

Services Company (WESCO) 1986). By 1982, over 200 permits for industrial discharges had been granted (WESCO 1986).

The amounts of heavy metals in the San Francisco Bay Estuary are projected to increase during the next 10 years. The San Francisco Bay Conservation and Development Commission, Center for Environmental Design Research, and the Greenbelt Alliance (1992) collectively modelled plausible land use changes and their impact to the health of the San Francisco Bay Estuary. Several methods were used to determine the effects of land use change including two future land use models. The model projecting the highest increase in heavy metal was based on a composite of the general plan maps for all of the counties in the estuary. Amounts of heavy metals including lead, nickel, and cadmium were projected to increase under both future land use models in all the watersheds that include habitat for these two plants.

As discussed in Factor A, habitat fragmentation may alter the physical environment. In addition, habitat fragmentation increases the risks of extinction due to chance events such as pest or disease outbreaks, reproductive failure, or other natural or human-caused disasters. The small, isolated nature of *Cirsium hydrophilum* var. *hydrophilum*, which has only two occurrences, makes extinction from stochastic (random) events more likely. Chance events, such as disease outbreak, oil spills, extended drought, or a combination of several such events, could destroy part of a single population or entire populations. The risk of extirpation due to genetic and demographic problems associated with small populations is a threat to at least the two occurrences of *Cordylanthus mollis* ssp. *mollis* that have fewer than 25 individuals.

Increases in foot traffic and mosquito abatement also will result from increased urbanization (Brenda Grewell, pers. comm. 1993). Mosquito abatement activities threaten *Cirsium hydrophilum* var. *hydrophilum* and *Cordylanthus mollis* ssp. *mollis*. Within Suisun Marsh, both species grow along or near either first order channels or mosquito abatement drainage ditches. Cleaning or dredging along these channels may adversely impact individual plants due to their proximity to the mosquito abatement drainage ditches. Vehicular damage to plant populations parallel to these channels has been noted (Randall Brown, *in litt.* 1993).

Foot traffic is a threat to *Cordylanthus mollis* ssp. *mollis*. A trail runs through the occurrence located on East Bay

Regional Park's Point Pinole Regional Seashore. Foot traffic also is a potential threat to the largest occurrence of *C. mollis* ssp. *mollis* due to the increased urbanization occurring within ¼ mile. Although foot traffic may create opportunities for *C. mollis* ssp. *mollis* to become established by reducing competition from *Salicornia*, this disturbance cannot be considered beneficial because *C. mollis* ssp. *mollis* plants have shallow roots, are very brittle, and can be easily damaged (Stromberg 1986).

Erosion is a threat to *Cordylanthus mollis* ssp. *mollis* located on the Point Pinole Regional Seashore. The main population of *C. mollis* ssp. *mollis* is immediately adjacent to a slough that is undergoing bank slumping (Stromberg 1986). Individual plants are threatened by the slumping and subsequent undercutting of the bank.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by these species in determining to propose this rule. *Cirsium hydrophilum* var. *hydrophilum*, limited to only two occurrences, is threatened variously by indirect effects of urbanization, vulnerability to extinction due to chance environmental events including oil spills, competition with non-native vegetation, projects that alter natural tidal regime, stochastic events, and inadequate regulatory mechanisms across all of its current range. Urbanization, industrial development, and agricultural land conversion have extirpated or potentially extirpated nearly 45 percent of known occurrences of *Cordylanthus mollis* ssp. *mollis*. The species currently is restricted to about 8 ha (20 acres) of habitat. Indirect effects of urbanization including habitat fragmentation, habitat conversion, alteration in water and salinity levels, inadequate regulatory mechanisms, mosquito abatement activities (including off-highway vehicle use), water pollution, insect predation, projects that alter natural tidal regimes, erosion, foot traffic, and extirpation due to genetic and demographic problems variously continue to threaten most occurrences of *C. mollis* ssp. *mollis* across its remaining range. Because *C. hydrophilum* var. *hydrophilum* and *C. mollis* ssp. *mollis* are in danger of extinction throughout all or a significant part of their respective ranges, they fit the definition of endangered species in the Act. The preferred action, therefore, is to list *Cirsium hydrophilum* var. *hydrophilum* and *Cordylanthus mollis* ssp. *mollis* as endangered. Other alternatives to this action were

considered but not preferred because not listing them at all or listing them as threatened would not provide adequate protection and would not be in keeping with the Act.

Critical Habitat

Critical habitat is defined in section 3 of the Act as: (i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management consideration or protection and; (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon determination that such areas are essential for the conservation of the species. "Conservation" means the use of all methods and procedures needed to bring the species to the point at which listing under the Act is no longer necessary.

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time the species is listed. The Service finds that designation of critical habitat is not prudent for *Cirsium hydrophilum* var. *hydrophilum* and *Cordylanthus mollis* ssp. *mollis* at this time. Service regulations (50 CFR 424.12(a)(1)) state that designation of critical habitat is not prudent when one or both of the following situations exist—(1) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or (2) such designation of critical habitat would not be beneficial to the species.

The listing of these species under the Act publicizes the rarity of these plants and, thus, can make these plants attractive to researchers or collectors of rare plants. Incidents of collection or vandalism could contribute to the decline of the species.

Critical habitat designation for *Cirsium hydrophilum* var. *hydrophilum* and *Cordylanthus mollis* ssp. *mollis* is not prudent due to lack of benefit. Most populations of the two taxa occur on private or State lands. Because both plant species occur at very few locations, any activity that would adversely modify critical habitat would likely jeopardize the continued existence of the species as well. The designation of critical habitat on private or State lands affords no additional