B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Overutilization currently is not known to be a factor for these two plants. Increased collecting for scientific or horticultural purposes or excessive visits by individuals interested in seeing rare plants could result, however, from increased publicity resulting from publication of this proposal.

C. Disease or Predation

The health of one of the largest occurrences of *Cordylanthus mollis* ssp. *mollis* is declining due to insect predation (Brenda Grewell, pers. comm. 1993). Intense insect seed predation has been observed in the population at Joice Island and Hill Slough within Suisun Marsh in Solano County (Randall Brown, *in litt.* 1993). Neither disease nor predation is known to be a factor for *Cirsium hydrophilum* var. *hydrophilum*.

D. The Inadequacy of Existing Regulatory Mechanisms

Section 404 of the Clean Water Act represents the primary Federal law that affords some protection for these two plants. Under section 404 of the Clean Water Act, nationwide permits may be issued for certain activities that are considered to have minimal impacts, including oil spill cleanup, minor dredging, maintenance dredging of existing basins, and minor bank stabilization. Activities that do not qualify for authorization under a nationwide permit, including projects that would result in more than minimal adverse environmental effects, either individually or cumulatively, may be authorized by an individual or regional general permit, which are subject to more extensive review. Regardless of the type of permit deemed necessary under section 404, candidate species may receive no special consideration.

The Army Corps of Engineers (Corps) is the Federal agency responsible for administering the section 404 program. The Service, as part of the section 404 review process, provides comments on both pre-discharge notices for nationwide permits and public notices for individual permits. The Service's comments are only advisory, although procedures exist for elevation when disagreements between the agencies arise. In practice, the Corps' actions under section 404 are insufficient to protect these candidate plants.

CDFG has listed *Cordylanthus mollis* ssp. *mollis* as rare under the California Endangered Species Act (chapter 1.5 sec. 2050 *et seq.* of the California Fish and Game Code and title 14, California Code of Regulations 670.2). Listing by the State of California requires individuals to obtain a memorandum of understanding with the CDFG to possess or ''take'' a listed species. Although the ''take'' of State-listed plants is prohibited (California Native Plant Protection Act, chapter 10 sec. 1908 and California Endangered Species Act, chapter 1.5 sec. 2080), State law exempts the taking of such plants via habitat modification or land use changes by the owner. After CDFG notifies a landowner that a State-listed plant grows on his or her property, State law requires only that the land owner notify the agency ''at least 10 days in advance of changing the land use to allow salvage of such a plant'' (Native Plant Protection Act, chapter 10 sec. 1913).

Under the California Environmental Quality Act (CEQA), the public agency with primary authority or jurisdiction over the project (the lead agency) is responsible for conducting a review of the project and consulting with the other agencies concerned with the resources affected by the project. However, the lead agency may approve projects that cause significant environmental damage, such as the destruction of State-listed threatened and rare species, and does not always require adequate mitigation for the replacement or protection of the affected resources. The protection of species under CEQA is, therefore, dependent upon the discretion of the lead agency.

Legislation enacted by the State of California in 1977 provided for the preservation of Suisun Marsh. This legislation established primary and secondary management areas. The secondary management areas were established to provide a buffer against development. In 1982, the Preservation Act was amended to exclude, in the primary management area, land proposed for the Lawlor Ranch development. Exclusion of this land has reduced the buffer between urbanization and Suisun Marsh. The indirect effects of urbanization are discussed further in Factors A and E.

E. Other Natural or Manmade Factors Affecting Their Continued Existence

Both occurrences of *Cirsium hydrophilum* var. *hydrophilum* are adversely affected by non-native plants. *Lepidium latifolium* (perennial peppergrass), a rated noxious weed (California Department of Food and Agriculture 1993), has ''moved in especially in the last 5 years'' (Brenda Grewell, pers. comm. 1993). *Cirsium hydrophilum* var. *hydrophilum* is out-competed by *L. latifolium*. Hybridization with *C. vulgare* (bull thistle), a non-native, also is a potential threat. *Cirsium vulgare* hybridizes readily with other *Cirsium*. Hybridization with *C. vulgare* was suggested as a possible explanation for the previously presumed extinction of *C. hydrophilum* var. *hydrophilum* (Smith and Berg 1988).

Chronic pollution from petroleum products is an ongoing threat to the habitat of both plants within San Pablo Bay and southern Suisun Bay. Oil spills can result in severe and long lasting destruction of salt marsh vegetation. Studies on mangroves, seagrasses, salt marsh grasses, and algae have shown that petroleum causes death, reduced growth, and impaired reproduction in large plants (Albers 1992). The effects of a petroleum spill to plants depends on several factors including the time of year, the type of petroleum product (crude or refined), and the degree of coverage (Hershner and Moore 1977; Rob Ricker, CDFG, pers. comm. 1993). A plant entirely covered by oil will die. Oil that seeps into sediments can affect the roots or rhizomes of plants as well. Oil spills may also affect plants by decreasing the amount of plant biomass (either above or below ground), or by decreasing the reproductive capacity of the plant (Rob Ricker, pers. comm. 1993).

Four hundred to 800 oil spills occur annually within California (Rob Ricker, pers. comm. 1993). Within northern California, 309 reported spills affecting marine or estuarine habitats within the jurisdiction of the Service's Sacramento Field Office occurred between March 1992 and March 1993 (Office of Environmental Services (OES) 1992 and 1993). Most of these spills occurred in the San Francisco Bay Estuary.

In 1988, an oil spill in Martinez, California, flowed as far as Suisun Bay. Although these plants are found within the northern part of the Suisun Marsh and may not be threatened directly by an oil spill in San Francisco Bay, the potential for oil spills exists from vessels operating within the marsh, as well as from an accidental spill from railroads that bisect the marsh. Oil spills also are an ever present threat to *Cordylanthus mollis* ssp. *mollis* occurring near Point Pinole (Pat O'Brien, General Manager, East Bay Regional Parks District, *in litt.* 1994).

Chronic pollution from other sources also may threaten the habitat of both plants. It is unknown, however, what effects heavy metals in industrial discharges have on these two taxa. In 1978, 52 municipal treatment facilities and 42 industrial facilities continuously discharged wastewater into San Francisco Bay (Western Ecological