



WHITE PAPER

Comparative analysis of land use options within Intact Forest Landscapes

How can FSC make a difference?

Executive summary

WWF offers the following recommendations for conducting regional analyses of alternative land use scenarios for intact forest landscapes (IFL) located within forest management units (FMU) certified according to the Forest Stewardship Council (FSC). These recommendations are meant to help develop regional approaches to protect and manage IFL.

1. Determine the reference area and landscape context of IFL. It is important that the natural conditions and socio-economic processes that determine possible policies for IFL be relatively uniform within the reference area. At this stage the drivers of IFL loss and their trends should be determined.
2. Identify what land uses are present and possible within IFL in the reference area, their scale and intensity. The comparative competitive position and their impact on IFL should be assessed, including the possible scenario of protected areas.
3. Identify the social context of IFL protection and management. The rights to resources and their level of access within IFL should be determined, as well as the scale and intensity of their use by indigenous peoples and local residents. Their viewpoints on how to protect and manage IFL and their desires for policy change should be respected and incorporated into policy development.
4. Assess the specific impacts of FSC-certified forest management on IFL and their associated High Conservation Value (HCV). Timber harvesting practices should be compared to natural disturbance dynamics, with the assumption that the more they differ, the greater their impact will be on HCV. Indirect impacts of forest management must also be taken into account, especially increased human access as a result of forest roads. Finally, the assessment should consider whether forest management in IFL is commercially sustainable in the long term, which brings us to the question whether forest management will eventually yield to other land uses in the reference area.
5. Based on the information explained in the first four steps, assess the potential impact of varying approaches to IFL protection within FSC-certified FMUs. The land use, social and forest management contexts should make it possible to weigh different policy options and seek the one that maximizes net conservation benefits without inciting land use decisions that will lead to unintended consequences for IFL.

Introduction

Since the passage of [Motion 65](#) at the 2014 FSC General Assembly, stakeholders within the FSC system have been grappling with an extremely complex task: how to maximize net conservation benefit for intact forest landscapes (IFL) without inciting unintended land use decisions.

In the case that forests cease to be FSC certified or managed to obtain forest products, what are the other likely land use options? How do these land use options compare with certified forest management in their impacts on IFL and the high conservation values (HCV) associated with such areas? Motion 65 encouraged stakeholders and standard setting groups (SSGs) to conduct such a “comparative analysis of land use options” in order to guide decision making about IFL protection and management. Unfortunately, this process was rarely carried out systematically due to a lack of clarity about the point’s intention. At the 2017 FSC General Assembly [Motion 34](#) was passed to provide clarity and guidance about this process and to facilitate its implementation in varying regional and national contexts. FSC has commissioned regional task forces to advise the SSGs on the implementation of Motion 34.

This briefing offers WWF’s vision of how comparative analysis of land use options could be conducted, and highlights two case studies that demonstrate this approach. Our intention is to identify the most important questions that we believe should be asked, not to provide a thorough methodology, a task that would require the input of diverse experts and Motion 34 task forces as part of the SSGs.

In certain instances, the protection of IFL within certified FMUs should be enhanced significantly and must be strengthened if the FSC system is to maintain credibility among all its stakeholders. Such situations often happen in regions where timber harvesting is the dominant land use option, and where practices of certification in IFL need to be differentiated more strongly from the non-certified status quo.

In other instances, requirements to change IFL protection requirements should be more modest for two reasons. Firstly, because existing practices are already producing comparatively low impacts on IFL and secondly, because strongly enhanced requirements could undermine the competitiveness of FSC-certified sustainable forest management, which may be the best land use option in that regional context. Such instances are usually observed when forestry has to compete with land use options associated with deforestation, such as agriculture, livestock raising, mining, etc.

Process

We believe that a comparative analysis of land use options can be carried out at multiple scales, including at the level of a single FMU. However, considering that Motion 34 focuses on analyses at a regional scale, this briefing offers recommendations on comparing regional land use scenarios, although there is significant overlap between the questions that should be asked at the regional and the FMU scale.

Comparative land use analysis should include the following steps:

1. Determine the reference area and its IFL context
2. Identify competing land uses in the reference area, their comparative competitive position and their impact on IFL
3. Identify the social context of IFL protection and management
4. Assess the specific impacts of FSC-certified forest management on IFL and their associated HCVs
5. Based on information from the above steps, assess the potential impacts of varying approaches to IFL protection within FSC-certified FMUs

Determine the reference area

Valid comparisons of land use options can only be made if we have determined the reference area. The reference area could be jurisdictional (a province, country or group of countries) or natural (for instance, an ecozone), and conditions and processes within that area need to be relatively uniform.

Some SSGs may choose to conduct a single comparative analysis for the entire area in which they function. Others may choose to conduct multiple regional analyses (especially in large, ecologically diverse countries), or, just the opposite, take part in a transnational analysis.

To give an example, in the case study below we will offer a comparative analysis of land use options in Guatemala. We could have chosen a larger reference area that did not observe political boundaries and included neighboring Belize or the Mexican state of Campeche, which have contiguous massifs of IFL and similar forest types. We chose not to do so because Guatemala has a quite specific policy context and demographic trends that pose unique risks.

In our second case study we chose the Russian province of Arkhangelsk. Russia is far too vast a country to make valid generalizations about land use at a national level. The forests of Arkhangelsk province alone are nearly equal to those of Sweden.

Once the reference area is identified, the next step is to determine the basic characteristics of how IFL are distributed within the area. Do intact forests comprise most of the area, or are they rare? Are data available on the rate that IFL are being lost due to fragmentation or conversion? What is the proportion of IFL in officially protected areas (though later in this assessment it is important to also ask “do those protected areas function?”) This information can help us assess the abundance and vulnerability of IFL, important factors for developing an IFL protection policy.

Finally, what proportion of the reference area is occupied by FSC-certified FMUs, and by FMUs in general? It is important to know the comparative weight of FSC in the reference area in order to understand the real impact of increased IFL protection measures.

