WWF

REPORT

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# MANAGING FORESTS, SUPPORTING WILDLIFE:

## Can biodiversity thrive in responsibly logged tropical forests?

# ACKNOWLEDGEMENTS

Front cover photo: Jaguar (Panthera onca) in a tree Pantanal, Brazil.
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WWF is one of the world's largest and most respected independent conservation organizations, with more than 5 million supporters and a global network active in over 100 countries. WWF's mission is to stop the degradation of the Earth's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

# SUMMARY


**With biodiversity declining at alarming rates, there is an urgent need to conserve natural habitats – particularly tropical forests, which are home to around three-quarters of all species found on land.**

Commercial logging in tropical forests can degrade ecosystems and fragment habitats, threatening biodiversity. However, when logging is responsibly managed, it has the potential to support local livelihoods and economic development while conserving biodiversity and the other vital services that forests provide.

To understand more about the impacts of forest management on biodiversity, WWF supports various research projects around the world. This briefing summarizes the findings of two recent studies carried out in the Peruvian Amazon. These suggest that:

- **Concessions certified by the Forest Stewardship Council (FSC) have a greater richness of species such as amphibians, insects and monkeys than non-FSC logging concessions.** Acoustic analysis found that the make-up of species in FSC-certified sites was more similar to undisturbed forest areas than non-certified logging sites.
- **Large mammals such as jaguars can thrive in sustainably managed forests.** Surveys found that densities of large and medium-sized animals in FSC-certified logging concessions were similar to or even higher than in protected areas.

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These findings suggest that low-impact logging following the FSC standard can be compatible with biodiversity conservation. However, the results observed in Peru do not necessarily apply elsewhere; more research is needed, covering different ecosystems and types of forest management. WWF calls upon governments, forest managers, buyers of forest products and certification schemes to support more biodiversity monitoring to improve our understanding and strengthen conservation measures in tropical forest management.

# WHAT IS AT STAKE?

**Worldwide, biodiversity is disappearing at an alarming rate. Between 1970 and 2014, vertebrate wildlife populations on our planet declined by 60 per cent on average. Species declines are especially pronounced in the tropics, with South and Central America suffering the most – an 89 per cent loss in the last 45 years.[1]**

## THE GLOBAL LIVING PLANET INDEX SHOWS A SPECIES DECLINE OF 60 PER CENT BETWEEN 1970 AND 2014

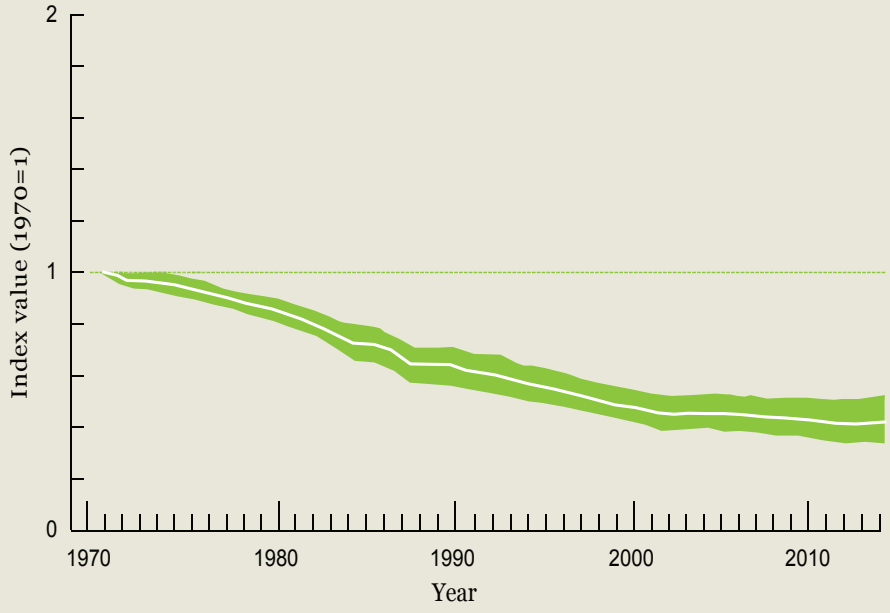


***Figure 1: The Global Living Planet Index 1970 to 2014***
*Average abundance of 16,704 populations representing 4,005 species monitored across the globe declined by 60%. The green line shows the index values and the shaded areas represent the statistical certainty surrounding the trend (range: -50% to -67%).*

*Key*

Global Living Planet Index

Confidence limits

Habitat loss, including deforestation and forest degradation, is the primary cause of biodiversity decline. Forests are being converted into other land uses including mining, livestock ranching and large-scale agriculture. In South America, almost 20 per cent of the Amazon rainforest has disappeared in the last 50 years.[2]

Despite political and corporate commitments, little action has been taken to reverse the trend of biodiversity decline. So how can we tackle biodiversity decline at the scale and urgency required?

