

Nuevas observaciones de *Erethizon dorsatum*, *Taxidea taxus* y *Castor canadensis* en un complejo de parques eólicos del Norte de México

New observations of *Erethizon dorsatum*, *Taxidea taxus*, and *Castor canadensis* in a Northern Mexico wind farm complex

Porto-Ramírez Sergio Leonardo^{1,2}, Prado-Ángeles Diego Alexis¹, Riaño-Ramírez Noel¹, Varela-Serrano Tonally¹, García-Ángeles Luis David¹, Seba-Palacios María Antonia¹, Sánchez-Caballero Carlos Adrián^{1,3}

1. Engineering for the Management

Restoration and Conservation of Ecosystems (IMRCE), Dr. Liceaga, 06720, México.

2. University of Mexico (UNAM)

Biology Institute, National Autonomous, Circuito zona deportiva, 04510, Mexico.

3. University (TAU)

Department of Zoology, Tel Aviv, Ramat Aviv, 69978, Israel

*Autor de correspondencia:
Carlos Adrián Sánchez-Caballero^{1,3}
adrian.sanchez@imrce.net

 orcid.org/0000-0003-2306-0316

Recibido: mayo 2025

Aceptado: junio 2025

Publicado: diciembre 2025

DOI: 10.5281/zenodo.18342015



Este es un artículo Open Access bajo la licencia CC BY-NC-ND.
<http://creativecommons.org/licenses/by-nc-nd/4.0/>

Abstract

Northern Mexico, presents major gaps in knowledge regarding mammal distribution, especially outside Protected Natural Areas. This study reports new records of three rarely documented species in the region: *Erethizon dorsatum* (Endangered), *Taxidea taxus* (Threatened), and *Castor canadensis* (Endangered) all of them listed under the NOM-059-SEMARNAT-2010 and considered at risk in several U.S. and Canadian states. Records were obtained during environmental monitoring programs conducted at the Amistad II, III, and IV wind farms and surrounding areas in the municipality of Acuña, Coahuila. Intensive linear transect search survey, complemented by camera traps and scent stations, yielded eight records of *T. taxus*, four of *E. dorsatum*, and one of *Castor canadensis* between 2024-2025. The presence of these species across multiple months in each year highlights the behavioral plasticity and capacity to persist in semi-arid environments, which contrast with their typical association with forested habitats in northern latitudes. These findings confirm the presence of these species in a previously underexplored region and suggest that wind farms, due to restricted human access and controlled management, may function as important refuges for rare or specially protected species. They also emphasize the need for continued research in the arid and semi-arid ecosystems of northern Mexico, which are crucial for the conservation of the country's mammalian fauna.

Key words

Mammals distribution, Coahuila, biodiversity, semiarid habitat, turbines

Introduction

Mexico ranks third worldwide in mammal species richness (Ceballos & Oliva 2005; Sánchez-Cordero et al. 2014). However, this diversity has been unevenly documented, with most studies concentrated in the central and southern regions of the country (Escalante et al. 2002). In contrast, the northern region (including Coahuila) remains significant understudied, especially regarding mammal distribution outside Protected Natural Areas (Sánchez 2014, Gómez-Naranjo et al. 2017, Mendoza et al. 2022).

Erethizon dorsatum has a broad distribution across the United States and Canada, and to a lesser extent in northern Mexico (Jones & Genoways 1968). Records from Coahuila are scarce; to date, only four records have been documented, with the most recent dating back to 2010 (Valdés-Alarcón et al. 2023) and earlier records from the 1950s and 1960s (List et al. 1999). As such, the species has remained undocumented for over 15 years. Similarly, *Taxidea taxus* ranges from southern Canada to central Mexico (Ceballos 2014), yet only one peer-reviewed publication has confirmed its presence in Coahuila (Gómez-Naranjo et al. 2017). Finally, the known distribution of *Castor canadensis* in Mexico includes areas influenced by the Rio Grande (Rio Bravo), the Bavispe River Basin in the state of Sonora, and the Colorado River Basin (Ceballos & Oliva, 2005). Nevertheless, there is no recent information about the presence of the species in the state of Coahuila, with only a few historical records (Villa-Ramírez 1954, Baker 1956).

These species are listed in the Official Mexican Standards (NOM) NOM-059-SEMARNAT-2010 and its Normative Annex III (latest update 2019): *Erethizon dorsatum* and *C. canadensis* are categorized as "Endangered" and *T. taxus* as "Threatened." Additionally, these species are considered at some level of conservation concern in certain states of the United States and Canada (NatureServe 2025). This status highlights the importance of verified records to update biodiversity databases, which are essential for biogeographic, conservation, and ecological studies of poorly known mammals in northern Mexico.

