High Conservation Values and forest plantations

Technical Paper

New Generation Plantations Project
June 2009

Summary

The paper discusses the role of the HCV concept in plantation forestry. It poses a series of questions:
Question 1: Who decides that something is of High Conservation Value and what criteria are used?
Question 2: How do HCV stakeholder processes relate to other official processes?
Question 3: What are the options to manage any identified HCVs?
Question 4: Should High Conservation Value analysis be more standardised?
Question 5: Is the HCV concept delivering added value to New Generation Plantations and if so how?

NGPP members identified the following general lessons:

- ✓ HCV analysis should wherever possible be integrated into existing legislative frameworks
- ✓ HCV analysis is a collective effort; expert input is helpful but other stakeholders should be included
- ✓ It is important to have national level toolboxes with clear definitions agreed upon by all key stakeholders
- ✓ Some training is important, particularly for those working in planning and management of plantations
- ✓ In most cases some level of state support –technical and financial– is also important
- ✓ Although sufficient tools already exist in some places, where they do HCV use is more challenging
- ✓ HCV can be used both for new and existing plantation
- ✓ Communication of the process and of its results to the wider community are both important components

Coordinated by WWF International with the participation of the following organisations:

Forestal Oriental

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Background

The concept of High Conservation Value Forests (HCVF) emerged from discussions within the Forest Stewardship Council. It was first developed to address principle 9 in the FSC principles and criteria, seeking a more sophisticated approach to determining whether or not a natural forest could be converted to a plantation under the FSC rules. Although it is one voluntary tool amongst many that can be used to promote conservation, and care must be taken to avoid duplication, HCVF has developed into one of the most successful tools to identifying critical areas for conservation.

In recent years the concept has been developed through the design and application of several tools for identifying HCVF in the field, development of principles, and for application at site and landscape scale. More recently, there has also been research into options for broadening the concept to a more general identification of High Conservation Values (HCV) or High Conservation Value Areas (HCVA), looking beyond forests to other habitats such as grasslands, inland waters and peat swamps and mires. The HCVF concept was developed to help governments, companies and other forest users to identify the most important forests from environmental and social standpoints and applies to all forests. The following paper however looks specifically at how HCV concept can be applied to plantation policy.

Application of the HCVF approach is currently only a *requirement* when a forest owner seeks FSC certification; however from the perspective of conservation management, the HCV or HCVA approach (or a similar and internationally accepted tool) could have value as a more universal means to identify areas where land use change could cause irreversible loss.

HCV is particularly important in terms of creating a supporting tool for local authorities where national legislation is weak or where data on land use and biodiversity are particularly incomplete.

Aspects of this Technical Paper on HCV will also feed into ongoing discussions within the FSC about future use and application of the HCVF concept. It looks in particularly at four issues:

- ✓ **The framework for determining and using HCV in plantations**: in particular who decides what is and is not HCV and who they should or could consult
- ✓ **Linking HCV to other policy instruments**: examining how the HCV concept complements (or clashes with) existing legal, official and voluntary ways of identifying conservation areas
- ✓ **Ecoregional planning**: management options for HCV on a site and landscape scale
- ✓ **Standardised approach to use in plantations**: options for developing a standardised approach to the use of HCV in plantations

Finally, we look more generally at whether HCV offers a useful tool for plantation managers and others interested in plantation development.

This issues paper gives some of the background and poses some questions, which are examined in light of experience amongst New Generation Plantations Project (NGPP) partners in implementing HCVF in their operations.

We are grateful to members of the New Generation Plantations Project for comments on the various drafts.

Question 1: Who decides that something is High Conservation Value and what criteria are used?

In an ideal situation, governments provide an overarching policy and legal framework that can direct land use for different purposes, including protection where needed. This policy is driven by several factors: international agreements (such as the EU Natura 2000 network); national legislation, local laws and voluntary actions. In some cases, this direction may not be available or may be insufficient. Responsible companies, land owners, governments and donors may then need to undertake their own analysis. HCV is one tool to help achieve this. In some case, governments do not have the time or resources to provide land use guidance at a site-by-site level and HCV can help to fill in these gaps. Currently HCVF identification is the responsibility of the entity undergoing FSC certification, to be checked by the certification body. In practice, companies and certification bodies have varied in their interpretation of HCVF. There is confusion about the best criteria to use for selection and the "weighting" of the HCV principles. These differentials have implications for both conservation benefits and for parity in certification. Setting aside some land from plantations has major economic implications. At present it is possible for one company to assess a forest or grassland and reject development because it believes it classifies as HCV, while another company might identify no HCV and convert the same area to a plantation. Such a result might not be through dishonesty or poor practice (although it might) but could come from genuine differences of interpretation. Confusion will increase if the HCV concept is expanded to other ecosystems. Responsible companies risk being penalised and the role of HCV as a planning tool could be undermined. The FSC and ProForest recognise these problems and have set up of an HCV Resource Network with an expert panel to review disputed cases (although some NGPP members question the balance of membership of this panel).

A plantation could strengthen some HCV principles while weakening others. For example a plantation established on grassland might *strengthen* aspects of ecosystem services, e.g. stabilising soil (HCV 4) while *eliminating* rare grassland habitat (HCV 2). How do we choose which is the most important criterion?
Several strategies could be adopted for agreeing who identifies HCV; these are not mutually exclusive:

1. Maintain the status quo, but put extra effort into: (1) providing information for companies on HCVs; (2) training certifiers in applying HCV
2. Introduce some form of agreed grievance system whereby decisions can be challenged within the FSC
3. Work with partners in identifying HCV
4. Train staff in the techniques needed for HCV identification
5. Insist on a more rigorous system, where the HCV concept is always applied by independent specialists – such a requirement would increase costs and might also pose capacity problems
6. Invest in robust, credible and science-based ecoregional level planning where land use planning frameworks are absent and use the HCV approach to contribute to such plans
7. Carry out capacity building with local authorities to ensure that concepts are taken up in national policy.
8. Develop tailored advice about application of HCV in determining the location of plantation establishment

What the case studies show: In terms of policy responses, NGPP members use a combination of options 3, 4, 5 and 6. Most NGPP members rejected the idea of an expert-only system and identified the need to work with partners. Governments are important partners in terms of supplying policy although government planning was identified as a potential constraint by FO in Uruguay, confining forests to specific soil groups (which may have rich biodiversity, likewise, non-priority soils can be poor in terms of biodiversity). (The FO approach in the 1990s identified and protected larger areas than subsequently with HCVF under FSC certification.) Sometimes partners are NGOs: e.g. WWF in Portugal, China and Malaysia, Conservation International in Brazil. In most cases several partners are involved; for example in China stakeholders included several government departments, a university and local communities; in Brazil the University of Santa Cruz, Instituto BioAtlantica and local communities; and in Malaysia the state forestry department, the NGO Hutan, the Sabah Society and local communities. In Scotland, UPM used its own forest ecologists with input from government experts and NGOs. In China staff received special training in HCV identification.

