PETITION TO LIST THE
Texas Distinct Population Segment of
Ocelot (*Leopardus pardalis pardalis*)
UNDER THE ENDANGERED SPECIES ACT

Laguna Atascosa National Wildlife Refuge, Texas. Photo: Jeff B.

Petition Submitted to the U.S. Secretary of the Interior, Acting through the U.S. Fish and Wildlife Service

<u>Petitioner</u>:

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INTRODUCTION

WildEarth Guardians (Guardians) respectfully requests that the Secretary of the Interior, acting through the U.S. Fish and Wildlife Service (Service) list the Texas Distinct Population Segment (DPS) of ocelot (*Leopardus pardalis pardalis*) as "endangered" under the U.S. Endangered Species Act (ESA) (16 U.S.C. §§ 1531-1544), separate from the listing of the species as a whole. Guardians requests that the Service designate critical habitat for the DPS concurrent with listing.

The ocelot is a small spotted cat native to the United States, Central America, and South America. Worldwide, it is listed as G4 ("apparently secure") by NatureServe (last reviewed in 1996) and "least concern" but "decreasing" by the IUCN (last reviewed in 2014). It is currently listed as "endangered" under the ESA throughout its range. It has a very small range in Texas and Arizona, where it is considered "critically imperiled" by NatureServe.

The Texas population qualifies as a DPS because it is both discrete and significant. It is discrete in that it is geographically separated from populations of ocelots across the border in Mexico. It is significant in that it is one of the northernmost populations of ocelot, and its loss would leave a significant gap in the range of the taxon. In addition, "[p]eripheral populations… are an important genetic resource in that they may be beneficial to the protection of evolutionary processes and the environmental systems that are likely to generate future evolutionary diversity" (USFWS 2014, p. 12,574).

Threats include fragmentation and destruction of thornscrub habitat, road impacts including vehicle collisions, loss of genetic diversity, and border activities, among others. Researchers estimate that without appropriate recovery strategies, ocelots in south Texas have a one in three chance of extinction over the next 50 years: "The control scenario, which represented the scenario that no recovery strategies would be implemented in the next 50 years, estimated that probability of extinction for ocelots in southern Texas was 33% with a final population size of five individuals" (Haines et al. 2006b, p. 432).

ENDANGERED SPECIES ACT AND IMPLEMENTING REGULATIONS

The ESA, 16 U.S.C. §§ 1531-1544, was enacted in 1973 "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species." 16 U.S.C. § 1531(b). The protections of the ESA only apply to species that have been listed as endangered or threatened according to the provisions of the statute. The ESA delegates authority to determine whether a species should be listed as endangered or threatened to the Secretary of Interior, who has in turn delegated authority to the Director of the U.S. Fish & Wildlife Service. As defined in the ESA, an "endangered" species is one that is "in danger of extinction throughout all or a significant portion of its range." 16 U.S.C. § 1532(6); *see also* 16 U.S.C. § 533(a)(1). A "threatened species" is one that "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." 16 U.S.C. § 1532(20). The Service must evaluate whether a species is threatened or endangered as a result of any of the five listing factors set forth in 16 U.S.C. § 1533(a)(1):

A. The present or threatened destruction, modification, or curtailment of its habitat or range;

B. Overutilization for commercial, recreational, scientific, or educational purposes;
C. Disease or predation;
D. The inadequacy of existing regulatory mechanisms; or
E. Other natural or manmade factors affecting its continued existence.

A taxon need only meet one of the listing criteria outlined in the ESA to qualify for federal listing. 50 C.F.R. § 424.11.

The Service is required to make these listing determinations "solely on the basis of the best scientific and commercial data available to [it] after conducting a review of the status of the species and after taking into account" existing efforts to protect the species. 16 U.S.C. § 1533(b)(1)(A); 50 C.F.R. § 424.11(b). "The obvious purpose of [this requirement] is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise." *Bennett v. Spear*, 520 U.S. 154, 175 (1997). "Reliance upon the best available scientific data, as opposed to requiring absolute scientific certainty, 'is in keeping with congressional intent' that an agency 'take preventive measures' *before* a species is 'conclusively' headed for extinction." *Ctr. for Biological Diversity v. Lohn*, 296 F. Supp. 2d 1223, 1236 (W.D. Wash. 2003) (emphasis in original).

In making a listing determination, the Secretary must give consideration to species which have been "identified as in danger of extinction, or likely to become so within the foreseeable future, by any State agency or by any agency of a foreign nation that is responsible for the conservation of fish or wildlife or plants." 16 U.S.C. § 1533(b)(1)(B)(ii); *see also* 50 C.F.R. § 424.11(e) (stating that the fact that a species has been identified by any State agency as being in danger of extinction may constitute evidence that the species is endangered or threatened). Listing may be done at the initiative of the Secretary or in response to a petition. 16 U.S.C. § 1533(b)(3)(A).

After receiving a petition to list a species, the Secretary is required to determine "whether the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted." 16 U.S.C. § 1533(b)(3)(A). Such a finding is termed a "90-day finding." A "positive" 90-day finding leads to a status review and a determination whether the species will be listed, to be completed within twelve months. 16 U.S.C. §1533(b)(3)(B). A "negative" initial finding ends the listing process, and the ESA authorizes judicial review of such a finding. 16 U.S.C. § 1533(b)(3)(C)(ii). The applicable regulations define "substantial information," for purposes of consideration of petitions, as "that amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted." 50 C.F.R. § 424.14(b)(1).

The regulations further specify four factors to guide the Service's consideration on whether a particular listing petition provides "substantial" information:

i. Clearly indicates the administrative measure recommended and gives the scientific and any common name of the species involved;
ii. Contains detailed narrative justification for the recommended measure; describing, based on available information, past and present numbers and distribution of the species involved and any threats faced by the species;
iii. Provides information regarding the status of the species over all or significant portion of its range; and
iv. Is accompanied by appropriate supporting documentation in the form of bibliographic references, reprints of pertinent publications, copies of reports or letters from

> authorities, and maps. 50 C.F.R. §§ 424.14(b)(2)(i)-(iv).

Both the language of the regulation itself (by setting the "reasonable person" standard for substantial information) and the relevant case law underscore the point that the ESA does not require "conclusive evidence of a high probability of species extinction" in order to support a positive 90-day finding. *Ctr. for Biological Diversity v. Morgenweck*, 351 F. Supp. 2d 1137, 1140 (D. Colo. 2004); *see also Moden v. U.S. Fish & Wildlife Serv.*, 281 F. Supp. 2d 1193, 1203 (D. Or. 2003) (holding that the substantial information standard is defined in "non-stringent terms"). Rather, the courts have held that the ESA contemplates a "lesser standard by which a petitioner must simply show that the substantial information in the Petition demonstrates that listing of the species may be warranted." Morgenweck, 351 F. Supp. 2d at 1141 (quoting 16 U.S.C. § 1533(b)(3)(A)); *see also Ctr. for Biological Diversity v. Kempthorne*, No. C 06-04186 WHA, 2007 WL 163244, at *3 (N.D. Cal. Jan. 19, 2007) (holding that in issuing negative 90-day findings for two species of salamander, the Service "once again" erroneously applied "a more stringent standard" than that of the reasonable person).

In 1996, the Service and the National Marine Fisheries Service jointly published standards for defining a Distinct Population Segment (DPS) (61 Fed. Reg. 4,722). This definition provides that in order to qualify as a DPS, a species must be a vertebrate that is both discrete from other populations of the species and significant to the species as a whole. These terms are defined as follows:

> **Discreteness:** A population segment of a vertebrate species may be considered discrete if it satisfies either one of the following conditions:
>
> 1. It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation.
> 2. It is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.
>
> **Significance:** If a population segment is considered discrete under one or more of the above conditions, its biological and ecological significance will then be considered in light of Congressional guidance... that the authority to list DPSs be used "...sparingly" while encouraging the conservation of genetic diversity. In carrying out this examination, the Services will consider available scientific evidence of the discrete population segment's importance to the taxon to which it belongs. This consideration may include, but is not limited to, the following:
>
> 1. Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon,
> 2. Evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon,
> 3. Evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range, or
> 4. Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics. (*Id.* at 4,725)

Although these criteria are "non-regulatory" and serve only as policy guidance for the agencies, the Service is committed to using these criteria for evaluating DPSs described in this petition (*Id.* at 4,723).

CLASSIFICATION AND NOMENCLATURE

Taxonomy. The petitioned species is the Texas Distinct Population Segment of *Leopardus pardalis pardalis*. The IUCN Cat Specialist Group has provisionally recognized two subspecies of ocelot as of 2017 (Kitchener et al. 2017, p. 47): *L. p. pardalis*, which includes both the Arizona and Texas population and extends all the way south to Costa Rica; and *L. p. mitis*, which is found in South America as far south as Argentina (Figure 1). *L. p. pardalis* is smaller and grayer than *mitis* (*Id.*).

Figure 1. Distribution of tentative subspecies of ocelot. Borders between subspecies are speculative (Kitchener et al. 2017, p. 47).

The full species taxonomy can be found in Table 1.

Table 1. Taxonomy of *Leopardus pardalis pardalis*.