Materials and methods

Records of *E. dorsatum*, *T. taxus*, and *C. canadensis* were obtained during terrestrial fauna monitoring conducted in and around the Amistad II, III, and IV wind farms, located in the municipality of Acuña, Coahuila de Zaragoza. Surveys were conducted from winter 2024 to fall 2025. In each season, up to ten linear transects (each 1 km long and 20 m wide) were established at each site. Transects were used to record both direct observations and indirect evidence of mammals (e.g., tracks, droppings, and hair). As a complementary method, scent stations equipped with track traps and camera traps were deployed and remained active for eight days per season.

Results and discussion

A total of eight records of *T. taxus* were documented (Figure 1); six of these sightings occurred within the wind farm areas (Amistad II, III, and IV), while two additional individuals were recorded in the surrounding areas (Table 1, Figure 2). The dominant vegetation types in the transects with sightings were Tamaulipan thornscrub and microphyll desert scrub, which aligns with previous studies reporting the presence of *T. taxus* in shrubland and grassland habitats (Quinn 2008, Huck 2010). These continuous, multi-season records provide strong evidence of the species' persistent presence in the region (even within the wind energy infrastructure), contrasting with previous studies that reported sporadic occurrences (Gómez-Naranjo et al. 2017).

Table 1. Sites where *Taxidea taxus*, *Erethizon dorsatum*, and *Castor canadensis* were recorded within the facilities of the Amistad II, III, and IV wind farms and in their surrounding areas.

Specie	Date	Latitude	Longitude	Vegetation type
<i>Taxidea taxus</i>	12/01/2024	29° 32' 44.79" N	101° 40' 40.58" W	Tamaulipan thornscrub
<i>Taxidea taxus</i>	25/01/2024	29° 37' 47.17" N	101° 39' 3.65" W	Tamaulipan thornscrub
<i>Taxidea taxus</i>	06/02/2024	29° 33' 8.52" N	101° 42' 20.26" W	Tamaulipan thornscrub
<i>Taxidea taxus</i>	07/03/2024	29° 35' 2.22" N	101° 30' 54.49" W	Tamaulipan thornscrub
<i>Taxidea taxus</i>	03/04/2024	29° 34' 13.47" N	101° 45' 27.45" W	Tamaulipan thornscrub
<i>Taxidea taxus</i>	03/04/2024	29° 33' 37.94" N	101° 46' 16" W	Microphyll desert scrub
<i>Taxidea taxus</i>	30/07/2024	29° 34' 24.09" N	101° 43' 54.99" W	Microphyll desert scrub
<i>Taxidea taxus</i>	03/09/2025	29° 22' 40.7" N	101° 4' 35.52" W	Tamaulipan thornscrub
<i>Erethizon dorsatum</i>	13/03/2025	29° 22' 40.7" N	101° 4' 35.52" W	Tamaulipan thornscrub
<i>Erethizon dorsatum</i>	06/09/2025	29° 38' 30.3" N	101° 39' 34.11" W	Tamaulipan thornscrub
<i>Erethizon dorsatum</i>	06/10/2025	29° 35' 59.32" N	101° 46' 31.64" W	Microphyll desert scrub
<i>Castor canadensis</i>	16/11/2025	29° 38' 58.76" N	101° 21' 42.21" W	Tamaulipan thornscrub

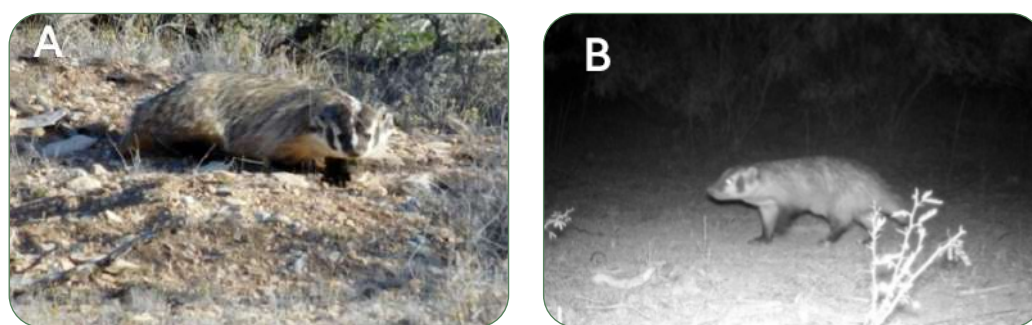


Figure 1. *Taxidea taxus* individuals observed during monitoring along linear transects (A) and through camera traps (B) within the wind farm facilities.

