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Articles

Eco-frontier building in the Maya Forest borderlands

La construcción de un eco-frente en la región fronteriza de la Selva Maya

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Abstract

The concept of eco-frontier examines the actions of ecological actors to analyze the ways in which these contribute to transform biodiversity-rich territories. Eco-frontiers are discursive and spatial appropriations that evolve in different historical stages. This article analyzes the case of the Maya Forest as an emerging eco-frontier since the 1970s. The Maya Forest is a concept constructed by ecological actors to conserve tropical rainforest that covers the border region between Mexico, Guatemala, and Belize. Based on analysis of various first-hand materials, the article shows how the construction of the Maya Forest-concept has transformed the borderland into a scenic eco-region subject to tropical conservation. Simultaneously, the appropriation of the *Maya* in its scientific and touristic dimension suggests the construction of international biocultural borderlands. However, the issue of Indigenous rights, multicultural context and that of *multispecies* remain subject to debate.

Keywords: border, frontier, conservation, ecological actors, territories, Mesoamerica.

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Resumen

El concepto de eco-frente analiza las acciones de actores ecológicos con la finalidad de considerar la manera en que contribuyen para transformar los territorios de alta biodiversidad. Los eco-frentes son apropiaciones espaciales y discursivas que evolucionan en etapas históricas. Este artículo analiza el caso de la Selva Maya como un eco-frente a partir de la década de 1970. La Selva Maya

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es un concepto construido por actores ecológicos para conservar selvas tropicales que cubre a la región fronteriza entre México, Guatemala y Belice. Se analizan materiales de primera mano que demuestran cómo la construcción del concepto ha transformado la región fronteriza en una eco-región paisajística para la conservación de selvas tropicales. Si bien, su apropiación de lo *maya* en su sentido científico y turístico refiere a la construcción de regiones fronterizas internacionales bioculturales, deja abierta la cuestión de derechos indígenas, su contexto multicultural, y de *multiespecies*.

Palabras clave: frontera, frente, conservación, actores ecológicos, territorios, Mesoamérica.

Introduction

Recently, the concept of *eco-frontier* has emerged to describe the transformation of territories subject to environmental concerns considered as spatial and discursive appropriations by actors with ecological interests (De Sartre et al., 2012; Guyot, 2011; Guyot & Dellier, 2009; Laako & Kauffer, 2022; Ramutsindela et al., 2020). Eco-frontiers refer to ecological appropriations that evolve in historical stages in supposedly virgin territories or "wildernesses". In other words, eco-frontiers help explain how ecological actors are influential in transforming these territories now subject to environmental concerns (Guyot, 2011). The academic discussion of eco-frontiers derives from Political Ecology focused on understanding the power relations concerning ecological actors in different territories that involve both biodiversity conservation and extraction and management of natural resources (Guyot, 2011; Guyot & Dellier, 2009). Thus, the concept of eco-frontier sheds light to the potential transformation of these territories influenced by ecological actors.

The term *eco-frontier* derives from the English concept of the frontier. However, in Spanish, the frontier has two connotations: the advancing frontier (for example, agricultural, deforestation, colonizing) and the frontier-border, which include international borders between countries. In this case, the eco-frontier refers to the advancing frontier, which is why the Spanish translation of *eco-frente* has been used in the original Spanish-version of this article. The concept of the eco-frontier illustrates how ecological actors contribute to transforming border regions.

This article suggests that eco-frontiers contribute to transfroming border regions towards conservation spaces. In this process, eco-frontiers not only appropriate but also question and generate borders in multiple senses. At the same time, this article maintains that eco-frontiers highlight historical dynamics and existing conflicts of the border territories that are composed of several, exploitative frontiers related to rights to lands, territories and natural resources.

This article contributes to eco-frontiers by exploring the case of the Maya Forest as a conceptual construct that translates into various conservation measures in the given border region (Nations, 2006; Primack et al., 1998). As an umbrella concept, the Maya Forest refers to a particular demarcation of the Mesoamerican tropical rainforest located in the tri-national borderlands of Mexico, Guatemala, and Belize. The concept was constructed by international conservation organizations (e.g., the International Union for Conservation of Nature [IUCN] and Conservation International [CI]) and national and international scientists in the 1990s to conserve the threatened

biodiversity of the region. In 2000, the Maya Forest was also defined as a biodiversity hotspot (Marchese, 2015). In this way, it became an important part of global and regional conservation strategies.

Although used rather frequently by conservationists and scientists, the concept has not been subject to in-depth research. Thus, this article contributes to understanding its origins, development, and meanings.

As a concept, the Maya Forest covers a certain territory, defined now as an eco-region with a particular cultural identity, which has also been subject to policization due to various disputes related to access to lands, territories and natural resources that are similar to many Latin American countries(Freitas, 2017; Miller, 2007).

Wakild (2017) has discussed the importance of "sociable scientists" in the development of conservation in the case of Patagonia in the Chilean-Argentininian border region (p. 39). By sociable scientists, she refers to the ways in which scientists have sought to connect with communities while intertwining empirical ecological studies with travel histories and in this vein, contributing to conservationist state-building. In similar vein, Mendoza et al. (2017) have explored the construction of the imaginary of Patagonia as a neoliberal conservationist project starting in the 1990s. For them, the development of eco-regionalisms binds state, business, and civil society actors, which promote both ecotourism and natural protected areas (NPAs).

Building on these observation by the aforementioned authors, this article suggests that the Maya Forest as eco-frontier has contributed to transforming the tri-border region into a cultural-ecological landscape and bordered eco-region with its expanding protected areas, and contradictions and challenges to curb down biodiversity loss. However, the Maya Forest is not only a concept that refers to a region to be conserved or spatially appropriated. The Maya Forest concept is the result of the conservationist transboundary organization that crosses institutional and civil society boundaries. Throughout its existence, conservation actors have generated and inspired different conservation projects, ideas, and methods that appropriate the *Maya* and the *tropical rainforest*, concepts explored in this article as categories subject to discussion. In this sense, the Maya Forest is a space for ecological collaboration rather than a fixed category of a jungle or the Maya. It is argued that, although relations between conservation actors and Indigenous peoples continue to be complex and even subject to conflicts, the Maya Forest represents a unique case of an eco-frontier due to the long history of appropriations of the *Maya*, which, in this case, intertwines the tourist-cultural dimensions with the scientific and ecological.

