

2021-2022

Monarch Butterfly  
Biosphere Reserve (2008)



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UPDATE OF THE STATE OF CONSERVATION  
REPORT OF THE WORLD HERITAGE PROPERTIES  
**MONARCH BUTTERFLY BIOSPHERE RESERVE**



Attention to decision 44 COM 7B.198 adopted by the Extended 44th session of the  
World Heritage Committee (Fuzhou (China)/Online Meeting, 2021)



**MEDIO AMBIENTE**  
SECRETARÍA DE MEDIO AMBIENTE Y RECURSOS NATURALES



**CONANP**  
COMISIÓN NACIONAL DE ÁREAS  
NATURALES PROTEGIDAS



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**Name of World Heritage Property (State Party) (Identification number)**

**Monarch Butterfly Biosphere Reserve (Mexico, 1290)**

**Date of inscription: 2008**

**Criterion: (vii)**

**Missions: 2011 Joint Reactive Monitoring Mission, January 10-14**

**2018 Joint Reactive Monitoring Mission, January 29 to February 3**

**Introduction**

The Monarch Butterfly Biosphere Reserve (MBBR), inscribed in 2008 on the World Heritage List, is located within the Monarch Butterfly Biosphere Reserve, a federally natural protected area, a key site for the conservation of the Monarch Butterfly migration phenomenon.

**1. Executive Summary of the Report**

The update of the State of Conservation Report (SOC) of the Monarch Butterfly Biosphere Reserve (MBBR) Property responds to Decision 44 COM 7B.198 adopted by the World Heritage Committee in 2021, as well as to the request for information made to the Government of Mexico.

The SOC includes the actions conducted in the period 2021-2022 in the World Heritage Property (MBBR) and its buffer zone, within the natural protected area of the same name.

They include the results achieved, and the resources invested in management, conservation, research, restoration, monitoring, as well as productive projects with the communities of the region, which contribute to maintain the attributes of Outstanding Universal Value, control and reduce risk factors.

The report meets the requirements of the Committee and World Heritage Center, through the activities conducted by the work team of the Direction of the MBBR, in coordination with other government agencies at the federal, state, and municipal levels, civil society organizations, research institutions and the participation of the communities that live in and around the MBBR, key actors for the protection and conservation of the natural heritage.

Special attention has been given to the protection and health of the forests, as they are key habitats for the Monarch Butterfly during its overwintering presence in the region, developing actions to prevent and combat illegal logging, discouraging land use change, reforestation, forest restoration and sanitation, fire management, and monitoring.

The monitoring of the overwintering colonies of the Monarch Butterfly has allowed the registration of new colonies in the Monarch region (outside MBBR), their population is subject to monitoring both nationally along the migration route by the National Monitoring Network and tri-national level with the United States and Canada.

The National Commission of Natural Protected Areas (CONANP) has followed up on its interaction with the communities, through its participation with subsidy resources for the Conservation Program for Sustainable Development (PROCOCODES) and the Program for the Protection and Restoration of Ecosystems and Species at Risk (PROREST), which contribute to two of the four substantive objectives of the Commission: the Conservation for Sustainable Development and Ecological Restoration, and Conservation of Priority Species. In addition, the National Forestry Commission (CONAFOR) and the governments of the states of Mexico and Michoacán provide the resources for the Payment for Environmental Services Program.

The Federal Government, represented by CONANP, reiterates its commitment to the protection of the Monarch Butterfly Biosphere Reserve Property, and the attention to the observations made by the World Heritage Committee in the Decision WHC/21/44.COM/7B.Add and to comply with the provisions of the Operational Guidelines for the Implementation of the World Heritage Convention, the State of Conservation Report for the Property was updated.

## 2. Response to World Heritage Committee Decision

**Decision: 44 COM 7B.198** adopted for the World Heritage Committee during the 44<sup>th</sup> extended session (Fuzhou, China/online meeting, 2021)

The World Heritage Committee,

1. Having examined Document WHC/21/44.COM/78.Add,

2. Recalling Decision 43 COM 7B.27, adopted at its 43<sup>rd</sup> session (Baku, 2019),

3. Expresses its great concern regarding the death of local conservationists, allegedly linked to their work to protect the property and fight illegal logging, and expresses its most sincere condolences to their families;

4. Notes with utmost concern that illegal logging activities in the property have substantially increased and that measures towards surveillance of illegal activities have been further curtailed due to limitations imposed by the global COVID-19 pandemic, and urges the State Party to significantly increase surveillance measures as a matter of priority in order to halt the illegal logging in the property;

5. Welcomes the ongoing commitment by the State Party in implementing the recommendations of the 2018 IUCN Reactive Monitoring mission to the Monarch Butterfly Biosphere Reserve Management Program with a participatory approach, and requests the State Party to submit it for review by the IUCN once completed;

6. Regrets that, whilst the Anganguero mining Project remains de facto prohibited, no updated information on the status of the Project and the current situation regarding mining concessions within the property and its buffer zone has been provided, and also urges again the State Party to ensure that no mining activities are permitted within the property, and to implement other recommendations of the 2018 mission related to this issue;

7. Also welcomes the ongoing trilateral cooperation between the States Parties of Canada, Mexico and the United States of America, and also requests the three States Parties to consolidate and build upon measures to conserve the butterfly through these means, with a particular focus on minimizing the loss and to restoring native milkweed species in the United States of America;

8. Noting the information regarding the strategies for adaptation to climate change implemented in the property and the wider region, also notes that Monarch butterfly colonies continue to occur outside the property, and given their susceptibility to climate change amongst other threats, encourages again the State Party to consider developing a proposal for an extension of the property in order to ensure that all areas consistently occupied by overwintering colonies are appropriately protected and to increase the potential of the property to effectively conserve its Outstanding Universal Value under changing climatic conditions;

9. Further requests the State Party to submit to the World Heritage Centre, by 1 December 2022, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its 46<sup>th</sup> session.

## Prevention and Combat of Illegal logging

4. Notes with utmost concern that illegal logging activities in the property have substantially increased and that measures towards surveillance of illegal activities have been further curtailed due to limitations imposed by the global COVID-19 pandemic, and urges the State Party to significantly increase surveillance measures as a matter of priority in order to halt the illegal logging in the property;

In this regard, it is important to mention that among the actions to prevent and combat illegal logging, surveillance activities are conducted in coordination between the MBBR staff and the Federal Attorney for Environmental Protection (PROFEPA) Office, the National Guard, the Civil Guard through the Forestry and Environmental Group, and the Participatory Environmental Surveillance Committees.

The Program to combat illegal logging in the MBBR is carried out in close coordination with PROFEPA, based on permanent forestry operations through the Monarch special group, the National Guard, the Civil Guard under the Ministry of Public Security (SSP) of the State of Michoacán and the Commission of the Estado de México, with inspection and surveillance actions, field and road patrols; incorporation of community surveillance with communal and ejido authorities, through Participatory Environmental Surveillance Committees and cross-cutting actions for the restoration and reincorporation of areas impacted by illegal logging during 2019-2022 period, on the actions carried out by PROFEPA in the MBBR and its area of influence. Through the Program for the Protection and Restoration of Ecosystems and Species at Risk (PROREST), during the year 2021, 6 surveillances and monitoring brigades were established and 7 in 2022, which conduct surveillance to prevent environmental illicit activities, in addition on conducting wildlife monitoring activities.

**Table 1.** Actions taken by PROFEPA in the MBBR and its area of influence in the period 2019-2022

Num.	Actions	2019	2020	2021	2022
1	Special forest operations	23	10	3	0
2	Surveillance tours (field and road)	86	45	15	6
3	Inspections to Forest Raw Material Storage and Transformation Centers and lumber yard.	12	1	12	2
4	Inspections of properties (forest, change of land use) (CUS), plantations, avocado orchards, risk, and sanitation)	19	7	34	16
5	Inspection filters for the transport of forest raw materials	31	19	0	0
6	Participatory Environmental Monitoring Committees (CVAP)	15	0	0	3

The actions focused on inspections of properties that presented irregularities, in 2021, 34 inspections and 15 surveillance tours were conducted, while during 2022, 16 inspections and six tours were carried out. Special forest operations and participatory monitoring committees reduced to three for the 2021-2022 period.

As a result of, the actions and operations conducted by PROFEPA in the period 2019-2022, were seized tools, equipment, vehicles, pack animals, timber and charcoal, sawmills were closed, and people involved in illegal logging activities were brought before the Public Prosecutor's Office.

The monitoring on forest degradation in the MBBR, conducted between March 2019 and March 2020 shows the degradation of 20.26 ha, of which 13.36 ha were affected by illegal logging; 3.46 ha under sanitation and 3.44 ha affected by drought.

Based on the results of the Analysis of Forest Change in the MBBR for the period 2020-2021, was recorded the degradation of 18.83 ha, of which 14 ha were impacted by illegal logging.

In 2020, a National Guard detachment was installed in the municipality of Zitácuaro, Michoacán State, in the vicinity of the MBBR, for timely attention and prevention of environmental crimes, which in coordination with staff from PROFEPA and CONANP, have conducted surveillance activities in the World Heritage Site, its buffer zone and zone of influence.

The effects of the Coronavirus pandemic SARS-Cov-2 have had a negative social, economic, and environmental impact; affecting communities with fewer opportunities, which, in the absence of employment, have resorted to illegal use of natural resources as a means of subsistence in the short term, this together with changes in law enforcement agencies and budget adjustments, have made inspection and monitoring activities in the MBBR more difficult, leading to the incidence of illegal logging activities, mainly in the indigenous communities of San Cristóbal, in the municipality of Ocampo, as well as Nicolás Romero and San Felipe de Los Alzati in the municipality of Zitácuaro, Michoacán.

The actions to prevent and combat environmental crimes focus on the illegal harvesting, transportation, storage, and processing of the forest raw materials, supported by permanent field visits.

In the period 2021-2022, the National Guard Environmental Mission has participated in:

- Field and operational tours for the prevention of environmental crimes, in coordination with the Directorate of the MBBR, PROFEPA and common authorities.
- Activities of social proximity in the localities of the MBBR, to keep the population informed about the crimes that can be committed if the activities are not conducted in accordance with the regulations.
- Actions to organize tourism activities in coordination with MBBR, PROFEPA, municipal and common authorities, and tourism committees in Cerro Prieto and El Rosario, ensuring that visitors do not enter the Monarch Butterfly colonies.
- Participation in working groups to address the problem of environmental crimes in localities that affect the MBBR to encourage the participation of the common and communities.



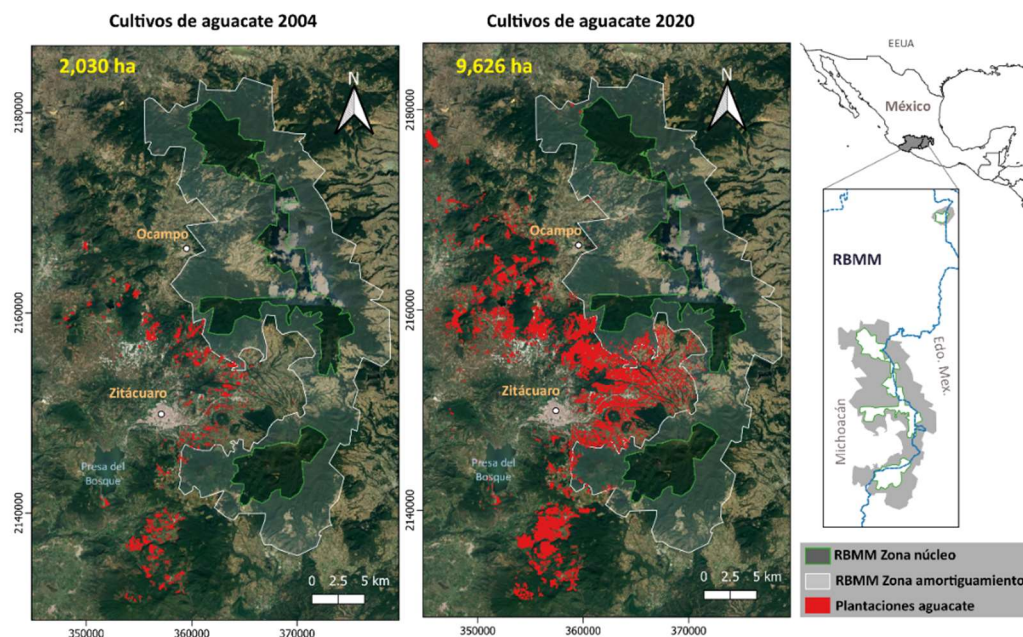
## Land-Use Change

### Commercial avocado production in the region

The state of Michoacán is the federal entity leading in the production of avocado in Mexico, accounting for 70% of national production (SIAP, 2022). There is a growing demand for this crop, which has led to the expansion and intensification of avocado plantations in the region, increasing the problem of deforestation and land use change. In its July 2022 monthly report, the Agri-food and Fisheries Information Service (SIAP), reports that in Michoacán exist close to 183,000 hectares dedicated to the so-called “green gold”, which means that the state is undergoing a process of expansion of the agricultural frontier.

The Monarch Butterfly region located in eastern Michoacán and western Mexico State, isn't strange to avocado cultivation, and the environmental problem generated by deforestation and water consumption in the zone of influence and some areas of the MBBR buffer zone. To date, the World Heritage Property in the core zone of the reserve has not been impacted; however, this productive activity is a potential threat.

According to the stations conducted by the Centro de Investigaciones en Geografía Ambiental de la Universidad Nacional Autónoma de México, UNAM (López Sánchez, 2022) in Michoacán, 441 hectares of avocado plantations are in the buffer zone of the MBBR (Fig. 1). The problem and the exponential growth of the area under avocado cultivation is concentrated in the municipality of Zitácuaro, in the indigenous communities of San Felipe Los Alzati, Crescencio Morales, San Francisco Curungueo, Nicolás Romero, Donaciano Ojeda, Carpinteros, Francisco Serrato and Aputzio de Juárez. For the Estado de México, there isn't information on the area under avocado cultivation.



**Figure 1.** Avocado orchards in the east of the State of Michoacán, Mexico.  
(Reference: López-Sánchez, 2022)

The inspection and surveillance work to prevent and avoid changes in land use in the MBBR by PROFEPA, the National Guard, CONANP, and the Michoacán State Police, are concentrated in the southern part of the reserve, in the buffer zone.

At least 76 actions related to land-use change for avocado cultivation, forestry, irrigation, and sanitation have been carried out during the period 2019-2021. In addition, recently created avocado orchards have been dismantled without authorization or with signs of expansion.

## Reforestation

In 2021, Protectora de Bosques del Estado de México (PROBOSQUE) reforested 29 ha and supported the maintenance of 158 ha of reforestation's carried out in previous years, benefiting 17 properties. For the year 2022, an additional 38 ha were reforested, while 60 ha reforested carried out in previous years were maintained, for a total of 98 ha with reforestation actions. For the period 2021-2022, 67 ha were reforested and maintenance was provided on 218 ha reforested in previous years on lands in the municipalities of Donato Guerra, Sa José del Rincón and Villa de Allende in the Estado de México. The species used for reforestation were oyamel (*Abies religiosa*) on the surface of the property, and pine (*Pinus*) was planted in the buffer zone.

The National Forestry Commission (CONAFOR) in the Estado de México applies the Environmental Compensation Program for Land Use Change; in its 2021 communication, in the Soils in Forest Land component, 22 hectares of the San Joaquín Lamillas Ejido, Municipality of San José del Rincón, in the Buffer Zone of the Reserve, were incorporated into the restoration of soil and water conservation works, as well as reforestation of 22,000 pine plants (*Pinus sp.*).

## Forest Restoration

In the MBBR, actions for forest restoration have been carried out through CONANP subsidy programs, such as the PROREST, the Conservation Program for Sustainable Development (PROCOCODES) and CONAFOR, and Payment for Environmental Services (PES), among others. The objectives of these programs are to promote the conservation, protection and restoration of the reserve's ecosystems and biodiversity with the direct participation of the local communities that live in the area, as detailed below:

### **Program for the Protection and Restoration of Priority Ecosystems and Species at Risk (PROREST)**

The program searches to promote the protection and restoration of the ecosystems present in the MBBR, as well as the conservation of its biodiversity through the support of technical studies and actions for the management of the territory and its priority species, with the direct and effective participation of the local population.

This program includes the Community Conservation Component, which searches to promote the direct and effective participation of the local population in actions for

prevention, protection and restoration of the ecosystems and their biodiversity, supporting:

### 1. Ecological Restoration

During 2021, nine projects were supported with an amount of \$1'293,000.00 MXN for reforestation maintenance actions, rehabilitation of firebreaks and fuel management (chapeo y acomodo). In the State of Mexico, the communities of San José Villa de Allende, Villa de Allende, San Joaquín Lamillas, San José del Rincón, Rosa de Palo Amarillo and San Pablo Malacatepec were benefited, while in Michoacán, support was provided to the localities of Macho de Agua (Quinta Manzana de Crescencio Morales), Zitácuaro, Cuartel de Emiliano Zapata, Ocampo, El Campamento (6th Manzana de Nicolás Romero), Zitácuaro, Cuartel de Emiliano Zapata, Ocampo, Crescencio Morales (San Mateo), El Campamento (Sexta Manzana de Nicolás Romero) and San José del Rincón. These actions benefit element 002 Chincua-Campanario-Chivati, as well as element 001 Cerro Pelón, of the Property.

### 2. Community surveillance and monitoring

During 2021 seven projects were supported with an amount of \$1'400,000.00 MXN, with which 70 community technicians were trained in techniques for monitoring terrestrial vertebrates, through photo trapping, identification of tracks and excreta, counting points and direct identification of species: in addition to contributing to forest surveillance actions for the detection and reduction of environmental crimes within the Property, in an area of 4,430 ha under surveillance.

In 2022 seven projects were supported with an amount of \$797,000.00 MXN, resources applied for the training of 70 people from the communities, in techniques for monitoring terrestrial vertebrates, through photo trapping, identification of tracks and excreta, counting points and direct identification of species; in addition to collaborating in forest surveillance work to reduce environmental crime in the Property. The area under surveillance was 2,700 ha in Hervidero and Plancha (Cuauhtémoc), municipality of Ocampo; Santa María La Ahogada, Contepec, El Calabozo Primera Fracción, Senguio and Rincón de Soto, Aporo, in the State of Michoacán and, Barrio de Arriba de San Juan Xoconusco, Donato Guerra, La Mesa, San José del Rincón, San Pablo Malacatepec, Villa de Allende, in the State of México.

### 3. Conservation of the species priority

As a result of the monitoring activities of terrestrial vertebrates in the MBBR, within which the Property is included, funded by the subsidy programs PROCODES (2017, 2018) and PROREST (2020, 2021), granted by the federal government through CONANP, the first record of two feline species that were not registered for the Property was achieved, the margay (*Leopardus wiedii*) and the jaguarundi (*Puma yagouaroundí*), listed in NOM-059-SEMARNAT-2010 in the categories of Endangered and Threatened, respectively. During the monitoring conducted in 2020, the jaguarundi was recorded and in 2020-2021, a population of six margay individuals was found.

The felines were registered in the mesophyll forest in the southern part of the MBBR, in the buffer zone of the Property, a very important region considering that it is in this zone

where the transition between the temperate forests and the lowland forests characteristic of the warm climates of the hot land of Michoacán begins.

During 2021, a project supported with an amount of \$250,000.00 MXN for the Monitoring of priority species, including the margay and the yaguarundi to continue with the register and contribute to the community participation in the conservation of the habitat of these species, and to the design of a database with the records obtained through camera traps and sampling, using the methods of footprints and excreta.

## **Fire Management**

The actions for the prevention, control, and combat forest fires in the MBBR are carried out in coordination with the three levels of government, the population of the local communities and civil society organizations, within the framework of the Interinstitutional Coordination Agreement for Fire Management with the participation of CONAFOR, PROBOSQUE, the Michoacan Forestry Commission (COFOM), Municipalities and the Association of Forestry Permit Holders of Eastern Michoacán (APFOMAC).

CONAFOR has 18 firefighting brigades in addition to the two community brigades of the MBBR, each made up of 10 brigade members from ejidos and communities in the states of Mexico and Michoacán, which have been operating since 2009 during the dry season from February to May. CONANP's two community firefighting brigades were trained and equipped through the Environmental Contingency Brigades component of PROCODES. The brigades are activated through the Forest Restoration and Forest Protection Committees in the States of México and Michoacán; this protocol is installed at the beginning of each dry season, monitoring is carried out through nine observation towers located in the municipalities of Hidalgo (Cerro de la Cueva, Cerro Azul and San Andrés), Ocampo (Camacho), Tlalpujahua (Cerro Alto), Queréndaro (Torre Garnica), Villa de Allende (Torre La Palma) y San José del Rincón (San Joaquín Lamillas).

There are also two fire management centers that operate with the different observation towers in the MBBR. These support bases are in the municipalities of Hidalgo, operated by CONAFOR in Michoacán, and PROBOSQUE, in the municipality of Metepec in the Estado de México. There is an interinstitutional coordination agreement for fire management in the MBBR, so that the two community brigades that make up CONANP join in the response to forest fires during the dry season, one in the town of Zitácuaro, which strategically serves, in coordination with CONAFOR and COFORM, the Indigenous Micro-region of Zitácuaro, which includes 16 communities and ejidos within the property, its buffer zone and its zones of influence. The other part that was attended was the Micro-region of San José del Rincón, Estado de México, where the coordination was with the Brigades of PROBOSQUE, who jointly attended in a timely manner the forest fires that occur in the Micro-region of San José del Rincón, Estado de México, which is made up of 16 ejidos and small properties.

There are radio communication, control and command bases that operate with the different observation towers in the MBBR, these support bases are in the municipalities of Hidalgo and Zitácuaro and are management by the staff from PROBOSQUE, CONAFOR, and the Direction of the MBBR.

The period 2018-2020 was characterized by prolonged dry periods that generated conditions and high temperatures, factors that favor the occurrence of forest fires. In 2021

and 2022, there were 35 and 33 forest fires each year, affecting an area of 722.95 ha and 119.87 ha, respectively. Of the 67 ha affected in the Property, 23 ha corresponded to shrublands and the rest to litter. (Table 3).

**Table 2.** Forest Fires and affected area in the MBBR 2021-2022.

State	2021		2022	
	Number of Fires	Area affected (ha)	Number of Fires	Area affected (ha)
Michoacán	15	623.45	17	88.37
Estado de México	20	99.50	16	31.50
Total	35	722.95	33	119.87

Source: Anual statistics of the National Forestry Commission (CONAFOR) and internal reporting of the PROCODES, Environmental Contingency.

As a preventive measure during the 2021 dry season, were rehabilitated 25 kilometers of firebreaks and removed and arranged combustible material on 65 hectares of land belonging to the Crescencio Morales indigenous community, Ejido Nicolás Romero, Communal properties of San Pablo Malacatepec and Ejido El Calabozo Segunda Fracción; these areas were considered at high risk of forest fires due to the accumulation of fuels in the polygons of Cerro Pelón, Sierra Chincua and Chivati-Huacal.

By the year 2022, in 190 hectares combustible materials were removed and 35 kilometers of firebreaks were rehabilitated within the Property of the Indigenous Community of Carpinteros and Donaciano Ojeda; Ejido El Calabozo Primera Fracción, Indigenous Community of San Felipe Los Alzati, Indigenous Community San Cristóbal, Ejido Crescencio Morales, were carried out by brigades from the ejidos and communities within the MBBR, coordinated by CONANP, as well as direct attention to forest fires that occur during the months of March to June each year.

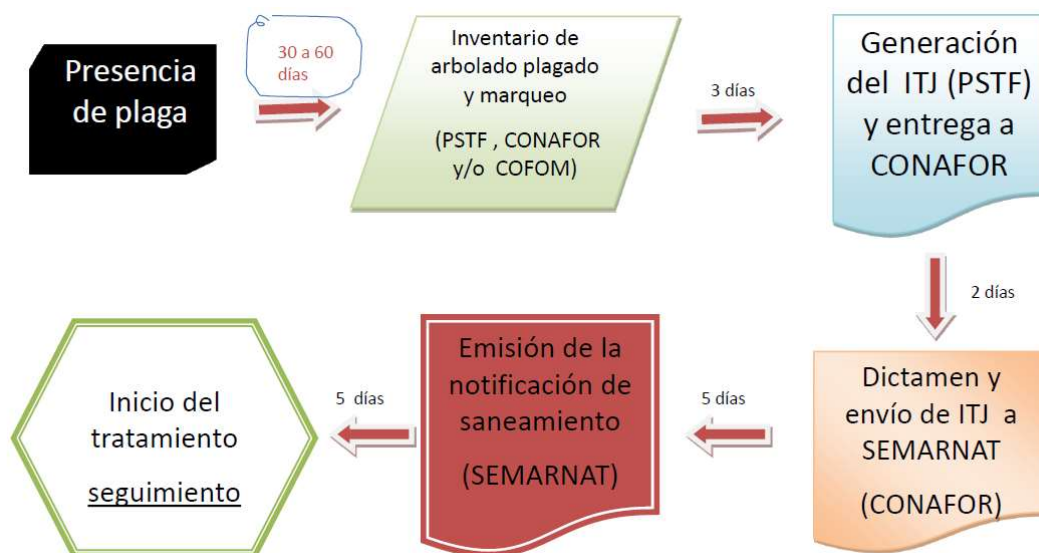
In addition, from March to June of each year, two brigades are integrated to control and combat forest fires in the municipality of San José del Rincón, in the northwestern part of the Property, on Cerro El Campanario, and in the municipality of Zitácuaro in the southern part of the reserve, which includes part of the Cerro Pelón property. Twenty people from 18 localities in the Reserve (La Mesa, Las Rosas, Fábrica Concepción, Buenavista Casa Blanca, Concepción del Monte y Trampa Grande, Francisco Serrato, San Felipe Los Alzati, La Mesa, Las Rosas, La Mesa del Monte and Trampa Grande are actively participating. Serrato, San Felipe Los Alzati, Curungueo, Rincón de Ahorcados, Crescencio Morales and Nicolas Romero.

## Forest Sanitation

Since 2008 the Interinstitutional Coordination Strategy for the Management of Forest Pest and Diseases in the MBBR has been implemented with the participation of the Ministry of Environment and Natural Resources (SEMARNAT), CONAFOR, PROBOSQUE, COFOM, forestry technical service providers (PSTF), agrarian communities and CONANP directorate of the MBBR.



The Forest Sanitation Protocol allows for timely response to pest outbreaks in the World Heritage Property and its buffer zone (Fig. 2), which helps reduce the time required to obtain authorization for forest sanitation from CONAFOR.



**Figure 2.** Interinstitutional Protocol for Forest Health in the MBBR.

Monitoring the phytosanitary status of the forests that cover the surface of the World Heritage Property is a fundamental activity for the detection of pest and diseases, and contributes to establish prevention, combat, and control for guaranteed the good conservation status of the forest mass and the habitat of the Monarch Butterfly.

The cover of the oyamel (*Abies religiosa*), and pine (*Pinus spp.*) forests have been affected by the incidence of bark stripping insect pests (*Scolytus mundus*, *Pseudohylesinus variegatus*, *Pityophthorus blackmani* y *Dendroctonus mexicanus*), causing a decrease in forest cover.

As show in Table 4 and Figure 3, during the period 2020-2022, pest incidence affected an area of 72.02 ha, with a volume of 13,800.576 m<sup>3</sup> VTA (Total Volume Tree) in the Property and 103.733 ha with a volume of 13,564.53 m<sup>3</sup> VTA in the buffer zone. The greatest impact occurred in 2021 with the occurrence of infestation in 56.785 ha with a volume of 10,627.616 m<sup>3</sup> VTA in the Property, as well as 80.252 ha and 9,059.877 m<sup>3</sup> VTA in the buffer zone; figures that place 2021 as the year with the greatest surface and volume of trees affected since 2008, this is attributed to the increase in the temperature and the delay in the rainy season. The most affected trees oyamel (*Abies religiosa*) and pine (*Pinus spp.*), to address the active outbreaks and the advance of the pest, 16 notifications were issued for the state of Michoacán and 10 for the Estado de México.

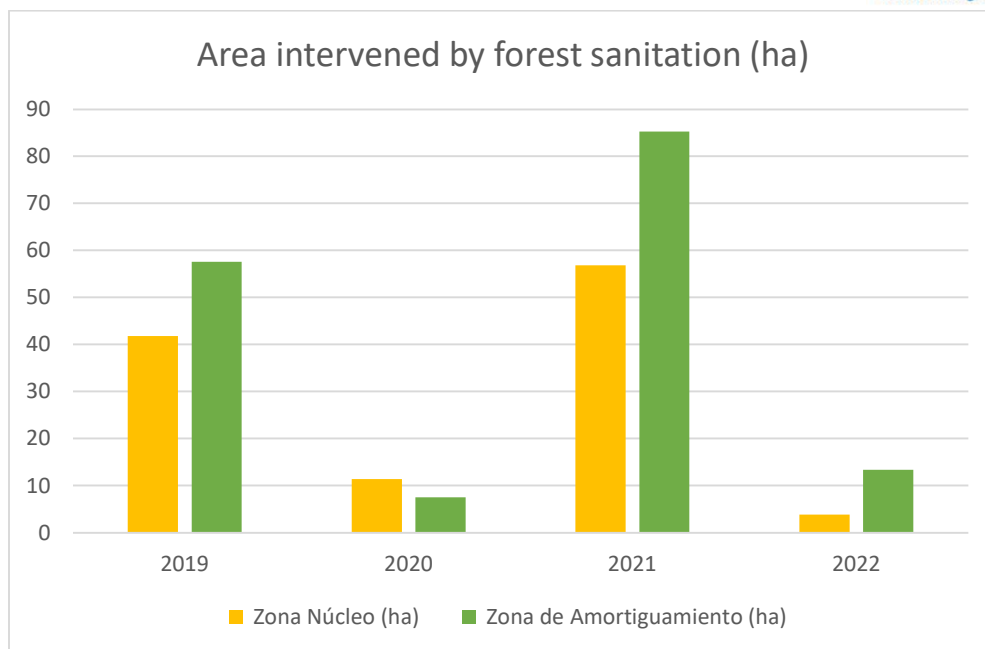
The polygon of the affected property corresponds to Cerro Campanario, Sierra Chincua y Chivati-Huacal. The area affected in the Property is in the state of Michoacán, while in the buffer zone 62,148 ha were affected in the state of Michoacán and 23,129 ha in the Estado de México.

In 2022, 10 notifications were issued for the State of Michoacán and one for the Estado de México, in an area of 17.20 ha of which 3.825 were affected in the Property and 13.375 ha in the buffer zone, the volume affected was 4,322.20 m<sup>3</sup> VTA, and 1,192.95 m<sup>3</sup> VTA in the Property, and in the rest, which corresponds to 3.129.25 in the Buffer Zone. The surface of the affected Property is in the Cerro Campanario polygon.

**Table 3.** Forest health in the MBBR 2008-2022

<b>Years</b>	<b>Property (Core Zone) (m<sup>3</sup> VTA)</b>	<b>Area affected in the Property (ha)</b>	<b>Buffer Zone (m<sup>3</sup> VTA)</b>	<b>Area affected Buffer Zone (ha)</b>	<b>Total Volumen (m<sup>3</sup> VTA)</b>
2008	3,549.090	20.870	1,379.560	6.110	4928.650
2009	10,806.640	44.461	69.730	3.070	10876.370
2010	630.380	4.000	0	0	630.380
2011	3,810.840	36.340	2,826.220	24.760	6637.060
2012	6,086.960	36.020	1,217.460	23.870	7304.420
2013	6,862.670	26.760	3,041.220	37.210	9903.890
2014	693.860	19.020	0	0	699.990
2015	3,858.040	14.690	228.930	2.310	4086.970
2016	0	0	212.860	0.460	212.860
2017	4,216.160	17.430	839.885	2.000	5055.320
2018	2,466.530	7.230	1726.396	7.500	4192.930
2019	3,049.320	41.770	3063.668	57.560	6112.990
2020	1,980.010	11.410	1462.206	7.520	3442.220
2021	10,627.616	56.792	9481.353	85.277	20108.969
2022	1,192.950	3.825	3129.250	13.375	4322.200
<b>Total</b>	<b>59,831.066</b>	<b>340.618</b>	<b>28,678.738</b>	<b>271.022</b>	<b>88,515.219</b>

VTA= Total Volumen Tree



**Figure 3.** Are intervened by forest sanitation 2019-2022.

The actions of forest sanitation are carried out in compliance with the specifications and technical guidelines established in the Official Mexican Standard NOM-019-SEMARNAT-2017, which establishes the technical guidelines for the prevention, combat and control of debarking insects, which specifies control and combat methods (SEMARNAT, 2018).

Prevention implicated the monitoring through field trips to detect the presence of the active pest and the advance front, as well as the placement of traps to identify trees with the presence of bark stripping insects, and mark them to establish combat and control actions, applying physical-mechanical methods for the sanitation of affected areas, in accordance with the specifications and restrictions contained in the Management Program of the Natural Protected Area (NPA) Monarch Butterfly Biosphere Reserve and NOM-019-SEMARNAT-2019, to avoid affecting the populations of the Monarch Butterfly (*Danaus plexippus*).

Another implemented actions for the opportunity detection of the incidence of pest and diseases are the training of working groups in the agrarian nuclei, aimed at the population, with the objective of providing them with the elements and knowledge that will allow them to identify the symptoms caused by the attack of bark stripping insects on the trees. These actions are carried out in coordination with CONAFOR, COFOM and PROBOSQUE, as well as some civil society organizations.

The area where the phytosanitary treatment is carried out is reforested with plants of the same species, to guarantee the recovery of the vegetation cover, an activity realized by the ejidatarios, community members and small forest owners with the support and advice of forestry technical service providers. In the Chincua-Campanario-Chivati of Property, in the ejido El Rosario, Municipio de Ocampo, Michoacán, one of the most affected areas, 300,000 oyamel (*Abies religiosa*), and pine (*Pinus pseudostrubus*) plants

were reforested in 2022, covering an area of 250 ha, an area larger than the area affected by sanitization.

## Update of the Management Program

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5. Welcomes the ongoing commitment by the State Party in implementing the recommendations of the 2018 IUCN Reactive Monitoring mission to the Monarch Butterfly Biosphere Reserve Management Program with a participatory approach and requests the State Party to submit it for review by the IUCN once completed.

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In October 2017, the process to update the Management Program of the Monarch Butterfly BR began. As part of the process, participatory workshops were carried out with the representatives of the six micro-regions that comprise the Reserve, in which social and environmental conditions and problems, best practices and suggestions for updating the Management Program were identified.

During 2021, two workshops were held in the Indigenous Zitácuaro and Aporo-Ocampo Angangueo to socialize the zoning proposal contained in the updated Management Program. The process programmed to conclude in 2023

Followed up was implemented in 2022, on the integration of the updated information of the lists of flora and fauna, resulting from research and community monitoring.