Reference area context
1. What proportion of the reference area is covered by intact forest landscapes?
2. What is the rate of IFL loss within the reference area? What are the drivers of IFL loss?
3. What trends are observed in these drivers?
4. What proportion of IFL in the reference area is within officially protected areas?
5. What proportion of IFL in the reference area is within FSC certified FMUs, and within FMUs in general?

Land use context

This leads to the next set of questions about the full suite of land use options in the reference area. Besides FSC-certified forest management, what other demands are there on the landscape? They could include both non-certified forest managers and entirely different uses, such as agriculture, mineral and fossil fuel extraction. How widespread are various land use options, compared to FSC-certified forests? How do economic returns compare between land use

options? Does forest management offer the most competitive economic use of these IFL? Would other land users occupy IFL if a certified forest manager gave them up?

Importantly, what are the different impacts of these land uses on IFL and the HCV areas associated with them? It is well known that many alternatives to forest management include conversion with significantly greater negative ecological impacts. However, other positive alternatives which may have a lighter touch than certified forest management can be considered. Most importantly, we can think of officially protected areas. To understand the feasibility of this option, we first need to ask "What is the position of state bodies on land use in IFL?"

The debates around Motion 65 and IFL over the past three years clearly indicate that different government agencies have differing levels of knowledge and attitudes. In general, officials in northern countries like Russia and Canada are more acquainted with the IFL concept, and in some cases have accepted the necessity to increase their representation in officially protected areas. However, these countries have had fierce conflicts over the economic effects of IFL protection in which government officials have also taken part. In the global south, the IFL concept hasn't been used that much, and has even inspired doubts from officials who are uncertain of its implications on land use planning.

It is very important, as part of the comparative analysis to assess the political will of government agencies to establish new protected areas and their capacity to then enforce the regime of those areas. As some of the protected areas in the Maya Biosphere Reserve case study will demonstrate, without that capacity, political will may have little practical meaning.

Another aspect to consider is whether financial mechanisms are available to reduce the economic impact of removing IFL from timber harvesting. Firstly, this means the selling of carbon credits or payments for ecosystem services. The presence of such mechanisms can help influence the attitude of both government agencies and forest managers to IFL protection.

Land use context
1. What are the possible land uses for these IFL? What are their scale and intensity?
2. How can we compare the economic returns from these competing land uses?
3. How do these various land uses affect HCV associated with intact forest landscapes?
4. What is the position of state bodies concerning land use in IFL?
5. Are there valid regional land use plans applicable to the reference area?
6. What is the feasibility of establishing new officially protected areas?
7. How effective are officially protected areas at maintaining the HCV associated with intact forests?
8. Are there mechanisms available to offset the economic impacts of setting aside HCVF or reducing harvesting volumes?

Social context

The FSC process wouldn't be fully legitimate without considering the rights and interests of indigenous peoples and local residents.

Decisions about IFL conservation and management particularly impact indigenous peoples as there is a significant overlap of IFL with their traditional territories. Indeed, this inspired the development of the indigenous cultural landscape (ICL) concept, which aims to fully incorporate indigenous rights and their ways of life into management processes. ICL guidelines are still being developed by representatives of indigenous groups, but we believe that these same factors can also be considered in a comparative land use analysis for IFL.

The impact of IFL decisions on both indigenous peoples and local residents depends on their form of livelihoods. High reliance on the forest management sector for employment can make residents wary of increased protection requirements for IFL, whereas such moves might be welcomed by residents dependent on hunting, fishing, non-timber forest product gathering or tourism. As our case studies show, both of these dynamics can be relevant in the same communities.

Social context
1. Are there IFL in the reference area that overlap with traditional territories of indigenous peoples? If so, are the position(s) of these indigenous peoples on land use options within IFL known? What rights do they hold within IFL that are recognized by FSC?
2. What are the attitudes of other local communities within and around IFL to land use options in intact forests?
3. What land uses do indigenous and local communities practice in IFL and at what scale? What resources do they value within IFL and what is their level of access to those?

Forest management context

In the land use context section above we compared FSC-certified forest management to other land uses. But it is also necessary to take a closer look at these practices.

Of course, certified organizations vary widely in the scale and intensity of their operations. One reference area might include both multinational timber companies and community forest cooperatives. It may be necessary to determine categories of certified forest users and consider their impacts separately. Furthermore, it is worth quantifying the proportion of certified FMUs that are covered by IFL to understand the stakes for managers. This figure can also vary widely from one FMU to another.

To understand the impact of forest management on IFL it is useful to compare timber harvesting practices to natural disturbance dynamics. A general principle that we can apply is that the closer post-logging conditions are to the conditions created by natural disturbances, the less it threatens the flora and fauna dependent on that ecosystem because of their capacity to adapt well to these conditions. That said, it is important to compare not only at the stand level but also at the landscape level. For instance, clearcutting with retention of individual large trees and snags or groups of such trees can resemble intensive natural disturbances like forest fire or windthrow at the stand level. But if this logging practice is used across the landscape at rates far exceeding natural disturbance rates, it can create a

landscape mosaic without natural equivalent. This can threaten some species with large-scale habitat requirements such as the woodland caribou in Canada.

Even if logging practices are quite moderate in their impact on IFL and resemble natural dynamics, the forest management process can still prove disastrous for biodiversity if indirect impacts are not addressed. For instance, low-intensity selection harvesting in many tropical forests can have a limited impact but is often followed by large increases in hunting and poaching pressure due to increased accessibility on logging roads. In the worst case this can lead to “defaunation” and the transformation of entire ecosystems reliant on large mammals (i.e. forest elephants or great apes) for the dissemination of tree seeds.

Finally, we must ask the question “is this type of management sustainable in the long term?” Imagine low-impact forest management that rigorously controls poaching but nonetheless leads to the exhaustion of available timber resources. This could be the case in some tropical forests where only a limited number of species have commercial value. If that is the case, forest management cannot be continued in the long run and the inevitable question arises “what land use decisions will be made when the timber runs out?” leading to the long-term viability of IFL management and conservation of IFL policies.

