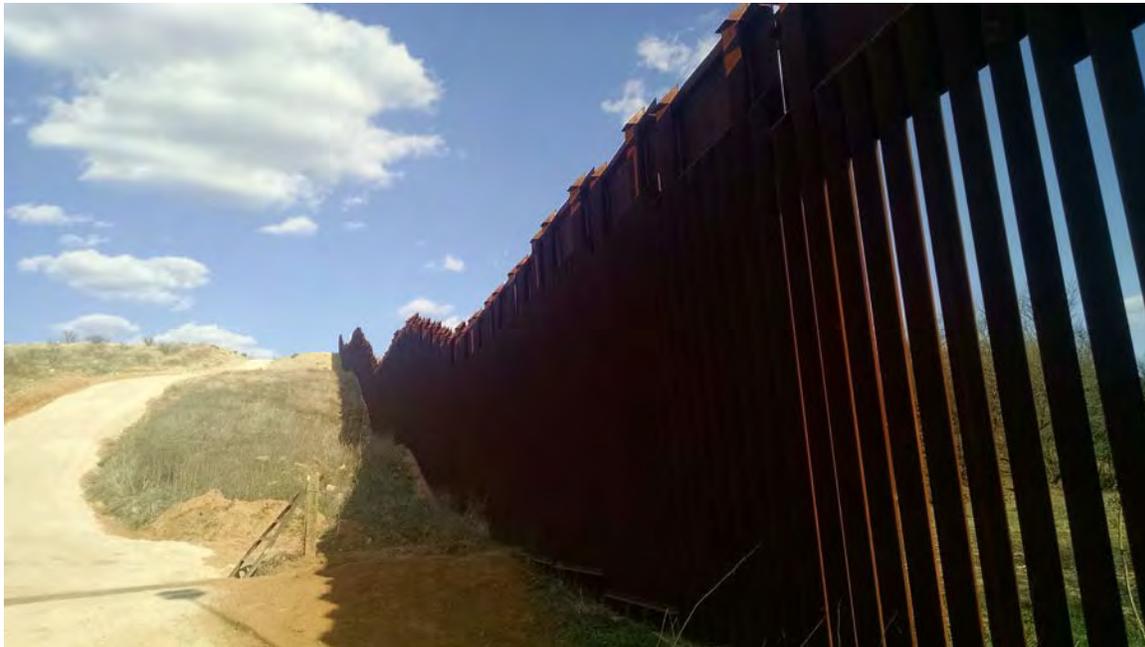


BORDERLANDS CONNECTIVITY REPORT

Advances in connectivity conservation in the borderlands of Sonora and Chihuahua, Mexico; and identification of border wall segments that need to remain undeveloped or that require mitigation actions to preserve connectivity for focal species.

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Border wall section in Nogales Arizona

INTRODUCTION

In recent years Mexican agencies, non-profit groups and academia have all made efforts to better address connectivity needs in the borderlands region of Sonora and northeastern Chihuahua. Some actions have focused on identifying impacts of U.S. border infrastructure, others have advanced protected area regulations, while still others seek to reduce habitat fragmentation generated by roads with a focus on Highway 2.

Notable among these efforts are the wildlife crossings built in the Pinacate Biosphere Reserve; the designation of a core area of the Janos Biosphere Reserve along the border



with New Mexico; and the certification by Mexico's Parks agency (CONANP) of two private reserves along the border: Los Fresnos and Los Ojos.

In addition to these actions, a coalition of groups and individuals from both Mexico and the United States has successfully collaborated with Mexico's Secretariat of Communications and Transport (SCT) in identifying and reducing the impacts of Highway 2 in the Sky Islands region of Sonora.

Finally, researchers from different universities, agencies and institutions of both countries have increased our knowledge of what areas different species need to move across the border, and while much is still unknown, some places already stand out for their importance to wildlife connectivity. Much of this research does not provide easily available geographic data, hence my gratitude to the Arizona Ecological Services Office of the US Fish and Wildlife Service (USFWS), to the *Instituto Nacional de Ecología y Cambio Climático*, and to Dr. Rurik List of *Universidad Autónoma Metropolitana-Lerma* for making GIS data available on the areas of connectivity concern for jaguar, pronghorn and bison.

This report is our first effort to put some of the information resulting from regulatory actions, wildlife-friendly infrastructure and research activities, into a series of maps that allows us to identify areas of the highest immediate concern for connectivity along the US border with Sonora and northwestern Chihuahua. Geographically explicit data is not as readily available as literature so this effort cannot contain all the research we are aware exists, nor does it cover all the different groups of fauna impacted by the border wall, as it focuses on a few wide-ranging species for which data could be quickly collected. Known omissions in the region include black bear research in the Sierra San Luis region and bird migration routes, especially in the San Pedro River Basin. Should we be able to obtain geographic data for these groups and species we will update this report to incorporate them.

REGULATING AND PLANNING FOR CONNECTIVITY

Janos connectivity core area

The Janos Biosphere Reserve has issued its management plan which includes maps and descriptions of its zoning. The plan identifies two polygons, as "*Corredor Fronterizo*" (Border Corridor) with a total surface of 11,729 hectares (29,000 acres) along the border with the United States, stating these represent crossing sites for pronghorn and bison, both listed in Mexico's NOM-059 (ESA equivalent)ⁱ. The plan further states these polygons are Core Areas important to maintain ecological and evolutionary processes of these two key grasslands species. It provides the areas with the most restrictions on use, to prevent changes that could affect migrating and dispersal patterns of these species along the border.