## Mining Project

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6. Regrets that, whilst the Angangueo mining Project remains de facto prohibited, no updated information on the status of the Project and the current situation regarding mining concessions within the property and its buffer zone has been provided, and urges again the State Party to ensure that no mining activities are permitted within the property, and to implement other recommendations of the 2018 mission related to this issue;

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In this regard, it should be noted that the Project Angangueo in the municipality Mineral de Angangueo, Michoacán, in the buffer zone of the Property, doesn't have authorization for change in land use. There is no mining project authorization process been registered by the General Direction of Environmental Impact and Risk (DGIRA) of the SEMARNAT, Delegation SEMARNAT Michoacán and CONANP Head Quarters. Even though, the Grupo Industrial Minera México, S.A. (IMMSA), initiated steps to reactivate operations, the project wasn't authorized.

CONANP reaffirm its commitment to the conservation and protection of the Monarch Butterfly Biosphere Reserve, with emphasis on the Monarch Butterfly and its hibernation habitat, a World Heritage Property, a key site for maintaining the migratory phenomenon of this species. It also recognizes the importance of examining the compatibility of mining activities, that even when a project is located outside the boundaries of the property, it requires attention and prevention, and to be evaluated in terms of environmental impact, allowing long term preservation of its Outstanding Universal Value.

## International Cooperation

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7. Also welcomes the ongoing trinational cooperation between the States Parties of Canada, Mexico and the United States of America, and also requests the three States Parties to consolidate and build upon measures to conserve the butterfly through these means, with a particular focus on minimizing the loss and to restoring native milkweed species in the United States of America;

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### Trilateral Cooperations Actions Canada-United States Mexico

Within the framework of trilateral cooperation between Canada, United States and Mexico, during 2021 and 2022 trilateral citizen monitoring of the Monarch Butterfly called Blitz (Initiative to better understand the distribution of migratory populations of the Monarch Butterfly in North America) was carried out, with the participation of civil society from the three countries, in order to collect information on the reproduction of the Monarch Butterfly and establish collaborations to support the conservation of the Monarch Butterfly and other pollinators.

The Monarch Blitz initiative is organized by the Trinational Monarch Conservation Scientific Partnership (TMCSP), a collaboration of several organizations including the Commission for Environmental Cooperation (CEC), the Montreal Insectarium “Space for Life”, Environment and Climate Change Canada (ECCC), the Monarch Joint Venture, the Journey North Project, the United States Fish and Wildlife Service (USFWS), the Xerces Society for Invertebrate Conservation, and CONANP.

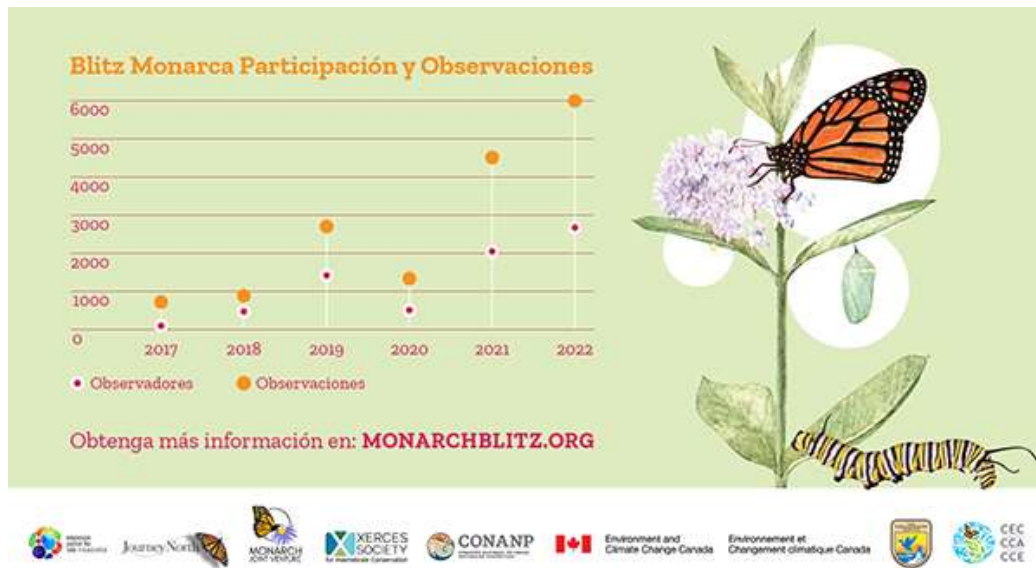
For the development of the activity, dissemination materials, communication strategies and digital monitoring platforms were implemented. During the 2021 Monarch Blitz, which took place from July 23rd to August 1st, 2021, more than one thousand volunteers from 80 states and provinces in Canada, the United States and Mexico took part in the operation, sharing 4,293 observations of monarch butterfly (*Danaus plexippus*) specimens and milkweed (*Asclepias spp.*) plants, reaching the highest level of participation recorded since the initiative inception in 2017.

In the results of Blitz 2022, on July 29th and August 7th, the participation in the monitoring initiative surpassed the number of participants recorded in previous years, with a new record of more than 2,600 people from 75 States, provinces, and territories in the three North American countries. This support resulted in nearly 6,000 sightings of monarch and milkweed plants. In the context of the recent inclusion of the migratory monarch butterfly on the International Union for the Conservation of Nature (IUCN), this trinational citizen science effort highlights the importance and critical value of regional collaboration to preserve this North American migratory species (Figure 4)

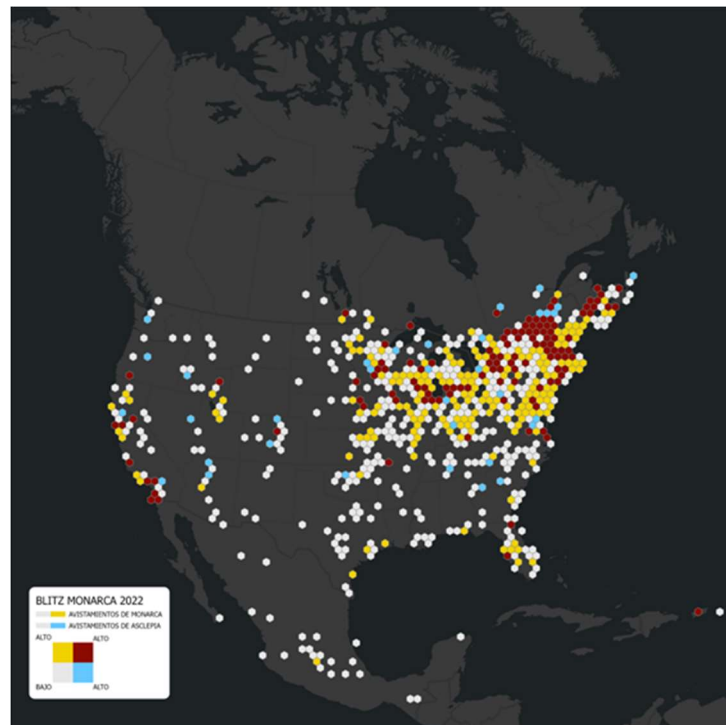
As the Montreal Insectarium, one of the organizations participating in this effort, points out, “the results obtained from the lightning operation demonstrate the community’s interest and commitment to support actions in favor of the conservation of the migratory population of the monarch butterfly. The remarkable participation reflects how communities throughout North America are collaborating to gather information to guide conservation efforts and research related to this endangered species”.



Understanding monarch butterfly breeding habitat is key to effectively prioritizing and targeting conservation actions across the subcontinent. A solid knowledge in this regard also offers the possibility of analyzing trends in summer breeding populations and learning more about the factors that may contribute to their fluctuations.



**Figure 4.** Blitz Monarch monitoring participants and observations 2017-2022



**Figure 5.:** Notes of the international initiative of monitoring Blitz Monarch 2022

**Reference:**

<http://www.cec.org/es/iniciativa-internacional-de-monitoreo-blitz-monarca/>

<http://www.cec.org/es/medios/comunicados-de-prensa/gracias-a-todos-ustedes-se-alcanzo-el-mayor-de-los-exitos-en-la-quinta-edicion-anual-de-la-iniciativa-internacional-de-monitoreo-blitz-monarca/>

<http://www.cec.org/es/newsletter/gran-apoyo-a-las-tareas-de-conservacion-de-la-mariposa-monarca-gracias-a-una-participacion-sin-precedente-en-la-iniciativa-blitz-monarca-en-los-tres-paises-de-america-del-norte/>

**National Action Plan for the Conservation of the Monarch Butterfly 2018-2024**

The Action Plan (First edition March 2019) shows Mexico's interest in contributing with the United States of America and Canada to achieve the effective and long-term conservation of this species shared by the three countries and the functional role in ecosystems it occupied throughout the North American region.

Within the Action Plan framework, CONANP has led significant efforts to monitor butterflies' passage through 48 Federal Protected Natural Areas, 29 State Natural Protected Areas, and three Priority Regions for Conservation (PRC) 22 states.

The Action Plan identify the priority actions in six major strategic lines and a total of 147 actions that require the participation of multiple actors for their implementation.

Strategic Lines of the Mexican Plan of Action

Priority Actions	Objectives
1. Economics of conservation	Develop and consolidate programs, projects and productive activities that provide sufficient income for the well-being and integral rural development of the communities living in the wintering habitat and along the migratory route.
2. Restoration and conservation	Maintain the integrity ecosystem of the Monarch Butterfly's overwintering habitat and migratory route.
3. Research and monitoring	Promote scientific research on priority issues that support decision-making for the conservation of the monarch butterfly migration phenomenon.
4. Inspection and surveillance	Strengthen participation in inspections and surveillance actions that contribute to the reduction of environmental crimes in the overwintering habitat and migratory route.
5. Social participation, communication, and conservation cultural	Promote a culture for the conservation of the migratory phenomenon of the Monarch Butterfly and strengthen spaces for social participation in making decisions.

6. Coordination and financing	Implement the Action Plan for the conservation of the Monarch Butterfly in Mexico 2018-2024 in an effective and coordinated manner through sustained funding.
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The National Action Plan for the Conservation of the Monarch Butterfly in Mexico 2018-2021 was edited and printed (2019) with the support of the Mexican Fund for the Conservation of Nature (FMCN). This instrument is implemented by the various partners that make up the National Monitoring Network to promote the actions of the strategic lines that comprise it.

<https://www.gob.mx/conanp/documentos/plan-de-accion-para-la-conservacion-de-la-mariposa-monarca-en-mexico-2018-2024>

### Monitoring of the Monarch Butterfly (*Danaus plexippus*)

In the season 2020-2021 were registered nine colonies of monarch butterflies, two in Michoacán and seven in the Estado de México, which occupied a total area of 2.10 ha of forest, and it was possible to establish that five colonies (1.32 ha) were located within the Property and its buffer zone, while four (0.78 ha) were established outside (Table 24). This area represents a 26% decrease compared to the area occupied in 2019-2020 which amounted to 2.83 ha. Figure 7 shows the location map of the monitored colonies.

**Table 4.** Hibernation colonies and forest area occupied by the Monarch Butterfly, season 2020-2021.

Ubication	State	Sanctuary	Colonies (Agrarian Properties)	Area (ha)
World Heritage Property and Buffer Zone	Estado de México	Cerro Pelón	E. El Capulín	*
			E. Mesas Altas de Xoconusco	*
			C.I. San Juan Xoconusco	0.07
			B.C. San Pablo Malacatepec	0.42
		Sierra Campanario	E. San Joaquín Lamillas	0.01
			E. La Mesa	*
	Michoacán	Cerro Altamirano	E. Contepec	*
		Cerro Pelón	E. Nicolás Romero	*
		Chivatí-Huacal	C.I. Carpinteros	*
		Sierra Campanario	E. El Rosario	0.73
		Sierra Chincua	State property	0.09
			E. Cerro Prieto	*
			E. El Calabozo Fracción 1	*
Lomas de Aparicio	E. Crescencio Morales	*		
Area occupied within the reserve				1.32
	Estado de México	Cerro del Amparo	E. San Francisco Oxtotilpan	0.05

Outside the MBBR (Influence zone)		Palomas	E. San Antonio Albarranes	0.43
		Piedra Herrada	E. San Mateo Almomoloa	0.28
		Peña Ahumada	E. Ojo de Agua	0.02
		Cerro de la Antena	E. El Potrero	*
	Michoacán	Los Azufres	P.P. San Andrés	*
		Mil Cumbres	E. Río de Parras	*
Area occupied outside the reserve				0.78
Area total occupied				2.10

In the season 2021-2022 were register ten colonies of the monarch butterfly, five in Michoacán and five in the Estado de México occupying a total area of 2,835 ha of forest and it was possible to establish that six colonies (2.174 ha) were located inside the Property, while four (0.061 ha) were established outside (Table 25). This area represents an increase of 35% compared to the area occupied in 2020-2021 which was 2.10 ha.

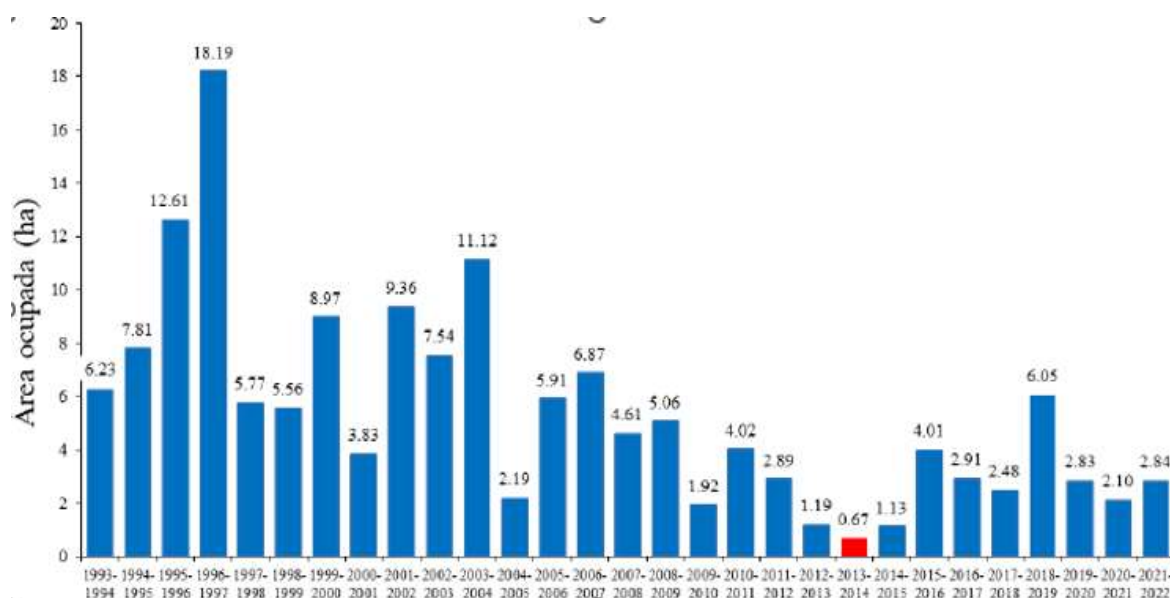
In the region of the Monarch the largest colony (1.187 ha) was recorded in the ejido El Rosario (Sanctuary Sierra Campanario) and the smallest colony (0.003 ha) was recorded in the ejido Crescencio Morales (Sanctuary Lomas de Aparicio). This colony in 2003-2004 was found for last time and recently, with the monitoring of the present season it has been recorded again.

**Table 5.** Hibernation colonies of the Monarch Butterfly, season 2021-2022

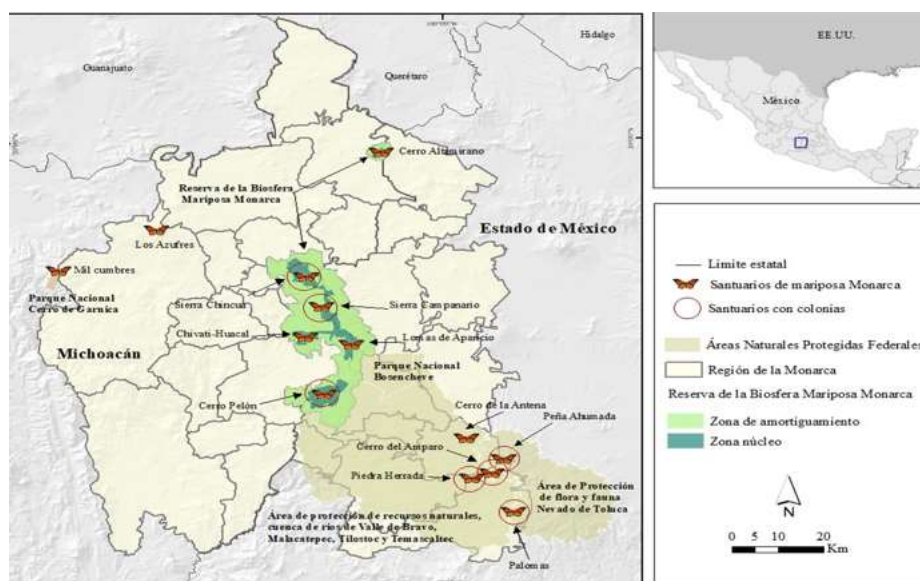
Ubication	State	Sanctuary	Colonies (Agrarian Properties)	Area (ha)
Within the World Heritage Property and Buffer Zone	Estado de México	Cerro Pelón	E. El Capulín	*
			E. Mesas Altas de Xoconusco	*
			C.I. San Juan Xoconusco	*
			B.C. San Pablo Malacatepec	0.016
		Sierra Campanario	E. San Joaquín Lamillas	*
			E. La Mesa	*
	Michoacán	Cerro Altamirano	E. Contepec	*
		Cerro Pelón	E. Nicolás Romero	0.556
		Chivatí-Huacal	C.I. Carpinteros	*
			C.I. Donaciano Ojeda	0.080
		Sierra Campanario	E. El Rosario	1.187
		Sierra Chincua	Propiedad Estatal	0.332
			E. Cerro Prieto	*
			E. El Calabozo Fracción 1	*
	Lomas de Aparicio	E. Crescencio Morales	0.003	
Area occupied within the reserve				2.174
Outside the MBBR (Influence zone)	Estado de México	Cerro del Amparo	E. San Francisco Oxtotilpan	0.011
		Palomas	E. San Antonio Albarranes	0.267
		Piedra Herrada	E. San Mateo Almomoloa	0.378



		Peña Ahumada	E. Ojo de Agua	*
		Cerro de la Antena	E. El Potrero	0.005
	Michoacán	Los Azufres	P.P. San Andrés	*
		Mil Cumbres	E. Río de Parras	*
Area occupied outside the reserve				0.661
Area total occupied				2.835



**Figure 6.** Forest area occupied by Monarch Butterfly colonies in Mexico, 1993-2022.



**Figure 7.** Location of the main Monarch Butterfly colonies, seasons 2018-2019 and 2019-2020.



## Monitoring

8. Noting the information regarding the strategies for adaptation to climate change implemented in the property and the wider region, also notes that Monarch butterfly colonies continue to occur outside the property, and given their susceptibility to climate change amongst other threats, encourages again the State Party to consider developing a proposal for an extension of the property in order to ensure that all areas consistently occupied by overwintering colonies are appropriately protected and to increase the potential of the property to effectively conserve its Outstanding Universal Value under changing climatic conditions;

## Forestry

Since 2021, CONANP, the Monarch Fund, and the World Wildlife Fund (WWF) have been conducting annual monitoring to determine the change in forest cover in the core zone of the Monarch Butterfly Biosphere Reserve.

The multidisciplinary group made up of technical staff from the CONAFOR, the PROFEPA, the Monarch Fund, the Institute of Biology of the UNAM, and the Directorate of the MBBR, conduct field verification visits to the points that show changes in forest cover in the core zone of the MBBR. These geo-referenced points are in a Geographic Information System with respect to the MBBR polygon area and proceed to corroborate in the field the location and the factor (logging, sanitation, drought, windthrow, among others) of land use change.

As part of the actions and followed of the annual monitoring carried out by CONANP and the Monarch Fund and the World Wildlife Fund (WWF), to determine the change in forest cover in the core zone of the Monarch Butterfly Biosphere Reserve, during March 2019 and March 2020, the alteration of a total area of 20.26 ha of forest in the Property Monarch Butterfly Biosphere Reserve, impacted by the incidence of pests that affected 3.46 ha drought in 3.44 ha and 13.36 ha subjected to illegal logging.

In 2020-2021, there was a change in forest cover of 18.829 ha, 3.064 ha affected by the fall of trees as a combination of wind and drought, in addition 13.936 ha due to illegal logging, 0.0532 ha to forest restoration and 1.297 ha to forest fires.

During the period 2021-2022, the change in forest cover was register in 58.686 ha, as a result of trees falling due to wind and drought in 1.423 ha, 13.406 ha affected by illegal logging, 28.735 ha to forest clearing and 15.122 ha to forest fires.

In the last 10 years, forest cover change has been the result of a combination of factors such as illegal logging, natural events (extreme winds, atypical rains, drought, frost, forest fires) and the incidence of pests (Figure 4); however, the effects of cover change are compensated through reforestation with native species. During 2022, 100,000 oyamel trees (*Abies religiosa*) were planted in the Nicolás Romero Community and Ejido; 38,000 in the San Felipe Los Alzati Indigenous Community in the Municipality of Zitácuaro; and 6,000 in the San Cristóbal Indigenous Community in the Municipality of Ocampo; 14,000

pine trees (*Pinus pseudostrobus*) were planted in the same community, all of them within the Property boundaries.



**Figure 8.** Change in forest cover in the core zone of the MBBR.

### Biological

The biological monitoring is aimed primarily at the Monarch Butterfly (*Danaus plexippus*), the ajolote (*Ambystoma rivulare*), and the community monitoring of terrestrial vertebrates.

#### 1. Monarch Butterfly (*Danaus plexippus*)

Monarch Butterfly monitoring includes population evaluation, number of colonies, their georeferenced location, and their movement. The actions are conducted by staff from the MBBR Directorate in coordination with the following natural protected areas; Nevado de Toluca Flora and Fauna Protection Area, Natural Resources Protection Area, Forest Protection Zone of the Terrenos Constitutivos de las Cuencas de los Ríos Valle de Bravo, Malacatepec, Tilostoc and Temascaltepec, and Iztaccíhuatl Popocatepetl National Park, with the participation of the World Wildlife Fund (WWF). The work is conducted by the staff from the MBBR, WWF, and the Cerro Prieto and El Rosario ejidos, who take samples and determine butterfly mortality.

It should be noted that, in addition to the sites in natural protected areas, where the Monarch Butterfly overwintering colonies have historically been recorded in the states of Mexico and Michoacán, monitoring is also conducted outside these areas, in the region of Mil Cumbres and Los Azufres in the state de Michoacán.

## 2. Ajolote arroyero (*Ambystoma rivulare*)

The monitoring of *Ambystoma rivulare* (ajolote arroyero), a Mexican endemic species listed as threatened in the list of species at risk in the Mexican Official Standard NOM-059-SEMARNAT-2010, has been conducted since 2007, by direct count, in the Sierra Chincua region, in the Llanos del Establo and Llano de Villalobos areas, in 20 fixed sampling sites where the most representative population of ajolotes is found.

Accessibility to these sites has made it possible to locate and quantify the number of organisms, work conducted by MBBR staff. Based on the 2021 records, 234 organisms were observed in Llano del Establo, 178 adults and 56 youth. In Llano de Villalobos, 25 organisms were observed, 16 in adult stage and 9 in youth and 4 in the larval stage. Based on these figures, the Llano del Establo pair has the highest abundance of the ajolote (*Ambystoma rivulare*).

### 1. Vertebrate monitoring

With the implementation of PROREST, in 2021 and 2022 the monitoring protocol was applied. BIOCOMUNI with monitoring of bird identification, footprints and dropping and placement of camera traps.

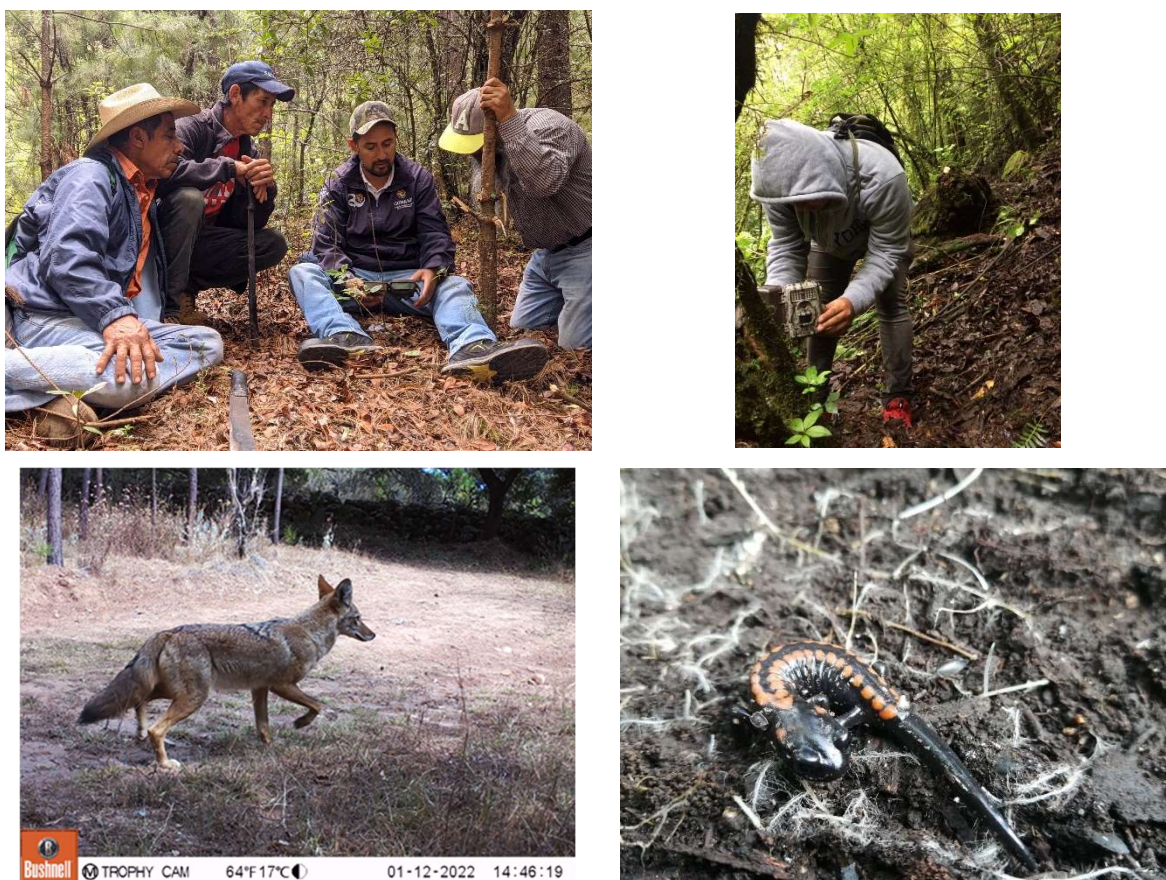
In 2021, the seven brigades, made up of 10 people each, conducted tours in different areas of the towns of Santa María la Ahogada, El Calabozo Primera Fracción, Hervidero y Plancha, Donaciano Ojeda, Jesús Nazareno Nicolas Romero y San Juan Xoconusco, in which 11 species of mammals were identified through photo-traps, among which are: rabbit (*Sylvilagus* sp.), coyote (*Canis latrans*), bobcat (*Lynx rufus*), white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), armadillo (*Dasypus novemcinctus*), squirrel (*Sciurus aureogaster*), gray fox (*Urocyon cinereoargenteus*), cacomixtle (*Bassariscus astutus*), trigrillo (*Leopardus wiedii*), badger (*Nasua narica*) and skunks (*Spilogale*). In addition to 60 species of birds such as red-chepe (*Cardellina rubra*), fire eyer (*Junco phaeonotus*), Mexican thrush (*Catharus occidentalis*), blackbird (*Turdus migratorius*), coa (*Trogon mexicanus*), chara copetona (*Cyanocitta stelleri*), cabeza prieta (*Pipilo maculatus*), gallina de monte (*Dendrortyx macroura*), capulinero (*Ptiliogonys cinereus*), jilguero (*Myadestes occidentalis*), matraca (*Campylorhynchus gularis*), chipec (*Leiothlypis celata*), papamoscas (*Contopus pertinax*), águililla cola roja (*Buteo jamaicensis*), pavito (*Myioborus miniatus*), carbonero (*Poecile sclateri*), chipec cabeza gris (*Leiothlypis ruficapilla*), calandria (*Icterus cucullatus*), gorrión (*Haemorhous mexicanus*), trepador (*Certhia americana*), tigrillo (*Pheucticus melanocephalus*), cuervo (*Corvus corax*), gorrión azul (*Sialia mexicana*), empidonax (*Empidonax occidentalis*), colibrí (*Colibri thalassinus*), colibrí oreja blanca (*Basilinna leucotis*), colibrí sumbador (*Selasphorus platycercus*), piranga (*Piranga flava*), paloma (*Patagioenas fasciata*), primavera (*Ridgwayia pinicola*), carpintero de pechera (*Colaptes auratus*), carpintero bellotero (*Melanerpes formicivorus*), cuitlacoche (*Toxostoma curvirostre*), cardenalito (*Pyrocephalus rubinus*), chipec ceja dorada (*Basileuterus belli*), reyezuelo (*Regulus satrapa*).

By direct observation at a counting point, three species of reptiles were recorded, black-tailed rattlesnake (*Crotalus molossus*), collared lizard (*Sceloporus torquatus*) and lizard (*Sceloporus grammicus*), as well as two amphibians, the pinto tlaconete (*Isthmura belli*) and salamandra (*Pseudoeurycea leprosa*).

In 2022, the brigades conducted monitoring tours in different parts of its forest lands, identifying 10 species of mammals through photo-trapping, 50 species of birds through direct observation at a counting point, four species of reptiles and two species of amphibians. In the localities of Santa María la Ahogada, Federal Property, Hervidero y Plancha and Rincón de Soto, in the state of Michoacán and La Mesa, San Juan Xocunusco and San Pablo Malacatepec in the Estado de México.

In 2022, the species *Contralalalus molussus* was observed in Ejido Rincón de Santo, a new record for the Biosphere Reserve, in addition to those of *Leopardus wieddi* (ocelot) and *Puma yagouaroundi* (jaguarundi) recorded through community monitoring of terrestrial vertebrates, funded by the PROCODES (2019-2020) grant programs, whose presence was confirmed in 2020-2021, and *Odocoileus virginianus* (white-tailed deer). These actions contribute to strengthening the community's knowledge of the wildlife in their territories.

In 2021, with support from PROREST through the Community Conservation Component, monitoring actions were continued and project “Monitoring of felines in the southern zone of the Monarch Butterfly Biosphere Reserve” was implemented with the objective of following up on the diagnosis of the population status of the ocelote, jaguarundi and bobcat, and their habitat in the southern zone of the MBBR (Fig. 5).



**Figure 9.** Monitoring actions in the MBBR



## Environmental monitoring

- Water quality monitoring with community participation.

The MBBR is integrated with a community water quality monitoring network, with physicochemical and bacteriological analysis, which operates in 36 permanent sites in the Lerma Toluca and Cutzamala watersheds. In the Lerma-Toluca basin, sampling is conducted in three ejidos within the Senguio, municipality of Senguio and in the Garatachea in the municipality of Angangueo; in Cuenca Cutzamala, monitoring sites are in the San Juan micro-watershed, municipality of Zitácuaro; in the indigenous communities of Curungueo, San Felipe Los Alzati; Donancio Ojeda, Francisco Serrato and Crescencio Morales.

The conditions of pH, turbidity, alkalinity, hardness, and oxygenation levels in the water bodies are determined by physicochemical and bacteriological parameters.

The information is transmitted to the agrarian nuclei in their assemblies, with the objective of creating awareness about water quality and its importance, and to provide recommendations aimed at minimizing negative effects on human health and preventing environmental impacts in their ejidos and communities.

## Program for Adaptation to Climate Change in the Monarch Butterfly Complex

During the 2018-2020 in the MBBR, actions to adapt to Climate Change were conducted, which are described in the Climate Change Adaptation Program (PACC) Monarch Butterfly Complex: Strategic Ecological Restoration and Diversification of productive activities and use of biodiversity.

Actions associated with the restoration of the Senguio in Michoacán were conducted, the production of plants in a community nursery, the collection of germplasm from the region, plant germination and care of their development, soil conservation works and control of exotic species. Actions were aimed at restoring riparian vegetation. Through the Conservation Program for Sustainable Development in 2021, resources were applied to the production of native species plants to contribute to the restoration of the Senguio micro-watershed. The production area was 170 square meters, producing 2,600 oaks trees (*Quercus*), 300 ailes (*Alnus*), 250 ash trees (*Fraxinus*) and 250 herbaceous plants.

## Programs of subsidy in support of communities

CONANP, to reach a balance between conservation and development and at the same time maintain the traditions of the communities and ejidos that are part of the Reserve, has continued to strengthen the social fabric, encouraging participation in productive and conservation activities.

The CONANP staff continue to promote studies, productive project, and training through different programs, in coordination with the three levels of government and in collaboration with Civil Society Organizations, to contribute to the economy of the population of and around the Biosphere Reserve by generating sources of employment and conservation alternatives.

The Directorate of the Reserve are also collaborating with community and ejido members and other entities such as CONAFOR and the Monarch Fund to continue generating income from conservation and not forest harvesting works, as well as payments for the generation of hydrological environmental services.

CONANP budgetary programs are currently included in the PROCODES and the PROREST.

### Conservation Program for Sustainable Development (PROCODES)

The objectives of PROCODES are to promote the sustainable use of natural resources and biodiversity by women and men living in Natural Protected Areas and their areas of influence for social development, providing direct support for its implementation through the following four components:

Component	Objective	Population eligible for support
<b>Technical Studies</b>	Promote the elaboration of technical studies that allow women and men living in the localities settled in the Natural Protected Areas and their zones of influence to plan, program and execute sustainable activities.	Women and men 18 years of age or older, who constitute organized groups; ejidos or communities and legal persons, who are owners, possessors, usufructuaries or users of the natural resources included in the localities of the municipalities of the Natural Protected Areas and their zones of influence (Rules of Operation).
<b>Projects</b>	Promote the sustainable use of biodiversity and natural resources through the development of sustainable productive activities, as well as restoration and conservation projects for productive purposes.	Women and men 18 years of age or older, who constitute organized groups; ejidos or communities and legal persons, who are owners, possessors, usufructuaries or users of the natural resources included in the localities of the municipalities of the Natural Protected Areas and their zones of influence (Rules of Operation).
<b>Training courses</b>	Promote the training of women and men who live in the localities settled in the Natural Protected Areas and their areas of influence for the sustainable use of natural resources.	Women and men 18 years of age or older, who constitute organized groups; ejidos or communities and legal persons, who are owners, possessors, usufructuaries or users of the natural resources included in the localities of the municipalities of the Natural Protected Areas and their zones of influence (Rules of Operation).
<b>Environmental contingency brigades</b>	Prevent, mitigate and restore risk situations derived from the presence of environmental contingencies that endanger the integrity of one or several ecosystems in Natural Protected Areas and their zones of influence.	Community brigades composed of at least eight people, men and/or women over 18 years of age, who must be trained in the subject matter in question by the corresponding institution.

