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Cañón del Río Blanco National Park: A Forgotten Protected Natural Area

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ABSTRACT

Objective: To submit a report about the current situation of the Cañón del Río Blanco National Park and to gather all the existing information about this Protected Natural Area (PNA) in a single document.

Design/Methodology/Approach: A bibliographic research and field work were carried out to determine the current state of the PNA.

Results: The decree, the geographical location, the history of its protection, the biological, sociocultural and economic characteristics, the environmental services, the CONANP work program, the environmental problems, and the category issues are described.

Study Limitations/Implications: There were no limitations.

Findings/Conclusions: The area still protects an important biodiversity and fulfills vital environmental services; however, assigning an adequate category to the park and appointing a director is an urgent matter.

Keywords: Protection, Center of Veracruz, CONANP, Conservation.

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INTRODUCTION

Mexico is a megadiverse country and this affirmation is supported by current specialized literature. Mexico is part of an exclusive group of nations where almost 70% of the worldwide animal and plant diversity can be found (CONABIO, 2021).

However, Mexico has faced —like most Latin American countries— a serious biodiversity loss over the years. One of the main tools used by the Mexican government to counteract this loss is the creation of a Protected Natural Area (PNA) network. Nevertheless, this strategy has not always been successful. Therefore, the objective of this study is to set out the current situation of the Cañón del Río Blanco National Park and to gather all the available data about this PNA in a single document.

Decree

General Lázaro Cárdenas del Río —then president of Mexico— issued a decree on March 22, 1938, establishing the Cañón del Río Blanco National Park as a Protected

Natural Area (PNA) (Departamento Forestal de Caza y Pesca, 1938). This National Park (NP) included 55,690 ha (González and Sánchez, 1961); however, no traversing was carried out. Therefore, the Comisión Nacional de Áreas Naturales Protegidas (CONANP) plotted a traverse survey, which included 48,799.77 ha (CONANP, 2018; CONANP, 2017).

Geographical Location

The Cañón del Río Blanco NP is located in the center of Veracruz, in the Altas Montañas region, which is one of 10 socioeconomic regions in which Veracruz is divided (INAFED, 2010). Twelve municipalities are fully or partially located within the NP. To the West, it borders with the State of Puebla. The municipalities included in its territory are: Acultzingo, Aquila, Camerino Z. Mendoza, Huiloapan de Cuauhtémoc, Ixhuatlancillo, Ixtaczoquitlán, Maltrata, Nogales, Orizaba, Rafael Delgado, Río Blanco, and Soledad Atzompa (Google, 2020; INEGI, 2019) (Figure 1). Orizaba —one of the most important cities of Veracruz— is located within the National Park.

Management Program

There is no management program that guides or determines the actions that must be carried out in the National Park.

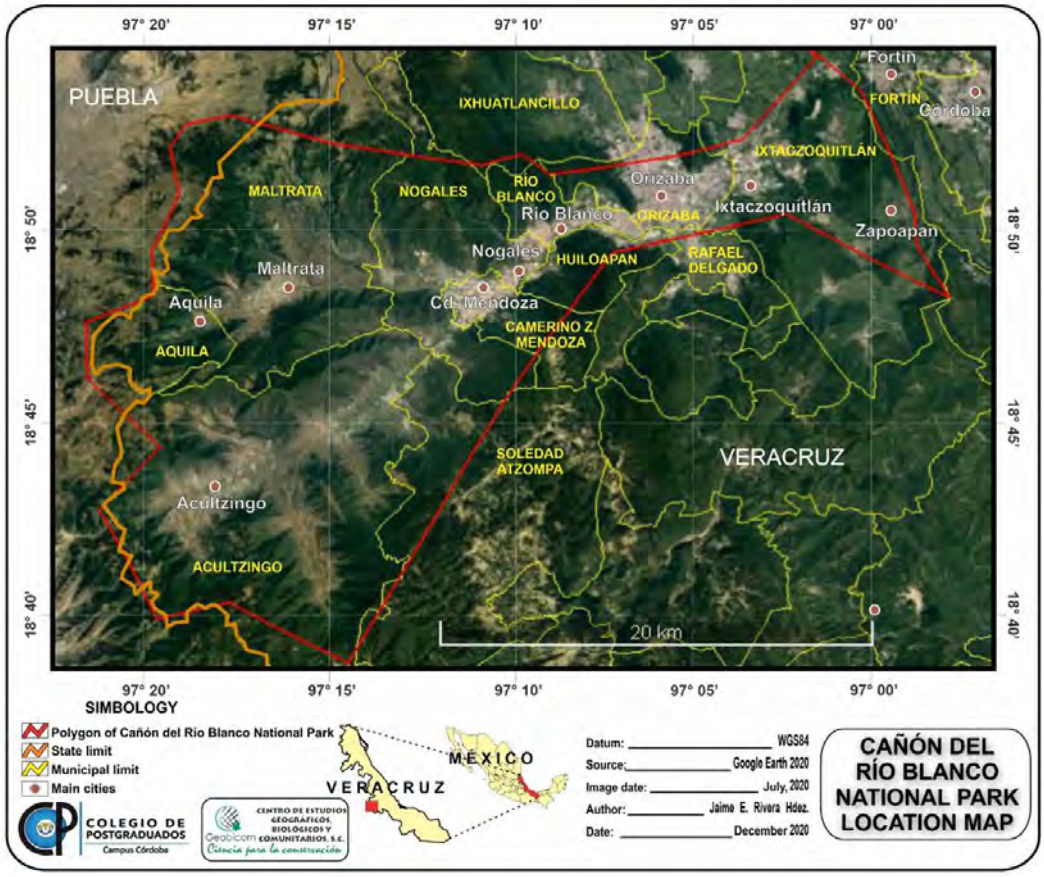

Figure 1. Map of the Cañón del Río Blanco National Park.

