

Venezuela: Mochima National Park

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Location: States of Anzoátegui and Sucre

Year created: 1973

Area: 94,935 ha

Ecoregion: Venezuelan coastal mangroves, La Costa xeric scrublands, Araya and Paria xeric scrublands, Cordillera de la Costa montane forest.

Habitat: Coral reefs, coastal mangroves, littoral grassland, tropical dry forests, wet montane forests, and cloud forests.



Summary

Description

Mochima National Park is located in the States of Anzoátegui and Sucre, on the northeastern coast of Venezuela. The park is made up of an exclusively marine area in its western sector (Anzoátegui State), a coastal marine area that includes the Gulf of Santa Fé and Mochima Bay, and a mountainous area that covers the Turimiquire Dam watershed (Sucre State). Mochima Park was created to protect the montane forests of the Turimiquire Range and the country's eastern coastal marine landscapes, which are exceptionally beautiful. However, it is one of the most threatened parks in Venezuela. Most of its threats stem from the fact that when the park was created, many human settlements were included in it and The National Parks Institute (INPARQUES) has not known how to manage this situation in the past. Even though educational policies have improved community relations, INPARQUES is still weak in terms of management and administration.

Biodiversity

Mochima offers great habitat diversity, ranging from small coral reefs, mangrove forests, and xerophytic shrubs in the coastal marine zone to wet forests in the Turimiquire Massif, where a large percentage of endemic flora can be found. The park has 78 mammal species and about 28 reptile species, including four species of endangered sea turtles. There is no bird checklist for Mochima, but 150 species have been found near the Turimiquire Dam in the south of the park, an area of high bird endemism.

Threats

A large number of problems threaten Mochima National Park, the most important of which are: confrontation with communities, town growth, wildlife commerce, non-metallic mineral extraction, domestic animal presence, lack of awareness of the State about the marine area, and highway construction inside the park. For these reasons the park has been classified as [Critically Threatened](#).

Description

Physical Description

Mochima National Park is located in the States of Anzoátegui and Sucre in northeastern Venezuela, between 10°09' and 10°26' North Latitude and 64°13' and 64°47' West Longitude. The Park rises from sea level to 1,150 meters at the Cerro de la Virgen, Turimiquire Massif. The park has three very distinct geographic zones: the West or Marine Zone, the East or Coastal Marine Zone, and the Continental or Mountainous Zone.

The West Zone is made up exclusively of marine areas extending 100 m from the coastline starting in Barcelona Morro, running through Pozuelos Bay, the ports of Guanta and Pertigalete, and Arapo Bay up to the Gulf of Santa Fé. It also includes the Borrachas and Chimanas Islands and a large number of islets that are frequently visited by tourists from Barcelona, Puerto La Cruz and Guanta (main settlements and industrial areas in the region).

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The East Zone includes marine areas and the coastline from the Gulf of Santa Fé to Manare Peninsula and Mochima Bay, and up to the west end of the park. The only road between the cities of Puerto La Cruz and Cumaná (Sucre State) crosses the park in this zone. The beautiful Mochima Bay beaches (visited by many tourists) and towns created along the roadway are noteworthy. Littoral grasslands and dry forests are dominant with numerous mangrove patches along the coast. Small coral reefs are also found.

The Continental Zone includes the northern mountainous area of the Western Mountain Range and contains a large part of the Neverí River watershed. The southern limit of this watershed and of the Turimiquire Dam are in the southeastern area of the park. Wet montane forests and cloud forests in the higher regions dominate this zone. Forests are secondary or have suffered intervention from agricultural practices due to their proximity to towns. The roadway that goes to Cumaná separates the coastal marine and mountainous zones.



Mochima National Park Map

Mochima National Park is located to the north of the Turimiquire Massif in the Eastern Mountain Range and is characterized by very steep terrain and closed valleys (PDVSA 1992, Técnica Ambiental 2002). The park is made up of mainly Mesozoic and Cenozoic sedimentary rocks, in the form of sandstone, limestone, and lute (Sánchez and González 2002). Emergent limestone is found toward the coast, a characteristic of coasts created by immersion (Técnica Ambiental 2002). The milky blue color of Mochima Bay waters is probably due to dilution of minerals from these outcrops (pers. obs.).



Mochima National Park satellite image (PDVSA 1992).

