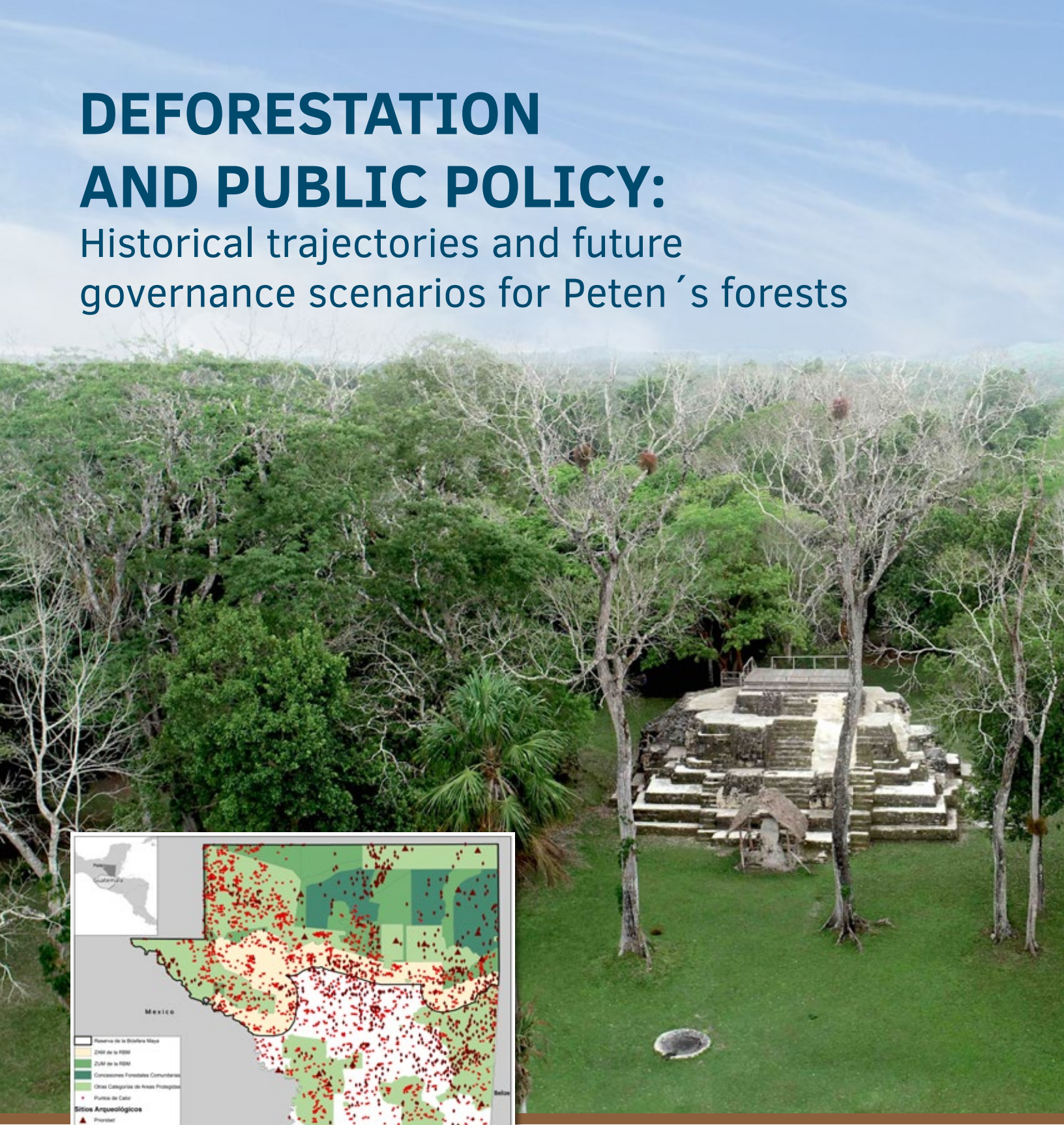
DEFORESTATION AND PUBLIC POLICY:

Historical trajectories and future governance scenarios for Peten´s forests



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PRISMA
Programa Regional de Investigación sobre Desarrollo y Medio Ambiente

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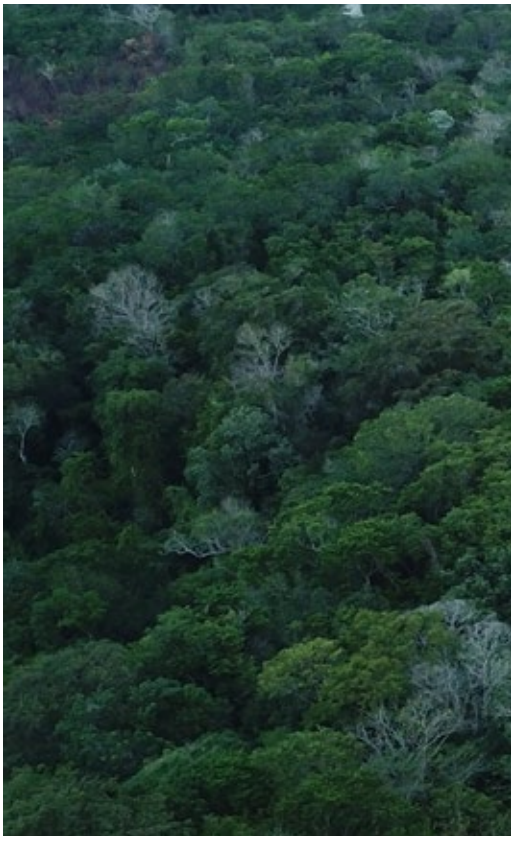
Executive Summary

The impact of fires on the forests of Petén Department in Guatemala has attracted national and international attention to the future of the region and its immense natural and archeological wealth. In 2017, the PRISMA Foundation conducted a study of geographical differences in fire incidence in the Maya Biosphere Reserve (MBR), finding that community forest concessions in the Multiple Use Zone were highly effective at prevention, in stark contrast to the core zones of the MBR.

This paper revisits the 2017 study. We found that during 2018, despite having been a year with fewer fires overall, the geographic dynamic has been similar to 2017. These differences in incidence are consistent with our analysis of fire dynamics over the past 10 years, in which community forest concessions were found to have an incidence of fires 16 times lower than the Core Zone. Furthermore, this shows the crucial nature of actions by community groups to protect archeological sites in and around the concessions. This explains why Petén's archeological sites, the focus of new attention and proposed tourism in 2018, are in the best conserved areas in the department.

To better understand the factors that have influenced such differentiated dynamics in Petén, this study provides a historical analysis of the effects of the main government interventions and social movements in the changing territorial dynamics of Petén.

The role of forests in government interventions in the Petén region has gone through three historical stages. The first period, from the 1960s to the late 1980s, was a stage of colonization, where forests were seen only for their role in an extractive economy. The stage during the 1990s, until the year 2000, represented a new way of viewing forests as a site to be protected. During this stage, and as a reaction to this perspective, social protests led to agreements between the



National Council of Protected Areas (CONAP) and communities within the area, which also involved industries and tourism interests whose interrelation enabled forming a zone characterized by stability and conservation. In the third stage, new initiatives emerged with renewed interest in forests as key spaces for economic development.

These stages resulted in trajectories that have produced highly differentiated territorial conditions in Petén that help to put fire dynamics into context. A trajectory of land clearing, seen as a vision for development, is common in southern Petén. A second trajectory involves an incomplete conservation approach, marked by the absence of operational arrangements for control over the forests, opening the door to deforestation and the emergence of illicit networks. The alternative built from the third trajectory involves coordination and consolidation with territorial interests and actors, in which community concessions play a critical part in territorial stability.

These dynamics demonstrate the shortcomings of proposals and policies that do not reconcile interests and actors around a model of sustainable forest management. This is especially relevant in the context of recent policies, since new tourism proposals for the MBR have emerged without efforts to consolidate the territorial level coordination in the MBR that has enabled the development of stable governance arrangements. Lack of attention to these elements could expand the dynamics of rampant degradation, conflict, and ungovernability in large areas of Petén, particularly in the national parks, where an incomplete conservation policy has revealed how hard it is for the government to coordinate with other actors. Ignoring these arrangements could jeopardize not only the forests and communities of the MBR, but also the preservation of the region´s World Heritage sites.

1. Introduction

Around the world, difficulties in simultaneously addressing forest degradation and ensuring economic benefits and improved livelihoods for local communities have fostered the search for mechanisms that enable ensuring sustainability objectives. The case of Petén, in northern Guatemala, has attracted attention because of the positive outcomes associated with an innovative management system for protected areas and forests based on the collaboration of multiple stakeholders. This process, encouraged by the willingness of the government and its adoption of the forest concessions policy, is led by the National Council of Protected Areas (CONAP), with the involvement of many stakeholders, including the forestry industry, non-governmental organizations (NGOs), and in particular, the communities organized under the Association of Community Forests of Petén (ACOFOP). The forest concessions model has successfully brought sustainability objectives together with the search for mechanisms to improve the quality of life and promote development, notably contributing to attaining the Sustainable Development Goals (SDGs).

To understand the dynamics and functioning of governance models based on community rights, this paper[1] draws on the monitoring and analysis of forest fires in the Maya Biosphere Reserve (MBR) in 2017 (Davis and Sauls, 2017). That report identified the preponderant role that community concessions had in the prevention and control of fires. The effectiveness of these actions provides proof of a statistically significant difference in fire prevalence among different management zones,

1 The analysis was based on a mix of methods (Hernández et al., 2014) that combine historic analysis, literature review, interviews with key stakeholders in the region, along with tools for analysis of spatial information and periodicals. The methodology used to analyze hotspots and fire incidence is described in detail in Davis and Sauls, 2017.

where coordinated actions among different stakeholders, led by concession organizations in the Multiple Use Zone (MUZ) (including community and industrial concessions), have been much more effective at fire prevention and control compared to other management zones.

This paper revisits that analysis, providing in Section 2 an update for 2018 on the outcomes of these actions, and how they have evolved over the past 10 years. Section 2 also provides contextualization for the social and environmental dynamics underlying the strong disparity between the MUZ and other MBR management zones.

Section 3 addresses the main research question of this paper: What has been the role of forests in the development approaches implemented in Petén? This analysis proposes a broader reflection to understanding the complex dynamics underlying the occurrence of fires. The results contribute to understanding historic changes in the government's perception of forests and identifying trajectories from which we can reflect on another question: What future can we envision for forests and the management of forest resources in the current proposals for the region? This historical reflection seeks to understand the role of forests over time, from the perspective of both the government and local community organizations. Our objective is to shine a light on factors that explain the different trajectories in fire patterns that we see in Petén. Section 4 provides an analysis of three trajectories that have marked the territorial dynamics of Petén, and Section 5 contains the conclusions of this analysis with recommendations for the current situation and proposals for development and conservation of the MBR.

2. Analysis of fires from 2008 to 2018: Results and territorial contextualization

In Petén Department, the region of Guatemala with the greatest expanses of forest, fire dynamics show geographically differentiated patterns, in line with the analysis by Davis and Sauls (2017). For our analysis, we used data from the Fire Information for Resource Management Systems (FIRMS) of the United States National Aeronautics and Space Administration (NASA) to study hotspot incidence[2] – a proxy for fires (cf. Davis and Sauls, 2017) – which can be seen for both the region of the MBR and the rest of the department of Petén.[3] Figure 1 shows the zoning for Petén's protected areas.

2 MODIS C6 hotspots indicate 1 km pixels in which at least one active fire is detected during a pass by the satellite (Davis and Sauls, 2017).