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Carnivora
Family	Felidae
Genus	*Leopardus*
Species	*pardalis*
Subspecies	*pardalis*
DPS	Texas population

SPECIES DESCRIPTION

The ocelot is a small spotted cat native to the United States, Central America, and South America. A thorough review of information on the species' physical description, habits, life history, and demography can be found in the recovery plan for the ocelot (USFWS 2016, pp. 15-17 & 22-24).

HABITAT REQUIREMENTS

> In south Texas, the species occurs predominantly in dense thornscrub communities… Horne *et al.* 2009 reported that ocelots in Texas selected woodland communities with >75% visually-estimated canopy cover. Other microhabitat features important to ocelots appear to be canopy height (>2.4 m) and vertical cover (90.4% visual obscurity at 1-2 m). Ground cover at locations used by ocelots was characterized by a high percentage of coarse woody debris (50%) and very little herbaceous ground cover (3%), both consequences of the dense woody canopy. (USWFS 2016, p. 23, *some internal citations omitted*)

The Texas population of ocelot's dependence on dense thornscrub, as well as other life history factors, make populations vulnerable to habitat fragmentation:

> Ocelots require large, intact, dense vegetation profiles that can support significant quantities of prey, as well as providing essential dens for their young. The long gestation period makes ocelots slow to recover, and their territorial requirements make them highly susceptible to threats such as habitat loss, habitat fragmentation, and hunting. Importantly, ocelot populations or subspecies are not defined by national boundaries and are often dependent on each other for long-term survival, such as the populations near the Mexico-U.S. border. (Graham 2017, p. 254)

Ocelots use "[r]ivers, former river meanders, irrigation canals, irrigation drains, natural drainages, shorelines, fencelines, and brushy road margins" as travel corridors (USWFS 2016*,* p. 17). Therefore, conservation of ocelots is dependent on conservation of thornscrub, but not limited to that habitat:

> The recovery of the ocelot in Texas will likely depend on the protection and reestablishment of thick thornscrub habitat as core habitat and landscape linkages among population segments. Habitats other than dense thornscrub should be considered for protection and restoration as ocelots have occurred in other habitats historically and even recently. (*Id.,* p. 41, *internal citations omitted*)

GEOGRAPHIC DISTRIBUTION

"Historically, the Texas-Tamaulipas ocelot inhabited southern and eastern Texas, north as far as Hedley, Texas, and west to Marfa, Texas" (USFWS 2016, p. 7, Figures 2 & 3).

Figure 2. Historic and current range of ocelots in the United States (Haines et al. 2005, p. 513)

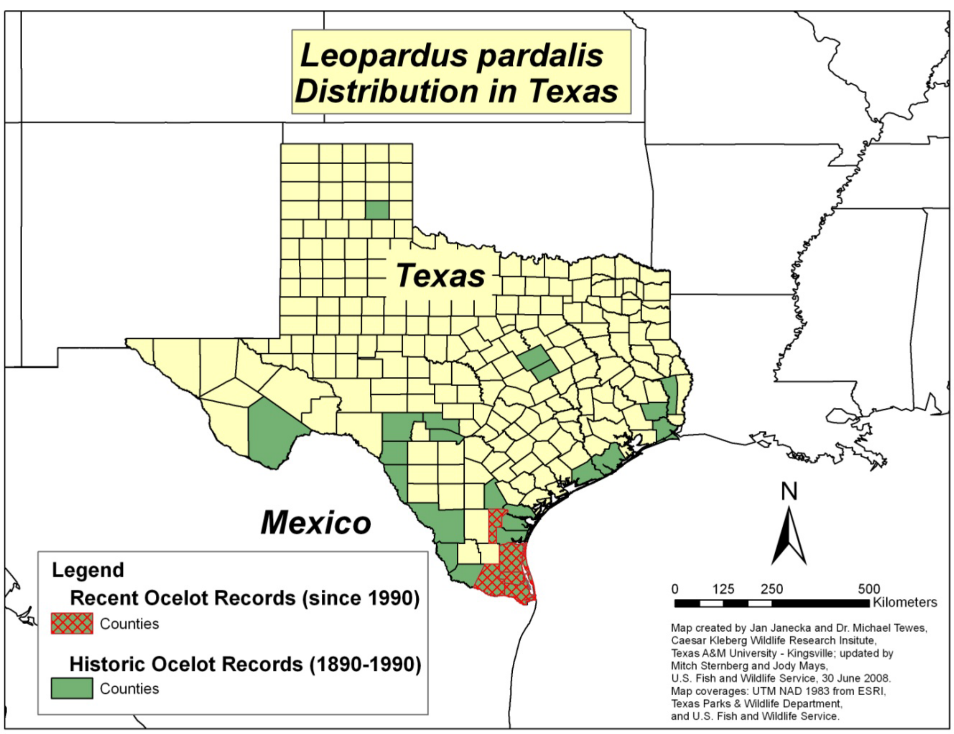

Figure 3. Distribution of ocelot records in Texas (USFWS 2016, p. 9).

> Since the 1960's, the ocelot was documented in Texas by photographs or specimens from Cameron, Hidalgo, Jim Wells, Willacy, and Kenedy counties. Two populations occur in southern Texas. One occurs in Willacy and Kenedy counties primarily on private ranches and the other in eastern Cameron County, primarily on Laguna Atascosa National Wildlife Refuge (LANWR). Individuals have occurred outside of these two populations, but there is no recent evidence that a breeding population occurs in other areas of Texas… Both Texas populations occupy remnant habitat fragments and are isolated from each other by 30 km although natural dispersal between the two populations is possible according to observations of two ocelots in recent years. (USFWS 2016 pp. 8-9, *internal citations omitted*)

There are only two known breeding populations in Texas; one in and around Laguna Atascosa National Wildlife Refuge and the other on Yturria Ranch, a private ranch (Haines et al. 2006a, p. 1, Figure 4).

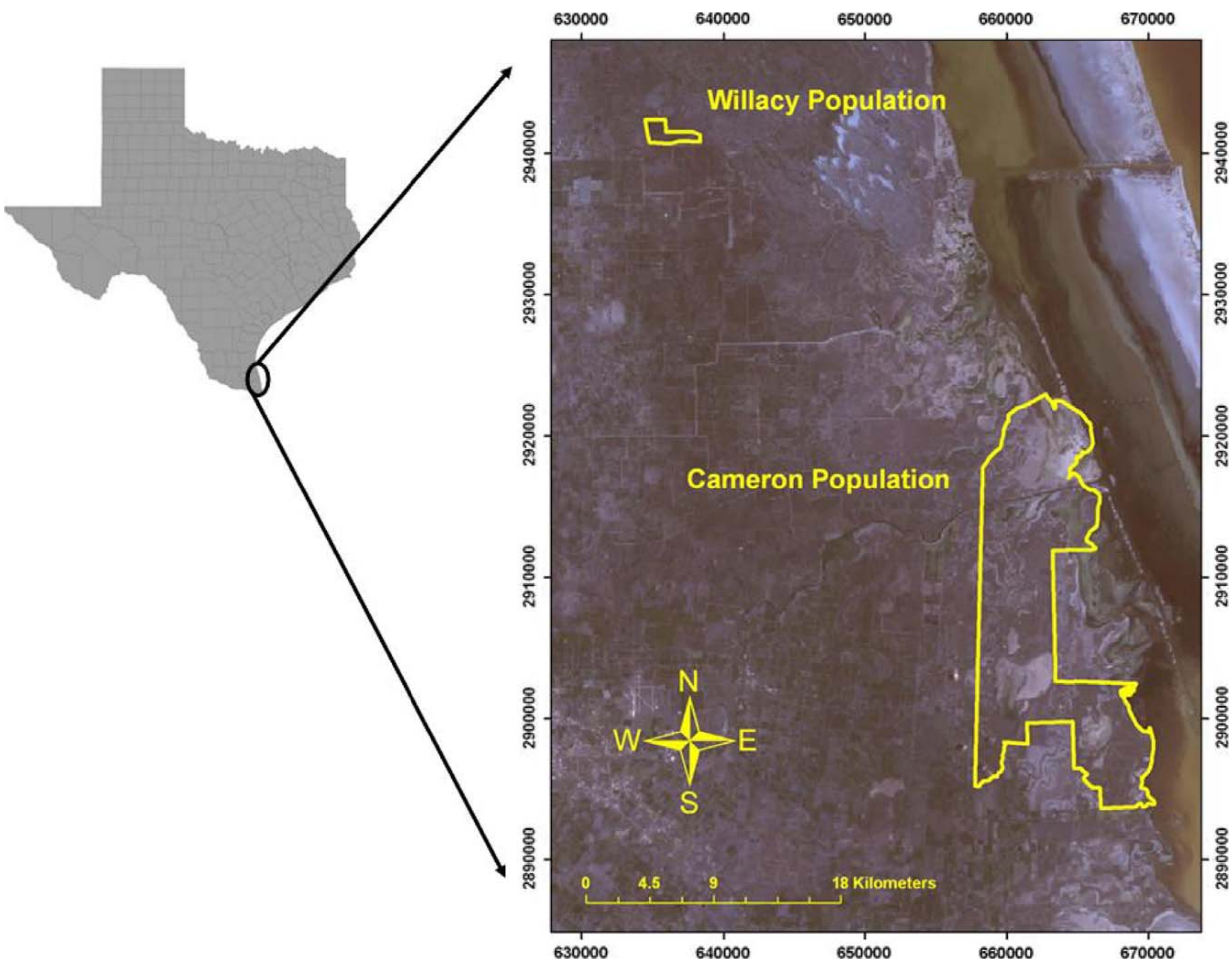

Figure 4. Map of Laguna Atascosa National Wildlife Refuge (Cameron Population) and two connected conservation easements (Willacy Population) in the Lower Rio Grande Valley, Cameron and Willacy counties, TX (UTM Coordinates in Zone 14N) (Haines et al. 2006b, p. 425).

