

FOREST SURFACE OCCUPIED BY MONARCH BUTTERFLY HIBERNATION COLONIES IN DECEMBER 2014

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Executive Summary

During the second half of December 2014, we registered 9 Monarch butterfly colonies (3 in Michoacán, and 6 in the State of Mexico) which occupied a total of 2.79 acres of forest: 5 colonies (2.27 acres) were located in the Monarch Butterfly Biosphere Reserve, and 4 colonies (0.52 acres) outside of the reserve. This accounts for a 68.7% increase compared to December 2013 (1.66 acres), but it is still the second smallest area occupied by these butterflies in Mexican sanctuaries since 1993, when monitoring began.

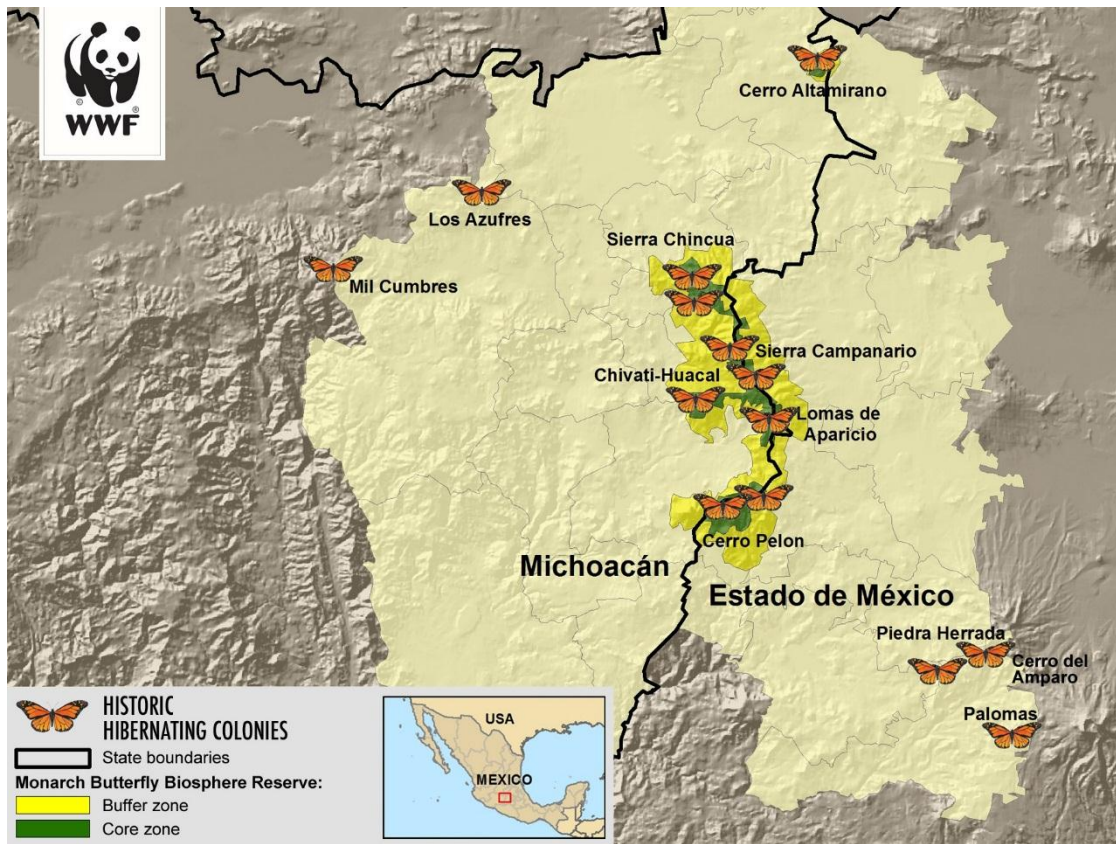
Introduction

Monarch butterflies (*Danaus plexippus*) that hibernate in Mexico migrate between 1,200 to 2,800 miles from Canada and the United States to establish their colonies in the temperate fir and pine forests along the border between the states of Michoacán and the State of Mexico (Fig.1, Rendón-Salinas et al. 2004-2013).

