



Mangroves

More than Just a Postcard

Environmental Recovery of Mexico's Mangroves

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Coastal wetlands are areas where ocean salt water and fresh water from streams and rivers come together; they are made up of different species of trees able to grow in soil waterlogged with salt water, mainly mangroves.

These ecosystems represent very important environmental goods, values, and services. In one year, each hectare of mangrove forest produces about 12 tons of fallen

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Photos courtesy of the Fund for Communication and Environmental Education.

leaves that provide food for many forms of coastal life, and captures about 17 tons of carbon dioxide from the atmosphere, mitigating the effects of climate change. Under their roots are deposited enormous quantities of organic matter and sediment that trap contaminants, cleaning the river water before it flows into the sea.

Although the mangroves' brackish water is a difficult habitat for plants, a great diversity of animals live there. Tropical fisheries depend to a great extent on these important carbon sinkholes, since they offer food and refuge for hundreds of larvae, fish, mollusks, and crustaceans with high commercial value, such as red snapper, snook, mullet, and others. The mangroves help stabilize the coastlines and diminish damage from storms and hurricanes as well as provide fuel. They are both beautiful and venues for recreational activities; they act as natural flood- and erosion-control systems and improve the quality of the water by functioning as a biological filter.

Undoubtedly, they are one of the planet's most productive ecosystems. That is why they are protected by the General Law on Wildlife and Natural Vegetation.

Fishing, aquaculture, the extraction of hydrocarbons and minerals, agriculture, extensive cattle ranching, and tourism exert great pressure on these fragile environments, a source of huge biological diversity. Despite their importance, the size of mangroves has shrunk notably worldwide.

Mexico is home to 5 percent of the world's total acreage of mangrove forests, putting it fourth on the list of the 125 countries that enjoy this ecosystem.

Before the year 2000, estimates of their size differed widely. In that year, the UN Food and Agriculture Organization (FAO) estimated that there were 440 000 hectares of mangroves worldwide,¹ while Mexico's Ministry of the Environment and natural Resources (Semarnat) reported almost 890 000 in the same year.²

In 2005, there were still no trustworthy estimates of how fast the country's mangroves were changing, and the factors causing those changes were unknown. For this reason, the National Commission for the Use of Biodiversity



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(Conabio) initiated the System for Monitoring Mexico's Mangroves; according to this system, in 2015, Mexico had 775 555 hectares of mangroves.³

This Conabio study created the knowledge needed to better plan and manage this kind of ecosystem nationwide.

The problems in preserving the mangroves arise from a vision that neither understands nor values the environmental services they offer. The only way of reversing this is to develop an environmental culture that promotes appreciating those environmental services.

Since 2008, the Fund for Communication and Environmental Education (FCEA) has been contributing to the environmental recovery of the Alvarado Lake System and the Tuxpan-Tamiahua Biological Corridor, both areas that contain important mangroves in Veracruz state. We have developed a program of education and environmental recovery financed by Petr leos Mexicanos (Pemex), Mexico's state-owned oil company, and the Veracruz Environmental Fund.

Both these locations are recognized as internationally important sites for the conservation of wetlands by the Ramsar Convention. Signed in Ramsar, Iran, in 1971, the Wetlands Convention is an intergovernmental treaty that is the framework for national action and international cooperation to preserve and encourage rational use of wetlands and their resources. This convention is the only global environmental treaty specifically covering one type of ecosystem. Today, 159 countries have signed it, and, by 2015, 2 186 wetlands of international importance had been designated. Our country is vitally important in the conservation of wetlands because its 142 designated wetland areas make it the nation with the second largest number of sites in the world.

Community involvement is indispensable to recovering the mangrove forests. That is why the FCEA is carrying out an environmental awareness campaign in these regions, to communicate to the population the goods, values, and services that their ecosystems provide. The ultimate aim is to promote pride and create the basis for carrying out environmental restoration projects in surrounding mangroves





that would have the community's esteem and protection.

Three community nurseries have been set up that have produced more than one million native plants, mainly of the four species of mangrove present in our country: the red mangrove (*Rhizophora mangle*), the black mangrove (*Avicennia germinans*), the white mangrove (*Laguncularia racemosa*), and the buttonwood or button mangrove (*Conocarpus erectus*), used to reforest both private and collective *ejido* land. More than 30 women have been trained and are in charge of their operation, and more than 800 hectares of mangrove swamp and low jungle have been reforested.

Nurseries set up at the Alvarado Lake System and in Tuxpan provide appropriate vegetable matter to establish new plantations and maintain them. In addition, they will contribute to improving the economic condition of those involved in managing them. The nursery's contributors, all women, select and transfer the mangrove seeds, prepare the substratum, and sow, water, and transfer the seeds and seedlings. But above all, the nurseries are a place to create environmental awareness for the inhabitants of these communities.

The reforestation is done using mangrove species native to the region, and they are located at sites with an optimum terrain and environmental micro-topographical profile.

A mechanism of payment for environmental services for five years has been established in three *ejido* plots of land, where the workers labor to guarantee the conservation of 500 hectares of pristine mangrove forest.

In local schools, an awareness and training program is being implemented among students and teachers, promoting significant learning and the building of a culture of caring for and sustainably developing their forestry, fishing, and tourism resources. This will bear fruit in the form of a better quality of life.

The students carry out environmental conservation campaigns oriented to observing and getting to know their surroundings, as well as ensuring the population recognizes the environmental impact of their own activities and the alternatives for sustainable development. They delve into topics linked to the dynamics of the basin, availability,

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the uses of and contamination of water, the hydric footprint, invasive species, and the wealth and importance of, as well as the threats to, the mangrove forests.

More than 70 schools in these regions have participated in the environmental education and reforestation program in their plots and neighboring areas; and more than 700 teachers and parents have trained in the environmental education program.

In addition, a system has been set up to monitor the reforested, preserved parcels of land, where the *ejido* members and their children record the birds they have observed, the state of the structure and coverage of the mangrove reforestation (the density of individuals, distribution, connectivity, and presence of clearings). This gives them an educational and life experience of contact with their surroundings.

In addition 15 women have been trained as micro-business owners to produce crafts using the water lily (*Eichhornia crassipes*), an invasive species in the Veracruz wetlands. This creates additional sources of income for the region.

The project's communication and dissemination strategy makes it possible to document, disseminate, and replicate the lessons learned in other areas. This kind of initiative can spark social processes that in the medium term will ensure the communities take responsibility for their resources, diversify their sources of financing, and preserve their natural heritage, on which important environmental services that benefit millions of Mexicans depend. **MM**

NOTES

¹ M. L. Wilkie and S. Forest Fortuna, *Status and trends in mangrove area extent worldwide*, Resources Assessment Working Paper no. 63 unpublished, (Rome: FAO Forest Resources Division, 2003).

² Secretaria de Medio Ambiente y Recursos Naturales, *Compendio de estadísticas ambientales, 2002* (Mexico City: Secretaria de Medio Ambiente y Recursos Naturales, 2003).

³ See <http://www.biodiversidad.gob.mx/ecosistemas/manglares2013/manglares.html>.

