

*Poa mannii* (Mann's bluegrass)

*Poa mannii*, a member of the grass family (Poaceae), is a perennial grass with short rhizomes (underground stems) and erect, tufted culms. All three native species of *Poa* in the Hawaiian Islands are endemic to the island of Kauai. *Poa mannii* is distinguished from both *P. siphonoglossa* and *P. sandvicensis* by its fringed ligule (an appendage on the leaf sheath) and from *P. sandvicensis* by its shorter panicle (a flower cluster) branches (O'Connor 1999).

Little is known about the life history of *Poa mannii*. Flowering cycles, pollination vectors, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Historically, this species was found in Olokele Gulch on Kauai. Currently, there is a total of six occurrences with approximately 268 individuals on State-owned land in the right and left branches of Kalalau Valley, Awaawapuhi Valley, Kuia Valley, and Kauhao Valley within the Kuia NAR, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and Waimea Canyon State Park (GDSI 2000; HINHP Database 2000; O'Connor 1999; K. Wood, *in litt.* 1999).

This species typically grows on cliffs or rock faces in lowland or montane mesic *Metrosideros polymorpha* or *Acacia koa*-*M. polymorpha* forest at elevations between 327 and 1,222 m (1,072 and 4,009 ft). Associated native plant species include *Antidesma platyphyllum*, *Artemisia australis*, *Bidens cosmoides*, *Bidens sandvicensis*, *Carex meyenii*, *Carex wahuensis*, *Chamaesyce celastroides* var. *hanapepensis*, *Cyperus phleoides* (NCN), *Diospyros sandwicensis*, *Dodonaea viscosa*, *Eragrostis variabilis*, *Hedyotis terminalis*, *Lobelia niihauensis*, *Lobelia yuccoides* (panaunau), *Luzula hawaiiensis* (wood rush), *Melicope anisata*, *M. barbigera*, *M. pallida*, *Nototrichium* spp., *Panicum lineale*, *Pleomele aurea*, *Pouteria sandwicensis*, *Psychotria greenwelliae*, *Psychotria mariniana*, *Schiedea* spp., or *Wilkesia gymnoxiphium* (HINHP Database 2000; 59 FR 56330; K. Wood, pers. comm., 2001).

*Poa mannii* survives only in very steep areas that are inaccessible to goats, suggesting that goat herbivory may have eliminated this species from more accessible locations, as is the case for other rare plants from northwestern Kauai. Threats to *P. mannii* include habitat damage, trampling, and browsing by feral goats, and competition with invasive nonnative plants. *Erigeron*

*karvinskianus* has invaded Kalalau, Koaie, and Waialae Valleys, three of the areas where *P. mannii* occurs. *Lantana camara* threatens all known populations, and *Rubus argutus* threatens the populations in Kalalau and Waialae Valleys. *Poa mannii* is also threatened by fire and reduced reproductive vigor and/or extinction from naturally occurring events, such as landslides or hurricanes, due to the small number of existing populations and individuals (59 FR 56330).

*Poa sandvicensis* (Hawaiian bluegrass)

*Poa sandvicensis* is a perennial grass (Poaceae) with densely tufted, mostly erect culms. It is distinguished from closely related species by its shorter rhizomes and culms which do not become rush-like with age, closed and fused sheaths, relatively even-edged ligules, and longer panicle branches (O'Connor 1999).

Little is known about the life history of *Poa sandvicensis*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Historically, this species was known from the following areas on the island of Kauai: the rim of Kalalau Valley; Halemanu Ridge, Kumuwela Ridge, and Kauaikanana drainage; Awaawapuhi Trail; Kohua Ridge/Mohihi drainage; and Kaholuamanu. Hillebrand's (1888) reference to a Maui locality is most likely an error. Currently, there is a total of nine occurrences with 1,321 individuals on State-owned land. *Poa sandvicensis* is known to be extant at Alealau, Keanapuka, Awaawapuhi Trail, Kumuwela Ridge, Maile Flat Trail, Mohihi Stream, Mohihi-Waialae Trail, Kawaiiki Valley, and Waialae Valley in the Alakai Wilderness Preserve, Hono o Na Pali NAR, Kokee State Park, Na Pali Coast State Park, and Na Pali-Kona Forest Reserve (GDSI 2000; HINHP Database 2000; 57 FR 20580; K. Wood, *in litt.* 1999).