Forest management context
1. What scale(s) and intensity(ies) are associated with FSC-certified forest management in the reference area?
2. What is the percentage of FSC-certified FMUs in IFL?
3. How do silvicultural practices in FSC certified FMUs compare to natural disturbance dynamics in forests of the reference area?
4. Are there data or observations on the impact of these silvicultural practices on rare or sensitive species or ecosystems?
5. What indirect impacts of forest management should be considered?
6. Are there concerns about the long-term timber sustainability of harvesting in IFL?

Assessing the potential impact of varying approaches to IFL protection

All the analyses listed above should enable us to compare varying approaches put forward by stakeholders to protect and manage IFLs in a given regional context.

For example, in Russia the standards development group has produced a preliminary approach to IFL protection called the “80-50-30 approach”. To summarize, a forest manager must set aside 80 per cent of the area of IFL within their FMU in case a rigorous IFL zoning process with relevant stakeholders is not conducted. If the manager is committed to reaching an agreement with stakeholders and conducting such a process (which should identify priority areas for conservation and adapted methods for timber harvesting in the remaining area) then the threshold of full protection can be brought down to 50 per cent. If the forest manager is also willing to jointly lobby with stakeholders to have the IFL “core area” set aside as an officially protected area, and this is successful, then the threshold can go as low as 30 per cent.

Russian stakeholders are offering their opinion on how these different scenarios would affect HCV associated with IFL and the economic viability of certified forest management. For instance, one large forestry holding in Siberia conducted an in-house economic impact assessment of 80-50-30. Its opinion is that 50 per cent protection was economically feasible while 80 per cent would undermine operations in certain leases and raises the question whether it should withdraw from the certification system. It is encouraging to see stakeholders grappling with these issues but we call on the SSGs to lead the comparative analysis process because in-house analyses will not always be trusted by other stakeholders and do not necessarily address the full range of factors.

A full comparative analysis should allow for weighing the costs and benefits of different proposed IFL protection requirements. In turn, this should allow us to pick the variant that maximizes net conservation gain with minimum unintended consequences (FSC flight, discouragement of future certification).

Case studies

Guatemala

Reference area context
What proportion of the reference area is covered by intact forest landscapes (IFL)?
Intact forest landscapes made up 5.2 per cent of Guatemala's forests in 2000. In the past 18 years this proportion has surely decreased. The remaining IFL are all found in the Peten province in the north, which has a much lower human population density than in the south.
What is the rate of IFL loss within the reference area? What are the drivers of IFL loss?
Between 2000 and 2013 13.3 per cent of Guatemala's IFL were lost, mostly due to land clearing and fire but also to some fragmentation within forest management areas.
What trends are observed in the drivers of IFL?
In the 1990s and 2000s forest fires and cattle ranching expanded steadily in the southern and western portions of the UNESCO Maya Biosphere Reserve. From 1998 to 2007, 7 per cent to 20 per cent of the forest area burned annually, though the area burnt on 11 functional FSC-certified concessions steadily dropped from 6.5 per cent in 1998 to 0.1 per cent in 2007 (Hughell and Butterfield 2008). Occurrence of fire had been much higher in three FSC concessions that ultimately failed (Radachowsky et al 2011). The strong contrast in forest fire and land clearance rates between functional FSC certified concessions and unleased forests and weakly protected parks in the MBR's western half is still visible today.
What proportion of IFL in the reference area can be found within officially protected areas?
100 per cent of the IFL in Guatemala is located within the UNESCO Maya Biosphere Reserve (MBR). However, the MBR contains zones with varying regimes of use: the strict protection zone, which includes 4 national parks and two protected biotopes, the multiple use zone, in which commercial harvesting of timber and non-timber forest products is permitted, and the buffer zone, where some agricultural activity is also permitted. Not all of the forests within the MBR are situated in IFL. In fact, most IFL can be found in the multiple use zone, in Mirador-Rio Azul and Tikal National Parks and the San Miguel La Polotada – El Zotz and Naachtun – Dos Lagunas Protected Biotopes. In the two largest national parks (Laguna del Tigre and Sierra del Lacondon) there were either no IFL at the time of the mapping in 2000 or they have been lost since then due to fires and land clearing.
What proportion of IFL in the reference area can be found within FSC-certified FMUs, and within FMUs in general?
Within the MBR there are 11 active concessions for timber and non-timber forest product harvesting, all of which must be FSC certified as required by the Guatemalan government. These concessions contain the large majority of IFL in the reference area.

Land use context

Besides certified forest management, what are the other competing land uses for these IFL?

Cattle ranching and other forms of agriculture are among the dominant competing land uses alongside forest management. They are often preceded by deliberately-set fires to clear forest cover. Encouraged by international donors, the Guatemalan government decided to establish the Maya Biosphere Reserve in the northern half of the Peten region and give legal preference to forest management, tourism and protection. The alternative scenario is quite visible in the western half of the reserve and in southern Peten, where in the past decades forests have been severely fragmented and degraded by expanding cattle ranching, sometimes accompanied by illicit drug operations.

It is also visible in portions of the MBR core or “fully protected”, multiple use and buffer zones in which local communities do not practice organized timber harvesting and non-timber forest product collection. In the buffer zone (mainly titled land without concessions) and in two poorly-protected national parks (Sierra del Lacandon and Laguna del Tigre) the occurrence of human-caused fires and clearing for cattle ranching is much higher than in active FSC-certified forest concessions (Hughell and Butterfield 2008). After 24 years of experimentation with community and industrial forest concessions, 11 of the 14 concessions are still active, which means 21 per cent failed. Of the 11 “successful” concessions, 9 are community-based and 2 are industrial.

It is not clear if other forestry organizations could replace the certified organizations that are presently managing these forests if the latter ceased to operate. It is worth noting that the Guatemalan government requires forest managers inside the MBR to receive and maintain FSC certification.

How do the economic returns of these competing land uses compare?