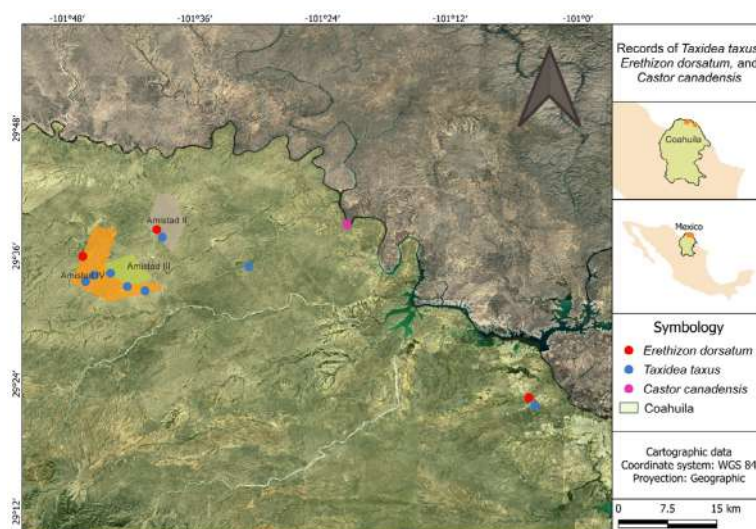


Figure 2. Records of *Taxidea taxus*, *Erethizon dorsatum* and *Castor canadensis* recorded within the facilities of the Amistad II, III, and IV wind farms and in their surrounding areas.