In 2021, 15 projects were implemented for a total amount of \$1'949,130.00 MXN, while by 2022, 46 projects were implemented for a total amount of \$4'525,000.00 MXN (Table 5).

**Table 6.** Investment of the PROCODES in the MBBR 2021–2022.

Component	2021		2022	
	Number of projects	Investment (MXN)	Number of projects	Investment (MXN)
Technical Studies	2	160,000.00	1	90,000.00
Projects	13	1'150,000.00	44	3'714,000.00
Training courses	-	-	1	45,000.00



Environmental contingency brigades	1	639,130.00	2	676,000.00
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Reference: CONANP, Directorate **MBBR** (2022).

## **Program for the Protection and Restoration of Priority Ecosystems and Species (PROREST)**

For fiscal year 2021-2022, PROREST provided direct support for implementation through the following components:

Component name	Objective	Population eligible for support
<b>Technical Studies for the Management of Natural Protected Areas.</b>	Promote the realization of technical studies for the effective management of Natural Protected Areas under the authority of the Federation.	Mexican higher education and/or research institutions and research centers, with national or regional representation, legally constituted, that are not for profit.
<b>Community Conservation in Natural Protected Areas</b>	Promote the direct and effective participation of the local population in actions for the prevention, protection and restoration of ecosystems and their biodiversity in Natural Protected Areas and their zones of influence, in such a way that economic opportunities are generated for population.	Women and men of 18 years of age or older that constitute organized groups that are not constituted as legal entities; as well as Ejidos and Communities that live in localities of the municipalities that comprise the Natural Protected Areas and their Zones of Influence

In 2021, were implemented seven projects of the Community Surveillance and Monitoring and one project for the Conservation of Priority Species, for a total amount of \$1'650,000.00 MXN. For the same project, in the Ecological Restoration Component, nine projects were implemented for \$1'293,000.00 MXN.

For 2022, were implemented 20 projects for a total amount of \$2'200,000.00 MXN pesos, for ecological restoration and surveillance or community monitoring. (Table 6).

### **2. Ecological restoration**

During 2021, nine projects were supported for a total amount of \$1'293,000.00.00 MXN for reforestation maintenance actions, rehabilitation of firebreaks and fuel management (chapeo y material handling).

In 2022, the investment was \$1'223,000.00 MXN, in the execution of 13 projects for integrated fire management actions for the conservation of ecosystems, consisting of fuel material management and the opening and rehabilitation of firebreaks in 325 hectares.

### **3. Surveillance and Community Monitoring**

In 2021, seven projects were supported with \$1'400,000.00 MXN, as resources used to train 70 community's technicians in techniques for monitoring terrestrial vertebrates, through photo-trapping, identification of track and excreta, counting points and direct identification of species; in addition to assisting in the work of forest surveillance to reduce environmental crimes in the Property (core zones of the MBBR), in an area of 4.430 ha under surveillance.

During 2022, seven projects were supported with \$797,000.00 MXN, with which 70 community technicians were trained in techniques for monitoring terrestrial vertebrates, through photo-trapping, identification of tracks and droppings, counting point and direct identification of species: in addition to assisting in the work of forest surveillance for reduction of environmental crime in the Property (core zone of the MBBR). The area covered was 2,700 ha under surveillance.

#### 4. Conservation of priority species

During 2021, a project was supported with resources for \$250,000.00 MXN for monitoring and recording actions of vertebrate species, which strengthens community participation in the conservation of priority sites as habitat for these species, in addition to creating databases with records obtained through camera traps, as well as the use of sampling methods of footprints and excreta.

**Table 7.** Investment of PROREST in the MBBR 2021–2022

Component	2021		2022	
	Number of projects	Investment (MXN)	Number of projects	Investment (MXN)
Surveillance and community monitoring	7	1'400,000.00	7	797,000.00
Ecological restauration	9	1'293,000.00	13	1'223,000.00
Conservation of priority species	1	250,000.00	-	-

### Sustainable business

The Monarch Butterfly Biosphere Reserve has promoted social welfare and the development of sustainable productive activities, through the Subsidy Program PROCODES, with the participation of the local communities

In 2020, within the framework of the Biodiversity Conservation in the Eje Neovolcánico (COBEN) program, between the German Cooperation Agency (GIZ) and CONANP through the program to strengthen socio-environmental enterprises, the following lines were supported:

1. Solidarity economy in the context of COVID-19, to strengthen management capacities and generate suitable conditions to face post-COVID challenges, facilitating access to capital to scale their impact, in which three MBBR business participate: 1) Butterfly in flight, Mazahua embroidery; 2) Forestry and environmental consultancy, nursery with production of forest plants; and 3) Cerro Altamirano, jewelry made from seeds and ocoxal.
2. Strengthening for tourism companies with the Market Ready Eje Neovolcánico model, with the objective of strengthening the capacities of key actors, such as social enterprises to generate alliances and professionalize the operation of nature tourism in natural protected areas, and promote the Eje Neovolcánico as a sustainable tourism destination, contributing to the implementation of CONANP subregional plans, in which two MBBR business participate, 1) Travel and show off my land and 2) Parador turístico Lechuguillas.

In 2022 two projects were executed with COBEN, in its second phase developed between 2018 and 2022:

The Biodiversity Conservation in the Eje Neovolcánico Project (COBEN) is implemented through a cooperation between the German Federal Ministry for Economic Cooperation and Development (BMZ) and the Agencia Mexicana de Cooperación Internacional para el Desarrollo (AMEXCID). The implementers of these Projects are Mexico CONANP and the German Cooperation Agency (GIZ), which through a consultancy contract have executed the project “Technical Support for tourist agents in selected sites of Eje Neovolcánico Region: Post-COVID-19 Green Recovery Strategy”.

The general objective of the project is to improve the management of protected areas in the central region of the Eje Neovolcánico. The end of this process is to strengthen management capacities and alliances among sustainable tourism actors in the Eje Neovolcánico. One of the key activities of the consultancy is to develop the recovery strategy post-COVID-19 to promote sustainable tourism as a mechanism for the effective management and administration of the natural protected areas of the Eje Neovolcánico. This is an instrument that will allow the Eje Neovolcánico to be recognized as a tourist destination that values the environmental services that natural areas contribute to the welfare of local community's and development of society.

As a follow-up to the projects that were executed in 2020; the need arose to implement, through the consultancy Tekio, the “Positioning Strategy of the Eje Neovolcánico through the strengthening of 50 local enterprises (phase 2)”, which was the objective to promote the economic recovery of the community's located within the NPA and their areas of influence in relation to COVID-19 in the Center Region and Eje Neovolcánico, by strengthening local value chains through the use of social and solidarity economy models and the dissemination of products/services linked to the productive dedication of the region. In the Reserve were analyzed five enterprises: Ocobella y Xepie of the Sello Colectivo Mariposa Monarca; PT Senguio, PT Lechuguillas y PT El Asoleadero.

### **Monarch Butterfly Collective Seal (Sello Colectivo Mariposa Monarca)**

In 2014, the Sello Colectivo Mariposa Monarca was created, using CONANP Sustainable Social Business criteria to measure the degree of sustainability according to the Project Sustainability Index (Índice de Sustentabilidad de los Proyectos). As a result, five projects were selected.

CONANP, through the Global Environmental Facility (GEF) and United Nations Development Program (UNDP-Resilience) project, will prepare a study for the diversification of productive activities, services, and sustainable products to reduce the economic vulnerability of the population and the pressure on the region natural heritage. The Sello Colectivo Mariposa Monarca, create the logos of each microenterprise and the labels of their products, the generation of a digital catalog, the creation of six videos for their dissemination, the design and generation of a web page, and the registration of their trademarks with the Mexican Institute of Industrial Property were designed.

In 2020, the seal was ,compound of seven business; in 2021, one more project was incorporated, and marketing reengineering was also conducted to make their products

more attractive. There are currently eight microenterprises that are part of the Sello Colectivo Mariposa Monarca:

- *Acahualli*, bee honey and products derived from the beehive, locality Santa Teresa, Villa de Allende, Mexico.
- *Bosque Rey*, handicrafts of ocoxal, locality Barrio de Arriba de San Juan Xoconusco, Donato Guerra, Mexico.
- *El Manantial*, jewelry made from recycled glass, locality Rincón del Ahorcado, Zitácuaro, Michoacán de Ocampo.
- *Xepje*, embroidery mazahuas, locality Barrio de San Diego Pueblo Nuevo, San José del Rincón, Mexico.
- *Minajoo*, handicrafts of ocoxal, locality Donaciano Ojeda (Primera y Segunda Manzana de San Francisco), Zitácuaro, Michoacán de Ocampo.
- *Shitamo*, textile mazahuas, locality Boca de la Cañada (Cuarta Manzana de Crescencio Morales), Zitácuaro, Michoacán de Ocampo.
- *Yeje Z'ana*, natural herbal products, locality La Barranca (Quinta Manzana Crescencio Morales), Zitácuaro, Michoacán de Ocampo.
- *Ocobella*, jewelry made from sedes and acoxal, locality Santa Mara la Ahogada, Contepec, Michoacán de Ocampo.

The Sello Colectivo Mariposa Monarca is promoted through the website:

<https://monarcasustentable.com.mx/>

In March 2020, was interrupted the on-site activities and events for disseminate and market the products made by groups of artisans to Monarch Butterfly Collective Seal (SVMM), in the face of the SARSCoV2 (COVID 19); however, close communication was maintained with SCMM members, and sales and promotion were carried out on internet platforms.

For the productive strengthening and improving production capacities, and organization of the people belonging to the Sello Colectivo Mariposa Monarca, with funding from PROCODES in fiscal years 2021-2022, the following support was channeled:

In 2021 investment of \$440,000.00 MXN for the next groups:

- *Acahualli*: Third of the workshop for the extraction, processing, and storage of honey
- *Ocobella*: Purchase of materials for the elaboration and exhibition of handicrafts, as well as a workshop for innovation in jewelry products made of ocoxal and seeds.
- *Bosque Rey*: Construction of the first stage of the workshop for the elaboration, storage, and exhibition of ocoxal handicrafts.
- *Xepje*: Construction of the second stage of the workshop for the elaboration, storage, and exhibition of mazahua handicrafts.
- *Xepje y Ocobella*: Through a consultancy, we designed the logo, label, and packaging, as well as the design of new products for the new groups that joined the collective; and in response to the need to incorporate online sales, the website was reactivated and strategies were designed to establish sales channels, and the Instagram account was created,

<https://www.instagram.com/sellocolectivomariposamonarca/>, which is one of the trend platforms that allows the establishment of online stores along with Facebook.

During 2021 there wasn't participation in events on-site; however, with the adaptation to online sales, the Sello Colectivo groups continued to work through national shipments and orders.

In 2022 the investment has been \$765,000.00 MXN for the following groups:

- *Bosque Rey*: Construction of the second stage of the workshop for the elaboration, storage, and exhibition of ocoxal handicrafts, as well as exhibition supplies for the Sello Colectivo Mariposa Monarca.
- *Ocobella*: Equipment for the workshop and purchase of materials for the elaboration of handicrafts, as well as supplies for the exhibition of the Sello Colectivo Mariposa Monarca.
- *Acahualli*: Fourth and final stage of the workshop for honey extraction, processing and storage.
- *El Manantial*: Construction of the first stage of the workshop for the elaboration, storage, and exhibition of jewelry made from recycled glass.
- *Xepje*: Construction of the third stage of the workshop for the elaboration, storage, and exhibition of Mazahua handicrafts, as well as exhibition supplies for the Sello Colectivo Mariposa Monarca.
- *Yeje Z'ana*: Trophology training course, which had the purpose of providing practical knowledge of natural medicine to identify foods that help maintain health, promote the appropriation of cultural identity roots through native foods, traditional recipes, knowledge sets to generate efficient and productive ways of life, promote self-consumption and marketable products, with local elements, provide and encourage fair trade partnerships with producers in other locations to expand the range of profitable and capitalizable goods.
- *Sandoval*: It is a new group of producers that was analyzed to be integrated into the Sello Colectivo Mariposa Monarca, through the project, the following purchases will be made to strengthen the production project with inputs, materials, tools, and equipment such as packaging of maguey honey that is produced from the mead of magueys, drums, buckets, gallons, devil, key, pump for storing the honey, development of the logo that will be used for labeling the product in its three different presentations for sale and supplies for display and production of Sello Colectivo Mariposa Monarca.
- *Sello Colectivo Mariposa Monarca*: This project benefits all the members of the Sello, as it strengthens their identity through the acquisition of uniforms that allow them to distinguish themselves at fair, symposium and presentations they attend, equipment with eco bags engraved with information about the group and the Sello, advertising with the purchase of banners which, in addition to being promotional, are informative for the exhibitions and events they attend; finally, the marketing plan and strategy will be reinforced with the management of a community manager who will manage their social networks Facebook and Instagram to have a greater reach of people, promotion and sale of their products.

During 2022 the participation of the groups of the Sello Colectivo Mariposa Monarca, was resumed, the events in which they have participated were the following:

- The groups Yeje Z'ana, Acahualli, Shitamoo , Xepje y Minajoo participated in the XXIX Monarch Butterfly Biocultural Festival, at the Parador Tourist in Sierra Chincua in the municipality of Angangueo, Michoacán; where visitors were able to join the wellness chain by purchasing products and handicrafts (March 12, 2022).
- The groups Minajoo, Yeje Z'ana, El Manantial, Xepje, Ocobella y Shitamo participated in the Expo Venta Artesanal 2022 in the municipality of San José del Rincón, Estado de México (March 17-20, 2022).
- The groups Acahualli, Yeje Z'ana y El Manantial participated in the presentation of the COSMOS project at the UMA de Valle de Bravo, Estado de México; where they explained to the German representatives of the project the importance of productive activities in the Monarch Butterfly Biosphere Reserve (June 23, 2022).
- The group Acahualli participated in the event called La Ruta de la Miel y de las Flores at the Complejo Cultural Los Pinos in Mexico City, where they presented the importance of bees for the Reserve and the world, as well as some of the productive activities conducted in the Sello Colectivo Mariposa Monarca (May 20-22).
- The eight groups that conform the Sello Colectivo Mariposa Monarca participated in the Sustainable Products Fair organized by CONANP in the Iztapalapa macro plaza in Mexico City (July 1 to 3, 2022)

### **Payment for Environmental Services**

Payment for environmental services (PES) is part of Mexico's forestry and rural development policy and is implemented through the programs of the CONAFOR, an agency that has also encouraged the attraction of complementary resources from other sectors, the inclusion of new actors and the construction of financial and institutional arrangements to respond to the needs for conservation of forest resources and their environmental services.

Monarch Butterfly Conservation Fund.

Among the experiences of concurrent funds, the Monarch Butterfly Conservation Fund, developed for the protection of the core zones of the Monarch Butterfly Biosphere Reserve (MBBR) designated as a World Heritage Site, stands out.

In 2009 this Fund, also known as Monarca Fund, and the concurrent funds of the CONAFOR, committed with the signing of a collaboration agreement, to allocate, for a period of 15 years (2011-2026), \$120'220,759.43 MXN to conserve an area of 9,928.34 ha, comprising 34 agrarian nuclei, equivalent to 73% of the total area of the core zones of the MBBR property. With this resource, the ejidos communities and small properties through community crews or brigades, carry out annual activities aimed at the conservation of these sites, including the prevention of forest fires, community vigilance, reforestation, the removal of combustible materials, the placement of protection signage, the cleaning of bodies of water and the maintenance of roads and/or access routes to the sites. <https://storymaps.arcgis.com/stories/26b2ff59ee4c49bb81927a3cc68ac6af>.

Based on the analysis of the annual forest monitoring, the Monarca Fund Commission of the Technical Committee of the Fund for Natural Protected Areas and the Technical Committee of the Monarca Fund, analyzed the situation of each property with respect



to compliance with the conservation of the forest cover of the core zone, in order to make the corresponding payments and, if necessary, issue the pertinent recommendations.

The ejidos, indigenous communities and small landowners that participate in the Monarca Fund carry out the following activities annually to maintain forest cover in the World Heritage Property Monarch Butterfly Biosphere Reserve:

- Reduction of overgrazing
- Community vigilance
- Forest fire prevention and firefighting
- Training for environmental monitoring
- Protection of areas with natural regeneration
- Reforestation with native species
- Maintenance and protection of reforested areas.
- Conservation activities floors (fuel material placement on contour lines, road maintenance, morillo, dams)
- Early detection of forest pests and diseases.
- Protection of springs

The annual amount for 2021 and 2022 was \$7'869,224.81 MXN and 33 properties of the Agrarian Nuclei and small landowners benefited, for the protection of 12,361 ha of the Asset. The breakdown is shown in Table 7.

**Table 8.** Payment for Environmental Services with Concurrent Funds.

Site	Area (ha)		Monarch Fund (MXN)	CONAFOR (MXN)	Total
	Core Zone	Concurrent Funds			
Ejido El Asoleadero	288	203.95	90,063.22	88,987.06	179,050.28
Indigenous community Francisco Serrato	241	185.18	76,813.10	81,816.92	158,630.02
Ejido Chincua	182	182.63	62,428.41	80,842.82	143,271.23
Ejido Santa Ana	134	97.07	42,121.53	37,080.74	79,202.27
Ejido Cerro Prieto	242	213.41	79,871.06	92,600.78	172,471.84
Ejido Hervidero y Plancha	272	124.23	78,238.00	58,534.02	136,772.02
Indigenous community San Cristóbal	281	226.71	90,638.91	97,681.38	188,320.29
Ejido El Rosario	845	719.13	276,291.07	302,285.82	578,576.89
Ejido Los Remedios	119	94.66	38,249.90	36,160.12	74,410.02
Sergio Martín Molina Marín	204	200	69,993.11	87,478.16	157,471.27
David Rubén Salgado Suárez	304	200	103,386.66	87,478.16	190,864.82



Site	Area (ha)		Monarch Fund (MXN)	CONAFOR (MXN)	Total
	Core Zone	Concurrent Funds			
José Luis Garduño Vázquez	300	141.00	87,415.31	64,940.16	152,355.47
Ejido El Calabozo	624	615.86	212,489.97	262,836.68	475,326.65
Ejido Senguio	439	391.33	145,308.38	160,566.22	305,874.60
Indigenous community Donaciano Ojeda	697	674.09	235,970.28	285,080.54	521,050.82
Bienes Comunes de San Juan Xoconusco	168	150.18	55,649.93	68,446.92	124,096.85
Ejido Mesas Altas del Xoconusco	165	164.25	56,327.14	73,821.66	130,148.80
Ejido Contepec	574	437.80	193,517.22	178,317.76	371,834.98
Bienes Comunes de San Pablo Malacatepec	117	101.20	38,418.09	49,736.56	88,154.65
Ejido Rincón de Soto	32	12.07	8,950.58	15,688.90	24,639.48
Indigenous community Carpinteros	228	215.63	77,837.49	92,123.24	169,960.73
Ejido El Capulín	701	642.01	233,738.70	272,825.98	506,564.68
Indigenous community San Felipe de los Alzati	55	35.45	16,850.58	13,541.90	30,392.48
Ejido La Mesa	726	447.38	220,376.79	181,977.32	402,354.11
Ejido Nicolás Romero	455	396.09	149,656.50	162,384.54	312,041.04
Ejido Jesús Nazareno	171	168.34	58,187.60	75,384.04	133,571.64
Indigenous community San Francisco Curungueo	177	166.16	59,406.68	74,551.28	133,957.96
Ejido Crescencio Morales	1017	581.00	246,197.39	221,959.00	468,156.39
Ejido El Depósito	311	281.74	104,674.26	104,115.00	208,789.26
Indigenous community de Crescencio Morales	1133	725.65	351,930.35	301,545.00	653,475.35
Indigenous community Nicolás Romero	1007	522.29	296,504.36	212,795.00	509,299.36
Ejido Anganguero	138	84.65	42,580.14	40,660.00	83,240.14
Ejido Cerritos Cárdenas	14	0	4,898.42	0.00	4,898.42
<b>TOTAL</b>	<b>12,361</b>	<b>9,401.14</b>	<b>3'904,981.13</b>	<b>3'964,243.68</b>	<b>7'869,224.81</b>

## Hydrological Environmental Services in the Buffer Zone:

The Government of the Estado de México through the Payment for Hydrological Environmental Services Program (PSAHEM) and concurrent funds, in 2021 made payments to 30 forest properties for an amount of \$7'204,770.00 MXN for the

conservation of 8,803.18 ha of forests (Table 8), while for the year 2022 payments were made to 21 properties for an amount of \$5'605,770.00 MXN for the conservation of 3,737.18 ha of forests (Table 9).

**Table 9.** Payment for Hydrological Environmental Services 2021 in the Estado de México

<b>Municipality</b>	<b>Site</b>	<b>Area (ha)</b>	<b>Amount (pesos)</b>
Donato Guerra	Fracción Corral Viejo	150	225,000.00
Donato Guerra	Ejido Mesas Altas Xoconusco	291	436,500.00
Donato Guerra	Bienes Comunes De San Juan Xoconusco	500	750,000.00
San Felipe del Progreso	Ejido Guadalupe Buenavista	100.24	150,360.00
San José del Rincón	Ejido Las Rosas	339	508,500.00
San José del Rincón	Ejido La Fábrica Concepción	70.98	106,470.00
San José del Rincón	Ejido San Jerónimo Pilitas	66.68	100,020.00
San José del Rincón	Ejido La Trampa	150	225,000.00
San José del Rincón	Ejido El Deposito	90.55	135,825.00
San José del Rincón	Ejido La Mesa	20	30,000.00
San José del Rincón	Ejido San Joaquim Lamillas	139.18	208,770.00
San José del Rincón	Ejido Los Lobos	130.98	196,470.00
San José del Rincón	Ejido Buenavista Casa Blanca	62.69	94,035.00
San José del Rincón	Ejido Concepción del Monte	174.3	261,450.00
San José del Rincón	Ejido San Felipe de Jesús	100	150,000.00
San José del Rincón	Ejido San Felipe de Jesús	100	150,000.00
San José del Rincón	Ejido San Juan Palo Seco	352	528,000.00
San José del Rincón	P.P. Fracción de Terreno denominada Monte se Catingo y San Jerónimo Chicheje (Fracciones I, II Y III)	65	97,500.00
San José del Rincón	P.P. Monte Catingo	40	60,000.00
San José del Rincón	Ejido La Rosa Palo Amarillo	215	322,500.00
Temascalcingo	P.P. Inmueble Ubicado en San José Ixtapa	73	109,500.00
Temascalcingo	P.P. San José Ixtapa	62	93,000.00
Temascalcingo	P.P. Inmueble Ubicado en la Comunidad de Ixtapa	28	42,000.00
Temascalcingo	Ejido Contepec Primera Ampliación Porción en el Estado de México	300	450,000.00
Temascalcingo	P.P. Fracción Número Tres del Predio Denominado Ixtapa (P.P. Gamboa)	20	30,000.00
Temascalcingo	Ejido Cerrito de Cárdenas Sección Matamoros	248.92	373,380.00
Villa de Allende	Bienes Comunes Santa María y sus Barrios	111	166,500.00
Villa de Allende	Ejido San José Allende o La Cabecera	184.38	276,570.00
Villa de Allende	Bienes Comunes San Pablo Malacatepec	118.28	177,420.00
Villa Victoria	Ejido Cuesta del Carmen	500	750,000.00
<b>Total</b>		<b>8,803.18</b>	<b>7,204,770.00</b>

**Table 10.** Payment for Environmental Services 2022 in the Estado de México

Municipality	Site	Area (ha)	Amount (pesos)
Donato Guerra	Bienes Comunes de San Juan Xocunusco	500	750,000.00
San Felipe del Progreso	Ejido Guadalupe Buenavista	100.24	150,360.00
San José del Rincón	Ejido Las Rosas	339	508,500.00
San José del Rincón	Ejido La Fábrica Concepción	70.98	106,470.00
San José del Rincón	Ejido San Jerónimo Pilitas	66.68	100,020.00
San José del Rincón	Ejido La Trampa	150	225,000.00
San José del Rincón	Ejido El Deposito	90.55	135,825.00
San José del Rincón	Ejido San Joaquin Lamillas	139.18	208,770.00
San José del Rincón	Ejido Los Lobos	130.98	196,470.00
San José del Rincón	Ejido Buenavista Casa Blanca	62.69	94,035.00
San José del Rincón	Ejido Concepción del Monte	174.3	261,450.00
San José del Rincón	Ejido San Felipe de Jesús	100	150,000.00
San José del Rincón	Ejido La Rosa Palo Amarillo	215	322,500.00
Temascalcingo	P.P. Inmueble Ubicado en San José Ixtapa	73	109,500.00
Temascalcingo	P.P. San José Ixtapa	62	93,000.00
Temascalcingo	Ejido Contepec Primera Ampliación porción en el Estado de México	300	450,000.00
Temascalcingo	Ejido Cerrito de Cardenas Sección Matamoros	248.92	373,380.00
Villa de Allende	Bienes Comunes Santa María y sus Barrios	111	166,500.00
Villa de Allende	Ejido San José Allende o La Cabecera	184.38	276,570.00
Villa de Allende	San Pablo Malacatepec	118.28	177,420.00
Villa Victoria	Ejido Cuesta del Carmen	500	750,000.00
<b>Total</b>		<b>37,37.18</b>	<b>5,605,770.00</b>

On the other hand, the CONAFOR in the Estado de México applies the payment for environmental services through CONAFOR-PROBOSQUE concurrent funds for the period 2021-2025, benefiting four agrarian nuclei in 638.22 ha, applied an amount of \$5'622,750.00 MXN (Table 10). In concurrence CONAFOR-Consejo Civil Mexicano para la Silvicultura, A. C. benefited a community Bienes comunales de Santa María y sus Barrios, of the Municipality of Villa de Allende, with 351.26 ha with an amount of \$843,024.00 MXN.

**Table 11.** Payment for environmental services through concurrent funds (CONAFOR-PROBOSQUE)

Municipality	Site	Area (ha)	Amount (pesos)
San José del Rincón	Ejido Concepción del Monte	174.3	1'402,250.00

San José del Rincón	Ejido La Rosa Palo Amarillo	215	1,707,500.00
Teamascalcingo	Ejido Cerritos Cárdenas Sección Matamoros	248.92	1'961,900.00
Temascalcingo	Ejido Zaragoza	66,80	551,100.00
<b>Total</b>		<b>638.22</b>	<b>5'622,750.00</b>

These resources are used for soil conservation, reforestation, attention to pest and forest disease outbreaks, road maintenance, cleaning and protection of springs, surveillance and forest fire prevention works, such as the rehabilitation of firebreaks and the removal of combustible or burning materials.

## Tourism

Some Natural Protected Areas are unique tourist destinations in the world, as is the case of the Monarch Butterfly Biosphere Reserve (MBBR) since no other area has the same concentration of butterflies as this. Therefore, they have the potential to contribute significantly to local and regional economic development, in addition to promoting the conservation of the species and the ecosystems.

Tourist activity has focused on public visits to the six Monarch Butterfly Sanctuaries (El Rosario, Sierra Chincua, Senguio, El Capulín, Macheros and La Mesa), for the observation of the Monarch butterfly, from November to March.

From the data in the visitors' books, for each season in each of the Sanctuaries open to the public, the number of visitors for each parador is determined. For the 2019-2020 period, 240,808 visitors were recorded, while for the 2020-2021 season, as a result of the SARSCoV2 pandemic (COVID 19), visitation dropped to 96,667 visitors.

In the 2021-2022 season, the number of visitors increased to 161,536 with the opening of El Rosario, Chincua, and Senguio sanctuaries in the State of Michoacán. The El Capulín and Macheros sanctuaries decided not to open to protect their population. La Mesa sanctuary has not had any tourist activity because no colonies have been established there (Table 12).

**Table 12.** Tourist inflow registered in the Sanctuaries of the MBBR 2019-2022.

Season	Tourist Parador						Number of visitors
	El Rosario	Sierra Chincua	Senguio	El Capulín	Macheros	La Mesa	
2019 - 2020	167,315	67,220	1,875	1,752	1,589	1,057	240,808
2020 - 2021	48,653	20,034	980	SR	SR	SR	69,667
2021 - 2022	101,781	52,012	3,700	SR	SR	SR	157,493

Regarding the origin of visitors, at the national level, the largest number of visitors come from: Michoacán, Estado de México, Mexico City, Jalisco, and Guanajuato. Internationally visitors come primarily from the United States, Canada, France, and Germany.

The worldwide effects of the pandemic caused by the SARS-CoV-2 virus (COVID 19) have had repercussions not only on the health crisis but also on the economic and social situation. In the Property, public/visitors access to the Monarch Butterfly sanctuaries was closed from March 12, 2020, until November 28, 2020, the date of the official opening of the sanctuaries, and tourism activity in the Reserve.

The importance and demand for tourism in the sanctuaries with public access in the Monarch Butterfly BR, determined that CONANP, in coordination with "Soñemos MX" and the Centro Latinoamericano de Formación y Capacitación para Guías en Turismo, S. C. (CENLATUR), with the financial support of the German Cooperation Agency for Sustainable Development (GIZ) in Mexico, developed the project "Strengthening capacities for tourism operations in Monarch Butterfly sanctuaries". This as part of the project "Strengthening of capacities for tourism operations in Natural Protected Areas in the context of COVID-19" through training, signage development, staff organization, and hygiene protocols for workers and visitors.

In 2020, the Sanctuaries of Michoacán were opened, starting with the training cycle for 170 Tourism Service Providers (TSP) at El Rosario Sanctuary, with five training courses of 40 hours each, during 5 working days, while at Sierra Chincua Sanctuary, 113 tourism service providers were trained in three 40-hour courses during 6 working days.

The training modality was a Course-Workshop for the development of a Hygienic-Sanitary Program, based on the recommendations elaborated by CONANP in the context of COVID-19 for tourism service providers and the hygienic-sanitary measures, Punto Limpio by the Ministry of Tourism of the Government of Mexico.

The objective of the course was for local service providers to apply the techniques and tools developed, to ensure the implementation and permanence of good hygienic-sanitary quality practices in the provision of their tourism services as professionals in the sector.

The official opening of the sanctuaries in the State of Michoacán took place on November 28, 2020. A low flow of tourist demand was expected compared to past seasons, due to the recommendations and restrictions issued by the Ministry of Health.

The situation in the Sanctuaries in 2022 was as follows:

- All local tourism service providers (people from the ejidos Cerro Prieto, Senguio and El Rosario) correctly used masks during their workday.
- Local tourism service providers took the temperature of each visitor entering the sanctuaries and disinfected their bodies by spraying them with an atomizer.
- Each visitor received a ration of antibacterial gel for hand disinfection before entering the Sanctuary. Filters with gel for hand cleaning are located in: restrooms, handicrafts and food stands.
- In the modules for food sales, the agreed spaces for diners and the number of visitors allowed to enter for food consumption were respected.
- There was little street hawking.



- The money was disinfected according to the technique learned, and the material used for visitor registration was constantly disinfected.
- The stablemen attended to the indications received for the safe care in terms of health for the visitor, cleaning the horse's saddle and reins.
- The circuits established for the observation of the Monarch butterfly were respected, with one entrance and one exit, thus avoiding the encounter and agglomeration of people.
- The Flow of visitors was noted.
- Most of the visitors (90%) used masks, although at different times they took them off to breathe better, given the complicated situation of walking uphill, on dirt roads and trails in places above 3,000 meters above sea level.
- The 50% capacity has been respected.
- The Schedule for entering and leaving the Sanctuary was respected (from 9:00 to 17:00 pm).
- The visitors didn't use disinfectant spray or antibacterial gel inside the property at the Monarch Butterfly colonies.
- No person was identified removing excess gel or disinfectant from water bodies or spring.
- There was good water management in toilets and kitchens.
- The kitchen area in El Rosario worked at 40% capacity and in Sierra Chincua at 80%. The sale of handicrafts was 70% in both sites.

For the 2021-2022 season, the sanctuaries were officially opened on November 27, 2020, working together with local tourism service providers to reinforce the topics learned in the 2020-2021 season training sessions. Eight training sessions were held for local tourism service providers (El Rosario, Sierra Chincua, Senguio, El Asoleadero, La Mesa, Remedios) on biosafety, the life cycle of the Monarch Butterfly, ecosystem services, and customer service; 38 guards were on duty on the weekends to supervise conditions and to accompany the reserve's staff at tourist sites.

The installation of 196 signs with sanitary protocols to prevent the spread of the SARS-CoV2 virus (COVID 19) was completed at the Sierra Chincua and El Rosario tourist attractions, and for the 2021-2022 season, signs were installed at the El Asoleadero, La Mesa and El Capulín-Macheros tourist attractions, indicating the direction of visitor traffic on the trails and the conditions within the World Heritage Site and its buffer zone.

In conclusion, CONANP recognizes the tourism service providers of the ejidos Cerro Prieto (Sierra Chincua Sanctuary) and El Rosario (El Rosario Sanctuary), who have been willing and interested in applying and following the methodology and operating guidelines for tourism activities, as well as applying the health and hygiene protocols designed and coordinated by the Ministries of Health and Tourism, and by CONANP itself.

On the other hand, it should be emphasized that COVID-19 in Mexico is present in any scenario, but the NPA are in the view of being excellent spaces for tourists - urban visitors, to mitigate the physical and emotional effects in the post-COVID-19 time, since they represent an opportunity for recreation, freedom and relief, which in turn should be for the beneficiaries, both for CONANP personnel and for tourist servers, promoting the sustainable development of the areas.

This post-COVID-19 tourism illustrates the need to continue consolidating actions to take advantage of opportunities to improve the quality of life of the beneficiaries and the environmental quality in which they live. COVID-19 generated a sense of the value of social and environmental solidarity through tangible actions that permeate the tourism service.

#### Effective Carrying Capacity in Sanctuaries (ECC)

**Table 13.** Effective Carrying Capacity (ECC) in Sanctuaries of the MBBR.

Trail	Effective Load Capacity (Num. Persons/per day)
El Rosario (Llano del Conejo a Colonia)	188
Sierra Chincua (Parador Chincua a Colonia)	402
Senguio (Llano de Koala a Colonia)	85
Capulín (Parador Capulín a Colonia)	143
Macheros (Parador de Macheros a Colonia)	176
La Mesa (Llano Grande a Colonia)	434

**Table 14.** Number of visitors in the seasons 2019-2020, 2020-2021 and 2021-2022

Season	Tourist Parador						Number of visitors
	El Rosario	Sierra Chincua	Senguio	El Capulín	Macheros	La Mesa	
2019 - 2020	167,315	67,220	1,875	1,752	1,589	1,057	240,808
2020 - 2021	48,653	20,034	980	SR	SR	SR	69,667
2021 - 2022	101,781	52,012	3,700	SR	SR	SR	157,493
% 2022 vs 2021	109%	160%	278%	-	-	-	126%
	53,128	31,978	2,720	-	-	-	87,826
% 2022 vs 2020	-39%	-23%	97%	-	-	-	-35%
	-65,534	-15,208	1,825	-	-	-	-83,315

For the ECC estimates, the full sighting season in the monarch butterfly sanctuaries was 151 days per year. Table 15 shows the maximum and minimum number of visitors for the 2019-2020 and 2020-2021 seasons; and Table 16 shows the maximum and minimum number of visitors for the 2020-2021 and 2021-2022 seasons.