3 The Fire Information for Resource Management System (FIRMS) at the United States National Aeronautics and Space Administration (NASA) provides active hotspot data from the MODIS C6 1 km and VIIRS 375 M satellite products. We chose MODIS data because it covers more time. Collection 6 MODIS NRT Hotspot / Active Fire Detection MCD14DL. Available on-line: [https:// earthdata.nasa.gov/firms]. DOI: 10.5067/FIRMS/MODIS/MCD14DL.NRT.006 (accessed 26 July 2018). For more information on the analysis methodology, see Davis and Sauls, 2017.

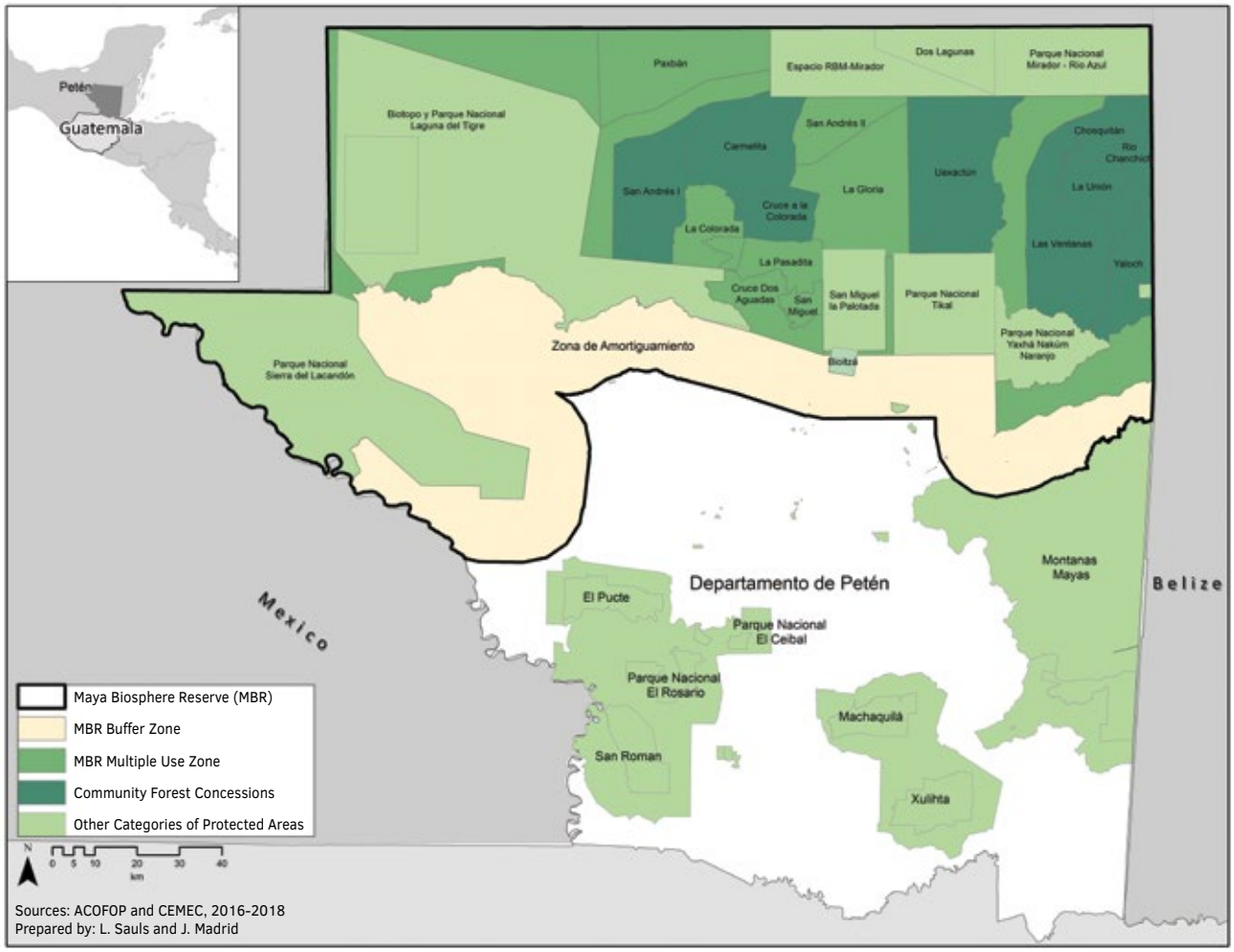


Figure 1. Maya Biosphere Reserve and southern Petén Protected Areas Complex. Community concessions form part of the MUZ.[4]

In 2018, there was a lower incidence of hotspots during the fire season compared to 2017 (Figure 2).[5] However, the geographic differences seen in 2017, with fewer fires occurring in the MUZ, continued. This compares with other management zones, where actions by community and industrial forest concessions play a central role. Actions by community concessions for fire prevention and control during 2018 are summarized in Box 1. Figure 2, below, shows that with these actions, community concessions not only protect ecosystem integrity, they also play a central role in the protection of archeological sites in the MBR. These actions form part of a broader process of territorial coordination between the government and the stakeholders that are involved in the MUZ (see Section 2).

4 The maps in this report were prepared using data from ACOFOP and the Center for Monitoring and Evaluation (CEMEC) and form part of the ACOFOP database of geospatial archives, most of which were provided by CEMEC, part of CONAP.

5 For the direct paired comparisons in this report, we used Student's t-test (significance level of $p < 0.05$ for all tests). The result of this analysis was statistically significant ($p = 0.04$).

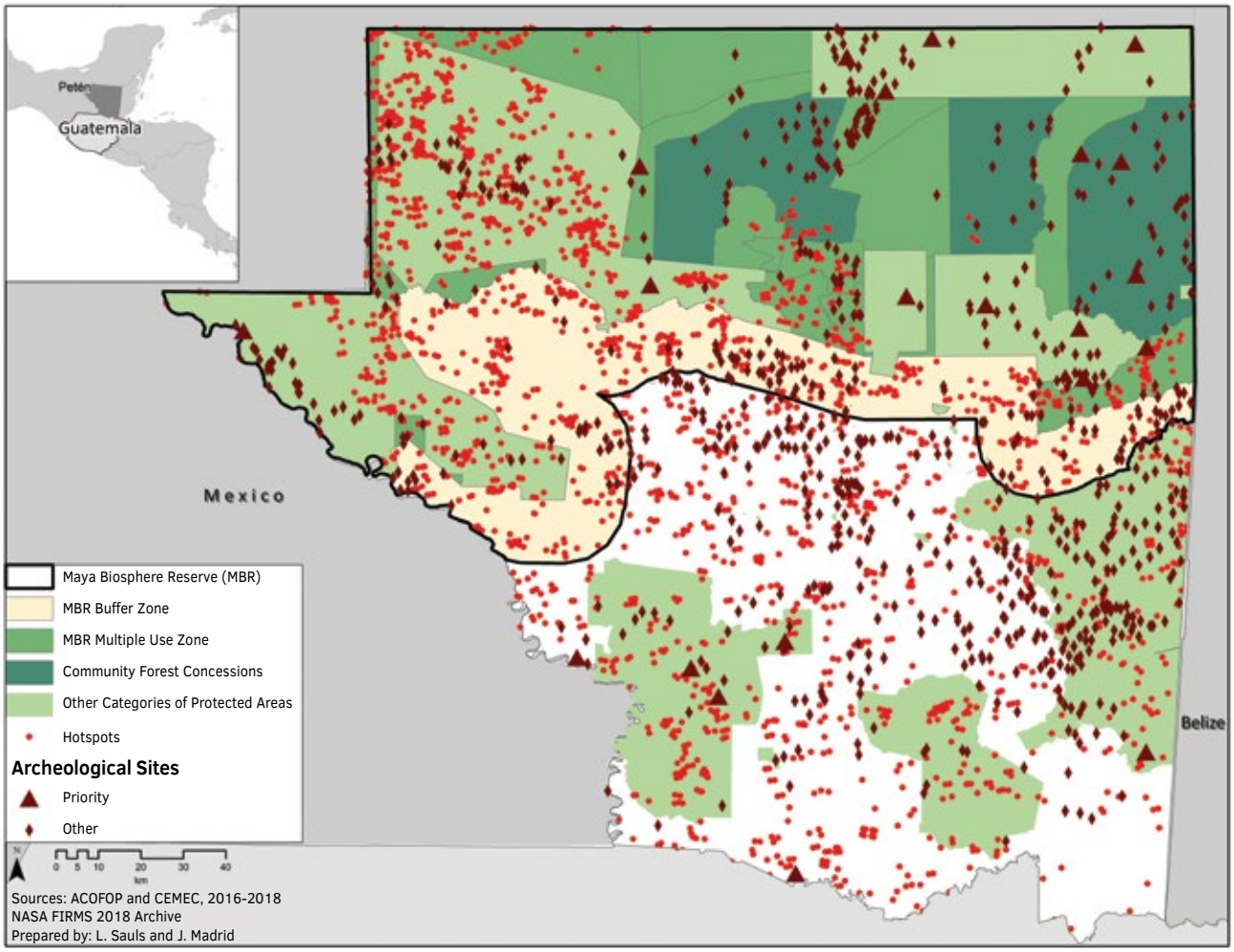


Figure 2. Distribution of hotspots in Petén Department, Guatemala in 2018. Note differences among management categories in the MBR and other types of protected areas in southern Petén. The map also shows the location of known archeological sites in the region, differentiated by level of importance.

Box 1. Community concessions' prevention and control actions in the MBR Multiple Use Zone.

According to Davis and Sauls (2017), community forest concessions organize their fire prevention and control action using annual plans. Each concession develops and funds its own plan, with oversight from CONAP. In 2018, community concession organizations invested over US$181,000 of their income from forest utilization to implement these plans. This investment enabled 324 patrol missions, and 121 fire control and prevention campsites, not only on the edges of community areas, but also in neighboring areas that are unprotected. They also carried out maintenance of 533 km of fire breaks throughout the concessioned areas. These actions are carried out through the collective efforts of all concession organizations and include collaboration on rotating patrols of shared boundaries, pooling of resources, and the coordination of information about threats. ACOFOP often plays a role as a platform to facilitate this collaboration, as well as investing additional resources in activities planned by individual concessions. All these efforts are coordinated with CONAP, which supervises the development and implementation of plans. Patrol missions are required to submit thorough reports to CONAP. Some of these missions are carried out together with public authorities. In turn, CEMEC sends a daily early warning report to the concessions on the presence and location of hotspots. Both the 2017 (Davis and Sauls) and 2018 studies found that concessions use different strategies depending on the nature and location of threats, with a wide range of technologies and cooperation mechanisms among communities, and between communities and the government.

In addition, as part of the organizations' conservation activities, the community concessions carry out specific tasks to protect the archeological sites within their management areas, which are reported to CONAP. The communities have detailed maps of the locations of these sites and their operating plans do not permit logging that could affect the monuments. These sites also form part of the tourism activities the communities are involved in, which together with the use of timber and non-timber products, make up the comprehensive economic model of these community concessions.

Our analysis of the last ten fire seasons (January-June)[6] in the MBR found that three regions have the greatest incidences of hotspots[7]: the Buffer Zone to the south, which has the highest fire incidence in the MBR (an average of 2.05 hotspots/1,000 hectares); inactive concessions[8] (1.73 1.73 hotspots/1,000 ha); and the Core Zone (1.48 hotspots/1,000 ha). Fire incidence is considerably lower in the active concessions (community and industrial: average incidence of 0.09 and 0.02, respectively) of the Multiple Use Zone (MUZ), compared to the Buffer Zone, Core Zone, and areas of the MUZ without an active concession.[9] Figure 3 graphs hotspot incidence from 2008 to 2018 in the MBR, revealing that after a peak in the early years of the analysis, hotspot incidence in inactive concessions has been lower than in the Core Zone.

6 Personal communication, J. Madrid (ACOFOP), June 2018.

7 To determine whether there was a statistically significant difference between the MBR management zones and the rest of Petén (southern Petén national parks and unprotected zones in Petén), we used a one-way analysis of variance (ANOVA) with $p < 0.05$. We found $p < 0.001$, meaning that hotspot incidence differs by zone.