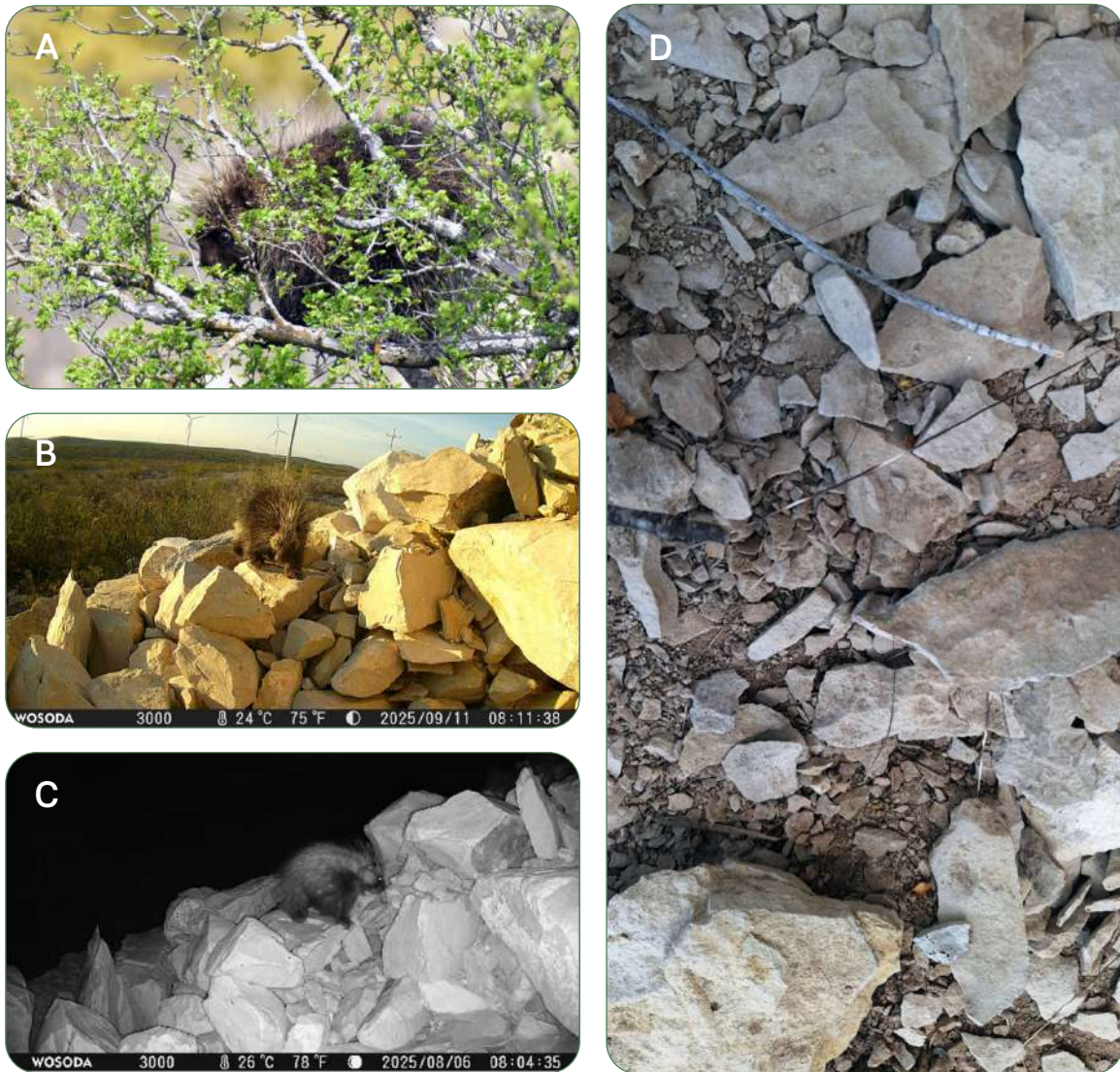


Figure 3. *Erethizon dorsatum* documented during monitoring in areas surrounding wind farms. (A) Individual resting in the branches of an *Ulmus* sp. tree within a glen bordered by natural rock walls containing small caves. (B–C) Individuals recorded by camera traps on rocky outcrops near wind turbines. (D) Spines collected as physical evidence of the species' presence.

On the other hand, multiple records corresponding to at least three individuals of *E. dorsatum* were obtained during the 2025 monitoring. One individual was sighted resting in the branches of an *Ulmus* sp. tree (Figure 3A) located in a glen surrounded by natural rock walls containing small caves that may serve as shelters. The remaining records were obtained from camera traps (Figures 3B and 3C), and one additional record consisted of collected spines (Figure 3D). Additionally, at three sites where the species was recorded, dens located nearby were identified. One of the recorded individuals was a female exhibiting active mammary glands (Figure 3C), consistent with recent or ongoing lactation, suggesting that the area serves as a reproduction site. This species is known to inhabit trees during summer, using them for feeding and resting, while in winter it tends to seek refuge in rocky crevices (Morin et al. 2005). In its northern distribution range (United States and Canada), it is primarily associated with pine-oak forests (Valdés-Alarcón et al. 2023). However, in Mexico, most records have come from semi-desert vegetation (List et al. 1999, Ceballos 2014, Valdés-

Alarcón et al. 2023), suggesting that *E. dorsatum* may exhibit some degree of ecological plasticity that enables it to persist in semi-arid habitats. This finding highlights the ecological importance of the locality as a potential breeding area for the species. Moreover, this constitutes the first record of more than one individual of *E. dorsatum* in the region, expanding the known information about its local distribution and behavior.

Finally, one record of *C. canadensis* was obtained during the 2025 monitoring. An individual was documented with a camera trap (Figure 4A) after locating an area with evidence of its activity (Figures 4B and 4C) near Rio Grande (Rio Bravo). This finding is consistent with the species' capacity to shape landscape features and modify the structure of aquatic ecosystems (Gibson & Olden 2014). Beaver dams are also widely recognized for their numerous positive effects on local flora and fauna (Rosel et al. 2025). Altogether, this underscores the ecological importance of their presence for the overall health of the ecosystem.



Figure 4. *Castor canadensis* observed during monitoring in the surrounding areas associated with wind farms (A), and evidence of its activity (B and C).

Conclusion

The detection of three rarely documented species in northern Mexico (*Erethizon dorsatum*, *Taxidea taxus*, and *Castor canadensis*) highlights the value of monitoring programs associated with wind-energy projects as complementary sources of biodiversity information. These records contribute to documenting species presence, distribution, and habitat use, thereby strengthening national biodiversity databases. Because all three species are listed as at risk under NOM-059-SEMARNAT-2010, their confirmed presence in this underexplored region suggests that wind farms, due to restricted public access and controlled management regimes, may serve as important refuges for rare or specially protected species. These findings further underscore the need for continued biological research in the arid and semi-arid ecosystems of northern Mexico, which are critical for the conservation of the country's mammalian fauna.