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Towards the coastal zone, the park's average annual temperature is 26.6 °C (24.8 °C to 27.5 °C). Average annual rainfall is 250 mm on the islands, 500 mm on the coast and over 2,000 mm in the mountain areas of the park. The rainy season lasts from July to October, with rainfall concentrated in August, but with concentrated rainfall sometimes lasting until October in the park's highlands.

Biodiversity

Because of Mochima's different environments, a high level of biodiversity is found in the park. However, studies concerning this biodiversity have not always been rigorous. The continental zone in the Turimiquire Massif is probably the most diverse in plant species, though it is the least well known. Similarly this is an area of high endemism, 18% of reported plant species are endemic to the region and many new species have been described from samples taken there (Bevilacqua 1990). The fact that many species' names make reference to the region is evidence of this: *Cynanchum sucrensis*, *Carex turimiquensis*, *Hypericum caracasenum turimiquensis*, *Sloanea anzoateguiensis* and *Stelaria turimiquensis*, among others. The Turimiquire Massif shares biogeographic affinity with the floristic province of Guayana and the Amazon (Bevilacqua 1990).

There are important mangrove forests on the coast. In the Bodega Lagoon there is a mangrove and palm mosaic where the Moriche Palm (*Mauritia flexuosa*) is found, its northernmost site in America. Some publications mention 14 equinoderm species that include sea spiders (ophiuroida), sea cucumbers (holothuroidea), sea urchins and starfish (equinoidea).

In Mochima 78 species of mammals from 29 families have been identified, this represents 25% of Venezuelan mammals (Bevilacqua 1990). More than 60% of these species are found in the continental zone forests of the park. There are also many cetaceans that may be present or have been reported near the park including the rough-toothed dolphin (*Steno bredanensis*), the common dolphin (*Delphinus delphis*), the Atlantic spotted dolphin (*Stenella frontalis*), the spinner dolphin (*Stenella longirostris*), the bottle-nosed dolphin (*Tursiops truncatus*), and Bryde's whale (*Balaenoptera edeni*) (Acevedo 2001).

In the park, 28 species of reptiles have been catalogued among which are four species of endangered sea turtles: the green turtle (*Chelonia mydas*), the loggerhead turtle (*Caretta caretta*), the leatherback turtle (*Dermochelys coriacea*), and the hawksbill turtle (*Eretmochelys imbricata*). According to the IUCN, the first two are globally threatened (EN A1abd) and the latter two are critical danger of extinction (CR A1abd, CR A1abd+2bcd). About 15 snake species can be found and several lizard species. The frog *Eleutherodactylus turimiquensis* is endemic to the mountainous region. A checklist of the bird species that inhabit the park does not exist, however there are many sea birds like the red-billed tropicbird (*Phaethon aethereus*) and the brown booby (*Sula leucogaster*), whose ranges are reportedly restricted to the Caribbean Islands. Other species like *Basileuterus griseiceps*, *Diglossa venezuelensis*, and *Premnoplex tatei*, which are endemic to Venezuela and globally threatened, have been seen in the Turimiquire Protector Zone, south of Mochima National Park (Wege and Long 1995). The park is probably also inhabited by populations of these species. It is worth noting that the Turimiquire Massif along with Paria Peninsula and Trinidad Island are important sites for South American bird endemism (Cracraft 1985). It is also considered to be an area of ancestral distribution for the red siskin (*Carduellis cucullata*), currently in critical danger of extinction (Rodríguez and Rojas-Suárez 1999). A recent study (Sánchez and González 2002) found 150 bird species around the Turimiquire Dam; 10 of them are endemic subspecies. Out of these species, some like *Phaetornis guy guy*, *Pyrrhura leucotis auricularis*, and *Thalurania furcata refulgens* have been included in CITES Appendix II. Bird monitoring must be increased in the rest of the park in order to determine the total number of species.

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Mochima is famous for its beautiful beaches, though less known for its mountainous zone, which is also of great scenic and ecologic value.

Management

INPARQUES is in charge of park management and administration.

