivity, and coherence of shape. The aim here is to produce a conservation plan that integrates all set-aside categories (community protected areas, HCV, HCS, riparian, peatlands, etc.) and has the highest likelihood of ecological viability. Operational concerns are also taken into account: for example, consideration of whether the conservation of a patch would fundamentally compromise the plantation operation by blocking a critical access point to a significant area of the concession, or if a patch is of a configuration and shape that makes the establishment of planting blocks impossible. General guidelines for this process are:

1. **Integration with HCV, peatlands and riparian zones:** Proposed HCS forest areas are combined and integrated with other layers of protection in the landscape. This may combine, or be carried out together, with boundary adjustments and the final connectivity decisions following consideration of the landscape matrix.
2. **Boundary adjustments:** Boundaries may be rounded to cut off small irregular points or 'fingers' of Young Regenerating Forest with no core, i.e. less than 200 metres wide, or to bridge gaps/pockets to make a more practical plantation boundary and give a more even edge for forest conservation. This is a 'give and take' approach to rationalize the boundary for management.
3. **High-risk, Medium Priority patches with fragmented cores:** Small (<10 ha sub-cores) outlier areas of the patch may be excised and may be removed from HCS if they do not provide connectivity or do not function as stepping stone areas, or they may be expanded on to rationalise the patch, again using a 'give and take' approach.
4. **RBA findings:** These should be considered alongside the degree of different forest ecosystems conserved or protected in the landscape (representativeness), and in particular the degree to which large patches can be conserved by the company together with the community.
5. **Degree of forest cover in the landscape:** The more fragmented and the lower the amount of forest in the landscape then the greater the importance of small patches. In low forest-cover landscapes (<30% forest cover) the Decision Tree brings smaller patches into consideration, and at this final conservation planning stage additional small (non-priority) patches can also be conserved to provide some natural forest cover and improved connectivity. In landscapes with high forest cover (i.e. over 80%) the focus will move to conserving larger continuous patches.
6. **Connectivity:** Patches should be combined with riparian zones where possible and their position in relation to other patches considered in order to contribute to coherent links and corridors in the landscape. These can include 'stepping stone' patches that can act as refuge areas for weak flying birds or small animals moving through the landscape.

The final HCS conservation plan proposal should be vetted by an independent conservation science expert as well as the HCS Approach Steering Group, which is developing a quality-control procedure to ensure that the steps outlined in this chapter are properly followed. Many resources exist to help develop such a conservation plan, including:

- G. Bentrup (2008). "Conservation buffers: design guidelines for buffers, corridors, and greenways." General Technical Report SRS-109. Asheville, NC: Department of Agriculture, Forest Service, Southern Research Station. Available at: http://www.srs.fs.usda.gov/pubs/33522
- Ministry of Natural Resources and Environment of the Government of Malaysia (2009). "Managing biodiversity in the Landscape: Guidelines for planners, decision-makers and practitioners". Available at: https://www.hcvnetwork.org/resources/folder.2006-09-29.6584228415/Guideline_Man_BioD_landscape_090519.pdf
- Zoological Society of London (2011)."A practical handbook for conserving High Conservation Value species and habitats within oil palm landscapes." Available at: https://www.hcvnetwork.org/resources/folder.2006-09-29.6584228415/ZSL%20Practical%20Handbook%20for%20Conserving%20HCV%20species%20-%20habitats%20within%20oil%20palm%20landscapes_Dec%202011.pdf

"The aim in this final stage is to produce a conservation plan that integrates all set-aside categories and has the highest likelihood of ecological viability"

HCS forest conservation

After the Decision Tree is completed and the boundaries of land areas which are to be conserved or developed have been finalized, the resulting proposed conservation area must be integrated with the participatory land use map of the communities. Necessary steps must then be taken to ensure the long-term viability of the area. The HCS forest conservation areas which overlap with community lands will be most successfully targetted as IUCN category IV community conservation areas, and the finalisation of the conservation area plans will need to be carried out as a participatory process with the customary rights-holding communities. This presumes that FPIC of the customary rights-holders is respected. If FPIC is not achieved and the customary land owners do not want their lands to be part of the conservation areas, then the areas are not marked as in the conservation area. However, the areas remain as HCS forest as far as the company is concerned.

To achieve the conservation of HCS forest areas with the community, benefits and incentives will need to be addressed such as through compensatory, incentive or ecosystem service payments. This could also include negotiating co-management agreements and arrangements with local, provincial or national governments to secure the conservation status of the area. Providing further guidance on how to develop an integrated conservation plan is one of the future challenges for stakeholders involved in the HCS Approach, and will be discussed in the final conclusions of the toolkit.