8 This refers to the three concessions that have been revoked or suspended.

9 For all comparisons, the result was $p < 0.01$.

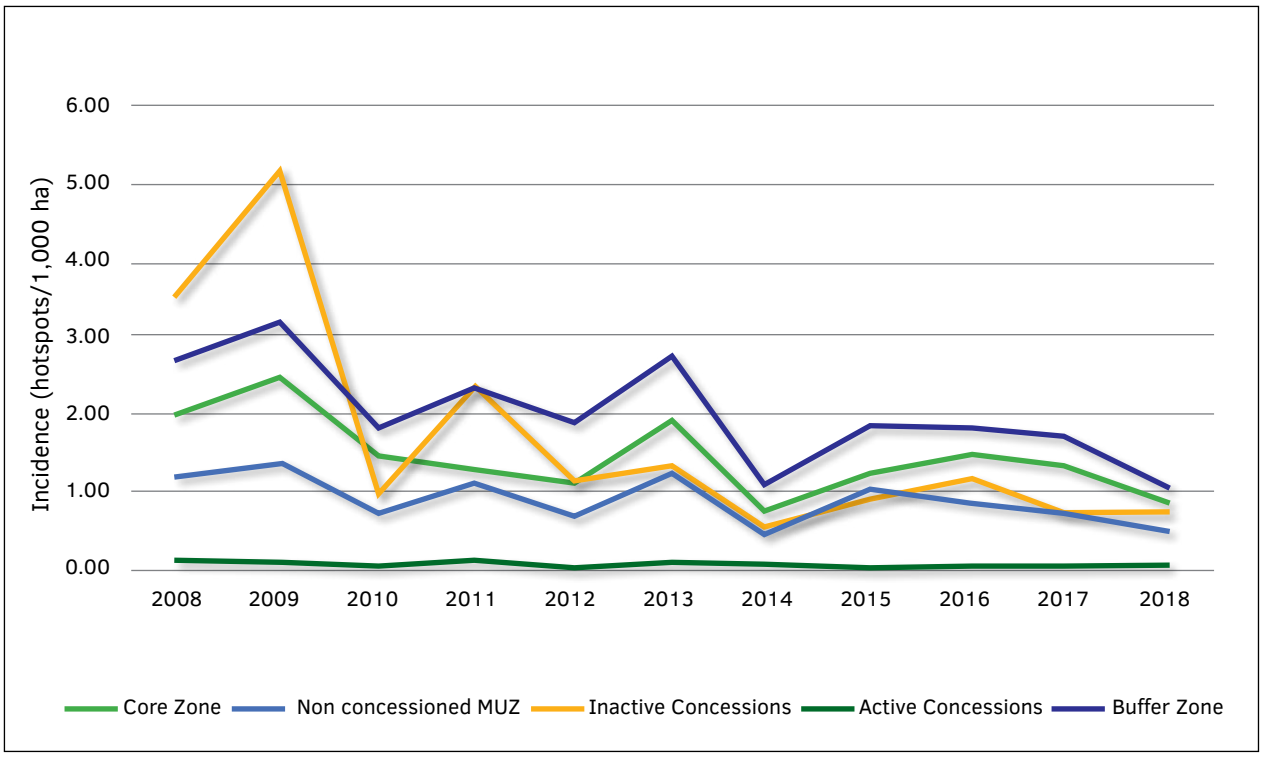


Figure 3. Hotspot incidence (per 1,000 ha) in the different zones of the MBR from 2008 to 2018. The Buffer Zone has the highest incidence in all years expect the first two; active concessions have an incidence close to zero over the entire period. Source: NASA/FIRMS 2018.

Looking at fire incidence since 2008, we see that distribution of hotspots by area does not correspond proportionally to the size of each zone. The core zones cover over 39.5% of the area of the MBR, but contain over 48.1% of hotspots in this period, the greatest proportion, even in comparison with the Buffer Zone, which has 36.5% of hotspots and 21.6% of the MBR's area. Furthermore, community concessions (22.3% of the MBR) only contain 1.3% of hotspots, and 15.5% of hotspots occur in the MUZ even though the zone covers 38.9% of the MBR (Figure 4). These data show that the Core Zone is the management zone most affected by fires.

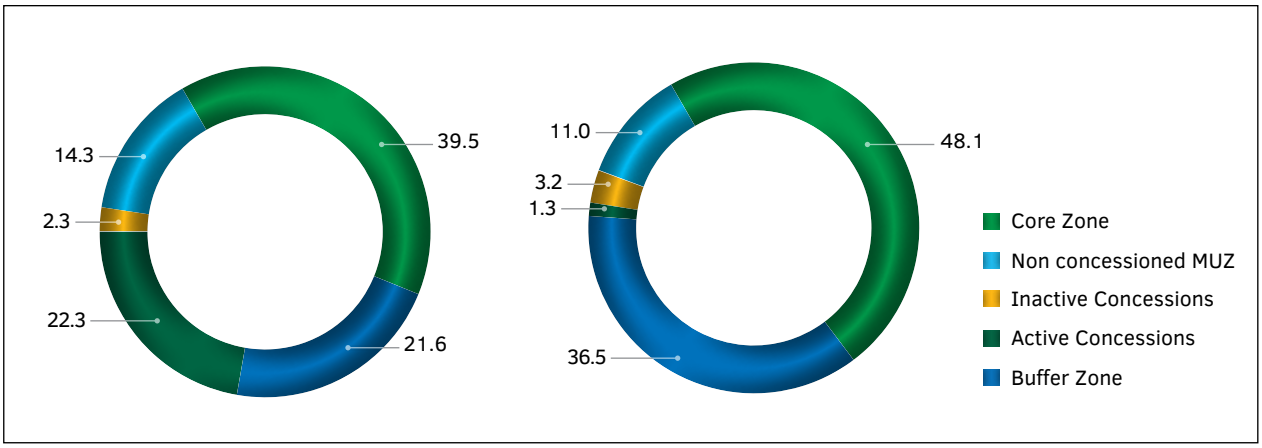


Figure 4. Distribution of MBR area by management zone (**left**) and hotspots from 2008 to 2018 in the same zones (**right**). The Core Zone is the largest area in the MBR, and its percentage of hotspots is even greater than its area. Source: NASA/FIRMS 2018.

During 2008-2018, as to be expected, hotspot incidence in the MBR (1.21 hotspots/1,000 ha) has been lower than in southern Petén[10] (1.45 hotspots/1,000 ha). However, it is worth noting that, overall, fire incidence in Petén has dropped in recent years (Figure 5). In the south, protected areas have had a higher incidence than unprotected areas (1.66 and 1.37 hotspots/1,000 ha, respectively), which might be explained by the change in land use in other regions outside the protected areas.[11] Even though protected areas in southern Petén show a higher incidence than the Core Zone of the MBR, the difference is not statistically significant.[12]

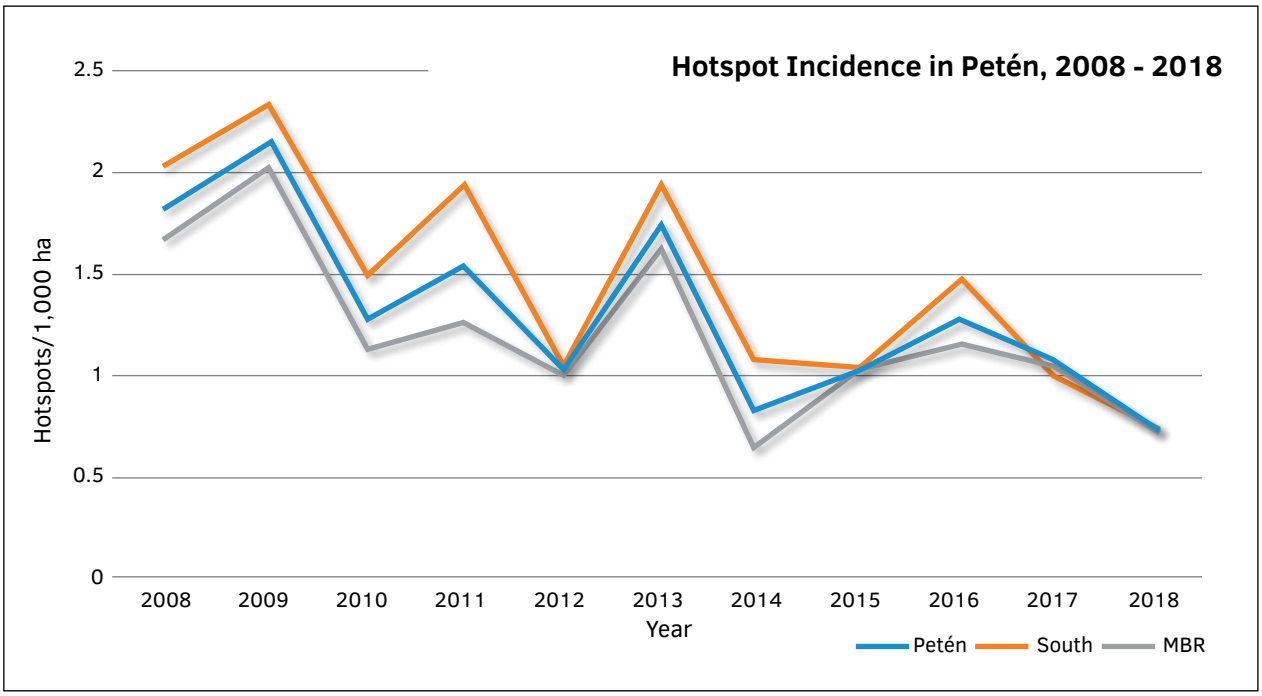


Figure 5. Hotspot incidence in Petén, in the department's northern (MBR) and southern regions. The MBR had a greater incidence than southern Petén only in 2017. In 2018, both regions had an incidence of 0.68 hotspots/1,000 ha. Source: NASA/FIRMS 2018.

Surprisingly, our analysis shows that during the past two years, the national parks inside the MBR have had higher rates of fire compared to the southern part of the department. In the areas that make up the Core Zone, the concentration of hotspots in Laguna del Tigre National Park can explain this difference in incidence. We can see that, generally, the areas in the MUZ have an incidence rate significantly lower than in the Buffer Zone or the Core Zone this year, and during the period analyzed, incidence rates in community and industrial concessions are the lowest.[13] These results suggest that concessioned areas provide a kind of "firewall" for the Mirador zone and the northern and eastern borders, keeping fires that come from the southern and eastern regions of Petén from affecting these regions.

10 Southern Petén refers to hotspots located outside the MBR perimeter.
11 $p = 0.01$. Significant difference.
12 $p > 0.15$. No significant difference.
13 In the two comparisons for the 2008-2018 period, $p < 0.001$.

2.1. Fires in the context of forest and territorial dynamics in Petén

To understand the results of fires and the threat they pose to the MBR's natural and cultural resources, it is important to characterize the territorial dynamics in today's Petén. According to an analysis of data obtained from the forest monitoring platform, from 2000 to 2017, Petén lost close to 26% of its forest cover, or more than 700,000 ha of forest (see Figure 6).[14] During 2000-2014, deforestation rates in the MBR were 5.5% in the Buffer Zone and 1.2% in the Core Zone, compared to 0.1% in the MUZ.

Regarding the most affected municipalities, the analysis of the percentages of forest-cover loss during 2000 to 2017 shows that the three least affected municipalities are Flores, Melchor de Mencos, and San José, all in the MBR (see Figure 7). In contrast, the municipality of Sayaxché, in southern Petén, lost 43% of its cover during this period.