**Table 15.** Effective Carrying Capacity and number of visitors in the seasons 2019-2020 and 2020-2021.

Trail	ECC (Day)	CCE (Season)	Number of visitors		CCE vs Number of Visitors	
			Season 2019 - 2020	Season 2020 - 2021	Season 2019 - 2020	Season 2020 - 2021
El Rosario	188	28,388	167,315	48,653	489%	71%
Sierra Chincua	402	60,702	67,220	20,034	11%	-67%

Senguio	85	12,835	1,875	980	-85%	-92%
El Capulín	143	21,593	1,752	SR	-92%	-100%
Macheros	176	26,576	1,589	SR	-94%	-100%
La Mesa	434	65,534	1,057	SR	-98%	-100%
<b>Total visitors in MBBR</b>	<b>1428</b>	<b>215,628</b>	<b>240,808</b>	<b>69,667</b>	<b>12%</b>	<b>-68%</b>

Since 2018, the effective carrying capacity of the sanctuaries has been exceeded by more than 10%, in the same proportion that the number of visitors grows, the negative impacts on the species and its habitat have been evidenced with the movement of butterflies to other sites where they usually arrive, due to the presence of people, however, other natural factors such as climate change also have an influence.

Likewise, as shown in Table 16, during the 2020-2021 season, the carrying capacity figures were respected in the Sierra Chincua Sanctuary and decreased notably in the El Rosario Sanctuary from 489% to 71% of overload on the trails, reducing the impacts generated by tourism.

A comparison was made between the 2021-2022 season and the 2020-2021 season, highlighting the need to continue with the efforts to control the number of visitors for the El Rosario, in addition to updating the Study of the Limit of Acceptable Change (ELCA) considering that the conditions prevailing in 2014, the year of its preparation have changed; on the other hand, with regard to the other paradors, the ECC is observed below the estimated maximum due to the low demand they present; even Sierra Chincua considered the second most visited paradors in the Property.

**Table 16.** Effective Carrying Capacity and number of visitors in the seasons 2020-2021 and 2021-2022.

Trail	ECC (DAY)	ECC (Season)	Number of visitors		ECC vs Number of Visitors	
			Season 2021-2020	Season 2022-2021	Season 2021-2020	Season 2022-2021
El Rosario	188	28,388	48,653	101,781	71%	259%
Sierra Chincua	402	60,702	20,034	52,012	-67%	-14%
Senguio	85	12,835	980	3,700	-92%	-71%
El Capulín	143	21,593	SR	SR	-	-
Macheros	176	26,576	SR	SR	-	-
La Mesa	434	65,534	SR	SR	-	-
<b>Total MBBR</b>	<b>1428</b>	<b>215,628</b>	<b>69,667</b>	<b>157,493</b>	<b>-68%</b>	<b>-27%</b>

Visitors have preferred the sanctuaries of El Rosario and Sierra Chincua because they are the most accessible due to their location and ease of access. They also have the advantage of being the most recognized locally, nationally, and internationally for having the largest colonies of Monarch Butterflies in terms of forest occupation, in addition to being historically the first to carry out tourism activities. In the case of El Rosario since 1985 and in Sierra Chincua in the 1990's, while the Mexican sanctuaries of La Mesa and Cerro Pelón are more recent and more difficult to access.

Since 2018, with the increase in the number of visitors, measures have been implemented for the adequacy of the trails to reduce possible impacts on the species and its habitat during the hibernation season in the MBBR.

The measures implemented are based on two important factors: visitor behavior and tourist service providers, such as guides (on foot, on horseback) and Sanctuary operating personnel (ticket agents, waitresses, management, etc.). The desired visitor behavior in the Sanctuaries is defined by a Visitor's Regulation, which must be fully complied with.

In this sense, the fundamental actions to reduce the impacts have been:

- Implementation of tourism authorization conditions in all sanctuaries, which are supervised by MBBR staff.
- Continuous training of Local Guides.
- No opening of new trails to avoid alteration of land use.
- Closing and/or closure of informal trails
- The group must always be accompanied by a trained guide who will inform the group about the rules (Responsible Tourist Code) and ensure the visitors safety.
- Elaboration of an informative video on the recommendations and rules of visitation
- Constant dissemination of information on responsible visitation in the sanctuaries is given.
- For responsible visitation, a Responsible Tourist Code has been developed, which in coordination with the guide, in the sanctuaries is disseminated to visitors so that they can contribute to the conservation of the species, considering the following:
  - During the tour follow the established trails.
  - Follow the indications of the local guides.
  - Don't introduce food, alcoholic beverages, sharp objects, firearms, or pets into the sanctuaries.
  - Don't take plants, animals, mushrooms, or any other element that is part of the forest.
  - No smoking, no camp fires.
  - Respect the minimum distance for the observation of monarch butterfly colonies (50 meters).
  - Remain silent during the stay in the sanctuary.
  - Don't use flash to take photographs.
  - During the stay in the Monarch Butterfly colony, don't eat any type of food.
  - Don't disturb, touch, or take Monarch Butterflies.
  - Don't stay more than 10 minutes inside the sanctuary, in order to give other people, the opportunity to live this experience without altering the hibernation state of the Monarch.
  - Keep a healthy distance inside the Sanctuary.
  - Correctly use the mask during the stay in the Sanctuary.
  - Don't use disinfectant spray or antibacterial gel near Monarch Butterfly colonies.
  - Don't litter or throw garbage inside the Sanctuary

To regulate tourism service providers, during the four seasons, 2018-2019, 2019-2020, 2020-2021 and 2021-2022, 266 permits were granted for the development of tourism

activities in the Monarch Butterfly Sanctuaries in the ejidos La Mesa, Capulín-Macheros, Cerro Prieto (Sierra Chincua), El Rosario and Senguio, and those offering additional services such as the ejidos Los Remedios and El Asoleadero (Table 17), information that is registered in the Integrated Quality Response System (SIRCA) of the CONANP. It's important to mention that the authorizations for the 2020-2021 season were issued for two years, which reduced the number of authorizations to 39.

**Table 17.** Number of authorizations for the provision of seasonal tourist services 2018-2019, 2019-2020, 2020-2021 and 2021-2022

Tourist season	Tourist Services			Total
	Recreational with infrastructure	Commercial (sale of handicrafts and food)	Recreational tourism (recreational use of non-motorized vehicles (horses))	
<b>2018-2019</b>	7	40	14	61
<b>2019-2020</b>	7	47	25	79
<b>2020-2021</b>	6	40	41	87
<b>2021-2022</b>	0	37	2	39
<b>Total</b>				<b>266</b>

The MBBR has quality infrastructure in the different sanctuaries with public access, as well as great diversity of services and natural attractions that delight visitors. This, combined with the strengthening of signage, trained guides, and the creation of internal regulations, has regulated in sanctuaries with a perspective of order and appropriate management of possible negative impacts that could arise from these types of activities, which are fundamental for generating sources of employment in the Monarch Butterfly region.

It's important to note that for 13 years, various institutions from the three levels of government and through different subsidy programs have created and strengthened the tourism infrastructure in the region, for institutions such as CONANP and SECTUR have played a decisive role.

## Investment in infrastructure in the sanctuaries of the MBBR

### Investment 2019

For 2019, with PROCODES, seven ecotourism projects were authorized, amounting to \$984,000.00 mxn (Table 18).

**Table 18.** Strengthening of tourism infrastructure in 2019.

Num	Locality	Description of the aid concept	Total authorized amount (MXN)
1	Ejido el Rosario	Development of tourism promotion materials and identity for the Sanctuary	\$ 129,000.00

2	Cerro Prieto	Development of tourism promotion materials and identity for the Sanctuary	\$ 129,000.00
3	Cuartel la Mesa (El Asoleadero)	Construction of a parking lot, acquisition of equipment, rehabilitation of a suspended bridge and production of tourism promotion materials	\$ 129,000.00
4	Senguio	Development of tourism promotion materials and identity for the Sanctuary	\$ 129,000.00
5	Cuartel de Emiliano Zapata	Rehabilitation of the tourist infrastructure of Parador Bosque Escuela	\$ 189,000.00
6	El Capulín	Development of tourism promotion materials and identity for the Sanctuary	\$ 129,000.00
7	Colonia Independencia (Angangué)	Rehabilitation of tourist infrastructure	\$ 150,000.00
<b>Total investment 2019</b>			<b>\$ 984,000.00</b>

### Investment 2020

For 2020, the process of selecting PROCODES projects was carried out, with four ecotourism projects authorized, with a total amount of \$485,000.00 MXN (Table 19).

**Table 19.** Strengthening of tourism infrastructure in the State of Michoacán 2020.

Num	Locality	Description of the aid concept	Total Authorized Amount (pesos)
1	Cuartel de Emiliano Zapata	Improvement of the infrastructure of the Parador Turismo Bosque Escuela, for quality service.	\$ 125,000.00
2	Manzana Los Remedios	Rehabilitation of the existing Cabin in the Tourist Park of Los Remedios	\$ 120,000.00
3	Ejido El Rosario	Strengthening of actions to promote and preserve the natural and cultural heritage of El Rosario Sanctuary. Rehabilitation of trails and development of tourist dissemination materials	\$ 120,000.00
4	Cerro Prieto	Rehabilitation of trails and rooftop access to the Sanctuary	\$ 120,000.00
<b>Total Investment 2020</b>			<b>\$ 485,000.00</b>

By 2021, two PROCODES projects were authorized to strengthen ecotourism activities totalling \$200,000.00 MXN (Table 20).

**Table 20.** Strengthening tourism infrastructure in the State of Michoacán 2021.

N°	Locality	Description of the aid concept	Total Authorized Amount (pesos)
1	Ejido El Rosario	Rehabilitation of trail that is used by horses. Rehabilitation of administration huts, roofing and	\$ 100,000.00



		painting. Identity and image of the parador (uniforms, signs).	
2	Cuartel La Mesa (El Asoleadero)	Rehabilitation of zipline cable Conditioning of the trail from the cabins to the El Salto waterfall.	\$ 100,000.00
<b>Total Investment 2021</b>			<b>\$ 200,000.00</b>

## Investment 2022

For 2022, seven PROCODES projects were authorized to strengthen the tourist inns of the Natural Protected Area Monarch Butterfly Biosphere Reserve, for a total amount of \$1'045,150.00 MXN (Table 21).

**Table 21.** Strengthening of tourism infrastructure in the State of Michoacán 2022.

No.	Locality	Description of the aid concept	Total Authorized Amount (pesos)
1	Ejido El Rosario	Rehabilitation audiovisual room	\$ 100,150.00
2	Ejido El Rosario	Equipment with uniforms	\$ 75,000.00
3	Cuartel La Mesa (El Asoleadero)	Tourism potential study	\$ 90,000.00
4	Ejido Senguio	Zipline rehabilitation	\$ 150,000.00
5	Ejido Chichimequillas	Rehabilitation and equipping of the zip line, cabin and gotcha area.	\$ 225,000.00
6	Ejido Cerro Prieto	Restroom area roof rehabilitation	\$ 225,000.00
7	Ejido Senguio	Purchase of uniforms for tourist service providers at 6 tourist sites in the reserve: Senguio, Asoleadero, Sierra Chincua, Lechuguillas, Remedios and La Mesa.	\$ 180,000.00
<b>Total Investment 2022</b>			<b>\$1'045,150.00</b>

### **3. Other current conservation problems identified by the State Party that may have an impact on the Outstanding Universal Value of the property**

#### **Actions for the SARS-CoV2 Pandemic (COVID 19)**

In March 2020, the General Health Council recognized the SARSCoV2 (COVID-19) pandemic in Mexico as a serious disease of priority attention, establishing preparedness and response activities.

In order to help reduce the probability of exposure and transmission, as well as to prevent and combat the SARS-CoV2 virus (COVID 19), and to protect the health of public servants working at the MBBR, as well as the population in general, the Decree declaring extraordinary actions in the affected regions of the entire national territory in terms of general health to combat the serious disease of priority attention generated by the SARS-CoV2 virus (COVID-19) was taken, published in the Official Gazette of the Federation on March 27, 2020 and the subsequent Decrees and guidelines on the subject, particularly the actions framed with the essential activities, dates and schedules of attention for the effects of the administrative acts and procedures substantiated by SEMARNAT and its deconcentrated administrative bodies.

For the Health Sector, the criteria for the continuity of work among the technical and administrative personnel of the NPA Monarch Butterfly BR were considered.

A dynamic of differentiated attention was established with personnel working from home, others in the office and some in the field when the situation warranted it. In this work and at all times, recommendations among the members of the Reserve were taken into account and ensured.

Attention to field activities was particularly complex due to the use of mouth covers and the fact of keeping a healthy distance, as well as the skepticism and/or lack of credibility by the community members or ejidatarios regarding the effects of the pandemic, who took more time to attend to the provisions of the health sector. However, with all the preventive measures taken by the Reserve's personnel, the needs of field activities have been met, although it has been a fact that at different times there has not been the same availability, mobility or support from other agencies to carry out activities, as each of them has responded to a different degree to the sanitary provisions.

Essential aspects such as forest fires, illegal logging, productive and conservation projects, pest outbreaks and forest harvesting were and have been always attended, trying to comply, as far as possible, with the recommendations of the health sector and to safeguard the integrity of the reserve's personnel.

Massive events or those involving the concentration of people, such as reforestation activities, symposiums, forums, micro-regional meetings, Advisory Council and tourist visits, among others, were definitively cancelled as a precautionary measure in the face of the COVID-19 pandemic.

Electronic media and social networks have played a fundamental role in providing continuity to the operation and communication among stakeholders. Videocalls and Webinars have been a permanent alternative for the development of online meetings and training processes. In addition, the staff worked daily on a report on the health status of each of the Reserve's employees, and on a weekly report that includes the progress of the activities carried out this week and the schedule for the following week.

Particularly complex has been the decision-making process for the opening and care of the Monarch Butterfly Sanctuaries with public access during the season from November to March. At least seven localities depend directly on the economic income generated by visitors to the Monarch Butterfly Sanctuaries: Ejidos Senguio, Cerro Prieto, Los Remedios, El Asoleadero and El Rosario in the State of Michoacán; as well as La Mesa and El Capulín in the Estado de México. The latter two of their own free will, decided not to open their Shrines to the public.

For the rest of the sanctuaries, a working group was established with the Ministries of Health, Tourism, CONANP, municipal authorities of Senguio, Ocampo and Angangueo, Civil Protection and ejido authorities in charge of the Sierra Chincua and El Rosario sanctuaries in the State of Michoacán. After analyzing the situation in terms of health and finances, they decided to operate the sanctuaries under strict sanitary measures and with a training process for local tourism service providers, which is monitored by the reserve's technical staff. The above, taking into consideration the provisions of the General Recommendations for the application of the new tourism standards in Federal Protected Natural Areas, issued by CONANP.

**4. In accordance with paragraph 172 of the Operational Guidelines, describe any potential major restoration, alteration and/or new construction planned within the Property, buffer zone(s) and/or corridors or other areas, where such developments may affect the outstanding universal value of the Property, including the authenticity and integrity of the property.**

No major restorations and/or planned constructions have been recorded within the Property, and the buffer zones that could affect the OUV of the Property, including its integrity.

In the buffer zone of the property, part of the Monarch Butterfly Biosphere Reserve NPA, avocado plantations have intensified in recent years. These are located on agricultural land with other crops, but there has also been a change in forest land use in areas very close to the boundaries of the NPA. This activity is described in the corresponding section

## Acronyms and Abbreviations

### Acrónimos, Siglas y Abreviaturas

ADVC	Área destinada voluntariamente a la Conservación  Areas voluntarily advocated to Conservation
ANP	Área Natural Protegida  Natural Protected Areas
APFF	Área de Protección de Flora y Fauna  Flora and Fauna Protection Area
APRN	Área de Protección de Recursos Naturales  Natural Resources Protection Area
CCA	Comisión para la Cooperación Ambiental  Commission for Environmental Cooperation
COFOM	Comisión Forestal de Michoacán  Michoacán Forestry Commission
CONABIO	Comisión Nacional para el Conocimiento y Uso de la Biodiversidad  National Commission for the Knowledge and Use of Biodiversity
CONAFOR	Comisión Nacional Forestal  National Forestry Commission
CONANP	Comisión Nacional de Áreas Naturales Protegidas  National Commission of Natural Protected Areas
DGIRA	Dirección General de Impacto y Riesgo Ambiental  General Direction of Environmental Impact and Risk
DOF	Diario Oficial de la Federación  Official Gazette of the Federation
FM	Fondo Monarca  Monarch Fund
FMCN	Fondo Mexicano para la Conservación de la Naturaleza  Mexican Fund for the Conservation of Nature
GEF	Fondo Mundial Ambiental  Global Environmental Facility
LGEEPA	Ley General del Equilibrio Ecológico y la Protección al Ambiente  General Law of Ecological Balance and Environmental Protection



MaB	Programa sobre el Hombre y la Biosfera Man and Biosphere Program
MIF	Manejo Integral del Fuego
NOM	Norma Oficial Mexicana Official Mexican Standard
PACC	Programa de Adaptación al Cambio Climático Climate Change Adaptation Program
PACMM	Plan de Acción para la Conservación de la Mariposa Monarca en México Conservation of Monarch Butterfly Action Plan in Mexico
PNANP	Programa Nacional de Áreas Naturales Protegidas National Program of Natural Protected Areas
PNUD	Programa de las Naciones Unidas para el Desarrollo United Nations Development Program
POA	Programa Operativo Anual Annual Operation Program
PSA	Pago por Servicios Ambientales Payment for Environmental Services
PROBOSQUE	Protectora de Bosques del Estado de México
PROCOCODES	Programa de Conservación para el Desarrollo Sostenible Conservation Program for Sustainable Development
PROFEPA	Procuraduría Federal de Protección al Ambiente Federal Attorney for Environmental Protection
PROREST	Programa para la Protección y Restauración de Ecosistemas y Especies en Riesgo Program for the Protection and Restoration of Priority Ecosystems and Species at Risk
RB	Reserva de la Biosfera Biosphere Reserve
RBMM	Reserva de la Biosfera Mariposa Monarca Monarch Butterfly Biosphere Reserve
SECTUR	Secretaría de Turismo Ministry of Tourism
SEMACCDET	Secretaría de Medio Ambiente, Cambio Climático y Desarrollo Territorial del Estado de Michoacán





	Ministry of Environment, Climate Change and Territory Development of the State of Michoacán
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales  Ministry of Environment and Natural Resources
SIAP	Servicio de Información Agroalimentaria y de Pesca  Agri-food and Fisheries Information System
SIRCA	Sistema Integral de Respuesta con Calidad  Comprehensive Quality Response System
SSP	Secretaría de Seguridad Pública del Estado de Michoacán  Ministry of Public Security of the State of Michoacán
UICN	Unión Internacional para la Conservación de la Naturaleza  International Union for Conservation of Nature
UMA	Unidad de Manejo para la Conservación de la Vida Silvestre  Management Unit for Wildlife Conservation
UNAM	Universidad Nacional Autónoma de México
UNESCO	Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura  United Nations for Education, Science and Culture Organization
USFS	Servicio Forestal de Estados Unidos  United States Forest Service
VUE	Valor Universal Excepcional  Outstanding  Universal Value
WWF	Fondo Mundial para la Naturaleza  World Wildlife Fund for Natur

## Annexes

1. Area of forest occupied by the colonies of Monarch Butterflies in Mexico during the 2021-2022 overwintering period.
2. Superficie forestal ocupada por las colonias de Mariposas Monarca en México durante la hibernación de 2021-2022.
3. Forest degradation in the core zone of the Monarch Butterfly Biosphere Reserve (2020-2021).
4. Análisis del cambio forestal en la zona núcleo de la Reserva de la Biosfera Mariposa Monarca (RBMM) 2020-2021.
5. Análisis del cambio forestal en la zona núcleo de la Reserva de la Biosfera Mariposa Monarca (RBMM) 2021-2022.
6. Fondo Monarca. Sinergia por la conservación.



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# AREA OF FOREST OCCUPIED BY THE COLONIES OF MONARCH BUTTERFLIES IN MEXICO DURING THE 2021-2022 OVERWINTERING PERIOD

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## Executive Summary

During the second half of December 2021, 10 colonies of Monarch Butterflies were registered covering 2,835 hectares (*ha*) of forest, this represents a 35% increase in relation to the area registered in 2020 (2.10 *ha*). Six colonies covering 2,174 *ha* were located inside the Monarch Butterfly Biosphere Reserve (MBBR) and four covering 0.661 *ha* were located outside the MBBR, five of those colonies were located in Michoacán and five in the State of Mexico. In Atluatla, east of the State of Mexico, butterflies were present, however, no colony was established.

## Introduction

The Monarch Butterflies (*Danaus plexippus*) migrate from southeastern Canada and northeastern United States to overwinter in the Mexican forests, in Michoacán and the State of Mexico (Fig. 1). The main threats to these butterflies in North America are: i. the decline of milkweeds at the breeding sites, ii. Forest degradation in Mexico, and iii. Climate change (Pleasants & Oberhauser, 2012; Vidal *et al.*, 2013; Zylstra *et al.*, 2021). The alliance WWF-Telmex Telcel Foundation and the National Commission of Natural Protected Areas (NCNPA) systematically monitor the overwintering sites of the monarch butterfly since 2004; in this report we include the forest area occupied by the colonies of these migratory butterflies in December 2021.

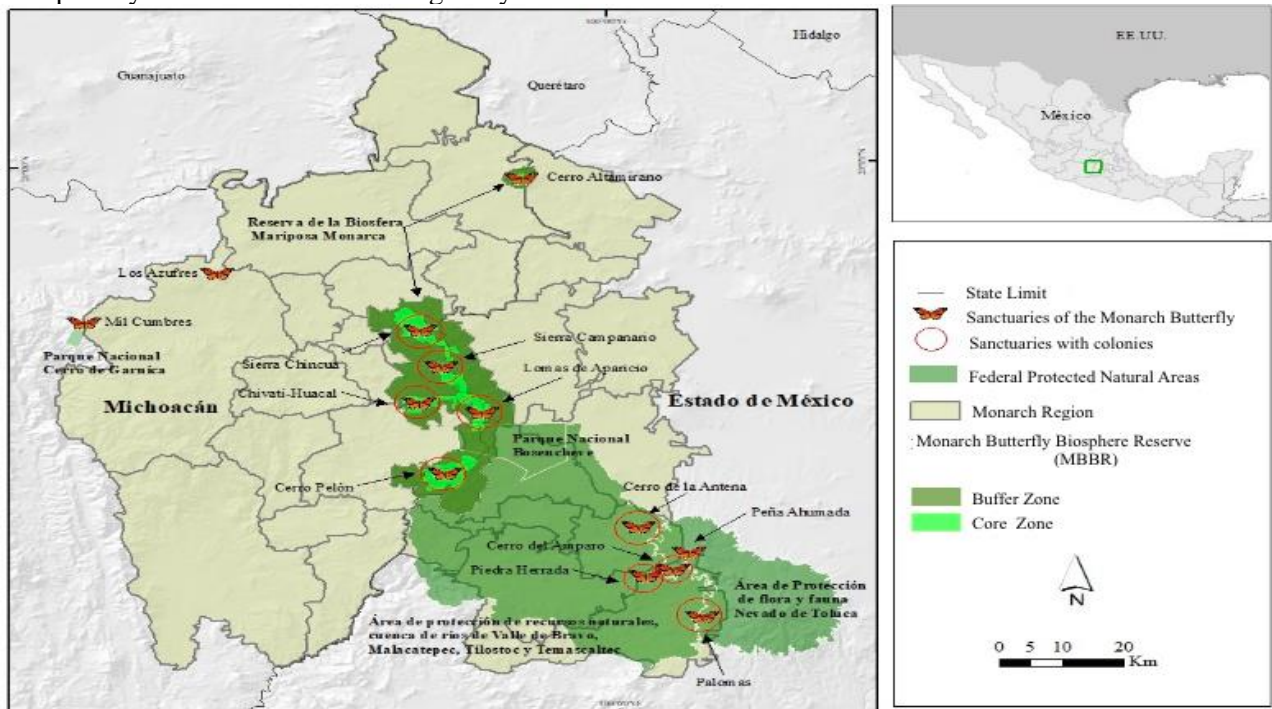


Figure 1. Six hibernation sanctuaries are located in the MBBR located in Michoacán and the State of Mexico, an additional seven hibernation sanctuaries are located outside of the MBBR in the Monarch Region.



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## Methodology

As of December 2021, each of the 13 hibernation sanctuaries located in the “Monarch Region” was visited twice a month. When a colony was located, the location was established using a Garmin® Geo positioning device in UTM projection, with the WGS 84 datum. The perimeter of the forest occupied by the butterflies was determined from the tree that was found on the highest point of the slope, to do this we recorded the direction and distance of the consecutive and peripheral trees of the colony. The data from the polygonal perimeter was processed with the ArcView 3.3 geographic information system (GIS) to establish the area occupied by the colony (Vidal y Rendón-Salinas, 2014). We visited the Atlautla sanctuary, whose area is not counted in the historical graph as it is located outside of the Monarch Region.

## Results

In the second half of December 2021, ten colonies of monarch butterflies were registered- five in Michoacán and five in the State of Mexico-, which occupied a total area of 2.835 *ha* of forest. Six colonies (2.174 *ha*) were located within the MBBR, while four (0.661 *ha*) were located outside of the reserve. This area represents an increase of 35% compared to the area occupied in 2020, which was 2.10 *ha* (Fig. 2). In the Monarch Region, the largest colony (1.187 *ha*) was recorded in el Ejido El Rosario in Sierra Campanario Sanctuary, and the smallest colony (0.003 *ha*) was located in el Ejido Crescencio Morales in Lomas de Aparicio sanctuary, this colony has been reported after it was found in 2003-2004 (Table 1). We visited Atlautla, adjacent to the Iztaccihutl-Popocatepetl National Park, where monarch butterflies were present, however, a colony was not established.

Table 1. Forest area occupied by monarch butterflies colonies throughout the second half of December 2021.

Location	State	Sanctuary	Colonies (agrarian properties)	Area (ha)
Inside the Monarch Butterfly Biosphere Reserve (MBBR)	State of Mexico	Cerro Pelón	E. El Capulín	*
			E. Mesas Altas de Xoconusco	*
			C.I. San Juan Xoconusco	*
			B.C. San Pablo Malacatepec	0.016
		Sierra Campanario	E. San Joaquín Lamillas	*
			E. La Mesa	*
	Michoacan	Cerro Altamirano	E. Contepec	*
		Cerro Pelón	E. Nicolás Romero	0.556
		Chivatí-Huacal	C.I. Carpinteros	*
			C.I. Donaciano Ojeda	0.080
		Sierra Campanario	E. El Rosario	1.187
		Sierra Chincua	Propiedad Estatal	0.332
			Propiedad Federal	*
			E. Cerro Prieto	*
			E. El Calabozo Fracción 1	*
		Lomas de Aparicio	E. Crescencio Morales	0.003
Area occupied inside the Reserve				2.174
Outside the MBBR	State of Mexico	Cerro del Amparo	E. San Francisco Oxtotilpan	0.011
		Palomas	E. San Antonio Albarranes	0.267
		Piedra Herrada	E. San Mateo Almomoloa	0.378
		Peña Ahumada	E. Ojo de Agua	*
		Cerro de la Antena	E. El Potrero	0.005
	Michoacan	Los Azufres	P.P. San Andrés	*
		Mil Cumbres	E. Río de Parras	*
		Area occupied outside the Reserve		
Total area occupied				2.835

E= Ejido , C. I.=Indigenous Community, P. P.= Small Property, B. C.= Communal Property, \* No colony present. Note: except for Small Property, all other are agrarian properties that exist in Mexico.

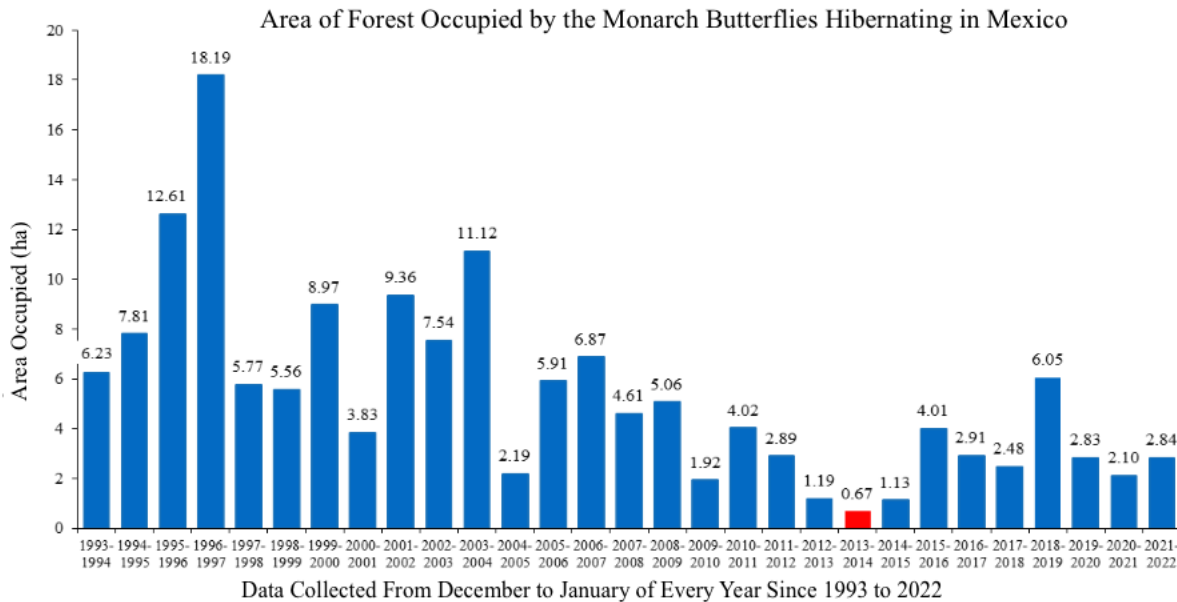


Figure 2. Area of forest occupied by monarch butterfly colonies in Mexico from 1993-1994 to 2021-2022.

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## SUPERFICIE FORESTAL OCUPADA POR LAS COLONIAS DE MARIPOSAS MONARCA EN MÉXICO DURANTE LA HIBERNACIÓN DE 2020-2021.

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### Resumen Ejecutivo

Durante la segunda mitad de diciembre de 2020 registramos nueve colonias de mariposas Monarca -dos en Michoacán y siete en el Estado de México- que ocuparon un total de 2.10 hectáreas (*ha*) de bosque, lo que representa una disminución del 26 % con respecto a la superficie (2.83 *ha*) de 2019: cinco colonias (1.32 *ha*) se ubicaron dentro de la Reserva de la Biosfera Mariposa Monarca (RBMM) y cuatro (0.78 *ha*) fuera de ella. La colonia de Atlautla, que se encuentra en otra región del Estado de México, ocupó 0.08 *ha* de bosque.

### Introducción

Las mariposas Monarca (*Danaus plexippus*) que hibernan en México migran desde la región de los Grandes Lagos en Canadá y los Estados Unidos, sus bosques de invierno se encuentran en el límite de Michoacán y el Estado de México (Fig. 1), sus principales amenazas continentales son: i. la disminución de los algodoncillos en los sitios de reproducción, ii. la degradación de los bosques en México, y iii. el cambio climático (Pleasants & Oberhauser, 2012; Vidal *et al.* 2013). La Alianza WWF-Fundación Telmex Telcel colabora con la Comisión Nacional de Áreas Naturales Protegidas (CONANP) para monitorear sistemáticamente la hibernación de la Monarca desde 2004 y en este informe incluimos la superficie forestal ocupada en diciembre de 2020 por las colonias como indicador indirecto de su abundancia en Norteamérica; la menor ocupación de bosques por las Monarcas se presentó en 2013-2014 con 0.67 hectáreas (*ha*) y la mayor en 1996-1997 con 18.19 *ha* (Rendón-Salinas *et al.* 2005-2019; Vidal y Rendón-Salinas, 2014).

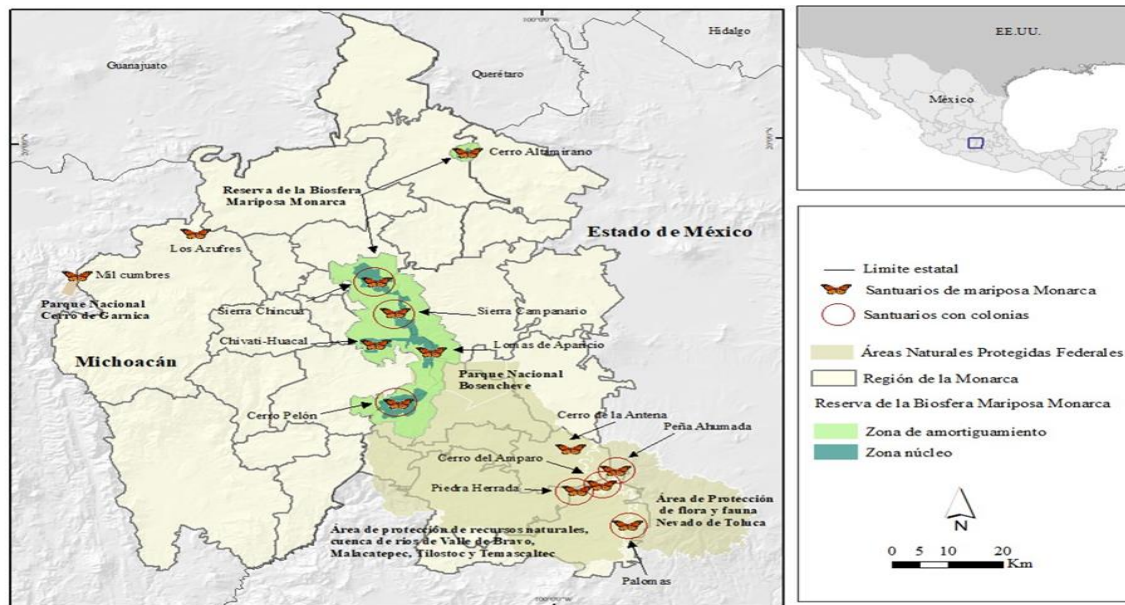


Figura 1. La Región de la Monarca incluye a la Reserva de la Biosfera Mariposa Monarca y a otros siete santuarios de estas mariposas migratorias de Norteamérica.



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### Método

A partir de diciembre visitamos dos ocasiones por mes los 13 santuarios de hibernación que se encuentran en la “Región de la Monarca”, cuando encontramos colonias, establecimos su localización con un geoposicionador Garmin® en proyección UTM, con el datum WGS 84. Determinamos el perímetro del bosque ocupado por las mariposas a partir del árbol que se encontró en la parte más alta de la pendiente, para ello registramos el rumbo y la distancia de los árboles consecutivos y periféricos de la colonia. Los datos del perímetro –poligonal- se procesaron con el sistema de información geográfica ArcView 3.3 para establecer la superficie ocupada por las colonias (Vidal y Rendón-Salinas, 2014). También visitamos la colonia de Atlautla, cuya superficie no se contabiliza en la gráfica histórica, debido a que esta fuera de la Región de la Monarca.

