

*mannii*, *Sadleria* spp., *Scaevola* spp., *Stenogyne campanulata*, *Tetraplasandra* spp., or *Zanthoxylum dipetalum* (HINHP Database 2000; K. Wood, pers. comm., 2001).

The primary threats to *Remya montgomeryi* are herbivory and habitat degradation by feral goats, pigs, cattle, and deer, and competition from nonnative plant species. Other threats include erosion, fire, and an increased risk of extinction from naturally occurring events (e.g., landslides or hurricanes) because of the small size of the populations and their limited distribution (Service 1995; 56 FR 1450).

#### *Schiedea apokremnos* (maolioli)

*Schiedea apokremnos*, a member of the pink family (Caryophyllaceae), is a low, branching short-lived perennial shrub 20 to 51 cm (8 to 20 in) tall with leaves that are somewhat fleshy. *Schiedea apokremnos* is distinguished from related species by shorter sepals, nectaries, and capsules (Wagner *et al.* 1999).

Some individuals of *Schiedea apokremnos* are functionally female and must be cross-pollinated to set seed. This reproductive strategy may be ineffective in populations with few individuals. Little is known about the life history of *Schiedea apokremnos*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

*Schiedea apokremnos* has been collected from Nualolo Kai, Kaaweiki Ridge, and along a 10.5 km (6.5 mi) long section of the Na Pali coast including Milolii Valley, Kalalau Beach, Kaalahina and Manono Ridges, Haeleele Ridge, and as far north as Pohakuao Valley, all on the island of Kauai. There is currently a total of five occurrences containing 201 individuals on State-owned lands. The species is extant at Nakeikionaiwi, Pohakuao, Nualolo Valley, Haeleele Valley, and Kawaiiki Valley within the Na Pali Coast State Park and Puu Ka Pele Forest Reserve (GDSI 2000; HINHP Database 2000; 56 FR 49639).

*Schiedea apokremnos* grows in the crevices of near-vertical basalt coastal cliff faces, at elevations between 11 and 538 m (35 and 1,765 ft). The species grows in sparse dry coastal cliff shrub vegetation along with *Artemisia australis*, *Bidens* spp., *Carex meyenii*, *Chamaesyce celastroides*, *Eragrostis variabilis*, *Lepidium serra*, *Lipochaeta connata*, *Lobelia niihauensis*, *Myoporum sandwicense*, *Peperomia* spp., *Pleomele aurea*, *Psydrax odorata*, or *Wilkesia* spp. (HINHP Database 2000;

56 FR 49639; K. Wood, pers. comm., 2001).

The restriction of this species to inaccessible cliffs suggests that goat herbivory may have eliminated it from more accessible locations. The greatest current threat to the survival of *Schiedea apokremnos* is still herbivory and habitat degradation by feral goats, as well as competition from the nonnative plants *Leucaena leucocephala* and *Hyptis pectinata* (comb hyptis), and trampling by humans. Given the small size of most populations and restricted distribution, depressed reproductive vigor may be a serious threat to the species. In addition, a single environmental disturbance (such as a landslide or fire) could destroy a significant percentage of the extant individuals (Service 1995; 56 FR 49639).

#### *Schiedea helleri* (NCN)

*Schiedea helleri*, a member of the pink family (Caryophyllaceae), is a short-lived perennial vine. The stems are usually prostrate and at least 15 cm (6 in) long. This species is the only member of the genus on Kauai that grows as a vine (Wagner *et al.* 1999).

Three plants have been observed flowering in February. No additional life history information for this species is currently known (Service 1998a).

*Schiedea helleri* was originally found only at a single location at Kaholuamano over 100 years ago. There is currently a total of three occurrences with 50 to 60 individuals on State-owned land at Mohihi Stream, Nawaimaka Valley, and Mohihi-Waialae Trail within the Alakai Wilderness Preserve and Na Pali-Kona Forest Reserve (GDSI 2000; HINHP Database 2000; K. Wood, *in litt.* 1999).

*Schiedea helleri* is found on ridges and steep cliffs in closed *Metrosideros polymorpha*-*Dicranopteris linearis* montane wet forest, *M. polymorpha*-*Cheirodendron* spp. montane wet forest, or *Acacia koa*-*M. polymorpha* montane mesic forest at elevations between 664 and 1,361 m (2,178 and 4,464 ft). Other native plants growing in association with this species include *Broussaisia arguta*, *Cheirodendron* spp., *Cibotium* spp., *Cyanea* spp., *Dianella sandwicensis*, *Dubautia* spp., *Elaeocarpus bifidus*, *Hedyotis terminalis*, *Melicope* spp., *Myrsine* spp., *Poa sandwicensis*, *Scaevola procera*, *Syzygium sandwicensis*, or *Viola wailenalanae* (pamakani) (HINHP Database 2000; K. Wood, pers. comm., 2001).

Competition with the nonnative plant *Rubus argutus*, a risk of extinction from naturally occurring events (e.g.,

landslides or hurricanes), and reduced reproductive vigor due to the small number of extant individuals are serious threats to *Schiedea helleri* (61 FR 53070).

#### *Schiedea kauaiensis* (NCN)

*Schiedea kauaiensis*, a member of the pink family (Caryophyllaceae), is an erect subshrub. This short-lived perennial species is distinguished from others in this endemic Hawaiian genus by its habit, larger leaves, the hairiness of the inflorescence, the number of flowers in each inflorescence, larger flowers, and larger seeds (Wagner *et al.* 1999).

Little is known about the life history of this taxon. Fruit and flowers have been observed in July through September. There is no evidence of regeneration from seed under field conditions. Reproductive cycles, longevity, specific environmental requirements and limiting factors are unknown (Service 1998a).

Historically, *Schiedea kauaiensis* was known from the northwestern side of Kauai, from Papaa to Mahanaloa. It was thought to be extinct until the five currently known occurrences in Mahanaloa and Kalalau Valleys, with a total of 22 individuals, were found. All occurrences are on State land within the Kuia NAR and Na Pali Coast State Park (GDSI 2000; HINHP Database 2000; K. Wood, *in litt.* 1999).

*Schiedea kauaiensis* typically grows in diverse mesic to wet *Acacia koa*-*Metrosideros polymorpha* forest on steep slopes at elevations between 117 and 1,290 m (385 and 4,232 ft). Associated native plant species include *Alphitonia ponderosa*, *Cryptocarya mannii*, *Diospyros* spp., *Dodonaea viscosa*, *Euphorbia haeleeleana*, *Exocarpos luteolus*, *Leptocophylla tameiameia*, *Microlepia strigosa*, *Nestegis sandwicensis*, *Pisonia* spp., *Peucedanum sandwicense* (makou), *Psychotria* spp., or *Psydrax odorata* (HINHP Database 2000; 61 FR 53108; K. Wood, pers. comm., 2001).

Threats to *Schiedea kauaiensis* include habitat degradation and/or destruction by feral goats, pigs, and cattle; competition from several nonnative plant species; predation by introduced slugs and snails; and a risk of extinction from naturally occurring events, such as landslides or hurricanes, and/or reduced reproductive vigor due to the low number of individuals in only two known populations. *Schiedea kauaiensis* is also potentially threatened by fire (HINHP Database 2000; Service 1998a; 61 FR 53108).