Since 1991 this national park has had a Use and Management Plan that was revised and corrected in 1993. The plan outlines the following nine management zones:

- **Integral Protection Zone:** Access is restricted, only INPARQUES supervised monitoring and investigation is allowed. Included are La Peña, Morro Blanco and immediate marine areas, Bodega Lagoon and nearby mangrove and "morichales," coral reef communities and ocean bottom, a 500m strip beginning in the mangrove formation along the coastline and ending in the Colorado River high watershed.
- **Primitive or Wild Zone:** North or coastal: All emergent landmasses that make up the insular system, except Arapo and the continental sector north of the roadway. South or continental: All land located south of the Puerto La Cruz-Cumaná roadway and those between the recovery zone and the park's southeast edge. Primitive Marine: 200m wide strip of water surrounding all islands in the park, and the internal area of Santa Fé.
- **Managed Natural Environment Zone:** Park's marine sector.
- **Natural Recovery Zone:** Made up of sectors that were affected by human activities before the area was declared a national park and are in need of restoration. In Mochima this includes the continental sector of the park between the roadway, the south or continental primitive zone, and the national park limits. The emergent landmasses of Arapo Island and a 600m wide strip of ocean water are also included.
- **Recreation Zone:** Includes the beaches of Vallecito, El Tamarindo, La Estebita, Esteban Grande, and Majagual.
- **Service Zone:** Zone for INPARQUES' installations in the Town of Mochima, Yaguaracual and Nurucual special use zones, and the San Pedrito, Barbacoa and Guaranache buffer zones.
- **Special Use Zone:** Sectors of the park that are most affected by human activities. The Nurucual and Yaguaracual communities, the Trunk 9 Limonal-Quebrada Cambural strip, the Trunk roadway 9 Yaguaracual-Bella Vista-Barbacoa strip, Arrojata Hill, electric line 1 and 11, the large ship navigation channel, drag fishing navigation channel and Pozuelo Bay.
- **Settlers Use Zone:** Town of Mochima and nearby non-flooding areas; towns of Petare and La Morena.
- **Buffer Zone:** Includes the towns of San Pedrito, Barbacoa, and Guaranache and their surroundings with the objective of buffering human activities in sectors adjacent to the park.

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Three recreational zones in different sectors of the park: Majagual is a privately owned residence where a tourist club also operates; Mochima Bay and El Mono Island in the west sector.

The code of use normalizes park access, ship navigation, tourist and recreational activities, research, and traditional fishing in the park. Access by drag fishing boats is allowed within certain limits, but acceptable fishing methods and extractable species are clearly outlined.

The personnel that work in the park include 20 park guards in charge of monitoring (seven in the west sector, six in the east marine sector, and seven in the east continental sector), three people for administration and management, and five technicians in charge of environmental education and supervision. The director of environmental education coordinates several young park guard volunteer brigades, a recent initiative with children between the ages of 7 and 15 from 16 schools inside and around the park. Unlike the young park guard program in Tacarigua Lagoon, (see [Tacarigua Lagoon National Park Profile](#)), these children do not participate in daily monitoring activities; their participation is limited to special events and educational activities at school.

Since 1998, the park's administrative center is located in the town of Mochima in a two story building with sleeping quarters, a library, an information center and several offices. Aside from this building and one park guard post in Borracha Island, there are no other posts in the entire park.

All park guards have radios. The number of vehicles is insufficient: four four-wheel drive vehicles are administered by the Sucre-Anzoátegui Regional Office for Mochima and two other nearby parks. Three of these vehicles do not work. They also have four boats, but only one works.

The park is managed with a budget of 49,000,000 Bs. (US\$ 35,000) not including personnel salaries. This year however they still have not received the designated budget from the central administration.

In order to guard the marine zone towards the east of the park, an important alliance has developed between the National Guard's Coastguard Division and the Oil Company Petrolera Ameriven, which donated a patrol boat dedicated

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to environmental monitoring exclusively.

Human Influence

Mochima National Park is located between the two centers of urban, industrial, fishery, and tourist development in eastern Venezuela: the cities of Cumaná (212,432 inhabitants) in the State of Sucre, and Barcelona (222,000 inhabitants) and Puerto La Cruz (70,000 inhabitants) in the State of Anzoátegui. After oil related activities started in Anzoátegui and Monagas, this region saw the most urban and industrial growth (Técnica Ambiental 2002). An important part of the only roadway that connects the central and eastern regions of the country goes through the park's continental zone. A presidential decree, consistent with regional development plans, has existed since 1976 to convert this roadway into a modern highway (V Plan de La Nación 1976).