Unfortunately for this analysis, we were not able to find accurate data on the relative economic returns of timber and NTFP harvesting vs. cattle ranching. The economic viability of forest management is confirmed by several long-term studies of the MBR, which indicate sustainable livelihoods for community members and investments in local social infrastructure (Nitler and Tschinkel 2005, Bray et al. 2008). However, they also mention inadequate business experiences among some of the managers, which led to questionable business investments such as sawmills in communities without sufficient logging volumes to support them. Furthermore, a recent 40 per cent drop in price for mahogany could strain the finances of many concessions.

How do these various land uses affect HCV associated with IFL?

If we recognize that the two primary scenarios are forest management and cattle ranching, the comparison is extremely stark.

Cattle ranching is often preceded by human-set fires meant to clear forest cover. Usually, it doesn't result in full deforestation, but rather the creation of mosaics of residual forest areas and pastures, with the latter constantly gaining ground as a result of continuing fires. Residual forests are subject to degradation both from ground fires and from increased logging and hunting pressure from the people tending the cattle. These highly fragmented and degraded forests cannot support some of the region's signature species that are sensitive to human pressure such as the jaguar.

As will be described below, timber harvesting in FSC-certified concessions is practiced using low intensity selection logging. Though individual trees removed may be quite large, in general this management results in only localized reduction in canopy cover, and logged forests are able to maintain much of their structure and processes in an unaltered state.

The concessions have been able to exclude land-clearers through a system of road control and patrolling that is carried out in collaboration with state agencies and NGOs. At the southern and western boundaries of the multiple use zone, there are roadblocks through which the transport of cattle and associated equipment is restricted, albeit imperfectly. This system includes deliberate duplication of inspection activities by different government agencies and NGOs to reduce the risk of corruption (McNab and Radachowsky, pers.comm., 2018).

What is the position of state bodies concerning land use in IFL?

The MBR was specifically established by the Guatemalan government as an expression of its desire to maintain the unique ecological and cultural values of this forest. There were clear policy alternatives – allowing uncontrolled settling of the area by displaced residents from areas affected by the Guatemalan civil war – but the choice was made to promote sustainable use and protection instead.

However, the MBR regime was designed to allow for significant economic use by local communities (logging, NTFP collection, localized agriculture). It was thought that although the establishment of national parks would produce income from tourism, it wouldn't be sufficient and that some extractive use would also be necessary. That's why the government has been reluctant to consider new scenarios that would expand the area of national parks at the expense of sustainable use zones. There has been no official comment by government authorities on the issue of IFL within these concessions, but if IFL protection requirements will be strongly increased this may generate similar concern.

What is the feasibility of establishing new officially protected areas?

Some stakeholders have proposed to significantly expand the area of national parks within the MBR to incorporate the entirety of the unique archeological territories within the reserve. This would entail ending active forest management in a significant part of the area currently FSC certified.

This idea has been publicly discussed and even received some official support, but at present, is not being implemented actively.

How effective are officially protected areas in maintaining HCV associated with IFL?

The Mirador-Rio Azul NP in the MBR is located almost entirely within IFL and has remained modestly impacted because it is extremely difficult to access. Unfortunately, more accessible national parks in the MBR have a troubled record of maintaining IFL, and even of maintaining forest cover. The worst case is Laguna del Tigre NP, where human-caused fires for land clearing have spread throughout the park due to severe corruption spawned by narco-trafficking, land speculation, and the flow of human migrants, combined with weak patrolling and control of the park's borders. Sierra del Lacandon NP has also suffered, losing significant IFL during the period 2000-2013 due to agricultural encroachment in the park's southern and eastern flanks (Hughell and Butterfield 2008).

It should be noted that both national parks border Mexico, where there are more settlements and where incursion is considered a serious issue. The operational concessions are far from the Mexican border, reducing human pressure. This complicates the comparison of the performance of the parks and concessions.

In certified concessions the occurrence of fires is very low because the authorities, forest users and NGOs prevent incursion by land-clearers. These concessions act as a buffer for Mirador-Rio Azul NP and other protected areas deep within IFL (Naachtun-Dos Lagunas Protected Biotope) against fire and land clearing to the south, which is concentrated in the MBR buffer zone. However, regional experts point out that the impact

can be mutual: patrols in well protected national parks such as Tikal in the reserve's south also help to prevent incursion into neighboring concessions.

Thus, it appears that managed forests can provide a valuable buffering function to protected areas, but the efficacy of both models of land use is dependent on rigorous patrolling and protection and on the overall level of human pressure. Without large-scale state support for patrolling it is not clear that community forest concessions would have performed better than national parks along the porous border with Mexico (McNab, pers.comm.).

Are there mechanisms available to offset the economic impacts of setting aside HCVF or reducing harvesting volumes?

Efforts are ongoing to incorporate the forest concessions within the MBR into the voluntary carbon market through a project called "Guatecarbon". The goal is to comply with the strictest standard, the Verified Carbon Standard (VCS) to demonstrate that these concessions are creating enormous carbon additionality by preventing the incursion of land-clearers and by maintaining forest cover through low-intensity timber management. The funds obtained would be used to improve the economic performance of this management model and to invest in local communities.

Social context

Are there IFL in the reference area that overlap with traditional territories of indigenous peoples? If so, what is (are) their position(s) on land use options within IFL? What rights do they hold within IFL that are recognized by FSC?

There is some contention as to whether people of Mayan descent in Peten should be considered an indigenous population. Currently, FSC practices do not differentiate them from other Guatemalans who may have moved to Peten from other parts of the country.

What are the attitudes of other local communities within and around IFL to land use options in IFL?

Around 180,000 people live within the MBR, 64 per cent of whom live in the buffer zone. Perhaps 10 per cent directly benefits from forest concessions. This model would have to be extended significantly into presently unleased forests in order for the majority of the MBR's residents to receive benefits from forest management (McNab, pers.comm. 2018).