Brief history of the protective measures taken in this region

The main objective of the creation of this NP was to protect the flora and fauna of the region, as well as the river itself. In fact, other protection decrees had already been implemented in this region: a) Zona Protectora Forestal Cuenca Superior del Río Blanco, issued on November 30, 1933, which included 16,700 ha; b) Reserva Forestal Cuenca Hidrográfica del Río Carbonera, issued on November 26, 1936, which included 22,050 ha; and c) Zona Protectora Forestal Cuenca Hidrológica del Río Carbonera, issued on November 26, 1936, which included 12,000 ha.

All previous and current decrees share the same aim: the protection of natural resources and environmental services that humans can enjoy.

Biological Characteristics

Flora and Vegetation

The biological diversity of this PNA has been documented since the last decade (2010-2020). Regarding flora and vegetation, Rivera-Hernández (2015) reported five ecosystems protected by this PNA: 1) xerophitic scrub, 2) oak forest, 3) cloud forest, 4) gallery forest, and 5) tropical rainforest (Figure 2).

All these ecosystems are of unparalleled importance. The xerophitic scrub (1) of this NP is one of the three semiarid areas in Veracruz and is the only one officially protected through a PNA decree. Recent botanical studies (Rivera-Hernández *et al.*, 2019), have

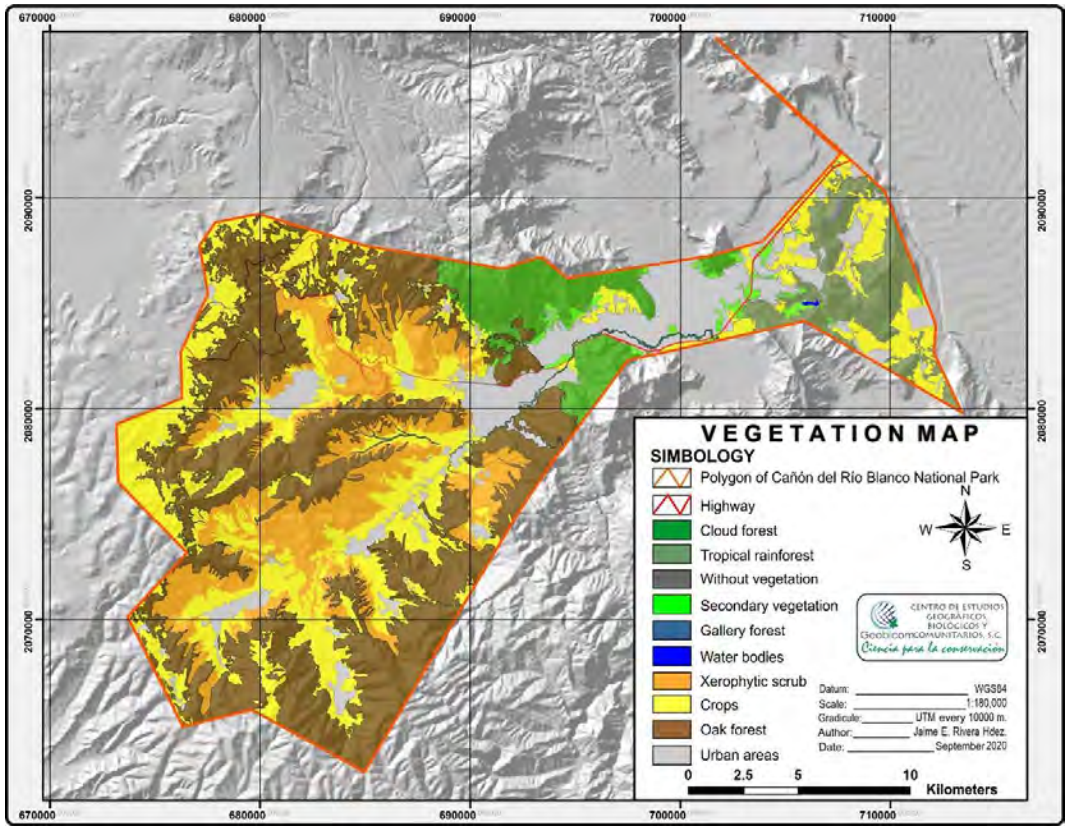

Figure 2. Vegetation and soil use map of the Cañón del Río Blanco National Park.

found that there are about 13 plant species in this semiarid area that were previously considered endemic to the Valle de Tehuacán-Cuicatlán. The oak forest (2) can also be found in the NP either as dry forest (adjacent to the xerophitic scrub and the gallery forest) or as a very humid forest (in a spot called Puerto del Aire, in the highest part of this PNA). Pines are spread throughout this oak forest, but they are not enough to be considered as a proper pine forest. Most of these pines have been felled, although many areas have been reforested with pines (mainly *Pinus patula* Schltdl. & Cham.) and other species (Figure 3). The cloud forest (3) is one of the most threatened ecosystems in Mexico. It has an important number of endemic species. This forest is also considered as one of the most