In what follows, the development of the Maya Forest as an eco-frontier is analyzed in four sections: first, the research methodology is explained. Second, the development of the Maya Forest as its initial stage as an eco-frontier is examined, defined as a particular Mesoamerican eco-region characterized by tropical rainforests since 1970. Third, the more recent spatial and cultural appropriation of the *Maya* of this eco-frontier is examined. Finally, the article discusses the cultural concerns in the Maya Forest conservation.

The case of the Maya Forest as an eco-frontier: methodological issues

According to Guyot (2011), eco-frontiers are ecological frontiers that advance in areas of high biodiversity to protect and restore nature and wildlife, i.e., they are established to reconfigure these areas. The eco-frontier concept involves two basic components of analysis: the first is the examination of the historical stages of the eco-frontier; the second is the simultaneous study of its spatial and discursive appropriations. In this way, the actions of conservation actors that change over time can be examined. The actions refer to territorial and discursive appropriations. For Guyot (2011), the appropriations deal with the (re)production of these territories as political spaces subject to ecological priorities, with a particular emphasis on natural resources or wildernesses. Guyot (2011) focuses on ecological actors seeking to appropriate and control regions. His definition of an ecological actor is broad, including, for example, environmental movements or green businesses. This article limits itself to conservation actors by referring to non-governmental organizations (NGOs) such as the Wildlife Conservation Society, international organizations such as the IUCN, governmental bodies such as the commissions for protected natural areas in Mexico and Guatemala, and research centers such as El Colegio de la Frontera Sur (Ecosur), which promote both conservation and the concept of the Maya Forest. We define conservation as the actions and instruments humans create to protect and restore nature and wildlife.

However, it is important to note that conservation actors do not form rigid public, private, governmental, or civil society categories, as these often overlap. Moreover, in the case of the Maya Forest, they usually related to Conservation Biology and Tropical Ecology. Both fields developed hand-in-hand in the 1980s but they also integrate different conservationist currents, which have evolved independently (e.g. Sarukhan et al., 2009). Nevertheless, they promote biodiversity conservation on a global scale, adjudicating the intrinsic value of biodiversity and lately, new biocultural, interdisciplinary research, particularly in tropical regions (Klier et al., 2017; Toledo & Barrera Bassols, 2009). Today, perspectives and actors related to Conservation Biology transcend different public and private spaces and organizations. Furthermore, as seen in the case of the Maya Forest, Anthropologists and Archeologists also play an important role.

The case study method in the social sciences represents one of the options for conceptual creation, theoretical understanding and empirical generalizations (Gundermann, 2001). The Maya Forest as an instrumental and illustrative case has the potential for broader conceptual development. Case study designs rely on multiple comparative perspectives and materials. The case of the Maya Forest has been chosen as it is a concept increasingly promoted in different contexts for academic and conservation purposes (see, e.g., Ford & Nigh, 2015; Martínez Reyes, 2016; Nations, 2006; Primack et al., 1998; Ybarra, 2018). Nonetheless, it has not been subject to research as a concept, and its definitions remain vague.

This article is based on research results obtained in 2019 and 2020, focused on the concept of the Maya Forest. Given that the emphasis of the study lies in exploring how conservation (inter)actions are constituted and their transformative implications, spatial and qualitative techniques have been used to help visualize interactions and to understand transformations. Initially, the research team explored databases and cartographic materials on the origins of the Maya Forest found in the library of El

Colegio de la Frontera Sur (Ecosur, 1995). Subsequently, a current map of the Maya Forest was produced to analyze the evolution of conservation measures in the region, particularly in terms of NPAs. This cartographic work enabled to study the spatial appropriations related to the Maya Forest.

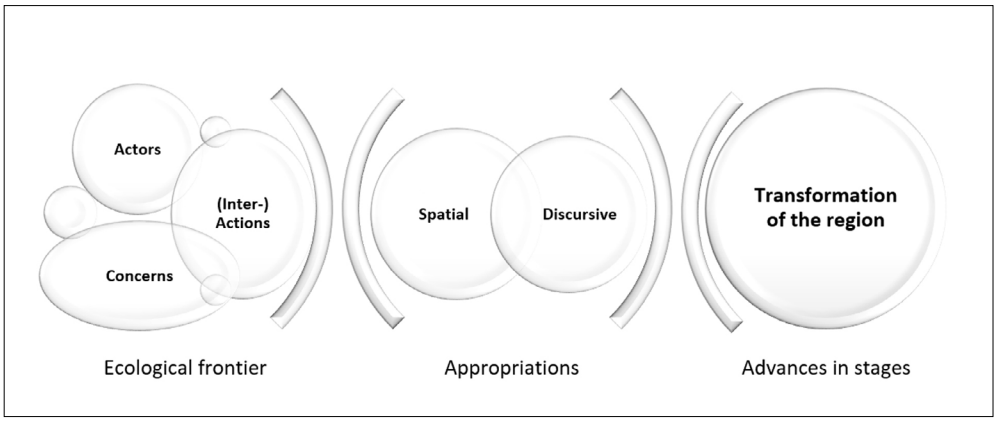
In addition, a literature review was conducted on the Maya Forest, particularly in terms of changes in perceptions and their origins, which, according to the eco-frontier methodology, enabled the contrasting of spatial appropriations with discursive ones. We also researched conservation laws of Mexico, Belize and Guatemala that supported the analysis of different aspects of transformation and evolution in terms of the three countries where the Maya Forest is located. Timelines of the conservation legislation were generated and analyzed together with cartographic and literature materials.

In parallel, we mapped current conservation projects that identify the Maya Forest as their axis or key concept. Four transboundary projects were found related to the Maya Forest concept: the *Selva Maya* project, the Mesoamerican Biological Corridor, the Jungle Jaguar Corridor, and the Maya Forest Corridor in Belize. All involve governmental and NGO-based conservation actors with ties to international conservation organizations (in terms of funding, collaborations, etc.). Two of these projects focused on NPAs, and three were corridors. All contain the idea of connectivity, some focusing more on NPAs and others emphasizing other types of collaboration to generate connectivity.