The analysis of the dynamics of fire and loss of forest cover presented above enables us to see that these changes are occurring in a broader context that transcends the boundaries of the MBR. Deforestation in Laguna del Tigre National Park continues apace, while the historic levels in Sierra del Lacandón have stabilized in recent years. These dynamics of deforestation and fires are driven by the presence of livestock, oil palm, and to a lesser degree, small farmers. Land grabs in these regions have been facilitated primarily by construction of access roads (CONAP, 2015); e.g., the road put in to build a pipeline to the Xan oil field (Cuellar et al., 2012).

The influence of illicit actors has been determinant in these dynamics, since livestock and oil palm represent ways to ensure territorial domination and control of lands that are subsequently used as exchange points, routes for illegal trafficking, and ways to launder money (Sesnie et al., 2017; McSweeney et al., 2017; Cuellar et al., 2012). The expansion of the domain of these actors runs in a corridor from Laguna del Tigre to southern Petén Department. In this region, expansion of these activities has had a major social and environmental impact, encouraging new deforestation and dispossession primarily of Q'eqchí communities by ranchers and oil palm plantations (Grunberg, et al., 2012). Concentration of land in the hands of these actors underlies the continuous pressure on all areas of the MBR. The following section delves more deeply into the causes underlying these dynamics, with the aim of contributing to public policies that support the conservation and development of Petén.

14 Data from Global Forest Watch, an online forest monitoring platform https://www.globalforestwatch.org (accessed 2 August 2018).

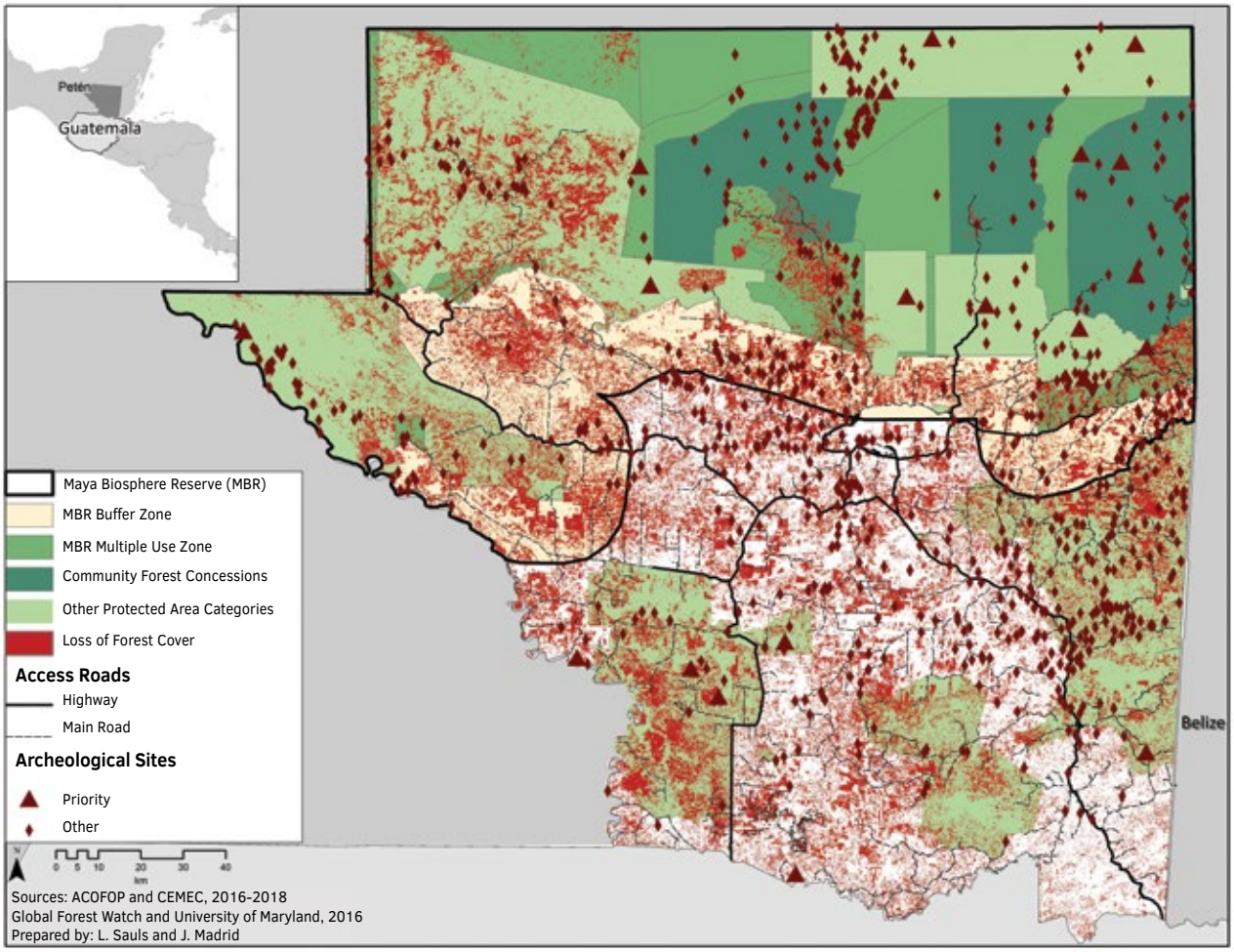


Figure 6. Deforestation in Petén Department from 2001 to 2014, with base year 2000.

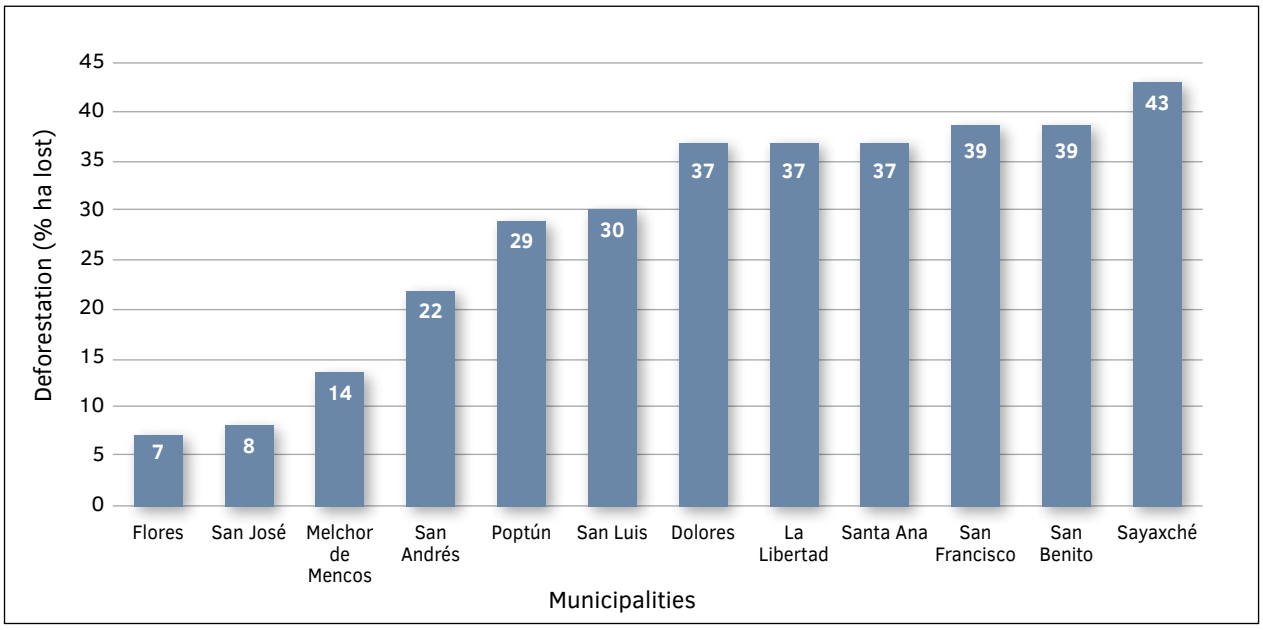


Figure 7. Percentage of forest-cover loss during 2000 to 2017 in Petén Department municipalities. Flores, San José, and Melchor de Mencos in northeast Petén – where most of the community concessions are – have had less deforestation. Source: Global Forest Watch 2018.

3. Changes over time in the vision of the forests in the Mayan Biosphere Reserve: Government perspectives and social movements

The different patterns in fire incidence in the MBR respond to its historic context and to changes in the vision of the forests from the perspective of the government, social movements, and the results obtained at the territorial level. To illustrate the government's perspective, we identified policies, regulations, and plans whose implementation[15] in Petén reflects changes in the vision of the forests (see Table 1). This section analyzes three distinct periods in the recent history of Petén that reflect an important shift in the government's perspective about the forests and management of forest resources. In the characterization of these periods of change, we have also identified key periods of social mobilization including resistance, negotiation, and social changes that promoted the emergence of organizational forms and institutional arrangements that have been crucial to management of the forests.

15 Implementation refers to putting into practice a specific policy, plan, or regulation at the territorial level.

Table 1. Government policies, regulations, and plans that reflect its vision of forests with regard to the MBR (1959 – 2018)

Year	Regulations and Key Policies	Relevance
Petén before the MBR: Integrating forest areas into the national economy (1959–1988)		
1959	Decree No. 1286. Law establishing FYDEP (the national enterprise for the economic development of Petén)	Poses the economic development of Petén as an issue of national urgency. Promotes colonization of forested lands and scientific use of Petén's land and resources.
1979	Decree 79-79	Introduced the first regulations on non-timber products (chicle).
1988	Dissolution of FYDEP	As part of the 1985 constitutional reform, a conservation objective was introduced into regulations in northern Petén and authority was transferred to CONAP.
Creation of the MBR: Forests as spaces needing protection (1989 – 2000)		
1989	Decree 4-89	Established the Protected Areas System and created CONAP, the National Council of Protected Areas.
1990	Decree 5-90	Established the Maya Biosphere Reserve with support from international cooperation agencies; zoned the northern region, creating three types of management areas.
1992	Petén Comprehensive Development Plan	Determines priority sectors for investment and political attention for departmental development.
1994	Community Forest Concessions Policy	Defines the requirements and approves the granting of community forest concessions (amended in 1998 and 2002).
1995	Decree 64-95	Established 4 complexes made up of 9 protected areas (411,379 ha) that cover the 7 municipalities of southern Petén.
1996	Peace Accords signed	The Socio-economic Agreement on the Agrarian Situation and Rural Development establishes the transfer of at least 100,000 ha to organized groups for natural resources management.
Challenges to consolidating the MBR: Reconsidering the role of forests as an opportunity for economic growth (2000 – present)		
2001	Government Agreement 63-2001	Created the National System for the Prevention and Control of Forest Fires (SIPECIF) under the coordination of CONAP.
2001	Resolution ALC 031/2001	Approves the Maya Biosphere Reserve Master Plan.
2002	Government Agreement 129-2002[16]	Created the Regional System for Special Protection of Cultural Patrimony.
2008	Decree 71-2008	Law establishing the National Economic Development Fund (FONPETROL)
2013	Petén Comprehensive Development Plan 2032	Updated the 1992 Plan and established five strategic drivers of economic development: fruit, cattle, and basic grain production; ecological tourism; and sustainable forest management.
2015	Update of MBR Master Plan	Updated the 2001 Master Plan and defined management priorities.
2017	Government Agreement 156-2017	Eliminated SIPECIF and transferred fire prevention and mitigation functions to the National Coordinating Agency for the Reduction of Natural or Man-made Disasters (CONRED).

