

# CLEMSON

U N I V E R S I T Y

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California Energy Commission  
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Dear Mr. Meyer:

I am a retired biology professor who has studied reptile species diversity in the deserts of the southwestern U.S. and northern Mexico for 40 years. I am writing to express my opposition to the proposed Solar 2 Imperial Valley solar energy project. My concern rests with the threat this project presents to the survival of the Flat-Tailed Horned Lizard (FTHL), *Phrynosoma mcallii*.

The FTHL is currently under consideration for listing as a Threatened species, 75 Fed. Reg. 9377 (March 2, 2010). In November 1993, the U.S. Fish and Wildlife Service published a proposed rule to list the FTHL as a Threatened species. The Secretary of the Interior never approved it and moved to withdraw the listing proposal in 1997. Defenders of Wildlife and other conservation groups then sued the Secretary to compel a listing determination, but the government compromised by promising to address the threats to FTHL habitat on public lands. Also in 1997, Wendy Hodges prepared a report assessing the habitat loss of the FTHL in Arizona and California. At that time, Dr. Hodges had determined that the species had suffered a nearly 50 percent loss of habitat due to agricultural development and urban sprawl. Other threats included off-road vehicle use, energy developments, and military activities. Fifteen years have elapsed since a listing was first proposed, and according to the Center for Biological Diversity (Public Comment Letter, April 30, 2010) FTHL populations are still in decline.

Two important "management areas" or Areas of Critical Environmental Concern (ACECs) are the West Mesa and the Yuha Basin, so designated by the Working Group of FTHL Interagency Coordinating Committee (May 1997). The two ACECs are connected by a habitat corridor that varies in quality, but is sufficient to support the species and provide genetic connectivity. If project construction goes forward, it will destroy 6,500 acres, 75 percent of which (ca. 4,875 acres) is marginal to good FTHL habitat. Furthermore, the habitat corridor between the West Mesa and Yuha Basin FTHL populations will be disrupted, genetically



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isolating the two habitat areas. Conservation biologists view habitat fragmentation as one of the most pernicious factors in the decline and eventual extinction of biological populations. Lack of gene exchange between fragmented populations causes inbreeding depression and field studies have demonstrated that inbreeding depression can increase the probability of extinction (Jimenez et al. 1994 *Science* 366:271-3; Newman and Pilson, 1997 *Evolution* 51:354-62; Saccheri et al. 1998 *Nature* 392:491-4).

Dr. Patrick Mock, the expert witness for the applicant (Tessera Solar), stated that Interstate Highway 8 is a "substantial barrier to movement", and concluded that the two management areas are already effectively isolated. I disagree with this assessment because, whereas road mortality will be high, highways are not complete barriers to dispersing individuals; some individuals will successfully cross highways. Population genetic theory suggests that between one and ten migrants (dispersers that breed) per generation is sufficient to negate the negative effects of inbreeding (Wright, 1931 *Genetics* 16:97-259; Allendorf and Phelps, 1981 *Canadian J. Fisheries & Aquat. Sci.* 58:1507-14; Mills and Allendorf, 1996 *Conserv. Biol.* 10:1509-18; Vucetich and Waite, 2000 *Animal Conserv.* 3:261-6). Furthermore, experimental data from both captive and wild populations demonstrate that this level of migration has beneficial effects on fitness and survival (Soule and Mills, 1998 *Science* 282:1658-59; Westemeier et al. 1998 *Science* 282:1695-8; Vila et al. 2002 *Proc. Royal Soc. London Ser. B*, 270:91-7).

As a mitigation procedure, it has been proposed to collect all FTHLs at the project site and relocate them to safe habitat areas. Unfortunately, there is now compelling evidence that translocation inevitably fails. For example, over the past 15 years, some 10,000 desert tortoises have been moved to the Large Scale Translocation Site in Clark County, Nevada, yet there has been no measurable increase in tortoise numbers at the site, and overall there has been a steady extirpation of tortoise populations due to habitat loss. The desert is a severe environment and if the number of individuals exceeds the carrying capacity of the habitat, the excess will die. FTHLs relocated to suitable habitat will lack familiarity with their new surroundings and will succumb relatively easily to predators because their escape behavior is less efficient than that of resident lizards. Horned lizards are limited by food availability (Whitford and Bryant, 1979 *Ecology* 60:686-94). Resident horned lizards are familiar with the locations of ant mounds and ant worker columns in their territories and forage efficiently on this patchy resource (Baharav, 1975 *Copeia*:649-57; Whitford and Bryant, 1979 *Ecology* 60:686-94; Shaffer and Whitford, 1981 *Am. Midl. Nat.* 105:209-16; Mungler, 1984a *Ecology* 65:1077-86, 1984b *Am. Nat.* 123:654-80). However, by increasing the number of FTHLs in an area through relocation, competition for food will intensify, increasing the probability of malnutrition for both resident and non-resident lizards. Malnutrition will have negative effects on subsequent

reproductive effort and over-wintering survival. In sum, translocation has potential negative consequences and should be abandoned as a mitigation procedure.

In conclusion, the Solar 2 Imperial Valley solar energy project should not be approved because it will destroy approximately 4,875 acres of marginal to good FTHL habitat, disrupting the habitat corridor between the West Mesa and the Yuha Basin FTHL populations which is critically important for gene exchange between the two. There are no effective mitigation options for the loss of the habitat and lizards at the project site or the loss of genetic connectivity. The FTHL has already lost more than 50 percent of its habitat from various anthropogenic activities. In 1997 the Federal Government promised to address the threats to FTHL habitat on public lands in response to a lawsuit by Defenders of Wildlife and other groups. Although I am not familiar with the exact language of the compromise, implicit in the agreement would be the protection of habitat corridors that are vitally important for gene exchange between fragmented populations. Clearly, by authorizing the Solar 2 Imperial Valley solar energy project, the Federal Government would violate the spirit, if not the letter, of its 1997 agreement with the Defenders of Wildlife and other plaintiffs.

Sincerely,



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