A successful example of the management regime in the MBR is the fact that local communities associated with forest concessions are now economically self-interested in perpetuating sustainable forest management, NTFP collection and tourism. This is clearly expressed in the near exclusion of forest fires from these concessions, as opposed to frequent human-set fires in several protected areas and in the buffer zone (Hughell and Butterfield 2008).

However, like the Guatemalan government, local residents may object to changes in land use that exclude commercial timber harvesting, one of the main sources of income for community concessions. There is a fundamental difference in livelihood opportunities between maintaining the forest and maintaining an "intact forest landscape."

What land uses do indigenous and local communities practice in IFL and at what scale do these occur? What resources do they value within IFL and what is their level of access to them?

Besides timber harvesting, locals within FSC-certified concessions practice commercial collection of NTFPs (chicle, decorative xate palm fronds, allspice), subsistence hunting and some sport hunting, as well as tourism. NTFP collection is based on similar principles of sustainable use as forestry operations and is widely available to local residents. Tourism-related activities are regulated by the Guatemalan authorities to minimize their impact on archeological sites. Though this reduces the scale of tourism, it ensures that activities are mostly run by residents using low-tech, low-impact methods, which guarantees local employment.

Monitoring has revealed that hunting pressure is one of the determining factors in determining population levels of many wildlife species, but that hunting regulation and access control can keep that impact within reasonable bounds (McNab, pers.comm.)

In general, access for local residents to commercial resources within the concessions is satisfactory. Extending similar levels of access to residents of the MBR outside of FSC-certified concessions, where land use is poorly regulated and many of the resources associated with IFL are under threat, is a more immediate concern.

Forest management context
What is the scale(s) and intensity(ies) associated with FSC-certified forest management in the reference area?
<p>Logging in certified concessions of the MBR is characterized by very low intensity selection harvesting (1-2 trees/ha, 1-5 cub. m/ha). These practices directly affect around 10 per cent of the area in which logging operations take place. This is partially required by Guatemalan forestry regulations and partially determined by the fact that only 5-12 tree species (of as many as 40 found in a given stand) are commercially valuable.</p> <p>A preliminary analysis of publicly available forest management plans shows that a wide range of the proportion of FMUs is set aside from logging. In some cases, these are only limited areas along rivers and key archeological sites, while in other cases set-asides comprise a large proportion of the FMU. A more in-depth analysis of the character of these set asides is needed. How are they delineated? How do they overlap with IFL? To what extent are they representative of the landscape as a whole? For instance, in one FMU (U.M. La Union) set asides cover at least a third of the territory but are mostly limited to wetlands, with little fully protected area in the terra firma forests.</p>
How do silvicultural practices in certified FMUs compare to natural disturbance dynamics in forests of the reference area?
<p>The forests of the MBR are affected by cyclical hurricanes on approximately 20-year intervals that can cause significant blowdown and create large openings in the canopy. In between these large-scale disturbances, the disturbance regime is one of small gap dynamics. The low intensity logging practices by certified concessionaires resembles these gap dynamics in scale and spatial distribution (Radachowsky, pers.comm. 2018).</p>
Are there data available or observations on the impact of these silvicultural practices on rare or sensitive species or ecosystems?
<p>The largest study on logging impacts in certified forests of the MBR (Radachowsky et al. 2004), which investigated vertebrates, birds, butterflies and dung beetles two years after harvesting, found very limited impacts. Only one species of large vertebrate, the mantled howler monkey (<i>Alouatta pigra</i>) had significantly lower density in logged forests, though the species was not extirpated. In some cases, logging increased species richness by bringing in light-loving species that had been absent before the disturbance, but notably without pushing out forest interior species.</p> <p>The authors attributed this limited impact to the very low intensity of logging, which maintains canopy closure over most of the area and results in logging gaps of limited size. However, they warn that most of the areas studied had been logged only once, and so further research is necessary to determine cumulative effects of multiple entries.</p> <p>Two large-scale camera trap studies found that, when hunting was controlled, populations of jaguar and their ungulate prey were not significantly impacted in managed, FSC-certified concessions in the MBR (Polisar et al. 2016, Tobler et al. 2018).</p>
What indirect impacts of forest management should be considered?
<p>In many tropical forest contexts, the indirect effect on biodiversity of increased access on logging roads is more important than the direct effect of logging. This is also the case in the MBR, though the intensity of</p>

impact on wildlife populations from the presence of logging roads was lower than in regions like the Congo Basin.

Both logging and road presence had impact on wildlife populations, though the former was very moderate and the latter significantly reduced by comparatively successful road patrolling by concessionaires, government agencies and NGOs.

Are there concerns about the long-term timber sustainability of harvesting in IFL?

Some parties have raised this issue in the MBR context, especially considering the limited number of tree species that can be logged commercially.

However, an analysis of timber stocks conducted in 2015 after logging in these concessions took place, revealed that volumes of mahogany, Spanish cedar and some lesser known commercial species should recover to pre-logging levels before the next entry, and that it seems possible to maintain such harvest levels over multiple entries. This very desirable situation was attributed to several factors: an unusually balanced age structure of the commercial species (as opposed to being lopsided towards the oldest age classes) and wise regulations by the Guatemalan government that set permitted logging intensities based on actual timber stock in every concession and not based on a region-wide average (Grogan et al. 2015).

Forest organizations within the MBR are also investigating the market potential of lesser known species that are abundant in their concessions in an attempt to increase the commercial sustainability of their management.

Preliminary conclusions: Guatemala

This case study does not comprise a full comparative analysis. It draws on public reports and expert interviews and was not developed in coordination with the full range of stakeholders. Nor does it contain comprehensive information about the comparative economic returns of different land use options.

Nonetheless, some preliminary conclusions are possible. The first is the critical role that commercial forest management (timber and NTFPs) has played in maintaining the unique forests of the Maya Biosphere Reserve. Forest management gives local residents an economic interest in maintaining the forest and holding off agricultural incursion.