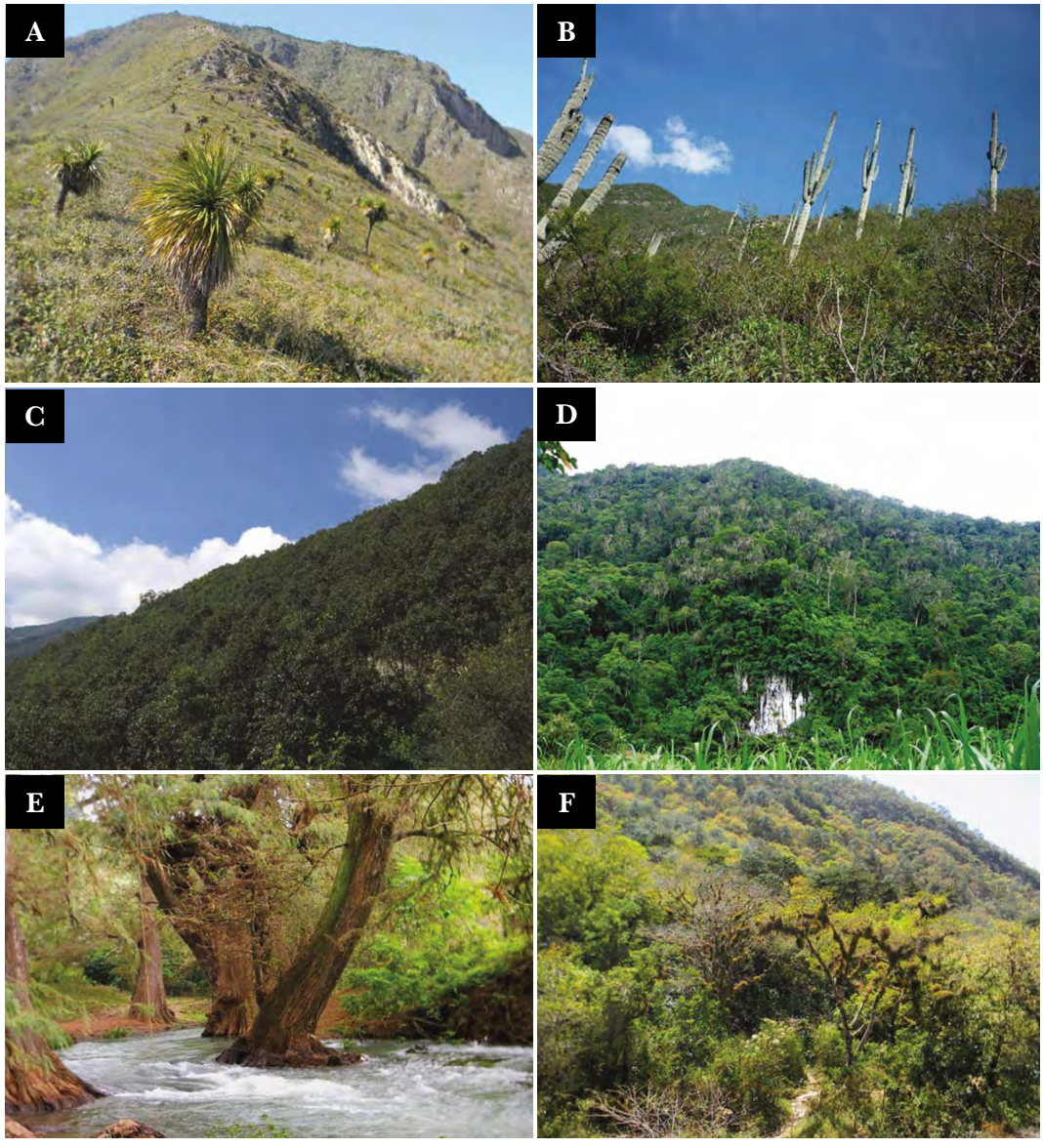

Figure 3. Types of vegetation that prevail in the Cañón del Río Blanco NP. A) Xerophitic scrub where *Quercus sebifera* and *Nolina parviflora* prevail; B) Xerophitic scrub where *Cephalocereus macrocephala* prevails; C) *Quercus* forest, D) Tropical rainforest, E) Gallery forest, and F) Cloud forest. Photographs by Jaime E. Rivera Hernández.

diverse forests of the country, because it houses a great number of flora species. The gallery forest (4) is the only forest in Veracruz were ahuehuete (*Taxodium mucronatum* Ten.), the national tree, predominates. Consequently, this forest has a high cultural importance. The tropical rainforest (5) of this NP is one of the last bastions of the karst tropical rainforests that widely prevailed in the past and that used to spread from this region up to Uxpanapa. Meanwhile, Rivera-Hernández (2015) reported a 1,688 plant species diversity in this PNA, more species have been reported in specific studies about the cloud forest (Vargas-Rueda, Rivera-Hernández, Álvarez-Aquino, Salas-Morales, Alcántara-Salinas and Pérez-Sato, 2020) and about the semiarid area of this PNA (Rivera-Hernández, Flores-Hernández, Vargas-Rueda, Alcántara-Salinas, Cházaro-Basáñez and García-Albarado, 2019), so far over 1,700 plant species have been reported.

Wildlife

Most of the studies focus on birds, recording about 417 bird species in this NP; this represents approximately 81% of the total birds reported in the Altas Montañas of Veracruz region (Alcántara-Salinas *et al.*, 2020). Regarding amphibia and reptiles, Canfield-Limón (2009) recorded 147 species (100 reptiles and 47 amphibia).

Mammals have been the subject of less studies. Only one study (Cid-Mora, 2015) has been recently carried out: 17 medium and large mammals were recorded in the cloud forest. The river otter was recorded for the first time in the high part of the Río Blanco in this PNA by Cid-Mora, Rivera-Hernández, Alcántara-Salinas, Sánchez-Páez, and Aranda-Sánchez (2018). The characteristics of this area are so peculiar and unique that a considerable number of species stand out as a result of their micro-endemism (Table 1). Regarding only vegetable species, Rivera-Hernández (2015) recorded 297 endemic Mexican species, out of which 20 are endemic to Veracruz. Approximately 20 bird species in the NP are endemic to Mexico (Figure 4).

Table 1. Species that stand out in the Cañón del Río Blanco NP.