POPULATION STATUS

The most recent population estimate indicates that there are approximately 80 ocelots in Texas:

> [T]he Texas ocelot population is estimated at 80 ocelots, which are found in two separated populations in southern Texas. This estimate is based on a combination of 55 known individuals, identified by their unique coat patterns, and the extrapolation of an additional 25 ocelots based on existing suitable habitat on private lands near or adjacent to existing ocelot-occupied habitat. A third and much larger population of the Texas/Tamaulipas ocelot… occurs in Tamaulipas, Mexico, but is geographically isolated from ocelots in Texas. (USFWS 2018b, p. 4)

LISTING HISTORY

> The ocelot was listed as endangered in 1972 under the authority of the Endangered Species Conservation Act of 1969. The 1969 Endangered Species Conservation Act maintained separate lists for foreign and native wildlife. The ocelot appeared on the foreign list, but due to an oversight, not on the native list. Following passage of the ESA in 1973, the ocelot was included on the January 4, 1974, list of "Endangered Foreign Wildlife" that "grandfathered" species from the lists under the 1969 Endangered Species Conservation Act into a new list under the ESA. (USFWS 2016, p. 2, *internal citations omitted*)

The U.S. population of ocelot was listed under the Endangered Species Act in 1982 with a "not prudent" critical habitat finding (USFWS 1982, *entire*). The Service justified the "not prudent" finding as follows: "[i]n the 1982 U.S. listing rule for the ocelot, [the Service] stated that critical habitat designation was not in the best interest of the species, on two bases: 1) it would draw attention to the species' location and might cause illegal attempts to capture the economically valuable ocelot for its fur or other use; and 2) the species' habitat was already protected on the Laguna Atascosa National Wildlife Refuge" (Guardians 2010, *entire*). Guardians submitted an APA petition for critical habitat designation for the ocelot in 2010, arguing that the Service's justifications were moot. The petition was denied in 2011 (USFWS 2011, *entire*).

QUALIFICATION AS A DISTINCT POPULATION SEGMENT

Discreteness. The Texas population of ocelot is markedly separated from other populations of the same taxon as a consequence of physical factors. Previous to the proposed revision of ocelot taxonomy, the USFWS considered the Texas/Tamaulipas population a single management unit:

> Texas supports isolated, highly imperiled populations that once were demographically linked to the State of Tamaulipas. The [Texas/Tamaulipas Management Unit] is a logical management unit because: 1) it encompasses the current known range of the subspecies (*L. p. albescens*); 2) the U.S. population was historically contiguous with a larger regional population across the Rio Grande River; 3) it has distinct habitat conditions that occur nowhere else in the species' range; 4) peripheral populations such as these are important genetic resources; and 5) there are established international cooperative efforts on behalf of the species in this area that are currently underway. Further, peripheral populations may be beneficial to the protection of evolutionary processes and the environmental systems that are likely to generate future evolutionary diversity. This may be particularly important

> considering the potential threats of global climate change. (USFWS 2016, p. 50, *internal citations omitted*)

However, the Texas population is physically separated from the Tamaulipas population. "Due to the extensive development along the lower stretches of the Rio Grande, connectivity with the northeastern Mexico populations cannot be established in the foreseeable future" (Janecka et al. 2014, p. 8). This separation is supported by studies of ocelot genetics, which reveal that "[t]here has been little to no genetic exchange… between Texas and Mexico in recent decades. Both Texas populations have lost genetic diversity and are becoming increasingly isolated" (USFWS 2016, p. 20, *internal citations omitted*). The 5-year review for the ocelot notes that the Texas population is isolated from conspecifics in Mexico (USFWS 2018b., p. 4) and that "[i]ssues associated with developing and patrolling the border between the United States and Mexico further exacerbate the isolation of ocelots in Mexico from those in Texas and Arizona" (*Id.*).

The Texas population of ocelot is also delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act. The USFWS has stated that the agency lacks the resources to conserve the ocelot outside the borders of the United States:

> The U.S. has little authority to implement actions needed to recover species outside its borders, especially when recovery requires the employment of laws and regulations. In many of the foreign countries in the range of the ocelot, key threats include the killing of ocelots and destruction of their habitat. The powers that the USFWS can employ in this regard are limited to prohibiting unauthorized importation of listed species into the U.S., prohibiting persons subject to U.S. jurisdiction from engaging in commercial transport or sale of listed species in foreign commerce, and assisting foreign entities with education, outreach, and other aspects of conservation through our authorities in section 8 of the ESA. The "take" prohibitions of section 9 of the ESA only apply within the U.S., within the territorial seas of the U.S., and on the high seas. They do not apply in the foreign countries where the majority of ocelots are actually found. Section 7 of the ESA, which provides for all federal agencies to use their authorities to carry-out programs for the conservation of the species, and to insure that any action authorized, funded, or implemented by the agency is not likely to jeopardize the continued existence of listed species or adversely modify its critical habitat, is the primary tool within the ESA to address conflict with development or construction. The USFWS has no section 7 authority outside the boundaries of the U.S. and there are examples of waivers of the ESA in the U.S. For example, section 7 authority was waived in a specific instance regarding threats to endangered species and construction of the border infrastructure pursuant to the Real ID Act. (USFWS 2016, p. 35)

The United States has more resources and authority to conserve the ocelot population within its borders than outside. As described elsewhere in this petition, peripheral populations can be crucial buffers against climate change and habitat fragmentation; therefore, the U.S. should ensure that it is doing everything in its power to protect the Texas population of ocelot over which it has jurisdiction.

Significance. The Texas population is one of the northernmost-known breeding population of ocelot; therefore, it is present in an ecological setting unusual or unique for the taxon. Loss of this population segment would result in a significant gap in the range of the taxon, because peripheral populations are important genetic reservoirs and potential buffers against habitat fragmentation and climate change impacts. "[P]opulations at the edge of a species' range play a role in maintaining the total genetic diversity of a species; in some cases, these peripheral populations persist the longest as fragmentation and habitat loss impact the total range" (USFWS 2014, p. 12,574).

Jaguar critical habitat designation provides a case study of a similar situation and supports both DPS status and critical habitat designation for the Texas population of ocelot:

> Because such a small portion [of the jaguar's range] occurs in the United States, researchers anticipate that recovery of the entire species will rely primarily on actions that occur outside of the United States; activities that may adversely or beneficially affect jaguars in the United States are less likely to affect recovery than activities in core areas of their range. ***However, the portion of the United States is located within a secondary area that provides a recovery function benefitting the overall recovery unit.*** For example, specific areas within this secondary area that provide the physical and biological features essential to jaguar habitat can contribute to the species' persistence and, therefore, overall conservation. These areas support some individuals during dispersal movements, provide small patches of habitat (perhaps in some cases with a few resident jaguars), and provide areas for cyclic expansion and contraction of the nearest core area and breeding population… [I]ndividuals dispersing into the United States are important because they occupy habitat that serves as a buffer to zones of regular reproduction and are potential colonizers of vacant range, and that, as such, areas supporting them are important to maintaining normal demographics, as well as allowing for possible range expansion. As described in the Recovery Outline for the Jaguar, the Northwestern Recovery Unit is essential for the conservation of the species; therefore, consideration of the spatial and biological dynamics that allow this unit to function and that benefit the overall unit is prudent. Providing connectivity from the United States to Mexico is a key element to maintaining those processes. Additionally… populations at the edge of a species' range play a role in maintaining the total genetic diversity of a species; in some cases, these peripheral populations persist the longest as fragmentation and habitat loss impact the total range. The United States and northwestern Mexico represent the northernmost extent of the jaguar's current range, with populations persisting in one of only four distinct xeric (extremely dry) habitats that occur within the species' range. Peripheral populations such as these are an important genetic resource in that they may be beneficial to the protection of evolutionary processes and the environmental systems that are likely to generate future evolutionary diversity. This may be particularly important considering the potential threats of global climate change… ***The ability for jaguars in the proposed Northwestern Recovery Unit to utilize physical and biological habitat features in the borderlands region is ecologically important to the recovery of the species; therefore, maintaining connectivity to Mexico is essential to the conservation of the jaguar.***
> (USFWS 2014, p. 12,574, *emphasis added*)

IDENTIFIED THREATS TO THE PETITIONED SPECIES: CRITERIA FOR LISTING

The Service must evaluate whether a species is "threatened" or "endangered" as a result of any of the five listing factors set forth in 16 U.S.C. § 1533(a)(1):

A. The present or threatened destruction, modification, or curtailment of its habitat or

range;
B. Overutilization for commercial, recreational, scientific, or educational purposes;
C. Disease or predation;
D. The inadequacy of existing regulatory mechanisms; or
E. Other natural or manmade factors affecting its continued existence.

