Project Update: May 2019

We have been sampling in the field using camera traps, to obtain records of the community of carnivores in a protected area, for a year. Camera traps have been distributed as follows (figure 1), and remained lit for 21 to 30 days in three different periods in 2018. So far in 2019 we have made the first sampling of this year.

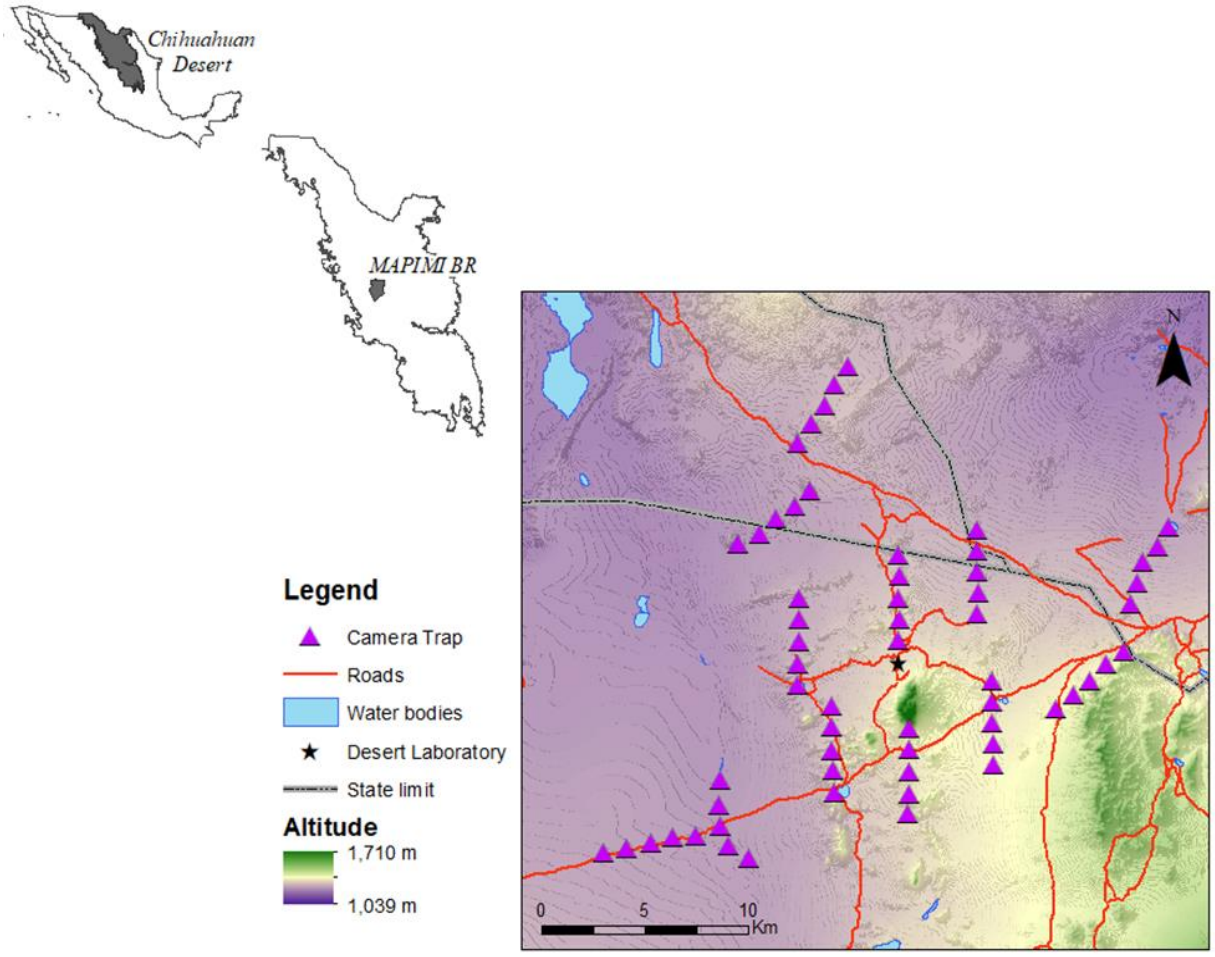

Figure 1. Localization of the Chihuahuan Desert in Mexico, location of the Mapimí Biosphere Reserve (MBR) in the Chihuahuan Desert and disposal of camera traps in the field.