Question 2: How do HCV stakeholder processes relate to other official processes and legal frameworks?

HCV stakeholder processes are frequently an additional element of planning, which in different countries and regions will already draw on other tools and frameworks such as:

- ✓ Existing forest classification systems, such as the system of forest reserves that exist in many countries
- ✓ Soil classification systems that determine types of agricultural use
- ✓ Landscape or watershed level land-use planning approaches
- ✓ Official or traditional ownership and tenure patterns, etc

HCV must comply with and complement existing legal and regulatory frameworks at a level appropriate to local conditions, rather than duplicating established systems. However there may be times when a certification process identifies an area as HCV that a government process has already identified for conversion and then some level of dialogue will be needed. Several companies report that application of the HCV concept can sometimes cause resentment because it is perceived as challenging national policies. The way in which HCV is applied will depend on circumstances, but several options exist:

1. **As a certification tool**: At the simplest level, HCVF is a technical input to certification, identifying areas that are of importance and that should either be set aside or treated under a different management prescription. As certification is itself voluntary then it follows that the accompanying analysis and prescriptions are also voluntary. Introducing these into existing institutions is often a time-consuming process that requires explanation and capacity building as part of the certification process.
2. **Linked to existing national processes including NGO processes such as national certification initiatives**: if existing stakeholder processes provide some of the information required for HCV analysis, there is no point in duplication. As HCV is a framework rather than a set methodology, initial discussions should identify what information exists and what gaps need to be filled; this may also be a way of drawing people into the use of HCV rather than them viewing it as undervaluing or threatening existing work.
3. **Integrated with official processes**: application of HCV acquires an additional dimension when government forestry, environment or agriculture departments are involved. Here there is clearly the potential for the approach, if it proves successful, to be used more broadly and brought into planning processes. But conversely there is also more room for HCV to be seen as complicating or competing with existing land classification methods. It is likely to be useful in those situations where it provides clear additional benefits and where it is supported by a broad range of stakeholders.
4. **Linked to existing international processes**: HCV could also become a tool to help implement international obligations, such as the Convention on Biological Diversity's *Programme of Work on Protected Areas* and the Ramsar Convention, by identifying potential sites for protection.

What the case studies show: NGPP members have been linking the process with statutory policy frameworks where these exist and using voluntary frameworks, including compliance with the FSC, where statutory frameworks are less fully developed. Many NGPP members stressed the importance of legal processes over voluntary processes. In Uruguay, FO's conservation actions stem from voluntary Environmental Impact Assessments (EIA) earlier in the project, which was later classified as HCVF as part of FSC certification. In Portugal, Portucel linked HCV identification closely with the European Union's Natura 2000 network and to statutory protection for cork and holm oak and other protected species. In Scotland, identification was linked with the UKWAS forest certification scheme, Red Data Book species and the UK SAP process related to the EU Habitat Directive. Outside Europe, most NGPP members linked identification closely to the FSC process, for instance in both Malaysia and China. In Brazil links with the FSC were also made but the area set aside as HCV was also linked to the largest private heritage reserve initiative in the Atlantic Forest.

Question 3: What are the options to protect or manage any identified HCVs?

Several options exist to manage HCVs. The FSC stresses that identification of an HCVF does not automatically mean that the forest should be protected – although this may be appropriate – but it infers that management should ensure that the HCVs are not degraded. In plantations, replacement of forest with a plantation usually means that, at least in a particular site, some high conservation values will be lost in terms of natural biodiversity. Does this imply that if an HCVF is identified this automatically precludes its replacement with a plantation in FSC certified plantations? Would such a principle apply to other High Conservation Value Areas, such as grassland? Are all six Values of equal importance? Are there HCVs that can be enhanced by plantations and if so when and where? How much should existing land use influence classification? Some (often poor) countries have large HCV areas: are they to be penalised compared to countries that have degraded their forests? If identification of an HCV in a potential plantation site does not automatically confer protection why bother to carry out the analysis? Will overly harsh restrictions simply drive companies away from use of HCV and FSC? A number of policy options exist:

1. A decision not to establish plantations on any identified High Conservation Value Area
2. A decision not to establish plantations on selected HCV habitat types decided on the basis of national or regional rarity and importance (e.g. a country might have a ban on planting on HCVF and HCV Wetlands but have less restrictive practices on HCV Grasslands)
3. A decision not to limit plantations in areas with certain agreed HCVs: for example an HCV defined because of the presence of unique species might be more vulnerable to conversion than an HCV defined on the basis of ecosystem services, which might be provided by plantations.
4. A decision to plan plantations so that they do not degrade HCVs at a landscape scale, while small plantations might be suitable as long as the landscape values remained intact – possibly with the additional requirement that plantation owners and managers actively engage in improving HCVs in other parts of the landscape to ensure that there is no net loss of values
5. A decision not to establish plantations on any or selected HCV habitat types as above, but with the potential for occasional derogations in cases where needs of disadvantaged members of society are likely to be unfairly penalised by a total ban (some derogation process would be needed).
6. Not having any fixed response to an HCV but developing positive approaches based on best practice.

These options should be seen in a wider context. Ideally, at the level of an ecoregion or province, potential HCVs should be identified before development starts, in a transparent and participatory process, so that if these are avoided site-level issues are minimised. It is also important to focus on what is needed to maintain *each of the values in turn*. If the question is about HCV3 (threatened ecosystem) then replacement is by definition damaging. However if the issue is HCV1 (threatened biodiversity) then limited plantations may not be damaging; in fact if non-planted land within the forest management unit is managed sensitively, such values may even increase. It is important to distinguish between areas that *contain* an HCV and areas that need to be *managed* to maintain an HCV: these may not be the same and management needs may differ. The commonest Values identified as being of concern in use of HCVF in forest certification by NGPP members are HCV 1 (biodiversity) and HCV 3 (ecosystems) and these may require particular attention.