Documenting the actors and projects is pertinent because there are no previous data or lists related to the Maya Forest conservation in the region. Tracing the origins is revealing as part of the environmental history of the tri-border region. This article supports its arguments with a triangulation of various first-hand sources: interviews, maps, laws, actors and projects.

This article was complemented with the registration and analysis of 15 semi-structured interviews to increase its explanatory capacity. The actors interviewed represent a sample of conservation actors involving information on the conservation strategies implemented, particularly those related to the Maya Forest. The selection was based on the snowball method, ensuring anonymity and ethical data management. The semi-structurred interviews focused on understanding the creation or current use of the term Maya Forest and the actions and strategies that promote it. The interviews included the three government agencies currently involved in Maya Forest projects and two key NGOs that promote and have promoted the concept in their transboundary conservation work. Interviews and documentary materials were analyzed and triangulated by using the eco-frontier perspective. The different ways in which the Maya Forest was described and mentioned over time was highlighted. Finally, the findings were categorized and organized into illustrative historical stages, as shown in Figure 1, according to the eco-frontier concept.

Figure 1. Methodological design of the eco-frontier concept



Source: created by the authors

The creation of the eco-region 1970-1990: tropical rainforest conservation

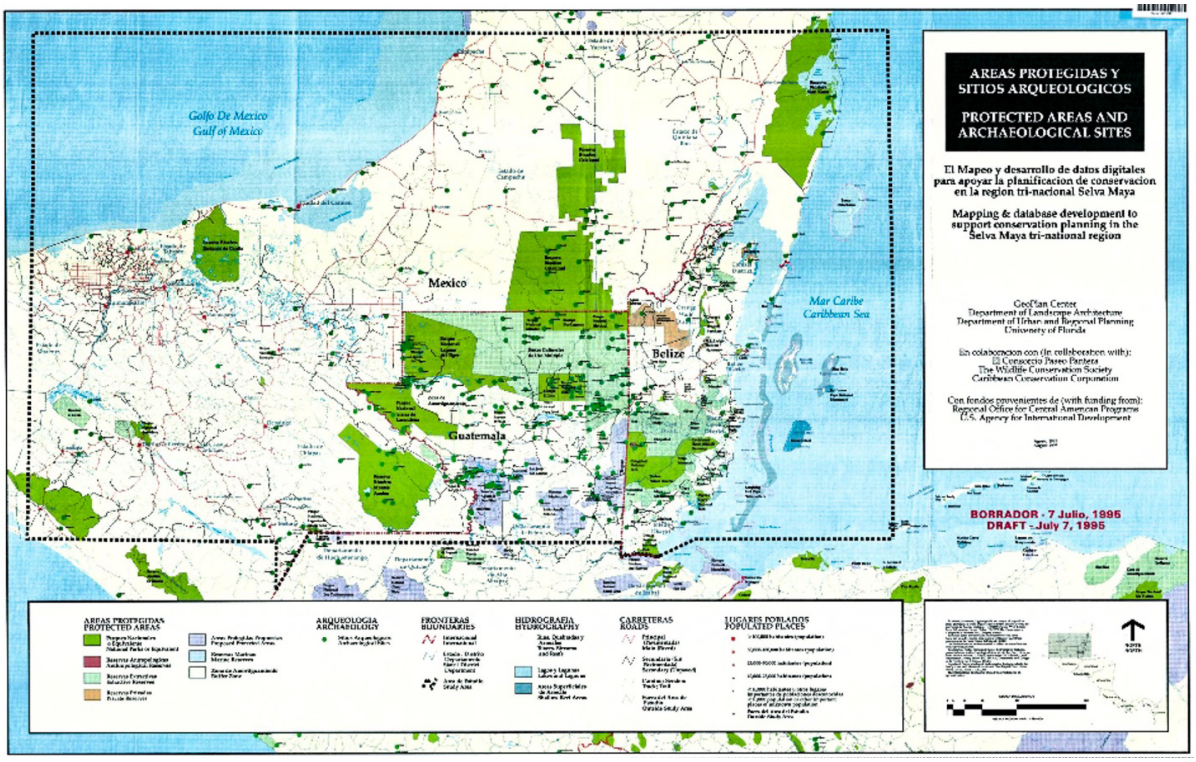
In this section, and based on our databases and cartography, the origins of the Maya Forest concept are traiced as a Mesoamerican tropical forest eco-region, modified by the Mayans. As part of the emergence of tropical forest conservation since the 1970s, the Maya Forest materialized in biosphere reserves that gave meaning to the concept and identified the totality that now encompasses the Maya Forest. In this historical part of the Maya Forest-building, national boundaries were emphasized as the problem for efficient tropical conservation and forest management.

The Maya Forest is a concept created by conservationists and scientists in the 1990s. Maps and databases planning conservation measures were developed by the University of Florida in collaboration with the Paseo Pantera Consortium, Wildlife Conservation Society, Caribbean Conservation Corporation, NASA, and Ecosur (1995). The maps show a demarcation of the region composed of the states of Chiapas, Tabasco, Campeche, and Quintana Roo in Mexico, the Department of Petén in Guatemala, and all of Belize (Ecosur, 1995). These maps identify the existing and planned NPAs, archaeological sites, international and state borders, as well as hydrography, roads, and populated areas. The same databases also include analyses of vegetation (mainly high and medium rainforest), regional biodiversity, and priority conservation sites. These maps and databases (1995) are extremely important since they illustrate how the concept was created and what type of eco-region was defined as the basis of the Maya Forest. In this original plan, the focus was on the conservation of tropical forests principally by means of the NPAs.

The databases were the result of a workshop held at Ecosur in Chiapas and organized by the US Man and Biosphere Program (Usmab) together with Conservation International (CI), Ecosur, and MAYAFOR (Ecosur, 1995). The objective of the meeting was to gather environmental, cultural, and socioeconomic information on the Maya

Forest to develop conservation strategies. In 1995, the primary focus was on the biosphere reserves of the border region: *1*) Montes Azules (Chiapas); *2*) Pantanos de Centla (Tabasco); *3*) Calakmul (Campeche); *4*) the Maya-Chiquibul Mountains (Petén) which border Chiquibul National Park (Belize); and *5*) Maya (Petén). An important element was also the identification of several biological corridors, migration routes, ecological units, riparian zones, cooperative management zones, and extensions that seek to connect the aforementioned NPAs. Figure 2—an original draft generated at the given meeting in 1995—shows the planned "Maya Forest" region and indicates the existing NPAs in green, and the archaeological sites with green dots. It should be noted that digital versions of these maps could not be located, thus, a scanned version is presented here.