Well-managed protected areas that restrict human access are one effective way to conserve biodiversity,[3] but they are not the solution everywhere. Our society depends on forest resources for food, fuel and materials, and a balance must be found between economic development and conservation.[4]

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Logging is an important part of the local economy in Madre de Dios, Peru.

## COMMERCIAL LOGGING IN TROPICAL FORESTS

Commercial logging is an integral part of our economies, providing a vast range of products we use in our daily lives. It is also a significant source of revenue in many tropical forest countries, and provides a livelihood for many people in areas where economic opportunities are limited. Nearly one-third of the tropical forest area globally is designated for timber production;[5] around 560 million cubic metres of industrial roundwood is harvested annually from tropical forests.[6]

Poor logging practices have significant impacts on forests and the biodiversity they support. They damage wildlife habitats and diminish the ability of forest ecosystems to recover or provide services such as clean water, traditional medicines and other non-timber forest products. On the other hand, responsible, well-managed logging concessions can help prevent deforestation by adding economic value to forests, while also acting as wildlife corridors or buffer zones around protected areas.[7]

## FOREST MANAGEMENT AND CERTIFICATION

Forest certification provides independent third-party verification that production forests are being managed responsibly, including in ways compatible with maintaining forest biodiversity in good health. WWF considers the Forest Stewardship Council (FSC) to be the most credible of these voluntary certification systems.

FSC recognizes and promotes “environmentally responsible, socially beneficial, and economically viable forest management”. FSC-certified logging operations are required to follow strict environmental standards, for example conserving forests that have high conservation value (HCV), limiting the use of chemicals, restricting hunting, and mitigating and repairing damage caused by logging operations.

Mounting evidence suggests that FSC certification has overall positive impacts on forests and people in the tropics. However, so far scientific evidence of FSC’s effectiveness in conserving biodiversity has been limited. To address this, WWF supports independent, scientific investigation into the effectiveness of FSC practices in concessions and on surrounding, wider forest landscapes. The next section introduces findings from two studies looking at the ecological outcomes of forest management in FSC-certified forest concessions in the Madre de Dios region of the Peruvian Amazon.

# CASE STUDY FROM MADRE DE DIOS, PERU'S BIODIVERSITY CAPITAL

**The Amazon is the largest rainforest in the world, covering 550 million hectares across eight South American countries. It harbours 10-15 per cent of all life on land.[9] Peru holds the second largest area of Amazon rainforest after Brazil, with forests covering almost 60 per cent of the national territory.**

The forests protect most of the country's freshwater supply, and contain valuable timber and non-timber forest products and globally important carbon stocks. The Peruvian Amazon is rich in biodiversity, including endangered wildlife such as the white-winged guan, spectacled bear and harpy eagle.

