

CONABIO, Talpan, Mexico, in litt. February 2007).

*Summary of Factors Affecting the Socorro Mockingbird*

*A. The Present or Threatened Destruction, Modification, or Curtailment of Socorro Mockingbird's Habitat or Range*

Socorro mockingbird habitat in the southern portions of the island has been severely degraded by construction of a naval base and sheep overgrazing for the past 50 years. In addition, locust swarms (*Schistocerca piceifrons*) have invaded that island since the mid-1990s. These threats to Socorro mockingbird habitat are discussed in turn.

*Naval base:* The Mexican Navy built a base on Socorro Island in the late 1950s (Martínez-Gómez *et al.* 2001). Built on the southernmost tip, at Bahia Vargas Lozano, the base supports more than 200 personnel and family (Wehtje *et al.* 1993). The Socorro mockingbird prefers undisturbed montane areas, and may have occupied the area seasonally before the base was built (R. Curry in litt. February 2007). During construction, native vegetation was removed from around the base and replaced with non-native grasses (Martínez-Gómez *et al.* 2001). Habitat destruction caused by construction of the naval base contributed to the species' extirpation from the southern third of the island (BLI 2000d), although not to the same extent as sheep overgrazing.

*Sheep overgrazing:* The greatest impact on the habitat of Socorro Island has been severe degradation due to intensive grazing by introduced mammals (BLI 2000d; Curry in litt. February 2007; Martínez-Gómez in litt. February 2007; Martínez-Gómez & Curry 1995, 1996; Martínez-Gómez *et al.* 2001). Socorro Island has no native mammals (Jehl & Parkes 1982). In our proposed rule, we noted that Cody (2005) reported that Socorro mockingbird habitat is threatened by destruction from introduced rabbits and pigs. However, Curry (in litt. February 2007) pointed out that, while rabbits and pigs are problematic on the nearby island of Clarión, these two exotic mammals were never introduced on Socorro.

Sheep were brought to Socorro Island near the end of the 19th century and, by 1956, there were an estimated 2,000 sheep living in the southern portions of the island (Brattstrom & Howell 1956). Left feral, the sheep overgrazed, creating extensive open areas (2005) and leaving the soil vulnerable to erosion (R. Curry in litt. February 2007; Wehtje *et al.*

1993). The Socorro mockingbird prefers undisturbed montane areas and forests with a dense understory. In the southern fig forests, hop bush (*Dodonaea viscosa*) has replaced the original understory, and these areas are too degraded for the Socorro to inhabit (Martínez-Gómez *et al.* 2001).

Habitat degradation caused by sheep drastically altered habitat on Socorro Island (BLI 2000d; R. Curry in litt. February 2007; Martínez-Gómez 2002), especially low- to mid-elevation fig forests (ranging in altitude from 0 to 1,640 ft (to 500 m)) in the southern portion of the island (Martínez-Gómez in litt. February 2007). By 1990, they had overgrazed the southern third of the island (Martínez-Gómez & Curry 1996), where the Socorro mockingbird was once plentiful (Brattstrom & Howell), although perhaps only seasonally (R. Curry in litt. February 2007). In the northern regions of Socorro Island, low- to mid-elevation fig forests are largely undegraded and serve as important habitat for the Socorro mockingbird (Martínez-Gómez & Curry 1996; Martínez-Gómez *et al.* 2001). Sheep overgrazing extirpated the species from one-third of its former range (BLI 2000d).

*Locust swarms:* Another factor causing the degradation of Socorro mockingbird habitat was brought to our attention by Martínez-Gómez (in litt. February 2007). According to Martínez-Gómez (2005), permanent locust (*Schistocerca piceifrons*) swarms have invaded the island since 1994. The locusts swarm twice yearly and are capable of reaching all points on the island. The swarms have defoliated trees and shrubs in several regions of the island, which decreases the availability of food from fruit trees and modifies the primary forest habitat which the species prefers. Locusts are especially pronounced in the southern portion of the Island. A larger number of young locusts and locusts in non-swarmling stages are found in the degraded habitats in the south (Martínez-Gómez 2005). Martínez-Gómez (2005) concluded that the higher intensity of outbreaks in the southern portion of the island was an indirect result of sheep overgrazing and predation caused by introduced mammals, namely sheep and cats (see Factor C). Sheep overgrazing has created open conditions, providing suitable habitat for locust reproduction, as evidenced by the high number of young and non-swarmling stages of locust found primarily in those areas (Martínez-Gómez 2005). In the northern portions of the island habitat is less degraded and bird densities are higher.

Less degraded habitat provides less favorable conditions for the locusts and the swarms are less intense. Because birds eat locusts, they are better able to moderate the effects of the swarm, which also drives down the locust population in the north, where birds are found at higher densities. In the south, locusts swarms are more intense, and habitat destruction combined with predation has reduced the number of birds inhabiting the southern portion of the island. The low bird density in the south is insufficient to moderate the effects of the swarms being produced there. Locust swarms have also reduced available food sources, by denuding the fruit trees of bark which serve as part of the Socorro mockingbird diet. Martínez-Gómez (2005) attributed the greater and continued intensity of swarms in the south to the combination of habitat degradation (which created unsuitable habitat for the birds) and predation by cats (which reduced the number of birds). We consider sheep overgrazing to be a factor contributing to the endangerment of this species.

*Summary of Factor A*

The current range of the Socorro mockingbird is limited to an estimated 6-mi<sup>2</sup> (15-km<sup>2</sup>) area. Habitat has been altered by construction of the Naval base, sheep overgrazing and locust swarms, compounded by predation (Factor C). Locust swarms have reduced available food sources by denuding the fruit trees of bark. Preferring undisturbed montane habitat and primary forest, these factors have created unsuitable conditions for the species. Overgrazing and locust swarms continue to threaten the Socorro mockingbird. We believe that the Socorro mockingbird is at significant risk throughout its range due to the present and ongoing destruction and modification of its habitat.

*B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes*

There is no information indicating that the Socorro mockingbird is being utilized for commercial, recreational, scientific, or educational purposes. The species is not known to be in international trade and has not been formally considered for listing under CITES ([www.cites.org](http://www.cites.org)).

*C. Disease or Predation*

We are not aware of any disease concerns that may have led to the decline of the Socorro mockingbird species.

Predation by native red-tailed hawks (*Buteo jamaicensis socorroensis*) and