Puerto La Cruz city and the industrial complexes of Pertigalete and Guanta (17,000 inhabitants) discharge their wastewater in the marine area located east of the park. After the 1980's there was a great increase in tourism and recreational development and a great number of hotels and urban complexes were built. A cement factory and an oil tanker port in Pertigalete and a ferry port (destined for Margarita Island) in Puerto La Cruz, create intense large boat traffic in the park's marine zone waters.

Park inhabitants

There were many towns and small settlements inside the park when it was created, however none of these were relocated nor were inhabitants paid for their properties. The restrictive policies of INPARQUES and the organizations that managed the park before 1978 (the year INPARQUES was created) generated serious conflicts between park inhabitants and authorities. These conflicts were especially severe in the town of Mochima (that is located on the edge of Mochima Bay and where fishing and tourism are the main economic activities). It is worth noting that only in the last four years was INPARQUES able to locate its office inside Mochima Town. From the park guard's point of view, relations with the community have improved substantially after the campaign started by INPARQUES as part of the World Bank funded project.



Mochima Town is a typical Venezuelan coastal town included as a traditional settlement in the ordinance plan. San Pedrito is found in one of the many special use zones that contain towns and settlements inside the park.

In addition to Mochima Town (451 inhabitants), there are other towns inside the park. Among them are Yaguaracual (351 inhabitants), Nurucual, El Tacal (4,242 inhabitants), El Baral (9,175 inhabitants), San Esteban and Los Totumos. In fact, a great part of the 10,166 inhabitants of Santa Fé Parish occupy land inside park limits (Técnica Ambiental 2002). According to a recent report, the park contains approximately 25,000 inhabitants (Parilly 2000).

Industries

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Close to the marine zone west of the park, there are many companies located in the Guanta-Pertigalete industrial complex. A cement factory and a port are probably two of the largest, though there are also tuna fishing industries. Even though the latter work outside the park's marine limits, they enter illegally on occasion. Wastewater from these industries and cities is generally dumped untreated into the park's marine zone.



From Pozuelo Bay you can see the Pertigalete cement factory's installations.

Tourism

Mochima has great attractions for tourism. There are calm, clear water beaches that are ideal for swimming along the park's entire coast. There are also a number of islands and reefs off the coast that are excellent places to fish and scuba dive. Every weekend thousands of people visit the beaches. Most of these people come from nearby cities: Cumaná, Puerto La Cruz, and Barcelona. On school breaks, however, tourists from Caracas, other parts of the country and even foreigners visit these beaches. All beaches are in recreational zones accessible from Mochima Town (the beaches of Maritas, Blanca, Gabarra, Manare, Cautaro, Cautarito, Taguaramo and La Canoa), Santa Fé Town (Cochaima Beach, Arapo Island, Caracas Islands, La Piscina), Puerto La Cruz (El Saco, Puinare, El Faro and Arapo), and Guanta Port (Isla de Plata, Monos Island, Arapo, among others). The price for the boat trip varies but it is on average 20,000 Bs (US \$ 15). All towns in the area have restaurants and hotels, and it is also possible to campout on the beaches. Even though the beaches are very calm during the week, they turn into noisy tourist sites on the weekends. There are no official records, but probably over 500,000 people visit the park every year which generate over seven million dollars of income per year for the region.



The number of tourists that visit park beaches is very high, however they leave no economic benefit to solve the problems caused.

There is a certain degree of informal tourism in the continental zone. The waterfall at San Pedro is a mayor attraction for local and foreign visitors. However neither the national park nor INPARQUES receive direct economic benefit from tourism in any case.

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The park has a large formal and informal beach tourism industry that leaves no benefit for the park. This is the result of poor planning by INPARQUES and regional governments.

Conservation and Research

A great number of marine biology and ecology studies have been carried out in Mochima, most of them done by researchers from the Universidad de Oriente which has its main campus in Cumaná. Carlsen (1999) gathered information about 115 studies on areas like marine ecology, zoo- and phyto- plankton inventories, fish inventories, and continental zone floral inventories. In the park, very little is done in other research areas although a fauna inventory of the Turimiquire mountainous zone was recently completed.

