1st Rufford Report

Introduction

Zamia inermis (Zamiaceae) is a rare, endemic cycad currently listed as Critically Endangered by IUCN, in danger of extinction by Mexican laws, it is listed in section II of CITES and it is a priority species for conservation according to the Mexican Commission of Biodiversity (CONABIO). This species is considered critically endangered due to its reduced distribution area and threats to its habitat. The species is endemic to the state of Veracruz, México (Vázquez-Torres et al., 2010), and according to Octavio-Aguilar *et al*. (2017), only one population composed of three subpopulations is known distributed in grasslands and seasonally dry and fragmented forests. Furthermore, due to the absence of its natural pollinator, a beetle, this species has extremely low recruitment and its genetic diversity is underrepresented in this unique population (Octavio-Aguilar *et al*. 2017). For all these reasons, it is considered the Mexican cycad that is at the greatest risk of extinction (Octavio-Aguilar *et al*. 2017). The main objective of this project is to study the subpopulations of *Zamia inermis* and protect them by habitat restoration and community education in Central Veracruz, Mexico.

Left: Picture of a female Zamia inermis with its reproductive strobilus. Right: Picture of a female Zamia inermis with its reproductive strobilus.

The natural habitat of the area is the tropical dry forest between 200-400 m asl, which has a warm climate throughout the year, with temperatures between 25 and 30 ° C, and with relatively abundant rainfall, from 300 to 1,500 mm. This biome goes through a long dry season, during the astronomical winter, which lasts 4-9 months. The conservation of these forests requires the protection of large and continuous areas for the survival of large predators and other vertebrates, and to protect the species from hunting. Preserving riparian forests and water sources is essential for many species. Large areas are also necessary to enable the species to recover after occasional events, such as forest fires. These forests are very sensitive to fires and deforestation; grazing and

exotic species can very quickly alter natural communities. They degrade easily and become thorny shrubs or dry grasslands (savannas).

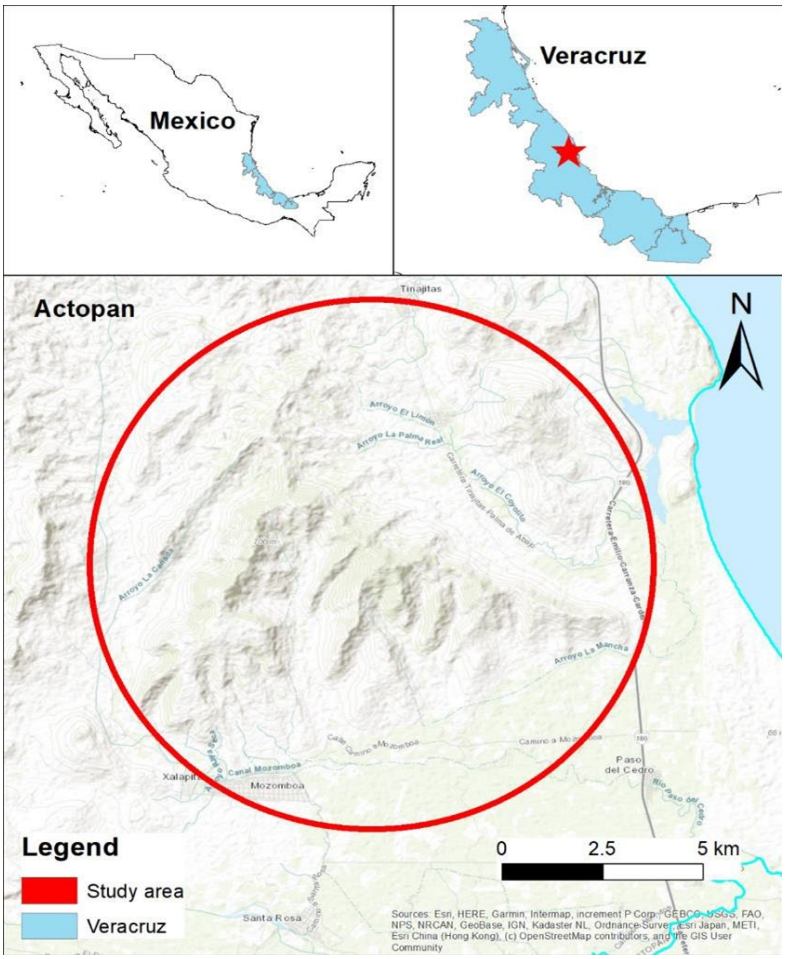
Activities

During this period, we made the following activities:

1. We worked with local people and authorities to present our project and to know the information that they have about the species.
2. We generated information on the spatial distribution of the species.
3. We started to study the phenological process of the species.