### Resultados

En la segunda mitad de diciembre de 2020 registramos nueve colonias de mariposas monarca -dos en Michoacán y siete en el Estado de México-, las cuales ocuparon una superficie total de 2.10 *ha* de bosques y se pudo establecer que cinco colonias (1.32 *ha*) se ubicaron dentro de la RBMM, mientras que cuatro (0.78 *ha*) se establecieron fuera de ella. Esta superficie representa una disminución del 26 % en comparación con la superficie ocupada en 2019 que ascendió a 2.83 *ha* (Fig. 2). En la Región de la Monarca la colonia más grande (0.73 *ha*) se registró en el ejido El Rosario (santuario Sierra Campanario) y la colonia más pequeña (0.01 *ha*) se localizó en el ejido San Joaquín Lamillas; se registró por tercera ocasión la colonia del ejido Ojo de Agua (santuario Peña Ahumada) con una ocupación de 0.02 *ha*. Se midió la colonia de Atlautla aledaña al Parque Nacional Iztaccihuatl-Popocatepetl, fuera de la Región Monarca con una superficie de 0.08 *ha* (Cuadro 1).

Cuadro 1. Colonias de hibernación y superficie forestal ocupada durante la segunda mitad de diciembre de 2020.

Ubicación	Estado	Santuario	Colonias (Propiedades agrarias)	Superficie (ha)
Dentro de la Reserva Biosfera de la Mariposa Monarca (RBMM)	Estado de México	Cerro Pelón	E. El Capulín	*
			E. Mesas Altas de Xoconusco	*
			C.I. San Juan Xoconusco	0.07
			B.C. San Pablo Malacatepec	0.42
		Sierra Campanario	E. San Joaquín Lamillas	0.01
			E. La Mesa	*
	Michoacán	Cerro Altamirano	E. Contepec	*
		Cerro Pelón	E. Nicolás Romero	*
		Chivatí-Huacal	C.I. Carpinteros	*
		Sierra Campanario	E. El Rosario	0.73
		Sierra Chincua	Propiedad Estatal	0.09
			Propiedad Federal	*
			E. Cerro Prieto	*
			E. El Calabozo Fracción 1	*
	Lomas de Aparicio	E. Crescencio Morales	*	
Superficie ocupada dentro de la RBMM				1.32
Fuera de la RBMM	Estado de México	Cerro del Amparo	E. San Francisco Oxtotilpan	0.05
		Palomas	E. San Antonio Albarranes	0.43
		Piedra Herrada	E. San Mateo Almomoloa	0.28
		Peña Ahumada	E. Ojo de Agua	0.02
		Cerro de la Antena	E. El Potrero	*
	Michoacán	Los Azufres	P.P. San Andrés	*
		Mil Cumbres	E. Río de Parras	*
Superficie ocupada fuera de la RBMM				0.78
Superficie total ocupada				2.10

E= Ejido, C. I.= Comunidad Indígena, P. P.= Pequeña Propiedad, B. C.= Bienes Comunales, \* No hubo colonia

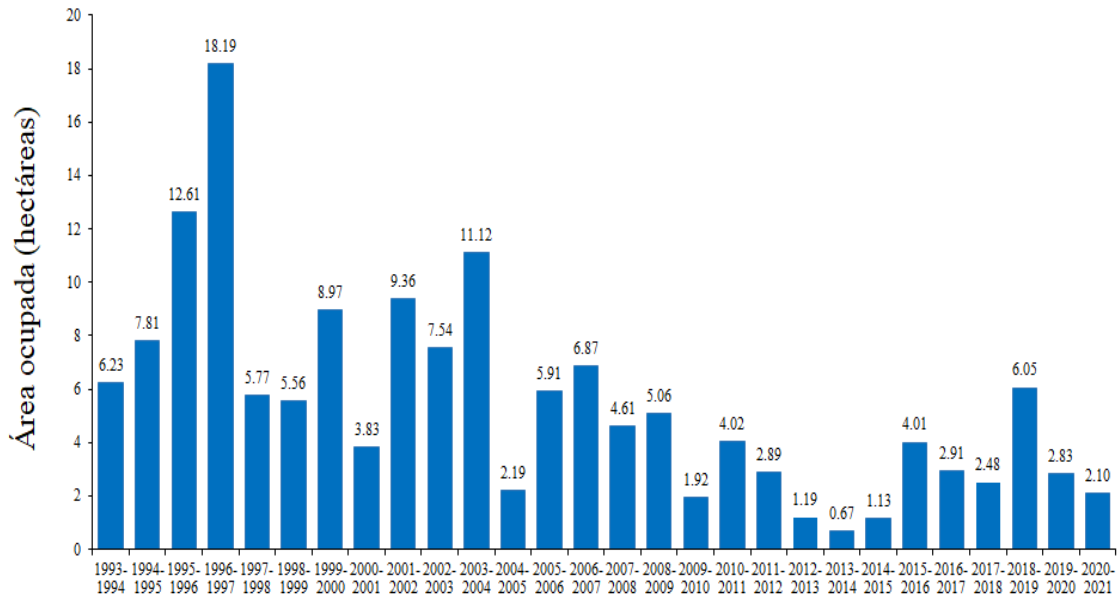


Figura 2. Superficie de bosque ocupada por colonias de mariposas monarca en México, 1993-1994 a 2020-2021.

### Agradecimientos

Agradecemos a las autoridades y colaboradores de las propiedades agrarias visitadas. Al personal del Área de Protección de Flora y Fauna Nevado de Toluca y del Área de Protección de los Recursos Naturales Zona Protectora Forestal, Valle de Bravo, Malacatepec, Tilostoc y Temascaltepec, así como del Parque Nacional Iztacihuatl-Popocatepetl. Este trabajo fue posible gracias al apoyo de la Alianza WWF Fundación Telmex-Telcel -que forma parte de la Alianza WWF-Fundación Carlos Slim- y de la CONANP, a través de la Dirección de la Reserva de la Biosfera Mariposa Monarca.

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## FOREST DEGRADATION IN THE CORE ZONE OF THE MONARCH BUTTERFLY BIOSPHERE RESERVE (2020-2021).

### Executive Summary

Between March 2020 and March 2021, 18.83 hectares (*ha*) of forest in the core zone of the Monarch Butterfly Biosphere Reserve (MBBR) were affected: 1.30*ha* experienced forest fires, 0.53*ha* were cleared for sanitation cutting, 3.06*ha* experienced drought, and 13.94*ha* experienced illegal logging; this is similar to last year's illegal logging data (13.36 *ha*). In general, the forest degradation decreased slightly (7%) compared to the 20.26 *ha* affected in 2019-2020.

The Monarch Butterfly Biosphere Reserve (MBBR) protects 56,259 hectares (*ha*) of forest where monarch butterflies (*Danus plexippus*) from North America hibernate (Fig 1.). The reserve has a core zone of 13,551 *ha* where the most important colonies of monarch butterflies are established and is part of the “Monarch Region” in the Mexican Neovolcanic System, between Michoacán and the State of Mexico. The MBBR is also the habitat of 132 species of birds, 56 mammals, 432 vascular plants and 211 fungi. The forests in this region capture fresh water from the Cutzamala System which supplies water to 13 municipalities of Mexico City and 14 municipalities of the State of Mexico, where more than 5 million people benefit from it.

The analysis of the change in the forest cover in the core zone of the MBBR includes a system of “Monitoring, Reporting, and verification (MRV)” that represents the scientific basis for the allocation of the economic incentives of the Monarch Fund (MF), which benefits the owners of these forests. The MF was established by World Wildlife Fund (WWF) and is administrated by the Mexican Fund for the Conservation of Nature (SEMARNAT). It was created in coordination with the Ministry of Environment and Natural Resources (MENR), as well as with the governments of Michoacán and the State of Mexico. Currently its benefits are in concurrence with the payment of hydrological environmental services of the National Forestry Commission (CONAFOR).

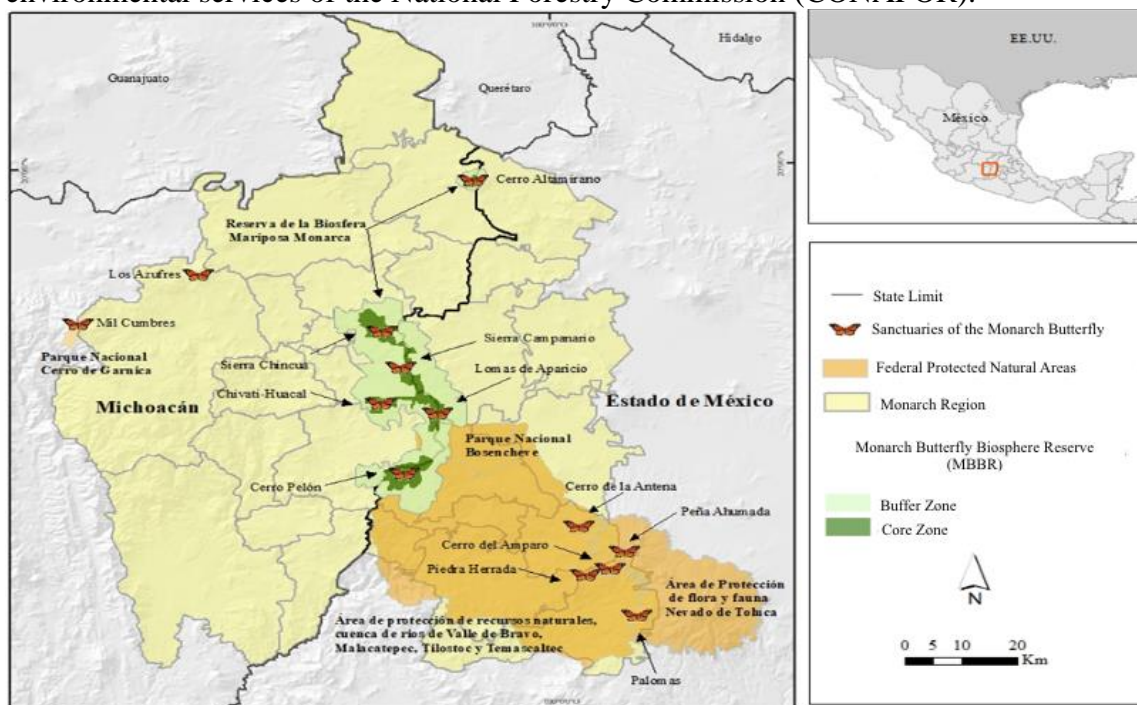


Figure 1. The Monarch Butterfly Biosphere Reserve (MBBR) located in the central zone of the Monarch Region.

The owners, both in the core zone and in the entire MBBR receive support for conservation and sustainable development projects from the National Commission of the Natural Protected Areas (CONANP), through the Management Office of the MBBR and the state governments. The WWF Telmex-Telcel Foundation Alliance supports, among other things, this analysis which compares aerial photographs from March 2020 and March 2021. The changes in the forest cover are incorporated into a Geographic Information System (GIS), where the magnitude is calculated, and the results are validated in the field under the leadership of the MBBR Management Office, with the participation of the UNAM Biology Institute, the Monarch Fund and PROFEPA, as well as with authorities of the agrarian properties with forest degradation.

### Forest Degradation 2020-2021

This monitoring, based on the analysis of the change in forest cover in the core zone of the MBBR, allowed us to establish that from March 2020 and March 2021, 18.83ha of forest were affected: 1.30ha experienced forest fires, 0.53ha were cleared for sanitation cutting, 3.06ha experienced drought and 13.94ha experienced illegal logging; similar to the 13.36ha affected by illegal logging the previous year (Table 1, Figures 2 and 3). The Indigenous Community of San Felipe de los Alzati in Zitácuaro, Michoacán, suffered the greatest disturbance due to illegal logging with 8.17ha affected, representing a significant increase of more than three times compared to the 1.87ha affected in the previous period in this property.

Table 1. Properties with forest affectation in the core zone of the MBBR and its causes (2020-2021).

State	Municipality	Property	Forest Fires (ha)	Sanitation Cutting (ha)	Drought (ha)	Illegal Logging (ha)	Total
State of Mexico	Donato Guerra	E. El Capulín			0.272		0.272
		E. Mesas Altas de Xoconusco			0.024		0.024
		P.P. Cañada Seca			0.206		0.206
		P.P. Los Saucos			0.322		0.322
	San José del Rincón	E. El Depósito				0.223	0.223
		E. La Mesa	1.297			0.044	1.341
		P.P. Catingo III			0.006		0.006
		P.P. Catingo IV			0.024		0.024
		P.P. Rancho Verde		0.078			0.078
	Temascalcingo	E. Pueblo Nuevo Solís			0.020		0.020
	Villa de Allende	C.I. San Pablo Malacatepec			0.004		0.004
		Litigio: CM, SM, SB, NR, SPM			0.019	0.017	0.036
	Subtotal in State of Mexico		1.297	0.078	0.897	0.284	2.556
Michoacán	Angangueo	E. Angangueo		0.007	0.021	0.082	0.110
		E. Hervidero y Plancha			0.499		0.499
		E. Jesús Nazareno			0.057		0.057
		E. Santa Ana		0.079	0.004		0.083
		Propiedad Estatal			0.021		0.021
		Propiedad Federal				0.649	0.649
	Contepec	E. Contepec			0.068		0.068
	Ocampo	E. Cerro Prieto		0.104	0.008		0.112
		E. El Rosario		0.264	0.074		0.338
	Senguio	E. Chincua			0.071		0.071
		E. El Calabozo I				0.589	0.589
		E. El Calabozo II				0.966	0.966
		E. Senguio				0.298	0.298
	Zitácuaro	C.I. Crescencio Morales			0.399	0.062	0.461
		C.I. San Francisco					
		Curungueo			0.325	0.478	0.803
		C.I. Donaciano Ojeda			0.241		0.241
		C.I. Francisco Serrato			0.379		0.379



C.I. Nicolás Romero				1.235	1.235
C.I. San Felipe los Alzati				8.708	8.708
E. Crescencio Morales				0.310	0.310
E. Nicolás Romero				0.275	0.275
<i>Subtotal in Michoacán</i>	<i>0</i>	<i>0.454</i>	<i>2.167</i>	<i>13.652</i>	<i>16.273</i>
<i>Total</i>	<i>1.297</i>	<i>0.532</i>	<i>3.064</i>	<i>13.936</i>	<i>18.829</i>

E= Ejido (Communal Land Management), C. I.= Comunidad Indígena (Indigenous Community), P. P. = Propiedad Privada (Private Property).

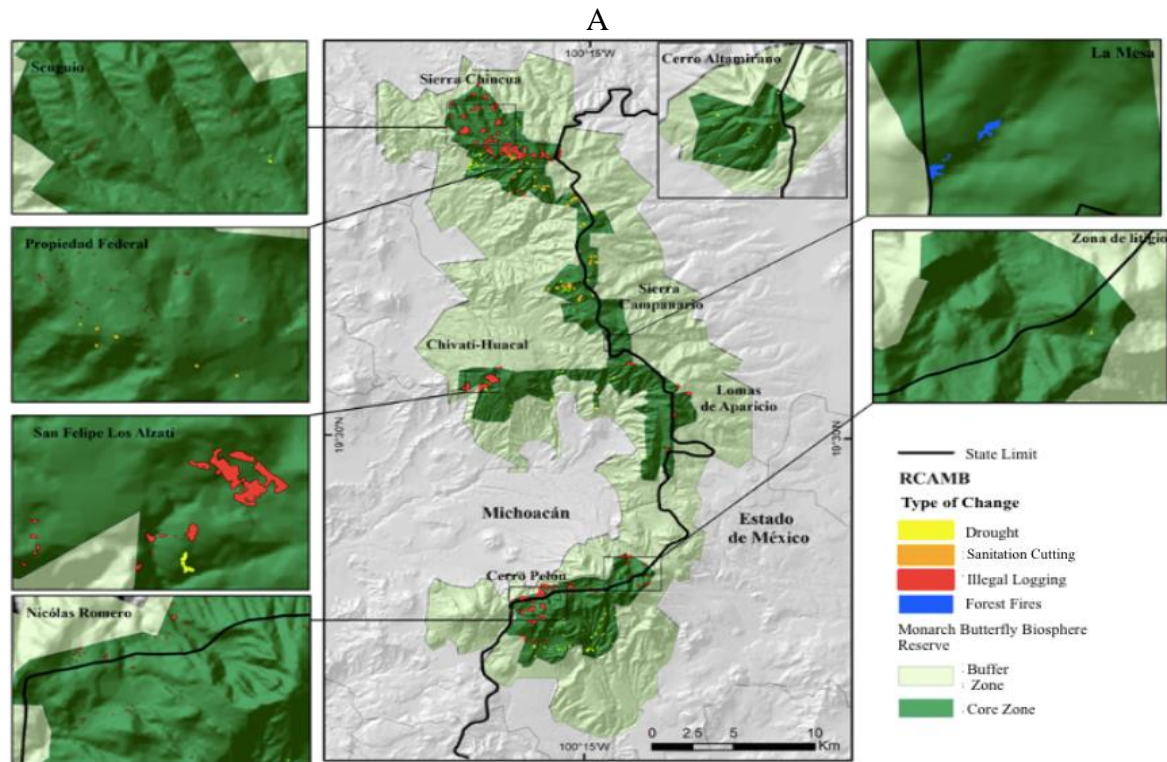


Figure 2. Area of Forests Affected in the Core Zone of the Monarch Butterfly Biosphere Reserve (2020-2021).

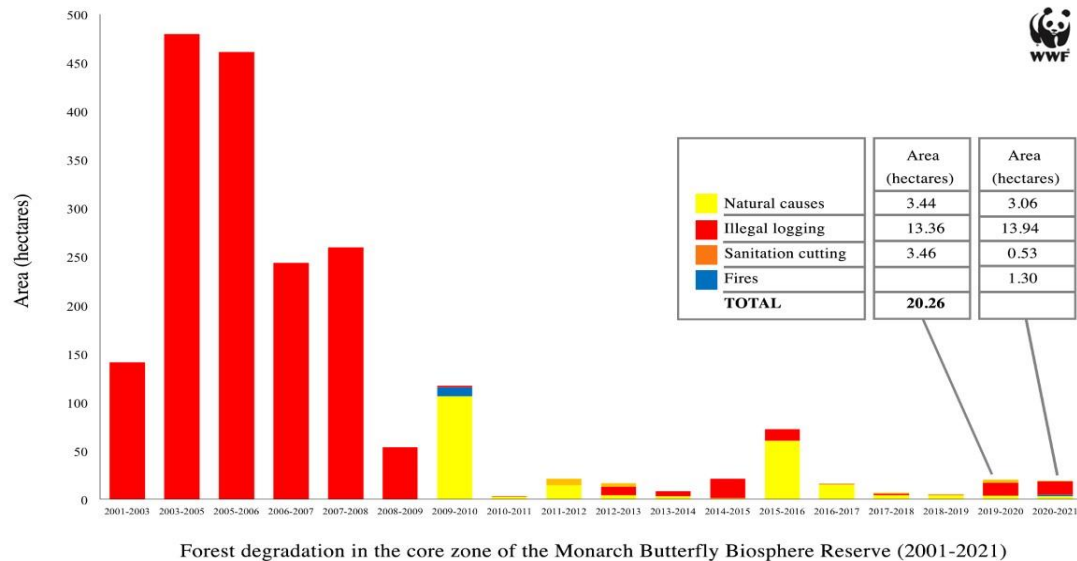


Figure 3. Historical Forest Degradation in the Core Zone of the Monarch Butterfly Biosphere Reserve (2001-2021).





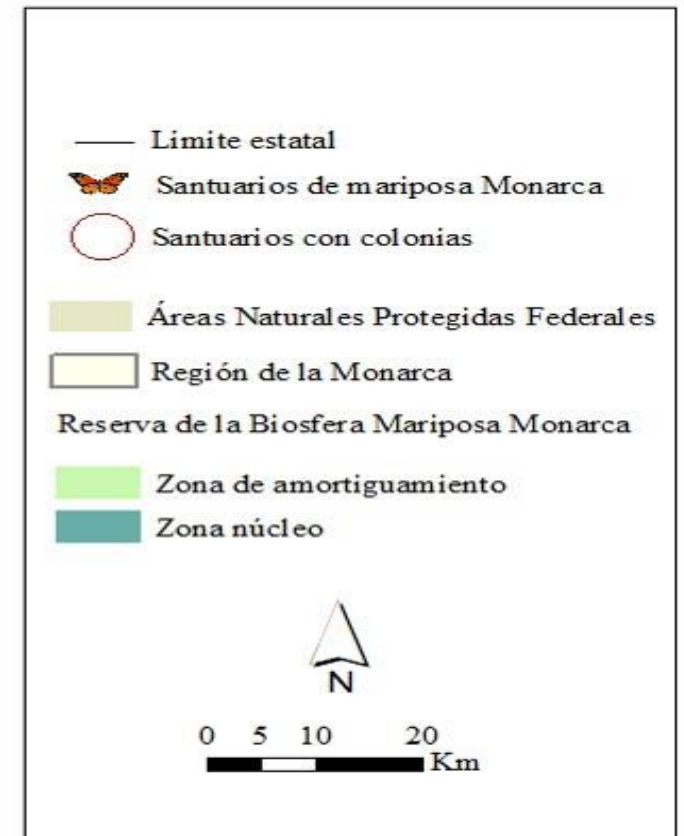
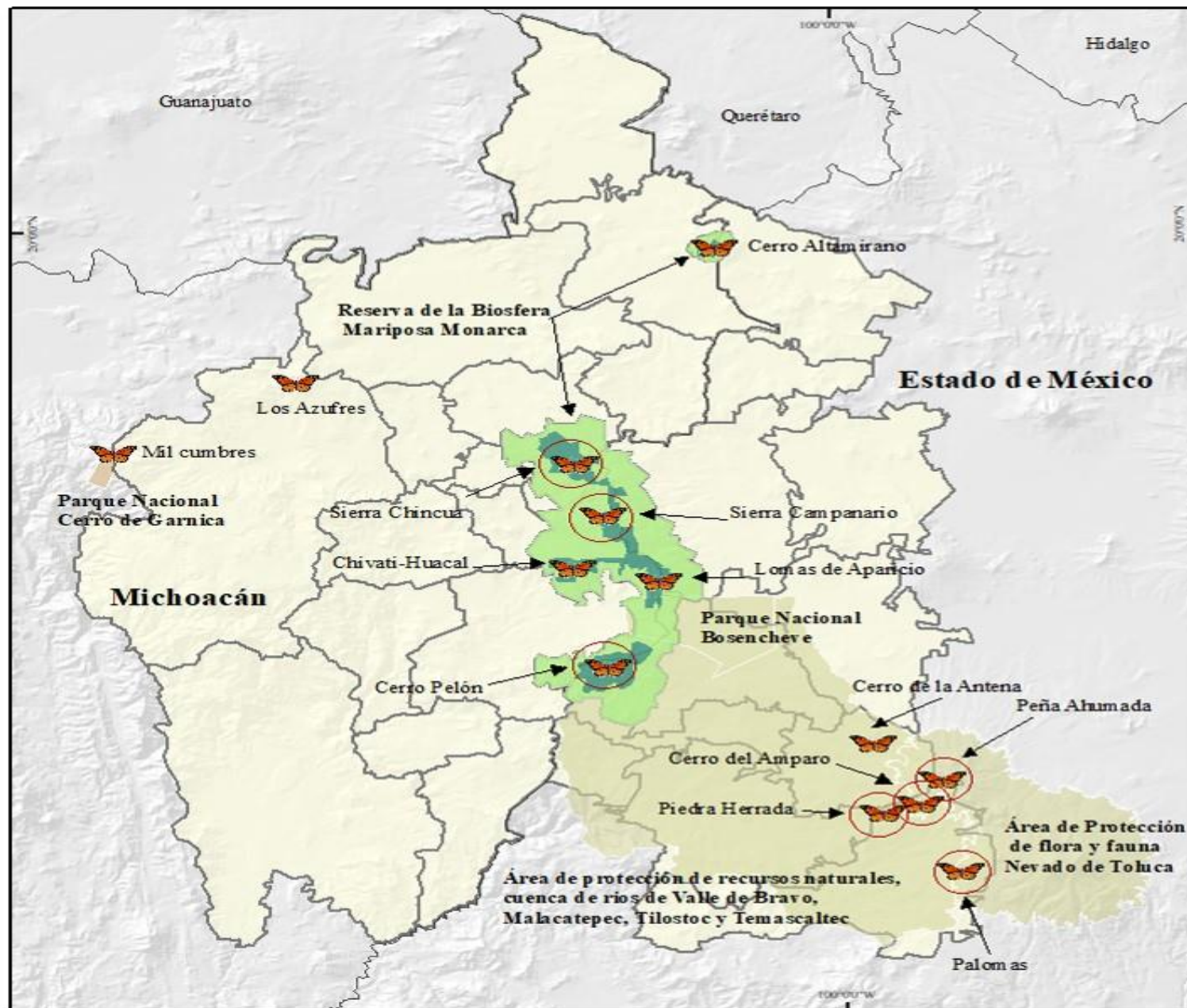
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Análisis del cambio forestal en la  
zona núcleo de la Reserva de la  
Biosfera Mariposa Monarca  
(RBMM) 2020-2021