(Factor A) The Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

Habitat loss. There is little remaining ocelot habitat in south Texas. "Tewes and Everett (1986) found <1% of south Texas supported the extremely dense thornscrub used by ocelots" (USFWS 2016, p. 23).

> Over 95% of the dense thornscrub habitat that supported the ocelot in the Lower Rio Grande Valley of Texas (LRVG) has been altered for agricultural and urban development. In Cameron County, 91% of native woodlands were lost during the mid-1900s, primarily for agricultural use. A significant amount of native habitat was lost in northern Mexico during what was termed the "Green Revolution", which was actually a period of conversion of much of the natural landscape to one of agricultural production in northern Tamaulipas. Sánchez-Ramos *et al.* (1993) reported that in northeastern Mexico the predominant land uses were agriculture, cattle-ranching, and utilization of forest products (e.g., harvesting timber for multiple uses such as for firewood and charcoal production). More recently, rapid population growth in south Texas has caused causing agricultural land to be converted to more urban development, resulting in further land and habitat fragmentation, and decreasing opportunities for habitat restoration. The human population in the LRGV increased 39.8% from 1990 to 2000, compared to an increase of 22.8% in Texas and 13.2% in the U.S. during the same period. Population levels in the LRGV are projected to increase 130.1 – 181.1% from 2000 to 2040. From 2010 to 2014, the human population of the LRGV continued to increase 5.7%. (USFWS 2016, p. 29, *some internal citations omitted*)

Habitat fragmentation. What little ocelot habitat remains "is extremely fragmented from agriculture and urban development… Future existence of the ocelot in south Texas will require a system of interconnected blocks of habitat that support sub-populations with the ability to interbreed" (Environmental Defense 2006, p. 3). Ocelots, as habitat specialists in the northernmost part of their range, are negatively impacted by habitat fragmentation. For example, ocelots "are severely restricted by highly fragmented landscapes surrounding [Laguna Atascosa NWR]. During 30 years of live-trapping and camera-trapping, only two ocelots have been documented in habitat patches isolated by croplands in the Lower Rio Grande Valley, and there has not been a single successful dispersal event observed (i.e., one in which the dispersing individual produced offspring in the new population)" (Janecka et al 2016, p. 11).

"Where habitat is degraded and fragmented, as in most areas of south Texas, restoration is critical to recovery of the ocelot… The re-establishment of thornscrub habitat in appropriate locations and spatial configurations will facilitate ocelot dispersal and colonization" (USFWS 2016, p. 24). However, thornscrub restoration is "still relatively costly and time intensive" (Environmental Defense 2006, p. 3) and it may take 15 years or more to create suitable ocelot habitat (Guardians 2010, p. 16, *internal citations omitted*). Thornscrub restoration is threatened by many factors:

> Invasive grasses, herbivory, and extreme drought are major threats to restoring thornscrub forests. Invasive grasses brought to the southwest in the mid-twentieth century for cattle forage and to reduce soil erosion have aggressively spread throughout the region. They are prolific seed producers, occupy newly-disturbed space rapidly, and their shallow, dense fine roots efficiently uptake water and nutrients, which is especially beneficial in semi-arid environments. While herbivory is natural, the introduction of nilgai (*Boselaphus tragocamelus*) to South Texas in the 1930's, a big game exotic from India, combined with depletion of natural predators via hunting and other human activities, has increased abundance of native herbivores, including white-tailed deer (*Odocoileus virginianus*) and eastern cottontail rabbits (*Sylvalagus floridanus*), who rely on browse as a major portion of their diet. Further complicating thornscrub restoration, the South Texas semi-arid climate, with high evaporation, low precipitation, and a net water deficit, is a difficult growth environment, and becoming increasingly more extreme with climate warming. (Alexander et al. 2016, p. 181, *internal citations omitted*)

Connectivity strategies (for example: designing corridors, removing barriers to dispersal, locating reserves close to each other, or reforestation) will be necessary to recover the Texas population of ocelot. A review of recommendations in response to climate change (Heller & Zavaleta 2009) revealed that these types of strategies were poorly developed in general:

> Despite wide acknowledgement, these connectivity strategies were among the most poorly developed recommendations, limited mainly to very general actions… without identification of kinds of actors that might need to be involved (e.g. reserve managers, policymakers, individuals) or information gaps. Landuse reform likely needs to bring together local governments, urban planners, community groups and conservation organizations and to involve high degrees of coordination across multiple jurisdictions to provide landscape cohesion. Substantial work to flesh out this process, as well as to guide information acquisition, is needed before new forms of management across landuse types can be implemented. (Heller & Zavaleta 2009, p. 25, *internal citations omitted*)

Fracked gas export terminals. Defenders of Wildlife and the Sierra Club recently filed lawsuits challenging the USFWS' approval of the Annova LNG and Rio Grande LNG fracked gas export terminals proposed for the Port of Brownsville area. The lawsuits state that these projects threaten to contribute to the extinction of the ocelot in the U.S..

> The environmental groups have claimed that the projects shouldn't be allowed to proceed because they put the ocelots at too great a risk of injury or death. That risk includes an increased likelihood that the cats will get hit and killed by traffic on new roads built for the project. The facilities would be built on more than 1,300 acres that serve as a passageway for ocelots to travel between the Laguna Atascosa National Wildlife Refuge and Mexico. (Mindock 2020, p. 1)

(Factor B) Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Ocelot trapping for fur was the main cause of the species' initial decline, leading to its inclusion on Appendix I of CITES (*see* Factor D, *below*). Considering the small population size in Texas, even a small amount of trapping mortality could have an impact on the population:

> In the U.S., private operations of predator control and fur-trapping could be a source of mortality given the small number of ocelots in existence, and as trap-related injury and mortality is likely under-reported by private trapping operations. Tewes and Everett (1986) recommended that lethal traps be prohibited in ocelot habitat and daily trap checks should be mandated to reduce deaths and injuries in traps. They also recommended selective methods of predator control, and educating hunters not to shoot ocelots. The [Texas Parks and Wildlife Department] has no restrictions on trapping for furbearing animals in or near areas occupied by the ocelot. (USFWS 2016, p. 30)

(Factor C) Disease or predation

Little is understood about how ocelots compete with other carnivores in their range, but competition appears minimal (USFWS 2016, p. 18) with one potential exception. In Texas, ocelots are sympatric with bobcats, which may impact the resiliency of the ocelot population.

> The ocelot is generally considered the dominant species in the Neotropical small-cat guild. Ocelots seem to prey on rodents proportionally to their availability more than the smaller felids do, and some evidence suggests that competition or predation by ocelots may limit the abundance of the smaller species. In the northern portions of the range of the ocelot, however, where they are sympatric with bobcats, the situation is quite different. Bobcats in southern Texas weigh 7.1–12.3 kg, and ocelots at Laguna Atascosa NWR weigh 6.6–10.3 kg. Bobcats are more abundant than ocelots and use a wider variety of habitats, including the dense thornscrub favored by ocelots, which would give them the edge in a scenario of exploitative competition. Interspecific competition may have important ramifications for the future of ocelots in the United States… Competition could reduce carrying capacity of habitat for ocelots, reduce potential rate of growth of populations, or both, all of which would limit the effectiveness of actions such as restoration of habitat and reintroduction. (Booth-Binczik et al. 2013, pp. 408-409, *internal citations omitted*)

(Factor D) The Inadequacy of Existing Regulatory Mechanisms

Federal. The ocelot has been protected by the ESA in the U.S. since 1982. We support the listing and believe it has prevented the extinction of the ocelot in the United States. However, for full recovery, populations in Texas must be connected to each other and to populations in Mexico. DPS listing would allow renewed focus on connectivity and habitat conservation and restoration in the ocelot's range. This includes adequate support for partnerships with private landowners. The interface between private lands and federal government regulations is an important one in this case, despite the fact that "recovery strategies cannot be implemented on private lands as readily as on public lands" (Haines et al. 2005, p. 513). "[B]ecause 97% of Texas is privately owned and most ocelots reside on private land, ocelot conservation has to rely heavily on the support of private ranchers. To encourage habitat conservation and restoration, and possible establishment of corridors, *private ranchers should continue to receive adequate support from the federal government with conservation easements and incentives"* (Haines et al. 2006a, p. 4, *internal citations omitted, emphasis added*). This includes the Safe Harbor Agreement, which will be in effect until 2036 (Environmental Defense 2006, p. 8)

<u>CITES.</u> In 1989, the ocelot was included in Appendix I of CITES (Haines et al. 2006b, p. 424). This designation provides some protection from international trade. Appendix I is the most restrictive:

> For trade to occur, a permit from the country where the species originates (or a re-exporting permit) and a permit from the recipient country are required. To ensure that both parties are aware and consent to the trade, the import permit must be issued before the export permit. Parties are advised that local regulation should be particularly strict for Appendix I species to protect their survival, and trade may be permitted only in exceptional circumstances. Furthermore, the export permit should be granted only when the state authority is satisfied that the export will not be detrimental to the survival of the species and that the specimen was not obtained in contravention of the laws of that state for the protection of fauna and flora, among other things. The import permit should not be issued unless the state authority is satisfied that, among other things, the import will be for purposes that are not detrimental to the survival of the species involved, the proposed recipient of a living specimen is equipped to house and care for it, and the specimen is not to be used for primarily commercial purposes. (Graham 2017, p. 256)

However, since currently lack of habitat connectivity, rather than trade, is the most pressing threat to the Texas population of ocelot, CITES protection is not sufficient to fully recover the DPS. In addition, trade in ocelots still occurs due to inconsistencies among CITES member states, which may impact the population as a whole:

> Inconsistent legislation poses a challenge for both the implementation of CITES and for the protection of ocelots. Countries that provide low levels of protection to ocelots are effectively draining the protection measures provided by other countries. Equally, countries that provide high levels of protection to ocelots but do little to enforce or implement the law are also operating like "a sink with no plug" for the species. The application of CITES with respect to the ocelot can be likened to a mouth with no teeth: the architecture is there, but there is limited bite. (Graham 2017, p. 288)

In order to conserve the ocelot locally, the United States must consider the international context:

> If ocelot populations are to realize levels consistent with their natural occurrence, member states of CITES with ocelots in their territories need to take the necessary steps to protect ocelot populations through appropriate and coordinated measures. Enhanced efforts on the ground are required, not only with regard to compliance and enforcement, but also with respect to the creation of biodiversity corridors, restoration of ecosystems, enhancement of livelihoods, education and awareness activities, along with demand management activities that effectively engage with the fashion, zoological, tourism, and pet industries, among others. (Graham 2017, p. 290)

State. The ocelot is listed as "endangered" under the Texas endangered species act:

> In Texas, sections 68.002, 68.015 of the Texas Parks and Wildlife Code and section 65.171 of the Texas Administrative Code provide designation and protections to listed threatened and endangered animals, including the ocelot as endangered, which prohibit a range of actions including, but not limited to take, possession, various commercial activity, and take attempts. (USFWS 2016, p. 33)

State listing is insufficient to ensure ocelot recovery, however. "Due to the anxiety of some landowners about the potential implications of having an endangered species on their property, much of the remaining potential ocelot habitat has not been surveyed and protection of that habitat has not been enforced" (*Id.*).

<u>(Factor E) Other Natural or Man-made Factors Affecting its Continued Existence</u>

Roads and vehicle collisions. Roads impact ocelot populations in Texas in multiple ways:

> Roads have two documented impacts, and a third potential impact, on ocelot populations. First, collisions with motor vehicles in Texas are the leading cause of known ocelot mortality and accounted for 45% of deaths of 80 radio-tagged ocelots between 1983 and 2002, and vehicle-related mortalities continue to be the most significant factor of ocelot mortality in Texas… Second, roads can decrease the probability of successful dispersal between patches of suitable habitat, thus increasing demographic and genetic isolation of populations. Third, to the extent that ocelots might avoid areas of high road density, some otherwise suitable habitats may not be occupied by ocelots or may serve as a population sink due to the risks posed by vehicles. Such avoidance of otherwise suitable habitat has been reported for wolves (*Canis lupus*) and black bears (*Ursus americanus*). (USFWS 2016, pp. 34-35, *internal citations omitted*)

Population viability analysis of the Texas population of ocelots indicated that "[r]eduction of ocelot road mortality was the most effective recovery scenario that reduced ocelot extinction probabilities in the US" (Haines et al. 2006b, p. 434). The authors recommend a short-term recovery strategy that includes reduction of road mortalities: "Successful mitigation of ocelot-vehicle collisions could be accomplished by constructing properly placed culverts with appropriate design along major roadways in southern Texas" (note that short-term solutions are not sufficient for full recovery. The authors also recommend a long-term recovery strategy that includes "restoration of habitat between ocelot habitat patches and the establishment of an ocelot dispersal corridor between the Willacy and Cameron populations" (*Id.*)).

Border activities. Border wall construction and associated activities are threats to one of the most biodiverse regions in North America and numerous species that inhabit it.

> The area of the border between the United States and Mexico is one of the most biodiverse regions in North America. The range of many Northern American species that are in the northern half of North America extends into the borderlands area, the range of many Northern American species that are in the southern half extends into the area, and some (sub)species, like the Sonoran Pronghorn (*Antilocapra americana sonoriensis*), only exist at the borderlands area. Prior to President Donald Trump taking office, 353 miles of border wall had been constructed, which has led to 56 species likely having been negatively affected by

> the wall. Five of these species have been listed as at risk of global extinction or at least having their population(s) in one or both of the countries as at risk of extinction. President Trump's executive order to extend the border wall to the entirety of the border between the two countries is estimated to impact 93 imperiled species. Fifty-seven of these are endangered and 24 are threatened. (Smith 2018, p. 39, internal citations omitted)

The Lower Rio Grande Valley is one of five "top-priority areas of high biological diversity and binational investment in conservation that are threatened by border wall construction" (Peters et al. 2019, p. 740). Wall construction is already undermining the purpose of National Wildlife Refuges in the area:

> A primary goal of the Lower Rio Grande Valley NWR system is to use the habitat that lines much of the Rio Grande to connect otherwise separate habitat in Starr, Hidalgo, and Cameron Counties. Further USFWS refuge tracts link federal lands along the Rio Grande to the Laguna Atascosa NWR on the Gulf Coast, where a population of endangered ocelots has been monitored with tracking collars for a number of years. This conservation strategy, which seeks to string together a protected and contiguous wildlife corridor, accounts for many of the tracts which make up the Lower Rio Grande Valley NWR system… The creation of a contiguous wildlife corridor of protected habitat is a critical part of recovery efforts for the endangered ocelot. The border walls erected in Hidalgo and Cameron Counties a decade ago already create barriers to the movement of ocelots and other terrestrial animals, disrupting the purpose of the refuge system. Habitat fragmentation and genetic isolation are two of the main factors driving ocelots in the United States towards extirpation. In the 2008 update to the USFWS ocelot recovery plan, the agency notes that "[i]ssues associated with border barrier development and patrolling the boundary between the United States and Mexico further exacerbate the isolation of Texas and Arizona ocelots from those in Mexico." [Customs and Border Patrol]'s planned border walls in Rio Grande Valley would put the continued recovery of ocelots at risk. (CBD et al. 2019, p. 13, *internal citations omitted*)

Border walls are well understood to be ecological stressors that destroy habitat, divide genetic interchange, and impede wildlife migration (Flesch et al., 2010, *entire*). In July 2018, more than 2,500 scientists published a paper detailing the harms that border walls cause to habitat quality, stating: "[p]hysical barriers prevent or discourage animals from accessing food, water, mates, and other critical resources by disrupting annual or seasonal migration and dispersal routes" (Peters et al. 2018, p. 740). Border walls in the Lower Rio Grande Valley have already caused extensive and well-documented harm to wildlife and natural processes, including the destruction and fragmentation of habitat, the entrapment of animals during flooding, and disturbances to wildlife during construction (*see, for example,* Peters et al. 2018, *entire,* Smith 2018, *entire,* Leslie 2016, pp. 64-67, & Flesch et al., 2010, *entire*).

> Like any large-scale development, construction of the wall and associated infrastructure, such as roads, lights, and operating bases, eliminates or degrades natural vegetation, kills animals directly or through habitat loss, fragments habitats (thereby subdividing populations into smaller, more vulnerable units), reduces habitat connectivity, erodes soils, changes fire regimes, and alters hydrological processes (e.g., by causing floods). (Peters et al. 2019, p. 740)

Large stretches of former ocelot habitat have already been rendered impassible by the border wall:

> Approximately 42 km of pedestrian fence (not permeable to ocelots) in 21 sections were proposed in the Lower Rio Grande Valley and as of March 2015, 18 sections (34 km) of fence were complete except for temporary gaps in the structure to allow landowners access to their property. These fence-gaps are expected to receive at least basic utilities (e.g., electricity to control motorized gates, security keypads, area-lighting). Of these 42 km, 13 km of flood control infrastructure was installed in Hidalgo County that permanently fragmented habitats and limited wildlife access to the Rio Grande which is in some places the only reliable source of freshwater for drinking. The flood walls, 4-5 m tall concrete walls, 2-20 km long, are a significant impediment to north-south connectivity for the ocelot. The infrastructure directly and indirectly impacts traditional access to dozens of private lands as well as units of Las Palomas Wildlife Management Area managed by [Texas Parks and Wildlife Department], the Southmost Preserve managed by The Nature Conservancy (TNC), and the Audubon Sabal Palm Sanctuary managed by Gorgas Science Foundation. (USFWS 2016, p. 37)
>
> Construction of the border fence by the U.S. Department of Homeland Security on the United States side of the Rio Grande has compromised recovery efforts for northern ocelots and other wildlife in the LRGV… The fence could impede north-south movements of transient northern ocelots and other wildlife from Mexico and the United States along the lower Rio Grande and thereby restrict dispersal from extant populations and the possibility of establishment of a new resident population. (Leslie 2016, pp. 45-46, *internal citations omitted*)

"At least 36 Federal environmental and cultural laws were waived to allow rapid construction of the border fence" (Leslie 2016, p. 65), and construction continues without adequate oversight or consultation (*see* CBD et al. 2018 & 2019, *entire*). Public input on border wall construction appears to be a "meaningless exercise" as CBP awarded contracts for sections of the wall at the same time as, or before, soliciting public input on the projects (CBD et al. 2019, p. 2). CBP has also neglected to provide materials or hold public meetings in Spanish.

