

## **ANALYSIS OF FOREST DEGRADATION IN THE CORE ZONE OF THE MONARCH BUTTERFLY BIOSPHERE RESERVE (2021-2022)**

### **Executive Summary**

*Between March of 2021 and April of 2022, 58.69 hectares (ha) of forests in the core zone of the Monarch Butterfly Biosphere Reserve (MBBR) were affected: 28.7 ha were cleared for sanitation cutting; 15.12 ha were affected by fires; 1.42 ha were affected by drought, and 13.41 ha were affected by illegal logging; this cause was slightly reduced compared to 13.94 ha of illegal logging recorded between 2020-2021. In general, the total forest degradation area tripled with respect to the 18.83 ha reported the previous year.*

The Monarch Butterfly Biosphere Reserve (MBBR) protects 56, 259 hectares (ha) of forest where monarch butterflies (*Danaus Plexippus*) that migrate from the east of North America establish their hibernating colonies. The reserve has a buffer zone of 42,707 ha , and a core zone of 13,551 ha where the most important colonies of monarch butterflies are established. The MBBR is part of the “Monarch Region” in the Mexican Neovolcanic System, between Michoacán and the State of Mexico, and 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 that contributes to the Cutzamala Hydrological System which supplies water to more than 5 million people in 13 municipalities of Mexico City and 14 municipalities of the State of Mexico (Fig 1.)

The change in the forest cover in the core zone of the MBBR is a system of “Monitoring, Reporting, and Verification (MRV)” that represents the scientific basis for the allocation of economic incentives from the Monarch Fund (MF), which benefits the owners of these forests. The MF was established by World Wildlife Fund (WWF) and is administered by the Mexican Fund for Nature Conservation; it was created in coordination with the Ministry of Environment and Natural Resources of Mexico (SEMARNAT), as well as 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).

