



FOREST DEGRADATION IN THE CORE ZONE OF THE MONARCH BUTTERFLY BIOSPHERE RESERVE 2015-2016

Executive Summary

Between February 2015 and May 2016, 72.30 hectares (ha) of forest were degraded in the core zone of the Monarch Butterfly Biosphere Reserve: 11.92 ha were affected by illegal logging, 53.94 ha by wind-fallen trees during the March 9, 2016 storm, and 6.44 ha by drought. Illegal logging decreased 40% compared to the 19.90 ha affected in 2014-2015, with the most affected located in the State Property in Michoacan (8.74 ha).

The Monarch Butterfly Biosphere Reserve protects 56,259 ha and its core area (13,551 ha) includes the forest habitat of the overwintering colonies of the monarch butterfly (*Danaus plexippus*) in Mexico (Fig. 1). These butterflies migrate each fall from Canada and the United States to the bordering area between Michoacan and the state of Mexico. These fir, pine, cedar and oak forests are also home to 132 species of birds, 56 mammals, 432 vascular plants and 211 mushrooms. These forests are also part of the watersheds that supply water - through the Cutzamala system- to 11 delegations in Mexico City and 11 municipalities in the state of Mexico.

This forest monitoring effort in the core area of the Monarch Reserve determines the application of economic incentives from the Fondo Monarca, established by World Wildlife Fund (WWF) and the Mexican Fund for the Conservation of Nature (FMCN), in coordination with the Secretariat of Environment and Natural Resources (SEMARNAT) and the governments of Michoacan and the state of Mexico. Its benefits are combined with the Payment for Watershed Services from the National Forestry Commission (CONAFOR).

Additionally, the core zone landholders receive support from the National Commission for Natural Protected Areas (CONANP) and the WWF Telmex-Telcel Foundation Alliance, Yves Rocher, and the government of the state of Mexico, for productive projects (sustainable forest management, community tree nurseries, reforestation, tourism, souvenir handicrafts, and forest surveillance) that increase their economic benefits and biodiversity conservation.

