

*albidus* (Metcalf Canyon jewelflower), and *Streptanthus niger* Greene (Tiburon jewelflower) are as follows:

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* The destruction of habitat through residential or recreational development is the greatest threat faced by these species. All 12 plants are limited to serpentine soils. Serpentine outcrops in the San Francisco Bay area are limited; 20 percent of those outcrops have already been eliminated as plant habitat due to development (McCarten 1987b). The pressure to build more houses, roads, and other facilities for humans is great in all the counties under consideration. In the 3 counties in which 10 of the species are found (Marin, San Mateo and Santa Clara), estimated percent population growth by year 2000 is 2.8, 6.4, and 12.0 percent, respectively (Calif. Dept. of Finance 1992). Sonoma County, which contains one of the species, is expected to grow by 21.4 percent by year 2000 (Calif. Dept. of Finance 1992). Serpentine habitats also have been fragmented by the construction of roads such as Interstate 280. Habitat fragmentation increases the risks of extinction due to chance events such as fire, flood, landslide, pest or disease outbreaks, severe drought, or other natural or human-caused disaster.

*Cordylanthus tenuis* ssp. *capillaris* has never been known from more than the two populations that occur today. Ownership of the type locality is mixed; part of the population occurs on the Harrison Grade Preserve, which is owned and managed by the California Department of Fish and Game. Habitat on the preserve is threatened by unauthorized activities such as off-road vehicle use. Plants on private parcels are threatened with potential development. The second population of *Cordylanthus tenuis* ssp. *capillaris* occurs on private property a few miles to the west of the type locality. Plans for residential development of this site have been reviewed by the Sonoma County Planning Department (Sigrid Swedenborg, Sonoma County Planning Office, pers. comm., 1993). The owner of this property has been working with the California Department of Fish and Game to minimize impacts to *C. tenuis* ssp. *capillaris* (Ann Howald, California Department of Fish and Game, pers. comm., 1992). Plans include the donation of 87 hectares (ha) (212 acres), including *C. tenuis* ssp. *capillaris* habitat, to the county for use as a park (S. Swedenborg, pers. comm., 1993). The county is considering restricting the park to passive recreation only;

however, no final policy has yet been determined (Betty Guggolz, pers. comm., 1993). This donation may afford protection to part of the second population of *C. tenuis* ssp. *capillaris*, but since the transfer has not yet taken place and final plans have not been made concerning protection of the plant, the population still should be considered threatened by development.

*Calochortus tiburonensis* is, at present, protected from development and fenced to reduce the incidence of off-road vehicle use because the land on which it occurs is owned and managed by The Nature Conservancy (TNC), a group whose management goals are the maintenance of biodiversity and the protection of rare and endangered species (Larry Serpa, pers. comm., 1992). The preserve is still accessible to bicycles, motorbikes, and pedestrians, however, and it is not patrolled. The proximity of the preserve to residential areas renders it vulnerable to overuse and vandalism. Because TNC cannot completely control access to the site or activities on the site, listing is needed. Furthermore, this preserve, being on The Nature Conservancy's list of potential divestitures, will transfer ownership when a suitable organization is found to manage it (Larry Serpa, pers. comm., 1992).

*Castilleja affinis* ssp. *neglecta* has never been widespread. Three of the six populations occur on the Tiburon Peninsula in Marin County, one occurs in Napa County, and one in Santa Clara County. Two recently discovered populations, one on the Golden Gate National Recreation Area and one east of Anderson Lake, extend the known range to western Marin and Santa Clara Counties, respectively. Each of the three occurrences on the Tiburon Peninsula has multiple landowners. The Nature Conservancy owns over half of the Ring Mountain occurrence and the town of Tiburon owns portions of the occurrence in the Middle Ridge area of the peninsula. The remainder of each of these occurrences is privately-owned. The third occurrence on the peninsula is on private property near St. Hilary's Church in Tiburon. Development on the Tiburon Peninsula is extensive and rapid; over 60 percent of *C. affinis* ssp. *neglecta* habitat has already been destroyed by development (Hunter 1989a). Residential development is ongoing on several parcels of the Middle Ridge occurrence and proposed for both parcels of the St. Hilary's occurrence (Andrew Allen, pers. comm., 1993). The habitat at both of these sites also is threatened by pedestrian traffic. The plants on Ring Mountain Preserve are protected from development but are

threatened by sliding of the slope on which they occur. The toe of the slope was removed to accommodate residential development in the 1960s. Soil material that slides into the street at the base of the slope is removed by the City of Corte Madera, and the slope continues to slump. Managers from The Nature Conservancy estimate that approximately one-third of the population is at risk (Lynn Lozier, The Nature Conservancy, pers. comm., 1992). The Napa County population occurs on private property near a gravel quarry. Although quarry expansion plans that would result in the destruction of more than 80 percent of the population are no longer actively being pursued, the potential for expansion still exists. The Santa Clara population consists of 13 plants that may be subject to grazing (R. Bittmann, pers. comm., 1993).

*Streptanthus niger* is an extremely narrowly-distributed species; its entire range amounts to less than one-third of a square mile. Urban development has destroyed over 40 percent of potential *S. niger* habitat (Hunter 1989b). Both of the two known occurrences have multiple landowners. The town of Tiburon owns portions of the occurrence on the Middle Ridge of the peninsula, and the occurrence at St. Hilary's Church in Tiburon is owned in part by the Tiburon Landmark Society. The remainder of each of these two occurrences is privately-owned and proposed for development. An area containing 20 plants adjacent to one of the parcels recently was bulldozed for construction of condominiums (Andrew Allen, pers. comm., 1993). Residential development is ongoing at several parcels of the Middle Ridge occurrence (Eva Buxton, Belvedere-Tiburon Landmark Society, pers. comm., 1993, Andrew Allen, pers. comm., 1993).

*Clarkia franciscana* was once thought to be restricted to the Presidio in San Francisco County but about 10 years ago, a population was discovered in Alameda County in the Oakland Hills. The two populations in San Francisco County occur at the Presidio, currently owned by the National Park Service. These populations are threatened by habitat degradation. Pedestrian and mountain bicycle traffic on and near casually established "social trails" threatens the habitat.

The three populations of *Clarkia franciscana* in Alameda County are all threatened by alien species (see Factor E). The smallest of the three, consisting of 30 plants (Olson 1991c), occurs on an undeveloped site adjacent to a proposed 32-unit residential development (Nixon