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Please consider the following petition to establish an Area of Critical Environmental Concern in the vicinity of the Soda Mountains.

Summary

This petition nominates public lands among the North and South Soda Mountains as an Area of Critical Environmental Concern (ACEC). Located in San Bernardino County, California southwest of the town of Baker, California, these lands have been identified as an important opportunity to restore habitat connectivity for desert bighorn sheep (*Ovis canadensis nelsoni*), and enhance the genetic diversity and resilience of the species across its range.

The petitioners believe an ACEC is preferable to energy development of the site, including the proposed Soda Mountain Solar project that would develop up to four square miles of key intermountain habitat, add a significant layer of anthropogenic disturbance, and potentially disrupt options for restoring bighorn sheep connectivity across Interstate 15. Until such time that connectivity is implemented to restore adequate desert bighorn sheep gene flow across Interstate 15, the Department of Interior should select "Alternative G" in its environmental review of the Soda Mountain Solar project. Specifically, the Bureau of Land Management should not authorize a right-of-way grant for the project and should amend the California Desert Conservation Area Plan to identify the site as an ACEC unsuitable for future energy generation, and to institute a disturbance cap to significantly limit destruction of the intact bighorn sheep habitat and intermountain sheep dispersal opportunities.

The importance of restoring bighorn sheep connectivity across highway barriers is of national significance for the iconic desert bighorn sheep. According to a study used as a primary resource, bighorn sheep are vulnerable to a loss of genetic diversity, and anthropogenic barriers – such as "highways, canals and developed areas" – pose a "severe threat to the persistence of naturally fragmented populations."[i] The same study estimates that "nuclear genetic diversity in populations completely isolated by human-made barriers has declined as much as 15% in *c.* 40 years since most barriers were erected," and that "some populations may lose up to 40% of their pre-barrier genetic diversity in the next 60 years." The genetic diversity of bighorn sheep is important so that the species can adapt to changing environmental conditions, including climate change. [ii]

The Soda Mountain habitat connectivity potential for desert bighorn sheep is exemplary in its significance. The intermountain habitat on both sides of Interstate 15 has been identified as "the most important restorable corridor for long-term demographic potential (i.e., population recolonization by ewes) across the entire southeastern Mojave Desert of California, as it would provide the best *and only* opportunity for movement between bighorn populations in the Mojave National Preserve and the large complex of populations to the north of Interstate 15," according to a biological study[iii] (emphasis added). According to the same study, "[t]he potential connection between the S. Soda Mountains and the habitat patches north of I- 15 is a critical component of what we consider to be the most efficient management strategy for maximizing metapopulation connectivity: restoring one key dispersal corridor across each of the interstate highways that currently fragment the Mojave Desert (I-15, I-40, and I-10). Our model suggests that this strategy would increase connectivity by 46 to 93 percent, depending on the type of connectivity considered (genetic vs. demographic and short-term vs. long-term)."

The Department of Interior's foreclosure of options to restore this habitat connectivity for desert bighorn sheep would contradict its own policies and priorities. Department of Interior Secretarial Order 3330 requires all DOI agencies, including the Bureau of Land Management, to adopt a "landscape-scale approach to identify and facilitate investment in key conservation priorities in a region." Secretarial Order 3330 affirms that the DOI "seeks to avoid potential environmental impacts from [energy development] projects through … landscape-level planning that identifies areas suitable for development because of low or relatively low natural and cultural resource conflicts." As stated above, the Soda Mountain Solar site is seen as the best and only opportunity to restore desert bighorn sheep populations here, clearly an area of high natural resource conflicts of the kind DOI seeks to avoid developing under S.O. 3330.

Separately, Secretarial Order 3289 requires the Bureau to "[c]onserve and manage fish and wildlife resources, including over 800 native migratory bird species and nearly 2,000 federally listed threatened and endangered species" in light of the increasing impacts of climate change.

Climate change is a significant threat to wildlife, including the desert bighorn sheep, and the Soda Mountains habitat and connection may play a key role in enhancing the survivability of bighorn sheep. According to the Department of the Interior, "[c]limate change has and will continue to have a negative impact on the population of desert bighorn sheep."[iv] This is in part due to the fact that a decline in the availability or dependability of natural springs and forage will impact the species. Lactating ewes, for example, need to drink water on a daily basis, according to the Department of the Interior. The conditions brought about by anthropogenic climate change can negatively impact reproduction and survivability of this species.

The natural springs at Zzyzx – in the Mojave National Preserve and adjacent to the Soda Mountains – may play a central role in supporting bighorn sheep herds. Not only will the restoration of habitat connectivity across Interstate 15 support genetic flow and reverse the isolation caused by the highway, it would also enable a larger bighorn sheep population to inhabit a wider range of viable habitat with access to a more stable water source. Restored habitat connectivity across Interstate 15 would particularly enable desert bighorn sheep to inhabit the North Soda Mountains. According to a biological study, "[p]rior to the construction of I-15, sheep would have moved readily between the North and South Soda Mountains and would have had access to the current excellent water on the east side of the South Soda Mountains." Additional human development in this area that draws on groundwater resources could jeopardize these springs, and thus the local bighorn sheep population and opportunities to restore effective gene flow across Interstate 15.

