

## Borderlands Conservation Hotspot

### 4. Big Bend



COOKIE BALLOU/NPS

Rio Grande Vista and Crown Mountain, Big Bend National Park

**T**he Rio Grande changes course between southwestern Texas and the Mexican states of Chihuahua and Coahuila, making the turn from southeast to northeast that gives the surrounding borderlands region its name, Big Bend. Big conservation success stories unfold here as researchers, biologists, land managers and volunteers on both sides of the border work together. Bringing the wall to Big Bend threatens to end these stories and the binational cooperation behind them—“25 to 30 years of confidence building and capacity building,” as researcher Gary Nabhan describes it (Nabhan 2018).

Big Bend already has some imposing natural walls, 1,500-foot canyon faces carved by the river in its path along its turn through the fragile Chihuahuan Desert. Like the Sonoran Desert, the 250,000-square-mile Chihuahuan is dotted with the isolated mountains known as sky islands, but it is a dryer, higher, cooler desert with an even greater biological diversity than the Sonoran. In fact, the Chihuahuan is one of the most biologically diverse deserts in the world (Pronatura Noreste et al 2004), home to 446 species of birds, 3,600 species of insects, 75 species of mammals and more than 1,500 plant species (U.S. Department of the Interior 2011).

The Big Bend region of the desert is remote—the area around Big Bend National Park has so little human

settlement that light pollution is negligible. According to the International Dark Sky Association, it is one of the best places in the world to see stars (National Park Service [NPS] 2012a).

At the moment, the Big Bend region has no border wall segments and very little fencing, but it is on the Department of Homeland Security (DHS) list for new barrier-building in Texas.

#### Conservation lands

The Big Bend region has 4,687-square miles of protected areas, including Big Bend National Park, Big Bend Ranch State Park and Black Gap Texas Wildlife Management Area in the United States and, in Mexico, reserves managed

## BIG CHALLENGES

**B**ig Bend faces conservation challenges as expansive as the landscape itself.

Despite relatively small human populations, the fragile Chihuahuan desert on both sides of the border in the region shows the damage of more than 150 years of overgrazing, logging and other resource extraction. In the high forests of the Maderas del Carmen of Mexico, logging operations began in the 1920s and continued on a large scale until the late 1960s (McKinney and Villalobos 2004). The landscape also bears the scars of mining for lead, silver and fluorspar.

Over large areas native grasses are gone, lost to overgrazing and replaced by sparse shrubs or bare ground with an impenetrable crust. Infrequent but heavy desert rains run off without soaking into the soil, eroding the land and making it impossible for native plants to re-establish (Rinas 2018). One endangered perennial grass, the Guadalupe fescue, has only two known surviving populations, one in the Chisos Mountains within Big Bend National Park and a second in the Maderas del Carmen mountains (NPS 2017b).

Development and water withdrawal have diminished and degraded the bosques (forests) along the Rio Grande (Hoyt 2002), imperiling forest-dependent species like western yellow-billed cuckoos and southwestern



Southwestern willow flycatcher

willow flycatchers (Hunter et al 1987) and likely causing the loss of the once-dominant screwbean mesquite tree from 50 percent of the places it was found a century ago (Foldi 2014). Cottonwoods and willows have vanished from much of Big Bend because the over-managed river no longer floods and wets the soil so seeds can germinate (Lovell, Gibson and Heshcel 2008).

As in other border regions, predators and game species like pronghorn and bighorn sheep were nearly wiped out at the hands of humans. Once common, jaguars were killed off in Texas by the 1940s (Brown and Lopez Gonzalez 2001; Sinclair 2008). Black bears disappeared from the Texas side of the Rio Grande in the 1950s but re-entered Big Bend National Park from Mexico in the late 1980s (NPS 2015a).

by Comisión Nacional de Áreas Naturales Protegidas (CONANP): Parque Nacional Cañon de Santa Elena, Área de Protección de Flora y Fauna Ocampo, and Maderas del Carmen Área de Protección de Flora y Fauna (Figure 8). Because of their global ecological importance, both Maderas del Carmen and Big Bend National Park have United-Nations-designated International Man and the Biosphere Reserve status.

