

season. We began with a Geographic Information System (GIS) layer identifying California sagebrush habitats (e.g., Diegan sage scrub, Riversidean sage scrub). We recognize that other habitats are used by coastal California gnatcatchers at various points in their life history, such as riparian and chaparral habitats during foraging or dispersal. However, few breeding territories have been documented in habitats devoid of California sagebrush. Once the vegetation layer was created, "core" patches of sagebrush were selected using a minimum patch size of 10 ha (25 ac) in a coastal climate zone, and 20 ha (50 ac) in an inland climate zone (coastal climate zone is defined as having an average January minimum temperature above 5° Celsius (C) (41° Fahrenheit (F)), whereas an inland climate zone is defined as having an average January minimum temperature below 5° C (41° F)). For gnatcatcher habitat within the Maritime and Coastal Climate Zones, a patch size equal to or greater than 25 acres was considered suitable gnatcatcher habitat. For gnatcatcher habitat east of the Maritime and Coastal Climate Zones, a patch size of equal to or greater than 50 acres was used because the density of gnatcatchers generally is lower farther from the coast. Research on home range and territory size indicates that territory size increases with distance from the coast (ERCE 1991, Preston *et al.* 1998); therefore, the model reflects this patch size difference between climate zones. Then, "satellite" patches less than 10 ha (25 ac) within 488 m (1600 feet) of "core" areas were identified. The 488 m (1600 ft) distance is the distance a bird would have to travel across the landscape to reach a "core" area while avoiding developed areas (as established by Mock 1992). The vegetation was then expanded beyond the 488 m (1600 ft) search distance by including sagebrush habitat contiguous to the "satellite." A layer called "high quality habitat" was then created by combining "core" and "satellite" areas. This "high quality habitat" was then given a value of 1, while all other areas were given a value of 0.

The second step used a digital elevation model to separate sagebrush by slope. As discussed in the Background section, many studies have suggested that gnatcatchers avoid nesting on very steep slopes (greater than 40 percent). Approximately 93 percent of the documented gnatcatcher sightings in the MSCP/MHCP study areas occur on slopes less than 40 percent (AMEC 2001). Consequently, sagebrush areas with slopes above 40

percent received a value of 0, while areas with slopes less than 40 percent received a value of 1.

Finally, the sagebrush was overlaid with a climate coverage to delimit areas above and below a mean minimum January temperature of 5° C (41° F), and an average rainfall of 33.66 cm (13.25 in). Five degrees C (41° F) was determined to be the threshold where the effects of temperature had an impact on gnatcatcher energetics (Mock 1998). The threshold for precipitation was determined by identifying the precipitation contour that captured 95 percent of the known occurrences. Sagebrush areas that are cold (*i.e.*, below 5° C (41° F)) and wet (*i.e.*, above 33.66 cm rainfall) received a value of 0. Areas that are warm and wet, or cold and dry, received a value of 1. Areas that are warm and dry received a value of 2.

To create the final model, the values for each area are totaled, with possible scores from 0 to 4. Areas with a value of 0 or 1 are considered to be of low quality, areas with a value of 2 of moderate quality, areas with a value of 3 of high quality, and areas with a value of 4 of very high quality.

This model was run using the vegetation coverage data available from the three southern California Counties that have digital vegetation maps: San Diego, Orange, and Riverside Counties.

After generating the model across the three Counties, we tested it to see if it accurately predicted coastal California gnatcatcher occurrences. We used an independently derived data set of coastal California gnatcatcher occurrences across Orange and San Diego counties (USFWS unpublished). This data set was collected in the summer of 2002 using systematic point counts with a random start, incorporating distance sampling. Over a GIS data layer depicting vegetation types in the two counties, points were randomly placed over all habitats incorporating coastal sagebrush, including coastal sage scrub vegetation types and coastal sage scrub/chaparral ecotone. The sampling protocol included recording weather, vegetation, and coastal California gnatcatcher observations at each point. Coastal California gnatcatcher observations were recorded for a 10 minute data collection period followed by a 2.5 minute period during which a taped call was played twice. A total of 436 points were surveyed during this effort, each between 1 and 4 times.

To test the predictive power of the model, we compared the independent data set of coastal California gnatcatcher points with the model to see what percentage of gnatcatcher points were

found to be occupied in each of the four different zones of habitat quality. The test found that 48 percent of the points located in habitat modeled as very high quality were occupied, 28 percent of the points in high quality were occupied, 8 percent of the points in medium quality were occupied, and essentially 0 percent of the points in low quality were occupied. The model was also tested and accepted under the Akaike's Information Criterion (AIC). This statistic is widely used as a measure for comparing the predictive power of constructed models (Burnham and Anderson 1998). Our independent study only sampled gnatcatcher abundance in San Diego and Orange counties, so we could not test the predictive power of the model in Riverside County.

Therefore, the model was used as a guide for determining critical habitat only in San Diego and Orange counties.

In all counties within the range of the subspecies, including the counties that we modeled, we first examined those lands identified for conservation under approved regional HCPs covering the coastal California gnatcatcher. These planning efforts utilized habitat evaluation models, coastal California gnatcatcher occurrence data, and reserve design criteria to identify reserve systems of core gnatcatcher populations and linkage areas that are essential for the conservation of the species. Lands within existing designated reserves, preserves, or other conservation lands were determined by us at the time we issued the permits to be essential to the conservation of the species. We have reevaluated those areas and we adhere to our earlier determination that such lands are essential to the conservation of the gnatcatcher.

Those conservation lands considered for critical habitat designation include: (1) Designated reserve system lands within the Orange County NCCP for the Central-Coastal Subregions; (2) designated preserve lands within the County of San Diego Subarea within the San Diego MSCP; (3) designated preserve lands within the City of San Diego Subarea within the San Diego MSCP; and (4) designated preserve lands within the Poway Subarea within the San Diego MSCP. In addition, we considered conservation lands established through other approved HCPs covering the gnatcatcher (*e.g.*, East Coyote Hills HCP, Shell/Metropolitan Water District HCP, Lake Mathews MSHCP and NCCP, Sycamore Canyon HCP, and the HCP for the Southeast Quadrant of the City of Carlsbad (Villages of La Costa)). The boundaries of these existing reserves, preserves, and other conservation lands are mapped