Study area

The only natural population of *Zamia inermis* is located in the “Sierra de Manuel Díaz”, Mozomboa, Veracruz, Mexico.



Map of the study area.

View of the Sierra de Manuel Diaz, the habitat of Zamia inermis

View of the Sierra de Manuel Diaz, the habitat of Zamia inermis

Habitat of Zamia inermis.

Presentation of the project before inhabitants and authorities

The participation of the inhabitants is important for the formulation of the conservation project. Firstly, an assembly was held to present the project with the community to identify key actors who will support us during the process and will be trained in some of the techniques used.

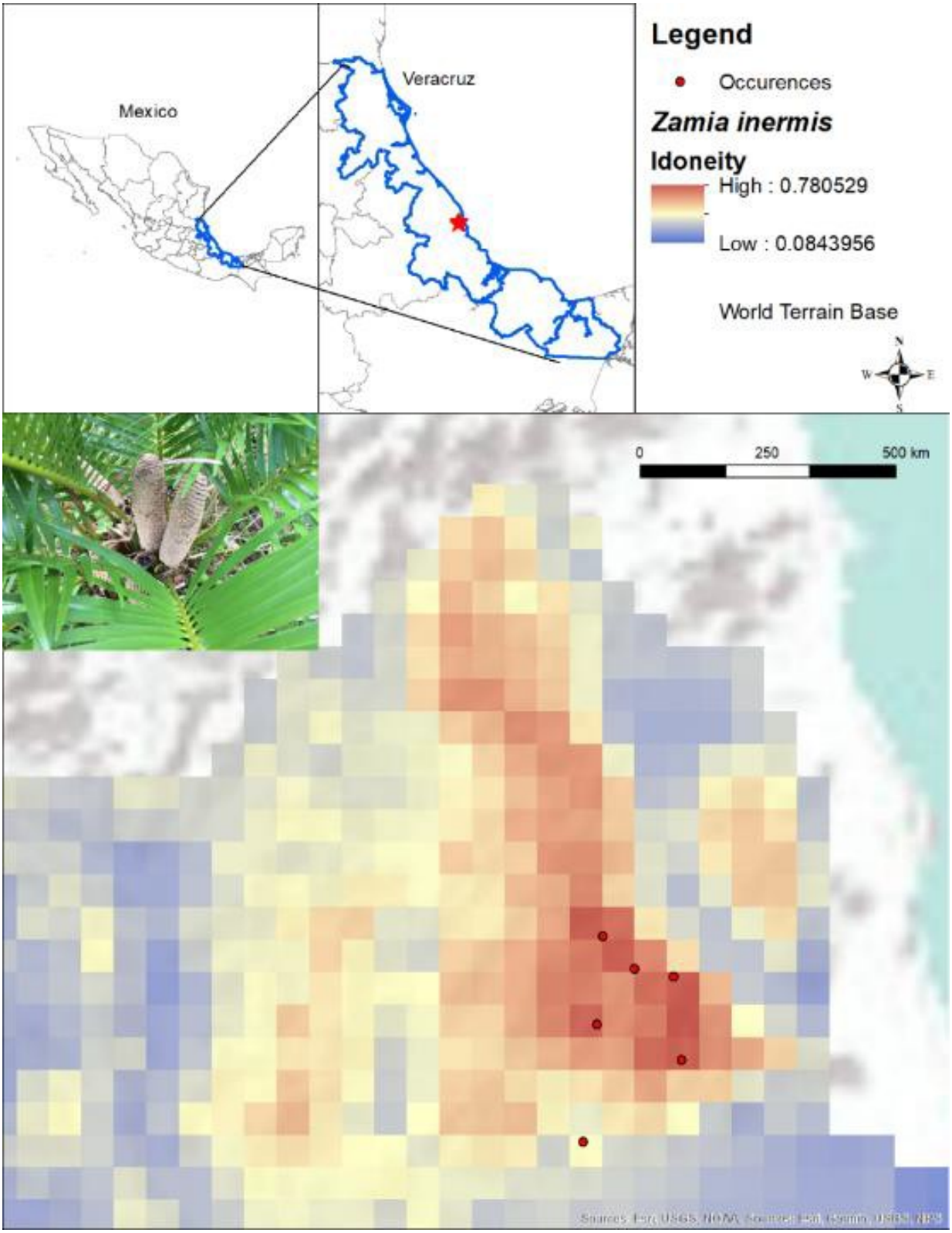
Visit the habitat of Zamia inermis with a key actor.

Training of a local inhabitant (left person) into the techniques to map species population.