What the case studies show: NGPP partners differ in their approach to managing HCVs although most focus primarily (often solely) on legal requirements. In Scotland, UPM has focused management on a combination of promoting HCVs within productive areas, restoration and set aside. In China, a series of zones have been identified with varying degrees of protection. In Brazil, areas outside the plantation have been protected and where necessary restored. In Uruguay, FO has set aside 40 per cent of its land from plantations and actively manage it for e.g. invasive species control. Most HCVF management by NGPP members appears to include decisions to set aside areas of land from planting, sometimes offset by intensifying management in other areas, drawing on a mixture of pragmatic forestry-based reasons (focusing plantations in the most productive areas) and conservation reasons (protecting the most valuable habitat).

Question 4: Should High Conservation Value analysis be more standardised?

Is it time to standardise HCV analysis more than was considered, and perhaps was necessary, when the concept was first developed? Should standardisation be global or relative to each country's conditions? The increasing use of HCVF to set company policy that has serious commercial and financial implications, and plays a key role in defining forest protection strategies, means that the system may need to be strengthened: this could be one important recommendation from the current FSC review process. A new manual has been produced – *Assessment, Management and Monitoring of High Conservation Value Forests* – which goes further than previous guides in providing instructions, although except for HCV1 nothing like a quantitative measure is attempted. The problem is easier to identify than to solve; providing rigorous standards for "values" is notoriously difficult. However, additional guidance could be provided, if it were identified as important, with respect to several aspects of HCV, including in particular:

- ✓ **Level of importance of a particular value**: through use of agreed measures such as the IUCN Red List; analysis of Key Biodiversity Areas (KBA); fragmentation and integrity thresholds; a compilation of agreed methods to identify priority ecosystems and habitats (e.g. Frontier Forests, High Value Grasslands); recognised valuation methods for watersheds and soil fragility indices; socio-economic or rapid participatory studies of non-timber forest products and other subsistence values; and government-compilations of cultural values coupled with local surveys. There are currently plans for discussions about how the KBA and HCV concepts can be more fully integrated for example.

- ✓ **Weighting with respect to different HCVs**: agreeing which Values are likely to be affected by a plantation and in what way (enhanced, reduced, destroyed etc) to provide a more sophisticated analysis that can guide management decisions. One way to address this would be to assess each Value in turn; although there may be practical problems in standardisation, demonstrated by the hugely variable international circumstances demonstrated in the case studies.

- ✓ **Context**: the extent to which the significance of an HCVA is influenced by the presence or absence of other HCVAs in the vicinity: another good reason for the development of larger scale planning frameworks. Clearly if the site contains the last example of a particular ecosystem or an endangered species this is more significant than if it contains one of its habitats amongst many. Although this is recognised in the HCVF literature there is no clear guidance with respect to this factor

- ✓ **Landscape implications**: some HCVs are site specific – for example if a plantation replaces a breeding colony of an endangered butterfly then it has gone – while others depend on the skill with which the plantation is integrated into the landscape (for example providing temporary habitat for wide-ranging mammal species). Clearer guidance – perhaps as a matrix – of values that are site or landscape-specific would be useful in judging the importance of HCVs in a landscape context.

What the case studies show: In discussions in the NGPP meetings there was no support for further standardisation of the approach. It is clear from the case studies provided by NGPP partners that currently very different approaches are taken around the world and that wherever possible these are integrated with existing statutory and legal processes. In Portugal, Portucel relied mainly on existing protection criteria under either European Union or national designations. UPM in Scotland focused on meeting the needs of EU and UK legislation related to three protected species and native woodland, and this was supported by its own ecological audit and prescriptions. The Sabah Forestry Department in Malaysia used a simplified version of the ProForest manual to identify HCVs. The China Forestry department developed its own indicators, which included a HCVF analysis based on Values 1, 3, 4 and 5. In Brazil, Veracel apparently used a simpler method, based on legal requirements, distinguishing native or regenerating native forest and setting this aside from the plantation.

Question 5: Is the HCV concept delivering added value to New Generation Plantations and if so how?

The key conservation and social questions about plantations now probably relate less to management issues then to broader planning and location. Plenty of bad management still exists but there are a collection of best practice guides; knowledge about how to address some, if not yet all, of the potential issues that arise; and examples of best practice around the world. The issue of where best to locate plantations is well understood from a silvicultural perspective but there are still information gaps about areas to avoid because they have HCVs and there is a demand from donor organisations such as the World Bank, from companies and from governments about concise and replicable guidance on these issues. If forest suitability maps can be overlaid with a second dataset, drawing on HCV analysis, on sites to avoid, then a clear picture of "best available sites" at a landscape scale should emerge. From the perspective of New Generation Plantations, the role of HCV would principally be in helping responsible companies avoid spending time and resources on potentially contentious locations where forest development could cause losses of irreplaceable values. The tool can operate on two levels:

- ✓ At a landscape scale to identify potential or actual HCVs as areas either to avoid in plantation establishment or to manage in ways that maintain such values – ideally this process should be government-led through e.g. an indicative forest or land-use strategy.

- ✓ At a site scale to help select areas to be left unplanted, so as to maintain key values within the site and ensure landscape scale biological connectivity, establishment of native species etc, incorporated into an Environmental and Social Impact Assessment (ESIA).

One way to help develop this function would be to have some explicit HCV material aimed at plantation development. Such guidance could act at several levels:

1. As a framework outlining key concepts that need to be addressed within plantation planning (for example some of the trade-offs, likely key issues etc) but which leaves individual users to develop their own tools for identification depending on local conditions and needs.
2. As a more detailed toolkit that provides tools for identification of the various values in a plantation context: such an approach would necessarily be more detailed and would take longer to prepare.
3. As a hybrid approach, which lays out a framework but also provides some sample tools that can be used if nothing else is available; in this case it would also be necessary to include guidance on a process for identifying and assessing whether existing tools are suitable to take part in the analysis.
4. As national toolkits developed by a wide range of stakeholders where the existing legal and regulatory frameworks are not strong enough.

What the case studies show: It is not completely clear the extent to which NGPP members are using HCV as a desired tool or just because it is a requirement of the FSC process; several stressed that HCV sometimes adds little to existing processes and needs to be more fully integrated. Most NGPP members are confining application of HCV to legal requirements but some, such as FO in Uruguay and UPM in Scotland, have clearly gone beyond the minimum required by the government.