> …DHS, CBP's parent agency, has waived dozens of laws to expedite border wall construction. DHS has done this by invoking Section 102 of the REAL ID Act, which we continue to argue is unlawful, as this waiver authority is no longer applicable and was never intended to exist in perpetuity. DHS's use of the Section 102 waiver to waive laws like NEPA, the Clean Water Act, the Clean Air Act, and other laws has denied residents in border communities the same critical public health and environmental protections that communities everywhere else in the nation receive as a basic right. The very purpose of these laws, and of Executive Order 12898, is to protect communities most at risk and ensure they receive the same protections and rights as all Americans. DHS's choice to cast aside dozens of critical public health and environmental protections endangers and exposes low-income minority populations to severe harm. This is profoundly undemocratic and raises significant environmental justice concerns. In this and other projects, DHS must work to actively engage stakeholders and respect our nation's laws, rather than using expired provisions of the REAL ID Act to deny legal rights to low-income and minority communities. (CBD et al. 2019, p. 22)

Even under the incoming Biden administration, the wall continues to present a threat. The existing sections fragment ocelot habitat, and aside from the physical barrier presented by the wall itself, activities associated with enforcement also threaten biotic communities on the border. "More border patrol agents mean more motor vehicles, all-terrain vehicles, horse patrols, helicopters, boats, camera towers, lights, and other forms of surveillance tools. There is ever-growing pressure to accommodate these agents and their equipment on tracts of the Lower Rio Grande Valley NWR, where isolated remnants of native vegetation provide cover for illegal activities" (Leslie 2016, p. 65).

As discussed elsewhere in this petition, road mortality is one of the biggest threats to ocelots in Texas. Proliferation of roads is associated with border wall construction and monitoring:

> Numbers of roads in the LRGV have increased substantially to provide access to the border fence and surveillance along the border. Many of these roads traverse important tracts of the Lower Rio Grande Valley NWR, some directly along the Rio Grande, and resulted in the loss of native habitat when vegetation was cleared to build the roads and enhance surveillance. These activities have created fragmentation of habitats critical to native wildlife, directly conflicting with the conservation mission of the Lower Rio Grande Valley NWR. The border fence isolated already fragmented tracts in the Lower Rio Grande Valley NWR, making it hard for refuge personnel to access them for monitoring and other management activities such as habitat restoration. (Leslie 2016, p. 65)

Ocelots are also indirectly threatened by the use of floodlights and other artificial lighting at the border. Flood lights adversely affect migration, dispersal, foraging, predation, and other activities. Customs and Border Patrol's own 2004 Environmental Impact Statement for Operation Rio Grande stated that "increased lighting from Operation Rio Grande may disrupt nocturnal behavior in portions of the project area, which could affect the ocelot" (CBP 2004, p. 4-15). Specifically, the illumination of brush disturbs or prevents the regular nocturnal habits of animals, which in the case of the ocelot includes hunting. Otherwise vital habitat becomes of limited value when blasted with floodlights. Artificial lighting could also impact the ocelot's prey base: "artificial lighting along the United States-Mexico border associated with the wall could affect activity patterns and behavior of northern ocelots' prey" (Leslie 2016, p. 46).

Because the ocelot population in Texas is isolated from the ocelot population in Mexico, it is crucial to focus increased recovery efforts on reconnecting ocelot habitat within Texas and on mitigating threats to the small Texas population from border activities.

Climate change. Climate change is creating challenges for biodiversity conservation worldwide. "Acute temperature stress can have severe negative effects on population dynamics such as abundance, recruitment, age structure, and sex ratios. Meta-analyses across thousands of species report that ~80% of communities across terrestrial, freshwater, and marine ecosystems exhibited a response in abundance that was in accordance with climate change predictions" (Scheffers et al. 2016, p. 722; *see also* Trisos et al., 2020, *entire*). "All three biotic realms (terrestrial, freshwater, and marine) are being affected by climate change, and… these impacts span the biological hierarchy from genes to communities. Of the 94 processes considered, we found that 82% have evidence of impact by climate change, and this has occurred with just 1°C of average warming globally. Impacts range from genetic and physiological changes to responses in population abundance and distribution" (Scheffers et al. 2016, p. 722). Despite the enormity of the threat, U.S. government agency plans have been insufficient to adequately address it (Delach et al. 2019, *entire*).

The exact nature of the threat climate change poses to the ocelot is uncertain. However, impacts may be unexpected and abrupt:

> [W]ithin 30 years, continued high emissions will drive a sudden shift across many ecological assemblages to climate conditions under which we have almost no knowledge of the ability of their constituent species to survive. We caution that the timing and magnitude of this exposure may occur earlier and be larger than we anticipate, because our analysis does not consider changes in extreme events, effects of warming on local habitat (for example, melting sea ice), covariation between climate variables, or that populations may be locally adapted. Furthermore, to the extent that species-realized historical thermal limits do reflect fundamental limits to persistence, then the occurrence of abrupt exposure events marks the crossing of an 'ecological horizon' beyond which catastrophic and coordinated species losses are expected. These abrupt events—projected to spread from ocean (for example, coral reef) to land (for example, rainforest) ecosystems by 2050 under high emissions—risk sudden disruption to ecosystems and their capacity to maintain current levels of biodiversity and functioning. (Trisos et al. 2020, p. 500)

Likely the threat will manifest as range shifts, to which the ocelot may not be able to adapt considering the paucity of available habitat in south Texas.

> Generally, climate change will cause a northward advancement of the tropical temperature zone, with associated biotic, but at present difficult-to-predict, changes. Rappole and others assessed changes in distributions of tropical, subtropical, and warm-desert bird species and concluded that at least 70 species have already expanded their breeding ranges northward and eastward into, within, and beyond southern Texas—many moving into temperate grassland and forested habitats. Although specific correlative data were lacking, increasing mean annual temperature was hypothesized to be responsible; many species moved into areas where availability of preferred habitats was declining. From a wildlife standpoint, species dependent on high-latitude habitats could suffer the most under a planetary warming scenario, but vigilance over the long term could be necessary everywhere to identify and respond appropriately to likely species-specific and localized conservation challenges as they arise. (Leslie 2016, p. 64, *some internal citations omitted*)

Improving landscape connectivity is "the most frequent recommendation for climate change adaptation" in reviewed literature (Heller & Zavaleta 2009, p. 24).

Genetics. The 50/500 rule posits that an effective population size of 50 is sufficient to prevent inbreeding depression in the short term (over the duration of five generations) and an effective population size of 500 is sufficient to retain evolutionary potential in perpetuity (Frankham et al. 2014, *entire*). Frankham et al. (2014, *entire*) revised the 50/500 rule after initially introducing it, recommending an effective population size of 100 to limit the loss of total fitness to <10% in the short-term and an effective population size of 1,000 to retain evolutionary potential for fitness in perpetuity, while recognizing that fragmented populations should be evaluated on a case-by-case basis. Jamieson and Allendorf (2012, *entire*) concluded that the 50/500 rule is a useful guiding principle in conservation management when genetic concerns are likely to affect the short- and long-term viability of populations.

As described in "Qualification as a Distinct Population Segment," above, the Texas population of ocelots is isolated from conspecifics in Mexico. This means reduced or nonexistent gene flow between the populations. "[L]imited gene flow or dispersal occurs between the Tamaulipan ocelot population in northern Mexico and the two breeding populations in the U.S.. Walker (1997) suggested that the Cameron and Willacy populations became isolated from the northern Mexico population causing a reduction in genetic variation. Reduction in genetic variation can decrease fitness in a felid population leading to inbreeding depression" (Haines et al. 2005, p. 513, *some internal citations omitted*).