16 Repealed in 2005.

3.1. Petén before the Mayan Biosphere Reserve: Integrating forest areas into the national economy (1959 – 1988)

Before the MBR was established, Petén was perceived to be an isolated region, made up of large expanses of forest covering almost the entire department, and was sparsely populated (fewer than 25,000 residents in the late 1950s, according to Schwartz, 1990). Colonization was aimed at increasing productivity and ensuring the economic and political integration of the region (Melville and Melville, 1971). Policies put in place during this period were focused on promoting agrarian development through colonization of the forests and the extraction of resources with high commercial value – timber,[17] chicle[18] y petroleum[19] – which would produce revenue for the government, contributing to the economic viability of the country (see Table 1). Implementation of these policies was the responsibility of the National Enterprise for the Promotion and Economic Development of Petén (FYDEP), an entity that was under the presidency and was primarily led by military personnel (Casasola, 1968; Pellecer, 2010). This vision of overcoming the isolation of forested lands, seen as an obstacle to development, is consistent with efforts by various governments in Latin America to nationalize, colonize, and promote the extraction of national resources as a mechanism to integrate forests into the global economy (Leal, 2013).

Studies defined priority zones for colonization and extraction. At least nine colonization projects were implemented on 1.8 million ha and a forest reserve was established north of latitude 17°10' (FAO, 1970; Milian, 2008). At the territorial level, implementation of these regulations favored conversion of forests to farming and livestock, as well as selectively tapping forest resources. To facilitate these activities, the government invested in road building and in granting property rights and natural resource extraction rights (FYDEP, 1971). The logic of these policies still prevails in the minds of settlers, who consider clearing the land to convert it into farmland and pastures to be part of 'improvements' that increase the economic value of the land and a necessary mechanism for claiming possession of the land. The economic value of the forest reflected in this vision is reduced to the extraction of products with commercial value such as chicle and timber.

As a result of these policies, an increasing number of people moved into the region in search of land. Immigration reached its pinnacle in 1970 and only began to stabilize in the 1990s (Grandia et al., 2001; Carr, 2008). The location and distribution of these new communities was associated with the building of access roads into the forests (Shriar, 2006). Colonization and agrarian development policies had a dramatic impact on the forests. According to available records, from 1960 to 1980 annual deforestation ranged from 30,000 to 40,000 ha, reaching 60,000 ha in 1980 (Nations and Komer 1983). Livestock and farming activities promoted primarily in the south continue to be one of the keystones of government actions and also one of the drivers of the regional economy. Proof of this is that currently, 20% of livestock production is in Petén, the highest level for any Department in the country, according to the Ministry of Agriculture and Livestock (MAGA, 2015). Extensive livestock farming is practiced, which demands large areas for grazing. Although our temporal analysis does not include this period, there are records that fire was the most common

17 Extraction rights were granted with few controls or management regulations on industrial actors with little coordination with the local population.

18 Chicle was the only non-timber product that was regulated (Decree 79-79, Chicle Law) during this period. These regulations focused on distribution of the profits from its sale and did not include management parameters.

19 Drilling for oil first began in 1976. Contract I-85, corresponding to the Xan oil field in Laguna del Tigre National Park, was signed in 1985 and renewed in 2009 (MEM, 2007).

method used to convert the use of the land to either ranching or farming (CONAP, 2001). However, an important characteristic is that during this period these practices were standardized and even encouraged by government policies that considered forest conversion as a means for agrarian development and colonization.

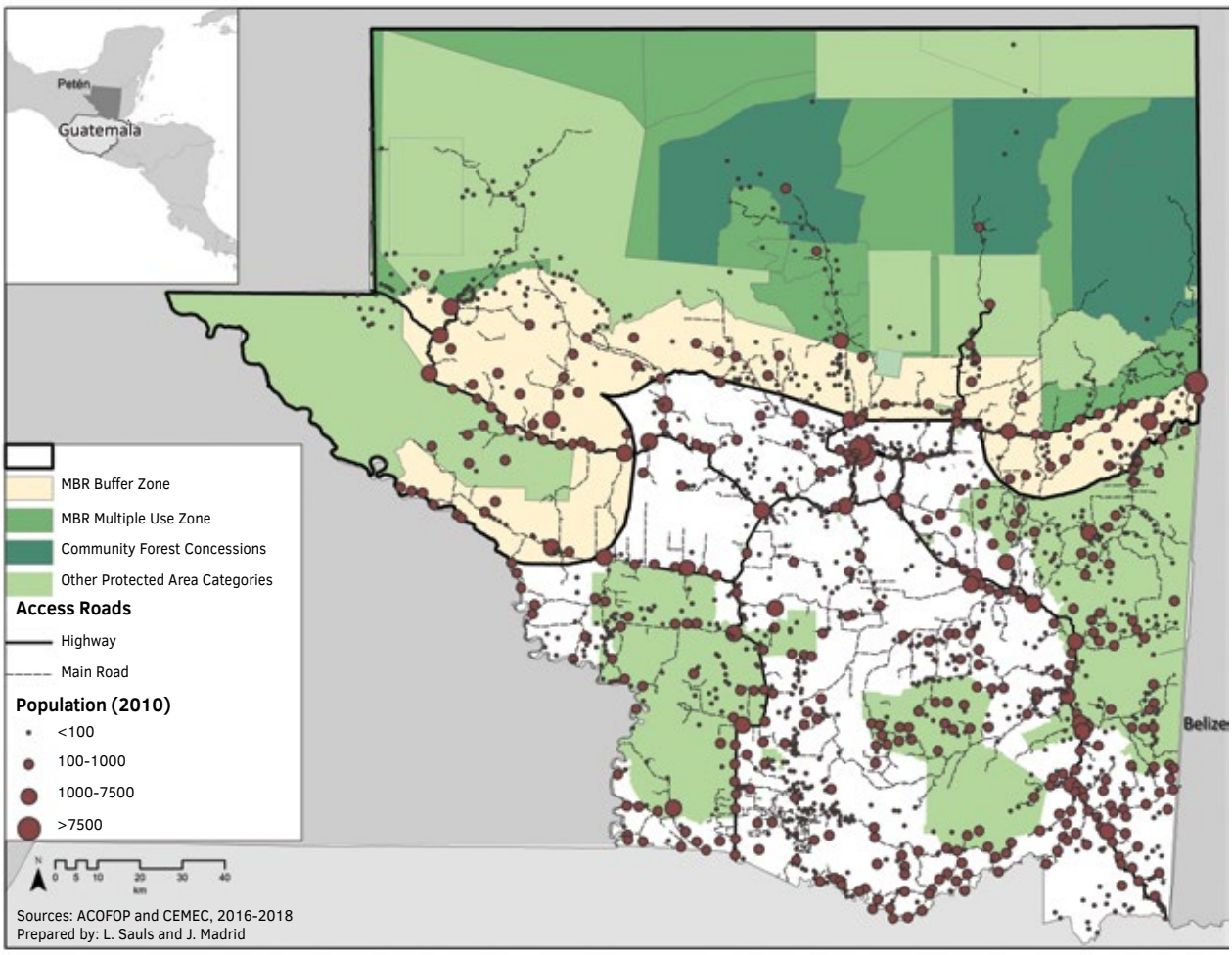


Figure 8. Settlements and access roads in Petén, Guatemala. The reach of the road network influences distribution of the population.

3.2. Creation of the Mayan Biosphere Reserve: Forests as spaces needing protection (1989 – 2000)

This period was characterized by a shift in policy that had a major impact on Petén (see Table 1). International interest in environmental protection and conservation coincided with negotiation of the Peace Accords and the return to democratic elections. Constitutional reforms in 1985 laid the foundation for environmental regulation and institutions in the country. In 1989, the National Council of Protected Areas (CONAP) was created, the governing body of the Guatemalan System of Protected Areas (SIGAP), and one year later, the country's most important protection area was established—the Maya Biosphere Reserve (2.09 million ha). This includes the area that was occupied by the earlier FYDEP forest reserve. Four protected area complexes were set up in southern Petén in 1995 (411,000 ha).[20] In the northern part of the region, establishment of the MBR entailed re-zoning, dividing the area into three management zones, with conservation objectives. This step reflects the most significant changes in the government's vision of the forests (see Figure 1). Implementation of this conservation policy at the regional level was strengthened through the Comprehensive Development Plan of the Petén, one of the first land use planning instruments at the country level (UNEPET and APESA, 1992).

Despite this sweeping change, agrarian development policies in southern Petén stayed on the same path begun during the previous period, promoting expansion of ranching and farming (Clark, 2000). At the same time, the contradictions between the new conservation approach and economic interests over the region´s resources were laid bare by the simultaneous continuation of oil drilling inside the Laguna del Tigre National Park along with the emergence of these conservation policy changes.

CONAP, a new, underfunded, and understaffed institution tasked with managing an enormous geographical area, was facing challenges to implement this vision of conservation. Although it has been argued that prior to the establishment of the MBR in 1990, there were few human settlements in the core zones, the existence of access roads encouraged accelerated occupation, particularly in Sierra del Lacandón and Laguna del Tigre National Parks,[21] along with the rest of the Buffer Zone (CONAP, 2006; Shriar, 2006), producing conflicts due to restrictions established in the regulations on the use of natural resources. In addition, there was no known process for grievances or recognition of land ownership claims in the Buffer Zone and MUZ,[22] contrary to what colonization period policies had promoted (Sundberg, 1998). The lack of venues for information and communication limited opportunities for community organizing in the core zones and limited options for settler communities to establish agreements of intent and sign cooperation agreements, which formalize settlements under strict regulations.[23] The only evidence

20 These two protection systems in northern and southern Petén account for 74% of SIGAP and place over 70% of the department under some protection category.

21 A case in point is the Laguna del Tigre National Park where construction of access roads is linked to the beginning of oil drilling in 1985. The Master Plan reported that by the end of 1997, seven agreements of intent had been signed and community management units had been established with the objective of stabilizing the agricultural frontier.

22 The only evidence of the continuity of land regularization policies is seen in the Buffer zone where the government did promote regularization of lands and granted property rights (Milian, 2008).

23 Recent CONAP data indicate that 10 communities in the Core Zone are legally recognized by CONAP, of which all have cooperation agreements. In addition, 17 settlements are in the process of negotiating cooperation agreements (most in national parks).

of openness to participation in management of the core zones has been the formalization of co-administration with non-governmental actors.[24]

Unlike what occurred in the Core Zone, in the MUZ the situation arrived at a critical turning point. Interest in gaining access to resources became an incentive for community-based groups, supported by the non-governmental sector, to mobilize and increase social pressure to find mechanisms to reconcile conservation interests with local needs and demands from different sectors. An opening appeared, encouraged by the perspective that the community sector could be a better partner in conservation as opposed to the industrial sector associated with the extractive period of FYDEP (Synnot, 1994; Schwartz, 2012). The government's response to this pressure was to adopt a policy that recognized management rights under concession contracts in the MUZ.[25] The first community forest concession contract was signed in 1994. The community movement led by ACOFOP promoted new ways of organizing so that communities inside the MUZ and organized groups in the Buffer Zone could gain access to these types of management (see Box 2). The signing of the Peace Accords in 1996 further secured the government's willingness to recognize rights for management of natural resources (Berger, 1997). This opening from the government proved to be a step that achieved coordination among actors with diverse interests around a common objective and marked the beginning of a process to develop institutional arrangements that would be crucial in the management of the MUZ.

The outcomes from this period of conservation policy implementation reveal the difficulties with stabilizing the negative impacts associated with the previous period. Although by the end of 2000, the immigration rate had decreased, Petén's population had increased by 25 times (some 450,000 people), with many people moving around in the same region (Carr, 2008). This mobility especially affects the MBR; in 2000, it was found that 65% of the population in the reserve had been born somewhere other than where they were currently living (CONAP, 2015). Regularization of ownership rights has been proposed as a solution to stabilize pressure on the core areas.

24 According to the MBR Master Plan (2001-2006), co-administration refers to a regimen of co-management in which civil society groups and CONAP coordinate efforts to meet established conservation objectives.