Overall lessons learned

NGPP members identified the following general lessons:

- ✓ HCV analysis should wherever possible be integrated into existing legislative frameworks; at a national level this would ideally be coordinated by the government, leaving plantation managers to look at the site level; this is not always possible at present
- ✓ HCV analysis is a collective effort in that some expert input is generally invaluable, but at the same time it is important to include other stakeholders in the discussion process
- ✓ It is important to have national level toolboxes with clear definitions agreed upon by all key stakeholders
- ✓ Some level of training is important, particularly for people working in the planning and management of plantations
- ✓ In most cases some level of state support – in terms of technical co-operation and probably financial support – is also important for successful HCV identification and management at a landscape scale. The adoption of an HCV approach at such a 'high' level can, potentially, attract further conservation benefits in raising awareness of the risk of other land use change (agriculture)
- ✓ Although sufficient tools (methodologies, legislation) already exist in some parts of the world for HCV identification, where they do not the process is more challenging, particularly at a national level
- ✓ HCV can be used both for new and existing plantation; in the latter case economic rotation age is the ideal time to consider forest restructuring
- ✓ Communication of the process and of its results to the wider community are both important components of successful implementation

Case Study 11: Methodologies and approaches for identifying high conservation value forests in a plantation in Portugal: Portucel

Location: Portugal
Organisation: Portucel Soporcel Group
Contact: Paula Guimarães [Paula.Guimaraes@portucelsoporcel.com]

Background

The objective of the project is to apply the High Conservation Value Forests concept to the managed forest area of Portucel Soporcel Group and is part of the implementation of a strategy for biodiversity conservation, where biodiversity specialists and local stakeholders are consulted and engaged in the approach. This case study refers to a Landscape Unit defined in the South of Portugal – 'Sudoeste Alentejano'.

The company manages over 120,000 ha throughout Portugal, of which 74 per cent are occupied by eucalyptus plantations with an average rotation time of 12 years; besides these, there are also important areas of other forest species, e.g. pine (*Pinus pinaster*), cork oak (*Quercus suber*) and holm oak (*Quercus ilex*), as well as patches of previously existing vegetation cover (old aged olives, oaks and other hardwood species or scrubland) that are seen co-existing with or entering eucalypt or pine areas.

For the company 'areas of significance for biodiversity' are the following: all areas with relevant patches of habitats described in the Habitats Directive of the EU Natura 2000 Network; ecosystems with cork oak, holm oak and other relevant plant species (in Portugal cork and holm oaks have been protected for many years); areas where species with 'endangered' statutory classification have been identified; riparian zones; areas of rocky outcrops; wetlands or scrubland; areas surrounding natural water points (swamps, lakes, etc).

Description of best management practices

A significant project is underway with the WWF Mediterranean Programme to assess whether High Conservation Value Areas (HCVA) are present in the area under the company's control. The implementation of a biodiversity conservation strategy led to a careful selection of the geographical scale of activity and of management parameters. In its approach the company defined as HCVAs areas containing significant values of biodiversity, species or habitats, or that provide environmental, social and cultural services at different levels: ecoregion, landscape or management unit. The methodology to approach HCVAs is based in two principles: (i) that the spatial structure at the landscape level has influence over the diversity, abundance and interactions between species and ecosystems and (ii) that a management unit (MU) is embedded in a spatial structure at the landscape level.

Thus, the analysis of the company's managed land started with the identification of seven Landscape Units (areas with ecological homogeneity and with impact at the regional level) and description of High Conservation Values present in "Biodiversity Sheets"; operational documents that will help to plan and manage at this level having conservation in mind. For the various areas which are not plantations, the company is carrying out an assessment of which natural values really exist (classified habitats and species), transcribing information onto maps and defining appropriate management. The approach was discussed with biodiversity specialists in a meeting that allowed them to feed back points of view and suggestions. For the remaining levels of HCV, work is being carried out mainly with local stakeholder consultation.

So far, the company has classified more than 48,000 ha (around 48 per cent) of its forest management unit that is certified as HCVAs at the landscape level (HCVA2) and in the landscape units that were classified as HCVAs work is in progress for the identification of HCVs at the local level. In 'Sudoeste Alentejano', values at Level 3 were already identified and management orientations for their conservation prescribed. There is

also a monitoring plan to verify if the conservation actions implemented are conducing to better conservation status of the values found.

Challenges and difficulties

This is time consuming work, requiring expertise, availability of people and a significant budget from the company, due to the extent of managed forest and the need to involve specialists on biodiversity. Field work is long and mapping skills and equipment required. Moreover, the assessments are dependent on the time of year (i.e. the presence or absence of flora and fauna species at the appropriate season).

Outputs, results, lessons learned

In this project a lot has been learned about the estate under the company's management, namely about its conservation values. Yet, scale of operation – all over the country – represents a considerable challenge in completing the whole assessment and classification of HCVAs. Globally, the project has a strong component of training and raising awareness on biodiversity conservation, results in the further involvement of technical staff on environmental issues and promotes more communication and stakeholder consultation opportunities.

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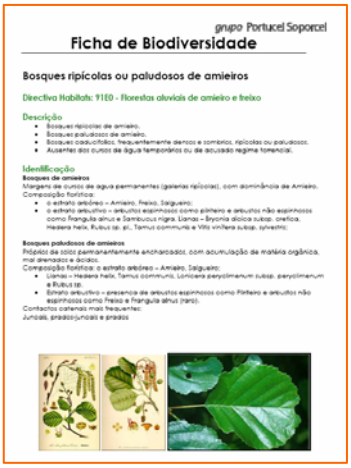
Figures: Biodiversity sheet; map of Landscape Units classified as HCVA2; Classified habitats found within the company Landscape Unit of Sudoeste Alentejano; and Bonelli Eagle (photo: Joaquim Pedro Ferreira)


grupo Portucel Soporcel

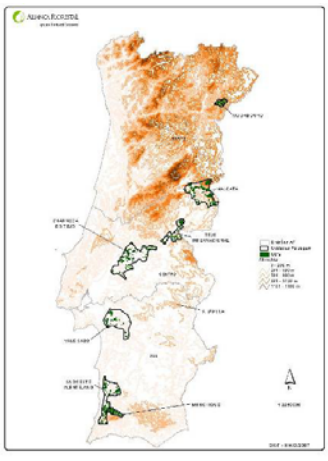
Ficha de Biodiversidade

Bosques ripícolas ou paludosos de amieiros

Directiva Habitats: 91E0 - Florestas aluviais de amieiro e freixo

Descrição

Identificação



Case Study 12: High conservation value identification in an existing commercial conifer plantation in Scotland: UPM Tilhill

Location: Killiechonate Forest, West Highlands, Scotland, UK
Organisation: UPM
Contact: Paivi Salpakivi [Paivi.Salpakivi@upm-kymmene.com]

