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U.S. Fish and Wildlife Service (USFWS)
Division of Policy and Directives Management
Arlington, VA

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Designation of critical habitat for the jaguar in the United States

Dear USFWS:

We are pleased to provide the following information and analysis to assist the Service in designating critical habitat for the jaguar (USFWS 2010).

As wildlife biologists with more than 60 years of combined professional experience, we are confident that designation of critical habitat for the jaguar is both possible and essential to the recovery of this endangered species. One of us petitioned the Service in 1992 to list the jaguar domestically under the Endangered Species Act of 1973 (ESA), proposed critical habitat designation for the species after its listing in 1997 (Povilitis et al. 1999), advocated for habitat conservation while participating on a state-led jaguar team (e.g., Sierra Institute 2000), and prepared a habitat-based framework for a U.S. jaguar recovery program (Povilitis 2010). We have expressed our concerns regarding the lack of progress toward recovery of the jaguar over the past two decades (Povilitis 2002; Povilitis and Becker 2010). We applaud the recent decision by the Service to propose critical habitat and prepare a recovery plan for this remarkable New World cat.

1. ***Purpose of critical habitat designation*** – Under the ESA, "critical habitat" is to include specific areas that are "essential to the conservation of the species" and that may require special management or protection. Designation of critical habitat by the Service facilitates species recovery through habitat protection (Suckling and Taylor 2006).

Jaguar recovery in the U.S – The Service should be clear about the operational context for "conservation of the species." ESA's focus is on wildlife recovery <u>in the U.S.</u>, the value of endangered wildlife to Americans, and the conservation of supporting ecosystems. The Act declares that species like the jaguar that have gone extinct or face extinction because of inadequate conservation "are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people," and that its purpose is "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved." The Service should protect critical habitat as part of a recovery program designed to restore the jaguar as a native species of the U.S.

Previously the Service opined that the U.S. is not essential to the conservation of the species arguing that the key to species' conservation [globally] lies beyond U.S. borders (USFWS 2006). This position was successfully challenged in court and was inconsistent

with the domestic focus of ESA, which is concerned that "various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation." Carrol et al. (2010) discuss further how conservation under the ESA goes beyond preventing extinction of the entire "species" and encompasses both human-centered and ecological goals that are furthered by a species presence across much of its former range.

The Service's current decision on critical habitat (USFWS 2010) wisely reflects recognition of the special biological and cultural significance of the jaguar in the U.S., opportunities for its conservation, and the value of its recovery to the species as a whole. Designation of critical habitat must logically benefit jaguar recovery in the U.S. since ESA's critical habitat mandate applies only therein.

Nonetheless, we are concerned that the Service may be tempted, out of expediency or because of political pressure, to restrict its critical habitat proposal to relatively small areas of Arizona and New Mexico in close proximity to the U.S.-Mexico border, where jaguars have recently occurred. This would be very unfortunate since it would do little to recover the jaguar as a species in the U.S. and globally.

Contribution to jaguar recovery globally – Habitat conservation within the historical range of the jaguar in the U.S. is essential for the recovery of the northern jaguar population (NJP), which is a global priority for conservation (Sanderson et al. 2002). Range maps for jaguar in North America indicate a broader geographic distribution historically in the U.S. than in northern Mexico (see, for example, Hall 1981; Valdez 2000). Reestablishing the jaguar within U.S. range and restoring population connectivity to the south is needed to conserve the northernmost jaguar population in the world, currently centered in the state of Sonora, Mexico.

Constrained by human domination of regional landscapes, a restored northern jaguar population would necessarily consist of a meta-population with core elements in northern Mexico and the southwestern U.S. The current NJP of an estimated 120 jaguars located largely in Sonora, Mexico (López 2005) almost certainly cannot grow to a viable size without reoccupying former habitats in Arizona and New Mexico. Recovery of the NJP will require habitat protection and re-colonization of currently unoccupied former range in both the U.S. and Mexico.

We urge the Service to embrace a holistic view of jaguar conservation, one that recognizes the intimate ecological and evolutionary interplay between an animal and its environment. "Species" only exist insofar as individual populations are conserved and restored (Cebellos and Ehrlich 2002). This concept is wisely reflected in the ESA which recognizes that an endangered species is one that is in danger over all or a significant portion of its geographic range. Given economic, political, and climate uncertainties across much of the jaguar's current range, and given expanding human populations throughout, the species' future will depend on recovery efforts in both South America and North America, the latter having served as home for the jaguar for hundreds of thousands of years. It will depend on the commitment, leadership, and success of each nation with the potential to

restore the species, including ours. The U.S. has institutional and technical capacities to recover the jaguar.