Students who have participated in the annual course "Techniques for the study of fauna and its habitat in arid zones" of the Institute of Ecology, have been trained in the management of trap cameras and served as volunteers to place the cameras (figure 2).

Figure 2. Students of the Institute of Ecology supporting the project by helping in the placement of trap cameras.

Thanks to these samplings we have the registration of twelve wild mammals in our cameras (figure 3). Of which, nine were carnivores, among them we recorded coyote (*Canis latrans*), bobcat (*Lynx rufus*), kit fox (*Vulpes macrotis*), gray fox (*Urocyon cineroargenteus*), puma (*Puma concolor*), hooded skunk (*Mephitis macroura*), hog-

nosed skunk (*Conepatus leuconotus*), american badger (*Taxidea taxus*) and raccoon (*Procyon lotor*). As for the herbivores, we recorded black-tailed Jackrabbit (*Lepus californicus*), mule deer (*Odocoileus hemionus*) and peccary (*Pecari tajacu*).

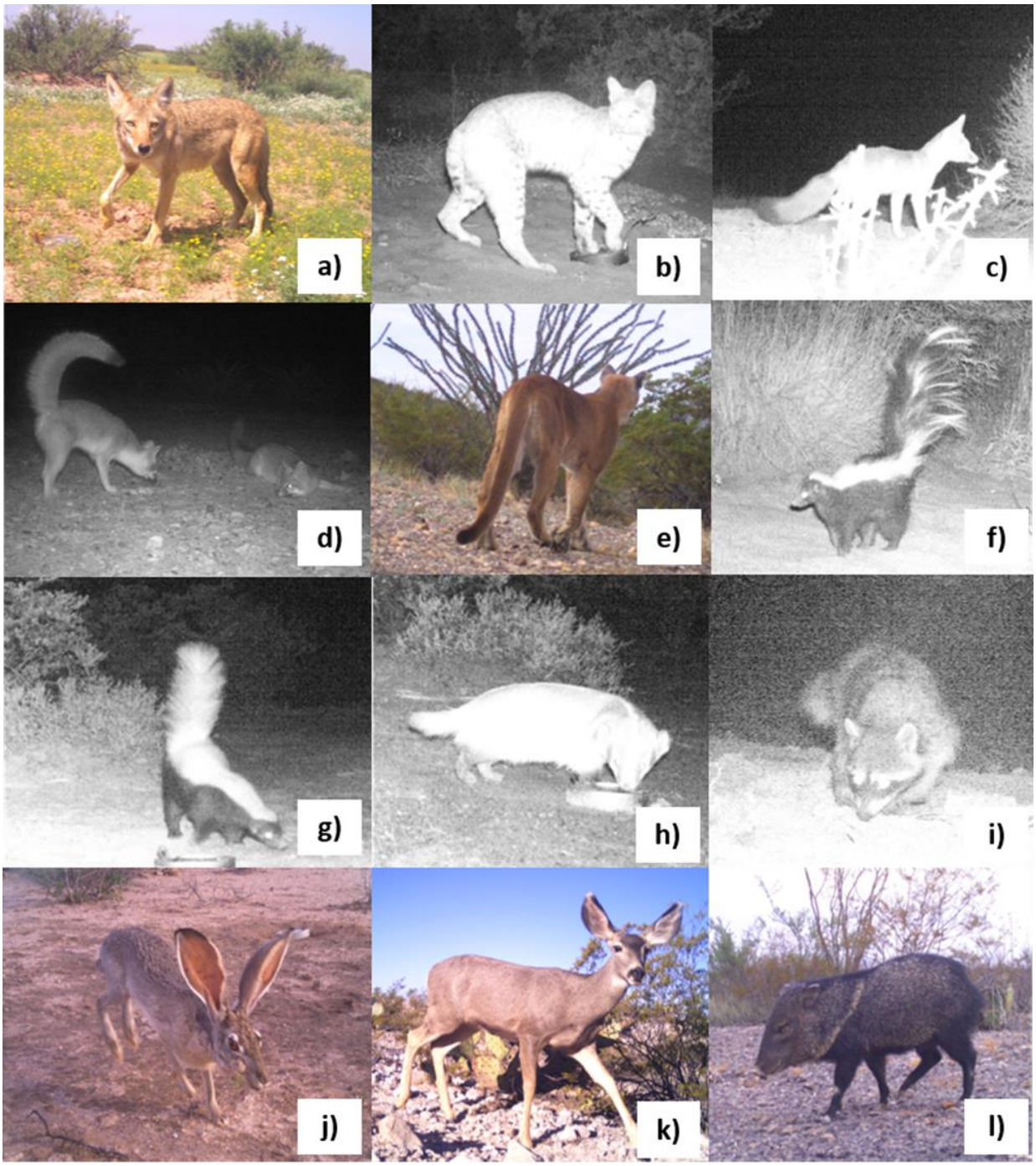

Figure 3. Mammals recorded by camera trap sampling in the Mapimi Biosphere Reserve, between 2018 and 2019. **a)** Coyote, **b)** Bobcat, **c)** Kit fox, **d)** Gray fox, **e)** Puma, **f)** Hooded skunk, **g)** Hog-nosed skunk, **h)** American badger, **i)** Raccoon, **j)** Black-tailed Jackrabbit, **k)** Mule deer and **l)** peccary.

We have obtained partial results of the objectives that we proposed at the beginning of the work. We have made presentations (poster and oral) of the results in national and international congresses (figure 4). Such as the XIV National Congress of Mastozoology and V Colombian Congress of Zoology.

Figure 4. Members of the work team, sharing with the scientific community the preliminary results of the project in **Top)** XIV National Congress of Mastozoology (Mexico) and **Bottom)** V Colombian Congress of Zoology (Colombia).

In addition, as part of the preliminary results, we have initiated the process to submit two scientific articles. The title and summary of these are the following.

"Search for chimeras is a matter of habitat: Co-occurrence of *Vulpes macrotis* and *Canis latrans* (Carnivora: Canidae) in the Mapimí Biosphere Reserve, Mexico".

Abstract: Coyote and kit fox are two canids that live in sympatry in the arid zones of North America. Studies in the United States indicate that the coyote is one of the main causes of mortality of the kit foxes, for which they avoid areas of greater coyote abundance, like scrub areas, even if these areas presents more prey rich systems. However, the mechanisms of the interaction of these species in Mexico are unknown. Therefore, the aim of this study is to determine the patterns of co-occurrence of both canids in the Biosphere Reserve of Mapimí (BRM), Mexico. For this reason, single and two species occupancy models were used, along with environmental covariates. The results of the models of two species indicate that both canids occur independently. These results are related to the effect of livestock on the habitat types in the BRM. The change in the dynamics of plant communities promotes the proliferation of hares in grasslands and in turn that of coyotes, because of this, the coyote can inhabit all kinds of habitats in BRM, forcing the kit fox to develop coexistence mechanisms.