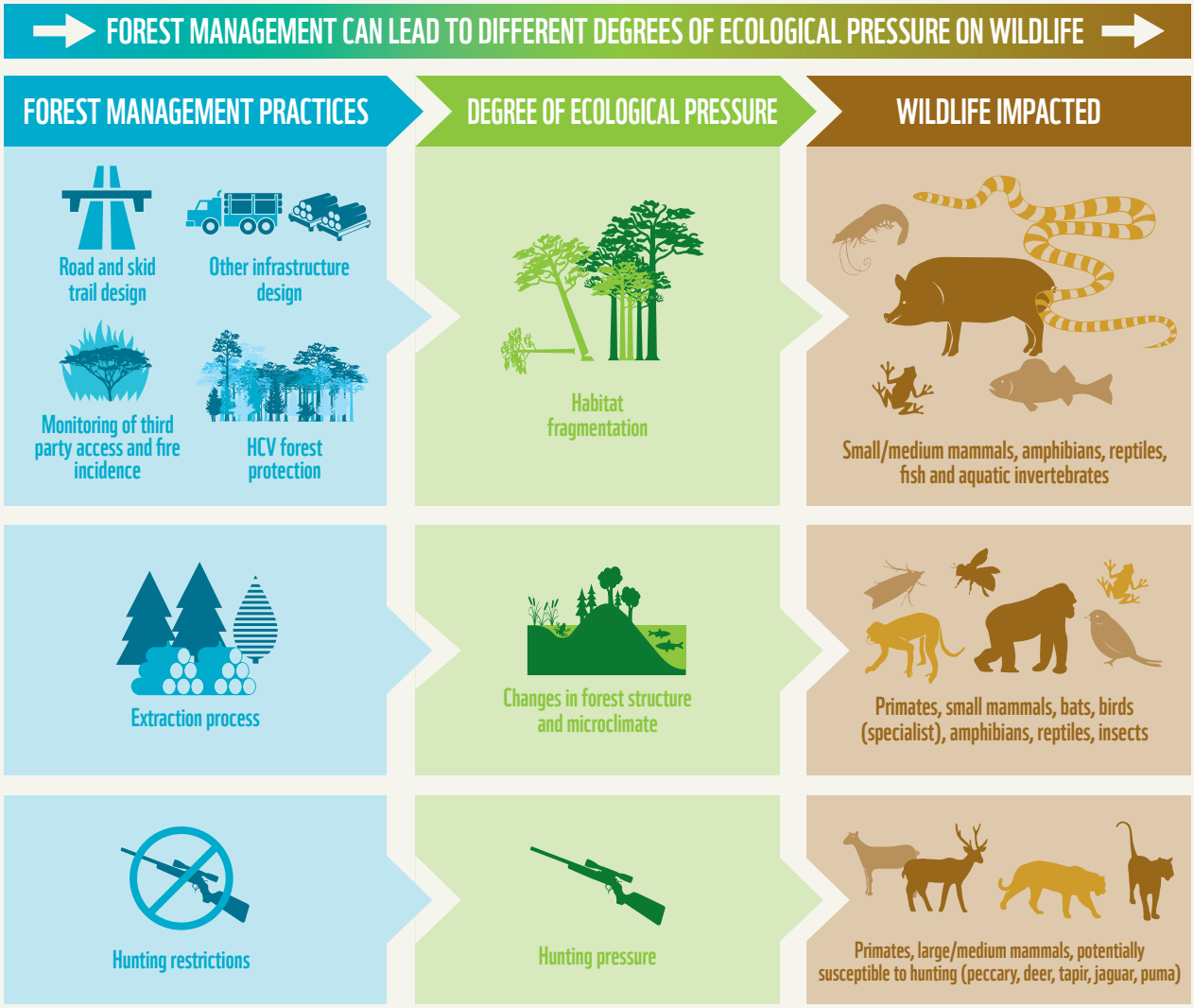
The Madre de Dios region of the Peruvian Amazon contains almost 8 million hectares of rainforest, and has had historically low rates of deforestation. Though relatively inaccessible, Madre de Dios's rainforests are not without human influence. They are home to hundreds of indigenous communities from dozens of ethnic backgrounds. Logging is an important economic activity, with logging concessions covering 1.3 million hectares.

In 2013, when a series of FSC impacts research began, 422,959 hectares of production forest was under FSC-certified management.[9] Most of the logging concessions – both certified and non-certified areas – are divided into 20 blocks with timber being extracted from one block each year. The volume of harvest varies widely, but is generally low: in most cases, only 1.2–3.0m$^3$ – think one or maybe two trees – is extracted per hectare.[10]

## INVESTIGATING BIODIVERSITY IN RESPONSIBLY MANAGED FORESTS IN MADRE DE DIOS

Conventional forest management affects biodiversity in various ways. Logging road networks and other infrastructure development, such as areas for loading logs and workers' camps, can lead to habitat fragmentation. Timber extraction opens the canopy of densely closed forests and changes the microclimate, which can be damaging to local biodiversity as many plants and animals cannot immediately adapt. Opening the forest for logging also makes it easier for illegal miners and hunters to enter the area.

Responsible forest management aims to reduce, mitigate and repair any damage. To verify whether FSC certification effectively contributes to wildlife conservation, WWF supported two research projects with different emphasis.