Background:
Killiechonate is a commercial conifer forest plantation created in the 1950s, 60s and 70s. The property extends to 1,212 ha and was established on former hill grazing land for sheep and cattle, intermixed with areas of native woodland. The land was purchased by The British Aluminium Company in the 1920s to secure the water catchments for supplying a hydro electric dam. The forest has changed ownership on three occasions since and is currently owned by a private investor. The aim of the current owner is to:

- ✓ Maximise financial return from the crop
- ✓ Maintain and enhance the underlying forest capital value
- ✓ Maintain and enhance amenity and conservation values
- ✓ Preserve ancient monuments
- ✓ Develop and maintain biodiversity
- ✓ Fulfil the carbon sequestration potential
- ✓ Manage the natural watercourses within the forest
- ✓ Comply with UK Forestry Standard and the UKWAS forest certification standard

Commercial plantation species cover 93 per cent of the area, mostly Sitka spruce (62 per cent) but with an element of Lodgepole pine, Larch, Norway Spruce and Scots Pine. Native woodland and open ground habitats cover the remaining 7 per cent. An ecological audit carried out as part of the forest planning process identified areas of HCV covering about 10 per cent of the forest management unit (FMU) that will be protected and enhanced as part of the ongoing forest restructuring process. The HCVA includes native woodland, oak woodland (EU Habitats Directive) and habitats of the chequered skipper butterfly (Red Data Book -RDB, UK Species Action Plan - SAP), red squirrel (RDB, UK SAP) and barn owl. The audit also identified plantation on ancient woodland sites that have potential for HCVA. The forest is important to the local community and tourists for recreation and an estimated 12,000 people visit the forest each year. The site has outstanding landscape value within a national context as recognised by the adjacent area's national scenic area status.

Description of best management practices

Ecological audit: UPM's own expert forest ecologist carried out an ecological audit of the property and set management objectives for the key areas of interest. These have been incorporated into the Forest Plan. The ecological audit was informed by an ancient woodland survey carried out by the local environmental authorities and consultation with external experts on the conservation of chequered skipper butterfly and red squirrel, two species protected by law and listed in the UK biodiversity action plan.

Protection, expansion and enhancement of HCVA: The forest plan identifies existing and potential HCVA and provides compartment level management prescriptions for protection, enhancement and expansion.

Native woodland	Protect existing native woodland areas and manage as non-intervention. Expand native woodland along riparian corridor through removal of exotic conifers at economic rotation age and replanting or natural regeneration with native trees
Plantation on ancient woodland sites	Remove exotic conifers at economic rotation age and regenerate as native woodland. Preserve remnant native trees by removing exotic conifers from under their canopies. Control deer grazing pressure
Chequered skipper butterfly habitat	Protect and maintain open sunny glades, through selection felling, within native woodland and along its edges.

Red squirrel habitat	Maintain and manage existing suitable areas of Norway spruce, Scots pine and larch as long-term retention and encourage the regeneration of small-seeded species such as birch, rowan, willow and aspen. Seek opportunities for linkage while regenerating adjacent productive stands.
Barn owl	Provision of nest boxes adjacent to regenerated clearfell sites where vole population is higher. Clean boxes and monitor breeding success. Maintenance of open ground habitat for flight paths and feeding

Forest restructuring: In the second rotation, a restructuring of the forest will target commercial species better to the most productive site types and provide long term environmental benefit through protecting and enhancing areas of existing HCV and taking opportunities to expand these habitats where economically and environmentally justifiable. The expansion of existing valuable habitats and restoration of ancient woodland sites will result in an increase in HCVA of around 10 per cent to over 30 per cent of the FMU during the 20 year plan period. The restructuring will also improve the landscape and amenity for visitors to the area.

Challenges and difficulties

- ✓ Reducing the productive forest area significantly and justifying it economically to the owner
- ✓ Time and cost in carrying out the ecological audit, including consulting external expert organizations

Outputs, results and lessons learned

Outputs

- ✓ 20 year forest management plan including compartment level management prescriptions for HCVA
- ✓ Ecological audit identifying and setting management objectives for HCVA
- ✓ Ancient woodland survey by environmental authorities
- ✓ Chequered skipper butterfly management plan
- ✓ Management of red squirrel habitat according to the forest authorities practice note

Results

- ✓ A committed forest plantation owner
- ✓ A plantation providing economic, social and environmental benefits
- ✓ Cooperation and commitment of external experts with input to the ecological audit
- ✓ Stakeholder approval for forest management plan
- ✓ HCVA protection, maintenance and enhancement
- ✓ Populations of chequered skipper butterfly, red squirrel and barn owl protected
- ✓ Restoration of potential HCVA
- ✓ State grant aid towards cost of managing HCVA
- ✓ Planned increase in HCVA from around 10-30 per cent FMU during the next 20 year plan period

Lessons learned

- ✓ Forest restructuring at economic rotation age provides a unique opportunity to improve the plantation design and address mistakes of the past plantation practices
- ✓ It is possible to protect and enhance HCVF and HCVA as part of good plantation design
- ✓ Existing tools are adequate for safeguarding HCVA
- ✓ Ecological audit is the starting point for evaluating HCVA and defining prescriptions
- ✓ Expert input is invaluable in identifying and setting management prescriptions for protecting, expanding and enhancing HCVA
- ✓ Involving experts and stakeholders is time consuming and costly, but it secures goodwill and support.
- ✓ Many HCVA management and restoration works are not possible without targeted state grant aid

References

- Forest plan
- Ecological audit
- Chequered skipper butterfly management plan
- Forestry Commission Red Squirrel Conservation practice note

Case Study 13: High conservation value forest identification in Yonglan Province, China: Fuijan Yong'an Forestry Group

Location: Yonglin, China
Organisation: SFA China - Fujian Yong'an Forestry (Group) Co., Ltd. (herein "Yonglin")
Contact: Xie Yilin (XYL996@vip.sina.com)

Background

Yonglin was established in 1994 and was the first forestry company listed on the Shanghai Stock Market. It has developed into a large integrated forestry corporation covering seedling cultivation and production, forest resource management, timber logging and processing, chemistry and pharmacy. The total forest area under Yonglin's operation is 120,800 ha, with a cumulative volume over 1.19 million m^3. The estate includes 23,900 ha of high conservation value forest and 897,000 ha of commercial timber. The main species grown in Yonglin are (by area): fir (*Cunninghamia lanceolata* 26.3 per cent), masson pine (*Pinus massoniana* 42.8 per cent), Eucalyptus (*Eucalyptus* spp. 8.9 per cent), plus hard broad-leaved species (*Sassafras tsumu*, *Schima superba*, etc.) and soft broad-leaved species (*Liquidambar formosana*, *Paulownia fortunei*, etc.)

