

Part Two

Fauna



Mexican wolf (Canis lupus baileyi)
Photo: Rurik List

This section offers a discussion of the possible impacts the construction and operation of the border fence might have on regional fauna, based on the analysis by the experts who attended the workshop. Also included are a chapter relating to the effects that wildlife mammals will suffer and one on the specific case of black bears.

POSSIBLE IMPACTS OF BORDER FENCE CONSTRUCTION AND OPERATION ON FAUNA

SPECIALIST DISCUSSION

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INTRODUCTION

The main effects on fauna generated by the possible construction and operation of the border fence, as identified by this discussion group, relate mostly to the free passage of animals across the border and the destruction of their natural habitats. Dispersion, migration and genetic exchange between populations will be affected.

MAIN IMPACTS ON FAUNA

I. Edge effect due to fragmentation

In fragmented habitats the edge effect has negative impacts on the distribution and abundance of animals.

II. Contraction of the area of activity of individuals'

Building a barrier would fragment territories, reducing the area of activity and modifying the living environments of many animal species.

III. A barrier for dispersion and migratory movements

The fence would represent a barrier that would impede the free transit of fauna between the two countries. The natural dispersion and migration processes would be affected.

IV. Interruption of genetic exchange

Physical barriers, in addition to isolating populations, prevent genetic exchange between individuals.

V. Proliferation of noxious and/or exotic fauna

Areas subjected to anthropogenic disturbances favor the proliferation of exotic and noxious fauna, such as rats and some birds. This fauna could directly or indirectly impact wildlife populations.

VI. Pollution from electric lighting

Electric lighting in the surrounding areas may affect several species of nocturnal animals, such as some predators, dispersers and pollinators. It would also affect the movement of migratory nocturnal birds that travel through the border regions.

VII. Noise pollution

The effect of noise on fauna may cause stress and lead to metabolic, hormonal and behavior effects.

Animal species that would be affected by the establishment of the border fence. The discussion group agreed that the effects of the construction and operation of the border fence would impact mainly species that are under some degree of risk (listed in NOM-059-SEMARNAT-2001) such as: the pronghorn antelope (*Antilocapra americana*), the American bison (*Bison bison*), the big-horn sheep (*Ovis canadensis*), the jaguar (*Panthera onca*), the Mexican gray wolf (*Canis lupus baileyi*), the ocelot (*Leopardus pardialis*), the American black bear (*Ursus americanus*), the black-tailed prairie dog (*Cynomys ludovicianus*), the North American porcupine (*Erethizon dorsatum*), the American badger (*Taxidea taxus*), the swift fox (*Vulpes velox*), the Montezuma quail (*Cyrtonyx montezumae*) and the wild turkey (*Meleagris gallopavo*), as well as various species of fish in border rivers and creeks and other medium and small species distributed in valleys and other sites along the border.

AVAILABLE INFORMATION

The discussion group identified the existence of a wide list of general information on the subject, among which the following topics stand out: the edge effect on fauna; the habits of large mammal species and the impediment that

the fence would generate for their free transit; the effects of barriers on dispersion; visual records and evidence of large mammals crossing the border zone; the impact of electric lighting and noise on animals.

INFORMATION OR RESEARCH GAPS

The group identified a series of gaps in the information required for a precise analysis of the impacts on the fauna, such as: there is no known Environmental Impact Assessment for the border fence in Mexico; there are no certainties regarding the areas where the fence will be built and its structural characteristics; there is a lack of knowledge regarding the environmental impact of human migratory flow on fauna; there are no descriptions of fragmentation zones; the critical connectivity sites for the fauna are unknown; there is no inventory or list of the species that would be affected; there is a lack of knowledge on activity areas, territories and living environments of many animal species; the dispersion and migration movements for some of the critical species that would be affected are unknown; the specific effects of the genetic isolation that the fence would cause for animal populations of many species are unknown and there are no models for it; it is unknown which species may be candidates for applying an individual relocation strategy; the magnitude of the impact of lighting on nocturnal fauna and all possible bat migration routes are unknown; the effects that the noise will have on border animal species is unknown.