Figure 2. Draft illustrating the original extent, protected areas, and archaeologicalsites of the Maya Forest



Source: University of Florida and collaborators, 1995

Indeed, the creation of the Maya Forest as an eco-frontier evolved amid a worldwide discussion on the tropical rainforest conservation that was focused on biosphere reserves and developing biological corridors as tools for connectivity thus marked a transformation in global and national conservation trends from the 1970s to the 1990s when the concept of biodiversity boomed and was consolidated in legislative processes, which also created new national level conservation institutions (Anderson, 2003; Boyer, 2015; Corlett & Primack, 2008). In this way, the concept of the Maya Forest emerged as a creation composed of "a single ecosystem extending from Chiapas through El Petén, Guatemala, to Campeche and Quintana Roo, and the nation of Belize", characterized

in particular by humid tropical rainforests (Ecosur, 1995). At the same time, it strengthened the internationalization of the region, now defined by its main actors of Conservation Biology as an ecological urgency with regard to tropical rainforests.

The environmental history scholarship identifies a transition in conservation trends that shifted from the national park model to biosphere reserves, which were sustained by the UNESCO's Man and the Biosphere Program created in 1972. The program also strengthened the understanding of reserves for their ecosystem functions and conditions of biodiversity, as an alternative to the earlier perception of national or recreational landscapes emphasized by the national park model (Boyer, 2015; Laako & Kauffer, 2022; Ortega et al., 2015; Sarukhan et al., 2009; Simonian, 1995). Until then, tropical rainforests were often perceived as hostile places (Anderson, 2003; Boyer, 2015) and of little use to the timber industry. However, from 1950 onwards, global interest in tropical rainforests grew due to the idea of modernization of the tropics, which would transform these regions into successful cattle ranching and cultivation areas, in addition to achieving an efficient use of their natural resources and oil (Kauffer et al., 2019, Laako & Kauffer, 2021; Tudela, 1992). In the 1970s, Tropical Ecology grew interested in halting the destruction of tropical forests increasingly subject to logging, wildlife trafficking, colonization, and accelerated advance of agricultural and cattle ranching frontiers. To date, these continue to be the main challenges for tropical conservation (Corlett & Primack, 2008)—challenges that by 2020 were the most frequently mentioned in this study's interviews.

The Maya Forest concept was strengthened in several academic studies. The pioneering works by Primack et al. (1998) and Nations (2006) which outline the origins of the creation and are based on the same geographical definition illustrated in Figure 2, stand out. The publications are the result of work conducted by several research centers and conservation organizations since the 1980s and they show a primary concern about the fate of tropical rainforests as a biogeographic representation. As indicated in the Maya Forest concept, these texts allude to the history of the Maya civilization beyond the protection of a threatened Mesoamerican rainforest with high levels of biodiversity. However, they also point out to a paradox in the sense that instead of the identification of a pristine Mesoamerican rainforest—as suggested by Guyot's (2011) spatial and discursive appropriation for the reproduction of wilderness—the Maya Forest was rather considered a secondary forest rewilded after the disintegration of the Classic Maya civilization in 900 AD.

The original Maya Forest-planning sources (Ecosur, 1995) also reveal other paradoxes. Despite the emphasis on the formation of a rainforest eco-region, Nations (2006) suggets that the Maya Forest contains distinct landscapes. Furthermore, the current definitions related to the extent of the humid, tropical rainforest and the Mayan civilization are much broader than the demarcation of the Maya Forest in 1995. It can be calculated that the Maya civilization and the Mesoamerican humid tropical rainforest extend to Veracruz in Mexico and as far as Honduras in Central America (Instituto Nacional de Estadística y Geografía, 2016; Ministerio de Medio Ambiente y Recursos Naturales, 2011; Martos López, 2010; Ministerio de Agricultura, Ganadería y Alimentación & Unidad de Planificación Geográfica y Gestión de Riesgo, 2006). In the original sources (Ecosur, 1995), there is no clear evidence as to why it was limited inside the three countries. Concerning Mexico, the exclusion of Yucatán stands out.

It is important to note that the creation of the Maya Forest concept as a unit encompassing existing biosphere reserves, protected areas, and planned corridors

occurred in a context where the borders were affected by the Guatemalan Civil War (1960-1996) and the refugees on the Mexican side in the 1980s. Particularly in Chiapas, a militant peasant organization was also forged, which later, in 1994, resulted in the Zapatista uprising. Political concerns increased the state and international institutional presence, coupled with a military onslaught.

The aforementioned original sources (Ecosur, 1995) also allude to international borders: they consider that the borders between Mexico, Belize, and Guatemala hamper the collaboration to conserve the transboundary Mesoamerican rainforest (Ecosur, 1995). This reconsideration of the borders coincided with important academic developments in the region, particularly on the Mexican side. By 1980, there were already several research centers in the region studying the dynamics and problems of the southern border, such as El Colegio de la Frontera Sur (Ecosur), the Centro de Investigaciones y Estudios Superiores en Antropología Social Unidad Sureste (CIESAS-Sureste), and the Centro de Investigaciones Humanísticas de Mesoamérica y el Estado de Chiapas (Cihmech), which is currently the Centro de Investigaciones Multidisciplinarias sobre Chiapas y la Frontera Sur (Cimsur) attached to the Universidad Nacional Autónoma de México (UNAM). At the same time, they revived different theoretical considerations of the international borderlands as an isolated and peripheral region, yet subject to important dynamics (Laako, 2016). The region was perceived academically and scientifically as a place of expansion and of great natural abundance, and hence as an opportunity for state expansion in the humid tropics (Fábregas et al., 1985). It was also highlighted that the Mayan territory was transboundary due to several historical and cultural convergences (De Vos, 2002).

