

A.28 AHART’S DWARF RUSH (*JUNCUS LEIOSPERMUS* VAR. *AHARTII*)

A.28.1 Legal and Other Status

Ahart’s dwarf rush currently has no status under the federal Endangered Species Act (ESA), but is included in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005), hereafter “Recovery Plan.” The subspecies was a Category 1 candidate for listing under the federal ESA, but its status was withdrawn in 1996 due to insufficient information to justify its listing as threatened or endangered (48 FR 53640, 61 FR 7457). The subspecies has no current status under the California ESA (DFG 2011).

The California Native Plant Society (CNPS) includes Ahart’s dwarf rush on list California Rare Plant Rank 1B.2 (formerly List 1B.2): Plants Rare, Threatened, or Endangered in California and Elsewhere (CNPS 2010).



photo courtesy BCAG



A.28.2 Species Distribution and Status

A.28.2.1 Range and Status

The California Natural Diversity Database (CNDDDB) documents Ahart’s dwarf rush at 10 locations in California: six in Butte County, two in Sacramento County, and one each in Calaveras, Yuba, Tehama and Placer Counties (CNDDDB 2007). One population in Sacramento County is believed to be extirpated due to development. All occurrences fall within the Northeastern Sacramento Valley or Southeastern Sacramento Valley Vernal Pool regions (see Figure A.28-1, *Ahart’s Dwarf Rush Modeled Habitat and Recorded Occurrences*).