*Poa sandvicensis* grows on wet, shaded, gentle to steep slopes, ridges, and rock ledges of streambanks in semi-open to closed, wet, diverse *Acacia koa*-*Metrosideros polymorpha* montane forest, at elevations between 473 and 1,290 m (1,553 and 4,232 ft). Associated native plant species include *Alyxia oliviformis*, *Bidens sandvicensis*, *Cheirodendron* spp., *Claoxylon sandwicense*, *Coprosma* spp., *Dianella sandwicensis*, *Dicranopteris linearis*, *Dodonaea viscosa*, *Dubautia* spp., *Hedyotis* spp., *Melicope* spp., *Peperomia* spp., *Psychotria* spp., *Scaevola procera*, *Schiedea*

*stellarioides*, or *Syzygium sandwicensis* (HINHP Database 2000; 57 FR 20580; K. Wood, pers. comm., 2001).

The greatest immediate threats to the survival of *Poa sandvicensis* are competition from nonnative plants, such as *Erigeron karvinskianus*, *Hedychium* spp., *Passiflora tarminiana*, or *Rubus argutus*; erosion caused by feral pigs and goats; and State Forest Reserve trail maintenance activities and human recreation. In addition, naturally occurring events, such as landslides and hurricanes, constitute a threat of extinction or reduced reproductive vigor due to the species' small population size (Service 1995; 57 FR 20580).

*Poa siphonoglossa* (NCN)

*Poa siphonoglossa* is a perennial grass (Poaceae) with extensive tufted and flattened culms that cascade from banks in masses. It differs from related species by its longer culms and lack of a prominent tooth on the ligule. In addition, its shorter panicle branches distinguish it from *P. sandvicensis*, and its short rhizomes and closed and fused sheaths separate it from *P. mannii* (O'Connor 1999).

Little is known about the life history of *Poa siphonoglossa*. Flowering cycles, pollination vectors, seed dispersal agents, longevity, specific environmental requirements, and limiting factors are unknown (Service 1995).

Historically, *Poa siphonoglossa* was known from five sites on the island of Kauai: Kohua Ridge, near Kaholuamanu, Kaulaula Valley, Kuia Valley, and Kalalau. Currently, there are a total of five occurrences with a total of 50 individuals on State-owned land at Kahuamaa Flats, Mohihi-Waialae Trail, Kuia Valley, Makaha Ridge, and Kaulaula Valley in the Alakai Wilderness Preserve, Kuia NAR, Na Pali Coast State Park, Na Pali-Kona Forest Reserve, and Puu Ka Pele Forest Reserve (GDSI 2000; HINHP Database 2000; K. Wood, *in litt.* 1999).

*Poa siphonoglossa* typically grows on shady banks on steep slopes in mesic *Metrosideros polymorpha*-*Acacia koa* forests at elevations between about 480 and 1,296 m (1,573 and 4,251 ft). Associated native plant species include *Alphitonia ponderosa*, *Alyxia oliviformis*, *Bobea brevipes*, *Carex meyenii*, *Carex wahuensis*, *Coprosma waimeae*, *Dianella sandwicensis*, *Dodonaea viscosa*, *Dubautia* spp., *Hedyotis* spp., *Leptecophylla tameiameia*, *Lobelia yuccoides*, *Melicope* spp., *Microlepia strigosa*, *Myrsine* spp., *Panicum nephelophilum*, *Poa sandvicensis*, *Psychotria* spp., *Scaevola procera*, *Tetraplasandra*