When analyzing the interviews on the creation of the Maya Forest eco-frontier between 1970 and 1990, the concerns over international borders between countries to achieve or hinder the Mesoamerican tropica rainforest conservation stand out. The analysis of the creation of NPAS, particularly in the form of the biosphere reserves, reveals that the Maya Forest materialized a spatial appropriation. However, not of a pristine kind but of a historically modified and increasingly politicized nature. That is, discursively it has been referred to privilege projects that are not necessarily only for conservation purposes.

Discursive appropriations: the ecological frontier and the Maya

In the 1990s, various regional political events profoundly transformed the territory of the Maya Forest. In practical terms, these events impacted especially on the discursive appropriations of the eco-frontier in its creation and use of the imaginary of the *Maya*. In this section, the appropriation of the Mayan aspect of the Maya Forest is examined in two categories: first, as a spatial and discursive appropriation of the Maya history of the region, created by social scientists (anthropologists, archaeologists, historians); second, as the Maya concept linked to tourist and archaeological sites, and thereafter in the development of ecotourism, specifically on how the conservation actors are often involved in governmental and/or private projects. Based on the ecological and political dynamics of the 1990s, the *Maya* of the Maya Forest stood out in the difficult negotiation between Indigenous rights, appropriation, and the attempt to integrate the cultural-

historical into conservation projects, while biodiversity conservation as a frontier advanced in the form of laws, institutions, and NPAs (see, for example, Figure 3; Kauffer et al., 2019; Laako & Kauffer, 2021, 2022).

Nevertheless, in this context, there were important global and Latin American transformations concerning Indigenous peoples. The term *Maya* was re-signified, and the critiques of discursive appropriations were strengthened internationally due to the so-called Indigenous emergence on national spheres in the 1990s (Bengoa, 2000). In the case of the Maya Forest, local tensions grew also in the territories of the protected areas. Thus, for example, in the 1990s and simultaneously with the rise of the concept of biodiversity, conflicts and discussions arose between peasants, rural and Indigenous communities settled there, and conservationists, since all parties were interested in the same bordered areas: conservationists often blamed rural communities located in the tropical rainforest for logging and fires, particularly related to the traditional slash-and-burn cultivation system (Leyva Solano & Ascencio Franco, 1997).

Again, conservationists were attacked for their territorial interventions and for promoting more NPAs without considering that they aggravated local agrarian issues since the territories, now subject to conservation, had previously been settled (Freitas, 2017; Kauffer et al., 2019; Miller, 2007). Thus, purist visions of nature conservation were challenged nationally and internationally (Adams, 2020; Stevens, 2014; Ybarra, 2018). In this context, several authors found an ethnic aspect and considered that Indigenous peoples settled in tropical territories actually live tacitly in interaction with biodiversity while they have been co-evolving (Boege, 2008; Dove & Carpenter, 2008; Oviedo et al., 2000), thus, cannot be dissociated. The human-nature coexistence was considered especially strong in groups with Indigenous roots since their culture was considered founded in elements to transform nature, interact with it, and to create various connections and rituals for its understanding.

The Maya Forest as an eco-frontier is embedded in this context in a complex way. This research analyzes differentiated conditions. First, the term *Maya* in the Maya Forest did not tend to refer to a question of rights but to a history. For example, mainstream authors on the Maya Forest did not allude particularly to Indigenous rights or the events major impact related to these in the region, such as the Zapatista movement in Chiapas (1994) or the pan-Maya mobilization in Guatemala (Nations, 2006; Primack et al., 1998). More so if they referred to archaeological and anthropological scholarly literature such as Ford and Nigh (2015), who use the Maya Forest Garden to highlight how the Maya historically conserved their forests. With this approach, it can be stated that the authors took critical distance from those conservation biologists who argued that peasants in the region simply destroyed nature. In this sense, the Maya Forest refers to a forest modified by the Maya, initially defined by the sociable scientists (Wakild, 2017), which takes critical distance from Guyot's (2011) approach to wilderness conquests. However, despite its apparent decolonial perspective, the term *Maya* continues to refer mostly to the historical and archaeological setting, although recently there have been important attempts to integrate local communities into conservation, for example, of the communitarian concessions in the Maya biosphere in Petén (see, for example, Wildlife Conservation Society, 2022).

However, in recent scholarship, Indigenous and peasant rights have been emphasized, even polemicized (Martínez-Reyes, 2016; Ybarra, 2018). For example, Ybarra (2018) discusses from a decolonial perspective how conservation is linked to militarization, violence, and socio-environmental conflicts in northern Guatemala. The title of her

book contains the phrase "the Maya Forest", yet it appears without definition: is it the Maya biosphere, or perhaps the Maya civilization of the region? According to Ybarra (2018), conservation alludes to a North American project supported by the State of Guatemala as a colonizing frontier that appropriates the territories of populations uprooted by war to protect nature. However, simultanouslyYbarra's argument also reproduces the history of conservation as a uniquely North American project with its model of national parks.

Thus, in terms of the eco-frontier of the Maya Forest, the term *Maya* is linked politically to Indigenous rights. Several authors have recently questioned how biodiversity conservation is linked to militarization, socio-environmental conflicts, and violence in these spaces (Ybarra, 2018). Given the processes of colonization, displacement, and conflicts in recent decades within the Maya Forest, there are socio-environmental tensions that subjugate NPAs and other conservation initiatives in agrarian and land tenure issues, which unfold the *Maya* in very different, critical ways during the past decades (Legorreta Diaz et al., 2014; Martínez-Reyes, 2016; Ybarra, 2018). The above is also linked to the more touristic use of space (Adams, 2020; Duffy, 2000).

This also brings into the focus the role of scientists—in this case, social scientists—in generating discursive appropriations of the Maya Forest. According to Nations (2006), the Maya Forest as an eco-frontier alludes to historical, anthropological, and archaeological *research* on this region. A considerable part of the Maya Forest literature includes North American scholarship, which, of course, formed part of the eco-frontier or influenced in building the knowledge in the creation of the Maya Forest concept. In this sense, the Maya is a discursive and territorial appropriation that pays homage to the current Maya civilization and studies of the region focused on ancient Mesoamerica.

