SUPPLEMENTARY INFORMATION:

Background

Achyranthes mutica, Cenchrus agrimonioides, Cyanea grimesiana ssp. grimesiana, Cyperus trachysanthos, Euphorbia haeleeleana, Isodendrion laurifolium, Isodendrion longifolium, Panicum niihauense, Phyllostegia parviflora, Platanthera holochila, Sanicula purpurea, Schiedea hookeri, Schiedea kauaiensis, and Schiedea nuttallii are, or were, known from ten

Hawaiian Islands—Laysan, Midway, Kure, Niihau, Kauai, Oahu, Molokai, Lanai, Maui, and Hawaii. The current and historical distribution by island is presented in Table 1 for each of the 14 taxa.

TABLE 1.—S	UMMARY OF	I SLAND	DISTRIBUTION OF	THE PROPOSED TAXA
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Species -		Hawaiian Island										
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Achyranthes mutica		Н	н	С	H C C C C C C C C	CCCCCC CHCC C	СН	H C H	СС	C H? H		

Key:

C = current; population last observed within the past 20 years.

H = historical; population not seen for over 20 years.

? = questionable locality or inconsistent information in sources.

Ku—Kure; Mi—Midway; La—Laysan; Ni—Niihau; K—Kauai; O—Oahu; Mo—Molokai; L—Lanai; M—Maui; H—Hawaii.

The Hawaiian archipelago includes eight large volcanic islands (Niihau, Kauai, Oahu, Molokai, Lanai, Kahoolawe, Maui, and Hawaii), as well as offshore islets, shoals, and atolls set on submerged volcanic remnants at the northwestern end of the chain (the Northwestern Hawaiian Islands, including Laysan, Midway, and Kure). The archipelago covers a land area of about 16,600 square kilometers (sq km) (6,400 sq miles (mi)), extending roughly between latitude 18°50' and 28°15' N and longitude 154°40' and 178°70' W, and ranging in elevation from sea level to 4,200 meters (m) (13,800 feet (ft)) (Department of Geography 1983). The regional geological setting is a midoceanic volcanic island archipelago set in a roughly northwest to southeast line, with younger islands to the southeast. The youngest island, Hawaii, is volcanically active. The older islands are increasingly eroded, so that the basaltic portions of many of the northwesternmost islands (such as Laysan, Midway, and Kure) are entirely submerged, and coralline atolls and shoals are often all that remain above sea level (Macdonald et al. 1986). The topography of the Hawaiian Islands is extremely diverse. On the youngest islands, Hawaii and Maui, gently sloping unweathered shield volcanoes with very poor soil development are juxtaposed with older, heavily

weathered valleys with steep walls, well-developed streams, and gently sloped flood plains. The older islands to the northwest (Niihau, Kauai, Oahu, and Molokai) are generally more weathered. On a typical older island, sea cliffs and large amphitheater-headed valleys on the windward (northeast) side contrast with erosionally younger, dissected slopes on the leeward (southwest) side (Department of Geography 1983).

The climate of the Hawaiian Islands reflects the tropical setting buffered by the surrounding ocean (Department of Geography 1983). The prevailing winds are northeast tradewinds with some seasonal fluctuation in strength. There are also winter storm systems and occasional hurricanes. Annual rainfall varies greatly by location, with marked windward to leeward gradients over short distances. Minimum average annual rainfall is less than 250 millimeters (mm) (10 inches (in.)); the maximum average precipitation is well in excess of 11,000 mm (450 in.) per year. Precipitation is greatest during the months of October through April. A dry season is apparent in leeward settings, while windward settings generally receive tradewind-driven rainfall throughout the year (Department of Geography 1983).

The native-dominated vegetation of the Hawaiian Islands varies greatly according to elevation, moisture regime, and substrate. Within nearly 100 recognized native vegetation types are numerous island-specific or regionspecific associations, comprising an extremely rich array of vegetation types within a very limited geographic area. Major vegetation formations include forests, woodlands, shrublands, grasslands, herblands, and pioneer associations on lava and cinder substrates (Gagné and Cuddihy 1990).

In Hawaii, lowland, montane, and subalpine forest types extend from sea level to above 3,000 m (9,800 ft) in elevation. Coastal and lowland forests are generally dry or mesic and may be open- or closed-canopied. The stature of lowland forests is generally under 10 m (30 ft). Ten of the taxa proposed for listing (Achyranthes mutica, Cenchrus agrimonioides var. agrimonioides. Cyanea grimesiana ssp. grimesiana, Euphorbia haeleeleana, Isodendrion laurifolium, Isodendrion longifolium, Panicum niihauense, Schiedea hookeri, Schiedea nuttallii, and Schiedea *kauaiensis*) have been reported from lowland dry or mesic forest habitat. Cenchrus agrimonioides var. *laysanensis* has been reported from dry coastal strand vegetation. Four taxa (Isodendrion laurifolium, Isodendrion longifolium, Phyllostegia parviflora, and Sanicula purpurea) have been reported from lowland wet forest habitat. One taxon, Cyperus trachysanthos, has been