## LOGGING, JAGUARS AND OTHER LARGE MAMMALS

Animals such as deer, tapir, jaguars and pumas need large areas to feed and hunt. Their protection requires large forest areas to be connected and free of hunting pressure.

Researchers from San Diego Zoo Global in Madre de Dios, Peru supported by WWF, used camera trap surveys to evaluate populations of jaguars and other terrestrial mammals in five FSC-certified logging areas managed by independent timber concessions in Tahuamanu province, Madre de Dios. Satellite analysis during 2000-2013 showed no deforestation in the study area.[11]

The research team set up 89 camera stations and captured images for four months during 2014. Using the camera trap data, the researchers examined the community structure and distribution of mammals and assessed the density of the jaguar population.

### KEY FINDINGS:

- Camera traps recorded 215 images of 43 jaguars (19 males, 22 females and 2 of unknown sex). Both sexes but particularly males showed a preference for roads: the probability of detection was higher on active roads than on old roads, much lower off road.
- The camera traps recorded 27 species, comprising 25 large and medium-sized mammals and two birds. Of these, seven species were significantly more likely to be seen in logged areas compared to unlogged areas. No species showed a negative initial response to logging.
- The proportion of the area occupied across the concessions ranged from 15 per cent for the pacarana to 95 per cent for the lowland tapir and the red brocket deer. Jaguars and pumas both used about 75 per cent of the area. The occupancy and density of various species were equivalent to those observed in protected areas.

The FSC-certified concessions had healthy populations of large and medium-sized mammals. The analysis indicates that, in the absence of hunting, some wildlife prefer opened forests to dense ones and use logging roads for movement. Predators such as jaguar and puma also take advantage of the logging roads to move across large areas for hunting. In some cases, especially when bushmeat hunting is strictly controlled, logging appears to have positive effects on populations. Similar results have been found elsewhere in Latin America.[12]

## ACOUSTIC ANALYSIS OF SENSITIVE SPECIES

The second study, led by WWF in collaboration with the University of Puerto Rico, focused on the impacts of responsible forest management at a smaller spatial scale. Here, the research team used cell phones to record sounds of hundreds of species of birds, insects, amphibians and monkeys. Unlike the large mammals, which are mobile and migratory, many of these local residents tend to be more sensitive to changes in microhabitats caused by very low intensity logging. The acoustic data allows researchers to assess the composition and abundance of a wide range of local forest residents; this analysis focused on birds.[13]

Between June and September 2017, the research team installed 72 camera traps and 72 sound recorders in three large industrial concessions (two FSC and one non-FSC), also in Tahuamanu province. The plots for the recorders were carefully selected from those that had been logged in different years, and those that had never been logged, which served as a reference for the natural state of forest.