Collectively, these reserves cover a large expanse of the Chihuahuan Desert and sky island mountains similar to those in the Sky Islands borderlands conservation hotspot. The Rio Grande itself is protected by U.S. Wild and Scenic River designation and by the Mexican Monumento Natural Rio Bravo del Norte.

Private landowners on both sides of the border are actively

engaged in land conservation. In 1985, the Hartes, a Texas newspaper family, donated 104 square miles of Chihuahuan desert grassland that became part of Big Bend National Park (Hevesi 2011). Although the Mexican government had designated Maderas del Carmen a protected area in 1994, it took a massive conservation investment by CEMEX, the global cement company, to ensure significant on-the-ground protection. In 2000, CEMEX began Proyecto El Carmen, an effort to purchase, protect and restore habitat that now covers 336 square miles (McKinney and Villalobos 2004).

A subsequent push by CEMEX and its conservation partners led to the 2005 designation of the land it owns adjacent to the border as the first wilderness in Latin America (Robles Gil 2006a). CEMEX is now working with Conservation International, Birdlife, and the WILD

Foundation on the El Carmen-Big Bend Conservation Corridor Initiative. The initiative is developing a wilderness management plan for the Sierra del Carmen Sky Island, roughly 781 square miles of private, corporate and government lands north and south of the border (Center for Biological Diversity [CBD] 2005).

**Conservation collaborations**

When President Franklin D. Roosevelt signed the legislation that established Big Bend National Park in 1944, he voiced his hope that it would one day be part of “one great international park” on both side of the Rio Grande (LoBello 2018). While no such physical designation yet exists, the vision of international cooperation in which it is rooted is flourishing in the region. The U.S. Department of the Interior (DOI) and Mexico’s Secretariat of the Environment signed a cooperative conservation agreement for the Big Bend area in 2011 (DOI 2011), and vigorous binational efforts are ongoing to restore habitat and wildlife and practice complementary land management.

**Forming international alliances**

Government agencies lead the Big Bend Conservation Cooperative, which has over 30 U.S. and Mexican partners, including the National Park Service (NPS), U.S. Fish and Wildlife Service, U.S. Geological Survey, Texas Parks and Wildlife; nongovernmental organizations like CONANP; World Wildlife Fund (WWF) and Profauna; Coca Cola and other companies; and universities like Utah State and Sul Ross State. Collective projects include the control of the

invasive tamarisk and giant river cane along the Rio Grande, reintroduction of the endangered Rio Grande silvery minnow, pronghorn and big horn sheep, and restoration of grassland, wetland, and riparian habitats on public and private lands (NPS 2012b).

The Greater Big Bend Coalition, an international member-based organization dedicated to protecting the region, supports restoration efforts and is developing momentum through a Change.org petition for realizing Roosevelt’s dream of establishing Big Bend International Park (Greater Big Bend Coalition 2017).