The model has not always been successful. 3 of 14 concessions were closed, succumbing to incursion and forest clearance by other land users, which is also causing severe degradation in Laguna del Tigre and Sierra del Lacandon National Parks. But where it has worked, especially in the more remote eastern half of the MBR, the forest management model has proven to be an excellent way to complement well-protected national parks such as Tikal.

Furthermore, the nature of the timber management carried out by FSC-certified leaseholders in the MBR is relatively benign. Harvest intensity is extremely low, focused on a few commercial species that appear to have sustainable populations that can support long-term management. A well-organized system of road access control keeps forest infrastructure from being used for large-scale poaching, thanks in large part to increased commitment from the Guatemalan state and NGO partners. Studies indicate that rare and sensitive species are maintaining stable populations in these partially logged forests.

It is tempting to say that this is a case of "if it ain't broke, don't fix it." Imposing much higher IFL set-aside requirements might undermine commercial forest management in leases with a high proportion of intact forests. And there are no clear alternatives to such management that will produce better outcomes for HCV associated with IFL.

However, there may be opportunities for fine-tuning the protection offered to IFL in these FMUs. All leaseholders set aside some areas from logging, but it is not clear that these are always representational of the surrounding ecosystems or delineated for maximal conservation effect. In some cases, set asides appear concentrated on wetlands and include few terra firma forests. We recommend that existing set-aside practices in concessions within the MBR be reviewed with an eye towards ensuring that all concessions have IFL core areas that are representational, include maximal biodiversity value and minimize edge/interior ratio.

Arkhangelsk Oblast (province), northwest Russia

Reference area context
What proportion of the reference area is covered by IFL?
IFL cover 30 per cent of the forested area of Arkhangelsk Oblast. The north of the Oblast is occupied by tundra ecosystems and a large ecotone of low-density woodlands that are not considered in this analysis.
What is the rate of IFL loss within the reference area? What are the drivers of IFL loss?
From 2010-2017 approximately 1.2 per cent of the region's IFL were lost annually, mostly due to fragmentation by clearcutting and building of forest roads. In some IFL massifs, such as the Dvinsko-Pinezhsky massif in central Arkhangelsk Oblast, rates were closer to 2 per cent annually, leading to the loss of 27 per cent of this massif over 17 years.
What trends are observed in these drivers?
Forest management-related fragmentation and transformation of IFL has remained steady and even accelerated in the past four years as the depressed value of the ruble has made exports of forest products more lucrative.
What proportion of IFL in the reference area is within officially protected areas?
At present 17 per cent of the IFL in Arkhangelsk Oblast is located within officially protected areas.
What proportion of IFL in the reference area is within FSC certified FMUs?
14 per cent of the region's IFL is in FSC certified FMUs. Thus, less than 1/5 of the region's IFL is officially protected, a bit less is under FSC management, and the remainder is either under management of uncertified timber organizations or presently "unassigned" forest area.

Land use context
What are the competing land uses for these IFL? What is the abundance of each?
<p>Industrial timber harvesting is the dominant land use in IFL in Arkhangelsk Oblast. Of the 400 concessions used for resource extraction in the region, 300 are for logging. The only other significant sector is mining and oil extraction, which happens predominantly in the northern sub-tundra forests where commercial logging is limited. Forestry is “following” this sector into the sub-tundra zone on the roads build to access mines and oil wells, but not yet on a significant scale (Shegolev, pers. comm. 2018).</p> <p>The true resource competition is between FSC-certified forestry organizations and forestry organizations with PEFC certification, or none at all. Pressure on the region's forest resources is growing, as the weak ruble makes export more profitable and investment in sawmills is increasing as a result. The central government is encouraging this growth through the Priority Investment Projects system, which offers timber leases at reduced cost to organizations investing in processing capacity. At this point, almost no forests remain available for lease in the middle or northern taiga zones. IFL are mostly situated in areas that are difficult to access or have limited productivity.</p> <p>Today, FSC-certified firms lease about 9 million hectares, while PEFC has certified just a few million. But the latter system is growing significantly faster, partially due to the difficult policy situation around IFL in the FSC system.</p>
How do the economic returns of these competing land uses compare?
<p>Unfortunately, we were not able to find any data comparing the economic returns of FSC-certified forest management and forestry that is PEFC certified or non-certified, particularly in the context of potentially significant IFL set-asides. Understanding this situation remains an important gap holding back the development of an IFL policy in the region.</p>
How do these various land uses affect the HCV associated with intact forest landscapes?
<p>There are few tangible differences in the way logging is conducted between FSC-certified, PEFC-certified and non-certified organizations. Their requirements for setting aside some portion of IFL is the main difference. Currently, in the FSC Russia national standards there is a requirement to set aside a “significant part” of IFL, though the proportion is not specified. This has led to moratoria on logging in certain IFL areas in certified concessions, and in several instances, to establish official protected areas there (see below). More than one third of the certified IFL area is excluded from logging per the conditions of moratoria.</p> <p>In contrast, PEFC has no requirements for the protection of IFL, unless they are located within officially planned protected areas (OOPT). Therefore, the future of IFL within PEFC-certified concessions is entirely uncertain. Some of these organizations lobby the government to reduce the area of planned PAs within their concession (Shegolev pers.comm. 2018)</p> <p>Entirely uncertified organizations also have no requirements to set aside IFL. However, developments in Russian forest legislation may produce new mechanisms for protecting IFL on an official level that could affect all concessionaires (See below).</p>
What is the position of state bodies on land use in IFL?
<p>Within the central government (Federal Forest Agency), the value of IFL is recognized and so is the need to zone these areas for conservation and management. At the same time, the Ministry of Industry and Trade administers the Priority Investment Project process, which is oriented on significantly increasing sawmill</p>

capacity in Arkhangelsk Oblast. This new capacity could almost certainly be supplied only by IFL (Greenpeace International 2017).

Oblast-level authorities have similarly mixed views. On the one hand, the governor signed off on a Forest Plan and Regional Land Use Plan that both include proposed new protected areas in IFL, including within the Verkhneyulovsky Reserve in the controversial Dvinsky-Pinega massif, and two others along the border with the neighboring Komi Republic. The governor has expressed public support for the establishment of the Verkhneyulovsky Reserve, and did not oppose earlier national parks and reserves that were created in IFL core areas, partially or fully removed from FSC-certified concessions.