25 Currently, there are two types of concession contracts that benefit both private industry and community-based organizations. Community forest concession contracts in the MBR are legal agreements between the Guatemalan government and a legally recognized grassroots organization through which the government grants management rights to administer an area through the use of timber and non-timber products for a period of 25 years.

Box 2. The role of ACOFOP in the process of establishing the community forest concessions system.

In 1995, groups inside and outside the MUZ formed CONCOFOP, the Council of Community Forests of Petén, with the objective of ensuring access to forest resources, proposing the possibility of gaining recognition of rights of use through concession contracts (ACOFOP, 2005). In 1997, this group became ACOFOP, the Association of Community Forests of Petén, comprising organizations located in the MUZ and the Buffer Zone. The role of ACOFOP was key, by organizing different groups with diverse histories and interests both inside and outside the MUZ (Gómez and Méndez, 2005). Through ACOFOP, grassroots organizations unified their claims for recognition of management rights and mobilized to urge the government to be open to organized groups carrying out forest management activities inside the MBR. In fact, 8 of the 12 concession contracts were signed after ACOFOP became a legal entity. ACOFOP became a key actor in channeling demands from communities at different levels (Taylor, 2010 and 2012). Community forest concessions enabled reconciling the conservation agenda with subsistence needs through sustainable forest management (Monterroso, 2016). The number of community concessions, the substance of the rights obtained, and the size of the forest are strongly linked to this social organization process, without which it would not have been possible for rights to be recognized for communities that existed before the MBR was established (such as Carmelita or Uaxactún) or that had been recently settled (such as Cruce a la Colorada or La Pasadita). Furthermore, it enabled organized communities in the Buffer Zone to gain access to forest resources and acquire management rights with impacts on both these communities and the forests (Monterroso, 2015).

During this period, the deforestation rate in the MBR also stabilized. According to data from CEMEC, the rate dropped between 1993-1995 (16,000 ha/year) and 1997-1998 (8,700 ha/year; CONAP, 2001). A CONAP study established the relationship between deforested areas in the MBR and the existence of roads (CONAP, 1996).[26]

With regard to fires, according to information from the United Nations Food and Agriculture Organization (FAO), the 1998 season marked a watershed in that the size[27] and location of the area affected in Petén increased political pressure to address the problem (FAO, 2004). During this year, there were 50% more fires in the region than nationally, revealing the severe susceptibility of southern Petén, the Buffer Zone, and Laguna del Tigre and Sierra del Lacandón National Parks to forest fires (Pantoja-Campa, 2010). The increased severity and incidence of fires was associated with climate variability factors.[28] However, studies concluded that in the MBR, 90% were related to changes in land use; e.g., agricultural burning and conversion to pasture, especially affecting the Buffer Zone and Laguna del Tigre and Sierra del Lacandón national parks (FAO, 2004). Again, recurrence of fires was associated with regions of higher road density.

Social mobilization in this period was evident in both the Core Zone and the MUZ. However, the government's openness was unequal, favoring mobilization by grassroots community organizations in the MUZ with more success (Gómez and Méndez, 2005; Monterroso, 2016). Openness to social organization and the development of these community organizations led to a different experience in the MUZ that also began to distinguish itself for stronger resource governance and management in this region, even though these remained incipient efforts in this period.

26 According to this report, 90% of deforestation occurred in within 2 km of roads (CONAP, 1996).
27 Over 600,000 ha, according to data from the Forest Fires Commission, 2006.
28 Decreased relative humidity and increased wind velocity and temperatures.

3.3. Challenges to strengthening the MBR: Reconsidering the role of forests as an opportunity for economic growth (2000 – present)

This period has been characterized by renewed interest in promoting development through activities that spur economic growth and public-private investment in the MBR. The conservation vision prevails and policies and plans advancing oil and tourism have been strengthened (see Table 1). The review of concessions policies and continuity of support to the system is enabling important advances in forest management activities in the MUZ. Planning documents drafted during this period reveal efforts to integrate conservation actions with economic development proposals[29] (SEGEPLAN, 2013; CONAP, 2015). Socially, conflicts around the compatibility of proposed models expose the contradictions in creating a coordinated vision that reconciles different interests at the territorial level.

Even though rates of forest loss have been stabilized in some management zones, the scant funding allocated to CONAP calls into question how much the government sees protected areas as a priority (Bovarnick et al., 2010). It is also hindering surveillance and control efforts that have not been able to coordinate local community support. In some areas, loss of governance is evidence of the major challenges to ensure the presence of the government and fulfillment of conservation objectives in isolated regions of the MBR (Sesnie et al., 2017).[30]

The difficulty in bringing about coordinated actions among different government sectors has produced conflicts at the local level. A clear example of this occurred during discussions over the renewal of the oil extraction contract in Laguna del Tigre National Park and has been exacerbated with approval of the FONPETROL National Economic Fund. This process has also demonstrated the absence of local government in decisions about the MBR. The reinitiation of drilling highlights the challenges facing the continuity of conservation policies in a context of pressure from strong economic interests. Currently, there are more than 10 areas in Petén that have been identified as potential concessions for both exploration and production (see Figure 9; data from MEM, 2018). Two of these are inside the MBR (Contract I-91 in the Buffer Zone and Contract 2-85 in the Core Zone, one part in the Laguna del Tigre National Park and the rest in the Laguna del Tigre-Río Escondido Biotope). In 2017, these wells accounted for over 80% of national oil extraction (MEM, 2018).

29 We are referring specifically to the update of the Petén Comprehensive Development Plan (SEGEPLAN, 2013), which also promotes a Territorial Development Plan, as well as updating the MBR Master Plan (CONAP, 2015).

30 https://www.prensalibre.com/hemeroteca/laguna-del-tigre-paraiso-de-narcos-madereros-e-invasores; https://www.prensalibre.com/ciudades/peten/localizan-narcoavioneta-abandonada-en-pista-clandestina-en-parque-nacional-laguna-del-tigre-peten.

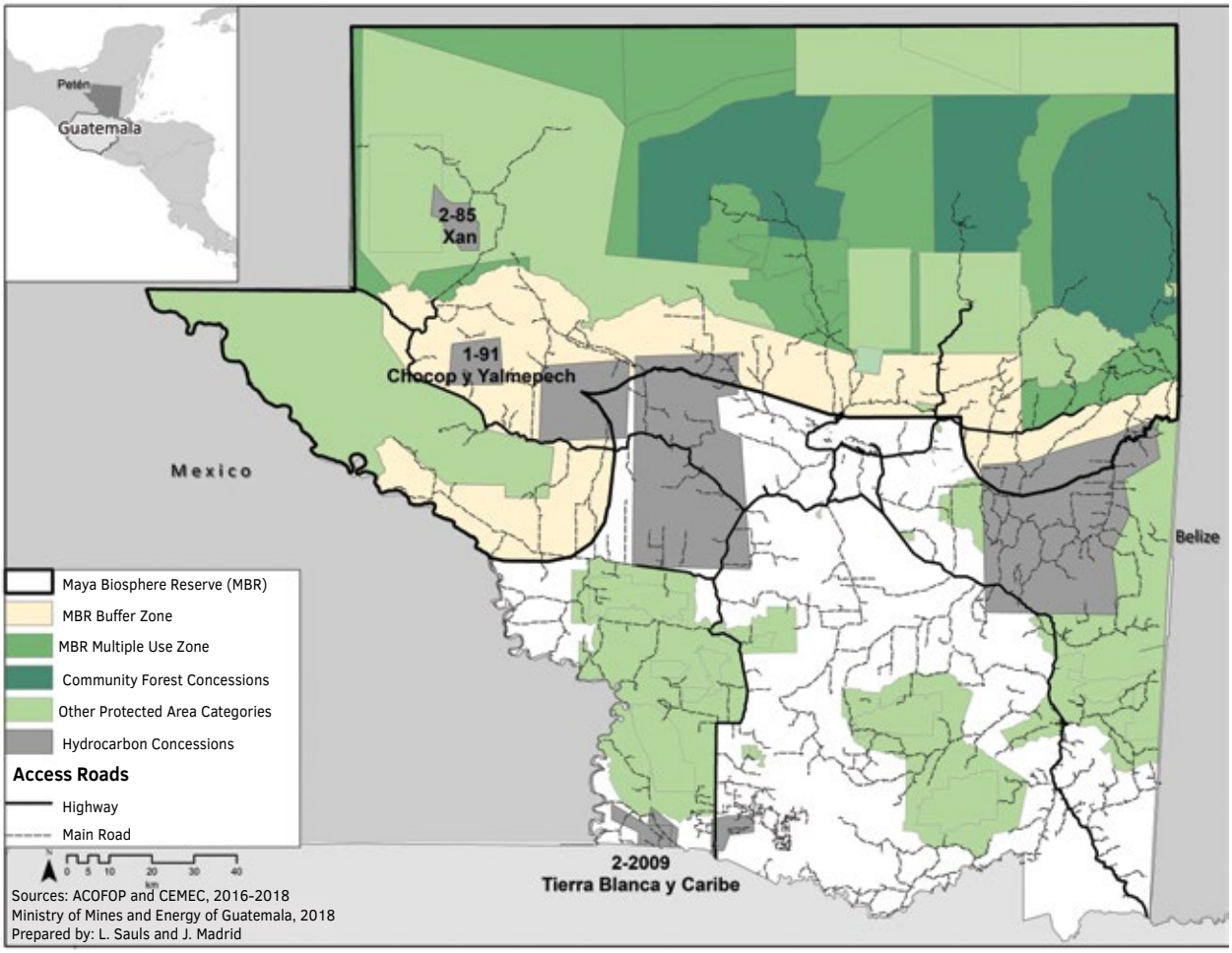


Figure 9. Protected Areas, Hydrocarbon Extraction Concessions, and Access Roads in Petén, Guatemala. Concessioned zones with bold names indicate extraction contracts. Unnamed concessions areas are exploration concessions.

The permanence of the concessions policy led to a development model that engages organized communities in both the MUZ and the Buffer Zone. This process shows how it is possible to bring diverse interests together around a common goal with multiple benefits. Community forest concession function is based on social construction that arose from social mobilization, was formalized through the establishment of community-based organizations, and consolidated in ACOFOP. The process brought together community, industrial, NGO, and government groups, which have produced institutional arrangements around forest management for almost 20 years. These include comprehensive management of timber and non-timber products and other activities such as tourism, and also produce important arrangements that contribute to the effective management of the MUZ.

The opportunity for local communities to obtain tangible management benefits (not only for subsistence, but also linked to tourism and changes in production patterns that have enabled producing value chains around different forest products) has led them to become a key actor in promoting territorial governance in the management areas with evident results in the MUZ. This opening by the government promoted social changes that have been documented for their successes for both communities and for ecosystems (Grogan et al., 2016; Stevens et al., 2015;

PRISMA, 2014; Monterroso and Barry, 2013; Radachowsky et al., 2012; Taylor, 2012). This group of arrangements around timber, non-timber forest products and tourism represents one of the productive sectors with the greatest potential for reconciling pressures on the forest and local demands if its economic and environmental impact is taken into account.

Finally, the growing interest in tourism through investment plans and proposals to develop areas rich in cultural[31] and natural patrimony is evident in government proposals for this period; however, their implementation has been uneven. The common element in these initiatives is the interest in developing tourism activities with an emphasis on the Mirador site in northern MBR. In 2002, Guatemala's President Portillo approved a special protection system for cultural patrimony in Mirador National Park,[32] and in 2006, the Multisectoral Commission for Conservation and Management of the Mirador-Río Azul Natural and Cultural Zone was established (Devine, 2018).