Species	Importance	Species	Importance
Mammillaria haageana subsp. *acultzingensis* (Linzen, Rogoz. & F. Wolf) D.R. Hunt	Endemic to Cañón del Río Blanco NP	*Dioscorea orizabensis* Uline	Endemic to Córdoba-Orizaba region
Ipomoea eximia House	Endemic to Córdoba-Orizaba region	*Hylorchilus sumichrasti*	Endemic to centre zone of Veracruz and adjacent zones of Puebla and Oaxaca
Sedum lucidum R.T. Clausen	Endemic to Cañón del Río Blanco NP	*Dendrortyx barbatus*	Endemic to the mountains along Golf of Mexico, from North Oaxaca to South Tamaulipas
Ribes orizabae Rose	Endemic to Córdoba-Orizaba region	*Pseudoeurycea granitum*	Endemic to centre zone of Veracruz
Peperomia cordovana C. DC.	Endemic to Córdoba-Orizaba region	*Mesaspis antauges*	Endemic to centre zone of Veracruz
Ceratozamia decumbens Vovides, Avendaño, Pérez-Farr. & J. González-Astorga	Endemic to Córdoba-Orizaba region	*Aquiloeurycea cafetalera*	Endemic to centre zone of Veracruz

Source: Rivera-Hernández (2015), Vargas-Rueda *et al.* (2020), Rivera-Hernández *et al.* (2019), Alcántara-Salinas *et al.* (2020), Roberto Mora-Gallardo (personal communication), Cid-Mora *et al.* (2018).

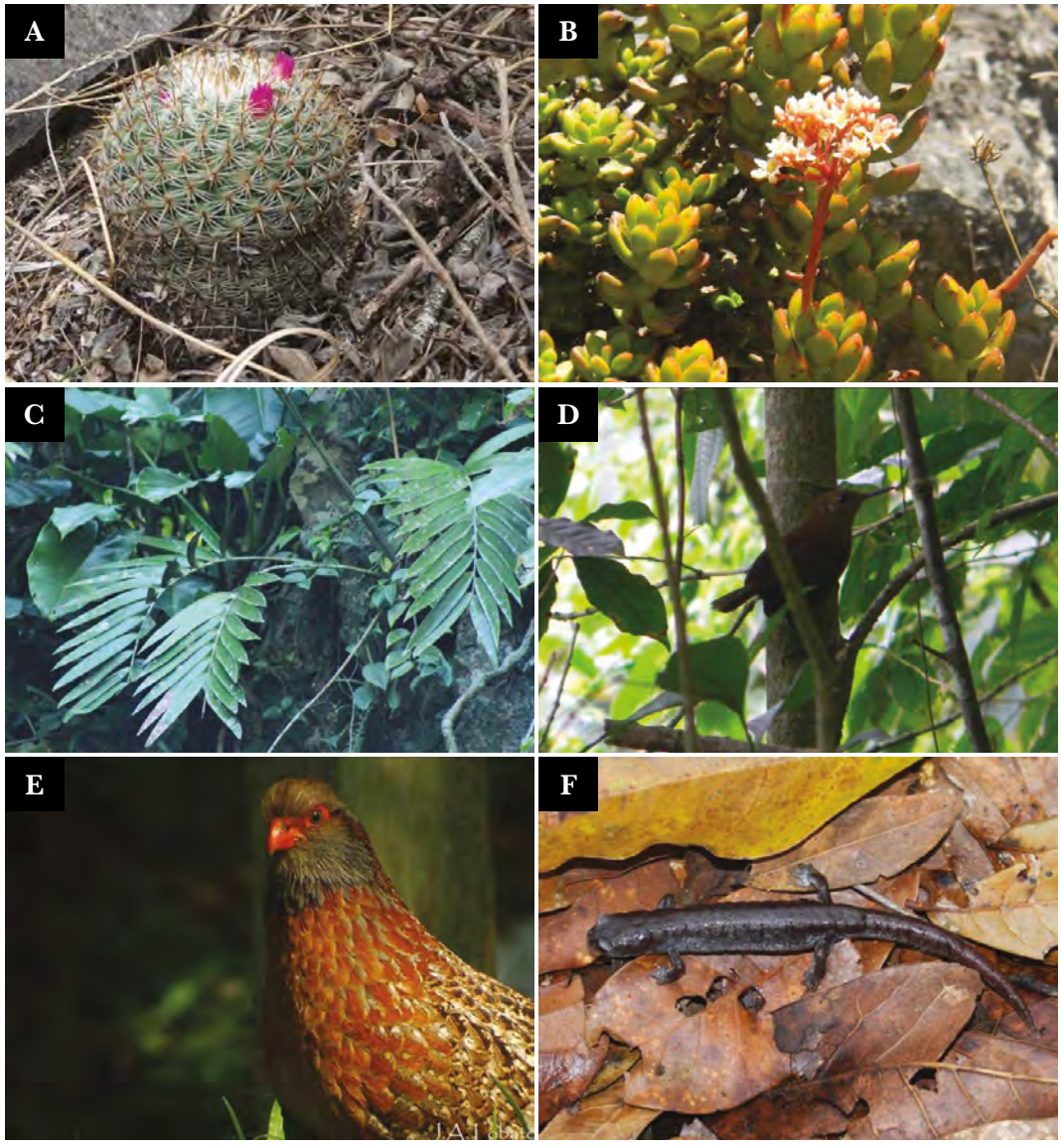

Figure 4. Some species that stand out in the Cañón del Río Blanco NP. A) *Mammillaria haageana* subsp. *acultzingensis*, B) *Sedum lucidum*, C) *Ceratozamia decumbens*, D) *Hylorchilus sumichrasti*, E) *Dendrortyx barbatus*, and F) *Aquiloeurycea cafetalera*. Photographs: A, B, C, and D) by Jaime E. Rivera-Hernández, E) by José Alberto Lobato García, and F) by Sean Michael Rovito (from Naturalista.mx).