On the other hand, the Oblast Parliament criticized Motion 65 and the efforts of conservation NGOs like Greenpeace and WWF to ensure protection of some of the region's IFL (Emelyanova 2016). This opposition is based on fears that this will result in lost jobs and manufacturing capacity. Greenpeace has characterized the parliament's position as "conserving the status quo to allow for maximal exploitation of the remaining IFL on the same extensive model that was earlier used on the rest of the region."

What is the feasibility of establishing new officially protected areas?

Considering the complicated attitude of central and local authorities to IFL and the cautious attitude of local residents (see below in "Social context") the creation of new protected areas is possible but requires significant political investment. This limits the scale of protection. For instance, for years WWF, Greenpeace and other NGOs have lobbied for the establishment of Verkhneyulovsky Reserve, investing significant time and donor resource. This process happened in the form of negotiations and sometimes, was also confrontational. As a result, the organizations have held firm on protection of the most valuable central zone even if the edges of the massif have been eaten away by checkerboard clearcuts. In April 2018, a preliminary agreement between the forest leaseholders within the massif (most of whom are FSC certified), WWF and Greenpeace was signed setting the boundaries for a 170,000 ha reserve. The question will now be brought before the public for further comment.

There is some promising precedent for establishing protected areas within IFL cores that were set aside by FSC-certified organizations. In Arkhangelsk Oblast the the Onezhskoe Pomorie National Park (180,000 ha) and the Uftyuga-Ilesha Reserve (78,000 ha) were both created in this manner. Furthermore, the federal authorities have worked closely with leading ecological NGOs on a concept called "National Forest Heritage," which would allow to set aside valuable forest landscapes such as IFL core areas without actually establishing national parks or nature reserves. This significantly brings down costs (no park staff, infrastructure) and theoretically can be done more quickly. No National Forest Heritage areas have yet been delineated, but the concept is being incorporated in national legislation and could play an important future role in the protection of IFL core areas.

How effective are official protected areas at maintaining the HCV associated with intact forests?

The effectiveness of official protected areas in Arkhangelsk Oblast is relatively high. They are generally well protected from illegal logging, man-made fires and poaching.

Are there mechanisms available to offset the economic impacts of setting aside HCVF or reducing harvesting volumes?

In Arkhangelsk Oblast no voluntary carbon market projects are currently operational, though there is precedent for intact forests that were set aside as HCVF in the course of FSC certification being incorporated in such projects in Russia. The most prominent example is the Terneyles group of organizations in Primorsky

Krai in the Russian Far East, which incorporated several hundred thousand hectares of HCVF in a programme working in the voluntary German market.

Social context

Are there IFL in the reference area that overlap with traditional territories of indigenous peoples? If so, are the position(s) of these indigenous peoples on land use options within IFL known? What rights do they hold within IFL that are recognized by FSC?

There are no recognized indigenous peoples in Arkhangelsk Oblast living in the zone where active forest management takes place. FSC acknowledges the Pomori people on the White Sea coast as having distinct local traditions that deserve extra attention, but they are not recognized as official indigenous peoples. As such they will not be considered in this analysis.

What are the attitudes of other local communities within and around IFL to land use options in intact forests?

In 2017, WWF Russia commissioned a survey of residents of communities near the proposed Verkhneyulovsky Reserve within the Dvinsko-Pinezhsky IFL. It clarifies the priorities and concerns of residents regarding IFL policy-making.

13 per cent of residents of these communities support the establishment of the Reserve unconditionally. 57 per cent would support it if there are no restrictions on traditional uses of the forest by residents, including hunting, fishing, berry and mushroom gathering and the use of hunting camps. 30 per cent are opposed to it, either because they fear they will lose their jobs in logging organizations or because they do not trust the Reserve authorities, believing they might still impose restrictions on traditional use.

Opposition to the Reserve is higher in towns where timber organizations still employ a significant proportion of the population, and lower in communities where timber organizations left and residents are more dependent on "traditional taiga livelihoods" (hunting, gathering) for income and personal use.

This survey applies only to one district but likely reflects realities applicable to the entire region. For some residents there is an inevitable conflict between conservation and employment, especially considering the extensive "wood mining" model of forestry in the region that requires constant expansion into new forest massifs. On the other hand, many residents are entirely reconcilable to large-scale conservation of IFL if this does not entail losing access to traditional uses. Many such residents voiced concerns in the survey about how large-scale timber harvesting would affect those traditional uses.

What land uses do indigenous and local communities practice in IFL and at what is their scale? What resources do they value within IFL and what is the level of access to those resources?

As mentioned above, local residents who live within or near IFL in Arkhangelsk Oblast primarily use these forests for hunting, fishing, collection of berries and mushrooms and general recreation. Responses to the above survey indicate that they often feel uncertain about whether they will be able to still access these resources in future. There are precedents in the region of access being restricted both by authorities of protected areas and by resource extraction leaseholders.

Collection of berries and mushrooms is generally considered sustainable given the vast resource and relatively low population density. Fishing and hunting, however, sometimes attain unsustainable levels that lead to exhaustion of populations of commercial species. Sometimes, this is the result of organized commercial poaching.