SOLUTIONS TO THE RESEARCH OR INFORMATION GAPS

The discussion group determined that in order to solve the gaps in information and research, the following must be done: disseminate at all levels the information on the risks of building the border fence and identify potential partners for carrying out joint efforts (on both sides of the border) to generate the necessary knowledge for proper decision making. Also, identify critical connectivity sites for fauna and propose strategies to conserve them; research the characteristics of the establishment of territories and living environments for the animal species that will be affected; generate precise information on the distribution and movements of fauna affected on both sides of the border; generate models and perform research on the effects of isolation on border animal populations, on the genetic structure of critical species; research, as a last resort, which species may be candidates for implementing a strategy of

individual relocation; perform scientific research on the effects of lighting and noise on animal populations and individuals.

POSSIBLE SOLUTIONS TO THE POTENTIAL IMPACTS

Although the general consensus in the discussion group was that the best way to avoid the impacts is to avoid construction of the border fence, some possible solutions of general nature were identified, such as: promote the prevention of habitat fragmentation by finding alternatives to the border fence; establish critical connectivity sites for fauna and propose strategies to conserve them; consolidate and implement the “wilderness” concept (large green corridors that connect both countries) and replicate successful habitat management cases in the border region. We also suggest using low impact night vision alternative technology that does not rely on radio frequency transmissions or sound waves which can be perceived by the animals, and limiting vehicle traffic.

CONCLUSIONS

The best was to avoid the impacts that the construction and operation of the fence would have on the fauna is definitely to avoid its construction altogether. Nevertheless, in view of the possibility that this project may be carried out, it is necessary to generate alternatives to the fence, while promoting at the same time binational efforts to conserve and protect the fauna and the ecosystems shared by the United States and Mexico. The alternatives to the border fence must allow the continuity of all biological and ecological processes that govern all plant and animal species in the border region.

DISCUSSION GROUP PARTICIPANTS

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Impact	I. Removal, fragmentation and edge effect on plant communities
Description	In fragmented habitats, the edge effect has negative impacts on species composition, and on the distribution and abundance of plant life.
Available Information	Literature on the Chihuahuan, Sonoran and Baja Californian Deserts. Environmental impact studies from previous projects. Technical reports. Clearing and deforestation databases. Lists of types of vegetation and flora along the border. Scientific publications. Land-use change studies. The effects of vegetation cover loss in the Tijuana River Basin (Lina Ojeda - COLEF).
Research or Information Gaps	Studies on the relationship between vegetation cover loss and aquifer recharge in arid and semi-arid zones. Studies on the relationship between vegetation cover loss and soil erosion and desertification.
Solutions to the Research or Information Gaps	<ul style="list-style-type: none"> • Perform detailed impact research studies. • Generate a data base from reliable scientific sources regarding the effects of plant cover loss. • Promote the establishment of priority study areas by CONACYT-CONAFOR and earmark funds to support research.
Possible solutions to the potential impacts	<ul style="list-style-type: none"> • Minimize the areas exposed to the edge effect. • Seek alternatives to building the fence. • Create cross-border flora corridors. • Propose a design that is less aggressive (reduce the strip of land taken up by fence construction). • Upon finishing construction, restore the affected areas with native species and techniques for soil decompaction and erosion control. • Compensate the damages.

II. Introduction and establishment of invasive and exotic species

Areas subjected to anthropogenic disturbances favor the proliferation of invasive species that may directly or indirectly impact wildlife populations.

Limited knowledge on potential invasive species and their effect on natural communities on both sides of the border.

- Establish quarantine and prophylactic measures.
- Permanent monitoring to prevent the introduction and establishment of invasive and exotic species.
- Seek alternatives to building the fence.
- Create cross-border flora corridors.