Description of best management practice

Yonglin has zoned its operation area into functional zones, which include:

- ✓ High conservation value forest zone (HCVF 1,3,4,5)
- ✓ Water converging zone
- ✓ Ecological landscape zone
- ✓ Erosion controlling forest zone
- ✓ Forest tourism zone
- ✓ Forest fire-risk zone
- ✓ Commercial forest zone (timber forest, fast growing forest, industrial raw material forest, native broadleaf forest, economic forest and bamboo)

Yonglin has established a two-tier forest resource management system: (1) the first tier forest zones are categorized as strict protection, priority protection, protectively management and intensive management; (2) the second tier is based on the first tier classification and further categorize A) the protective management zone into protection, consolidation, adjustment and renewable sub-zones; B) the intensive management zone into nurturing and utilization sub-zones.

Yonglin has set up a GIS-based forest resource database in which information of forest management is recorded and updated periodically. The information collected and updated includes: species, site, age, slope, etc.

The management plan of Yonglin, which was already one of the best in the country, has been further upgraded to meet FSC standards, in particular to include HCVF identification and related management planning. Trained by WWF and domestic experts, Yonglin took the lead in HCVF identification by consulting many stakeholders, including: experts from universities (for methodology, technical guidance); governmental forestry department (for policy consultancy, information on animal and plant resources); environmental department (for environmental assessment); water department (for water monitoring issues and data on water quality); local communities (for cultural characteristics, basic requirements); etc. Yonglin did not stop at HCVF identification, but further developed a monitoring plan with 100 sampling sites in the HCVF areas to keep close track of the values.

The indicators they use are mainly (incomplete list):

- ✓ Species composition: changes of animal and plant species, changes in number, changes of forest succession
- ✓ Human disturbance: intensity, times
- ✓ Monitoring indicators of endemic vegetation types: area, volume, species composition, intra-specific and inter-specific competition, advantage population life process, characteristics of forest succession.
- ✓ Monitoring indicators of watershed and water conservation forest: area, volume, water conservation function (such as buffer runoff, water filtration and water storage), human disturbance etc.
- ✓ Monitoring indicators of special purpose forest: species composition, area, whether the function of such forest changes.

In order to get FSC certification, Yonglin has trained its management staff several times on management planning, HCVF identification and FSC standards. The key staff members are now able independently to prepare documents for FSC auditors review.

Challenges and difficulties

Monitoring of water and soil erosion: Fujian Province is in the priority forest areas in the south of China, where infrastructure is fairly developed within the forest area; therefore water and soil erosion are short-term consequences caused by forest management operations, with limited impact. In addition, Fujian province is a mountain-dominant region so logging areas are small and very scattered, which makes it high cost and labour-demanding if water and soil erosion monitoring sites are set in the operation area, neither can those monitoring sites be adequate in terms of being representative.

Standardization of labour outfits/equipment: the current outfits and equipment in the forest management unit lag far behind FSC principles and criteria requirements. The company currently cannot afford the cost of upgrading to new equipment.

Lessons learned

Yonglin revised its forest management plan according to the FSC principles and criteria with the government's technical requirements incorporated. Yonglin received its FSC FM and COC certificate in June 2008. The company has established an industrial raw material production base with a completed forest area of 45,800 ha. The main species are fir, pine, eucalyptus, and native broadleaf species. Average rotation time is 14.1 years.

In order to conduct the environmental impact assessment on exotic species introduced by Yonglin, mainly eucalyptus, Yonglin carried out an environmental assessment with the assistance of national experts and compiled a comprehensive assessment report covering not only the environmental impacts of eucalyptus in the region, but also the various methods and activities that they will adopt in operation and monitoring to minimize the negative impacts of exotic species.

With an area of over 116,000ha, Yonglin is now the first large forest management unit with FSC certification in Southern China, and the lessons learnt in its FSC application process can be practical and useful for similar companies in the region wishing to improve their forest management. During the certification process, Yonglin and WWF China worked closely together to solve technical issues and overcome many barriers. The certification practice here will be a reference case for FSC certification in Southern China where without careful planning, forest conversion, eucalyptus plantation and community forests could become obstacles to certification.

Case Study 14: High conservation value forest identification in Bahia, Brazil in a Eucalyptus plantation with remnant Atlantic forest: Veracel Celulose

Location: Bahia, Brazil
Organisation: Veracel Cellulose
Contact: Eliane Anjos, Sustainability manager, Veracel Celulose (eliane.anjos@veracel.com.br)

Background

Veracel, a joint venture between Stora Enso and Aracruz, comprises a state-of-the-art pulp mill and associated eucalyptus plantations located in southern Bahia, Brazil. Bahia has ideal conditions for eucalyptus growing. Favourable climatic conditions allow year-round planting and rapid growth. The rotation time of eucalypts is approximately seven years. Veracel has a total area of 214,600 ha, of which currently some 90,000 ha are planted with eucalyptus, 104,000 ha is a protected area and around 6,000 ha is to be planted. Veracel plantations are certified by FSC and CERFLOR.

Veracel's plantations are mainly established on former pasture lands for cattle and only occupy half of the land it has acquired. The plantation setup is unique: only flat areas are planted and the original vegetation of the Atlantic Rainforest is allowed to regenerate naturally in valleys. In addition, Veracel annually restores some 400 ha of the Atlantic rainforest, helping to conserve and restore local biodiversity. Before Veracel started operating, more than 93 per cent of the original area of the Atlantic rainforest had been converted to other land uses. The deforestation has been especially severe during the past three decades. At present, some 71 per cent of the land area in South Bahia is pasture. Veracel never converts rainforest into plantations.

Veracel also comprises a private conservation area of 6,069 ha, called Estação Veracel (Veracel Station). It has been established to conserve one of the largest remaining continuous fragments of the Atlantic rainforest and serve as centre for restoration of other remaining forest fragments in the region. More than 80 per cent of the area of Estação Veracel is covered with intact Atlantic Rainforest. The station is also recognized as part of UNESCO's Atlantic Forests South-East reserves natural World Heritage site and is largest private natural heritage reserve of Atlantic Rainforest. The Atlantic rainforest is one of the world's 25 biodiversity hotspots identifying by Conservation International as harbouring a high level of endemism.

Description of best management practice

In 2007 Veracel concluded the revision of the management plan of Estação Veracel together with Conservation International, the University of Santa Cruz (UESC) and Instituto BioAtlântica (IBio). The plan aligns the management of Estação Veracel with regional conservation projects and contributes to connecting the remaining forest fragments in the region. The plan has three main objectives: (1) conserve biodiversity and protect endangered flora and fauna species of the reserve, (2) protect the hydrological resources of the area and (3) promote environmental education. The plan strives to achieve the objectives through various activities, including research, physical protection of the area, public visits and programmes of environmental education.