World Beach Day was being celebrated during our visit. In Venezuela, Fudena (Fundación para la Defensa de la Naturaleza) coordinates this activity and in Mochima, support is given by many companies from the State of Anzoátegui (Petróleos de Venezuela (PDVSA), Petrolera Ameriven, (CEMEX), Guanta's local government, and the Paseo Colón Boaters Association, among others.

Together with INPARQUES, Petrolera Ameriven promotes a project aimed towards solving educational and employment problems in the region. From 2003 on, Ameriven will finance the creation of youth brigades and the creation of a plant nursery in the schools inside the park. It will also finance the creation of a carpentry shop to make the park's signs and generate jobs for park inhabitants.



Clean-up activities during "World Beach Day".

Threats

Many problems threaten Mochima National Park's biodiversity. The level and severity of these threats has surpassed management levels and in some cases has attained extreme levels. This is why the park is considered to be Critically Threatened. The worst threats in historical order are:

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- Confrontations with the communities
- Uncontrolled urbanization
- Low levels of environmental awareness
- Pollution
- Illegal hunting, fishing, and agriculture
- Mineral resource extraction
- Lack of infrastructure and equipment
- Tourism
- Lack of park awareness
- Forest fires
- Highway construction

Current Threats

Community confrontations

The oldest problem and probably the cause of many other threats in Mochima involves confrontations with the communities. When the park was created many towns and settlements were included in it. They were never relocated and an adequate management plan was not designed. In the absence of a legal instrument that would allow regulation and alternative economic development, park administrators opted for a repressive strategy, revoking land use and construction or household modification rights. This situation made inhabitants feel the existence of a park was more a burden than a benefit to them. Consequently, as time went by it has become more difficult to implement rules and regulation on inhabitant activities. They see in INPARQUES an external agent who imposes restrictions over their rights. In fact, INPARQUES does not represent an authority to the people of these towns, especially in Mochima Town. INPARQUES was not able to build its office in Mochima until four years ago because personnel had been the victims of aggression on several occasions. In the opinion of some interviewed boaters, "INPARQUES only represents a bother for them, it does not help in emergency situations and it demands certain regulations in their own town." Another example of the lack of authority is manifest in the bay beaches tourist installation management. These were built by the townspeople and they pay a concession fee to the town's Neighborhood Association.

Uncontrolled urbanization

Mochima is located between the two centers of industrial and tourist development of the country's eastern region. This promotes uncontrolled population growth that is easier still because of the lack of regulation. The State of Sucre is one of the most economically depressed in the country (Técnica Ambiental 2002); this motivates settlers from outside of the park to move their households toward areas with more tourism and commercial activity. Mochima's management plan was finished 18 years after the park was created, when rampant growth had already destroyed many natural areas and had caused serious impacts on the landscape and natural resources.



Irregular settlement expansion has caused damage to the park's natural and scenic resources.

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Pollution

In addition to the antagonism between park inhabitants and authorities, the low level of environmental awareness of many of the towns and visitors is relevant. In Plan de la Mesa settlement there is no solid waste management, inhabitants dump waste near the town causing sanitation and health problems. There are few places for waste disposal in and around the park, with the noteworthy exception of Mochima Bay and some west sector beaches. During the beach clean-up activities carried out on World Beach Day, ParksWatch corroborated the extraction of over a ton of waste that included mostly glass, wood and plastic.

The city of Puerto La Cruz and the industrial zones of Guanta and Pertigalete dump their untreated wastewater into the park. Pozuelos Bay has a large amount of dissolved hydrocarbons due to the immense volume of boat traffic in the zone. Most of the traffic is made up of oil tankers that transport hydrocarbons to Bergatín Bay, but also occurs inside the park, where an important oil terminal is located. A worker who prefers to remain unidentified told us that sometimes these tankers have had small spills that go unnoticed. Previous studies have condemned the recreational use of Barcelona Bay for similar reasons (Halcrow 1993). Recent data made available by the Water Quality Department of the Environmental Ministry (2001) indicate that many beaches in the western zone of the park are highly contaminated because they registered fecal bacteria densities above legally permissible limits. Water analysis from Mochima Bay and the Gulf of Santa Fé beaches did not show signs of contamination, even at the most visited sites. An exception was the mouth of the Nurucual River, where car and truck washing and maintenance by passing truck drivers is common.