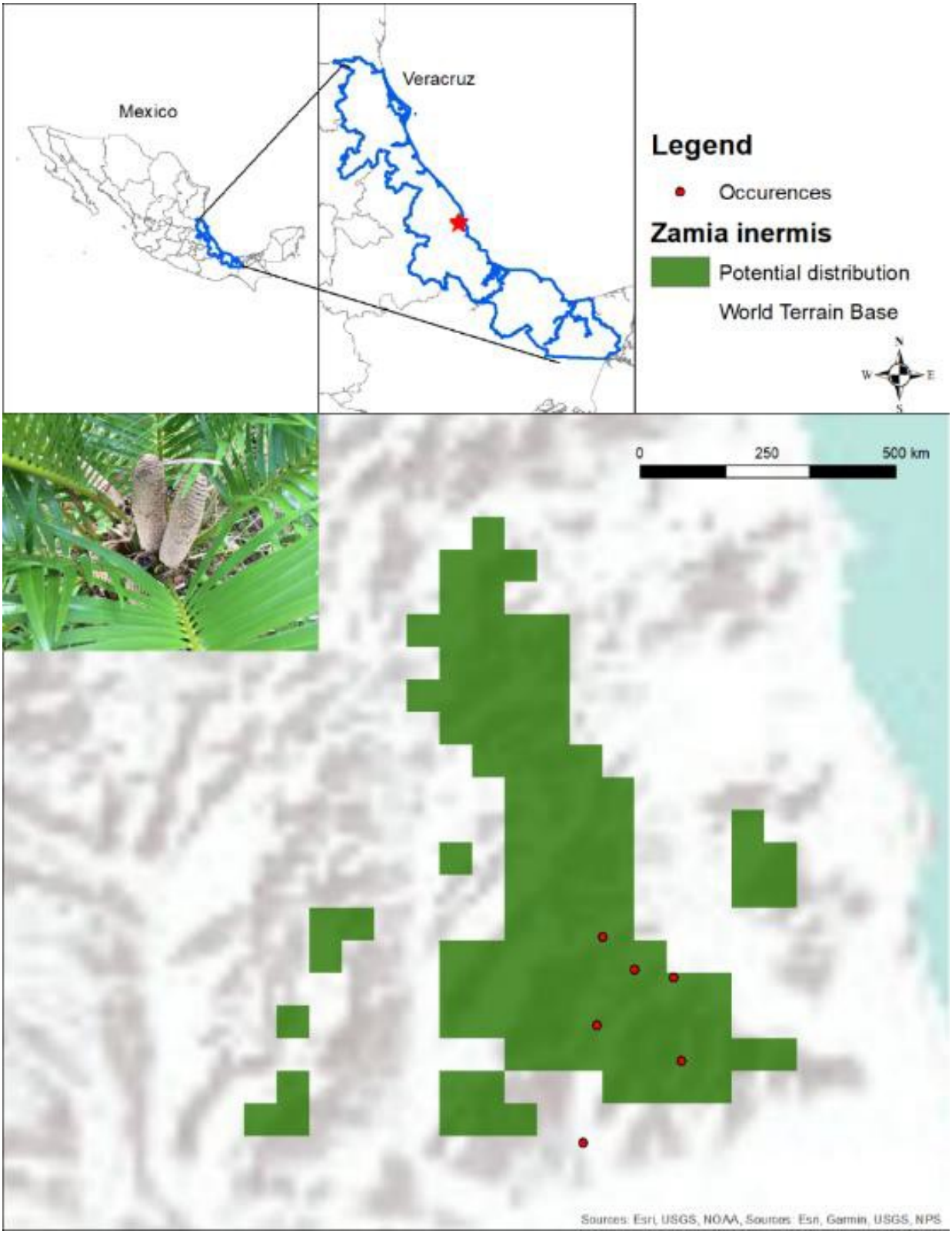
Mapping the species

To map the abundance and spatial distribution of the species, we visited all the locations reported on the labels of herbarium specimens, the Global Biodiversity Information Facility (GBIF), and the points that the experts showed us. Once the database with the presence points was completed, we created a potential distribution model of the species. The model was made using the method of Maxent including the important bioclimatic and terrain layers for the species.