III. Loss of substrate (soil erosion and compaction)

Vegetation removal, use of equipment, vehicular and human traffic, the formation of pathways and roads, and soil removal are all highly erosive factors that produce irreversible ecological damage.

Literature on soil compaction and erosion.
 Technical reports.
 CONAGUA databases.
 Scientific publications.
 Land-use change studies.
 Environmental impact studies from previous projects.

Fragility characterization by types of soil and geographic areas.

- Perform fragility studies by type of soil and geographic area.
- Soil recuperation and restoration process studies by type of soil and geographic area.
- Minimize the use of heavy equipment.
- Upon finishing construction, restore the affected areas with native species and techniques for soil decompaction and erosion control.
- Seek alternatives to building the fence.
- Create cross-border flora corridors.

Impact

I. Removal, fragmentation and edge effect on plant communities

Possible solutions
to the potential
impacts

Groups that are
currently working
on the subject or
that could work
on it

Autonomous University of Nuevo León (Aquifer Recharge as a Function of Vegetation Cover in Semiarid Zones); Autonomous University of Baja California (Ecosystem Classification in the Area of the Californias, Tecate), National Forestry Commission, Cementos Mexicanos-SUL ROSS UNIVERSITY (Vegetation in the Rio Grande and Big Bend areas), SEMARNAT (Environmental Impact Studies), STATE GOVERNMENTS (Environmental Impact Studies) University of Arizona, COLEF, Autonomous University of Tamaulipas, Texas A&M. UNAM Institute of Ecology.

II. Introduction and establishment of invasive and exotic species

- Propose a design that is less aggressive (reduce the strip of land taken up by fence construction).
- Upon finishing construction, restore the affected areas with native species and techniques for soil decompaction and erosion control.
- Compensate the damages.

III. Loss of substrate (soil erosion and compaction)

- Propose a design that is less aggressive (reduce the strip of land taken up by fence construction).
- Upon finishing construction, restore the affected areas with native species and techniques for soil decompaction and erosion control.
- Compensate the damages.

Impact	IV. Interruption or alteration of seed dispersers, colonization and pollination
Description	<p>The establishment of the fence may constitute a physical barrier for free passage of dispersers or of the seeds themselves. In addition, the lighting, the radars and other measures may affect the behavior and the distribution of nocturnal pollinators, such as bats, and of seed dispersers, affecting genetic exchange between populations.</p>
Available Information	<p>There is sufficient theoretical information published on the subject.</p>
Research or Information Gaps	
Solutions to the Research or Information Gaps	
Possible solutions to the potential impacts	<ul style="list-style-type: none"> • Propose a construction design that allows free action of pollinators, seed dispersers and colonization of native plants. • Establish seed banks on both sides of the fence and promote seed exchange among populations that are cut off from each other. • Seek alternatives to building the fence. • Create cross-border flora corridors. • Propose a design that is less aggressive (reduce the strip of land taken up by fence construction). • Upon finishing construction, restore the affected areas with native species and techniques for soil decompaction and erosion control. • Compensate the damages.
Groups that are currently working on the subject or that could work on it	

V. Alteration of plant communities due to disruptions in water flow and soil removal

Water plays an important role in the dispersal of seeds and plant propagules. Changes or disruptions in its flow affect the existing dispersal patterns. Soil removal generates a change in its structure, which can in turn impact the composition and abundance of the vegetation community at the affected site.

- Prevent the modification of flow patterns in microbasins and allow drainage that respects these patterns.
- Avoid modifying the area's topography (geomorphology).
- Seek alternatives to building the fence.
- Create cross-border flora corridors.
- Propose a design that is less aggressive (reduce the strip of land taken up by fence construction).
- Upon finishing construction, restore the affected areas with native species and techniques for soil decompaction and erosion control.
- Compensate the damages.

VI. Microclimate alterations

The removal of native vegetation impacts heat ratios in the ground, as well as water absorption and evaporation, generating microclimate alterations (temperature, relative humidity, albedo, rainfall, air currents, etc.).

There is sufficient theoretical information published on the subject.