In 2008, the 4-Balam[33] initiative was launched, which takes into account the whole of Petén, but includes Mirador as one of its core efforts. In 2012, the National Policy for the Sustainable Development of Tourism in Guatemala was adopted and the archeological project presented the first proposed map for the tourism route for Mirador[34] and surrounding sites, and in 2018, a High Level Commission for Tourism and Development in Petén was formed.[35] Tourism has been put forward as a proposal for bringing together conservation interests with the possibility of promoting economic investment and income generation. However, the few opportunities for bringing together stakeholders' varied positions on the issue and the lack of clarity about the model has given way to conflicts (Devine, 2018). The interest in expanding tourism in the MUZ management zones and lack of knowledge of processes that are underway and the existence of pre-existing concession rights is producing concern because these proposals based on tourism could undermine the institutional arrangements that have taken years to build and that have been crucial to promoting the strong governance in the MUZ and at the same time exacerbate conflicts.

The results of these policies on the forests have varied according to the sector and management zone where they have been implemented. The political decision to renew oil drilling in Laguna del Tigre National Park in 2009 is evidence of one of the strongest incongruencies, taking into account the commitment to strict conservation that was put forward, at least on paper, for national park management. Although oil drilling has had a localized impact in the forest, a bigger impact has come from road construction, one of the factors associated with encouraging the incursion of migrants and of fires. Along these lines, a study concluded that from 2000 to 2014, there had been a 67% increase in roads in the MBR's national parks (most of these in Laguna del Tigre and Sierra del Lacandón national parks, according to data from CONAP and WCS, 2015).[36] Without a doubt, FONPETROL is one of the factors that have benefitted the parks. From 2009, the year it was

31 According to data from Chan (2007), there are around 188 archeological sites in the MBR (88% of which have not yet been classified); of these, 30% are in the MUZ and 44% in the Core Zone.

32 This agreement was later repealed, due to the fact that this special system does not recognized the pre-existing rights of six concessions, including four community concessions and two industrial concessions (Monterroso, 2010).

33 The Petén Development Program (IDB Funds) implemented plans known as 4-Balam, but these did not include investments in the MBR even though they did include Mirador in their proposals (Interviews, 2018).

34 Subsequently, in 2013 and 2014, FUNDESA and PACUNAM presented maps of potential tourism investments for Mirador and later expanded them to include the MBR (Interviews, 2018).

35 Interviews, 2018.

36 This same study concluded that in the MUZ, road construction had extended along the route to Carmelita in particular.

created, to 2017, Petén has received over US$132 million.[37] According to an analysis by CONAP and WCS (2015) for 2014, 57% of this money had been allocated to investment projects on local roads and another 13% to municipal works.

Furthermore, the lack of CONAP personnel and resources in national parks has encouraged the development of illegal actors. Investigations associate the presence of these actors with land grabs and investment in livestock (McSweeney et al., 2017). A recent study that analyzed three pressure routes in the MBR determined that 60% of the cattle herd was in Laguna del Tigre National Park (CONAP and WCS, 2015:36[38]). The government's response has been to remilitarize protected areas[39] and set up new military bases, assign special forces such as the Green Battalion, and set up joint operations centers distributed in various points around the MBR (CONAP 2015; WCS, 2015; Devine, 2017). However, even with this re-militarization, these actions continue.

In the forests, the concession policies have had a very different outcome: over 330,000 ha managed by communities have current certification.[40] This system is one of the most internationally renowned tropical rainforest management models (Grogan et al., 2016). Recent studies conclude that these activities are compatible with the sustainability objectives in multiple use zones and represent alternatives that enable reconciling clashing interests and decreasing conflicts (Tobler et al., 2018). With regard to economic aspects, management activities in the MUZ have also proven the possibility for producing considerable benefits, ensuring social investments that enable improving living conditions in the communities (Bocci et al., 2018). In addition, community concessions implement different activities to preserve territorial governance in their management areas. These include monetary investments, establishing checkpoints, monitoring and patrol; these activities are defined according to specific plans designed by each of the concession organization. In 2018 alone, community organizations invested over USD237,000 in control and patrol activities. These funds were invested in establishing 92 surveillance camps and for carrying out 648 patrol activities in boundary areas, covering over 140,000 hectares beyond the concession boundaries that are prone to external threats. Surveillance activities are closely coordinated with CONAP and other State security entities. According to ACOFOP data (2018), forest management generates annual income that exceeds US$5 million through use and processing of timber and non-timber products (see Figure 10). Although timber products account for most of the income, in part because this is where the clearest progress has been made in processing and supply-chain integration; the social value of economies of non-timber products is crucial because they produce opportunities for jobs and income for vulnerable groups, particularly women. Likewise, in 2003, the community

37 Analysis based on data available at http://www.mem.gob.gt/hidrocarburos/ingresos-por-produccion-petrolera-nacional/fonpetrol/ July, 2018. This amount is distributed as follows: 20% to CODEDE; 5% to COMUDE; and an additional 3% is allocated to CONAP surveillance activities.

38 According to data from CONAP and WCS (2015), this information is based on a sample that identifies pressure areas: the Route to Melchor de Mencos, Laguna del Tigre National Park, the Multiple Use Zone, and Sierra del Lacandón National Park. On the other hand, as productive options in the MUZ linked to forest management have been growing, CONAP and ACOFOP have reported a 54% reduction in the cattle herd in the community of Carmelita (CONAP and ACOFOP, 2016).

39 The recuperation of governance in protected areas was one of the key negotiating points for the debt swap between the governments of the United States and Guatemala in 2006.

40 Forest Stewardship Council (FSC) forest certification annually evaluates management practices to make sure that the management techniques that are used ensure ecosystem integrity. Of the 12 contracts, 8 community forest concessions have kept their certification current. Two community concessions populated by recent immigrants (La Colorada and San Miguel) were cancelled by CONAP due to breach of contract. Additionally, eight of the community forest concessions have a specific certificate for the extraction and management of non-timber products from FSC, granted in 2008 for the extraction of *Chamaedorea* palm and resin from *Manilkara zapota* or chicle (SW-FM/COC- NTFP000161).

organizations decided to organize themselves into a business, forming the Community Enterprise for Forest Services (FORESCOM), a corporation made up of nine community partner organizations, seven of which have a community concession contract.[41]

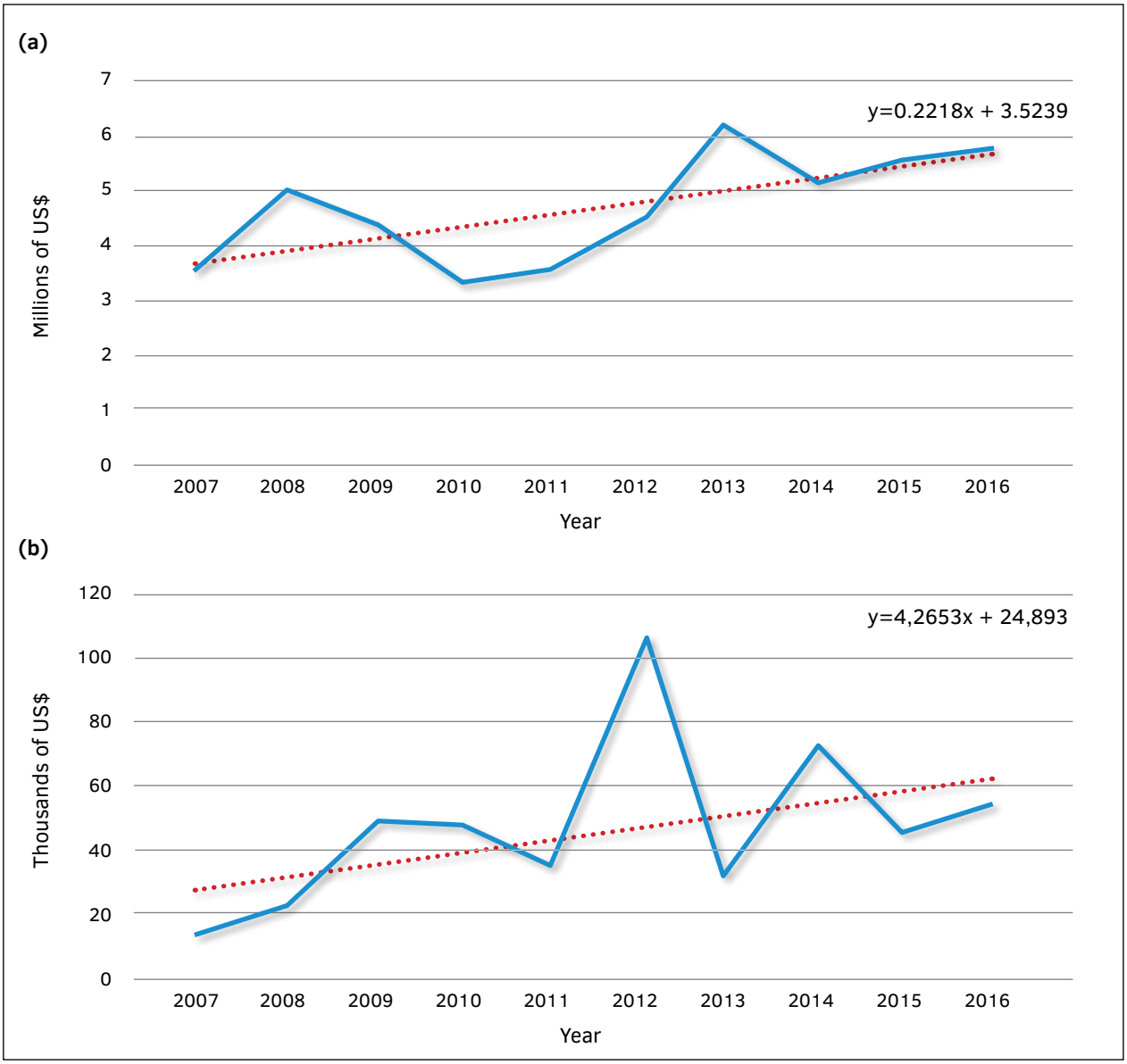


Figure 10. Revenue from sale of (a) timber and (b) non-timber products in community forest concessions. Source: ACOFOP, 2018.

In 2001, under CONAP's coordination, the National System for the Prevention and Control of Forest Fires (SIPECIF) was created, which promotes a prevention and mitigation approach.[42] During 2003 and 2005, a study based on data from the CONAP Monitoring Center analyzed these two seasons, finding that almost 400,000 ha had been damaged by fire (Pantoja-Campa, 2010). The maps show

41 certification, and develop the value chain (http://www.forescom.com.gt/).

42 However, in 2017, SIPECIF ceased to exist when its functions were transferred to CONRED. According to the interviews conducted for this paper, this has important implications given that there are still no prevention protocols and that most actions are still focused on mitigation when fires have already broken out.

the same trend in areas in the Buffer Zone and Laguna del Tigre National Park. At the same time, in the northeastern region, where the concessions are, there is no evidence of hotspots. The study argues that the existence of roads coincides with areas of greater density of hotspots and greater recurrence of fires during the period from 2001 to 2009. The results of the historical analysis that we present for the period 2008–2018 show the effectiveness of the actions implemented and clearly differentiate the results in the MUZ compared to other management zones.[43]

These dynamics demonstrate that coordination among the actors for the good of a common goal—fire control and management—is possible, if the different actions can successfully be coordinated. In Laguna del Tigre National Park, it is clear that the government alone has a hard time implementing actions and that coordination among actors cannot be imposed, not even through militarization. The difficulties faced in Laguna del Tigre National Park and to a lesser extent in Sierra del Lacandón National Park point to the need for coordination among different actors and local communities in these regions to ensure that actions are effective. These conclusions are similar to those put forth in previous analyses (Pantoja-Campa, 2010). Strengthening benefits for local populations and an economic and social development model is an incentive and ensures that revenue can be allocated to these community organizations to complement government actions, not only regarding fires, but also for surveillance and control. This suggests that the willingness of the government to promote management models that involve communities could be a key element in strengthening governance in these areas.