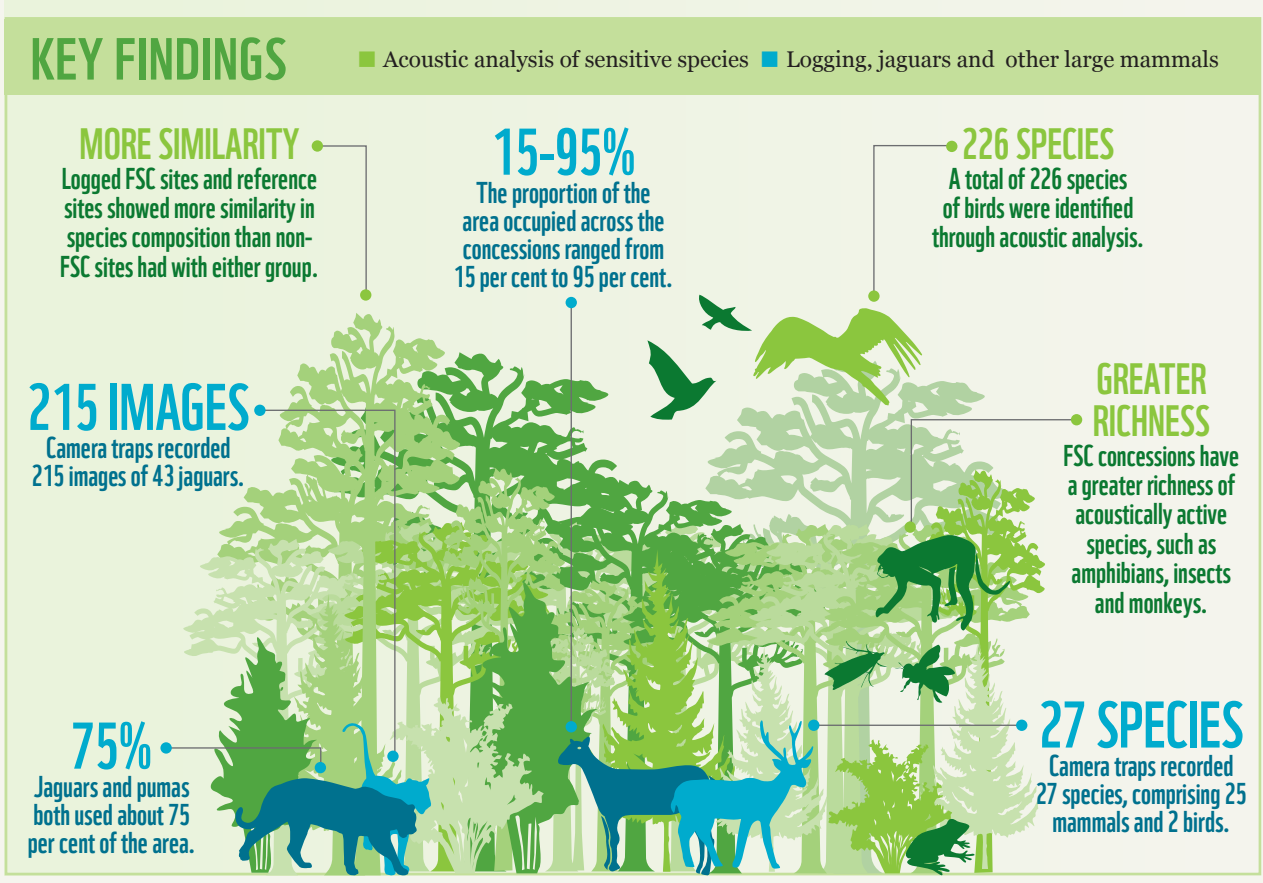
### KEY FINDINGS:

- A total of 226 species of birds were identified through acoustic analysis.
- The FSC concessions appeared to have a greater richness of acoustically active species, such as amphibians, insects and monkeys, than the non-FSC concession, as greater quantity and variety of sounds were recorded in the FSC sites. This finding holds after taking into account other variables that may affect species richness, such as habitat composition, vegetation and proximity to water.
- Logged FSC sites and reference sites (undisturbed areas) showed more similarity in species composition than non-FSC sites had with either group
- Bird richness was similar between FSC, non-FSC and undisturbed forests.



Blue and yellow macaw, Madre de Dios.

Forestry activities seem to have little negative impact on birds, probably because they are highly mobile. The differences in species richness suggested in the soundscape analysis are most likely due to acoustically active insects and amphibians, which may be more sensitive to changes in microhabitat. This finding is consistent with previous research in this field.[14]



# CONCLUSIONS

**Commercially logged tropical forests can help conserve wildlife populations when they are managed responsibly according to FSC standards.** The research in Madre de Dios shows that low-intensity logging activities have little impact on mammals, including top predators like jaguars, and birds. When hunting is strictly controlled, these mobile animals – which travel long distances – use logged forests in FSC-certified concessions as much as undisturbed forests. Insects and amphibians benefit from low habitat disturbance in FSC-certified logging concessions compared to non-FSC logging concessions.

**Responsibly managed production forests can complement protected areas to provide extensive habitat for a wide range of species in the Amazon.** Preventing habitat loss is critical to halting declines in biodiversity. Certified forestry concessions can support local development and add value to the standing forest, reducing the pressure to clear the forest to make way for other land uses. Forest managers also have an important role to play in preventing illegal activities such as hunting, logging and mining that threaten biodiversity.

**Cost-effective technologies allow for large-scale monitoring of biodiversity even in relatively inaccessible forests.** Advances in camera trapping, satellite imaging and automated sound and image identification techniques, as well as scores of other emerging technologies like drones and environmental DNA analysis, have dramatically improved our ability to collect biodiversity data at scale. These technologies need to be used to ensure that forests managed for timber production help conserve biodiversity.