Illegal hunting, fishing and agriculture

Toward the continental zone where vigilance is less frequent, there are a number of settlements and large towns. Many of these inhabitants hunt indiscriminately for subsistence or commercial purposes. Even though there are no official records in the park, a recent study in the Turimiquire Dam area (González-Fernández 2002) determined that the main game for inhabitants include the collared peccary (*Tayassu tajacu*), paca (*Agouti paca*), rufus-vented chachalaca (*Ortalis ruficauda*), agouti (*Dasyprocta leporina*), crested guan (*Penelope purpurascens*), and the red-brocket and white-tailed deer (*Mazama americana*, *Odocoileus virginianus*).

The study reported 42 species frequently hunted in the Turimiquire Dam surroundings, 17 of which are used for food (mammals and large birds), two species (ocelot and puma) are hunted for illegal sport and the remaining 23 are bird species (psittacids and passeriforms) whose use was reported as "customary" (pets), which could also cover commercial use through sale (González-Fernández 2002). Studies to determine wildlife use in the rest of the park are necessary. The mountainous zone is good for agriculture because of its favorable climate and the quality of its soils. From the roadway that leads to the dam, there are many shifting plantations that break up the mountain forests. The zone's main crops are yucca, okume, and yam; these are sold every Saturday in a free market near the dam. INPARQUES has no control over farmers, even though they generate problems such as deforestation and forest fires.



Uncontrolled farming activities generate problems such as deforestation and forest fires.

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With regard to fishing activities, there is a high level of traditional fishing. Its impact on the resource is unknown because there are no recent fishery evaluations. Likewise, there is a certain level of illegal drag fishing around Borracha Island in the park's western zone.

Mineral resource extraction

Along the roadway to Cumaná, inhabitants sell pieces of rock in slab or tile shape that are illegally extracted from the park. Rock slabs are in high demand for house construction and decoration throughout Venezuela; their price varies between 3,500 and 10,000 Bs. (US \$2 to 6) per square meter. Tiles are obtained by chiseling sandstone and limestone formations that emerge all around the park, deforming the landscape and increasing erosion and the risk of landslides. Extraction and commercial sale of slabs is a relatively recent activity. The inhabitants of towns that extract slabs used to dedicate themselves to the production and sale of handicrafts, an activity that has decreased a great deal in the area.



The selling of slabs used for decoration is considered a serious threat because of potential landscape alteration and increased erosion.

Lack of infrastructure and equipment

Aside from the superintendent's building in Mochima Town, there is only one park guard post in the entire national park. In the large continental zone we did not observe park guard posts, and signs were insufficient, except on the road that leads down to Mochima Town. Similarly, the park does not have enough vehicles or boats in working order. The lack of infrastructure and equipment hinders vigilance and facilitates violations of the code of use.

Tourism

The influx of tourism to Mochima and the surrounding beaches is extremely high and completely out of control. There is no record of the number of people who visit these beaches. However, with data supplied by the Mochima Boaters Association, ParksWatch-Venezuela estimated 30,000 people visited Mochima Bay during the 2002 Easter Break. This would imply over 300,000 people visit this park annually, if the tendency observed in other parks is the same as for Mochima. Income from transport services, not considering room and board, could be over US\$ 600,000 a year in Mochima Town alone. More precise estimations for the rest of the park's recreational zones should be made. Many of the beaches in Mochima Bay have recreational infrastructure: bathrooms, campsites, restaurants; these sites are administered by the townspeople who pay a concession fee to the Mochima Neighbors Association.

There are many ways to access the western beaches, none of which have vigilance or appropriate monitoring by park guards. This makes it difficult to avoid code of use violations, which are frequent due to the fact that visitors ignore the national park's value and in some cases even its existence. There are no records or control of tourist activities. Currently recreational areas could surpass the maximum density allowed in the code of use. The solid waste contamination in some beaches is extremely high. With the current situation, neither the national park nor INPARQUES as an institution benefit from tourist activities.

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Lack of park awareness

Regardless of the large number of tourists that visit the park's recreation zones, very few associate the beaches with the national park. Most tourists think Mochima is simply a coastal town and a public seaside resort. Few people recognize it is inside a national park and nobody associates it with the Turimiquire mountainous zone. A detailed study of visitor profiles determined they are generally misinformed, as are the inhabitants, about the national park, its ecological value, and its importance as a legal entity (Parilly 2000). The image of tourist destination has supplanted the image of national park because adequate informational and educational policies are lacking and because of the high degree of human intervention along the roadway. The amount of visual pollution along the roadway reduces the effect of INPARQUES' signs and the sensation of being in a protected natural area.