Socio-cultural characteristics

The Cañón del Río Blanco NP was one of the first sites included in a PNA decree in Mexico. The PNA includes cities of different size and Orizaba is the most important city in the area. In 2015, Orizaba was added to the Pueblos Mágicos (Magical Towns) Program of the Secretaría de Turismo (SECTUR, 2021). This city is part of an industrial corridor that links several conurbations, including: Río Blanco, Nogales, and Ciudad Mendoza. Additionally, this area includes rural communities, located in municipalities, such as: Acultzingo, Aquila, Camerino Z. Mendoza, Huiloapan de Cuauhtémoc, Ixtaczoquitlán, Nogales, and Soledad Atzompa.

Some nahua communities also live in these municipalities, including: Acultzingo, Soledad Atzompa, and Camerino Z. Mendoza (INPI and INALI, 2020). The Río Blanco city is also located in this area. This city is historically important because it witnessed one of the first worker's uprising that led to the Mexican Revolution. The worker's uprising was carried out in a yarn and fabric factory. Unfortunately, there were many deaths; this episode is known as the Río Blanco rebellion (Sánchez-Hernández, 2010).

Economy Characteristics

Orizaba and its metropolitan area are one of the most important industrial areas in Veracruz. One of the main breweries in Mexico (Cuauhtémoc Moctezuma) is located in this area. In addition, several industries and companies are located throughout the metropolitan area of Orizaba, including several fabric and manufacturing industries of historical importance. Eleven of the localities that make up the conurbation are municipal seats; therefore, this area is the conurbation with the highest number of municipalities of Veracruz (Jiménez-Trejo, 2007).

Environmental Services

The NP provides the following environmental or ecosystem services: capture and filtering of water and control of the hydrological cycles; oxygen generation and assimilation of several pollutants —particularly environmental pollutants produced by the regional industries—; maintenance of the gas quality in the air —which helps to regulate weather—; generation and conservation of fertile soils; shelter for wild animals; and biodiversity conservation. In addition, the NP provides food, raw materials, genetic resources, and medicinal and ornamental plants. It also provides natural spaces with outstanding landscapes for recreation, scientific research, and education.

Work Program

Despite the decrees and preservation aims of the PNA, the area remained abandoned for a long time, until 2004, when the Comisión Nacional de Áreas Naturales Protegidas (CONANP) took charge of the NP. In 2008, it appointed an official manager (rather than an official director) to manage the NP, as well as two other areas: the Pico de Orizaba National Park and the Cofre de Perote National Park. The Cañón del Río Blanco National Park was never managed by an exclusive director or team. In 2018, the park lost its manager and, to this day, the NP remains under the management of the Dirección Regional Planicie Costera y Golfo de México. Finally, in 2022 CONANP has designed an administrator (not director) exclusively to Cañón del Río Blanco National Park, who is in charge of the different social support programs in this PNA.

As many other PNAs, the CONANP management is based on the allocation of projects through subsidy programs; these subsidies are granted specifically by the Programa de Conservación para el Desarrollo Sostenible (PROCODES), which mainly supports the following projects: biodiversity technical studies, communal ecotourism, communal birdwatch, and clean-up of water bodies. A key role of the administration of this NP was to provide technical opinions for more than 74 Environmental Impact Statement

applications, most of which were related to infrastructure construction sites (Raúl Álvarez, personal communication).

Environmental Problems

This region has been inhabited since colonial times. Villa de Córdoba and Villa de Orizaba were founded in 1618 and 1774, respectively. Over time, this area has become an important industrial zone and, therefore, the region has suffered a great environmental degradation, mainly in terms of loss of habitat, air pollution, and riverbed pollution. Based on Rivera-Hernández (2015), the following problems were identified:

a) Agricultural Areas

The main problem in the highlands —located in Acultzingo, Maltrata, and Aquila, in the westernmost side of the PNA— is the change in land use from forest to agricultural. The agricultural area of Puebla ends where the Cañón del Río Blanco starts; in this area, the rough conditions of the soil do not allow the establishment of more crops. However, crops have also been established in the flat areas of the high part of some of the hills of these municipalities. The same situation can be found in the lowlands of Acultzingo and Maltrata, where the agricultural areas spread to all the valleys and reach the skirts of the hills.

Meanwhile, growing coffee is also a widely-spread practice in the region, mainly in the tropical rainforest of Ixtaczoquitlán and, to a lesser degree, in the cloud forests of Orizaba and Huiloapan. In these areas, the natural ecosystems have been replaced by coffee crops and, only in small areas of very wild lands, these natural ecosystems remain as a memory of the vast tropical rainforests that once prevailed in the region. Coffee crops have practically replaced the shrub layer, both of the tropical rainforest and the cloud forest, extinguishing an outstanding number of plant species. Nevertheless, several studies (Manson *et al*., 2008; López, 2004) prove that coffee is one of the less harmful crops to biodiversity and that it even works as biodiversity reservoirs (Macip and Casas, 2008).

Finally, sugarcane (*Saccharum officinarum* L.) is the most spread crop in the lowest lands of the National Park, followed by chayote (*Sechium edule* (Jacq.) Sw.). Unlike coffee plantations, these two crops completely modify the ecosystems, reducing the quality of the soil; additionally, they do not promote biodiversity. Fortunately, these crops are only established in the lowest and flattest parts of the NP and, therefore, they do not impact the hillsides. However, maize and coffee are also established on the hillsides. Consequently, the tropical rainforest is one of the most fragmented and threatened ecosystems of the National Park (Figure 5).

b) Illegal Human Settlements

These settlements are considered one of the main problems faced by the National Park. To date, several ecosystems adjacent to the urban sprawl have been impacted by illegal settlers, mainly in the Río Blanco, Huiloapan, Nogales, and Ciudad Mendoza areas, as well as in the Acultzingo and Maltrata municipalities. They remove the primary vegetation to increase the urban sprawl (Figure 6A).