**More scientific research and long-term biodiversity monitoring is needed.** The impact of certification varies depending on the forest ecosystem, the equivalent conventional logging practices, land tenure security, and other social and ecological factors. The results in Peru do not necessarily apply elsewhere. We need to better understand the impacts more systematically, including for different ecosystems and regions and of different forest management regimes, and to unpack where and how forest management certification can be most effective in conserving biodiversity.



Tree frog in the Peruvian Amazon. Amphibians are highly sensitive to changes in habitat and microclimate.

# FINDING A BALANCE BETWEEN PRODUCTION FORESTRY AND BIODIVERSITY CONSERVATION: RECOMMENDATIONS

**The studies in Madre de Dios demonstrate that it is possible to combine production forestry with biodiversity conservation. To halt and reverse the decline in biodiversity in tropical forests, however, low-impact logging practices need to be adopted across the industry. At the same time, more research is needed to improve understanding and further minimize the impacts of forest management on biodiversity. Government, forest managers, buyers of forest products and certification schemes all need to work together to achieve this.**

## GOVERNMENTS AND DONOR AGENCIES CAN:

1. **Integrate forest management into landscape-level planning for biodiversity conservation, including the use of certified logging concessions as wildlife corridors and protected area buffer zones.** In places where responsibly managed commercial logging has been shown to safeguard biodiversity effectively, sustainable forest management can be integrated into land-use planning and management at landscape level to deliver socially, economically and ecologically sustainable outcomes.

2. **Provide financial incentives for forest managers to monitor biodiversity.** Financial incentives could be offered to forest managers who can demonstrate biodiversity benefits with independent verification. More research funding could be directed towards making new monitoring technologies cheaper and more accessible, so that biodiversity is incorporated into routine forest management planning and monitoring.

3. **Align biodiversity monitoring in forest management with national policies and assessments.** There are numerous international efforts to improve biodiversity reporting (such as National Biodiversity Strategies and Action Plans under the Convention for Biological Diversity and National Ecosystem Assessments), yet investment in field-based data collection at scale has been lacking. Providing technical guidance to forest managers on biodiversity data collection in line with national policies could be an effective way to get a coherent and consistent picture of the overall status of biodiversity.

## FOREST MANAGERS CAN:

1. **Partner with FSC, independent researchers and conservation organizations to demonstrate their biodiversity impacts.** FSC's new Ecosystem Services Procedure enables independent verification of biodiversity benefits. In addition, opportunities to partner with independent researchers to conduct biodiversity monitoring are abundant.

## FOREST PRODUCT BUYERS, MANUFACTURERS AND RETAILERS CAN:

1. **Ensure the timber they source is FSC certified, especially from tropical forests with high biodiversity.** The more the market shows that it cares, the more incentives forest managers have to look after biodiversity and monitor its status.

2. **Raise awareness about the ecological benefits of responsibly managed forests and the FSC label.** Companies sourcing from tropical forests should support their suppliers to monitor biodiversity impacts, and communicate these results to customers. WWF has created resources to help communicate the value of responsibly managed forests.

## FOREST CERTIFICATION SCHEMES CAN:

1. **Collect and report data on biodiversity systematically.** Auditors often collect a large amount of data, but this is not always made publicly available. Certification schemes can upgrade their data management systems and audit requirements to store and share data in a way that facilitates internal reviews, external research and public communications.

2. **Establish strategic collaborations with research institutions.** Independent researchers often have difficulties accessing data, sites and contextual information. Certification schemes can establish strategic research agendas and help facilitate data collection, without undermining the integrity and impartiality of academic research.

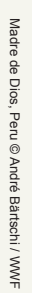


Maderacre concession, Madre Dios region, Peru.

The research studies above show that commercially logged forests in the Madre Dios region can help conserve wildlife populations when they are managed responsibly, and that it is possible to undertake long- term biodiversity monitoring in an efficient and cost-effective way.

With forest certification designed to balance the different aspects of sustainability – environmental, social and economic – it is imperative to understand its on-the-ground impacts. Better understanding of the role responsible forest management and low-impact logging practices can play in maintaining biodiversity is particularly crucial given the scale and urgency of the global biodiversity crisis.

WWF will continue to support research on the conservation impacts of interventions in biodiversity hotspots across the world. We will also work to translate science into action and bridge the gap between research and practice. We invite everyone committed to biodiversity conservation to join us in these efforts.


Madre de Dios, Peru © André Bartschi / WWF

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