Forest Fires

Forest fires are relatively frequent in the continental zone. During the 2001-2002 fire season approximately 556 ha were destroyed by 108 fires, 44 of which were stopped before they caused significant damage. Most of the fires are caused by agricultural activities inside the park or by hunters. The park does not have all the necessary equipment to fight them.

Future Threats

Highway construction

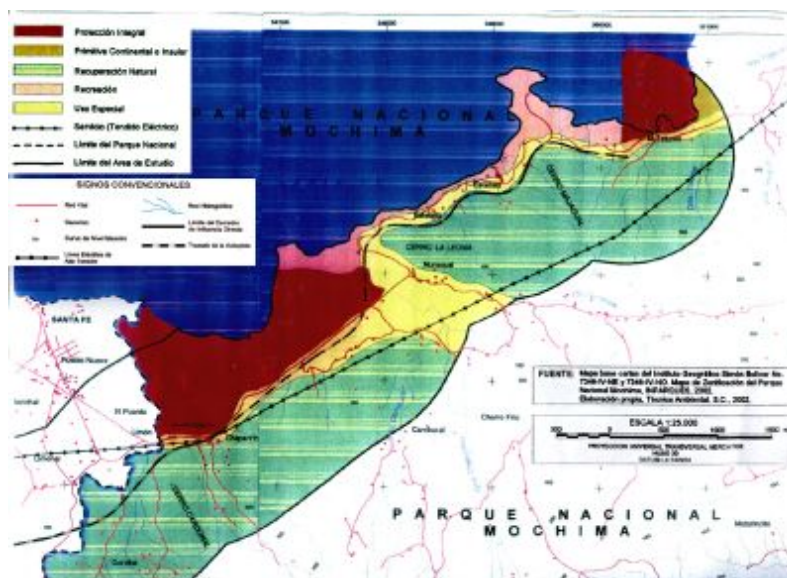
The construction of the second stretch of the Antonio José de Sucre Highway will begin soon. It will cross the national park parallel to the current roadway, separated in some places by 15 km. The stretch will be 7.37 km long and 100 m wide, and will connect the town of Santa Fé at the western limit of the park with that of Yaguaracual, located in a special use zone (Técnica Ambiental 2002).



View of preliminary work for highway construction.

A number of environmental and social impacts are foreseen from this project. Among them are the loss of large areas of vegetative cover, habitat perturbation, topography and water drainage modification, detonation and explosive use damage, contamination and waste generation, increase in fire risk, change in air quality, and an increase in human migration and land invasion tendencies. There is no doubt that during the four-year construction and thereafter, the ecologic, social, and economic environment in and around the park will be significantly and irreversibly changed. ([Ver mapa de la autopista](#)).

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The highway will cross special use, natural recovery, and integral protection zones.

Recommended Solutions

Current Threats

Community confrontations, low level of environmental awareness, illegal hunting and fishing, lack of park awareness

The severity of most of Mochima's problems makes them unsolvable in the short or medium term. Probably the only solution for many of these problems is a reengineering process that involves a long and continuous youth educational program and a job development strategy in park conservation activities for local inhabitants. The high cost of such a program would force INPARQUES to form alliances with NGOs and private companies, but above all with the governmental agencies which are in charge of development and the execution of economic development programs in the region.

On this topic, we must mention the initiative of a company like Petrolera Ameriven that supports alternative employment plans for the region and that will finance a carpentry workshop-school in 2003 that will make the park's signs. Likewise, we consider the project carried out by the park's Environmental Education Office with children from the schools inside the park as a high priority. This program could be the tool that will change the view park inhabitants have, demonstrating the park's ecologic value and teaching them to modify their conduct in it. Child-directed education not only has a favorable impact on their families but also modifies completely the perspective of future generations. Much more financing must be obtained in order to complement the program with direct park monitoring activities, similar to the Tacarigua Lagoon young park guard brigade (see Tacarigua profile). In fact, replicating the experience of this program in both parks would be worthwhile.