The new management plan was prepared between 2005 and 2007. The process included organizing the baseline information by using existing information and conducting complementary studies on physical environment (e.g. climate, hydrology, soils, geology and geomorphology) and flora and fauna of the reserve. Further to the baseline studies, various options for public use of the reserve were analysed and a comprehensive plan for environmental education in Veracel's influence area was prepared. During the preparation phase, Veracel and Conservation International organized several workshops with representatives of local communities, non-governmental and governmental organizations, universities and other stakeholders.

Implementation of the activities defined in the management plan is ongoing. For instance, the Research Programme involves researchers from different places and contributes to increasing knowledge about biodiversity in Atlantic Rainforest. Good Neighbour Program develops initiatives of conservation aligned with the needs of human development of surrounding communities by using participatory planning methods. The infrastructure of the reserve has been improved in order to be better able to receive various researchers and other visitors of the area. Currently the reserve employs 21 people.

Challenges and difficulties

The integrity of Estacao Veracel is challenged by several factors such as poaching, encroachment, waste disposal and fire risks. In particular, hunting for subsistence and commercial purposes poses a significant threat to endangered species. Veracel has tackled the problems by running environmental education programmes that aim at increasing awareness and respect for nature as well as guiding toward responsible consumption. As an immediate action to prevent poaching and monitor the fires risks, guards have been employed to patrol in the reserve.

Outputs, results and lessons learned

Despite the various challenges, actions taken by Veracel have already started bearing fruit. Encouraging conservation achievements have been, for example,

Improved conservation status of the reserve

- ✓ Gradual decrease of the hunting in the reserve due to environmental education efforts
- ✓ Return of the locally extinct Harpy Eagle (*Harpia harpyja*) to nest in the reserve.

Increased research information about the biodiversity of Atlantic Rain Forest

- ✓ Veracel Station harbours more than 400 animal species and 300 tree species, a proportion of which are endangered and/or endemic. Research in the station has contributed to creating more information on these species and even totally new species have been identified.

Contribution to monitoring of the environmental impacts of eucalyptus plantations

- ✓ Watershed monitoring programme of Veracel uses Estação Veracel as a reference point and allows comparisons between hydrological impacts of natural forests and eucalyptus plantations.
- ✓ New research is being carried about role of the plantations in landscape ecology.

Improving the general environmental awareness of the local communities

- ✓ More than 30 000 people have visited Estação Veracel since its creation.

References

- http://www.veracel.com.br/web/en/sustentabilidade/ => the Veracel Station

Figure: Veracel mill and plantations with restored Atlantic rainforest in the valley

Case Study 15: High conservation value forest identification in Sabah, Malaysia: Malaysian Forestry Department and WWF

Location: Sabah, Malaysia
Organisation: Sabah Forest Department, WWF-Malaysia and co-funded by the British High Commission in Malaysia and WWF-Netherlands
Contact: Ivy Wong Abdullah (iwong@wwf.org.my) and Dr. Junaidi Payne (jpayne@wwf.org.my) WWF

Summary of Main Operation and surrounding conditions

The state of Sabah on the island of Borneo, Malaysia, has since 1997 seen a revolution in incorporating new knowledge to reflect the changes in management philosophies for forest management. The increased demands from public, private and other forest users, along with renewed environmental awareness, have resulted in the development of the management concept of multiple users or multiple resource management.

The Ulu Segama Malua (USM) Forest Reserve comprising of Ulu Segama and Malua Forest Reserve (Class II – Production forest) with a total area of 236,825 ha; three virgin jungle reserves i.e. Merisuli (552 ha), Kawang Gabang (707 ha) and Sepagaya (2316 ha); and one protection forest, Sapogaya FR (698 ha) came into being in March 2006. The total area of 241,098 ha was to be managed under ecosystem management based on Sustainable Forest Management (SFM) principles. Ecosystem management through SFM would guarantee that the pursuit of resource management objectives (timber production, wildlife protection, recreation, water supply, etc.) are carried out in a manner that is compatible with the long term ecological health of the total forest ecosystem.

This is the heartland of orang utan (*Pongo pygmaeus mario*) and home of the globe's richest stand of dipterocarps. The whole USM Forest reserve complex comprises of native indigenous tropical lowland dipterocarp forest and other native wild plants. The diversity of the dipterocarps include the group of Shoreas including *Shorea albida, S. ovalis, S. rubella, S. pachycarpa, S. pauciflora, Vatica* spp., *Palaquium ridleyi*, etc.

The USM Forest Reserve is managed for the next 50 years for ecosystem management with an emphasis on wildlife conservation and connectivity, with no timber harvesting from the said area.

Description of best management practices

The state forest department was exemplary in acknowledging the need for a new set of technical and analytical skills and a paradigm shift in attitude and understanding of the forest by the forest managers and the public. Some key management strategies were applied in order to facilitate this transition and since then, the department has incorporated key relevant organizations into formulation of the medium term Forest Management Plan (FMP) of USM.

The FMP team comprise of Sabah Forest Department as the lead agency, Sabah Foundation, Sabah Wildlife Department, WWF-Malaysia, HUTAN (a French NGO working on Orang Utan conservation), Sabah Society and community groups was set up in April 2006. Through this FMP exercise formulation, an alternative cycle of planning processes was designed to ensure that the USM FMP is more adaptive, flexible and anticipatory of changing conditions and issues.

The HCVF assessment for USM Forest Reserve and its chapter preparation within the FMP for USM Forest Reserve was tasked to WWF-Malaysia. In the implementation of the HCVF application, a consultation workshop was held with representatives of the various government departments, local communities and environmental groups in the area.

The approach taken to address HCVF identification within the USM Forest Reserve was to simplify the Proforest methods and to present results as tables and maps for each HCV. These were modified through discussions held during the USM FMP task force, *ad hoc* site visits and structured discussions via a paper prepared by WWF-Malaysia as well as during the consultation workshop.

Challenges and difficulties

The main challenge faced during the process was in clarifying or clearing up confusion about HCVF among the various stakeholders in the process. The confusion was centred on the definition of HCVF and with the designation of a particular compartment of the forest reserve in the Sabah context. The other difficulty faced during the process was addressing the question of at what stage does a forest ecosystem lose its conservation value given the extent of harvesting and over harvesting of the said area.