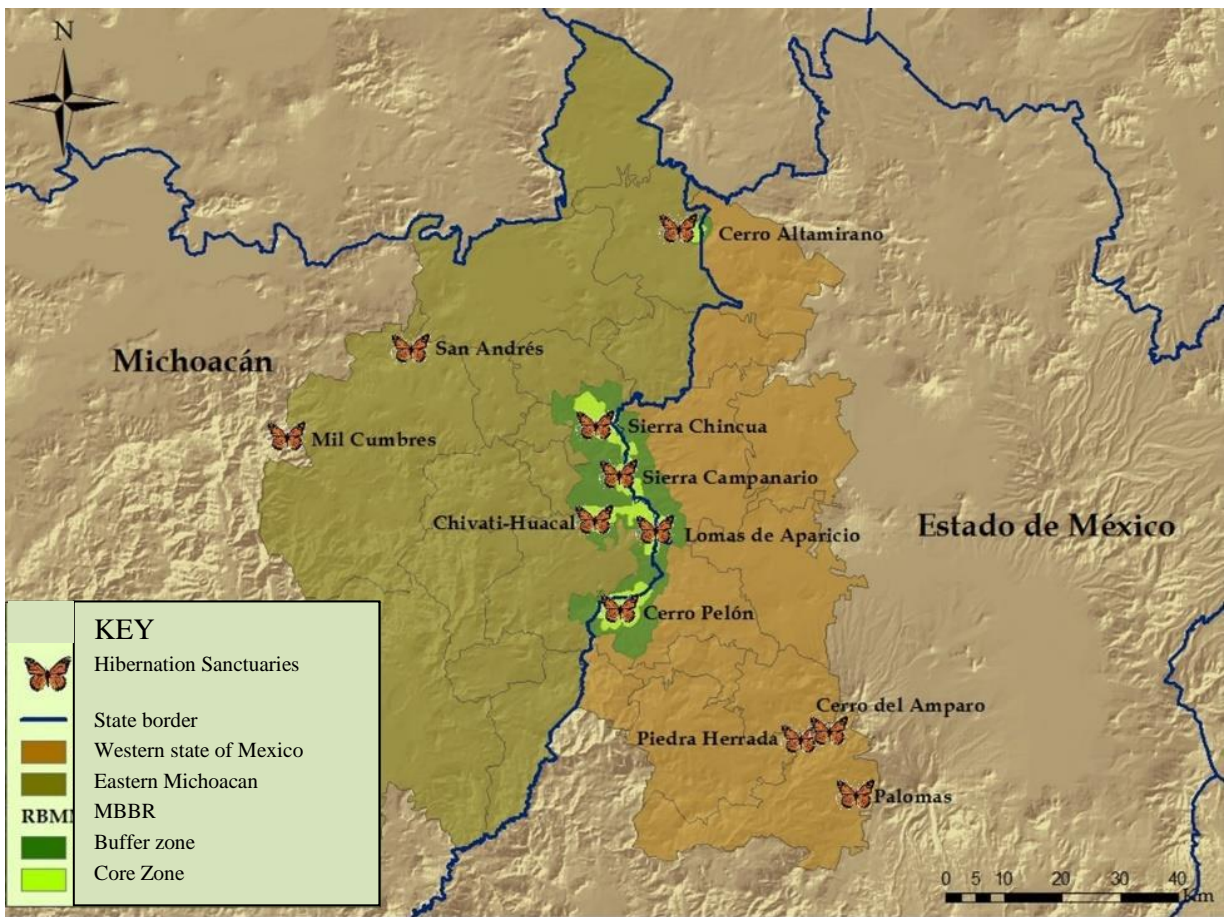


Fig. 1. Monarch Region and Monarch Butterfly Biosphere Reserve (MBBR)

This analysis of forest cover changes in the natural protected area core zone, in 2015-2016, was made comparing aerial photographs for February 2015 and May 2016. Both sets of images were used to create orthoimage mosaics standardized for comparison. The changes detected were integrated to a Geographic Information System, along with the location where they occurred. Subsequently, the results were validated in the field with the participation of experts from WWF, the Biology Institute of the National Autonomous University of Mexico, the Fondo Monarca, the Monarch Reserve Management, CONAFOR and PROFEPA, accompanied by the authorities of the agricultural areas that showed changes in the forest cover.

2015-2016 Forest Degradation

Between February 2015 and May 2016, 72.30 ha of forest were degraded in the core zone of the Monarch Reserve: 11.92 ha were affected by large scale illegal logging, 53.94 ha by wind-fallen trees, and 6.44 ha by drought. 73.3% of the illegal logging occurred in the State Property in Michoacán; while in San Felipe de Alzatí it decreased from 19.13 ha to 0.70 ha (Table 1, Figs. 2 and 3). Also, CONANP used complaint reports to document illegal logging in Jesús de Nazareno and the Ejido del Calabozo, which were not detected in the image comparison because the trees harvested were widely dispersed.

Clandestine logging was detected, by the presence of stumps observed during the field verification of areas affected by wind-fallen trees, in the indigenous community of Crescencio Morales in Michoacán and the La Mesa and El Capulín *ejidos* in the state of Mexico.

Table 1. Forest Degradation in the Core Zone of the Monarch Butterfly Biosphere Reserve 2015-2016.