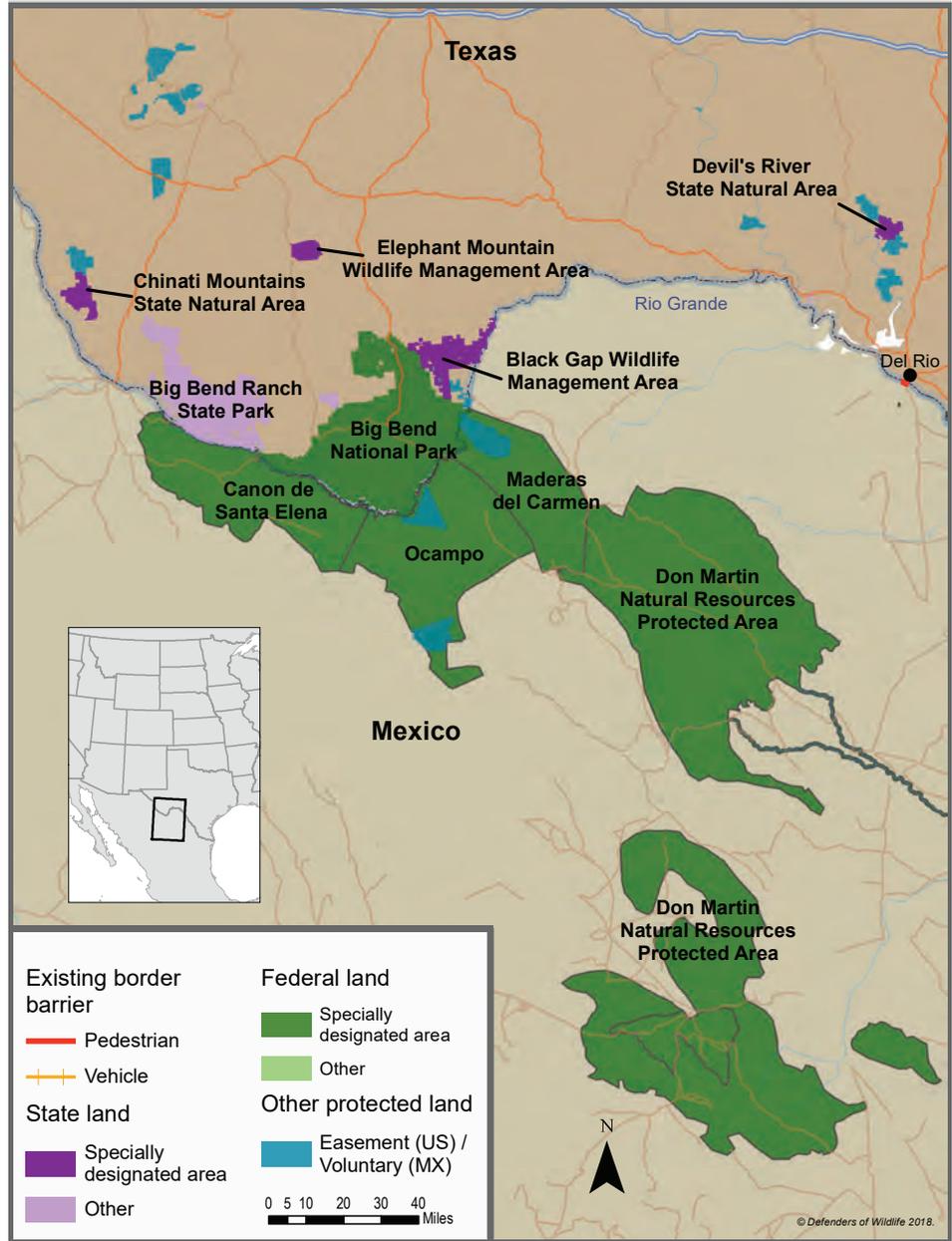


Figure 8. Protected areas in the Big Bend region



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A prescribed burn of giant cane, an invasive plant of no value to wildlife, continues into the night in Big Bend National Park.

### *Restoring grasslands*

Conservation groups have been working with NPS since 2000 to restore the degraded Chihuahuan Desert grasslands in Big Bend National Park. Members of the Sierra Club and other groups—including volunteers from as far away as Washington state—are beginning to bring back grass cover on parts of this land eroded and devoid of plant cover after years overgrazing and water mismanagement (Brockmann 2014). According to Christina Rinas, a former park ranger at Big Bend, the volunteers gain work experience in resource management and restoration and “help keep our public lands in a healthy condition.” Similar restoration work is underway across the border at the Maderas del Carmen Biosphere Reserve, work that started with moving cattle off CEMEX land (Reynolds McKinney 2006).

### *Controlling invasive plants*

In Big Bend National Park and elsewhere along the river dense stands of Asian tamarisk have replaced native willows and cottonwoods in the river’s flood zone. Tamarisk does provide habitat for some birds and other wildlife but supports fewer types of birds, reptiles, amphibians and insects than native tree communities (Shafroth et al 2005). Giant cane—with no food value for native wildlife—has formed dense monocultures along many banks, completely excluding native plants (NPS 2015b) and trapping silt, which builds up and narrows the river.