"Superposition of activity between carnivores and their potential prey in the Chihuahuan Desert: Temporary segregation with the livestock".

Abstract: The daily activity reflects a dimension of the behavior of the animals and depends on the nutritional and reproductive demands, as well as the need to minimize the risk of predation, providing information on their natural history and ecological niche. However, because disturbances such as the presence of livestock can modify the activity, we investigate the patterns of activity and the degree of overlap between the carnivores, their potential prey and the cattle, in a portion of the Chihuahuan Desert using circular statistics. Carnivores did not reflect a temporary segregation between them, with the exception of the bobcat (*Lynx rufus*) and the puma (*Puma concolor*). Carnivores synchronized their activity with one of their main prey, the hare (*Lepus californicus*), despite potential encounters with the dominant predators. Likewise, we observed a temporal segregation between the mule deer (*Odocoileus hemionus*) and the puma, as a possible antidepredator response. Mammals had activity patterns significantly different from those of cattle, therefore, a low overlap of activity, suggesting that carnivores are less likely to attack livestock. However, to obtain a more complete view of these interactions, it is necessary to include the spatial and trophic axes, and interpret the patterns in light of the social perception of carnivores in particular, which allows a more efficient management of protected areas in balance with the local community.

Recently, we have talked with the residents of the Mapimi Biosphere Reserve, through semi-structured interviews, during a community immersion (figure 5), to learn about their perception of wildlife and possible conflicts with carnivores. People mention that the main threats that wildlife exerts on them, are the depredation of livestock and farm animals. In particular, coyotes prey on the young of goats and cows, bobcats prey on the hens and pumas prey the foals. To a lesser extent, other carnivores such as skunks, foxes and badgers destroy their corrals. We have also been getting involved with the community to request spaces in their ejido meetings to communicate the results we are getting.

Figure 5. Support in the activities of the local community, during the immersion with the community of the Mapimí Biosphere Reserve.