Border Private Lands Certification

Two private reserves directly at the borderline in northeastern Sonora have been certified as Areas Voluntarily Destined for Conservation (ADVC for the Spanish acronym): Los Fresnos and Los Ojosⁱⁱ. ADVC certifications are issued by Mexico's National Commission of Natural Protected Areas (CONANP) when landowners demonstrate that their properties have significant ecological value and commit to a self-regulation plan that promotes habitat conservation. These lands serve as platforms for regional conservation actions such as wildlife monitoring, habitat restoration and community outreach. Los Ojos, is not only located on the US-Mexico Border, it is also bisected by Highway 2 providing an ideal area for the establishment of wildlife crossings, and associated infrastructure (funneling fencing, exit ramps, etc.), protected from external disturbance, vandalism or theft.

Highway 2: Cocóspera bypass re-routed

Plans for a bypass to reduce transit time between Ímuris and Cananea were introduced to regional landowners in the summer of 2015. These plans included massive impact to over 16 miles of riparian habitat along the Cocóspera River on a known jaguar corridor. Wildlands Network, with help from volunteers, and from Carlos Robles Elías, owner of El Aribabi – Conservation Ranch wrote a case for the protection of the Cocósperaⁱⁱⁱ and successfully collaborated with the Secretariat for Communications and Transportation (SCT) in identifying alternative routes that would not impact the river. The Environmental Impact Office of SCT agreed to change its plans and is now working on assessing a different route; it has further agreed to include wildlife crossings in any new plans^{iv}.

WILDLIFE CROSSINGS ON HIGHWAY 2

Wildlife crossings in Pinacate.

In 2012 SCT began the expansion of Highway 2 in the Sonoyta-San Luis Río Colorado stretch. The environmental requirements set by the *Pinacate y Gran Desierto de Altar Biosphere Reserve* for this expansion included the establishment of wildlife crossings along the highway to allow for the movement of pronghorn, bighorn seep and species using riparian corridors. To date, 18 wildlife underpasses have been built in that stretch and evidence of use by bighorn sheep and other wildlife has been documented^v.

Wildlife crossings under review in the Sky Islands region

Wildlands Network and its partners of the Wildlife Linkages Binational Partnership organized a trip for SCT personnel to visit the wildlife crossings on Oracle Road, just north of Tucson, hosted in part by the Regional Transportation Authority based in Tucson. After participating in the field visit, personnel of SCT requested initial recommendations to begin evaluating options for making the Agua Prieta - State limits stretch of Highway 2 more permeable to wildlife^{vi}. They also agreed to fund an inventorying of all culverts, bridges and drainages from Ímuris to the State limit, as a first step to identify opportunities to convert some of these into effective wildlife



crossings. Recommendations were handed to SCT in January and are under review to assess viability with current budgets. These recommendations include 17 sites for wildlife crossings, six of which are marked as priority areas for the immediate raising of fencing and building of exit ramps, to allow existing bridges and culverts to serve as wildlife crossings, within the private protected area Los Ojos. Other recommendations include areas outside Los Ojos, areas that may need additional mitigation measures and areas targeted for further evaluation to determine their suitability as locations for future wildlife overpasses. Locations were determined with the help of culvert inventorying efforts, roadkill monitoring and landowner consultation.^{vii}

RESEARCH ON KEY BORDER CROSSING SPECIES

Jaguar Connectivity models

In 2015 the USFWS published a jaguar habitat-connectivity model^{viii}, resulting from work with researchers from the Wildlife Conservation Society and the Jaguar Recovery Team, comprised of experts of both countries. While the model left out much potential habitat in Chihuahua, Arizona and New Mexico, it was the first publicly accessible GIS model of jaguar connectivity across the borderlands. It presents a matrix of habitat at a 1km/pixel resolution which highlights areas potentially used as corridors through the use of the Circuitscape software, which simulates an electric current running through that matrix as a proxy for jaguars navigating resistance on their path between two core habitat areas. A revision of the model, at a much higher resolution (30m/px), with a refined matrix and an updated version of Circuitscape is in production by scientists at Conservation Science Partners and should be published shortly. This report includes only the USFWS model.

Status of pronghorn in Mexico

In 2011 the *Instituto Nacional de Ecología y Cambio Climático* (INECC, at the time *Instituto Nacional de Ecología*) published a report^{ix} on the status of pronghorn in Mexico, compiling a database with information from all the different populations of the species in three states: Chihuahua, Coahuila and Sonora. The report authors determined areas of pronghorn activity by defining buffers around each individual record of the species. Buffer sizes varied according to observed behavior in the populations of each state. The report's recommendations include one for the border wall: "*In areas used by pronghorn, require changes to existing people barriers which prevent the crossing of wildlife but not of people, and instead use vehicle barriers with a design that allows the crossing of medium and large mammals but prevent vehicles crossing.*"

Status of border bison in Mexico

In 2008 INECC also published a report^x on the status of bison along the border of Chihuahua and New Mexico and concluded: "*The biggest threats to the population in Mexico used to be the expansion of farmlands in bison habitat, and illegal hunting. Nonetheless, a greater threat has emerged: the construction of the border wall. It will obstruct the free movement of bison across both countries...*" Among its many findings



the report identified 5 places where bison crossed the border, one place where pronghorn crossed and one black bear track nearby. Recommendations include the establishment of wildlife crossings along the border, especially in areas east of the crossing named El Berrendo.

SOURCES

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