43 Similar trends are seen in the national parks and biotopes bordering the MUZ, in particular, Tikal National Park, Yaxhá, Mirador Río Azul, and Dos Lagunas and San Miguel La Palotada biotopes.

4. Explaining changes and identifying trajectories

The historical analysis of public policies and the role of social mobilization reveal at least three different development trajectories, which contribute to explaining why fire management actions have been more effective in some areas of the MBR than others.

1. **Continuity of the agrarian colonization policy:** This is the main characteristic of the MBR's Buffer Zone, with deforestation dynamics and fire incidence to some extent similar to the processes that affect southern Petén. This region best illustrates the continuity of the agrarian policy in the region and its incongruence with social and environmental objectives. The main economic base of this region is livestock and farming. Government investment to alleviate pressure on core zones through ownership rights and infrastructure projects, especially access roads, contrast with meager investment in public services. However, the analysis of the results of these policies shows that these investments have effects contrary to conservation objectives. In fact, since the late 2000s, local population has been pushed out of some areas targeted by land regularization programs, in places that are attractive for oil palm production (mainly in southern Petén) and ranching (Grunberg et al., 2012).

Reconcentration of land in southern Petén is encouraging migration toward protected areas where the government is essentially absent and oversight is weak. This uprooting, accompanied by major limitations on productive livelihoods, is increasing pressure on protected areas and affecting the cultural patrimony of archeological sites in this region. The situation is worsening, considering the dependency of the population on farming: close to 90% of the population in the MBR are farmers, 60% are poor (35% live in extreme poverty, twice the department's average), and fewer than 10% have formal employment (CONAP, 2015). Given that 60% of the MBR's population lives in the Buffer Zone,[44] compatible production proposals must be developed. However, according to an analysis of data from 2004 to 2011, 80% of credits granted in Petén were for livestock ranching (Grunberg, et al., 2012). There is an urgent need to analyze the lessons learned and the opportunities to develop new mechanisms for participation in management in these areas.

2. **Incomplete conservation policy:** A second trajectory characterizes the dynamics in Laguna del Tigre y Sierra del Lacandón national parks (which cover 65% of the land in the Core Zone). In this region, the current dynamics are the result of an incomplete conservation policy and show the incongruencies between regulations that encourage strict conservation and investment policies that prioritize resource extraction (oil). The difficulty of connecting different government approaches relating to the objectives for this region resulted in a conflict zone with high levels of social instability. The scenario of ungovernability, characterized by increasing drug trafficking and other illegal activities, and encroachment on the land, bring with them degradation of resources and the impossibility of producing institutional arrangements enabling the areas to be managed. The approach to ungovernability must be comprehensive, and go beyond militarization of the areas.

   Even though this area generates royalties for the department from oil extraction, government presence and investment here are the lowest in the region. In addition, there are restrictions on livelihoods associated with the strict conservation model. The local population, 13% of MBR residents, has few opportunities for development in the formal sector. Greater militarization, the government's proposition for recovering governance, has the potential to generate more social conflicts to the detriment of forested areas if tensions are not relieved between demands of the local population and the need to strengthen the government's proposals regarding investment and conservation objectives, in order to fortify forest governance. These dynamics could also help explain the situation in the four complexes in the southern protected areas, where expansion of oil palm and the lack of government support have resulted in high rates of deforestation and ungovernability.

3. **The possibility of coordinating policies at the territorial level:** Here we include the entire block that makes up the Multiple Use Zone and Tikal, Mirador, Río Azul, and Yaxhá national parks. The region has managed to integrate the interests of communities, the private sector, civil society institutions, and the government around similar objectives for conservation and development with the active engagement of organized groups at the local level. The development of the concession process, which has taken almost 20 years, and the emergence and strengthening of ACOFOP, are evidence of the development of complex institutional arrangements around the management of protected areas with tangible social and economic benefits. This has enabled

44 Para el 2013 se reportaba que el 65% se encontraba en la ZAM, 20% en la ZUM y 15% en zonas núcleo – 8% en el PNSL y 5.5% en el PNLT según CONAP, 2015:52

activities based on forest management that have demonstrated opportunities to generate income, promote changes in production patterns, and produce value chains that create jobs and social benefits at the local level based on the use of natural resources.

These benefits in turn have promoted local-level investment schemes that have even assumed government responsibilities by investing in public services. This trajectory is not free of challenges; the constant narrative associated with the interests of investment in tourism and the argument that the income that can be generated through this activity will safeguard the MBR, disinform and ignore the achievements of the MUZ and endanger the long process of social construction that the concessions have played in the MUZ and their objectives. The role that community actors have played in fire management and prevention, including their investments in surveillance and control actions, have been crucial to promoting governance in this management zone. These actions demonstrate the potential that these schemes have to support government actions to promote governance in the region.

5. Conclusions

This report updates the occurrence of fires in the MBR during the 2018 season and compares these dynamics with fire incidence in the different management areas of the reserve during the past 10 years. The location of forest fires in Petén (in 2018, by mapping hotspots) and analysis of fire incidence in the region during the past 10 years clearly show that in the area covered by concessions (community and industrial), fire incidence is significantly lower. This year, we have analyzed these dynamics in a broader context, showing that the behavior of fires in some of the regions inside the MBR is similar to the dynamics in southern Petén. The historical analysis shows that during the three periods identified, fires continue to be used as the main mechanism for gaining access to and claiming possession of the land. These practices became standardized in the region starting with the colonization process of the 1960s and still prevail in the imaginary of the population as the means for converting land use. Although policies about the forest have changed and the conservation orientation regulates the use of fire in agricultural and livestock practices, the implementation of these regulations has been more effective in zones where government efforts are linked to those of diverse actors.

Our analysis identified three different trajectories that demonstrate tensions between the content and the outcomes of policies. A key point is the need to strengthen institutions and the presence of the government in the region and particularly in protected areas. This does not imply reducing this support to an increase in militarization, but rather to build capacity among the diverse entities so they will be capable of promoting sustainable development trajectories. An initial step could be a review of public investment, one of the best indicators of the embodiment of policy priorities, which so far have been concentrated in the southern region and in road infrastructure. Along these lines, a look at the investments of FONPETROL is crucial. A second step could be a review of the potential that economic activities planned for the region have in producing benefits that are not only economic and in line with social demands, but also ensure the integrity of the forests.

The contributions of community forest concessions for both fire management and for surveillance and control are a clear example of the benefits of engaging stakeholders. The results show that integrated forest management activities in Petén have the potential to link conservation objectives with local demands to generate social and economic benefits. The effectiveness of fire management actions in the MUZ shows that this linkage is possible when a common objective is identified. Community participation, including investments to implement activities during the fire season, is explained by the tangible benefits that concession organizations associate with forest management. In addition, investments in surveillance and control show that communities play a preponderant role in governance and social stability at the territorial level. Furthermore, these contributions produce positive lessons that have the potential to maximize social, economic, and environmental benefits while they also promote governance in the region. Although these benefits are currently concentrated in the MUZ and in some surrounding areas, this potential can expand into other management zones; e.g., the non-concessioned zone in the MUZ (over 300,000 ha) in the Southern Protected Areas (over 400,000 ha), and in areas with legally recognized population. It is important to revisit the lessons learned from the MUZ to generate mechanisms for participation and management opportunities for other communities. The possibility of incorporating new areas under management schemes could enable promoting greater participation that could generate greater social and environmental benefits. However, even though it is evident that concessions have produced social, economic, and environmental benefits for both communities and for management of the MUZ, now the advances and benefits generated by this model are endangered from a lack of clear commitments to ensure the renewal of these contracts and to protect the institutional arrangements that have been successful thus far.

Despite the potential of the natural and cultural patrimony of the entire region, economic activity and economic development proposals, such as those for tourism, have so far not incorporated the lessons learned from the concession process. The government has a strategic role in promoting development processes that bring together these diverse interests around common objectives to promote a development model that enables forest management, ensures the welfare of local populations, and preserves environmental goods and services and contributes to community development. Government participation should be contemplated beyond the development of policies, regulations, or plans; it should assume a role that facilitates linkages and promotes coordination and collaboration by the sectors that make up the government and the diverse actors, including communities and the private sector. The leadership that the government has assumed during the development of the MUZ, in coordination with multiple actors, is a clear example that this type of process is possible.

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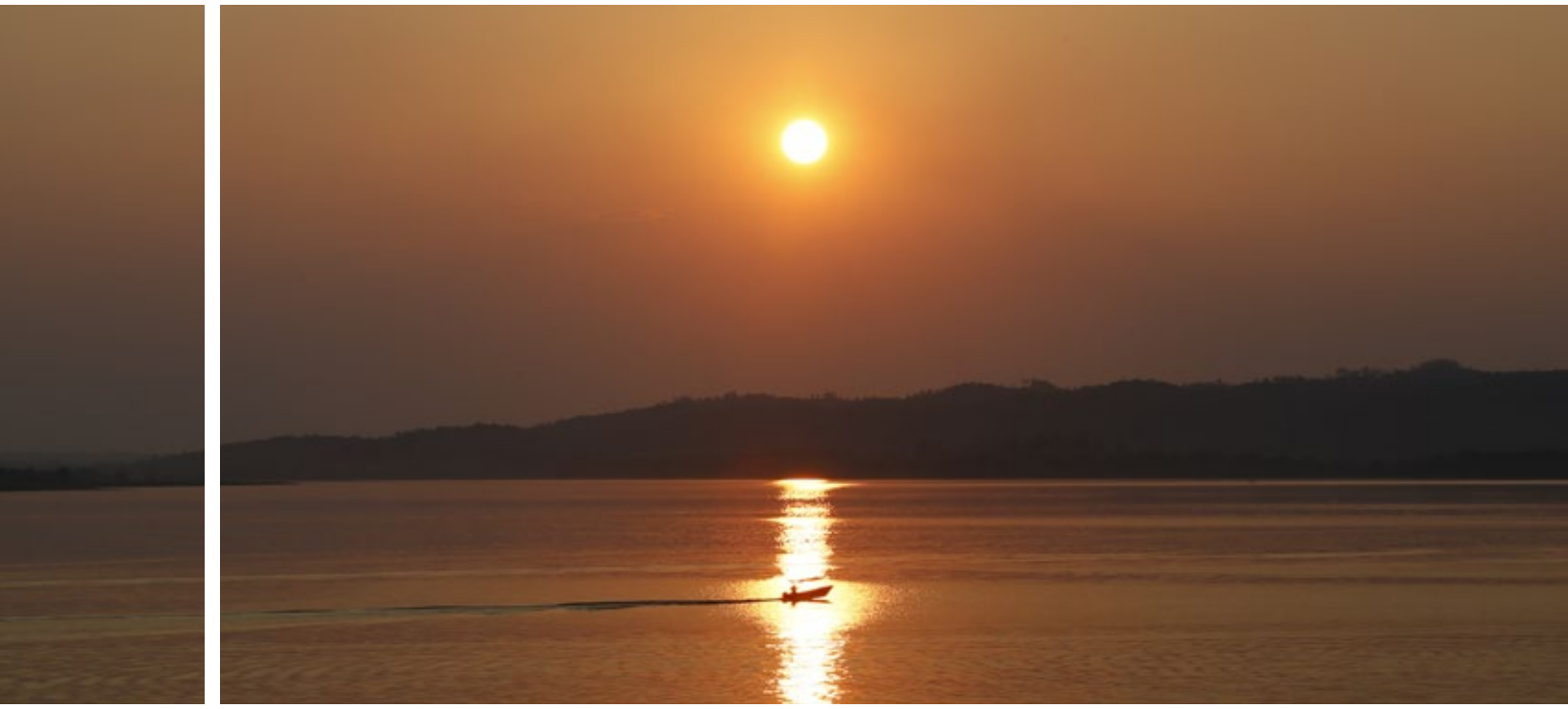

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