The situation is exacerbated by the fact that the two Texas breeding populations appear to be isolated from each other:

> According to Korn (2013), ocelots in south Texas exist as two genetically distinct and isolated populations, one in Cameron County and one in Willacy County. There has been little to no genetic exchange between Cameron and Willacy populations in Texas, as well as between Texas and Mexico in recent decades. Both Texas populations have lost genetic diversity and are becoming increasingly isolated (USFWS 2016, p. 20, *some internal citations omitted*).
>
> Reduced genetic variability in Texas ocelots suggests that these small Texas populations have been isolated for many generations. The widespread conversion of thornscrub habitat to agriculture and other intensive land uses has not only reduced the total population, but has reduced the potential for dispersing ocelots to reach habitat fragments and other subpopulations, and has made the natural recolonization of vacant range unlikely. Such isolation is exacerbated by the proliferation of roads and highways throughout the region, and the subsequent habitat effects and mortality that directly impact both resident and dispersing ocelots. In the absence of population expansion, restoration of demographic linkages with other populations, and a significant reduction in fatal strikes from vehicles, the ocelot in Texas faces a high risk of extinction in less than 40 years as the result of the combined effects of reduced genetic variability and environmental stochasticity. Successful recovery will be the product of population management that improves genetic fitness and population size, and longer term efforts that protect and restore habitat, enhance landscape linkages among populations, promote range expansion, and reduce threats from roads and other sources of development-related mortality (USFWS 2016, p. 51, *internal citations omitted*)

Considering the two populations as separate, neither of them meet any of the thresholds for sustainability under the 50/500 rule:

> The two known ocelot populations in the United States are characterized by small effective population size (N_e <14), high genetic drift (F_{st}= 0.163, P,0.001), and reduced genetic variation (H_e= 0.399 in Laguna Atascosa National Wildlife Refuge [LANWR] and H_e=0.553 in Willacy County). This may be the result of human activities in the early 1900s including uncontrolled harvesting of ocelots and extensive thornshrub habitat removal. Information regarding the role that anthropogenic factors played in the loss of genetic diversity in ocelot

> populations in the United States has important implications for ocelot recovery efforts currently underway. For habitat specialists like the ocelot, fragmentation via anthropogenic perturbations disrupts connectivity between populations, increases human caused mortality, and contributes to demographic instability. This also decreases genetic diversity and increases divergence as a consequence of drift and inbreeding. Deleterious effects include loss of adaptive variation and an increase in the frequency of detrimental alleles; both of these factors can lead to inbreeding depression. (Janecka et al. 2014, p. 1, *internal citations omitted*)

> Several pieces of genetic evidence suggest that the two remaining ocelot populations in Texas have responded negatively to habitat fragmentation, with inability to disperse between habitat patches. Estimates of effective population size (N_E) are low for both of these populations. In comparison to populations in northern Mexico, the Texas populations show lower heterozygosity for microsatellite loci and less mitochondrial haplotype diversity. Moreover, genetic variation in historical samples from Texas is higher than seen in the current populations. (Janecka et al. 2016, p. 2, *internal citations omitted*)

The impacts are already apparent; genetic diversity is lower in the population compared to both historic populations in Texas and contemporary populations in Mexico. "Comparisons of contemporary ocelot populations to historical specimens provided strong evidence for a loss of genetic diversity in Texas over the last 100 years. The historical Texas population examined had haplotype and nucleotide diversity comparable to a contemporary population in northern Mexico, and substantially higher than what remains in Texas" (Janecka et al. 2014, p. 7). The situation is dire enough that Janecka et al. (2016, p. 13) recommend immediate action to restore genetic diversity: "Conservation actions designed to restore genetic diversity and avoid inbreeding depression, such as trapping and translocating ocelots between the two populations in Texas, and supplementing both with ocelots from northeastern Mexico, need to be implemented immediately to ensure persistence of ocelots in the U.S."

The recovery plan for the ocelot also acknowledges reduced genetic diversity as a threat and recommends specific recovery actions to mitigate it, including:

> Monitor genetic health and diversity in Texas ocelot populations; evaluate genetic augmentation. Reduced genetic diversity in Texas is a threat. Analysis of the Texas populations should continue to assess its status and track progress towards recovery as translocations occur and the population grows. Tissue samples collected during routine capture activities and the use of hair collected from baited hair snares can provide the samples necessary for standard protocols to track genetic changes in the population. The genetic augmentation plan should include a monitoring protocol for evaluating results and appropriate adaptive management. Both source and recipient populations will be evaluated prior to translocation. After translocation, monitor recipient populations for multiple generations. The collection of data on indicators of reduced fitness and inbreeding depression (such as fertility and infant mortality) are important components for evaluating genetic health. Such data could provide compelling evidence of a need for genetic augmentation. (USFWS 2016, p. 75)

Small, isolated populations. The Service has previously recognized that small population size and small, isolated populations increases the likelihood of extinction.[1] For example, in reference to the Sisi snail (*Ostodes strigatus*), the Service noted that "[e]ven if the threats responsible for the decline of this species were controlled, the persistence of existing populations is hampered by the small number of extant populations and the small geographic range of the known populations."

"Small and declining populations, such as the ocelot in Texas, face both demographic and genetic threats. From a demographic perspective, smaller and more isolated populations have a greater extinction risk as they are more sensitive to environmental stochasticity" (USFWS 2016, p. 19, *internal citations omitted*). Heightened risk of extinction is "inherent in low numbers," a basic tenet that has been a cornerstone of conservation biology (Caughley, 1994, p. 216). Small, isolated populations such as those of the ocelot are particularly vulnerable to: 1) demographic fluctuations, 2) environmental fluctuation in resource or habitat availability, predation, competitive interactions and catastrophes, 3) reduction in cooperative interactions and subsequent decline in fertility and survival, 4) inbreeding depression reducing reproductive fitness, and 5) loss of genetic diversity reducing the ability to evolve and cope with environmental change (Traill et al., 2010, p. 29). "All populations with small numbers of breeding individuals are likely to be destabilized by demographic stochasticity and are also the most likely to suffer from inbreeding depression" (Benson et al., 2019, p. 2, *internal citations omitted*).

The Service, in their final rule listing the streaked horned lark and Taylor's checkerspot butterfly, considered both species at risk due to small population size or small, isolated populations (USFWS, 2013a, p. 61,489).

> Populations that are small, fragmented, or isolated by habitat loss or modification of naturally patchy habitat, and other human-related factors, are more vulnerable to extirpation by natural, randomly occurring events, to cumulative effects, and to genetic effects that plague small populations, collectively known as small population effects. These effects can include genetic drift (loss of recessive alleles), founder effects (over time, an increasing percentage of the population inheriting a narrow range of traits), and genetic bottlenecks leading to increasingly lower genetic diversity, with consequent negative effects on evolutionary potential. (USFWS, 2013a, p. 61,488)

The Service found similar threats when listing the Florida bonneted bat:

> In general, isolation, whether caused by geographic distance, ecological factors, or reproductive strategy, will likely prevent the influx of new genetic material and can result in low diversity, which may impact viability and fecundity. Distance between subpopulations or colonies, the small sizes of colonies, and the general low number of bats may make recolonization unlikely if any site is extirpated. Isolation of habitat can prevent recolonization from other sites and potentially result in extinction. The probability of extinction increases with decreasing habitat availability. Although changes in the environment may cause populations to fluctuate naturally, small and low-density populations are more likely to fluctuate below a minimum viable population (i.e., the minimum or

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[1] For examples, see candidate assessment forms for *Ostodes strigatus* (Sisi snail, June 2013), *Porzana tabuensis* (spotless crake, June 2013), *Vagrans egistina* (Mariana wandering butterfly, June 2013), *Gallicolumba stairi* (friendly ground-dove, June 2013), and *Hyla wrightorum* (Arizona treefrog, April 2013) (Available at http://ecos.fws.gov/tess_public/pub/SpeciesReport.do?listingType=C&mapstatus=1)

> threshold number of individuals needed in a population to persist in a viable state for a given interval). If populations become fragmented, genetic diversity will be lost as smaller populations become more isolated. (USFWS, 2013b, p. 61,037, *internal citations omitted*)

The ocelot has small, isolated populations and fragmented habitat, and thus is facing a similar risk of extinction.

Cumulative threats. The Service should consider whether the array of aforementioned threats intersect and act synergistically, therefore increasing the likelihood of extinction of the ocelot in the foreseeable future. For example, human population growth encourages the growth of roads, which are one of the main threats to ocelot habitat and connectivity. "The Lower Rio Grande Valley (LRGV) has the most impoverished and rapidly growing border population of humans in the U.S.. This rapid growth not only threatens the preservation of ocelot habitat but also fosters construction of new roads in the area" (Haines et al. 2005, p. 513, *internal citations omitted*).

Interactions between habitat fragmentation, demography, and genetics could also exacerbate each of these threats. A case study of isolated mountain lion populations in California concluded that:

> [S]mall populations isolated by freeways and urbanization are subjected to elevated extinction risk due to interactions between demography and genetics. We agree with previous authors that demographic and genetic risk factors for small populations should not be considered in isolation and that both must be addressed in any comprehensive wildlife conservation strategy within urbanized landscapes. Indeed, other small, isolated populations of felids are threatened by a combination of limited habitat and mortality, such as the highly endangered Iberian lynx. (Benson et al., 2019, p. 12, *internal citations omitted*)

The Texas population of ocelot should be considered among the number of felid populations threated by cumulative impacts of limited habitat and elevated mortality risk. These are just a few examples of intersecting threats facing the ocelot.

