

a genetic analysis of moth populations from both Kahoolawe and Maui to determine if the moth has perhaps evolved either a preference for, or an adaptation to, feeding on *Nicotiana glauca*. It was suggested that the Service might learn whether the Kahoolawe moth population is dependent upon Maui moth populations for recruitment. Furthermore, genetic analysis might reveal that *Nicotiana glauca* raised moth populations are dependent upon *Nothoecstrum* spp. plants or that such moth populations are genetically distinct from those moth populations that appear to be *Nothoecstrum* spp. dependent.

Our Response: We agree that a greater understanding of the moth's genetics is needed to better address its long-term conservation needs. However, researching this aspect of the moth's biology is beyond the scope of this document. We are currently preparing a draft recovery plan for the moth that will identify a genetics study, in addition to other priority research objectives.

(10) **Comment:** Most of the peer reviewers stated that the proposed critical habitat areas seem suitable in size and that they are ecologically appropriate, provided that: (1) The proposed areas are protected from their primary threats, and (2) the excluded lands are properly managed and of large enough size to be ecologically sustainable.

Our Response: We believe the core area of suitable habitat has been demarcated by the critical habitat boundaries as presented in this final rule. Moreover, the designated critical habitat units were chosen to create an array of multiple discrete populations across the four islands to reduce the risk of extinction resulting from catastrophic natural events, such as hurricanes, and to enhance the likelihood of conservation. Furthermore, the units were chosen because they are the highest quality native habitats essential to the moth's conservation and all are identified as manageable, restorable, and sufficient in size to capably support self-sustaining moth populations. Our conclusion is that 9 sites located within historic range on four islands are sufficient to achieve these goals. If provided with new information, we may revise the critical habitat designation in the future.

(11a) **Comment:** Three peer reviewers and one commenter noted that the proposed rule did not contain a great deal of information about the distribution of the mesic habitat plant, *Nothoecstrum longifolium* nor its potential as a host plant for the larval

stage of the moth. It was recommended that the Service map the distribution of *N. longifolium* by island. (11b)

Comment: Two reviewers and one commenter, including one with HDOA, noted that very little mesic habitat, other than on Molokai, was proposed as critical habitat for the Blackburn's sphinx moth. They recommended that the Service include more mesic habitat in the final designation, especially in light of the fact that the islands have undergone, and often undergo, long periods of drought. (11c) **Comment:** One peer reviewer with HDOA provided additional observational data for the moth at light traps located near Olinda, East Maui, and suggested that the moths were either flying long distances from known habitat areas, or represented adults from an undocumented population potentially utilizing *N. longifolium* plants in mesic forests of northwest Haleakala. (11d) **Comment:** Another peer reviewer with DOFAW provided additional observational data for the moth on Maui that may indicate a distinct seasonal pattern to its appearances on that island. It was suggested that these respective periods of moth appearance coincided with annual regional precipitation patterns, and might indicate the moth was taking advantage of appropriate opportunities for larval development and flower (e.g., nectar) foraging. (11e) **Comment:** The same reviewer recommended the inclusion of an altogether new unit on West Maui that was not proposed as critical habitat. The unit was justified since it would include additional mesic habitat and was persistently and strongly occupied by the moth. Additionally, the area contained adult Blackburn's sphinx moth primary constituent elements, specifically *Plumbago* spp. and *Ipomea* spp., as well as other potential larval stage host plants (not identified as primary constituent elements) such as *Solanum nelsoni* and *Scaevola sericea*. Lastly, it was suggested that the new unit might provide an important corridor for adult moths migrating toward the proposed Unit 7 on Molokai because of its proximity to Molokai and the area's relative lack of strong winds like those found in the isthmus area of Maui between West Maui and Haleakala.

Our Response: We did not designate additional mesic land on East or West Maui because those lands are not essential for the conservation of the moth. This conclusion is based on available information concerning the status of the Blackburn's sphinx species in specific areas and/or the level of habitat degradation. We agree that some

mesic forest areas not designated as critical habitat, especially on Maui, may potentially harbor undocumented populations of Blackburn's sphinx moth. We also acknowledge that additional survey efforts are needed to ascertain the existence of these moth populations or potential host plant populations. In preparation of this rule, we did fund three surveys for moth host plants within mesic habitats (Perry 2001; Wood 2001a; 2001b). While new reports of moth sightings provided by reviewers will be useful in focusing future survey efforts and research needs, the fact remains that too little is known about the moth's potential mesic habitat requirements. For example, the potential host plant suitability of mesic habitat plants such as *Nothoecstrum longifolium*, to warrant the designation of additional mesic habitat for the moth beyond what we have designated. Furthermore, the mesic habitat we designated on the island of Molokai was identified as the best quality mesic habitat essential for the conservation of the moth. Lastly, the two designated units within the Maui isthmus, Units 5 and 6 are expected to adequately serve as a corridor for moths migrating to the designated unit on Molokai (Unit 9).

(12) **Comment:** Two peer reviewers noted that the quality of 'darkness' (i.e., absence of artificial lighting) could be an important factor in the Blackburn's sphinx moth's biology, and suggested this habitat quality be considered a primary constituent element. It was stated that 'darkness' may be important for the normal nocturnal foraging, biology, and movement behavior of the adult Blackburn's sphinx moth. Furthermore, it was noted that most of the proposed critical habitat units are still in relatively dark areas, with the exception of proposed Units 3, 5a, and 5b. One commenter provided information about two occasions in which the moth was observed flying to bright lights at the State Forestry Baseyard in Kahului, Maui. During one of the occasions, the moth became disoriented and was killed by a feral cat. Two reviewers and one commenter suggested that management for darkness may be an important issue for Blackburn's sphinx moth conservation, especially if specific critical habitat units became more developed, such as in proposed Units 3, 5a, and 5b. One reviewer suggested that low-intensity and/or shielded lighting strategies might help reduce attraction and disorientation of nocturnally migrating adult moths. One commenter recommended that proposed Unit 3 not be included in the designation because