Additionally, the interviewees in this research—conservation actors who have used the term Maya Forest in their projects, particularly in Mexico, either within government institutions or in NGOs—worked mostly in the communities that colonized the forest in the 1980s and without direct relation to the Mayan past, although some populations are Indigenous from other parts of Mexico. In this context, the Maya refers inevitably to the Maya civilization rather than the Maya of today. In the interviews with representatives of current projects related to the Maya Forest and despite the fact that no much reference of Mayan rights were made, there was an awareness concerning land rights, and many projects emphasized collaboration with communities (Laako & Kauffer, 2021).

The concept of the Maya Forest has also taken the tourist route. According to Nations (2006), the creation of the Maya Forest concept in the 1990s coincided with a special issue initiative of the National Geographic regarding the Maya Route in the late 1980s. Nations' own book (2006) is also addressed to students and travelers interested in the region's history and archaeology. As demonstrated in Figure 2, conservation planning for the Maya Forest includes the mapping of archaeological and tourist sites, which was later taken up by Primack et al. (1998). In this sense, we suggest that the Maya Forest has been built as a unit not only for biodiversity conservation but with the objective of conserving the historical sites and combined with the promotion of (eco) tourism (see also Martínez-Reyes, 2016).

Fieldwork and interviews indicate about the Maya that: *1*) there is a general disengagement of Indigenous rights in the conservation discourse; *2*) the social scientists play a significant role in the Maya Forest building; and *3*) the conditions related to different historical and touristic elements are still present in current

references to the Maya Forest concept. At the same time, the concept has been appropriated for different uses related to these three points. On the one hand, we observed how some conservationist organizations indicated that the concept of the Maya had to do with the recognition of Mayan origins and rights over "their forest". On the other hand, other conservationist actors argued that the Maya is mostly related to (eco)tourism and megaprojects.

Thus, although the genealogies of eco-frontier presented here were convincing, the anthropological arguments about the concept of the Maya are not so much, as the Maya concept is imprecise at the best, and there is no single Maya region as such (Galán et al., in press). Rather, different regions coexist, with peoples who share cultural traits, for example, the Maya linguistic families. Moreover, in Archaeology, which studies ancient artifacts and is key to revealing the splendid pre-Columbian buildings found in Maya territories, the idea of a common Mayan history has also been questioned (McAnany, 2020). By 2021, a broad strand of Anthropology has indicated that there are Mayan nations sharing the common legacy of Mesoamerican origin, customs, popular religiosity and language, with different social agencies in the present (Castillo Cocom et al., 2017).

Having said that, while it is difficult to construct genealogies of the Maya, today the Maya is frequently presented as a label that alludes to a majestic past in the territories of southern Mexico, Guatemala, and Belize. Since the 1990s, the term *Maya* has been systematically used in different megaprojects, and many of them for tourism such as Riviera Maya, Mundo Maya, Ruta Maya, Tren Maya, and Ríos Mayas (Hervik, 1999), which connects the Mayan with neoliberal conservation oriented toward tourism or ecotourism, driven by private or public initiative, which also uses the Mayan element by means of administration of ethnicity (Crespo, 2005). Thus, as an eco-frontier, the current Maya Forest represents a singular case as it seeks to interweave cultural diversity with biological diversity in a complex border region of the Maya where paradoxes cannot be minimized.

The current Maya Forest: the border region towards ecologized space

This final section analyzes the Maya Forest of today. It detects the continuous development towards an ecologized space (with emphasis on corridors and connectivity, although not necessarily by means of the NPAs) by the actors using the term Maya Forest, thus resulting in a border region where the ecological issue has penetrated.

To detect current trends in the Maya Forest in terms of the eco-frontier, Figure 3 on the same original region was devised. We decided to add Yucatán since, according to the interviewees, its inclusion makes sense in cultural terms, i.e., the state has a mostly Mayan population, sharing the same linguistic roots. However, its inclusion is debatable since the vegetation is mostly composed of dry broadleaf forest, not the humid tropical rainforest that has traditionally defined the Maya Forest landscape. A comparison of Figures 2 and 3 shows that the number of NPAs has increased and expanded seaward. In particular, the NPAs in the categories of voluntary areas designated for conservation (Mexico), regional municipal parks and private protected areas (Guatemala), and marine conservation areas (Belize) have increased. However, the first two are not very

extensive in hectares (see also Kauffer et al., 2019). This coincides with the conservation trends detected by Adams (2020) in the sense that the creation of eco-regions has expanded toward marine areas and private or community NPAs.

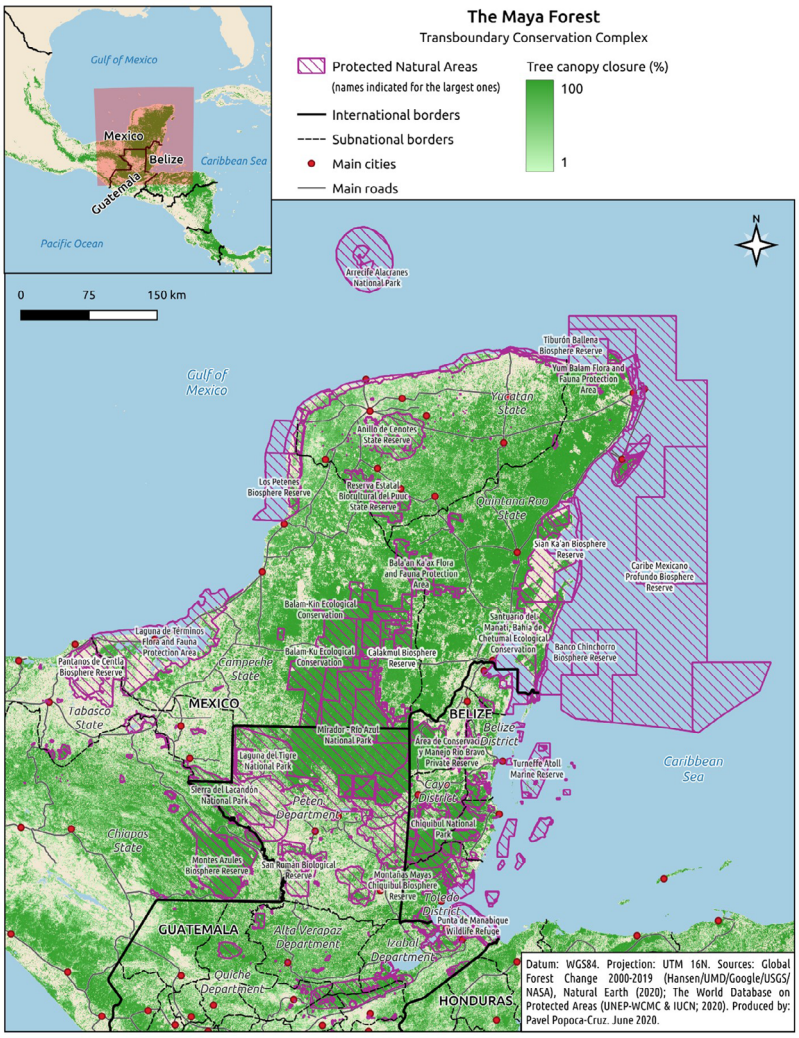
Regarding UNESCO's international conservation categories in the Maya Forest, Mexico currently has six cultural heritage sites, of which Sian Ka'an in Quintana Roo is defined as a natural site and Calakmul in Campeche as natural-cultural (UNESCO, 2020). Guatemala has one: Tikal National Park in Petén, which is defined as a natural-cultural heritage site. Belize also has one, Belize Barrier Reef Reserve System, which is registered as a natural site.

