var. *sonomensis* (Sonoma alopecurus), *Carex albida* (white sedge), *Clarkia imbricata* (Vine Hill clarkia), *Lilium pardalinum* ssp. *pitkinense* (Pitkin Marsh lily), *Sidalcea oregana* ssp. *valida* (Kenwood Marsh checkermallow), and *Trifolium amoenum* (showy Indian clover) are found in mesic areas mostly within 33 kilometers (km) (15 miles (mi)) of the central coast of California. *Astragalus clarianus* (Clara Hunt's milkvetch), *Plagiobothrys strictus* (Calistoga allocarya), and *Poa napensis* (Napa bluegrass) are found up to 70 km (32 mi) inland in a variety of habitats around the City of Calistoga in the Napa Valley, California. Urbanization, road construction, a possible water storage project, airport construction, development of hot springs into commercial resorts, agricultural land conversion, wetland drainage, waste disposal, competition with aggressive plant species, collection for horticultural use, and livestock grazing have destroyed much of the habitat and numerous populations of these nine plant species. Historically, these nine species have not been known to occur outside of Alameda, Marin, Mendocino, Napa, Santa Clara, Solano, and Sonoma counties.

Discussion of Inland Species

The habitats in which *Plagiobothrys strictus* and *Poa napensis* can be found include meadows near small thermal hot springs underlain by gravelly loams mixed with clays that are associated with high water tables. High concentrations of boron, arsenic, and sulfates, which are usually toxic to plants, are found in thermal pools and meadows. A few unique plants have evolved under these normally adverse conditions, including *P. strictus* and *P. napensis*. *Astragalus clarianus* occurs in openings within valley grasslands or in broad-leaf upland forests. *Astragalus clarianus*, *P. strictus*, and *P. napensis* have only been found in Napa and Sonoma counties. Large amounts of habitat have been lost to urbanization, road construction, lake building, airport construction, and development of hot springs into commercial resorts.

Willis Jepson (1925a) first described *Astragalus clarianus* in 1909 from specimens collected by Clara Hunt in the Conn Valley near St. Helena, Napa County, California. Axel Rydberg (1929) and Willis Jepson (1936) treated this taxon as *Hamosa clariana* and *Astragalus rattani* var. *clarianus*, respectively. Rupert Barneby (1950) re-established *Astragalus clarianus* as a full species. *Astragalus clarianus* is a low-growing annual herb belonging to the pea family (Fabaceae). *Astragalus clarianus*, a slender, sparsely leafy plant, is sparingly covered with sharp, stiff, appressed hairs. The simple single or few basally branching, ascending stems reach 7 to 20 centimeters (cm) (3 to 8 inches (in.)) in height. The leaves are alternate, 1.5 to 6.0 cm (0.5 to 2.5 in.) long, with 5 to 9 uncrowded leaflets 2 to 10 millimeters (mm) (0.1 to 0.4 in.) long. The leaflets are oblong to obovate, narrow at the base, and notched at the tip. Small, pea-like flowers appear from March through April. The petals are bicolored, with the wings whitish and the banner and keel purple in the upper third. The keel is longer and wider than the wings. The horizontal to declining seed pods are narrow, linear, slightly curved, pointed at both ends, and occur on a 1.5 to 2.5 mm (0.06 to 0.10 in.) long slender stalk. *Astragalus rattanii* var. *jepsonianus* looks similar to A. *clarianus*, but grows 10 to 36 cm (4 to 14 in.) tall, has larger flowers, and seed pods that are not elevated on a seed stalk.

Astragalus clarianus is found on thin, rocky clay soils derived from volcanic substrates in foothill grasslands, in openings in *Arctostaphylos* (manzanita), and in openings in *Quercus douglasii* (blue oak) woodlands over an elevational range of 75 to 225 meters (m) (240 to 750 feet (ft)). Historically, six populations were known from Napa and Sonoma counties. Two historical populations have been extirpated by urbanization and viticulture (California Natural Diversity Data Base (CNDDB) 1993). The population at the type locality was reduced in size by the creation of Lake Hennessey in the 1940s. Currently, three populations are found in northwestern Napa County and one on the eastern side of adjacent Sonoma County. Collectively, the four populations of *A. clarianus* are scattered over approximately 16 hectares (ha) (40 acres (ac)) (CNDDB 1994). ''The trend for Clara Hunt's milkvetch is one of decline as a result of habitat destruction and modification'' (California Department of Fish and Game (CDFG 1991)). The four populations of *A. clarianus* are variously threatened by urbanization, recreational activities, airport maintenance, elimination due to plant community succession, competition from nonnative weed species, inadequate regulatory mechanisms, stochastic events, and a possible future water storage project. One population occurs in the Bothe Napa Valley State Park. Another population occurs on the shore of Lake Hennessey and is owned by The City of Napa. Two remaining populations occur on private land.

Edward Greene (1892) and Willis Jepson (1901) treated *Plagiobothrys strictus* as *Allocarya stricta* and *Allocarya californica* var. *stricta*, respectively, before Ivan Johnston (1923) assigned the present name, *Plagiobothrys strictus*, to specimens collected on alkaline flats near sulphur springs at Calistoga, Napa County, California. *Plagiobothrys strictus* is a small, erect, annual herb belonging to the borage family (Boraginaceae). *Plagiobothrys strictus* grows 1 to 4 decimeters (dm) (4 to 15 in.) in height. The nearly hairless plant has either a single stem or branches from near the base. The linear lower leaves are 4 to 9 cm (1.5 to 4 in.) long. Small, usually paired, white flowers appear in March to April in a slender, unbranched inflorescence. The fruit is an egg-shaped nutlet about 1.5 mm (0.6 in.) long, keeled on the back, with wart-like projections without any prickles. *Plagiobothrys greenei*, *P. lithocaryus*, *P. mollis* var. *vestitus*, *P. stipitatus*, and *P. tener* occur in vernal pools and have ranges that overlap with the range of *Plagiobothrys strictus*, but they do not resemble *P. strictus*.

Plagiobothrys strictus is found in vernal pools adjacent to and fed by hot springs and small geysers in foothill grasslands at an elevational range of 90 to 160 m (300 to 500 ft). Three historical populations occurred within a 3 km (2 mi) radius of Calistoga, Napa County, California. One population has been extirpated by urbanization and agricultural land conversion. One remaining population of *P. strictus* occurs at a small, undeveloped thermal hot spring. The other population occurs at the Calistoga Airport in the center of the city of Calistoga. The combined area of the two remaining populations in Napa County is less than 80 square (sq) m (900 sq ft) (California Native Plant Society (CNPS) 1990). Most of the thermal hot springs in Napa County have been developed. The remaining undeveloped hot springs occupy very few acres (Dave Steiner, Napa County Soil Conservation Service, pers. comm. 1993). ''The overall trend for Calistoga popcornflower (*Plagiobothrys strictus*) is one of decline'' (CDFG 1991). The species is threatened by recreational activities, airport maintenance, urbanization, inadequate regulatory mechanisms, and stochastic events. Both populations occur on private land and neither is protected.

Alan Beetle (1947) first described *Poa napensis* in 1946 from specimens that he collected in a meadow moistened by seepage from hot springs, 3 km (2 mi)