Although renewable energy generation is a central solution to this problem, building the large-scale Soda Mountain Solar project on the *only* key habitat connectivity restoration opportunity across Interstate 15 is unnecessary and irresponsible. Several large-scale solar power projects have been built on already-disturbed lands that have less harmful impacts on wildlife. Already established Solar Energy Zones have been established after extensive negotiations and involvement by diverse stakeholders. Yet this project would add a significant human-disturbance to the landscape, pushing the already stressed landscape (e.g. Highway 15) over the edge. Basic mitigation measures for the project applicant to fully fund and construct a wildlife bridge and to create lost foraging habitat is not a legally-enforceable condition being considered.

The opportunities for habitat connectivity restoration present in the vicinity of the Soda Mountains are few, and it is important to maintain the option of genetic flow through existing culverts and bridges in the vicinity of the Soda Mountains. A large-scale solar project could further deter bighorn sheep dispersal through existing bridges and culverts, and preclude the pursuit of more optimal connectivity restoration perhaps through the development of a wildlife overpass. A wildlife overpass built across U.S. Highway 93 in Arizona immediately improved connectivity for the species.[v]

Until such time that a more effective connectivity restoration option can be executed across Interstate 15, bighorn sheep biologists have recommended developing a water source in the North Soda Mountains to encourage dispersal of sheep south from the Avawatz Mountains, and perhaps encourage some genetic

flow across Interstate 15. According to Epps and Wehausen, "[i]ncreased use of the North Soda Mountains could lead to increased use of under-crossings …[g]iven the major migration barrier of I-15, it is important to retain these potential crossing locations at least until a freeway overpass for bighorn sheep can be built."[vi]

Construction of the Soda Mountain Solar project or other significant human development on this same intermountain habitat would destroy foraging habitat and deter bighorn sheep from these potential crossings. Large solar arrays would act as a barrier between bighorn sheep and potential crossings. Even if the solar array is configured to leave corridors of intact habitat between the mountains and the culverts or bridges, not enough is known about bighorn sheep behavior to determine how wide a corridor would need to be to allow viable and effective bighorn sheep movement to and through crossings. Allowing development before identifying effective movement corridors could lead to long-term or permanent loss of the opportunity because of the difficulty of restoring vegetation cover and natural substrate. A study of post-fire desert shrub restoration in the western Colorado Desert found that brittlebush cover returned 20 years after a fire, but creosote bush and white-bursage failed to recover.[vii]

Therefore, the Bureau of Land Management should establish an ACEC in the outlined area (see attached map) to protect core desert bighorn sheep habitat and the intermountain habitat necessary to maintain opportunities for connectivity, and ultimately restore effective gene flow across Interstate 15. The Bureau of Land Management should manage these lands to exclude large-scale ground disturbance including renewable energy. Additionally, groundwater resources should be managed to maintain the natural springs – particularly Soda Springs at Zzyzx – that are critically important to maintaining bighorn sheep populations locally, and the genetic diversity of the species range wide.

Sincerely,

David Lamfrom
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National Parks Conservation Association

[i] Epps, C. W., P. J. Palsbøll, et al. (2005). "Highways block gene flow and cause a rapid decline in genetic diversity of desert bighorn sheep." Ecology Letters 8(10): 1029-1038.
[ii] Epps, C. W., P. J. Palsbøll, et al. (2005). "Highways block gene flow and cause a rapid decline in genetic diversity of desert bighorn sheep." Ecology Letters 8(10): 1029-1038.
[iii] Epps, Clinton; Wehausen, John; Monello, Ryan, and Creech, Tyler, "Potential impacts of proposed solar energy development near the South Soda Mountains on desert bighorn sheep connectivity," *Report to the California Department of Fish and Wildlife, National Park Service, and Bureau of Land Management,* 25 February 2013.
[iv] National Park Service, "The Adverse Affects of Climate Change on Desert Bighorn Sheep," < http://www.nps.gov/articles/desertbighornsheepresearch.htm>, accessed on March 8, 2015.
[v] McKinnon, Shaun, "On road to Hoover Dam, bighorns get a bypass," *Arizona Central*, <http://www.azcentral.com/news/articles/2011/02/21/20110221hoover-dam-bridge-bypass-bighorn-sheep.html#ixzz3Tpwl323k>, accessed on March 8, 2015.
[vi] Epps, Clinton; Wehausen, John; Monello, Ryan, and Creech, Tyler, "Potential impacts of proposed solar energy development near the South Soda Mountains on desert bighorn sheep connectivity," *Report to the California Department of Fish and Wildlife, National Park Service, and Bureau of Land Management,* 25 February 2013.
[vii] Steers, Robert J. and Allen, Edith B., "Fire Effects on Perennial Vegetation in the Western Colorado Desert, USA," *Fire Ecology*, Volume 7, Issue 3, 2011.

Soda Mountain, Map Proposal for Area of Critical Environmental Concern (ACEC) Designation