In the Maya Forest, Mexico has 10 biosphere reserves, half of which are marine; Guatemala has one biosphere reserve, La Maya in Petén; and Belize has no natural protected areas in the biosphere reserve category. In the international category of Ramsar wetland sites, Mexico reports 12, Guatemala two, and Belize also two (UNESCO, 2020). These data show that the eco-frontier is advancing, particularly in terms of bio-cultural heritage, and that the border location suggests an increasingly internationalized territorial transformation of conservation (Laako, Pliego-Alvarado, Ramos Muñoz & Marquez, 2022; Laako, Pliego-Alvarado, Ramos Muñoz, Marquez, Wakild, et al., 2022; UNESCO, 2020).

The increase of reserves in the heritage category suggests a strenghtening of the tourist approach to conservation. Aquino Pires do Rio and Name (2017), among others, have mentioned the conservation heritage trend in the case of Iguazu Park in the Brazil-Argentina-Paraguay triple border region. The notion of cultural heritage has been disseminated from the XVII UNESCO Congress (1972) and the Convention on Biological Diversity (1992) to catalog and conserve sites of cultural and natural importance for humanity's heritage. Particularly since the 1990s, the concept of world heritage has evolved in parallel with biodiversity conservation tools (Aquino Pires do Rio & Name, 2017). The trend has been particularly marked in border regions, including the Maya Forest, where the NPAs of different categories have been established on both sides of the border. This entails increasing transboundary conservation collaboration, including biological and ecological corridors, international forest ranger meetings, and funding for transboundary conservation projects. Nonetheless, the Maya Forest case is particularly interesting because it encompasses—unlike many other equivalent cases in Latin America—the *Maya* as a cultural and historical aspect of the region.

Effectively, the mapping of actors or projects with the current use of the Maya Forest concept resulted in four transboundary cases. One of the greatest ones is the *Selva Maya* project (www.selvamaya.info), which involves a transboundary project funded by GIZ, a German Agency for International Cooperation. Between 2005 and 2022 the project has collaborated with protected area commissions in Mexico and Guatemala and the Belize Forestry Department to improve connectivity of the Maya Forest NPAs in Campeche, Quintana Roo, Petén, and Belize. The interviewees were not familiar with the original mapping of the Maya Forest, and responded with doubts about the role of the Lacandon Jungle in Chiapas and the state of Tabasco concerning the notion. However, they did consider it possible to extend the concept towards Yucatán. The interviews highlighted that there is indeed a change in spatial focus: while the literature and mapping of the 1990s gave weight to the Lacandon Jungle of Chiapas and even to the Usumacinta River region in Tabasco, the use of the term Maya Forest has recently been extended towards Campeche, Quintana Roo, and Yucatán.

Figure 3. Today's Maya Forest



Source: Pavel Popoca-Cruz

It should be noted that in Belize the Maya Forest refers to a new government plan called Maya Forest Corridor, which aims to connect the NPAs of southern Belize to the border of Guatemala and Mexico. Indeed, the Maya Forest Corridor is the second case found that actively continues to use the term. The example shows that Maya Forest has increasingly been used to define complex border regions that cover biological and ecological corridors and span international borders. A third case is the Jungle Jaguar Corridor that uses the Maya Forest concept to promote transboundary jaguar conservation in the region (De la Torre et al., 2021).

Lastly, the Mesoamerican Biological Corridor (MBC) is an intergovernmental project that ended for Mexico in 2018 (Finley-Brook, 2007). It is important to note that while the Maya Forest is a concept created to define an eco-region by conservationists and scientists, the MBC is an intergovernmental initiative within which several collaborations

between nations and their conservation institutions took place, albeit confined to international borders. Subsequently, these two strategies have existed in parallel, but they are not synonyms. However, there is no doubt that the identification of tropical forests and transboundary conservation trends strengthened the internationalization of the space when redefining these territories as ecological spaces.

There are few studies on these conservation corridor-frontiers. Moreover, it is important to consider that these projects and conservation policies have a very recent history, which makes it difficult to assess their impact. However, the results indicate that, in terms of these corridors, to the conservation tendencies reach beyond the NPAs that create a border between populations and nature and, thus, generate spatial appropriation frontiers. We detected a connectivity trend that considers inhabited landscapes and secondary forests as an ecological element for conservation. However, more research is required on these recent transboundary initiatives. The results suggest that collaboration has increased not only between governmental and international bodies with NGOs—as originally indicated with this eco-frontier—but there is more collaboration between conservationists and local people who also use conservation to resist other frontiers (Laako & Kauffer, 2021). Table 1 summarizes the findings on the Maya Forest as an eco-frontier.