State	Municipality	Location	Wind-Fallen Trees and Drought (ha)	Illegal logging (ha)	Affected Area (ha)
State of Mexico	Donato Guerra	PP Cañada Seca	1.31		1.31
		E. El Capulín	5.76		5.76
		PP Los Saucos	6.90		6.90
		E. Mesas Altas Xoconusco	0.24		0.24
		IC San Juan Xoconusco	4.38		4.38
	San José del Rincón	PP Catingo I and II	0.06		0.06
		PP Catingo III	0.44		0.44
		PP Catingo IV	0.22		0.22
		E. El Depósito	0.16		0.16
		E. La Mesa	2.50		2.50
		PP Rancho Verde	0.07		0.07
	Temascalcingo	E. Rosa de Palo Amarillo	0.09		0.09
		E. Pueblo Nuevo Solís		0.44	0.44
	Villa de Allende	Litigio 1	2.06	0.81	2.87
IC San Pablo Malacatepec		0.23		0.23	
<i>Subtotal State of Mexico</i>			24.42	1.25	25.67
Michoacán	Angangueo	State Property	1.10	8.74	9.84
		Federal Property	0.13		0.13
		E. Santa Ana	0.16		0.16
	Contepec	E. Contepec	* 6.44		6.44
	Ocampo	E. Cerro Prieto	3.89		3.89
		E. El Asoleadero	0.28		0.28
		E. El Rosario	10.45		10.45
		E. Los Remedios	4.71		4.71
		IC San Cristóbal		0.10	0.10
	Senguio	E. Chincua	0.03		0.03
		E. Senguio	0.11	0.78	0.89
	Zitácuaro	IC Crescencio Morales	5.70		5.70
		IC Donaciano Ojeda	0.40		0.40
		IC Francisco Serrato	1.12	0.14	1.26
IC Nicolás Romero		1.44	0.21	1.65	
IC San Felipe los Alzatí			0.70	0.70	
<i>Subtotal Michoacán</i>			35.96	10.67	46.63
<i>Total</i>			60.38	11.92	72.30

E = *Ejido* (communal land), IC = Indigenous Community, PP = Private Property, *Drought.