Forest management context
What is the scale(s) and intensity(ies) associated with FSC-certified forest management in the reference area?
All FSC-certified forest managers in Arkhangelsk Oblast can be characterized as "industrial," practicing clearcutting in blocks of up to 50 ha in size. High intensity selection logging is carried out on a limited basis, mostly in certain categories of forest where clearcutting is prohibited. Certified concessions can be from tens to hundreds of thousands of hectares in size. Development of timber resources is often practiced as 'checkerboard clearcuts,' whose geometric shapes are easily visible from space.
How do silvicultural practices in certified FMUs compare to natural disturbance dynamics in forests of the reference area?
<p>Natural disturbance dynamics in natural forest ecosystems of Arkhangelsk Oblast vary by forest type and landscape position. In a simplified division we can differentiate Scots pine forests on sandy river terraces from the more widespread spruce forests. The former are characterized by period ground fires, while the latter are shaped by partial disturbances such as insect outbreaks, blowdown or the poorly understood phenomenon of "spruce die-off," when mature spruce trees experience mortality over large areas but younger trees are unaffected, causing generational turnover but not a change of dominant species.</p> <p>Such large clearcut remove practically all the living trees and often lead to change of dominant species (young birch trees overtop the coniferous regeneration) which have little in common with the region's natural disturbance dynamics.</p>
Are there data or observations on the impact of these silvicultural practices on rare or sensitive species or ecosystems?
<p>Scientific data on logging impacts on biodiversity are rare in Arkhangelsk Oblast, though certain especially vulnerable species have been identified. These tend to be associated either with exceptionally old and structurally complex individual forest stands (such as bryophytes or woodborning insects with narrow habitat niches and limited distribution capability) or mammals associated with large, inaccessible forest massifs.</p> <p>The most prominent representative of the latter group is the forest subspecies of reindeer, which is listed in the Red Book (of endangered species) of Arkhangelsk Oblast. Wildlife biologists in the region observe a progressive retreat of reindeer to the most remote forest massifs as habitat transformation and intense hunting pressure reduce its population in actively managed forest areas. This phenomenon has been observed in the nearby Khanti-Mantsi Autonomous Region (Volkov and Larin 2007).</p>
Are there concerns about the long-term timber sustainability of harvesting in IFL?
There are significant concerns about whether the type of forest management practiced in Arkhangelsk Oblast is actually sustainable, even in the case of FSC-certified practices: On paper almost all FMUs have large volumes of timber and appear to be logging at rates lower than what is biologically possible to regenerate. But in practice these figures can be highly inflated. For instance, they include large areas of low-productivity or inaccessible forests that the organization will not attempt to access. Furthermore, the forest inventory may not have been updated in the field for several decades, leading to many uncalculated losses of timber volume to forest fires, illegal logging, insect outbreaks, etc.

In the Russian forest management system the annual sustainable logging volume is calculated for the entire FMU, and the organization then chooses where to harvest that volume. As a result, the most productive and accessible forests are usually logged first. At some point the organization may decide that the remaining forests are too remote and low-productivity to log profitably and abandon the lease. In this way, what looks like sustainable forest management on paper is in fact localized resource exhaustion (Khakimulina 2016).

The long-term solution to this problem is intensification of forest management. Greater investment is needed to ensure that logged areas successfully regenerate commercial coniferous species and that they are well tended so that they produce merchantable timber in the shortest possible period. Such intensive management is common in neighbouring Fennoscandia but almost absent in Russia. Forestry organizations, NGOs and the government have put much emphasis on intensification as a means to provide timber sustainability and reduce pressure on the last remaining IFLs. But transitioning to intensive forest management will take decades and cannot solve short-term conflicts over logging in IFL. In the short term, only the establishment of protected areas (resulting in reduced logging volumes) can maintain IFL that are already in the “logging frontier” (Shvarts and Shegolev 2017).

What indirect impacts of forest management should be considered?

An extensive network of forest roads in the taiga of Arkhangelsk Oblast increases hunting and poaching pressure as well as human-caused forest fires. Hunting and poaching pressure can affect relatively common species such as moose and roe deer, but also the rare and vulnerable forest reindeer, which has become the object of intense commercial harvesting in Russia.

Data on the impacts of forest roads in Arkhangelsk Oblast are limited, but studies by WWF-Russia in similar conditions in Siberia and the Russian Far East showed significant increase in risk of destruction by fire in close proximity to forest roads (Vladimirova et al. 2017, Pavlichenko 2017).

Preliminary conclusions: Archangelsk

The forest management practiced in intact forest landscapes (IFL) of Arkhangelsk Oblast differs fundamentally from the one described above in Guatemala. Industrial clearcutting fundamentally alters the boreal forests both at the stand level and at the landscape scale in the mosaic of different age classes that is created. Though some adaptations to logging practices are being proposed, including retention of key structural and habitat features during logging and fitting logging sites to natural boundaries, they can only modestly reduce the transformational impact of clearcutting on structurally complex, late successional coniferous forests.

For this reason a relatively strict approach to IFL core delineation appears necessary in northwest Russia.

Stakeholders including WWF-Russia have put forward a proposed approach to IFL core area delineation known as “80-50-30,” which allows for varying proportions of core area delineation depending on the rigor of protection the cores are provided. 80 per cent protection will be needed if the FSC-certified organization doesn’t set up a rigorous delineation process that involves diverse stakeholders. If such a process is organized and agreement with key stakeholders has been reached, the proportion can be brought down to 50 per cent. If the forest manager successfully lobbies the government to create an official protected area on the territory of the core area, then the proportion can be as low as 30 per cent.

The case study shows us that, although it remains a difficult task, FSC organizations can lobby the state to create a protected area if other stakeholders are also involved. Considering the exceptionally high stakes (some of Europe’s last intact taiga, intense pressure on remaining timber stocks, logging systems that contrast strongly with natural disturbance dynamics) the route of establishing official protected areas should be used as frequently as possible. Longer-term adaptations such as intensification of forest management are needed to gradually reduce pressure on

IFL, but considering the amount of time it takes to make this transition, the most ecologically and socially valuable IFL could be lost unless more direct means of protection are used.

Recommendations

FSC can greatly assist stakeholders and standard-setting groups to conduct regional comparative analyses of land use options by offering guidance on the following, particularly complicated aspects:

1. How to commission and conduct third-party assessment of the economic returns of competing land-use options and the potential economic impacts of proposed IFL protection measures.
2. Rubrics for assessing the long-term sustainability of forest management practices in IFL.
3. How to conduct consultation with indigenous peoples and local residents on their current and desired uses of IFL in a culturally appropriate manner.

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