The main threats for the Monarch butterfly in its range in North America are (Vidal et al. 2014): (i) the reduction of breeding habitat in the United States due the decrease of common milkweed because of the use of herbicides and land use change; (ii) deforestation and forest degradation by illegal logging of overwintering sites in Mexico; and (iii) extreme weather conditions in Canada, the United States and Mexico. The combination of these threats is responsible for the dramatic decrease over the last decade in the density of butterflies that hibernate in Mexico, which, by 2013-2014 reached the lowest occupied area in two decades (Rendón-Salinas et al. 2013, Vidal & Rendón-Salinas 2014).

Herbicide use for soy and maize cultivation since 1999 to 2010 in the United States reduced milkweed availability (main larvae food source) in 58% and butterfly reproduction dropped in 81% which is related to the decrease of butterfly density in the overwintering sites in Mexico (Pleasants & Oberhauser 2012). Deforestation and forest degradation in the core zones due to illegal logging within Mexican sanctuaries decreased drastically thanks to the commitment of ejidos and indigenous communities of the Monarch Reserve, the surveillance and payment of environmental services by Mexican authorities, the support of philanthropists and Mexican and international companies that promote locate alternative-income generation and employment to local communities (Vidal et al. 2014).

Since 2004-2005, the Alianza WWF-Telcel in coordination with the Direction of the Monarch Reserve of the National Commission for Protected Areas (CONANP) from the Secretariat of Environment and Natural Resources (SEMARNAT) has monitored the Monarch butterfly colonies in Mexico. In this report we present the forest area occupied by butterfly colonies during the 2014-2015 season in Mexican sanctuaries, using the forest area occupied by these butterflies as an indirect indicator of their density.



Map: Overwintering sanctuaries inside and outside the Monarch Butterfly Biosphere Reserve.

Methodology

Starting on December 1, 2014, field trips were performed in the Monarch Region to systematically monitor the 11 sanctuaries with historical butterfly aggregations. Each sanctuary was visited every 15 days and the location of the colonies was registered with a Garmin® geopositioner in UTM projection and datum WGS 84. This registry is made starting from the peripheral tree at the highest point of the slope from which the perimeter of the colonies is registered based on the direction and the distance of consecutive peripheral trees occupied by butterflies. With the data from the perimeter, researchers form a polygon, and the area occupied by the colony is determined using an Arc View 3.3 geographic information system (Vidal & Rendon-Salinas 2014).

Results

During the second half of December 2014, we registered 9 Monarch butterfly colonies (3 in Michoacán, and 6 in the State of México) which occupied a total of 2.79 acres of forest: 5 colonies (2.27 acres) were located in the Monarch Butterfly Biosphere Reserve, and 4 colonies (0.52 acres) outside of the reserve (Figure 1). This accounts for a 68.7% increase compared to December 2013 (1.66 acres), but it is still the second smallest area occupied by these butterflies in Mexican sanctuaries since 1993, when monitoring began (Figure 2).

The largest colony (1.40 acres, 50.4% of the total) was found in El Rosario, Sanctuary of Sierra Campanario, (Michoacán), and the smallest colony (0.02 acres) was found in the Ejido La Mesa (State of México). For the third time, a colony was found in indigenous community of San Pablo Malacatepec (State of México) and a new colony was registered in Mil Cumbres (Michoacán), where they had not been detected since the 2010-2011 season (Figure 1).