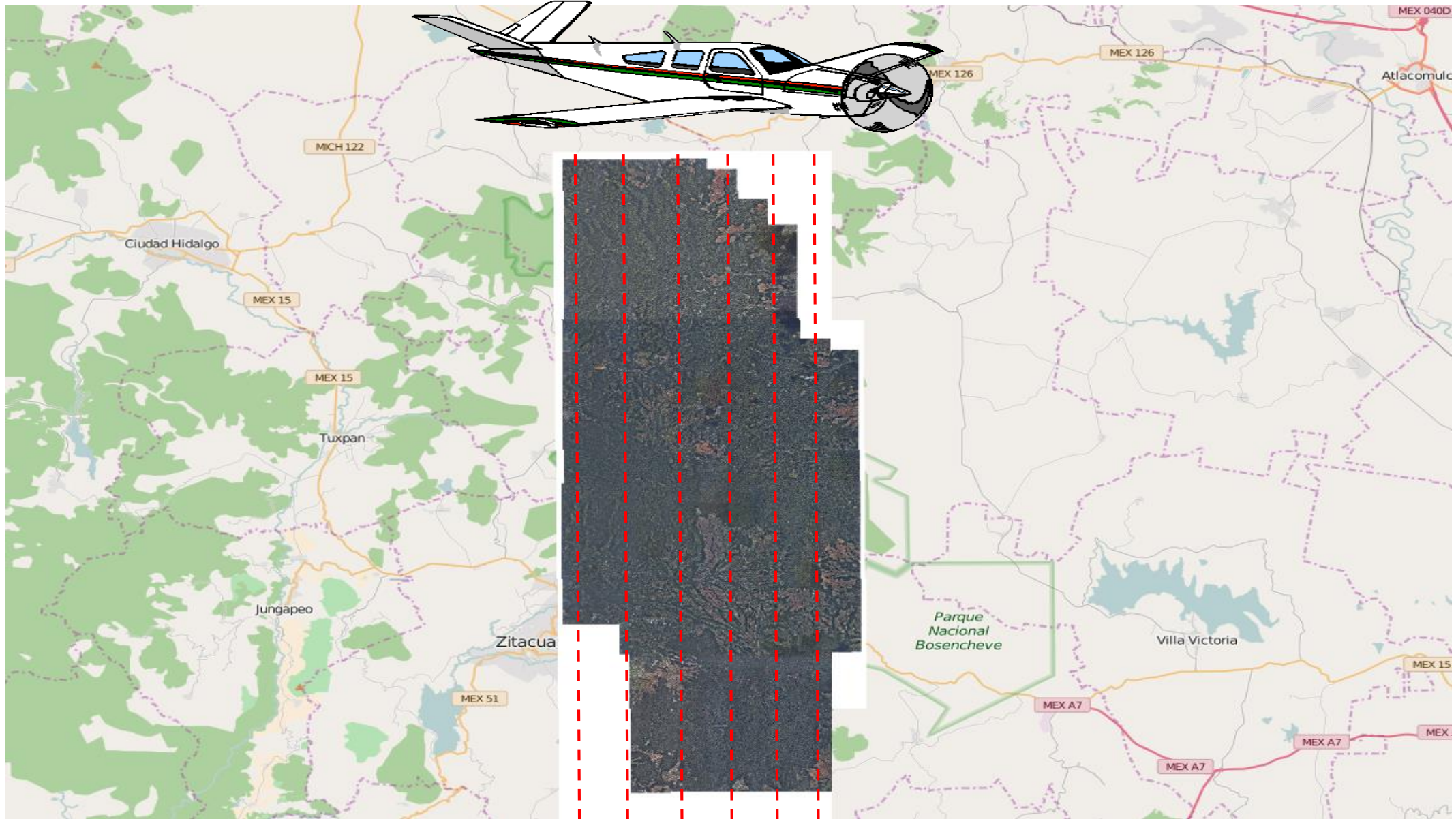
*22 de septiembre de 2020*



# Introducción



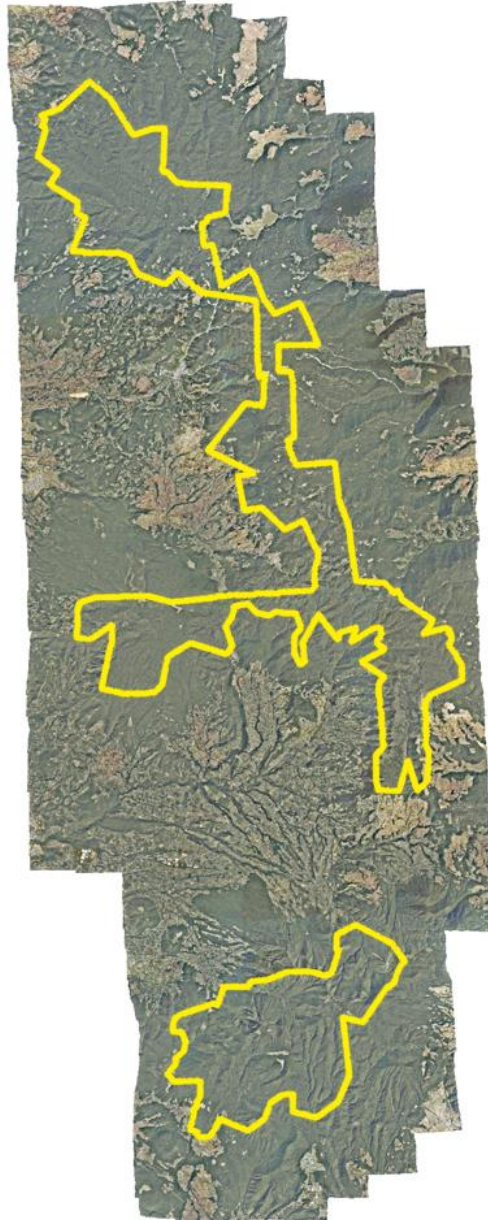
# Método: Captura de imágenes aéreas



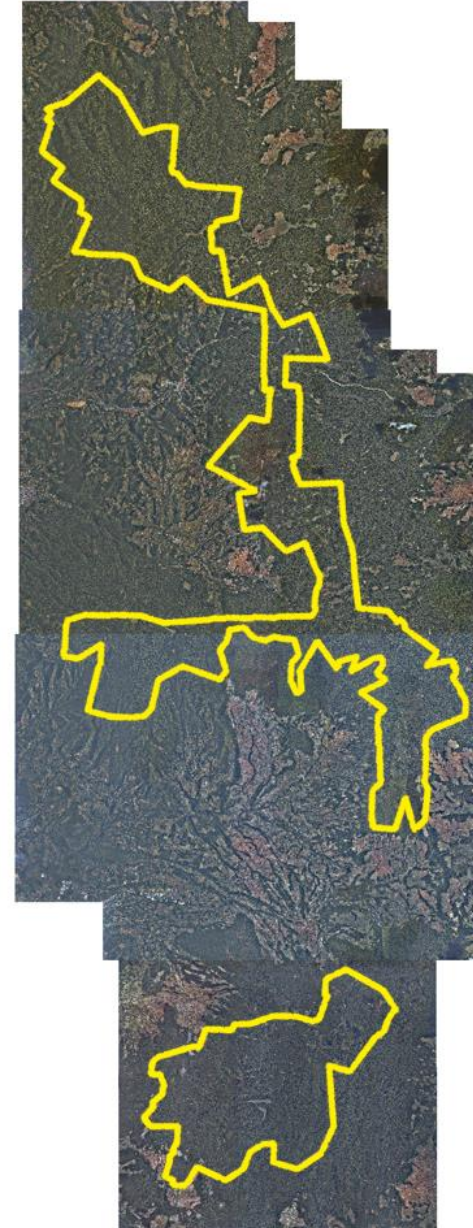


# Método: Mosaico fotográfico de la zona núcleo (RBMM)

Marzo  
2020

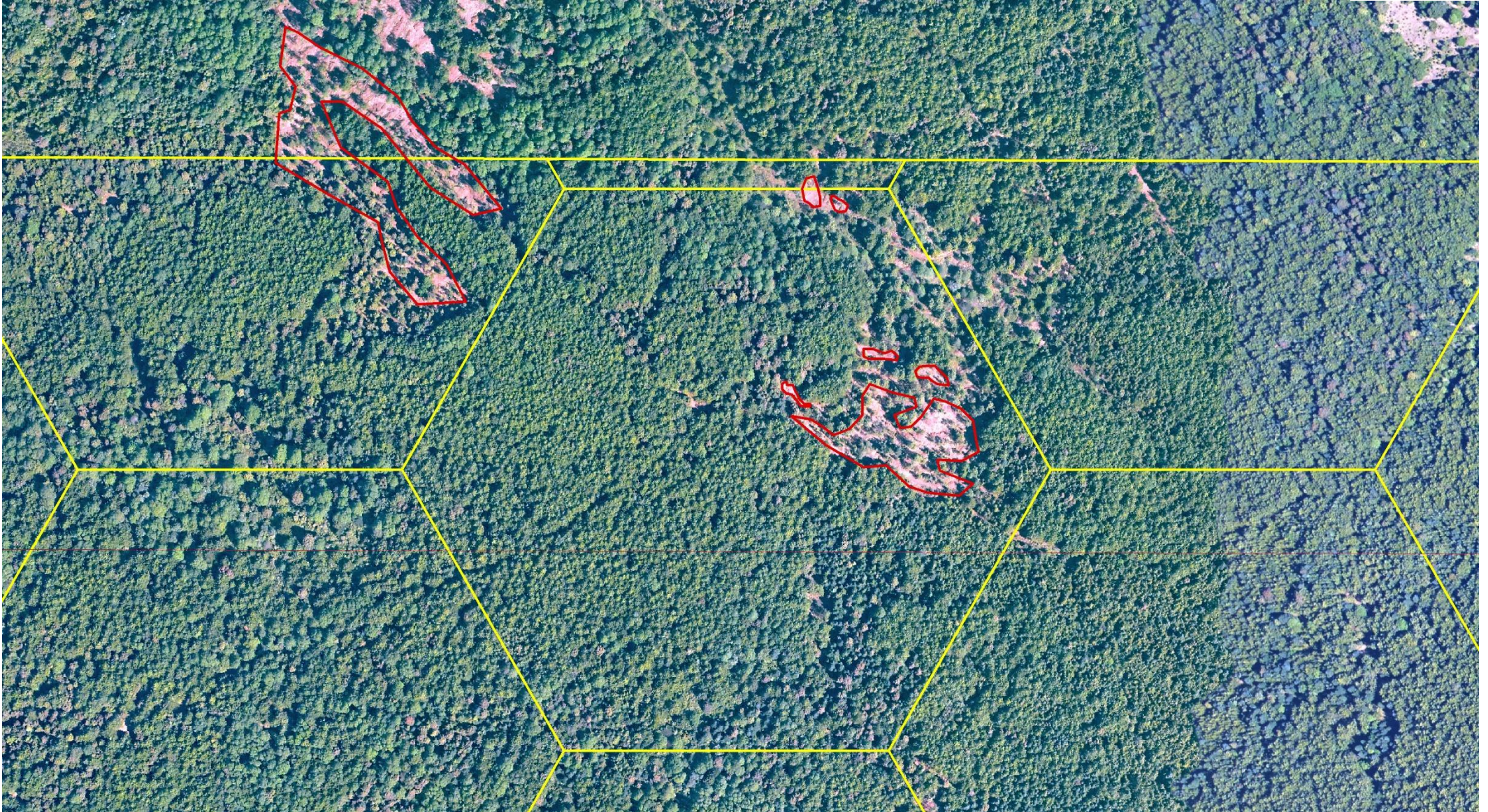


Marzo  
2021





# Método: comparación de imágenes





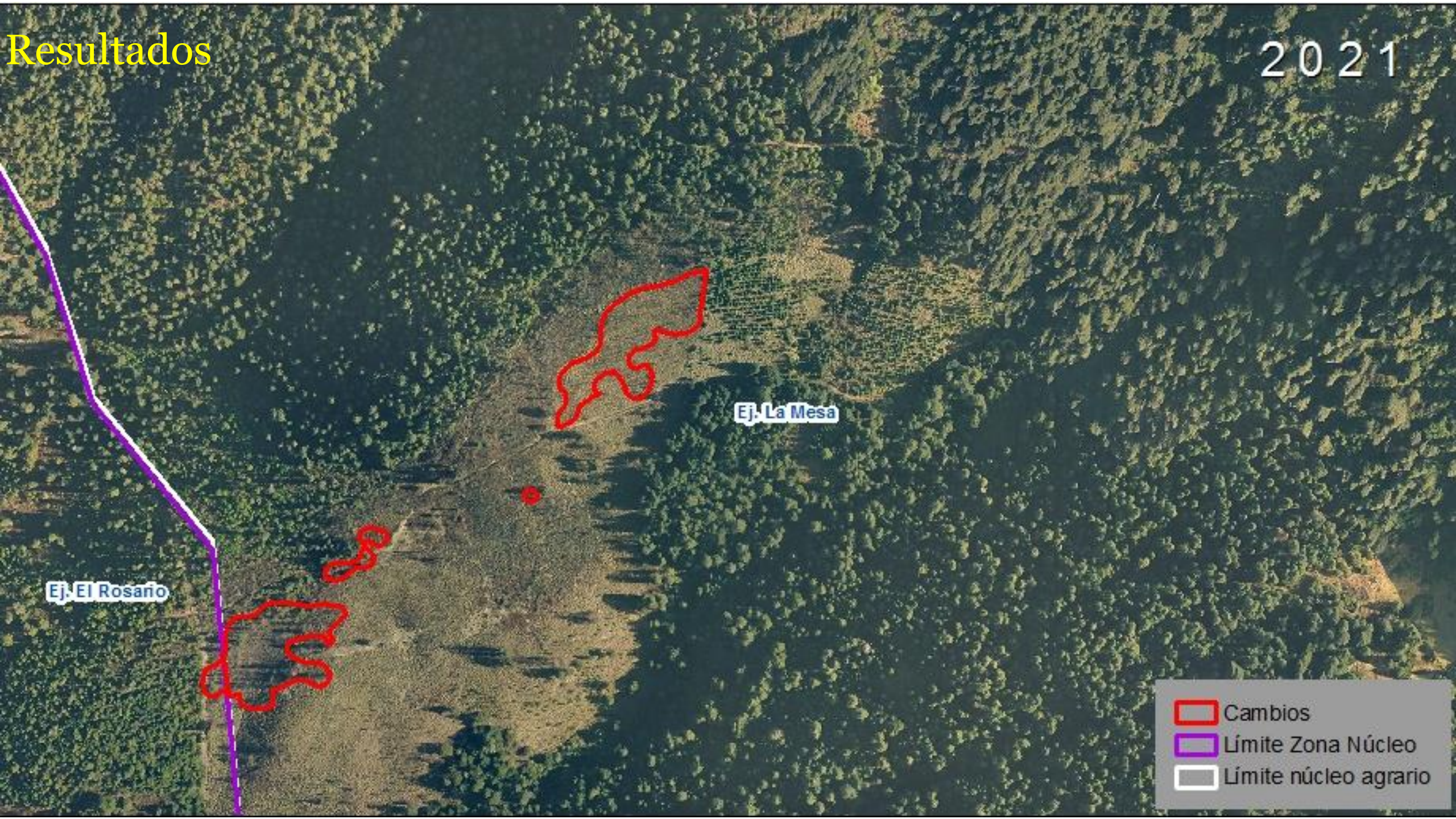
# Método: verificación de campo

## Lista de cambios detectados

- Comisión Nacional de Áreas Naturales Protegidas (CONANP)
- Fondo Monarca (FM)

Estado	Municipio	Predio	Saneamiento forestal (ha)	Muerte de árboles por sequía (ha)	Tala clandestina (ha)	Total (ha)
Estado de México	San José del Rincón	E. El Depósito		0.025	0.550	0.575
		E. La Mesa	0.399	0.190		0.589
		E. Rosa de Palo Amarillo		0.006		0.006
		P.P. Catingo I y II		0.036		0.036
		P.P. Catingo III		0.126		0.126
		P.P. Catingo IV		0.024		0.024
		P.P. Rancho Verde		0.100		0.100
	Subtotal Estado de México		0.399	0.507	0.550	1.456
Michoacán	Angangueo	E. Angangueo		0.120		0.120
		E. Hervidero y Plancha		0.186		0.186
		E. Jesús Nazareno	0.040	0.532		0.572
		E. Santa Ana	0.351	0.064		0.415
		Propiedad Estatal		0.005	0.062	0.067
		Propiedad Federal		0.155	0.596	0.751
		E. Cerro Prieto	0.384	0.016		0.400
		E. Los Remedios	0.219	0.001		0.220
	Áporo	E. Rincón de Soto		0.012		0.012
	Contepec	E. Contepec		0.470		0.470
	Ocampo	C.I. San Cristóbal		0.078		0.078
		E. El Asoleadero	0.256	0.017		0.273
		E. El Rosario	1.516	0.015	0.076	1.607
	Senguio	E. Chincua	0.300	0.043		0.343
		E. El Calabozo I		0.011	0.192	0.203
		E. El Calabozo II		0.331	0.358	0.689
		E. Senguio		0.273	0.115	0.388
	Zitácuaro	C.I. Carpinteros		0.015	0.449	0.464
		C.I. Crescencio Morales		0.008	0.233	0.241
		C.I. Curungueo		0.064		0.064
		C.I. Donaciano Ojeda		0.316		0.316
		C.I. Francisco Serrato		0.019		0.019
		C.I. Nicolás Romero			2.132	2.132
		C.I. San Felipe los Alzati		0.152	1.874	2.026
		E. Crescencio Morales		0.027	6.711	6.738
		E. Nicolás Romero			0.015	0.015
	Subtotal Michoacán		3.066	2.930	12.813	18.809

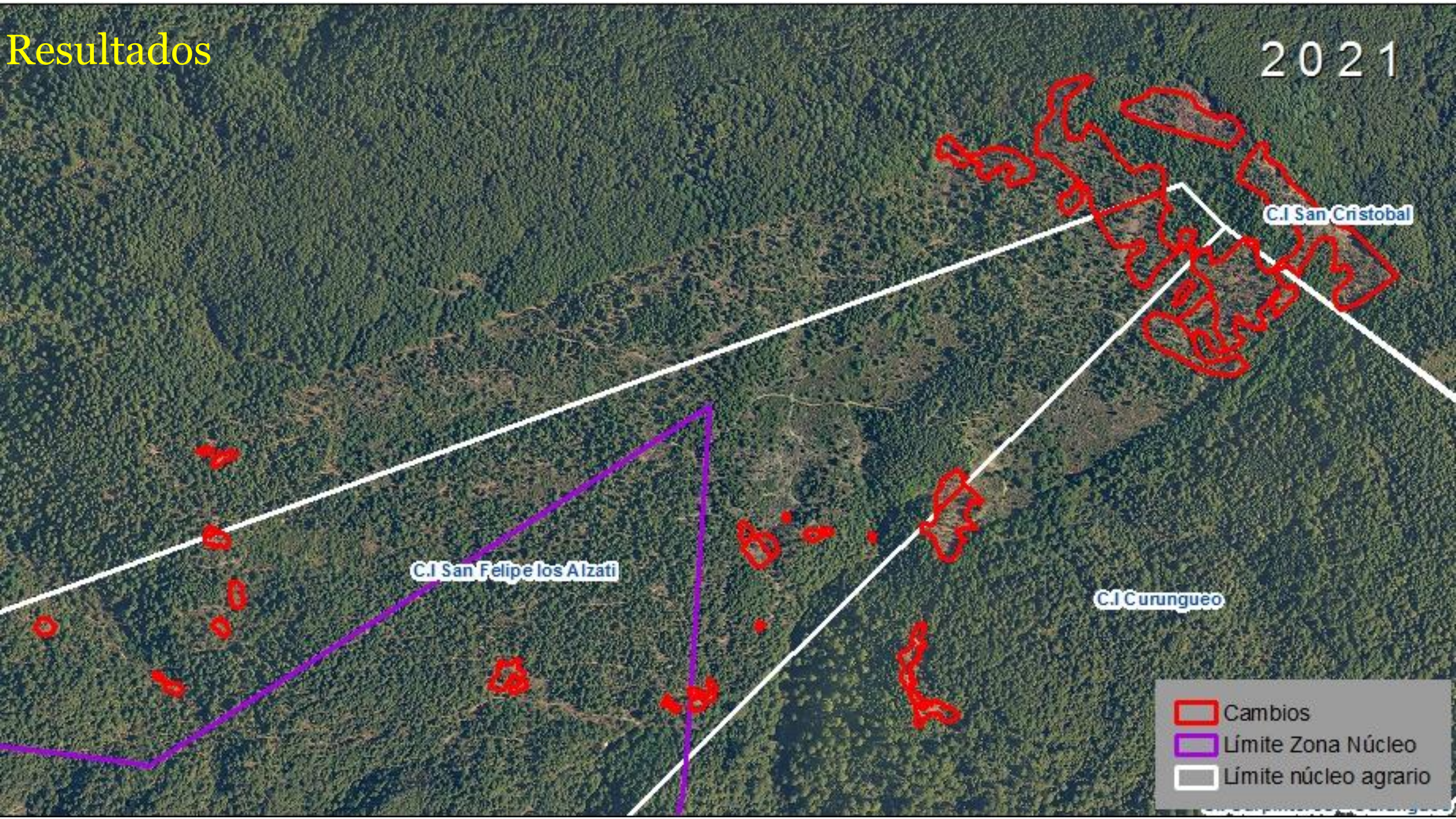






# Resultados

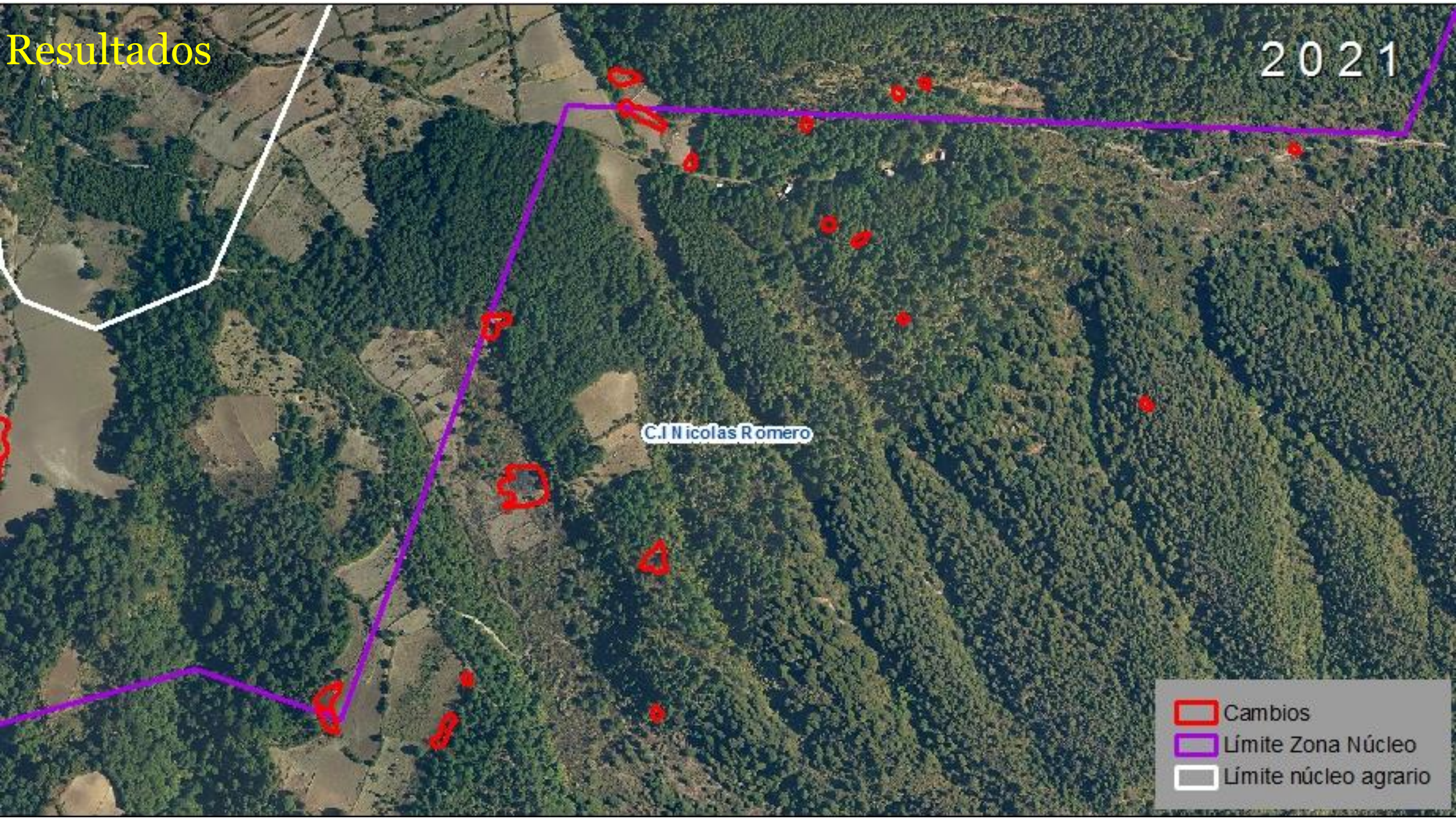
2021





# Resultados

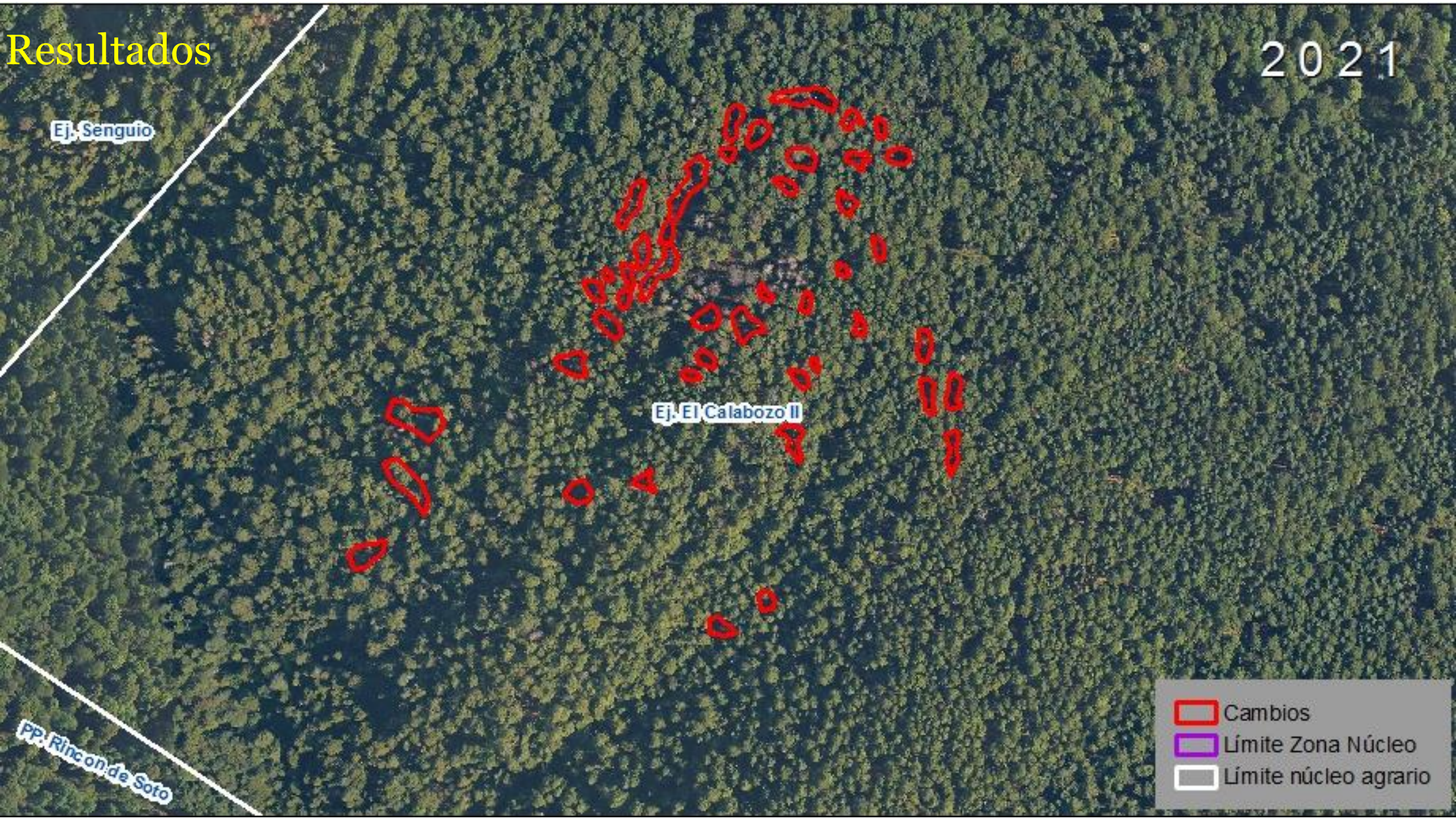
2021



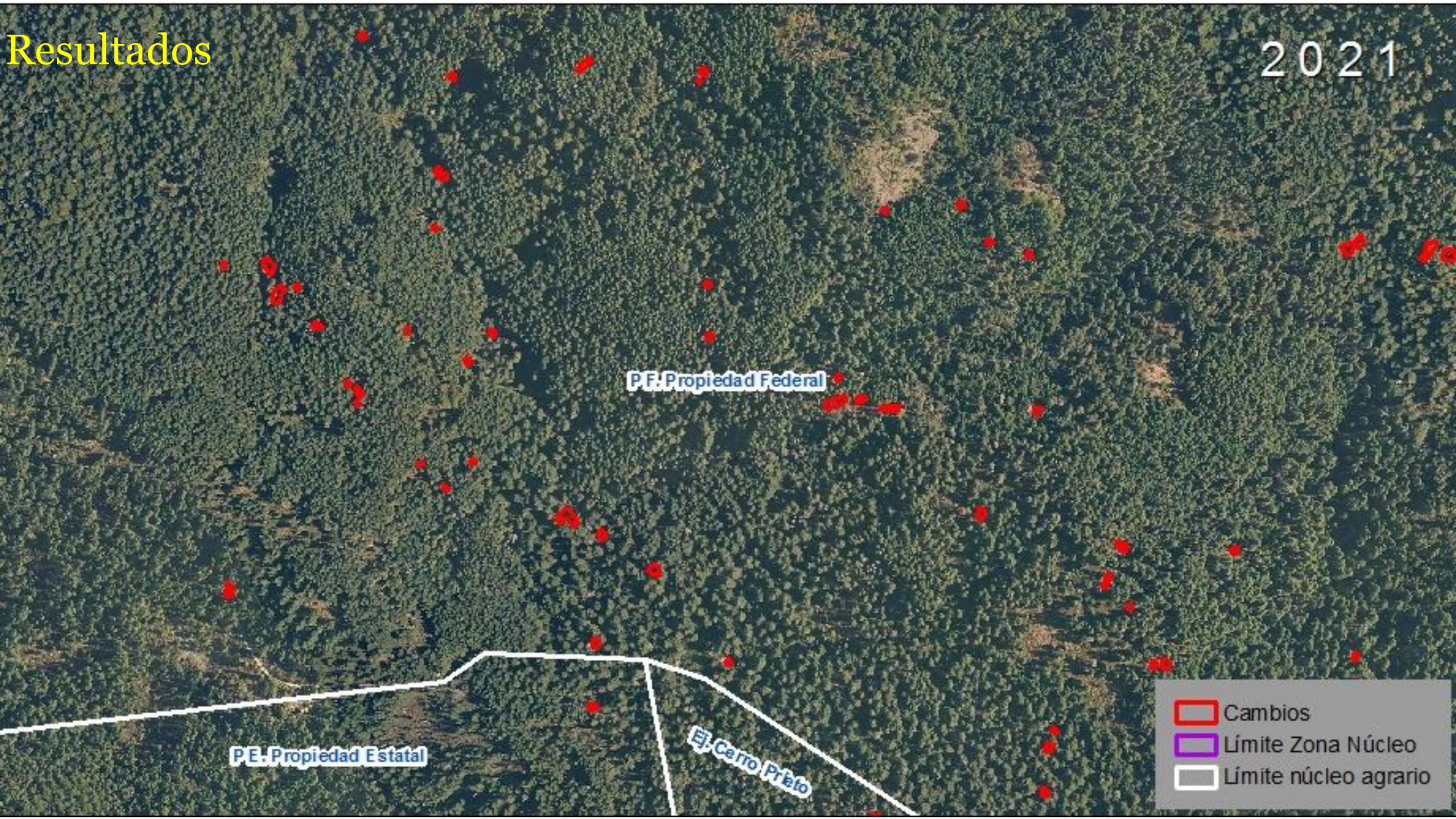


# Resultados

2021





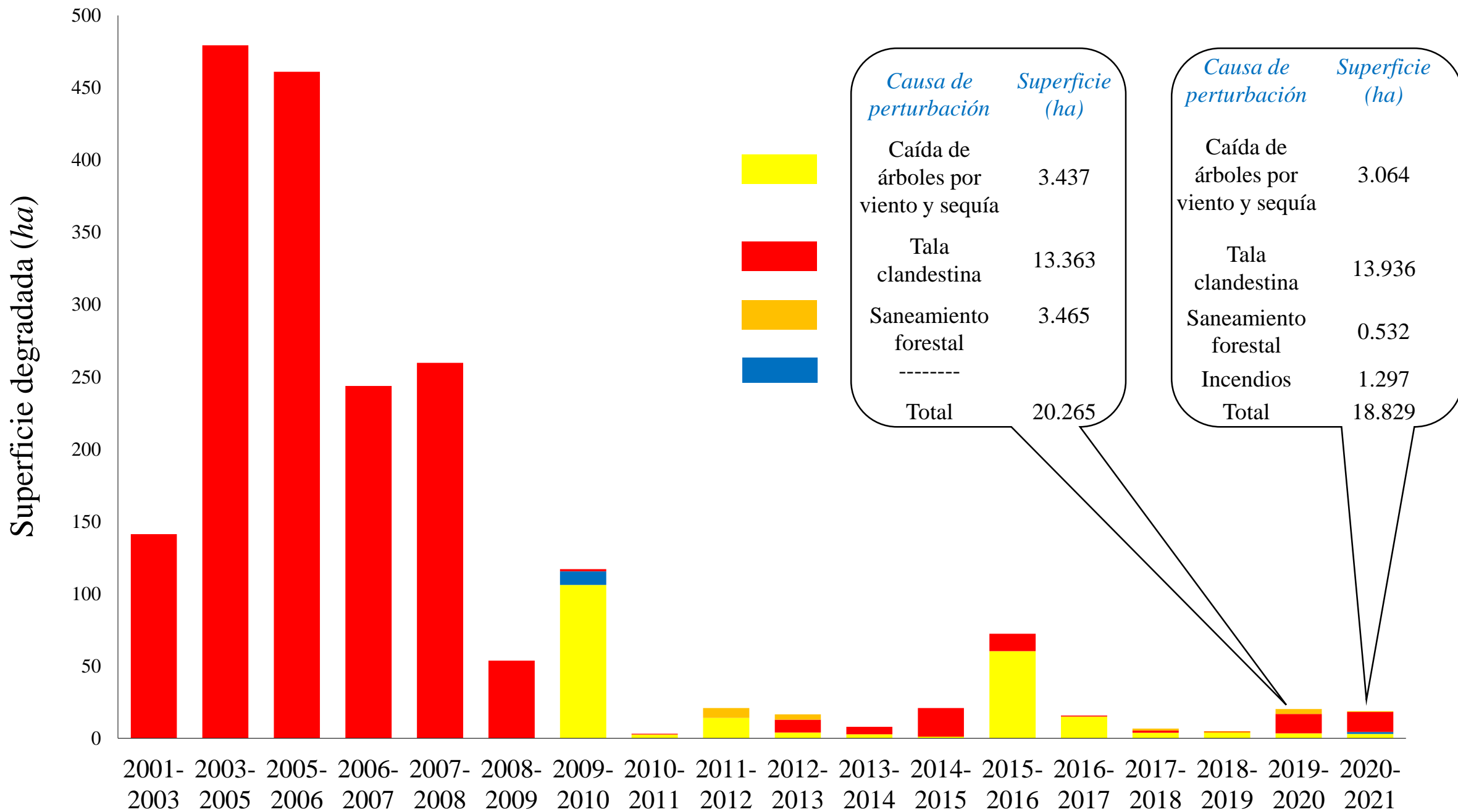




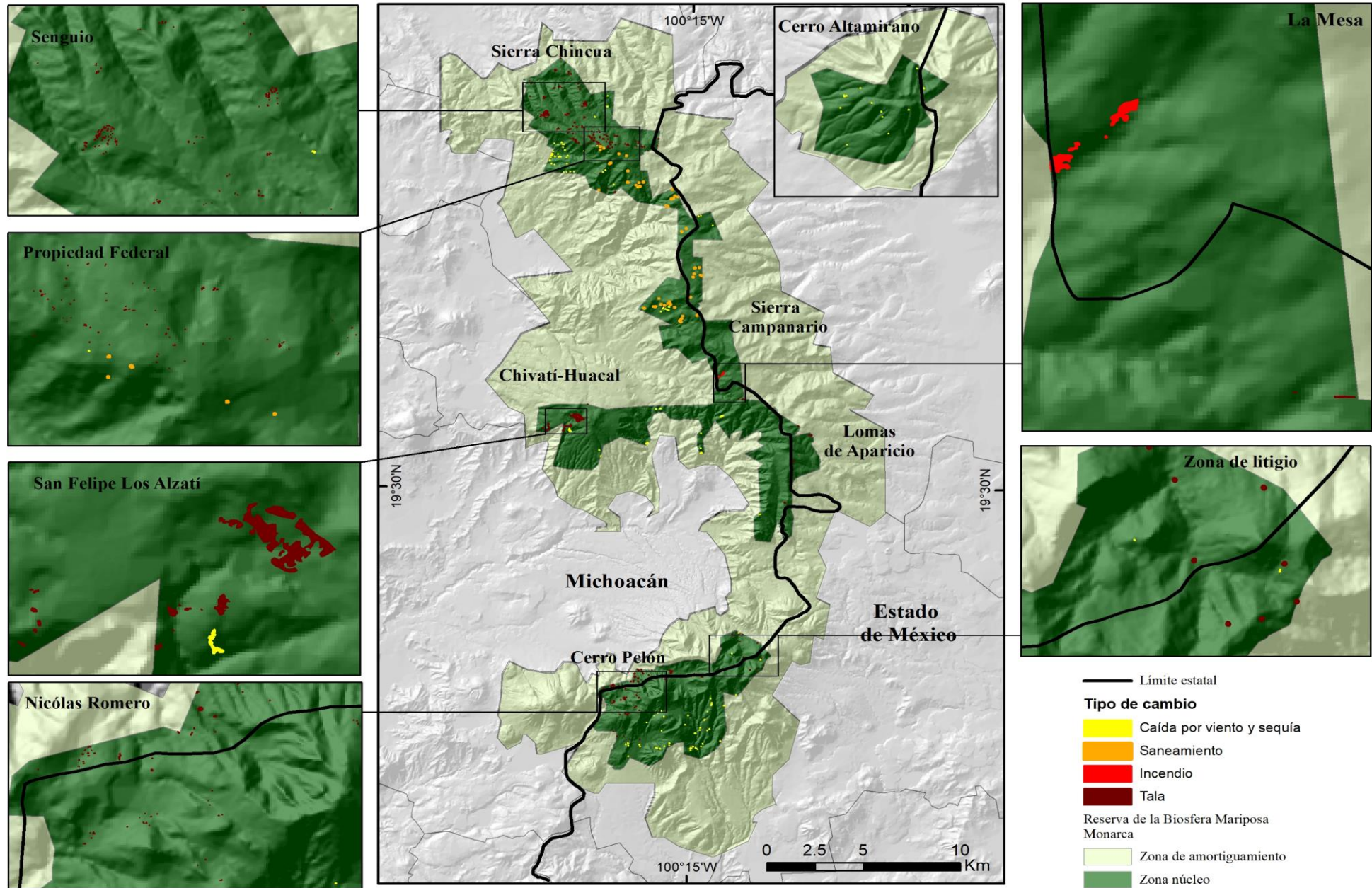
Estado	Municipio	Predio	Incendio (ha)	Saneamiento (ha)	Sequía (ha)	Tala (ha)	Total general
Estado de México	Donato Guerra	E. El Capulín			0.272		0.272
		E. Mesas Altas Xoconusco			0.024		0.024
		P.P. Cañada Seca			0.206		0.206
		P.P. Los Saucos			0.322		0.322
	San José del Rincón	E. El Depósito				0.223	0.223
		E. La Mesa	1.297			0.044	1.341
		P.P. Catingo III			0.006		0.006
		P.P. Catingo IV			0.024		0.024
		P.P. Rancho Verde		0.078			0.078
	Temascalcingo	E. Pueblo Nuevo Solís-Contepec*			0.020		0.020
Villa de Allende	C.I. San Pablo Malacatepec			0.004		0.004	
	Litigio (CM, SM, SB, NR, SPM)			0.019	0.017	0.036	
Subtotal Estado de México			1.297	0.078	0.897	0.284	2.556
Michoacán	Angangueo	E. Angangueo		0.007	0.021	0.082	0.110
		E. Hervidero y Plancha			0.499		0.499
		E. Jesús Nazareno			0.057		0.057
		E. Santa Ana		0.079	0.004		0.083
		Propiedad Estatal			0.021		0.021
		Propiedad Federal				0.649	0.649
	Contepec	E. Contepec			0.068		0.068
	Ocampo	E. Cerro Prieto		0.104	0.008		0.112
		E. El Rosario		0.264	0.074		0.338
	Senguio	E. Chincua			0.071		0.071
		E. El Calabozo I				0.589	0.589
		E. El Calabozo II				0.966	0.966
		E. Senguio				0.298	0.298
	Zitácuaro	C.I. Crescencio Morales			0.399	0.062	0.461
		C.I. San Francisco Curungueo			0.325	0.478	0.803
		C.I. Donaciano Ojeda			0.241		0.241
		C.I. Francisco Serrato			0.379		0.379
		C.I. Nicolás Romero				1.235	1.235
		C.I. San Felipe los Alzati				8.708	8.708
		E. Crescencio Morales				0.310	0.310
		E. Nicolás Romero				0.275	0.275
Subtotal Michoacán			0	0.454	2.167	13.652	16.273
Total general			1.297	0.532	3.064	13.936	18.829

Estado	Municipio	Predio	Incendio (ha)	Saneamiento (ha)	Sequía (ha)	Tala (ha)	Total general
Estado de México	Donato Guerra	E. El Capulín			0.272		0.272
		E. Mesas Altas Xoconusco			0.024		0.024
		P.P. Cañada Seca			0.206		0.206
		P.P. Los Saucos			0.322		0.322
	San José del Rincón	E. El Depósito				0.223	0.223
		E. La Mesa	1.297			0.044	1.341
		P.P. Catingo III			0.006		0.006
		P.P. Catingo IV			0.024		0.024
		P.P. Rancho Verde		0.078			0.078
	Temascalcingo	E. Pueblo Nuevo Solís-Contepec*			0.020		0.020
	Villa de Allende	C.I. San Pablo Malacatepec			0.004		0.004
		Litigio (CM, SM, SB, NR, SPM)			0.019	0.017	0.036
Subtotal Estado de México			1.297	0.078	0.897	0.284	2.556

Estado	Municipio	Predio	Incendio (ha)	Saneamiento (ha)	Sequía (ha)	Tala (ha)	Total general
Michoacán	Angangueo	E. Angangueo		0.007	0.021	0.082	0.110
		E. Hervidero y Plancha			0.499		0.499
		E. Jesús Nazareno			0.057		0.057
		E. Santa Ana		0.079	0.004		0.083
		Propiedad Estatal			0.021		0.021
		Propiedad Federal				0.649	0.649
	Contepec	E. Contepec			0.068		0.068
	Ocampo	E. Cerro Prieto		0.104	0.008		0.112
		E. El Rosario		0.264	0.074		0.338
	Senguio	E. Chincua			0.071		0.071
		E. El Calabozo I				0.589	0.589
		E. El Calabozo II				0.966	0.966
		E. Senguio				0.298	0.298
	Zitácuaro	C.I. Crescencio Morales			0.399	0.062	0.461
		C.I. San Francisco Curungueo			0.325	0.478	0.803
		C.I. Donaciano Ojeda			0.241		0.241
		C.I. Francisco Serrato			0.379		0.379
		C.I. Nicolás Romero				1.235	1.235
C.I. San Felipe los Alzati					8.708	8.708	
E. Crescencio Morales					0.310	0.310	
E. Nicolás Romero					0.275	0.275	
Subtotal Michoacán			0	0.454	2.167	13.652	16.273
Total general			1.297	0.532	3.064	13.936	18.829