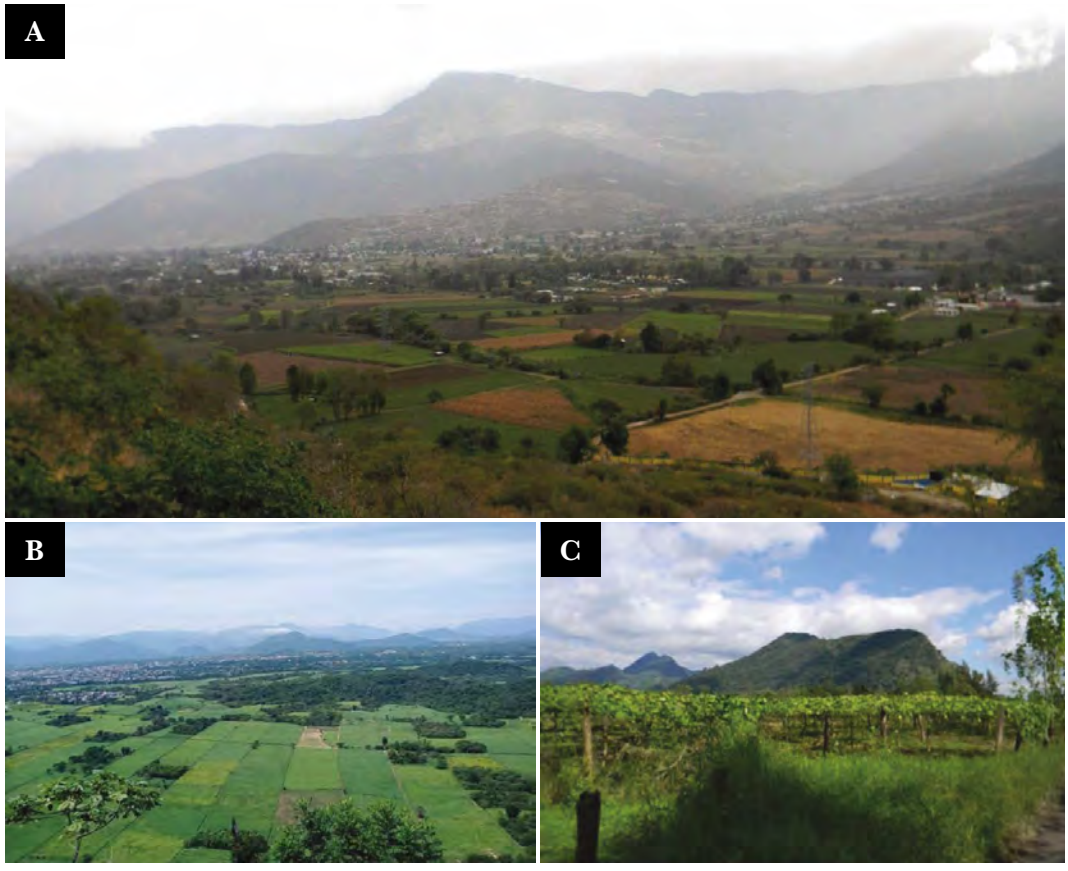

Figure 5. Crops grown in the Cañón del Río Blanco National Park. A) Crops in the lowlands of Acultzingo, B) Sugarcane plantations in lowlands of NP, and C) Chayote in the Tuxpanguillo area. Photographs: A) and C) by Jaime E. Rivera Hdez. and B) by Raúl Pablo García Sánchez.

c) Air Pollution

The problem is mainly focused in the metropolitan industrial area of Ixtaczoquitlán-Ciudad Mendoza, where a high number of factories —such as the Kimberly-Clack paper mill, the Sabritas fried potato manufacturer, the Proquina pharma, the Cuauhtémoc-Moctezuma brewery, and the yarn and fabric manufacturer Coats, among others— are established. These industries produce diverse air and water pollutants, as well as high volume of solid waste (Figure 6B).

d) Quarries or rock extraction banks

At least four opencast mines are destroying the biodiversity habitat in the Orizaba-Ixtaczoquitlán area. The largest is located in Ixtaczoquitlán, in the Buenavista hill, and it belongs to the Holcim-Apasco multinational. This is the only multinational that has an environmental restoration program, working together with the Instituto de Ecología, A.C. of Xalapa, Veracruz. The other three mines are located as follows: the first one is located in the Escamela hill, Orizaba; the second, in the San Cristóbal hill, in Huiloapan; and the third, also in the San Cristóbal hill, but it belongs to the Rafael Delgado municipality. The last one is located outside the traversing of the NP, but adjacent to it. These mines pose a

real problem to the biodiversity conservation and to the existence of the NP as a whole, because, day by day, they destroy the local hills, reducing the fragile habitat of the cloud forest ecosystem (Figure 6C).

e) Water Bodies Pollution

Most of water bodies of the NP are polluted: domestic wastewater and industrial liquid waste alike are poured into them. The crops established in the whole region are another important source of pollution: both weed-killers and chemical fertilizers are dragged by rainfalls and end up in the rivers. In addition, solid waste (garbage) pollutes the river when it flows by human settlements. The Río Blanco originates in Acultzingo and it is polluted throughout its course. Once the river reaches the lowest parts of the NP, it is polluted to such a degree that the pollution can be perceived by the color and odor. This river flows into the Laguna Alvarado and, then, into the Gulf of Mexico; its pollution impacts the Parque Nacional Sistema Arrecifal Veracruzano. This situation has a highly negative impact on the oceans (Figure 6D and 6E).

f) Charcoal Production

This is a low-scale activity that, nevertheless, is constantly carried out in the holm-oak wood near Ciudad Mendoza (Figure 6F). This situation has had a negative impact on these ecosystems of the PNA, because the number of oaks is constantly being reduced.