Historically, the range of the NJP covered at least 8 degrees of latitude over a remarkable environmental gradient and unique ecological settings, particularly in the U.S. (see #3 below). Peripheral populations in such distinct ecological and evolutionary environments have real value for species conservation (Lesica and Allendorf 1995; Abbitt et al. 2000; Nielsen et al. 2001). They may survive as well or better than those in "core range" depending upon the geography of human impacts (Channell and Lomolino 2000), and the strength of local and region recovery efforts.

In sum, protection of critical habitat for the jaguar in the U.S., as part of a national or bi-national recovery program for the NJP, is essential to species conservation. Efforts undertaken together with Mexico may serve as a model for bi- or multi-national efforts elsewhere within jaguar range.

2. ***Geographic context for critical habitat designation --*** Jaguars historically occurred in California, Arizona, New Mexico, Texas, and possibly Louisiana (USFWS 2010). Additionally, there were reports of jaguars as far north as Colorado and east to the Ohio Valley and the Appalachian Mountains (see, for example, Daggett and Henning 1974; Mahler 2009). Proposed critical habitat designations should include areas with physical or biological features adequate to expand occurrence of jaguars and sustain their presence within historic range. While our comments emphasize habitat protection to recover the NJP in Arizona and New Mexico, we urge the Service to consider critical habitat designation in Texas and Louisiana with an eye toward recovery of the jaguar also in the northeastern portion of its global range.

3. ***Physical and biological features of jaguar habitat in the U.S.*** -- We recognize the challenge of designating critical habitat for the jaguar given the animal's wide-ranging and secretive behavior, its occurrence at low density especially in relatively arid portions of its geographic range, and its early extirpation from most of its former U.S. range by hunting and efforts to eliminate wild predators prior to the advent of modern wildlife research (Brown and López 2001). Nevertheless, designation of critical habitat can be accomplished by applying the best available scientific information on jaguar habitat associations and selection, and by choosing areas for designation that can meet the biological requirements of the species.

Vegetation and topography -- McCain and Childs (2008) documented jaguar use of Sonoran desert and scrub, mesquite grassland, Madrean oak woodland, and pine–oak woodland over extensive areas. One resident male jaguar used an area of at least 1,360 sq km covering two mountain range complexes and a large valley basin (877-1,577 m elevation). Jaguars moved across the U.S.-Mexico border using mountain ranges and canyon bottoms.

Those recent findings are consistent with jaguar habitat associations based on occurrence records in Arizona. Brown and López (2001) matched records for jaguars with the biotic

communities where they were killed or photographed in Arizona and New Mexico. Jaguars occurred in Madrean evergreen woodland, Rocky Mountain conifer forest, semidesert grassland, Great Basin conifer woodland, riparian habitat, chaparral, Sonoran desert scrub, and subalpine conifer forest, in that order of frequency. Boydston and Lopez (2005) found occurrence of female jaguars in broadleaf forest and mixed forest in greater portion than the availability of these habitats. Shrublands had the highest percentage of female records, but proportionally less than would be expected, while records from needle leaf forest and grassland was roughly comparable to the availability of these habitat types. In a separate analysis, Hatten et al. (2005) found that jaguar records coincided most frequently with mixed grass-scrub vegetation and with moderate to very rugged terrain.

The historic range of the northern jaguar features a remarkable diversity of major biotic communities (Brown and Lowe 1994). It transitions from largely Sinaloan thornscrub in Sonora, Mexico to a regional mosaic of Madrean evergreen woodland, shrub invaded semi-desert grassland, Petran montane conifer forest, Great Basin or plains grassland, Sonoran desert scrub, Chihuahuan desert scrub, and interior chaparral to larger blocks of woodland and forest in the highlands of central Arizona and New Mexico. The northern range of the jaguar, particularly the U.S. portion, historically covered a broad ecological gradient distinct from anywhere else.

Prey availability – The jaguar is an opportunistic predator known to prey on large and mid-sized prey including deer, peccary, largomorphs, and coati (Valdez 2002; López 2005; Rosas-Rosas et al. 2008). In the U.S. portion of the jaguar's historic range, ungulate populations are monitored, managed, and protected by well-established state game authorities. White-tailed deer, mule deer, collared peccary, and smaller prey are abundant over extensive areas of habitat. The presence of elk in much of the jaguar's historic U.S. range adds a large prey item to the jaguar's prey base north of Mexico.