> Traits such as ecological specialization and low population density act synergistically to elevate extinction risk above that expected from their additive contributions, because rarity itself imparts higher risk and specialization reduces the capacity of a species to adapt to habitat loss by shifting range or changing diet. Similarly, interactions between environmental factors and intrinsic characteristics make large-bodied, long-generation and low-fecundity species particularly predisposed to anthropogenic threats given their lower replacement rates. (Brook et al., 2008, p. 455, *internal citations omitted*)

> [O]nly by treating extinction as a synergistic process will predictions of risk for most species approximate reality, and conservation efforts therefore be effective. However challenging it is, policy to mitigate biodiversity loss must accept the need to manage multiple threatening processes simultaneously over longer terms. Habitat preservation, restoring degraded landscapes, maintaining or creating connectivity, avoiding overharvest, reducing fire risk and cutting carbon emissions have to be planned in unison. Otherwise, conservation actions which only tackle individual threats risk becoming half-measures which end in failure, due to uncontrolled cascading effects. (Brook et al., 2008, p. 459, *internal citations omitted*)

CONCLUSION AND REQUESTED DESIGNATION

WildEarth Guardians hereby petitions the U.S. Fish and Wildlife Service under the Department of Interior to list the Texas Distinct Population Segment (DPS) of ocelot (*Leopardus pardalis pardalis*) as "endangered" under the Endangered Species Act. Separate listing for this DPS is warranted, given its discreteness and significance, and ongoing and future threats to the Texas population specifically. The Texas DPS of ocelot is threatened by at least three of the five listing factors under the ESA: the present or threatened destruction, modification, or curtailment of its habitat or range; inadequate regulatory mechanisms; and other natural or manmade factors affecting its continued existence.

WildEarth Guardians requests that critical habitat be designated for the Texas DPS of ocelot in occupied and unoccupied suitable habitat concurrent with final ESA listing. Designating critical habitat for this DPS will support its recovery and protect areas crucial to its long-term survival.

REFERENCES

Alexander, H. D., Moczygemba, J. & Dick, K. (2016). Growth and survival of thornscrub forest seedlings in response to restoration strategies aimed at alleviating abiotic and biotic stressors. *Journal of Arid Environments*, *124*, 180-188.

Benson, J. F., Mahoney, P. J., Vickers, T. W., Sikich, J. A., Beier, P., Riley, S. P. D., Ernest, H. B., & Boyce, W. M. (2019). Extinction vortex dynamics of top predators isolated by urbanization. *Ecological Applications 29*(3), e01868.

Booth-Binczik, S. D., Bradley, R. D., Thompson, C. W., Bender, L. C., Huntley, J. W., Harvey, J. A., Laack, L. L. & Mays, J. L. (2013). Food habits of ocelots and potential for competition with bobcats in southern Texas. *The Southwestern Naturalist 58*(4), 403-410.

Brook, B., Sodhi, N., & Bradshaw, C. (2008). Synergies among extinction drivers under global change. *Trends in Ecology and Evolution 23*(8), 453-460.

Caughley, G. (1994). Directions in conservation biology. *Journal of Animal Ecology 63(*2), 215-244.

[CBD] Center for Biological Diversity et al. (2018). *Re: Rio Grande Valley Proposed Border Barrier Construction Comments.* Letter submitted to U.S. Border Patrol and Department of Homeland Security.

___ (2019). *Re: Coalition Response to "FY19 Rio Grande Valley Levee/Border Wall System Construction Projects Request for Input."* Letter submitted to U.S. Border Patrol and Department of Homeland Security.

Delach, A., Caldas, A., Edson, K. M., Krehbiel, R., Murray, S., Theoharides, K. A., Vorhees, L. J., Malcom, J. W., Salvo, M. N. and Miller, J. R. (2019). Agency plans are inadequate to conserve US endangered species under climate change. *Nature Climate Change 9*(12), 999-1004.

Flesch, A. D., Epps, C. W., Cain, J. W. III, Clark, M., Krausman, P. R., & Morgart, J.R. (2010). Potential effects of the United States-Mexico border fence on wildlife. *Conservation Biology 24*, 171-181.

Frankham, R., Bradshaw, C. J., & Brook, B. W. (2014). Genetics in conservation management: revised recommendations for the 50/500 rules, Red List criteria and population viability analyses. *Biological Conservation 170*, 56-63.

Graham, K. (2017). International intent and domestic application of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): the case of the ocelot *(Leopardus pardalis*). *Journal of International Wildlife Law & Policy 20*(3-4), 253-294.

[Guardians] WildEarth Guardians (2010). *Petition to Designate Critical Habitat for the Ocelot (*Leopardus pardalis*).* WildEarth Guardians, Santa Fe, New Mexico.

Haines, A. M., Tewes, M. E., Laack, L. L., Grant, W. E., & Young, J. H. (2005). Evaluating recovery strategies for an ocelot (*Leopardus pardalis*) population in the United States. *Biological Conservation 126,* 512-522.

Haines, A. M., Janecka, J. E., Tewes, M. E., Grassman, L. I., Jr., & Morton, P. (2006a). The importance of private lands for ocelot *Leopardus pardalis* conservation in the United States. *Oryx 40*(1), 1-5.

Haines, A. M., Tewes, M. E., Laack, L. L., Horne, J. S., & Young, J. H. (2006b). A habitat-based population viability analysis for ocelots (*Leopardus pardalis*) in the United States. *Biological Conservation 132,* 424-436.

Heller, N. E., & Zavaleta, E. S. (2009). Biodiversity management in the face of climate change: A review of 22 years of recommendations. *Biological Conservation 142*, 14-32.

Jamieson, I. G., & Allendorf, F. W. (2012). How does the 50/500 rule apply to MVPs? *Trends in ecology & Evolution 27*(10), 578-584.

Janecka, J. E., Tewes, M. E., Laack, L. L., Caso, A., Grassman L. I., & Honeycutt, R. L. (2014). Loss of genetic diversity among ocelots in the United States during the 20th century linked to human induced population reductions. *PLoS ONE 9*(2): e89384.

Janecka, J. E., Tewes, M. E., Davis, I. A., Haines, A. M., Caso, A., Blankenship, T. L., & Honeycutt, R. L. (2016). Genetic differences in the response to landscape fragmentation by a habitat generalist, the bobcat, and a habitat specialist, the ocelot. *Conservation Genetics 17*(5), 1093-1108.

Kitchener, A. C., Breitenmoser-Würsten, Ch., Eizirik, E., Gentry, A., Werdelin, L., Wilting, A., Yamaguchi, N., Abramov, A. V., Christiansen, P., Driscoll, C., Duckworth, J. W., Johnson, W., Luo, S.-J., Meijaard, E., O'Donoghue, P., Sanderson, J., Seymour, K., Bruford, M., Groves, C., Hoffmann, M., Nowell, K., Timmons, Z. & Tobe, S. (2017). *A revised taxonomy of the Felidae. The final report of the Cat Classification Task Force of the IUCN/SSC Cat Specialist Group.* Cat News Special Issue 11.

Leslie, D. M., Jr. (2016). *An international borderland of concern—Conservation of biodiversity in the Lower Rio Grande Valley*. U.S. Geological Survey Scientific Investigations Report 2016–5078.

Peters, R., Ripple, W. J., Wolf, C., Moskwik, M., Carreón-Arroyo, G., Ceballos, G., Córdova, A., Dirzo, R., Ehrlich, P. R., Flesch, A. D., & List, R. (2018). Nature divided, scientists united: US–Mexico border wall threatens biodiversity and binational conservation. *Bioscience 68*(10), 740-743.

Scheffers, B. R., De Meester, L., Bridge, T. C., Hoffmann, A. A., Pandolfi, J. M., Corlett, R. T., Butchart, S. H., Pearce-Kelly, P., Kovacs, K. M., Dudgeon, D., & Pacifici, M. (2016). The broad footprint of climate change from genes to biomes to people. *Science 354*(6313), 719-731.

Smith, I. (2018). The axiological problem with Trump's wall and endangered species. *Ethics, Policy & Environment 21*(1), 39-41.

Traill, L. W., Brook, B. W., Frankham, R. R., and Bradshaw, C. (2010). Pragmatic population viability targets in a rapidly changing world. *Biological Conservation 143*, 28-34.

Trisos, C. H., Merow, C., & Pigot, A. L. (2020). The projected timing of abrupt ecological disruption from climate change. *Nature 580*(7804), 496-501.

[USFWS] U.S. Fish and Wildlife Service (1982). Endangered and threatened wildlife and plants; endangered status for U.S. population of the ocelot. *Federal Register 47*(140), 31,670-31,672.

___ (2011). *Letter in response to petitions to designate critical habitat for the ocelot and jaguarundi.* U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico.

___ (2013a). Endangered Species Status for the Florida Bonneted Bat; Final Rule. *Federal Register 78*(191), 61,004-61,043.

___ (2013b). Determination of Endangered Status for the Taylor's Checkerspot Butterfly and Threatened Status for the Streaked Horned Lark; Final Rule. *Federal Register 78*(192), 61,452-61,503.

___ (2014). Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Jaguar; Final Rule. *Federal Register 79*(43), 12,572-12,654.

___ (2016). *Recovery Plan for the Ocelot (*Leopardus pardalis*), First Revision.* U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico.

___ (2018a). *Jaguar Recovery Plan (*Panthera onca*).* U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico.

___ (2018b). *5-Year Review: Summary and Evaluation Ocelot (*Leopardus pardalis*).* U.S. Fish and Wildlife Service, Laguna Atascosa National Wildlife Refuge, Los Fresnos, Texas.