g) Goat Grazing

Billy goat grazing is a common practice in Maltrata and Acultzingo and it has a direct impact on the local xerophitic scrub (Figure 7A).

h) Poaching

Despite the existing legislation, poaching is a common practice in the whole NP and adjacent areas. Different ejidos and groups have expressed their worries and disagreements about external people (sport hunters) who hunt in their territories without asking for their permit. Additionally, some landowners also engage in poaching and members of the local communities allow hunters to enter the area (Figure 7B).

i) Forest Fires

This type of accidents takes place during the dry season, mainly in the dry oaks zone of Ciudad Mendoza (Figure 7C).

j) Introduction of exotic species

This is a common problem througout Mexico, mainly in the areas adjacent to human settlements. Many inappropriate reforestation and restoration activities are carried out. Non-native species are used for this purpose, including: jacaranda (*Jacaranda mimosifolia* D. Don), African tulip tree (*Spathodea campanulata* P. Beauv.), Chinese privet (*Ligustrum lucidum* W.T. Aiton), and southern silky oak (*Grevillea robusta* A. Cunn. ex R. Br.). In addition, Maltrata has commercial *Cupressus* spp. and *Pinus* spp. plantations. Finally,

Figure 6. Canón del Río Blanco NP problems. A) Illegal human settlements, B) Air pollution, C) Quarries or rock extraction banks, D) Wastewater discharge in the Río Blanco, E) Water pollution of the Río Blanco as a result of solid waste, and F) Charcoal production. Photographs: A, B, C, D, and E) by Jaime E. Rivera Hdez and F) by Oscar Cid Mora.

domestic cats pose a threat to local fauna, including several birds, reptiles, and wild mammals (Figure 7D).

Problem of the Category

The National Park category was the first category used in Mexico and, therefore, it is also one of the most limiting categories regarding the use and exploitation of natural resources in the PNA. Originally, its only aim was biodiversity conservation and, consequently, the National Park category does not allow any sustainable exploitation, just research activities.

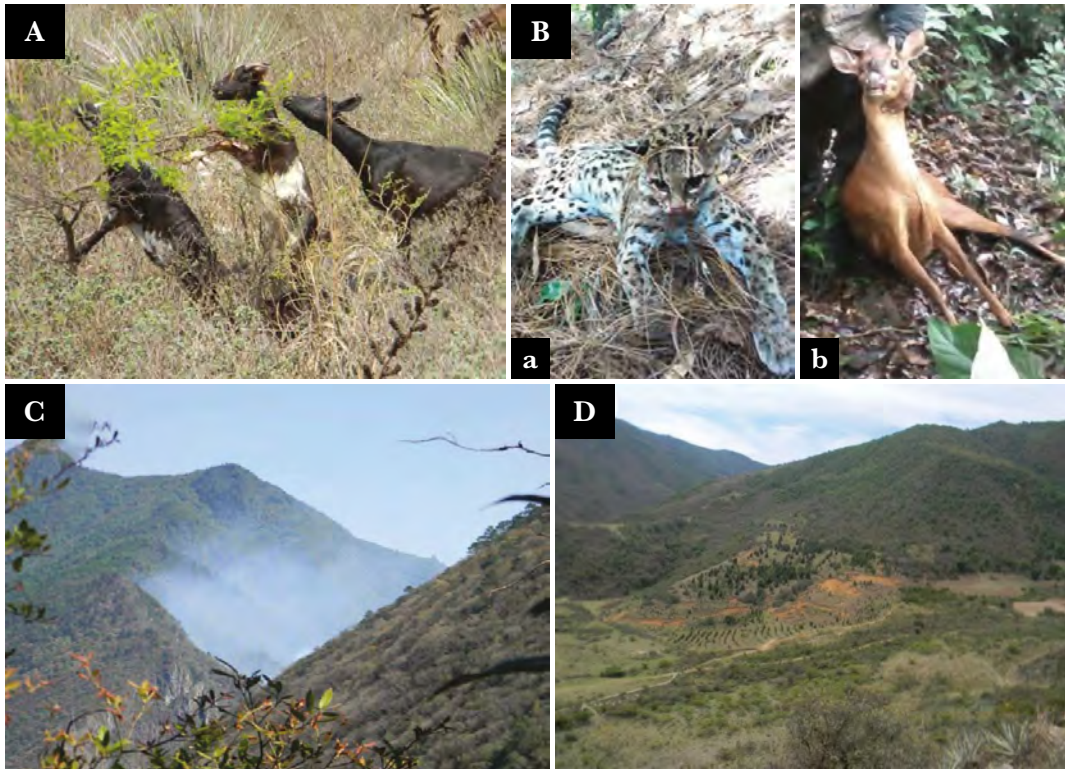

Figure 7. Cañón del Río Blanco NP Problems (cont.). A) Goat grazing, B) Poaching (a) margay (*Leopardus wiedii*) and (b) Central American red brocket (*Mazama temama*), C) Forest fire in the NP, D) *Cupressus* spp. and *Pinus* spp. commercial plantations. Photographs A, C, and D) by Jaime E. Rivera Hdez. and B) by Oscar Cid Mora.

In this context, it is obvious that placing the Cañón del Río Blanco under this category was a mistake from the beginning, because it included several cities. Currently, dealing with all the violations against the natural resources of this PNA is a very difficult task, because even agriculture should be prohibited in this area. Additionally, the authorities cannot authorize sustainable exploitation projects in this NP, because they would violate the protection decree.

Therefore, CONANP is currently analyzing the modernization of the decree of this NP. The proposal includes a change of category to an Área de Protección de Recursos Naturales, taking into account that the main reason behind its establishment was to secure water supply and environmental services in the Córdoba-Orizaba area. This objective should have been achieved through the restoration of the forests; already in 1930, the region was highly deforested. In addition, the main urban areas of the NP would be excluded from this decree.