"To achieve the conservation of HCS forest areas with the community, benefits and incentives will need to be addressed such as through compensatory, incentive or ecosystem service payments"

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Appendix: Pre-RBA Check methodology

Introduction

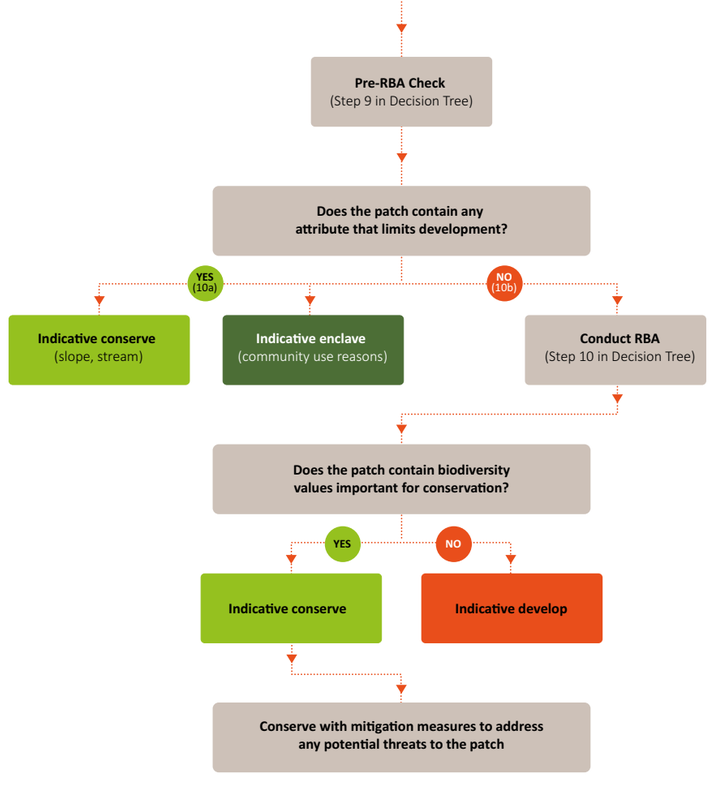
The Rapid Biodiversity Assessment described in Step 10 of the Decision Tree is designed to be precautionary towards important biodiversity values that may not have been captured in an individual patch through either the HCV Assessment or the thresholds used in the Decision Tree. The assessment aids in deciding whether smaller forest patches should be conserved or made available for development.

Because conducting a full RBA requires a certain degree of specialised resources, before undertaking an RBA it is recommended to conduct a rapid Pre-RBA to determine if there is any environmental or social constraints to developing the patch. Where such constraints exist, then the patch is short-listed for conservation and no further assessment work would be required. The core objective of the Pre-RBA check is thus to ensure that only key patches move on to the full RBA process.

An overview of how the Pre-RBA fits into the Decision Tree process is illustrated right.

"Because conducting a full RBA requires a certain degree of specialised resources, before undertaking an RBA it is recommended to conduct a rapid Pre-RBA"

FIGURE 5: **THE PRE-RBA ASSESSMENT PROCESS**



Appendix: Pre-RBA Check methodology

Conducting a Pre-RBA Check

The Pre-RBA is conducted by operational staff, typically based at the site of development. The attributes selected for reviewing during the Pre-RBA are easily identified and therefore do not require experts to conduct the assessment.

The Pre-RBA is conducted via a walk-through of the patch along the axis of longest distance through the patch to increase the chance of capturing the largest variation, as shown in the figure below. The route for the walk through should be determined using GIS, with the route uploaded to a GPS for the assessor to follow.

FIGURE 6: **EXAMPLE SELECTION OF THE LONG AXIS THROUGH A PATCH**

Identifying and documenting key attributes

During the walk-through the assessor observes and documents the presence of key attributes including:

- Characteristics of the environment within the patch, including presence of water features or slope
- Evidence of recent local community activity, such as harvesting forest products
- Presence of access paths, such as roads or daily use walking paths
- Infrastructure such as housing
- Other land use, for instance semi-permanent use such as farms or gardens, and
- Accessibility issues.

During the walk-through the assessors should photograph any key attributes and record their GPS coordinates along with any observations in the form presented at the end of this appendix.