To combat these exotic plants, binational teams organized by the WWF Mexico Program, NPS, Profauna, Pronatura and CONANP cut, burn and apply herbicide on both banks of the Rio Grande (NPS 2014, 2016). With the successful use of tamarisk beetles from Asia to kill and reduce tamarisk groves on the river (Loomis 2017, Knutson, Mugge and Deloach 2015), efforts are focusing more on cane control (Briggs 2017). Mark Briggs, a conservation scientist and WWF program officer, says that although data is still being analyzed, “eradicating giant cane appears to be increasing riparian plant biodiversity, improving riparian and aquatic habitat, and making it easier for people to access and enjoy the river” (Briggs 2017).

### *Bringing back large mammals*

At Maderas del Carmen, restored habitat and protection set the stage for growing populations of rare or previously extirpated wildlife, including Carmen Mountain mule deer, Rocky Mountain elk, pronghorn and black bear. In 2000, CEMEX, in cooperation with conservation organizations and wildlife agencies in Mexico and Texas, began breeding and releasing desert bighorn sheep, absent from Sierra del Carmen for more than 50 years (Reynolds McKinney 2006).

Ten years later, U.S. and Mexican wildlife agencies, including Secretaría del Medio Ambiente y Recursos Naturales (SEMARNAT, Mexico’s ministry for the environment) and the New Mexico Department of Game

and Fish, released New Mexican pronghorn. Entirely missing from the state of Coahuila since the 1950s, there are now more than 150 pronghorn in the Maderas del Carmen reserve (CEMEX 2016). Recent similar projects have reintroduced bighorn to Big Bend State Park, pronghorn within 40 miles of the border near Marfa, Texas, and mule deer to Black Gap Wildlife Management Area (Texas Parks and Wildlife 2018, 2016, Mule Deer Foundation 2016).

Patricio Robles Gil, founder of the Mexican conservation organizations Agrupacion Sierra Madre and Unidos para la Conservacion, helped CEMEX and its partners develop plans for bringing back the large mammals. He says, “Undoubtedly, we still face many challenges. But in this vast and remote wilderness, we can also find many opportunities to show that Texas and Mexico can be good neighbors and responsible stewards of the land and wildlife we all treasure (Robles Gil 2006b).”

### *Studying cross-border monarch migration*

Every spring, imperiled monarchs fly from central Mexico and Texas to migrate north to Canada. In late summer and fall they return to Mexico. Most monarch migration maps do not include Big Bend as part of the migration corridor, but Gary Nabhan, a pollination ecologist who is part of a binational group of conservationists and scientists working to identify monarch migration routes and food sources, has verified ample evidence that the Big Bend region of Texas and the Sky Islands of Arizona are equally important because both have abundant milkweeds that flower at the right time to feed the monarchs.

“The resource management team at Big Bend National Park has been incredibly generous in supporting cross-border work just south of the border, where monarch breeding is highly probable,” says Nabhan (Nabhan 2018). In 2015 and 2016, NPS and other collaborating organizations trained staff from U.S. and Mexican agencies and nonprofits to identify areas where monarchs are breeding and to propagate and plant milkweed, the host plant for monarch larvae.

### *Solving Mexican long-nosed bat mysteries*

Mexican long-nosed bats are endangered because overharvesting, agriculture and other human activities have wiped out wild agaves, their main food source in northern Mexico. But the lack of information on where these bats live, feed and migrate hinders conservation measures (Gomez 2017).

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Scientists surmise that the bats winter in Mexico in a handful of caves, and then many—mostly females—migrate, following the sequential north-to-south flowering of agaves until they reach Big Bend National Park, where they spend the summer.

A binational effort is underway to establish the basic natural history of these bats: How many are there? Where do they roost and bear their young? Where are the remaining patches of the agaves on which they depend? Researchers are solving these mysteries with a combination of old-fashioned fieldwork and modern high-tech. They capture bats in mist nets and fit each one with a passive integrated transponder (PIT) tag. The tag sends signals to an antenna at the mouth of a cave, providing the scientists with a record of each time a bat flies in and out of the cave. NPS provided a plane for aerial agave surveys in the mountains of the Maderas del Carmen Biosphere Reserve across the river from Big Bend National Park.