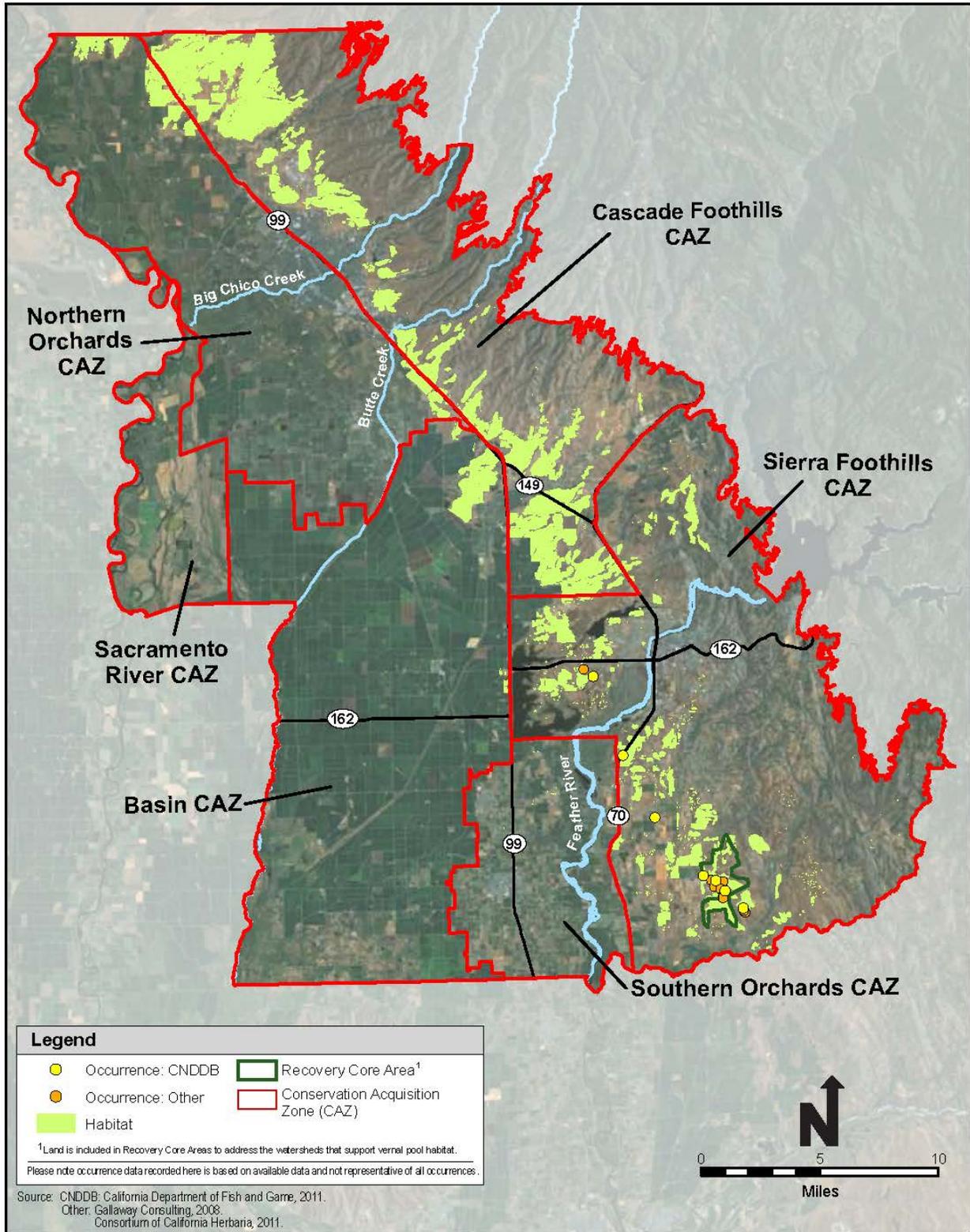


Figure A.28-1 Ahart’s Dwarf Rush Modeled Habitat and Recorded Occurrences

A.28.2.2 Distribution and Status in the Planning Area

There are a total of 17 known occurrences in the Plan Area (Figure A.28-1). The CNDDDB includes six occurrences of Ahart’s dwarf rush in Butte County. All are listed as “presumed extant”; however, two have not been visited for censusing since 1973 (CNDDDB Occurrences 5 and 6), when they were first documented on Ahart Ranch (Honcut quadrangle) by the owner. One other occurrence on Ahart Ranch (CNDDDB Occurrence 1), the type locality for the taxon, was last confirmed extant in 1991 (Figure A.28-2, *Distribution of Ahart’s Dwarf Rush in California [USFWS 2005]*). In all, Ahart’s dwarf rush has been documented in about 10 separate vernal pools at Ahart Ranch, which is located in the Northeastern Sacramento Valley Vernal Pool Region. The fourth occurrence in Butte County (CNDDDB Occurrence 4) is located near the city of Oroville (Palermo quadrangle), on both sides of the runway at the Oroville Municipal Airport, on Redding Series soils (CNDDDB 2007).

A.28.3 Habitat Requirements and Special Considerations

Little has been reported in the literature on specific habitat requirements of Ahart’s dwarf rush. The taxon is in the rush family (Juncaceae) and is restricted to acidic soils in swales and shallow areas within low-elevation Northern Basalt Flow, Northern Claypan, Northern Hardpan, and Northern Volcanic Mudflow vernal pool types (Ertter 1986, Sawyer and Keeler-Wolf 1995, USFWS 2005).

Like most vernal pool plants, Ahart’s dwarf rush is a low-growing, annual species (i.e., it germinates, grows, produces seed, and dies within one year) that is well-adapted to the Sacramento Valley’s Mediterranean-type weather patterns, with its cool, wet winters and hot, dry summers (Zedler 1990). Ahart’s dwarf rush is probably a fairly recent endemic, likely having co-evolved from more common upland species with recent climatic and geologic changes to extreme fluctuation in water availability between winter-spring inundation and spring-summer drought. It is known to thrive on gopher mounds (USFWS 2005).

Plants associated with Ahart’s dwarf rush include numerous annual graminoids and forbs that specialize in the higher, less mesic edges of vernal pools. Other documented annual rushes include toad rush (*Juncus bufonius*, native), leafy bracted rush (*J. capitatus*, not native), and inch-high dwarf rush (*J. uncialis*, native). Other documented co-occurrences include annual hair-grass, (*Deschampsia danthonoides*, native annual grass), Sacramento pogogyne (*Pogogyne zizyphoroides*, native annual herb), marigold navarretia (*Navarretia tagetina*, native annual herb), smooth cat’s ear (*Hypochaeris glabra*, nonnative invasive annual herb), hyssop loosestrife (*Lythrum hyssopifolium*, nonnative invasive herb, annual or perennial), hawkbit (*Leontodon taraxicoides*, nonnative perennial herb), cowbag clover (*Trifolium depauperatum*, native annual herb) and Fremont’s goldfield (*Lasthenia fremontii*, native annual or perennial herb) (Hickman 1993, USFWS 2005, CNDDDB 2007).