ACKNOWLEDGMENTS

We extend our gratitude to ENEL Green Power Mexico for their collaboration in facilitating periodic wild-life monitoring as part of their conservation strategies. We would also like to acknowledge Luis Cardona and Teresa Mijangos for their support in the administrative procedures and for their comments on this document. Finally, we would like to express our sincere gratitude to Mayra Pérez for their insightful and constructive feedback on the manuscript.

REFERENCES

- Baker, R.H. 1956. Mammals of Coahuila, Mexico. University of Kansas Publications, Museum of Natural History, 9:125-335.
- Ceballos G. (2014). Mammals of Mexico. Johns Hopkins University Press. Baltimore, Unites States of America, 974 pp.
- Ceballos G. and Oliva G. (2005). Los mamíferos silvestres de México. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad and Fondo de Cultura Económica, Mexico City, Mexico. 986 pp.
- Escalante T., Espinosa, D. and Morrone J. J. (2002). Patrones de distribución geográfica de los mamíferos terrestres de México. Acta Zool. Mex. (87), 47-65. DOI: <https://doi.org/10.21829/azm.2002.87871800>
- Gibson, P.P., and Olden, J.D. (2014). Ecology, management, and conservation implications of North American beaver (*Castor canadensis*) in dryland streams. Aquat. Conserv. 24(3), 391-409. DOI: <https://doi.org/10.1002/aqc.2432>
- Gómez-Naranjo M. V., León-Tapia M. Á. and Hortelano-Moncada Y. (2017). Mammals of the Tamaulipeco Thorny Scrubland, Northwestern Coahuila, Mexico. Therya 8(1), 35-44. DOI: <https://doi.org/10.12933/therya-17-445>
- <https://doi.org/10.1111/j.1365-2907.2005.00067.x>
- Huck K. L. (2010). Reproductive den habitat characterization of American badgers (*Taxidea taxus*) in central California. Master's Thesis. Faculty of the Department of Biological Sciences, San Jose State University. California, United States of America, 33 pp.
- Jones, J. K. and Genoways H. H. (1968). Distribution of the porcupine, *Erethizon dorsatum*, in Mexico. Mammalia 3(4), 709-712.
- List R., Ceballos G. and Pacheco J. (1999). Status of the North American porcupine (*Erethizon dorsatum*) in Mexico. Southw. Naturalist. 44(3), 400-404. DOI: <https://www.jstor.org/stable/30055242>
- Mendoza E., Camargo-Sanabria A. A. and Godínez-Gómez O. (2022). Is camera trapping helping us to fill knowledge gaps related to the conservation of wild mammals? J. Nat. Conserv. 70, 126282. DOI: <https://doi.org/10.1016/j.jnc.2022.126282>
- Morin P., Berteaux D., and Klvan I. (2005). Hierarchical habitat selection by North American porcupines in southern boreal forest. Can. J. Zool. 83(10), 1333-1342. DOI: <https://doi.org/10.1139/z05-129>
- NatureServe. (2025). *Taxidea taxus* and *Erethizon dorsatum* – Conservation status by subnational units. NatureServe Explorer. Retrived July 9, 2025, from <https://explorer.natureserve.org/>
- Quinn J. H. (2008). The ecology of the American badger *Taxidea taxus* in California: assessing conservation needs on multiple scales. PhD thesis. University of California, California, United States, 131 pp.
- Rosell, F., Bozser, O., Collen, P., and Parker, H. (2005). Ecological impact of beavers *Castor fiber* and *Castor canadensis* and their ability to modify ecosystems. Mammal Rev. 35(3-4), 248-276. DOI:



- Sánchez L. I. (2014). Estado del conocimiento actual de los mamíferos terrestres en México. Bachelor's thesis. Biological Sciences Faculty. Universidad Veracruzana. Veracruz, México. 36 pp.
- Sánchez-Cordero V., Botello F., Flores-Martínez J. J., Gómez-Rodríguez R. A., Guevara L., Gutiérrez-Granados G. and Rodríguez-Moreno Á. (2014). Biodiversidad de Chordata (Mammalia) en México. Rev. Mex. Biodiv. 85(1), 496-504. DOI: <https://doi.org/10.7550/rmb.31688>
- Valdés-Alarcón M., Pacheco J., Betancourt A., and Ceballos, G. (2023). Registro de Puercoespin (*Erethizon dorsatum*) en Valle Colombia Coahuila, México. RMM. 13(2), 73-80. DOI: <https://doi.org/10.22201/ie.20074484e.2023.13.2.398>
- Villa-Ramírez, B. 1954. Distribución actual de los castores en México. Anales Inst. Biol. Univ. Nac. Méxic, 25:443-450.