Table 1. Findings on the Maya Forest as eco-frontier

Action/decades	1970-1990	1990-	2000-
Action or strategy	Creation of conservation biology and tropical ecology NPAs, particularly UNESCO biosphere reserves	Creation of the Maya Forest concept Strengthening of conservation laws Expansion of NPAs of various categories as a result of the Convention on Biological Diversity Mesoamerican Biological Corridor	Multi-sector and multi-scale collaboration New paradigm of collaboration with communities Voluntary and community NPAs Ecological corridors Incentives for conservation *Selva Maya* Project Jungle Jaguar Corridor Maya Forest-Belize Corridor
Actors	Biologists and ecologists from several universities exploring and mapping the region International Mesoamerican Studies National Geographic	Among others: Conservation International, Wildlife Conservation Society, Man and Biosphere Programme, University of Florida, Paseo Pantera Consortium, Ecosur, USAID, Amigos de Sian Ka'an, Conabio	Among others: Wildlife Conservation Society, Conanp, Conap, Forestry Department-Belize, Conabio, IUCN, German Cooperation and GIZ, Natura Mexicana
Appropriation trends	A tropical rainforest eco-region in the forests modified by the historic Mayan civilization Mayan Route and archaeological sites	Polygons of the NPAs in politicized natural areas: between the historical Maya, the scientific Maya, and the tourist Maya in the face of Indigenous rights Mayan Riviera/Mayan World	Tendency towards ecological space in the border region with the increase of border NPAs Landscapes that integrate and connect populations and nature The Maya Forest toward the peninsula Mayan Train/Mayan Rivers

Source: own elaboration

Conclusions

This article has analyzed the Maya Forest as an eco-frontier. The eco-frontier is a concept that importantly sheds light to the transformations of peripheral territories, now subject to conservationist eco-frontiers that see to protect the threatened biodiversity. In this article, we pointed out that the eco-frontiers serve as interlocutors that address previously unexplored ecological and environmental concerns in international frontier regions. Eco-frontiers are embedded in these territories and reconfigure them through different spatial and mental appropriations during different time periods. Simultaneously, the eco-frontiers are transfigured and transmuted over time and in interaction with the existing borderlands.

Such is the case of the Maya Forest. This article has analyzed its creation as an eco-frontier considering its definition as a tropical rainforest and its use of the *Maya*. First, the creation of the Maya Forest by conservationists and scientists interested in protecting Mesoamerican rainforests was analyzed from the 1970s onwards, culminating in the adoption of the Maya Forest concept in the 1990s. By then, the Maya Forest was identified as an eco-region and ecosystem located in the border region between Mexico, Guatemala, and Belize, and now redefined as a territory subject to conservation due to its severely threatened biodiversity. In turn, this process allowed for the reconstruction of the border region as an internationalized ecological space. We showed that this space has involved various paradoxes, as it consists of several historically modified landscapes and forests. In this sense, the Maya Forest should be understood as a concept subject to debate.

Second, the appropriations and meanings of the *Maya* were explored. Indeed, the case of the Maya Forest stands out for its adoption of the term "Maya" for the conservation of biodiversity in this delimited region. Our findings indicate that the concept of the Maya has been appropriated in two ways: first, its scientific connections to Mesoamerican studies; and second, its reappropriation linked to tourist routes and archaeological sites beyond biodiversity conservation. The role of historians, anthropologists, and archaeologists has been remarkable in this process. Consequently, we identified a trend towards a bio-cultural space that illustrates this particular Maya Forest eco-frontier: the bio-cultural entails the search to link the cultural with biodiversity, which, at the same time, sheds light to a forest modified by the Mayans for centuries, and whose current tourist and neoliberal uses may be critiqued in their complicated links and absences in terms of rights related to lands and natural resources.

In effect, the biocultural perspective, which is currently evolving in conservation projects related to the Maya Forest, derives from the politicized Indigenous rights framework of the 1990s and the biodiversity boom, which first generated divisions between populations and conservationists over ecological issues. In this regard, the eco-frontier concept illustrates the difficulty of interweaving the culture-nature relationships. According to anthropologist Lowenhaupt Tsing (2015), it is complicated to place other actors than humans at the center of the analysis. Biocultural conservation suggests that conservationists and the scientists involved have attempted to integrate the cultural into the ecological-biological. On the other hand, it also indicates an attempt to create an eco-region beyond the anthropocene: it is not only the Maya at the center of the analysis but also their eco-region. Indeed, works such as that of

Lowenhaupt Tsing (2015) are part of the new perspective of *multispecies* that seeks to emphasize that one does not live in a space only occupied by humans. As the author states, stories about the relationship between humans and nature often reproduce viewpoints centered on conquests and domestication, and not of interdependence and interaction. For future research, perhaps both the eco-frontier in its critical framework concerning the (eco-)frontiers and the concept of the Maya Forest can move in towards that direction.

Given this unique link of the Maya Forest with biodiversity conservation and Indigenous issues, we detected a transition towards a biocultural heritage. In fact, the concept of the Maya Forest is unique compared to many other transboundary conservation cases—such as the previously mentioned case of Patagonia—in encompassing the Mayan cultural aspect (see Laako, Pliego Alvarado, Ramos Muñoz & Marquez, 2022; Laako, Pliego Alvarado, Ramos Muñoz, Marquez, Wakild, et al., 2022). By analyzing the Maya Forest as an eco-frontier in tune with Indigenous issues within this biocultural heritage region, the forest is transformed into a hybrid border-frontier practice that combines the anthropological emphasis on the contemporary population settled there with their perception of nature and biocultural landscapes.

How could the Mayans or other Indigenous peoples settled in this biocultural landscape appropriate the Maya Forest? The Maya Forest can be considered evidence of the global concern for conserving nature in the understanding of its scientific value. It is also justified as a heritage from the listings of endemic flora and fauna, hydrological or geological resources and, recently, with the educational or scenic opportunities it provides (see, for example, De la Torre et al. 2021; Fedick, 2003; Martínez-Reyes, 2016; Meave et al. 2021; Mejía-Ortiz et al. 2021).

Safeguarding certain biogeographic representations is a success of abstract knowledge, but in these spaces there is also tacit knowledge exercised by the inhabitants as they co-evolve in the territory. This knowledge is sometimes invisible, and its importance for conservation is unknown. In this sense, it is very interesting that the idea of Maya Forest expresses a recognition of the cultural, of the *in situ*, but it can also follow the long Mexican tradition of the Indigenous or the *mestizo*, which rather refers to a splendid past.

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