# Resultados







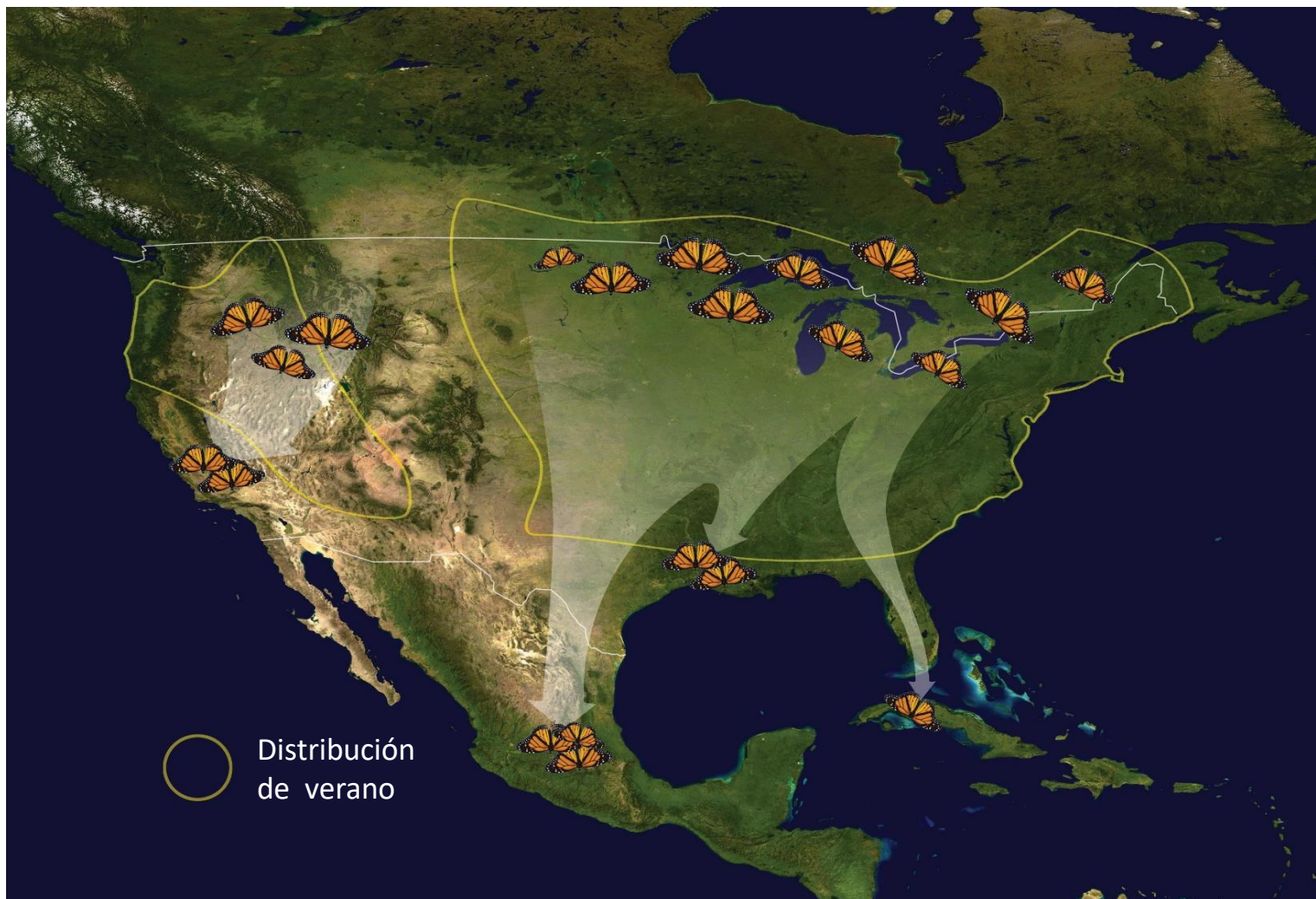
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Gracias

*22 de septiembre de 2020*



Estado	Municipio	Predio	Incendio (ha)	Saneamiento (ha)	Sequía (ha)	Tala clandestina (ha)	Total general
Estado de México	Donato Guerra	E. El Capulín			0.272		0.272
		E. Mesas Altas de Xoconusco			0.024		0.024
		P.P. Cañada Seca			0.206		0.206
		P.P. Los Saucos			0.322		0.322
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Subtotal Estado de México			1.297	0.078	0.897	0.284	2.556
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		E. Hervidero y Plancha			0.499		0.499
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		Propiedad Estatal			0.021		0.021
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		C.I. Nicolás Romero				1.235	1.235
		C.I. San Felipe los Alzati				8.708	8.708
		E. Crescencio Morales				0.310	0.310
		E. Nicolás Romero				0.275	0.275
Subtotal Michoacán			0	0.454	2.167	13.652	16.273
Total general			1.297	0.532	3.064	13.936	18.829

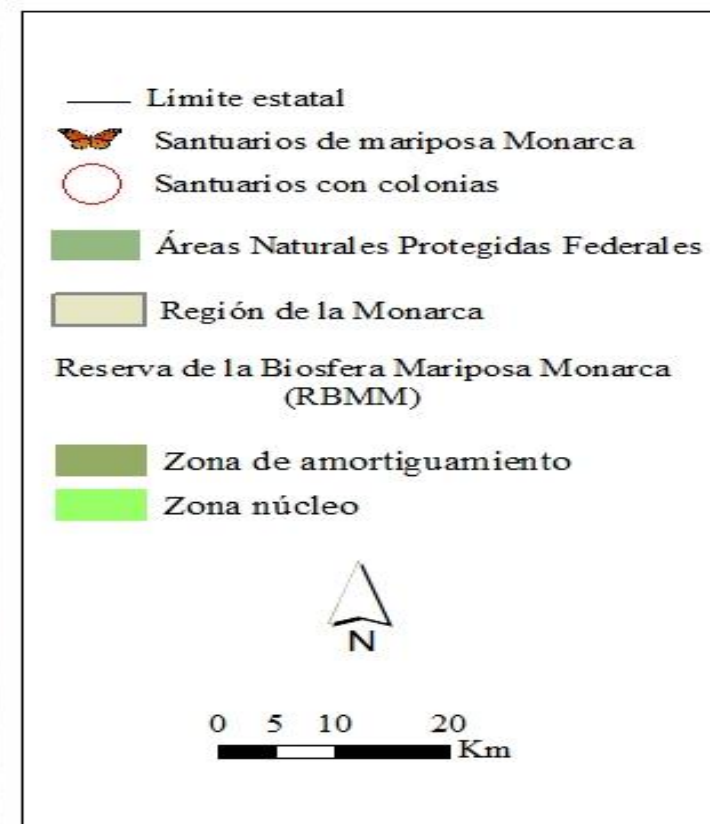
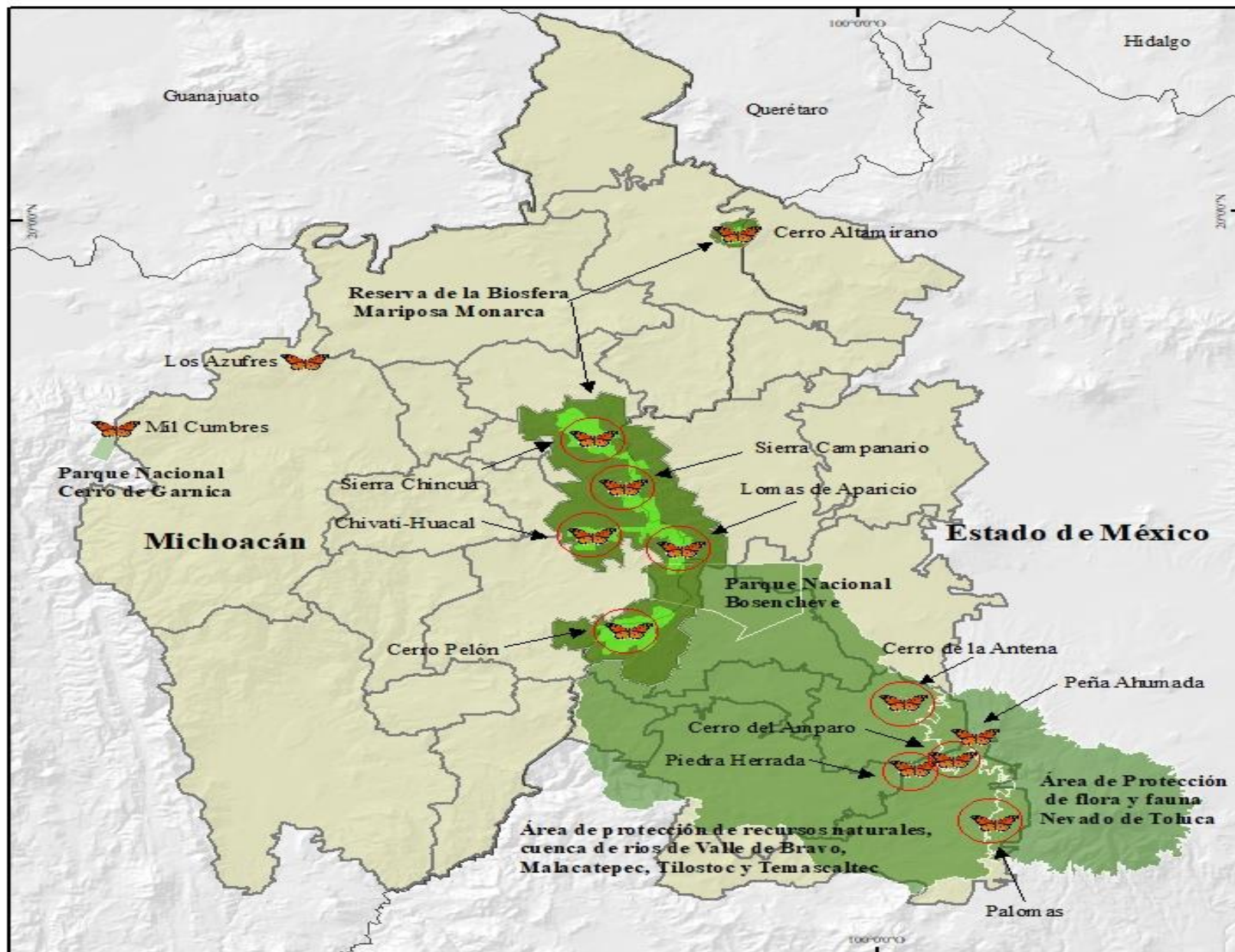


fondomonarca  
20años

## Análisis del cambio forestal en la zona núcleo de la Reserva de la Biosfera Mariposa Monarca (RBMM) 2021-2022

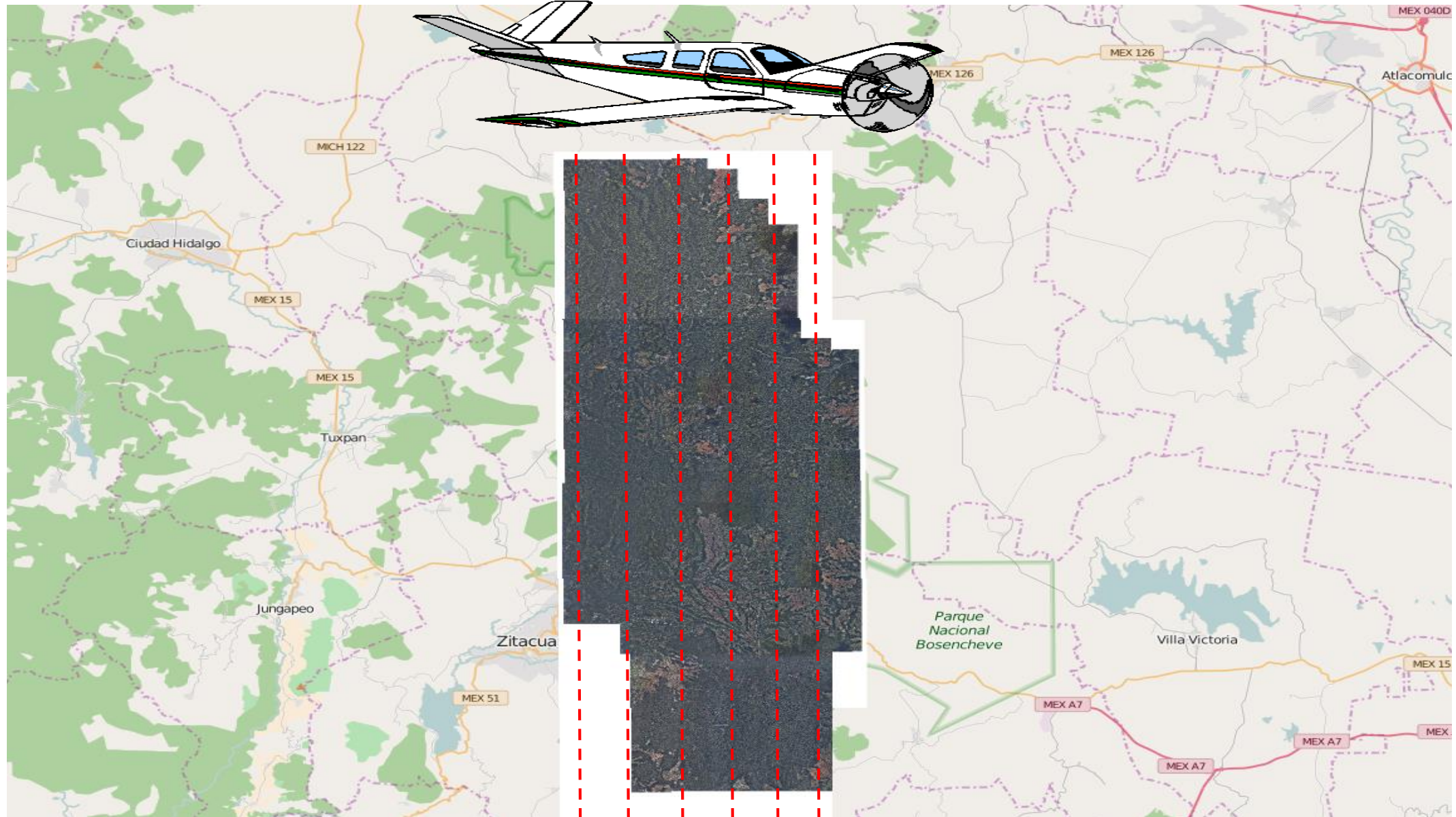


# Introducción





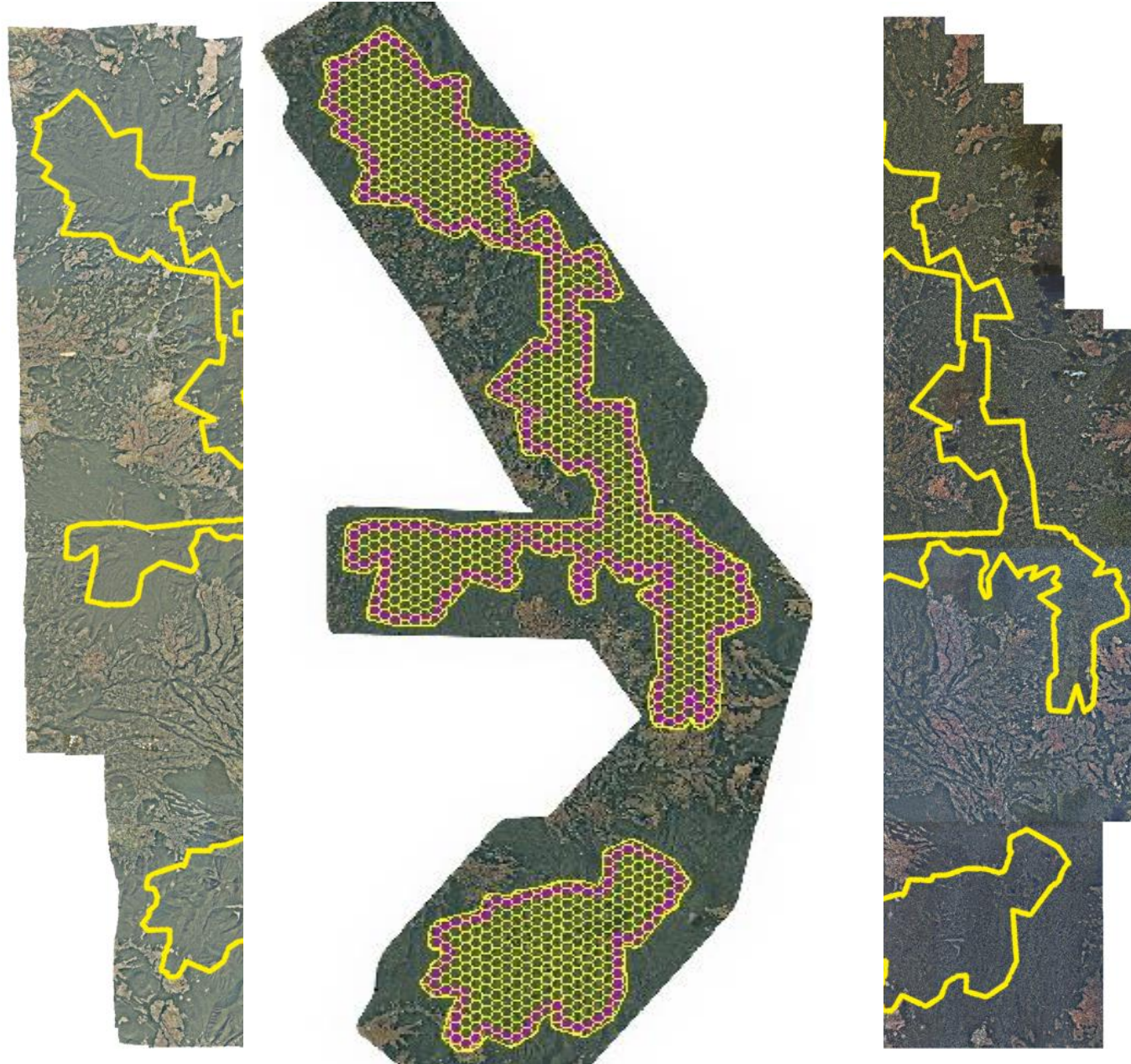
## Fotografías aéreas





## Mosaicos fotográficos de la zona núcleo

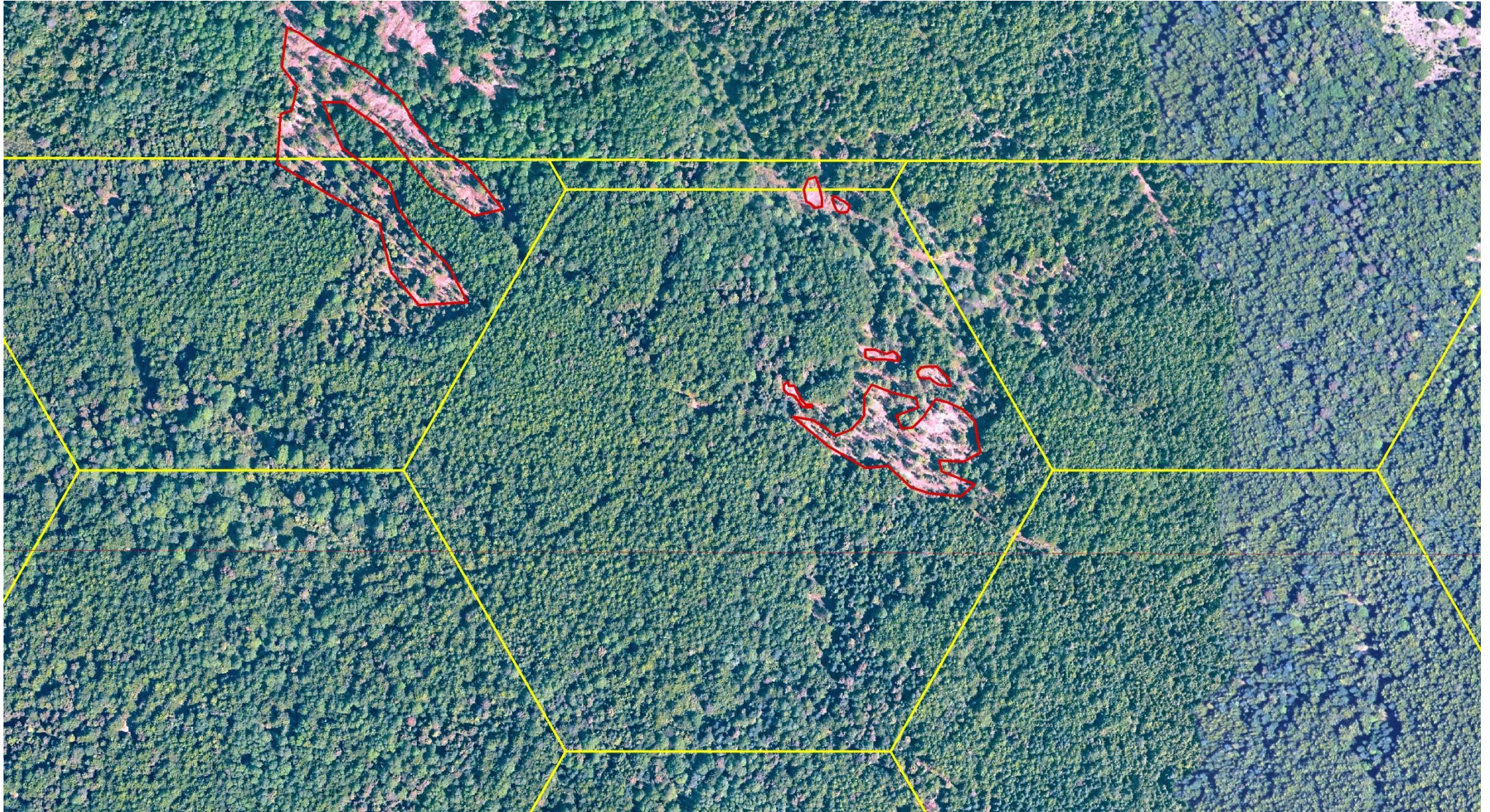
Marzo  
2021



Abril  
2022



## Comparación de la imágenes





# Verificación de campo

## Lista de cambios detectados

Estado	Municipio	Predio	Saneamiento forestal (ha)	Muerte de árboles por sequía (ha)	Tala clandestina (ha)	Total (ha)
Estado de México	San José del Rincón	E. El Depósito		0.025	0.550	0.575
		E. La Mesa	0.399	0.190		0.589
		E. Rosa de Palo Amarillo		0.006		0.006
		P.P. Catingo I y II		0.036		0.036
		P.P. Catingo III		0.126		0.126
		P.P. Catingo IV		0.024		0.024
		P.P. Rancho Verde		0.100		0.100
Subtotal Estado de México			0.399	0.507	0.550	1.456
Michoacán	Angangueo	E. Angangueo		0.120		0.120
		E. Hervidero y Plancha		0.186		0.186
		E. Jesús Nazareno	0.040	0.532		0.572
		E. Santa Ana	0.351	0.064		0.415
		Propiedad Estatal		0.005	0.062	0.067
		Propiedad Federal		0.155	0.596	0.751
		E. Cerro Prieto	0.384	0.016		0.400
	Áporo	E. Los Remedios	0.219	0.001		0.220
		E. Rincón de Soto		0.012		0.012
	Contepec	E. Contepec		0.470		0.470
		C.I. San Cristóbal		0.078		0.078
	Ocampo	E. El Asoleadero	0.256	0.017		0.273
		E. El Rosario	1.516	0.015	0.076	1.607
	Senguio	E. Chincua	0.300	0.043		0.343
		E. El Calabozo I		0.011	0.192	0.203
		E. El Calabozo II		0.331	0.358	0.689
		E. Senguio		0.273	0.115	0.388
	Zitácuaro	C.I. Carpinteros		0.015	0.449	0.464
		C.I. Crescencio Morales		0.008	0.233	0.241
		C.I. Curungueo		0.064		0.064
		C.I. Donaciano Ojeda		0.316		0.316
		C.I. Francisco Serrato		0.019		0.019
		C.I. Nicolás Romero			2.132	2.132
		C.I. San Felipe los Alzati		0.152	1.874	2.026
		E. Crescencio Morales		0.027	6.711	6.738
E. Nicolás Romero				0.015	0.015	
Subtotal Michoacán			3.066	2.930	12.813	18.809
Total			3.465	3.437	13.363	20.265

- Comisión Nacional de Áreas Naturales Protegidas (CONANP)
- Fondo Monarca (FM)
- Representantes de Ejidos y Comunidades