Bat researcher Emma Gomez and her team visit Mexican communities, informing them about bats, their roosting caves and the remote stands of agaves where they feed. “One of our local team leaders grew up near an important bat cave,” says Gomez. “He guided us to a cave near his community where we captured bats and was so excited to see them all up close.... Now he and other local community members guard the caves.”

Another bat expert, Mexican conservationist Rodrigo Medellin, works with the Tequila Interchange Project to convince tequila companies to allow 5 percent of their plantation agaves to flower naturally to provide nectar for the bats. The companies benefit because bats cross-pollinate the domesticated agaves with wild ones, adding genetic diversity to the domestic stock.

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Some tequila brands now sport a bat-friendly label. In a *National Geographic* article Medellín describes the labeling program as “nothing short of a dream come true” that “will help save the bat and tequila at the same time.”

### The looming threat of the wall

A 2017 DHS report called for construction of 151 miles of wall—as high as 30 feet—in Texas, including in Big Bend (Berrien 2017). Because most of state’s border is private land, which must be seized by eminent domain—a long and costly process, federal lands like Big Bend National Park are relatively easy places for DHS to build.

**Changes in water flow patterns.** Although the exact locations of possible Big Bend sections of the wall are unknown, the wall has caused flooding in other places, notably Organ Pipe Cactus National Monument and Nogales. Walls near the Rio Grande—or any river—can pose a danger to wildlife when animals get trapped against them by rising water and are unable to escape.

Conversely, habitat could be harmed if the wall *prevents* flood waters from reaching it. For example, willow and cottonwood trees, important habitat for imperiled species like yellow-billed cuckoos and southwestern willow flycatchers, require periodic flooding for their seedlings to establish.

**Blocked wildlife movement.** The Big Bend Conservation Cooperative and many others have invested huge amounts of work in restoring habitat and reintroducing animals like desert bighorn sheep, pronghorn, deer and bear. The goal for much of this work is the unimpeded cross-border movement of large mammals necessary to maintain connected, healthy populations on both sides. “Over recent decades, it’s been our goal to remove fences that block natural wildlife movement,” says Raymond Skiles, wildlife biologist at Big Bend National Park.

The importance of binational populations is clear from the story of Big Bend National Park’s black bears, absent from the park for decades before bears from Mexico moved north of the border to the park. According to Louis Harveson, director of the Borderlands Research Institute at Sul Ross State University, “If there’s a wall, West Texas would be out of the bear business.”

A more immediate threat from a future wall set back two or three miles from the river is the possibility of cutting off



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Jose Santos is one of the locals enlisted by bat researchers to protect caves where endangered Mexican long-nosed bats roost.

animals from the drinking water the river provides. “The Rio Grande is also the park’s most important water source for animals...it’s as simple as that,” says Big Bend biologist Skiles.

**Reduced access for monitoring and management.** Control of tamarisk and giant cane is a prime example of why easy access—unhindered by a wall—to both sides of the river is essential for managing habitat. These exotics infest both banks of the river and are currently treated by binational teams working either side with boats to control the two invasive plants.

**Hurdle to international cooperation.** Building border walls puts decades-long, cross-border cooperative projects—like managing stream flow and riparian vegetation, native fish and bighorn sheep and their habitats—and the relationships that support them at risk. “Managing only one side of a river is simply not possible,” says WWF’s Mark Briggs. “From planning to design to implementation, effective management of the Rio Grande/Rio Bravo requires active and equal participation from scientists, managers and riverside citizens from both countries” (Briggs 2018).

**Diversion of resources.** Monarch butterfly researcher Gary Nabhan points out that money spent on the wall is money urgently needed for conservation. “The agencies that do such work have already suffered budget cuts, and it seems like their international programs are targets for politicians who do not value cross-border work,” says Nabhan. Lack of resources and the political climate could undo 25 to 30 years of confidence building and capacity building in successful transborder collaborations.” (Nabhan 2018). Cuts in the United States coincide with recent substantial budget cuts in Mexico for the agencies supporting biodiversity like CONANP and the Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (De la Torre 2015).