The proposed Área de Protección de Recursos Naturales category would establish the respect for the forestry calling and promote the restoration of the biodiversity of the forest and the expansion of the forest limits. It would open and promote models for the sustainable exploitation of the natural resources and would support sustainable agricultural production processes that are appropriate for the PNA.

The legislation also allows the establishment of a restoration sub-area within the zoning, in those areas where the natural resources have been seriously altered or modified, establishing especial programs for their ecological restoration. Likewise, areas that include representative ecosystems of the PNA can be established, as a result of their conservation interest, excluding them from any type of exploitation.

CONCLUSIONS

The area still shelters an important biodiversity and also performs vital environmental services —such as oxygen supply, carbon capture, and biodiversity conservation, among others. In addition, humans can still enjoy its outstanding landscapes (Figure 8).

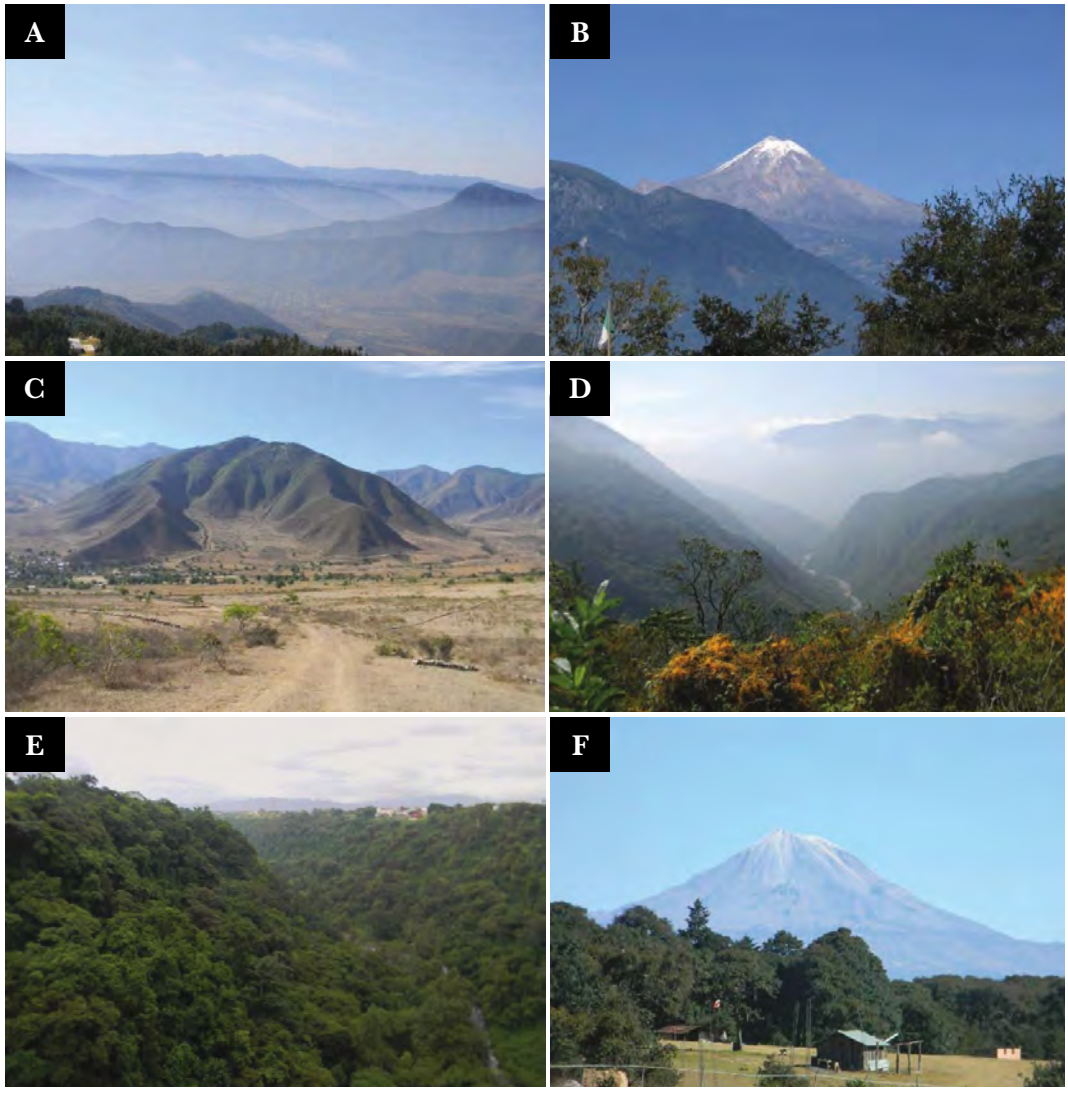

Figure 8. Some landscapes of the Cañón del Río Blanco NP. A) View of the mountains from the heights of the municipality of Nogales, B) View of the Citlaltépetl Volcano or Pico de Orizaba from the Escamela hill in the municipality of Orizaba, C) Hill in the municipality of Acultzingo, D) Carbonera Canyon, E) Metlac Ravine, in the municipalities of Fortín and Ixtaczoquitlán, and F) View of the Citlaltépetl volcano from the municipality of Nogales. Photographs by Jaime E. Rivera Hernández.

A deep analysis of the current situation of this NP must be carried out, in order to provide the NP with the appropriate category, taking into consideration the reshaping of the polygon. This measure would allow it to function as a protected natural area enabling the implementation of the appropriate regulation. In addition, the support aimed to the development of projects for the conservation and sustainable exploitation of the natural resources by the rural communities in the PNA should be arranged. Finally, CONANP must promptly appoint a new administration or person in charge of this National Park, who can reliably face the problems discussed in this study and can materialize the modernization of the decree, allowing this PNA to comply with the objectives for which it was created.

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