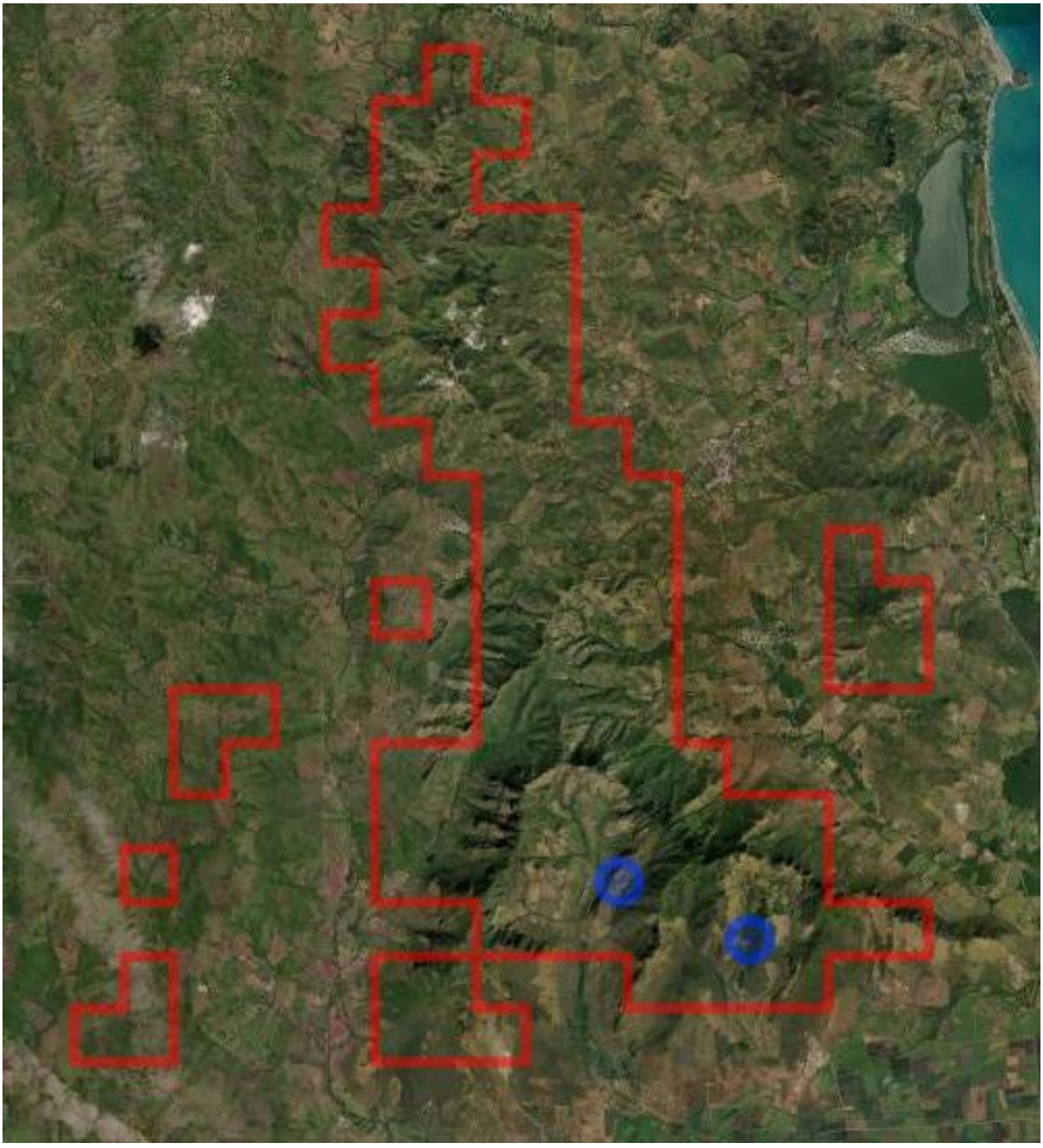
Searching populations of Zamia inermis



Continuous species distribution map of Zamia inermis, in red the areas with high suitability for the presence of the species and in blue the areas with low suitability. Red points reflect the occurrences of the species.



Binary species distribution map of Zamia inermis, in green the areas, predicted to be suitable for the presence of the species. Red points reflect the occurrences of the species.



Suitability map (red polygon) with the only known existing populations (blue points) of Zamia inermis.

Phenology

To study the phenological process of the species, the populations located in the previous phase will be periodically monitored. Censuses and targeted samplings have been carried out, aimed at registering those individuals that are in the reproductive stage, and the production of reproductive structures (polliniferous and

ovuliferous strobili). Monthly visits will be made for this purpose. The visits will intensify to once a week or every other day, depending on the progress in the development of the structures.

Ovuliferous strobilus of Zamia inermis

Polliniferous strobili of Zamia inermis

Ovuliferous strobilus of Zamia inermis

Polliniferous strobili of Zamia inermis

References

Octavio-Aguilar, P., Iglesias-Andreu, L. G., Vovides, A. P., & Rivera-Fernández, A. (2017). *Zamia inermis*, la cícada más amenazada de México. Cuadernos de Biodiversidad, (52), 1-5.

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