Outputs, results and lessons learned

The HCVF identification process and consultation for USM Forest Reserve produced simplified version of addressing and appointing HCVF values in USM via consultative and collaborative means. An open and engaging state forest department with regards to working with local community, social and environmental NGOs is crucial in over-coming hurdles in this particular area of natural resource utilization. The inclusion of the various groups at the onset of the planning as well as in the process and in coming up with the decision is critical.

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Case Study 16: High conservation value forest identification in eucalyptus plantations in Western Uruguay: Forestal Oriental

Location: Uruguay
Organisation: Compañia Forestal Oriental, a subsidiary of Botnia
Contact: Matthew Rivers [mrivers@forestaloriental.com.uy]

Background

In 1990 Shell and UPM-Kymmene established a joint venture (Compañia Forestal Oriental) in Uruguay to establish eucalyptus plantations. Botnia, a Finnish pulp manufacturer, purchased Shell's 60 per cent stake in 2003 and merged with Tile Forestal in 2006 to create Forestal Oriental (FO). FO supplies 3.5 million m^3 per annum of wood for the Botnia pulp mill in Fray Bentos, which started operations in late 2007. The early FO plantations were focused in the departments of Río Negro and Paysandú and covered 55,000 gross ha (35,000 ha planted). From 2003 to 2008 the owned land area spread to the departments Soriano and Tacuarembó, and increased to approximately 180,000 ha of which 110,000 ha are classed as plantable, and annual planting rates were boosted to about 17,000 ha. The FO plantations have been established on areas defined by the Uruguayan Government as 'Forest priority soils', of extensively grazed grassland (cleared of a savannah like scrub centuries ago). This country strategy identified about 3.5 million ha (out of some 17 million ha) as being of lower productivity for agriculture and suitable for such afforestation. Shareholders had a vision of implementing 'best practice' in land use change and silviculture. The business undertook voluntary Environmental Impact Assessments (EIA) in 1992, 1996 and 2007. Monitoring and research is conducted including soils and site investigation, climate data collection, silviculture practices, a breeding programme (most planting is clonal material) and biodiversity monitoring. The business achieved FSC Forest Management certification in 2001 and has since both expanded the certified area and had the certificate re-awarded. FO benefited from a brief consultancy from WWF in early 2006.

Description of best management practice

The EIA identified areas that were later classified as HCV during FSC certification. Experts ensured that the project implemented best practice well before codified external standards were developed. One area so identified has subsequently been designated as a Ramsar site and more recently added to the Uruguayan national protected area network. In addition, areas are required for infrastructure (roads and buildings) and substantial lowlands are retained unplanted. The protected areas, infrastructure and unplanted areas cover some 40 per cent of total land ownership and offer an important reserve of pre-existing habitat and connectivity. These areas are all managed – e.g., to remove exotic invader woody species.

Monitoring and research has produced remarkable results. The number of amphibian species recorded in Uruguay increased from 22 to 31, along with 2 new reptile species. Some 2,370 vegetation samples were added to the Herbarium of the School of Agronomy and 14 species new to Uruguay identified. Some 219 bird species have been observed in FO land; of which 4 were new to the country and 16 are on the IUCN 2007 Red List as vulnerable or endangered. As the land acquisition process accelerated from 2003 further areas – not classified as HCV – have been identified and designated (internally) as protected areas. These are all in addition to the Uruguayan statutory protection of remaining fragments of native woodland and palm trees; *Butia yatay*. At the end of 2008 FO had designated some 3,158 ha, distributed between 11 separate land holdings, to this level of voluntary protection. The stated goals of these protected areas are:

- ✓ The conservation of rare/endangered species or habitats
- ✓ Restoration of regionally important biological corridors
- ✓ Environmental research and education
- ✓ Collaboration with national conservation programmes and initiatives

FO has two full time environmental experts and a wide network of Uruguayan and international consultants In the FSC certification, renewal process workshops were held with stakeholders and experts to re-evaluate and confirm the previous HCVF process and validity. No additional HCVF values were found.

Challenges and difficulties

There is no national HCV initiative and statutory protection is limited to native woodland fragments (mostly by watercourses), protected species (e.g., *Butia yatay*) and protected areas. FO has acquired land over 18 years on a piecemeal basis (with average land purchase units of 1,000 ha). Other competing entities have also bought and planted land in the same zones taking the total percentage afforested, in a few catchments, above 50 per cent. Although all owners comply with mandatory conservation requirements not all subscribe to initiatives such as FSC and the scope to consider landscape scale HCV attributes is circumscribed.

Plantation development has been directed to soil types identified as ''forest priority''. Only where a proprietor wishes to plant other soils on more than 100 ha is an EIA required. Priority soils are likely to support similar habitat types and hence likely to have been managed less intensively (not being suitable for arable) and thus have a better chance of containing high biodiversity. Many farms now growing plantations show evidence of intensive activity and consequential soil erosion. As a result of cumulative land use change what was a locally common ecotype could become relatively scarce, although it should be noted that plantations only cover 4.5 per cent of total Uruguay land area. FO has been through a period of rapid expansion in land holdings. At the same time others interested in acquiring land for afforestation have been active. Changes in FO's land ownership and in surrounding land use patterns present challenges in needing to re-define or re-analyse some HCV designations. It seems that under dynamic land use FO may need to re-assess systematically previous evaluations to ensure that conclusions remain valid. It is not clear what action would be appropriate from FO if the actions of third parties prejudice previously legitimate conclusions.

Outputs, results and lessons learned.

- ✓ Attributes were identified, safeguarded and appropriately managed by a responsible and thorough approach well before the development of the HCV system.
- ✓ Application of the precautionary principle depends on the extent of baseline knowledge. The FO studies have described many species unknown in the location 18 years ago. This raises the question of how a new plantation developer can reasonably gather sufficient data (if the national data sets are inadequate) to assess the relative importance of environmental attributes before deciding to invest/plant?
- ✓ Land ownership patterns and land use in Western Uruguay has been very dynamic. The actions of a responsible actor can seem somewhat futile in the face of others' actions.
- ✓ Advance designation (and prioritisation) by national authorities has focused forestry on 'poorer' soil types. An outcome can be concentration of afforestation on sites that may have specific biodiversity values. A more sophisticated analysis might better designate indicative 'preferred areas' and introduce other constraints, such as mandatory biological corridors.
- ✓ The voluntarily protected areas have been of substantial educational value and together with the native woodland fragments can form the basis for a restoration and expansion programme.

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Figures: anthill on Mafalda farm included in Uruguayan SNAP and *Butia* forest on El Ombu farm.