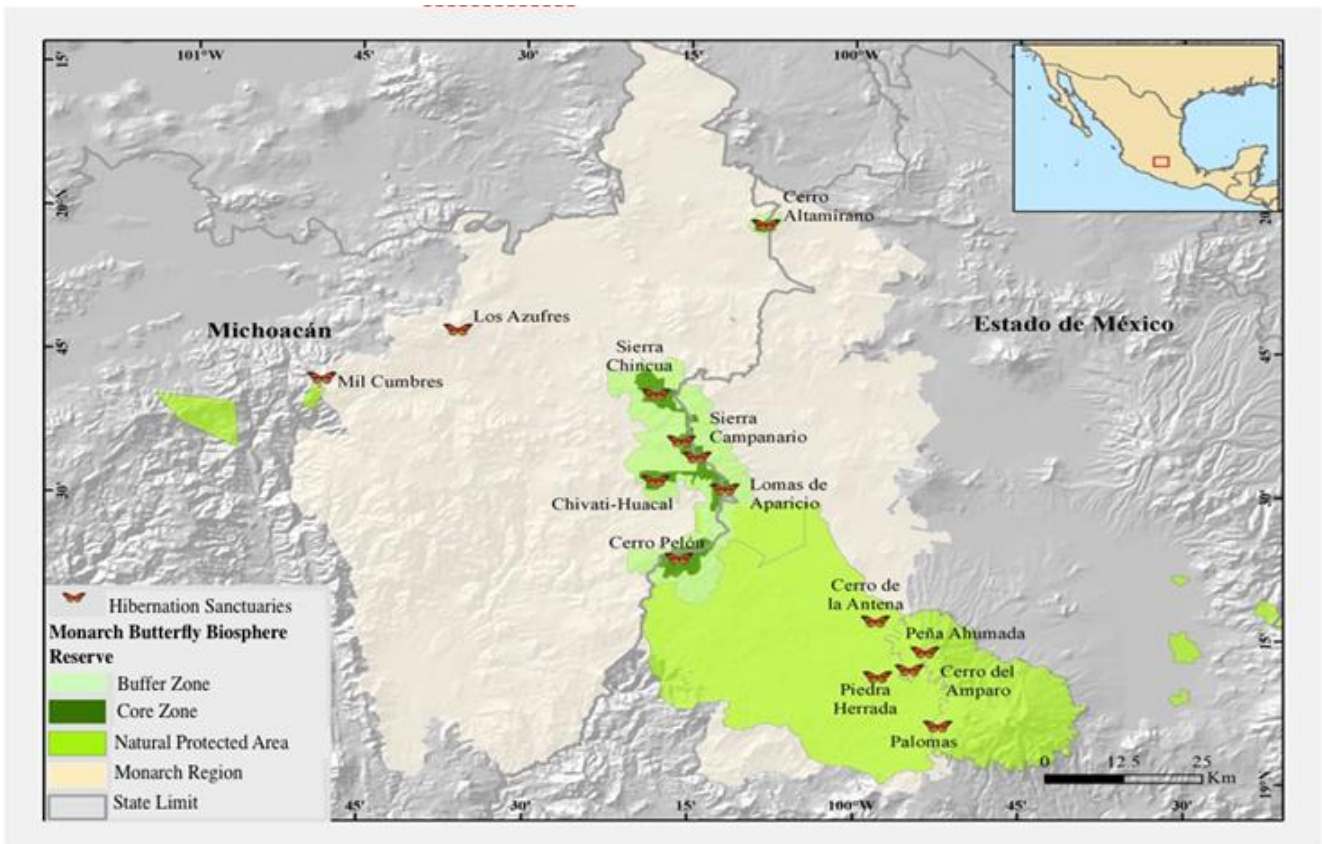


Figure 1. The Monarch Butterfly Biosphere Reserve is in the central zone of the Monarch Region.

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 Alliance WWF Telmex-Telcel Foundation supports, among other things, this analysis which compares aerial photographs from March 2022 and April 2022. 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 2021-2022

This analysis of the change in forest cover in the core zone of the MBBR allowed us to establish that from March of 2021 to April of 2022, 58.69 *ha* of forest were affected: 15.12 *ha* experienced forest fires, 28.74 *ha* were cleared for sanitation cutting, 1.42 *ha* experienced drought, and 13.41 *ha* experienced illegal logging; this last cause was very similar with respect to the 13.94 *ha* affected the previous year (Table 1, Figures 2 and 3). The Indigenous community of San



Felipe de Los Alzati, in Zitácuaro, Mich., suffered the greatest disturbance due to illegal logging with 8.98 *ha* affected, and they also experienced forest fires with a magnitude of 11.73 *ha*; in El Rosario ejido 24.15 *ha* of forest experienced drought.

Table 1. Properties with affected forest areas in the core zone of the MBBR and their causes (2021-2022).

| State                    | Municipality        | Property                  | Natural Causes | Fire   | Sanitation Cutting | Illegal Logging | Total  |        |
|--------------------------|---------------------|---------------------------|----------------|--------|--------------------|-----------------|--------|--------|
| State of Mexico          | 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  |        |
|                          | San José del Rincón | Ej. El Depósito           |                |        |                    |                 | 0.136  | 0.136  |
|                          |                     | Ej. La Mesa               | 0.088          |        |                    |                 |        | 0.088  |
|                          |                     | Ej. Rosa de Palo Amarillo |                |        |                    | 0.030           |        | 0.030  |
| Subtotal State of Mexico |                     |                           | 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  |
| Subtotal Michoacán       |                     |                           | 1.204          | 15.122 | 28.441             | 12.444          | 57.211 |        |
| Grand Total              |                     |                           | 1.423          | 15.122 | 28.735             | 13.406          | 58.686 |        |