"The attributes selected for reviewing during the Pre-RBA are easily identified and therefore do not require experts to conduct the assessment"

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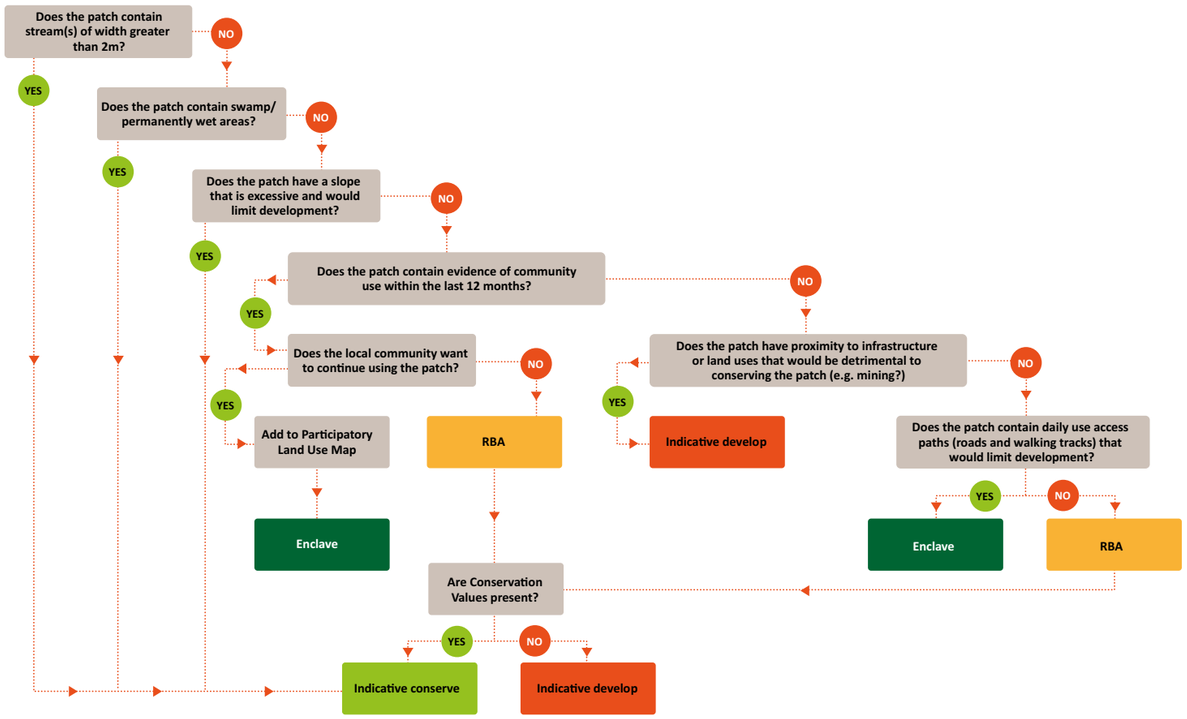
HCS FOREST PATCH ANALYSIS DECISION TREE

Analysing the results of the Pre-RBA

The decision process outlined in the figure below is used to process the findings documented from the Pre-RBA. The attributes addressed at each step are ranked by importance. For example, if a patch has a stream running through the area then it is of highest importance and shall be conserved.

FIGURE 7: **PRE-RBA DECISION MAKING PROCESS**



Appendix: Pre-RBA Check methodology

Pre-RBA Check Assessment Form

Attribute	Presence (Yes/No)	GPS Location Latitude	Longitude	Photo No.	Comments and observations
Presence of perennial stream > 2m width					A perennial stream is one which has continuous flow in parts of its stream bed for at least six months of the year
Presence of ephemeral stream > 2m width					An ephemeral stream is one which only exists for a short period following precipitation
Presence of spring					A spring is defined as any natural situation where water flows to the surface of the earth from underground
Presence of swamp or permanently water logged areas					A swamp is an area that is saturated with water, either permanently or seasonally, and surrounded by forest
Presence of excessive slope that limits development					The definition of 'excessive slope' will vary by crop and should be determined with input from the concession holder. In palm oil, the RSPO standard defines excessive slope as a gradient of 25 degrees or greater
Evidence of community use within the last 12 months					Examples include areas communities have used for gardens or collection of materials for housing
Presence of regularly-used access paths					For instance, roads or walking tracks that are used fequently for access to the area or other areas
Presence of other land use that is detrimental to either conservation or development					For instance if the patch is in the middle of a mining area
Location aspects and accessibility					If the patch is inaccessible and is thus not going to be developed, then there is no point assessing – rather just add to conservation or leave as community lands if they have identified it as such
Other observations (including wildlife and plants)					