Security cover and isolation from disturbance – Jaguars in a Sonora, Mexico inhabit steep terrain and dense vegetation (López 2004) reflecting a need for security cover where poaching is common (Rosas-Rosas and Valdez 2010). Recent jaguar presence in remote, rugged terrain of southern Arizona and New Mexico (Glenn 1996; McCain and Childs 2008) indicates the importance of cover and isolation as features of jaguar habitat. Arizona and New Mexico contain large tracts of remote country where vehicle access is limited or absent.

Habitat connectivity – The best available scientific information and theory indicates that jaguar recovery will require a system of interconnected areas of habitat (Quigley and Crawshaw 1992; Weber and Rabinowitz 1996). Given widespread fragmentation of habitat caused by development, connectivity conservation for large carnivores is of primary concern for population viability (Carrol 2006). Habitat linkages for the jaguar in the U.S. have been identified by the Jaguar Habitat Campaign (see below), the corridor design group at Northern Arizona University, the Arizona Wildlife Linkages Workgroup, and Pima County, Arizona.

Spatial extent of habitat – Recent evaluations of potential jaguar habitat in Arizona (Hatten et al. 2005) and New Mexico (Robinson et al. 2006) are based on record locations of jaguar, habitat associations, availability of surface water, and exclusion of areas with high human density and agricultural development. The resulting mapped habitat indicates the presence of large tracks of habitat, particularly in the southeastern quarter of Arizona and the southwestern quarter of New Mexico.

While the extent of potential jaguar habitat is vast, jaguars are likely to restrict much of their activity to specific areas with optimal habitat features. Blocks of habitat in the Southwest containing high quality conditions are substantial and well represented on comparatively undeveloped public lands. For example, the Coronado National Forest of southeastern Arizona alone includes approximately 1.78 million acres (7, 200 sq km). That extent of habitat, with connectivity between units, could potentially support 72-144 individuals, assuming a density of jaguars comparable to the 1-2 animals per 100 sq km estimated for Sonora, Mexico (López 2004, 2005). Millions of acres of habitat currently unoccupied by the jaguar also occur on public lands just to the north of the Coronado National Forest, on national forests in central Arizona and western New Mexico.

Climate – A broad range of climatic conditions occur across the historic range of the jaguar in the U.S. This advantages the species in terms of varied environments and associated resource opportunities, serving also as buffer against unfavorable climate shifts. The designation of critical habitat for the jaguar should reflect representation across climatic gradients, given the threat of rapid climate change.

There is a scientific consensus that the historic range of the NJP in U.S. and Mexico will dry significantly in the 21st century (Seager et al. 2007). The topographic and elevational diversity within the region, however, can be expected to ameliorate detrimental biological effects that may stem from a hotter and drier climate. Critical habitat designation should include areas in the region with relatively cool and moist climates. For example, substantial critical habitat should be designated for the jaguar in the mountains of central Arizona and western New Mexico.

The jaguar, a species of Holoartic origin, can be expected to survive and reproduce in temperate habitats in the U.S. having a suitable prey base. Like other large bodied cats, the jaguar is capable of withstanding below freezing conditions. There does not appear to be any climate-related limitation on jaguar re-colonization of former habitat areas.

4. ***Previously proposed habitat protection for jaguars*** – For eastern Arizona and western New Mexico, Povilitis et al. (Sierra Institute 2000) suggested for protection a set of primary habitat areas connected by corridors of secondary habitat, based on criteria similar to those later used by Hatten et al. (2005) and Robinson et al. (2006) to map jaguar habitat. Their report was based in part on an earlier request to the Service to designate areas of critical habitat for the jaguar in Arizona (Povilitis et al. 1999). Hatten et al. (2005) proposed a conservation area for the jaguar within a broad triangular geographic area of southeastern Arizona extending roughly from the Gila River south to the Baboquivari Mountains on the west and the Chiricahua Mountains on the east. Povilitis (1996)

provided a conservation model for the Gila-Sky Island bioregion of Arizona and New Mexico that included the jaguar as a species indicative of ecological integrity.

5. ***A framework for designating critical habitat –*** Extensive acreage of managed or protected habitat in the Southwestern U.S. and northern Mexico is essential to the conservation of the species. Population viability for the NJP will require thousands of individuals, a generally accepted goal for vertebrates among conservation biologists. The extensive movements of jaguar through varied vegetation types and topography indicate the importance of large expanses of intact core and connective habitats for the species (McCain and Childs 2008). These findings are consistent with the large spatial requirements of other top carnivores in North America, such as grizzly bear and gray wolf (Carrol 2006).