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

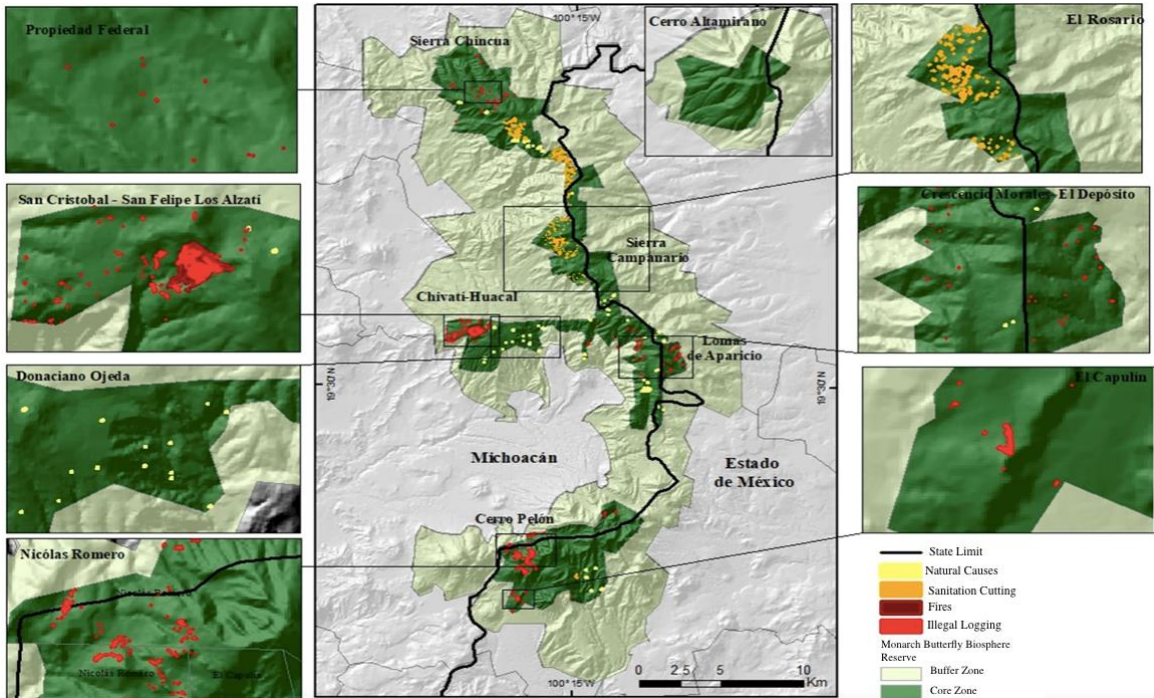


Figure 2: Area of forest affected in the core zone of the Monarch Butterfly Biosphere Reserve (2021-2022).

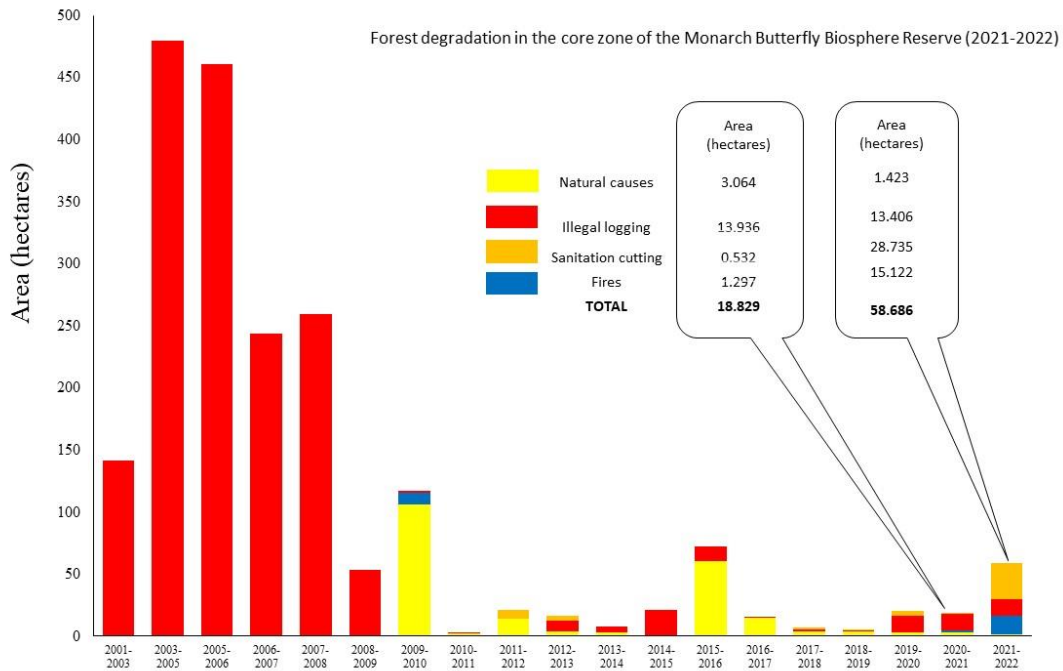


Figure 3: Historical forest degradation in the core zone of the Monarch Butterfly Biosphere Reserve (2001-2022).