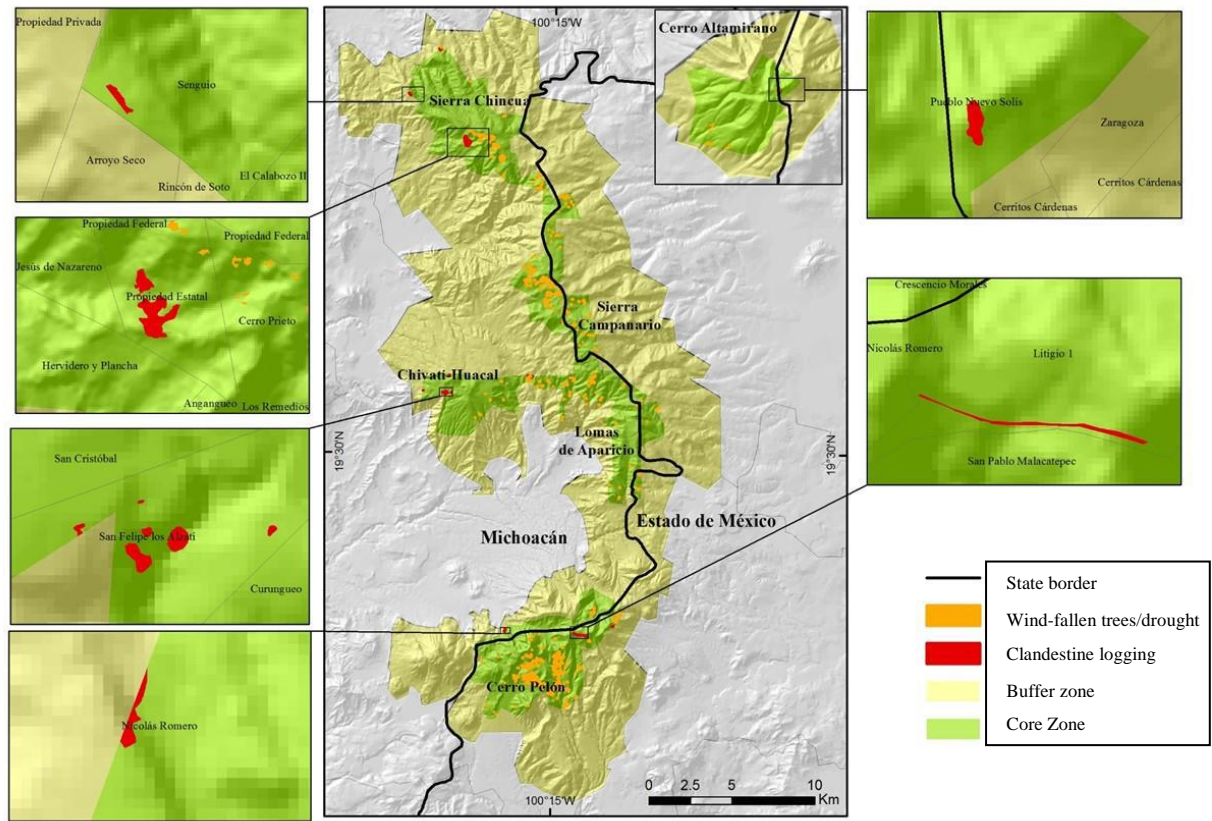


Figure 2. Forest Degradation in the Core Zone of the Monarch Butterfly Biosphere Reserve 2015-2016.

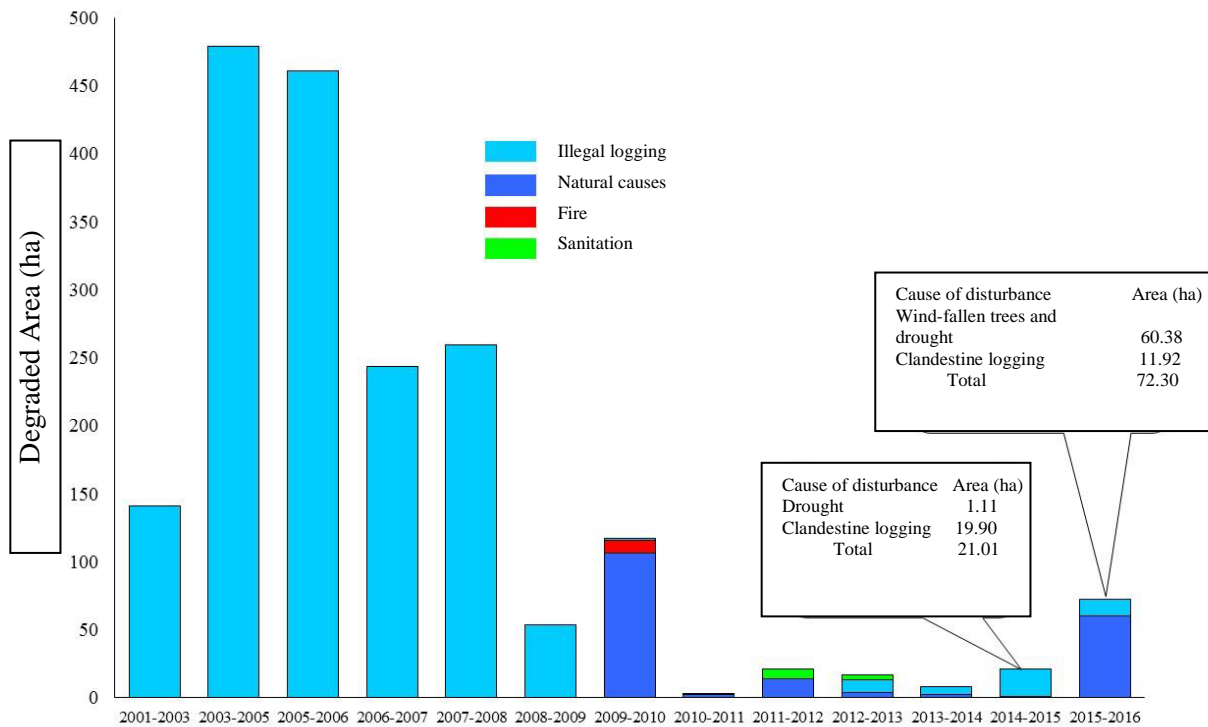


Figure 3. Forest Degradation and Forest Loss in the Core Zone of the Monarch Butterfly Biosphere Reserve (2001-2016). Data for 2001-2003 and 2003-2005 correspond to a two-year analysis.