Location	State	Sanctuary	Colony (property)	Area (acres)	
Inside the Reserve	Michoacán	Cerro Altamirano	E. Contepec	*	
			Chivatí-Huacal	C. I. Carpinteros	*
			E. Cerro Prieto	0.12 ^a	
		Sierra Chincua	Propiedad Federal	0.12 ^a	
			Propiedad Estatal	*	
			E. El Calabozo Fracción I	*	
			C. I. Crescencio Morales	*	
			E. Nicolás Romero	*	
		Lomas de Aparicio	E. El Rosario	1.40	
			E. La Mesa	0.02	
			C. I. San Juan Xoconusco	*	
		Estado de México	Cerro Pelón	E. El Capulín	0.44
				E. Mesas Altas de Xoconusco	*
				C. I. San Pablo Malacatepec	0.14
				Area occupied inside the Reserve	
Outside the Reserve	Michoacán			Los Azufres	P. P. San Andrés
		Mil Cumbres	E. Río de Parras	0.07	
		Cerro del Amparo	E. San Francisco Oxtotilpan	0.05	
		Estado de México	Palomas	E. San Antonio Albarranes	0.17
			Piedra Herrada	E. San Mateo Almomoloa	0.22
Area occupied outside the Reserve		0.52			
Total area occupied		2.79			

E= Ejido; C. I. = Indigenous community; P. P.= Small property; *No colonies registered. ^aOne single colony on the boundary between two properties.

Figure 1. Hibernation colonies and forest area occupied by monarch butterflies in December 2014.

Isolated groups of butterflies were seen flying in the Chivatí-Huacal Sanctuary (Michoacan) only during the first half of December. In the Lomas de Aparicio Sanctuary (Michoacan) local inhabitants reported isolated groups of butterflies during the last week of November (the authors found butterfly wings).

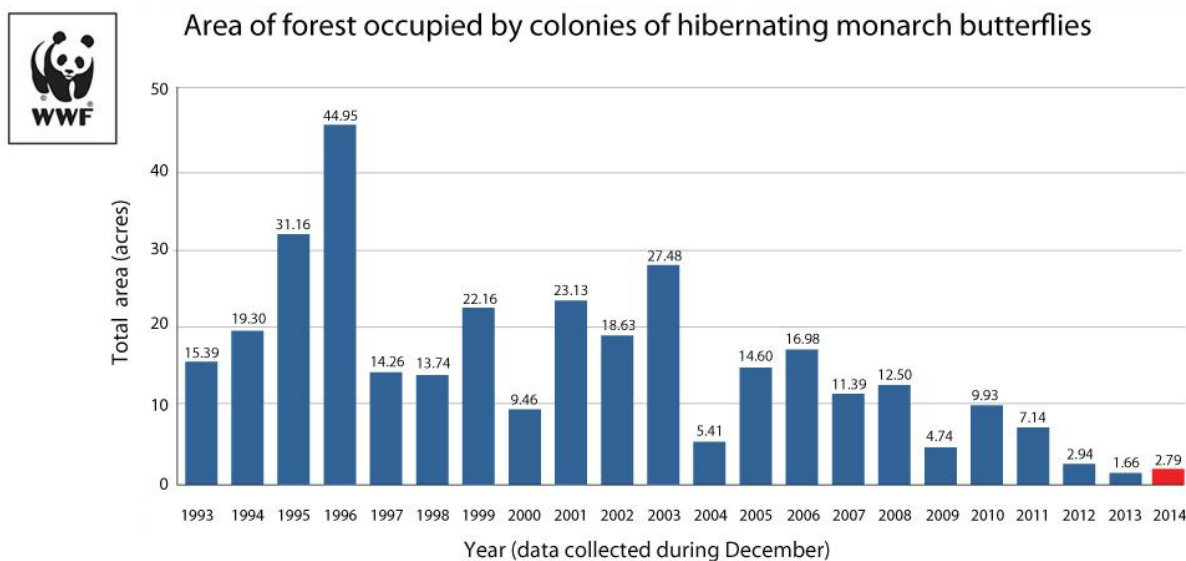


Figure 2. Area of forest occupied by monarch butterfly colonies in Mexico, 1993-2014 (See Vidal & Rendón-Salinas 2014).

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