Lack of infrastructure and equipment

The lack of infrastructure and equipment is mainly caused by the budget crisis INPARQUES has had for several years and now support seems to have come to an end. Drastic measures must be adopted in order to force the national government to pay the entire budget as well as expired salary debts. Aside from this, INPARQUES must search for alliances with large companies in the region that directly affect the park and negotiate with them for infrastructure improvement and remote park guard post construction (for example, the cement and other companies that operate from Bergantín Port).

Tourism

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Coordinated efforts must be carried out between INPARQUES, the local governments of Sucre and Anzoátegui, private companies, and the National Educational Cooperation Institute (INCE) in order to create a tourist industry development plan for the park and beaches in the surrounding region. The plan should include a youth training programs and favor the development of small enterprises, all within the appropriate use of the park's natural resources. This way many of the problems associated with tourism's uncontrolled growth will improve. This solution requires a large amount of investment that can only be attained through the joint effort of the private sector and governmental agencies in charge of infrastructure and economic development programs.

Forest Fires

Mochima has a large amount of fire occurrence information that could be used to design a geographic information system (GIS) to predict major risk zones in certain times of the year. This method could provide a better understanding of the park from a spatial point of view since this information must be complimented with a vegetation and soil type map. The volunteer fire fighters must be strengthened during the fire season. We again recommend following El Ávila National Park model, where Pajaritos camp has been very useful for forest fire fighting and prevention.

Pollution

With regard to the beaches, currently there is a clean-up campaign organized by Fudena during World Beach Day. Guanta's local government, Mochima's Neighbor Association, and some companies in the area (PDVSA, Cemex and Petrolera Ameriven) also convene volunteers for cleaning on that day. Previous experience has demonstrated that it is possible to educate visitors in how to manage their waste when they go to the beaches. This has been Petrolera Ameriven's experience, an oil company based in the region, when it started a campaign that gave out prizes as incentive to tourists that picked up a certain amount of trash during the high tourist season. Initiatives like this one should be promoted and extended to other parts of the park. Similarly, in highly contaminated recreation zones, a large part of the problem would be solved with a small investment in garbage cans and in port control posts where visitors would be checked for the garbage they generated. With regards to Pozuelo Bay waters, many experts, including some that work in the park, say that it should be excluded and replaced by higher quality zones that are currently outside the park.

Future Threats

Highway, uncontrolled urbanization

The truth about the highway is that it is a long awaited project that nobody would understand stopping for the benefit of a park no one recognizes or has feels connected to. It is sadly true that inhabitants, especially locals, want the highway more than they want to protect the park. In this situation it might be favorable for INPARQUES to take advantage of the construction, allude to its magnitude of destructive impact, and negotiate the enlargement of the park towards the south. The Turimiquire Massif is located there, as is a protected area that is not under INPARQUES' jurisdiction. That way the Turimiquire Dam watershed and the mountain range forests would be better protected. Similarly, highway construction could be used as an alternative plan to relocate the remaining towns of the area that are still illegally in the park. During the impact evaluation stage more than 2.5 billion Bs. (US\$ 1.7 million) were invested; most of which has been paid to inhabitants of the affected area who will begin relocation in less than a year.

Conclusion

From all points of view Mochima is the most threatened park in Venezuela. Its threats have existed since it was created and have become more severe with time due to the lack of coherent policies. Currently most of its problems lack feasible solutions. Mochima is a clear example of Venezuelan territorial ordinance errors and the lack of environmental awareness in the country's development plan. It is beyond comprehension that a national park was declared in an area contemplated for the construction of a highway vital for economic and social development of the eastern region of the country and where there was already a roadway. Perhaps from the beginning, two distinct protected areas should have been created: a much larger national park towards the Turimiquire Range that would protect most of the high and middle watersheds of rivers that serve the cities in Sucre, Anzoátegui, and Nueva Esparta, and a natural monument that

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covers the marine zone and islets of Mochima Bay, the Gulf of Santa Fé, and Pozuelos Bay. Because of Pozuelo's Bay high level of contamination, including its waters in the national park is of no ecologic relevance. Although the solution to the problem is not to exclude these zones from the national park, the highway construction could be used to force the enlargement of the park towards the south. These areas, currently under the Turimiquire Protector Zone are very important as a water and biodiversity reserve. Possibly the only solution to the severe problems faced by the park lies in the development of a continuous and long-term environmental education plan for children, for which the first steps have already been taken.

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