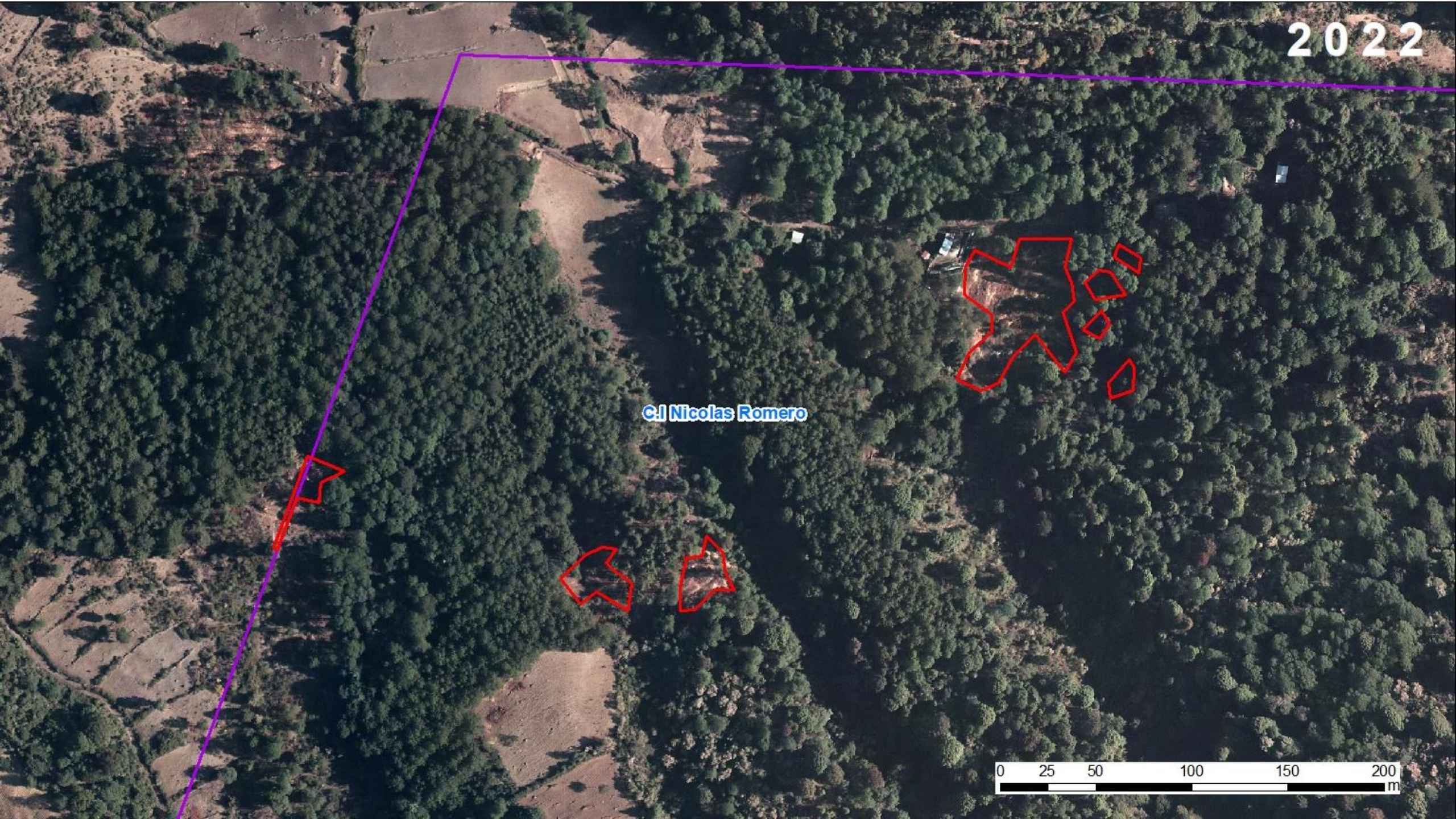
## Resultados



2022

C.I Nicolas Romero

0 25 50 100 150 200  
m

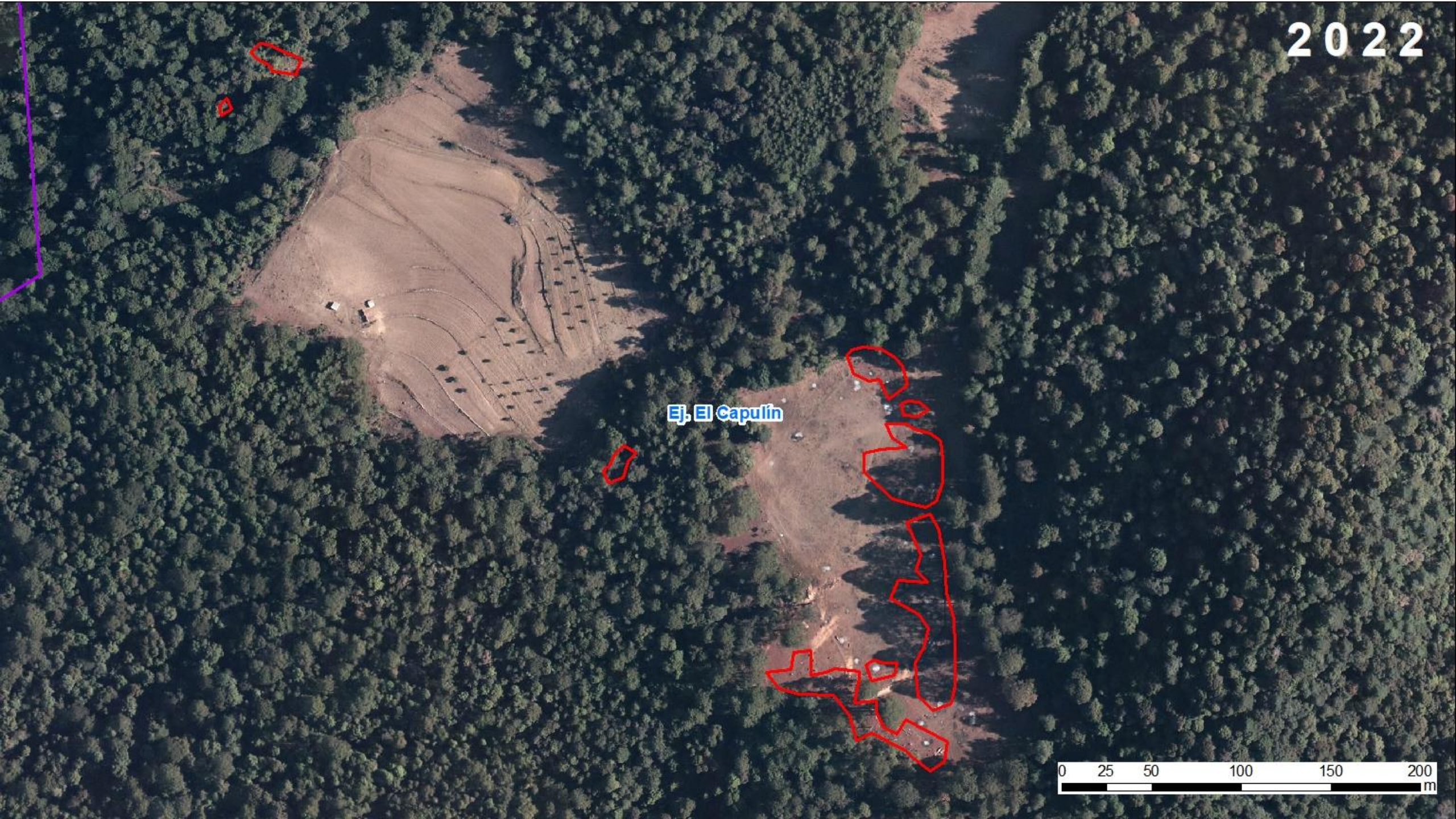




2022

Ej. El Capulín

0 25 50 100 150 200  
m





2022

Ej. Cerro Prieto

0 25 50 100 150 200  
m



2022

Ej. El Rosario

0 50 100 200 300 400 m



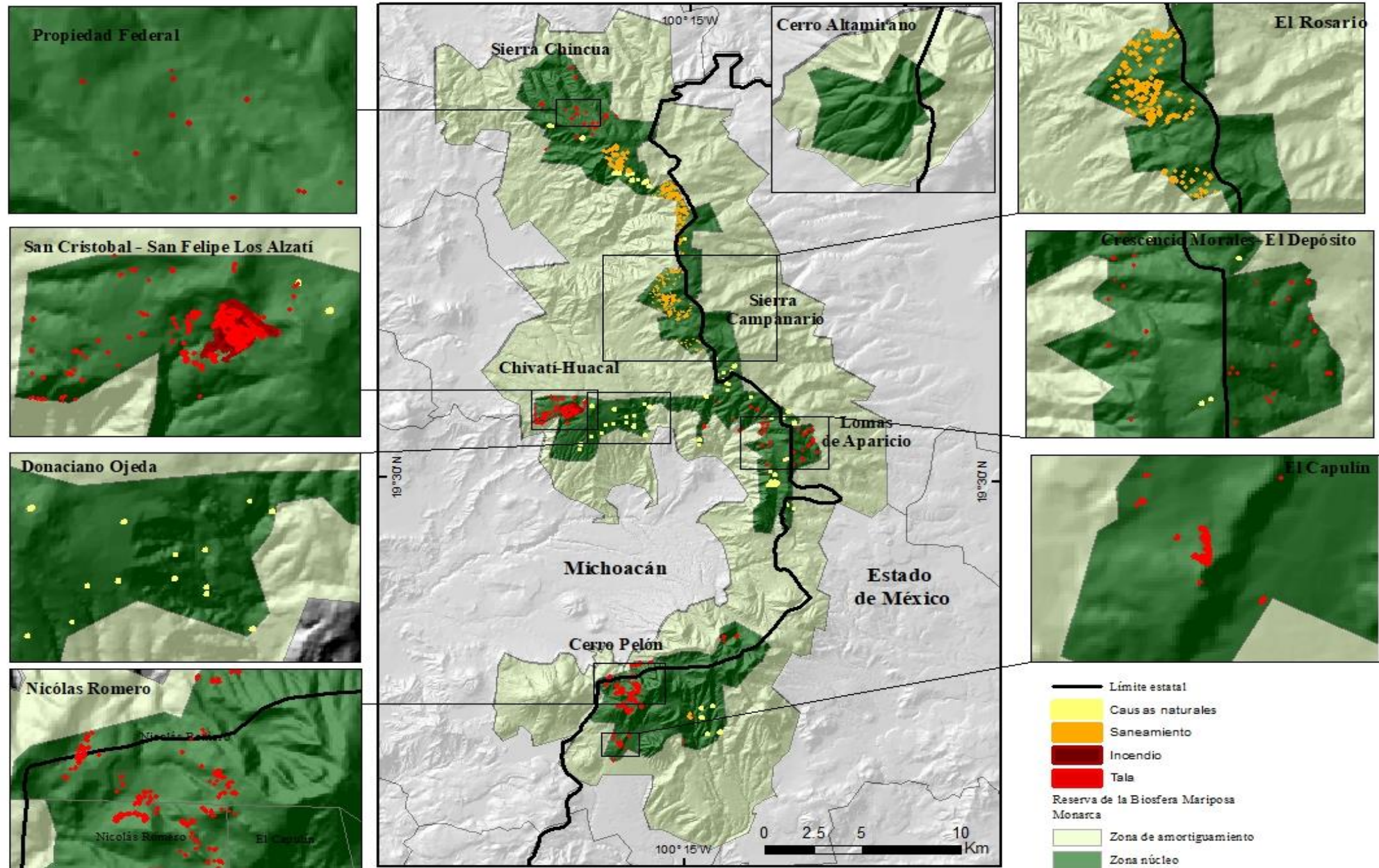
2022

SAN CRISTOBAL

SAN FELIPE DE LOS ALZATI

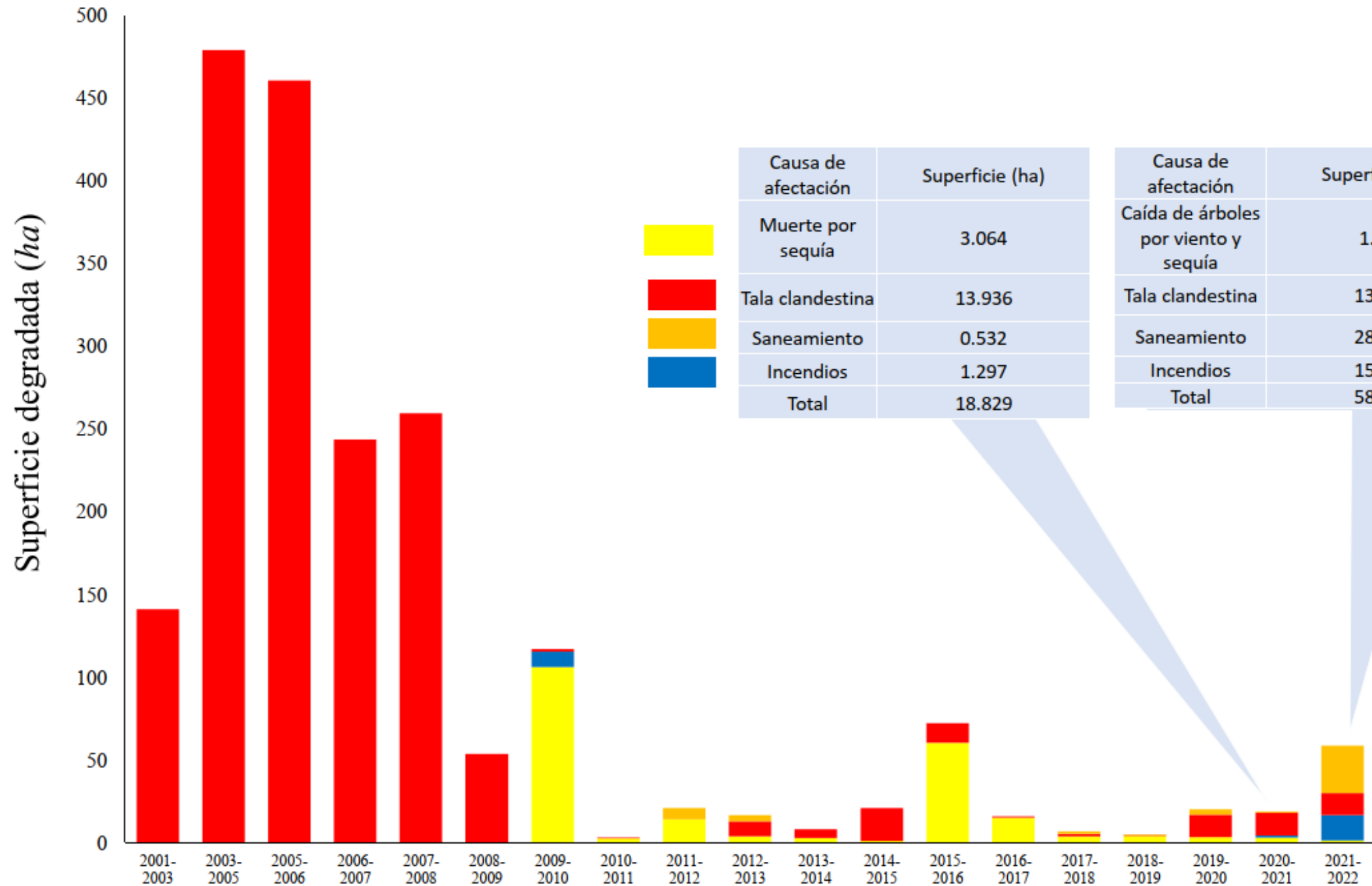






Estado	Municipio	Predio	Causas naturales	Incendio	Saneamiento	Tala clandestina	Total
Estado de México	Donato Guerra	B C San Juan Xoconusco			0.264	0.044	0.308
		Ej. El Capulín				0.782	0.782
		Ej. Mesas Altas Xoconusco	0.083				0.083
		PP. Cañada Seca	0.048				0.048
		Ej. El Depósito				0.136	0.136
	San José del Rincón	Ej. La Mesa	0.088				0.088
		Ej. Rosa de Palo Amarillo			0.030		0.030
Subtotal Estado de México			0.219		0.294	0.962	1.475
Michoacán	Angangueo	Ej. Cerro Prieto			1.620		1.620
		Ej. Los Remedios			2.082		2.082
		Ej. Santa Ana	0.670		0.240		0.910
		P E. Propiedad Estatal	0.017				0.017
		P F. Propiedad Federal				0.094	0.094
		Ej. Jesús Nazareno	0.128		0.161		0.289
	Ocampo	C.I San Cristóbal				0.576	0.576
		Ej. El Asoleadero			0.191		0.191
		Ej. El Rosario			24.147		24.147
	Senguio	Ej. El Calabozo I				0.068	0.068
		Ej. El Calabozo II				0.243	0.243
	Zitácuaro	C.I Carpinteros	0.061				0.061
		C.I Crescencio Morales				0.460	0.460
		C.I Curungueo					0.000
		C.I Donaciano Ojeda	0.328				0.328
		C.I Nicolás Romero				1.317	1.317
		C.I San Felipe los Alzati		11.734		8.981	20.715
		Ej. Crescencio Morales		3.388			3.388
		Ej. Nicolás Romero				0.705	0.705
Subotal Michoacán			1.204	15.122	28.441	12.444	57.211
Total General			1.423	15.122	28.735	13.406	58.686







¡Gracias!







# Fondo Monarca

Sinergia por la conservación



GOBIERNO DEL  
ESTADO DE MÉXICO



Comisión Forestal del  
Estado de Michoacán



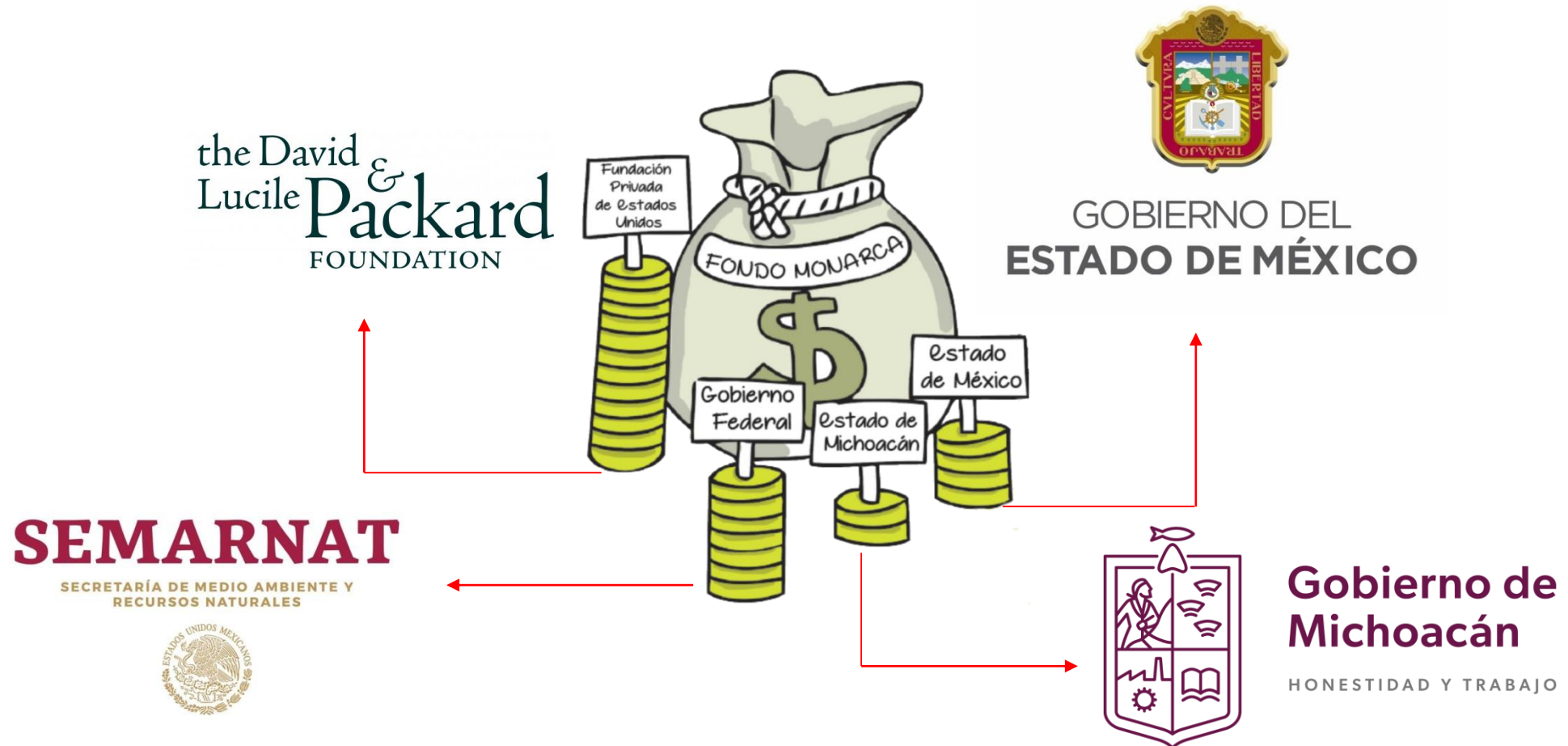
# LA GENTE DEL BOSQUE



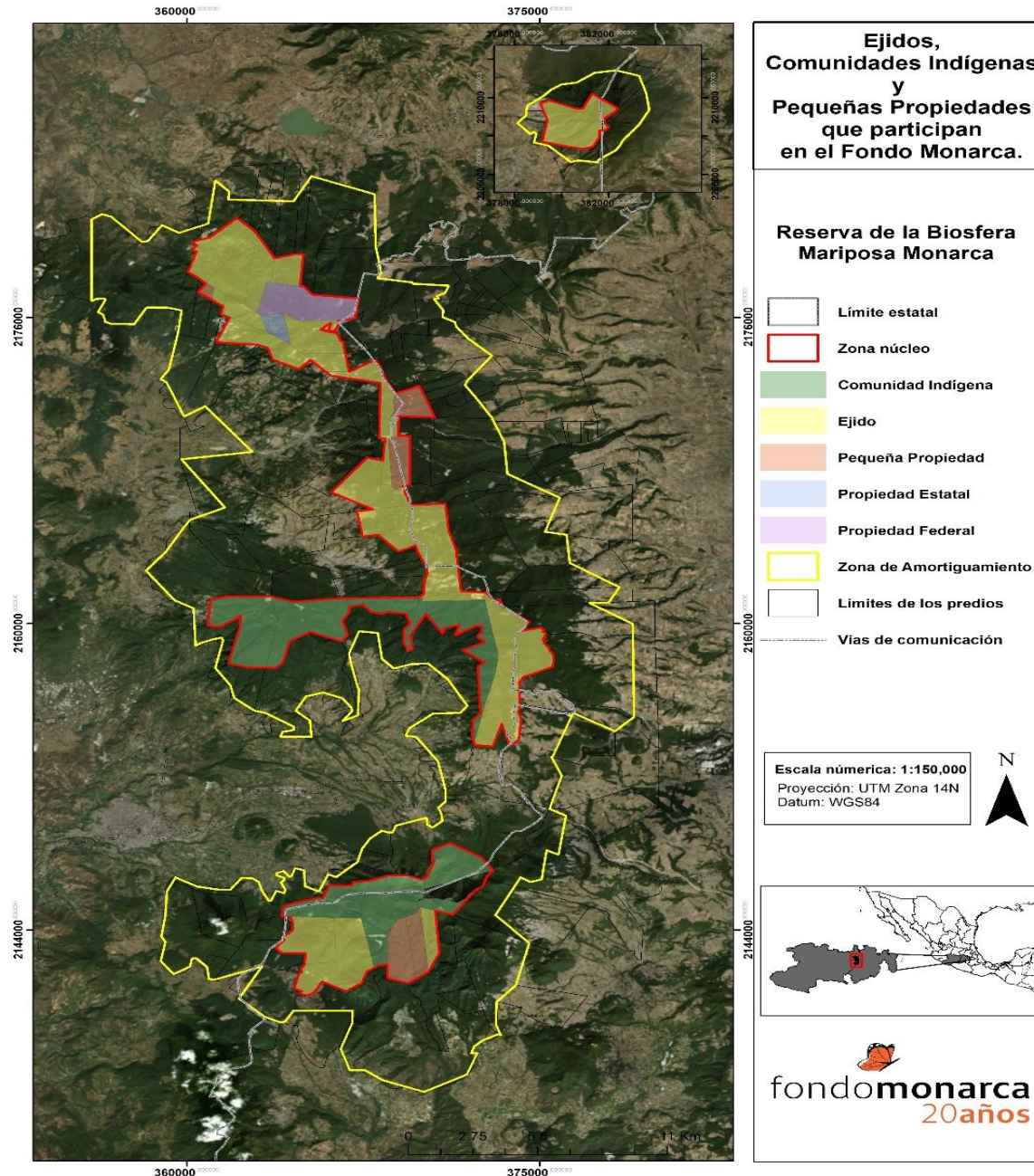


1. EL FONDO MONARCA es una estrategia de conservación con base en incentivos económicos para el pago por servicios ambientales en la zona núcleo de la Reserva de la Biosfera Mariposa Monarca.

## Patrimonio Fondo Monarca



## 2. EJIDOS, COMUNIDADES INDÍGENAS Y PEQUEÑOS PROPIETARIOS QUE PARTICIPAN EN EL FONDO MONARCA.



20 EJIDOS



10 COMUNIDADES INDÍGENAS

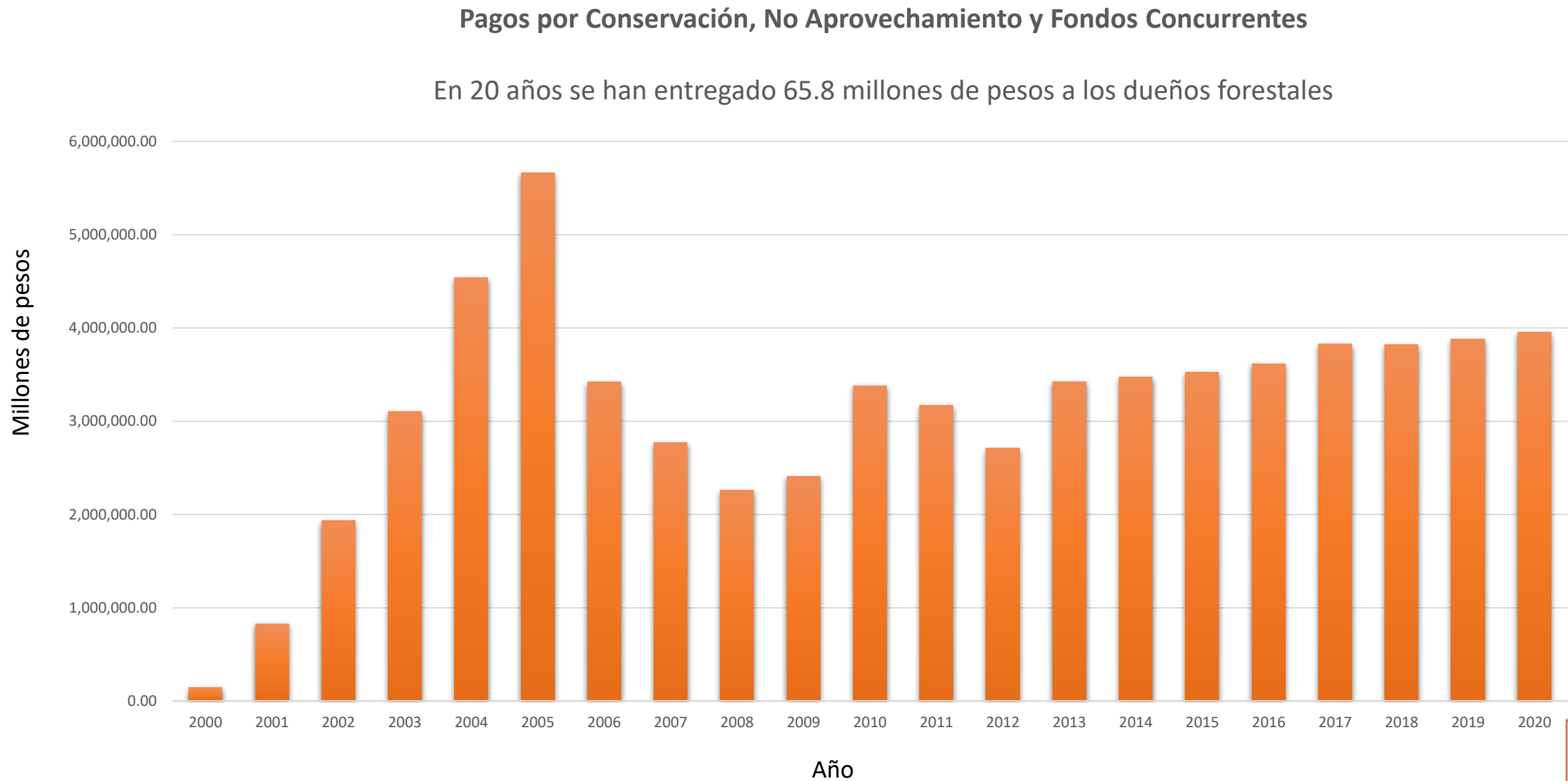


3 PEQUEÑOS PROPIETARIOS

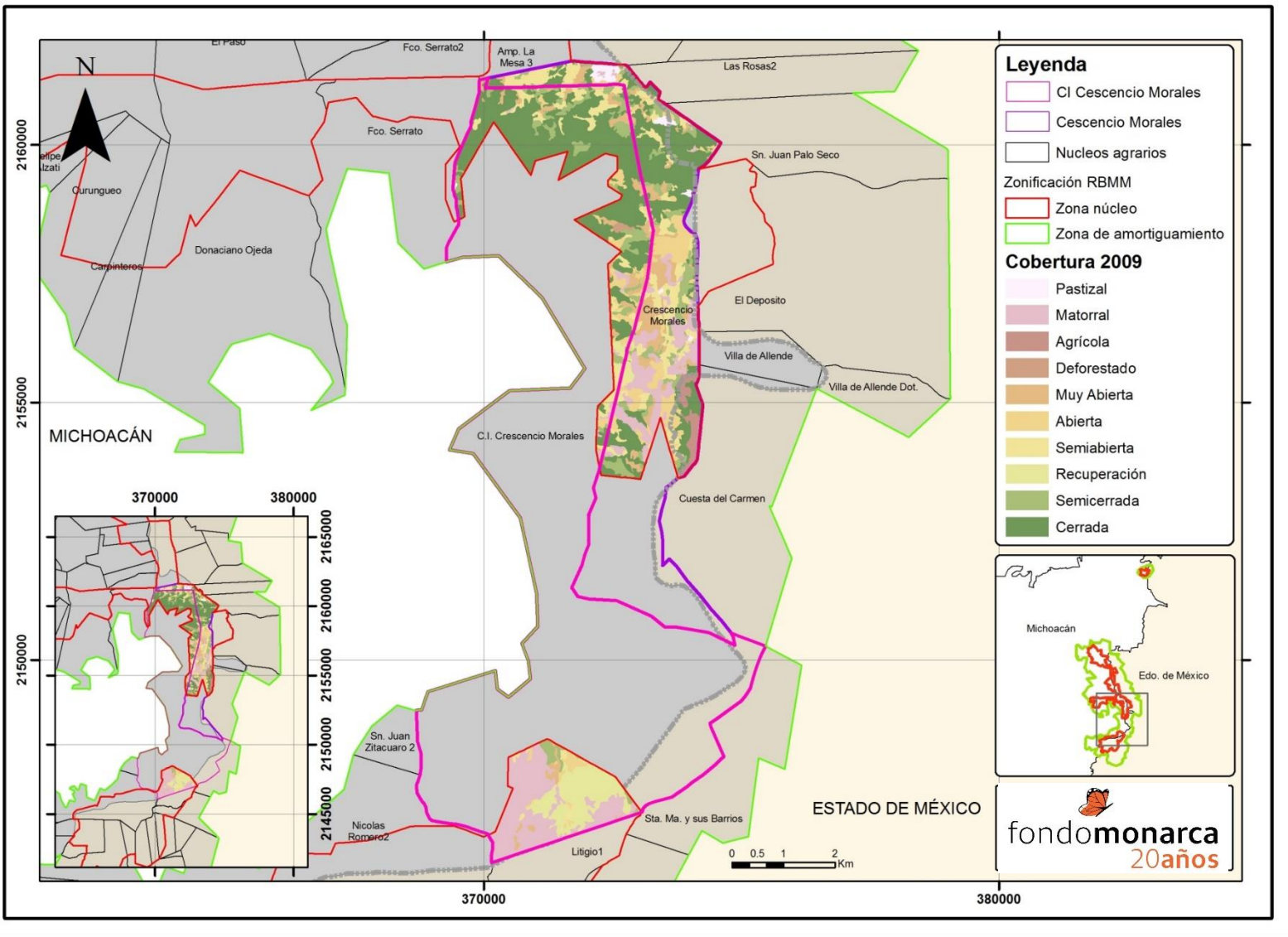




### 3. RECURSOS ENTREGADOS A LOS PREDIOS DE 2000 AL 2020.



## Línea Forestal 2009 - Crescencio Morales



**33 predios** PARTICIPAN EN ACCIONES DE CONSERVACIÓN, RESTAURACIÓN Y PROTECCIÓN.

**12,367 hectáreas** ASISTIDAS CON RECURSOS DEL FONDO MONARCA Y LOS FONDOS CONCURRENTES.

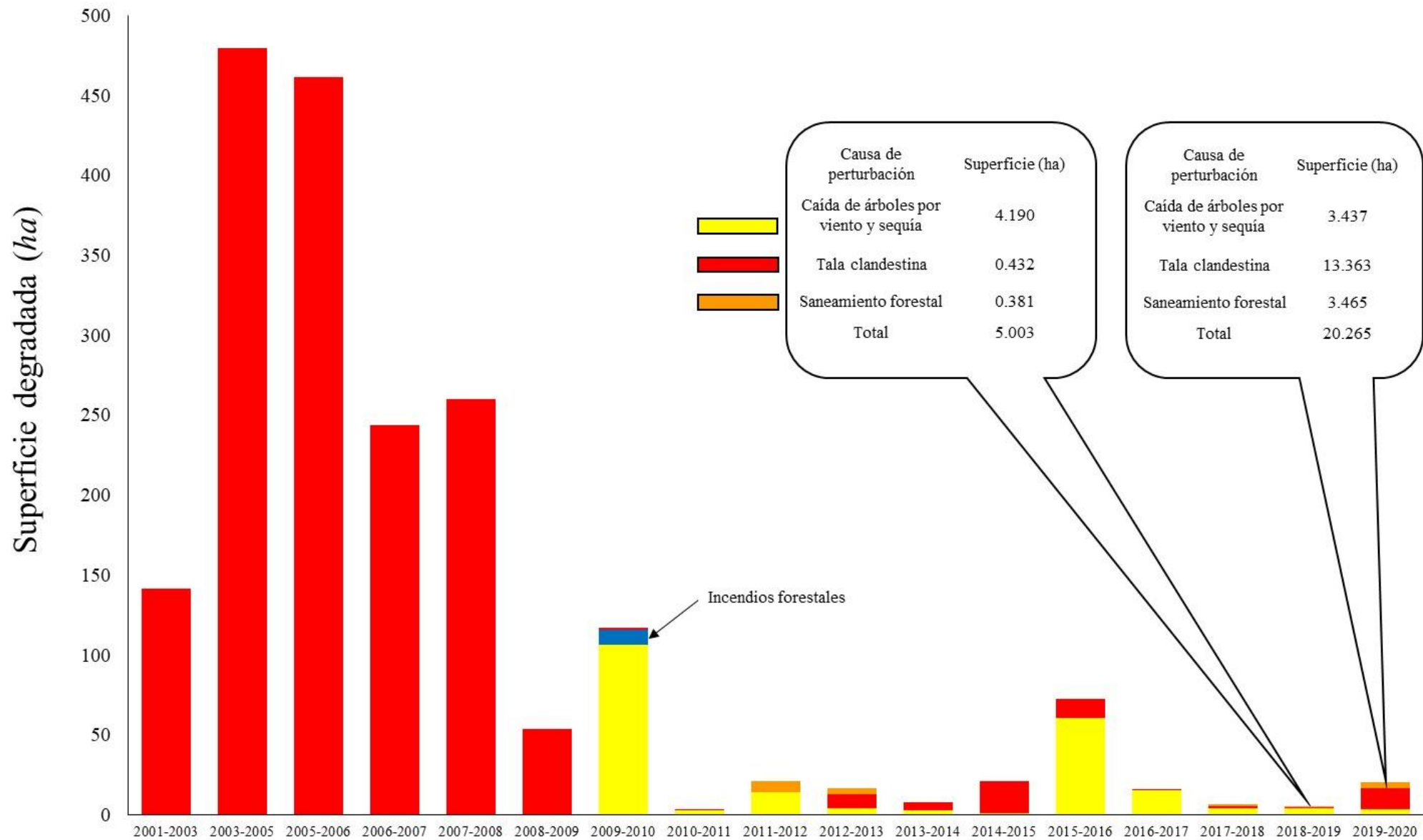
**9,188 hectáreas** CON PROGRAMA DE BUENAS PRÁCTICAS DE MANEJO PARA LA CONSERVACIÓN.

**10 asesores técnicos** DAN SEGUIMIENTO A LOS TRABAJOS ANUALES DE MANEJO JUNTO CON LOS DUEÑOS FORESTALES.





4.2. DISMINUCIÓN DE LA DEGRADACIÓN FORESTAL EN LA ZONA NÚCLEO DE LA RESERVA.



4.3. DEGRADACIÓN Y RECUPERACIÓN FORESTAL EN LA ZONA NÚCLEO DE LA RESERVA.

Área sin degradación  
(hectáreas)



11,300.18

Tala Clandestina  
(hectáreas)



1,787.68

Incendios  
(hectáreas)



9.35

Fenómenos Naturales  
(hectáreas)

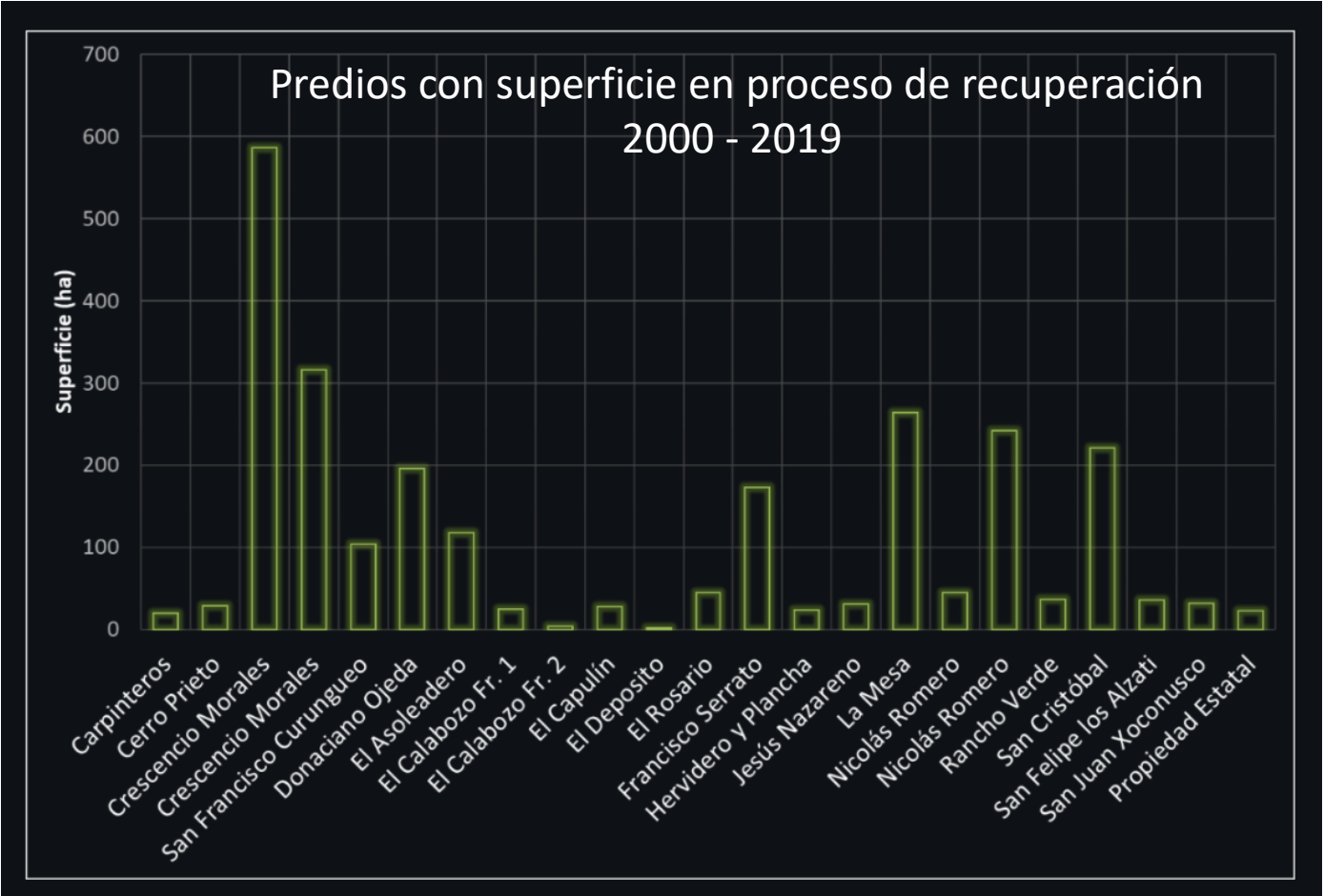


215.07

Saneariento  
(hectáreas)

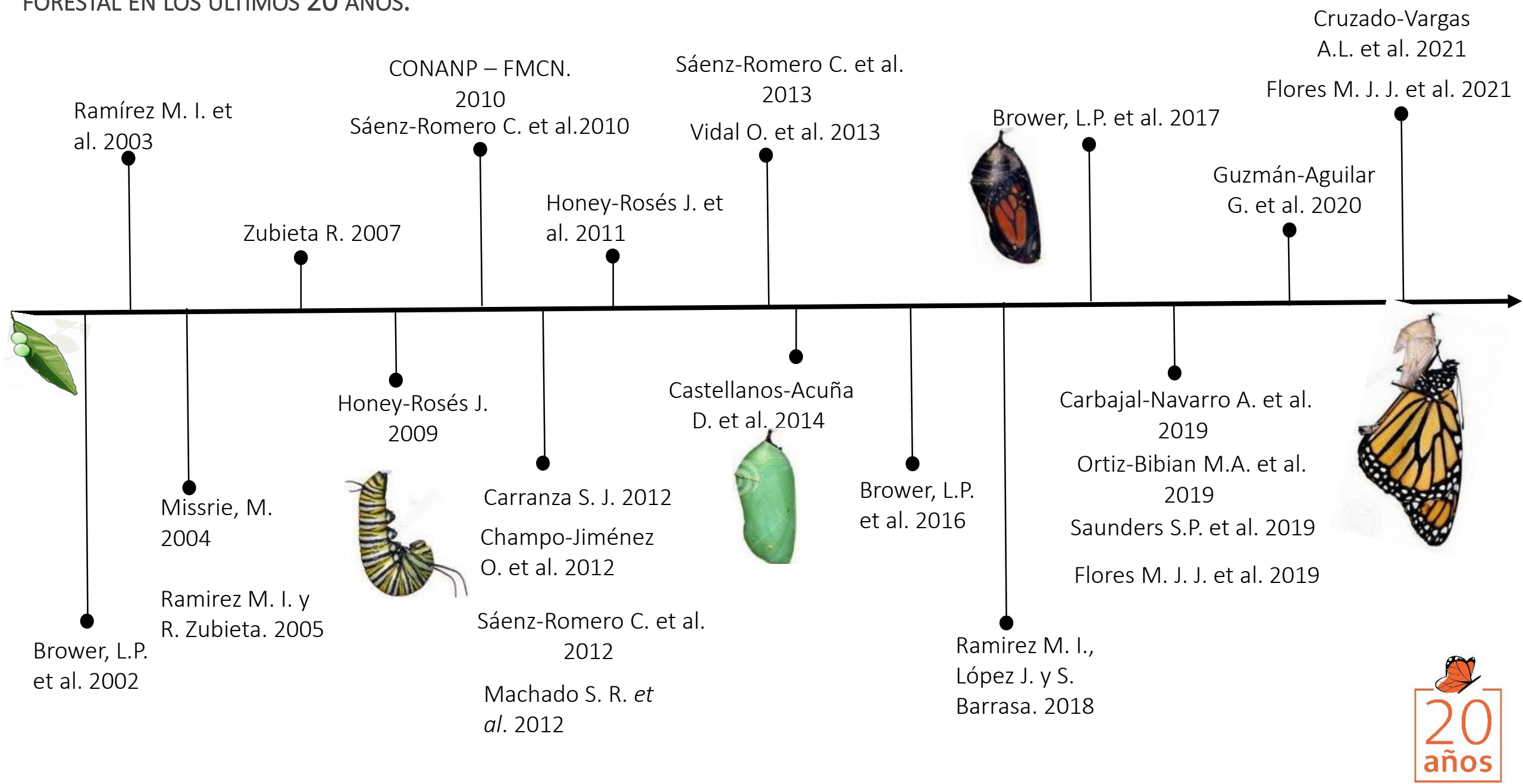


15.72





4.4. NUESTROS RESULTADOS COINCIDEN CON LA MAYORÍA DE LOS ESTUDIOS REALIZADOS SOBRE DEGRADACIÓN Y RECUPERACIÓN FORESTAL EN LOS ÚLTIMOS 20 AÑOS.



## 5. ALIANZAS





## 5. PERSPECTIVAS.

INFORME DE LOS 20 AÑOS DEL FONDO MONARCA.

<https://storymaps.arcgis.com/stories/26b2ff59ee4c49bb81927a3cc68ac6af>



¡GRACIAS!

