entered into voluntary protection agreements with TNC (CDFG 1993b). Since that time, TNC and the California Conservation Corps have jointly built and maintained cattle exclosures in an attempt to protect the plants at both sites. Some plants, however, continue to suffer herbivory from livestock and wildlife, resulting in loss of flowers and seeds (L. Lozier, *in litt.* 1990). A Memorandum of Understanding is currently in effect between CDFG and the Berry Botanic Garden, Portland, Oregon, for research on germination and recovery of this species (CDFG 1993b). Additionally, TNC obtained a voluntary agreement in 1990 with private landowners to protect one population of *Astragalus clarianus.* CDFG is proposing to purchase approximately 37 ha (90 ac) of the Kenwood Marsh as an ecological preserve (A. Howald, pers. comm. 1993). The date for acquisition of the preserve, however, is dependent on cooperation with the current landowners. The owner of one parcel, which contains approximately one half of the Kenwood population, has declined to sell her property to the State (N. Wilcox, pers. comm. 1994). Purchase of the land as a preserve would prevent grazing on the site and would allow direct management of the plant population with possible opportunities to expand the population (A. Howald, pers. comm. 1993). The preserve would be comprised of only a small portion of the watershed, however, limiting the protection that the preserve could afford to the hydrology of the marsh (N. Wilcox, pers. comm. 1994). TNC also has entered into a verbal conservation agreement with a landowner for the protection of one of the two populations of *Clarkia imbricata*. However, this larger population of *C. imbricata* was mowed before seed set in 1989 and 1991, reducing the seed production and number of plants in the years following mowing (B. Guggolz, *in litt. 1993*).

Seed from cultivated *Trifolium amoenum* plants is currently being collected for future reintroduction efforts (P. Conners, pers. comm. 1994). In addition, half of the seed that was recovered from the single plant in 1993 was deposited for long-term storage at the U.S. Department of Agriculture National Seed Storage Laboratory in Fort Collins, Colorado (Conners 1994).

Although Point Reyes National Seashore (Seashore) is part of the National Park system, 17 cattle and dairy ranches are contained within the Seashore boundaries. Grazing and ranching, which have occurred on the peninsula for more than a century, have been determined to be ''consistent with the purpose for which the Seashore was authorized'' (Clark and Fellers 1987). Fowler and Fellers (1985) state that grazing has been a serious threat to *Alopecurus aequalis* var. *sonomensis* occurrences located on the Seashore.

E. Other Natural or Manmade Factors Affecting Their Continued Existence

Alopecurus aequalis var. *sonomensis* suffers from competition from aggressive emergent wetland species, including rushes (*Juncus* spp.) and sedges (*Cyperus* spp.) at one location. These wetland plants have nearly extirpated *A. aequalis* var. *sonomensis* from that site (V. Norris, *in litt.* 1993; CNDDB 1993). Additionally, *A. aequalis* var. *sonomensis* is not readily propagated. Two attempts to reintroduce the species from seed to suitable habitat within its range have failed. Naturally occurring floods also may be an ongoing threat. One reintroduction failed due to a flash flood in 1993 (V. Norris, pers. comm. 1993).

The population of *Astragalus clarianus* located on the north shore of Lake Hennessey has an infestation of an aggressive and dominating nonnative weed, yellow star-thistle (*Centaurea solstitialis*). This nonnative weed infestation was a direct result of ground disturbance associated with the removal of dredge spoils that were placed on top of this population as discussed under Factor A (A. Howald, pers. comm. 1993). Competition from this nonnative annual weed is also considered a threat to the population of *A. clarianus* at the Bothe Napa Valley State Park (J. Ruygt, *in litt.* 1993). A proposed application to build two small agricultural water storage reservoirs along a creek in Napa County would avoid direct impacts to another population of *A. clarianus,* but ground disturbance would most likely introduce this same nonnative aggressive weed (A. Howald, pers. comm. 1993). Establishment of yellow star-thistle from this proposed activity is considered a threat to this population.

Plant succession may be excluding or reducing the population of *Astragalus clarianus* at one site (J. Ruygt, *in litt.* 1993) where *A. clarianus* grows sparingly in the interspaces of the developing manzanita plant community. As new manzanita seedlings emerge and grow and the existing plants grow larger, less and less interspace between plants is available for *A. clarianus.* Fire suppression has reduced fire occurrences in the manzanita community. Periodic fire is needed to reduce manzanita cover and create interspaces for this plant. This species, therefore, is vulnerable to habitat loss from advancing plant succession. Another population of *A. clarianus* is threatened by competition from French broom (*Genista monospessulana*), a nonnative aggressive shrub (CNDDB 1993).

The potential for loss of the Kenwood Marsh population of *Sidalcea oregana* ssp. *valida* from stochastic events, because of the small population size, is exacerbated by drought and water diversions. In addition, this population is being encroached upon by aggressive weeds, including yellow star-thistle and blackberry (*Rubus* spp.) (A. Howald, pers. comm. 1993). One of the Kenwood Marsh subpopulations was driven over by Sonoma County personnel during maintenance of the Sonoma Aqueduct, which passes through Kenwood Marsh. The maintenance activity occurred late in the season when the soil was relatively dry, resulting in minimal damage to the plants. If maintenance activities occur during a time when the soil is saturated, they pose a threat to the plants (A. Howald, pers. comm. 1993).

Because it is unlikely that *Lilium pardalinum* ssp. *pitkinense* is self-pollinating, single plants or widely separated plants in sparse populations may not set viable seed (Mark Skinner, CNPS, pers. comm. 1993). The two remaining plants at Pitkin Marsh are monitored closely by CNPS volunteers and have not been observed to have set seed for several years (M. Skinner, pers. comm. 1993). Much of Pitkin Marsh has been invaded by blackberry vines that compete with *L. pardalinum* ssp. *pitkinense* for space, light, and nutrients (CDFG 1993b).

Grass mowing, vehicle traffic, and parking have impacted and continue to threaten one population of *Poa napensis* at the Calistoga Airport site (CNPS 1990; Robert Soreng, Cornell Univ., *in litt.* 1993). Grass mowing is done at regular intervals through the spring and summer growing season to reduce fire and aircraft safety hazards. The airport is used by a spray plane service, recreational gliders, and associated tow planes. The service vehicles for the planes and private vehicle traffic of the customers impact this population of *P. napensis,* especially during the spring and summer when airport use increases.

The extirpation of all historical populations of *Trifolium amoenum* may have partially been a result of competition with weedy, nonnative plant species. A recent germination study of other *Trifolium* species from historical *T. amoenum* habitat in Sonoma County suggested that some annual *Trifolium* species germinate in late November, well after many introduced species, including redstem storkbill (*Erodium cicutarium*), ripgut