The task at hand for the Service is to identify for critical habitat designation a network of core habitat areas and connecting linkages adequate to recover the species. Habitat designated in the U.S. as critical for the jaguar must be of sufficient extent to complement habitat in northern Mexico which, taken together, would support a viable jaguar population.

Examples of critical habitat linkages –For southeastern Arizona, we identified 8 areas of remaining open space and mostly natural vegetation that connect larger blocks of jaguar habitat (see Appendix). These linkages are in danger of being severed by land development and related human activities. We have posted these critical habitat linkages for the jaguar online (also, see *map*). We ask the Service to designate them as critical habitat and, without delay, work to ensure their conservation.

To allow jaguar movement between the U.S. and Mexico, we recommend 6 other linkage areas for critical habitat designation (Appendix). These linkages, identified by suitable topographic and biological features, are threatened by fence construction and other human activities along the U.S. Mexico border.

Additional habitat linkages should be identified and designated critical habitat to protect connectivity from the southeastern portion of Arizona to the state's Mogollon Rim highlands and the western mountains of New Mexico.

Examples of critical core areas – A list of primary or core habitat areas for the jaguar in southeastern Arizona have previously been provided to the Service (Povilitis et al. 1999). Other blocks of habitat, particularly in the mountains of central Arizona and western New Mexico, are essential to the conservation of the jaguar and should be selected under a broad designation for critical core habitats.

6. ***Special management and protection for critical linkages and core areas –*** We suggest that the Service delineate critical habitat on a fine map scale for habitat linkages while providing coarser scale critical habitat designations for large blocks of primarily public lands.

We urge the Service to adopt the following measures and policies as part of its program for safeguarding critical habitat for the jaguar:

Habitat linkages – (1) Fine scale planning with local and state authorities, other federal agencies, private landowners, the transportation, energy, and recreational industries, and conservation organizations to protect open space and vegetation cover, and improve highway infrastructure to allow safe wildlife passage. Specific challenges to habitat linkage conservation include current proposals for new highway construction (related to I-10) and the SunZia energy project across southern Arizona and New Mexico; (2) Planning with the U.S. Department of Homeland Security to limit impenetrable fencing along the U.S.-Mexico border and protect travel corridors for jaguar and other trans-border wildlife.

Habitat core areas – Habitat conservation with federal and state land management agencies to protect the essential physical and biological features of the environment for the jaguar and its prey. The conservation program would address specific threats such as large scale surface mining, excessive road densities, predator control activities, loss of surface water and watershed damage, degradation and loss of natural vegetation, and depletion of prey species.

7. ***Habitat conservation is an urgent matter*** – Given rapid land development, the Service needs to expedite critical habitat protection for the jaguar consistent with the ESA goal of protecting its ecosystems from "economic growth and development untempered by adequate concern and conservation." While we appreciate movement in the right direction, we are troubled by the anticipated date of January 2011 for finalizing a critical habitat proposal for the jaguar (USFWS 2010). Many critically imperiled habitat linkages are already known and their designation for protection should be made in a matter of months on an emergency basis.

We call upon the Service to provide extraordinary leadership and move with utmost urgency in designating critical habitat and implementing a jaguar recovery program. The jaguar was placed on the U.S. list of endangered species 13 years ago, and critical habitat protection for the species is long overdue.

Please let us know if we can be of further assistance. We appreciate this opportunity to comment.

Sincerely,

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Appendix

Habitat linkages in southeastern Arizona essential to the conservation of the jaguar.

Pinaleno Mountains-Dos Cabezas/Chiricahua Mountains
Little Dragoon Mountains
Rincon Mountains-Santa Rita/Whetstone Mountains
Tumacacori Highlands-Santa Rita Mountains
North Peloncillo-South Peloncillo Mountains

Chiricahua Mountains-Dragoon Mountains
Huachuca Mountains/Canelo Hills-Whetstone Mountains
Santa Rita Mountains-Patagonia Mountains

Cross border linkages
Peloncillo Mountains-Mexico
Chiricahua Mountains-Mexico
San Pedro Valley-Mexico
Patagonia/Huachuca Mountains-Mexico
Tumacacori Highlands-Mexico
Altar Valley/Baboquivari Mountains-Mexico