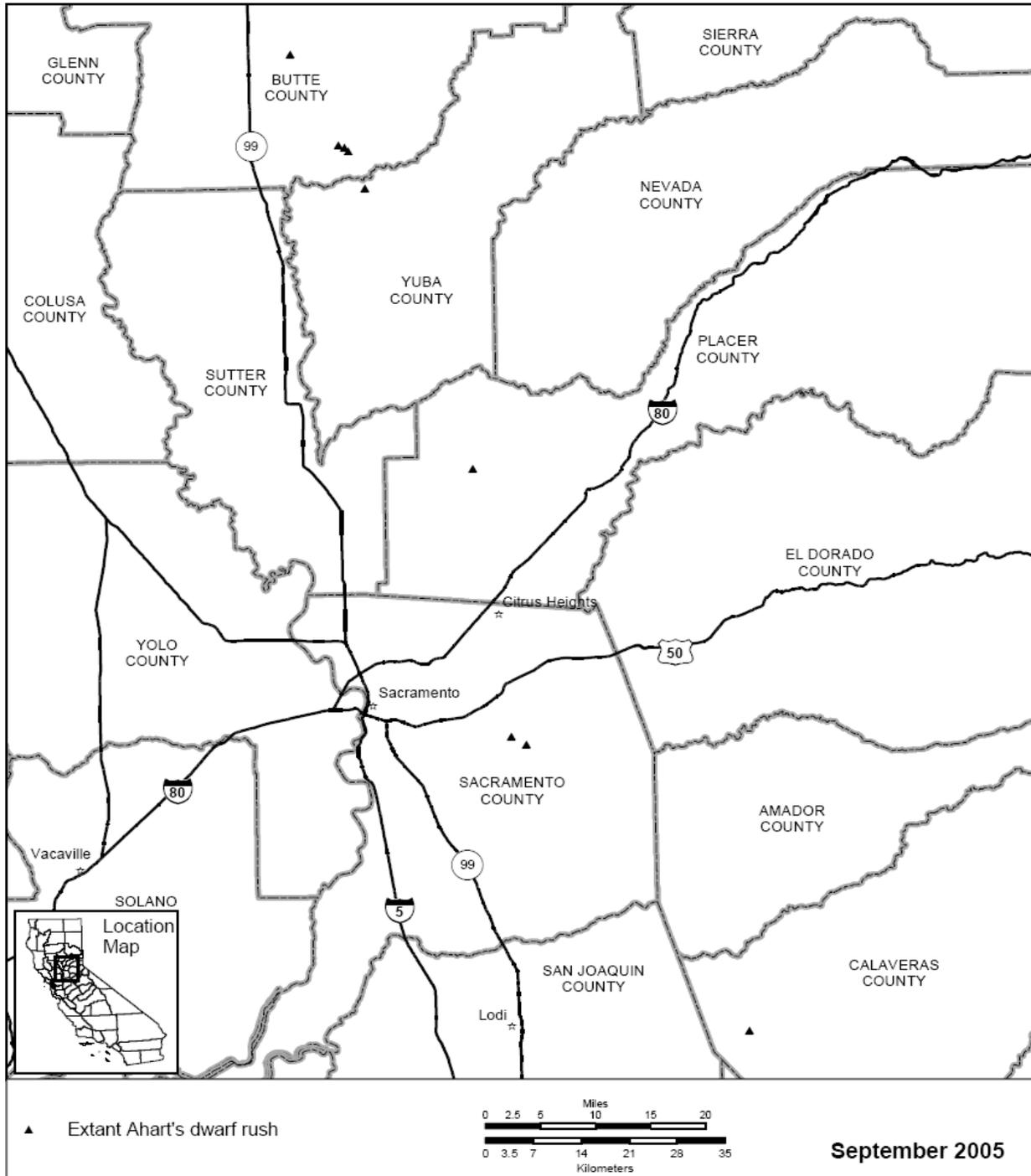


Figure A.28-2 Distribution of Ahart's Dwarf Rush in California (USFWS 2005)

In the deeper parts of vernal pools where Ahart’s dwarf rush has been documented, associated species include great valley eryngo (*Eryngium castrense*, native perennial herb), bractless hedgehyssop (*Gratiola ebracteata*, native annual herb), tricolor monkey-flower (*Mimulus tricolor*, native annual herb), American pillwort (*Pilularia americana*, native fern), bristled downingia (*Downingia bicornuta*, native annual herb), folded calicoflower (*Downingia ornatissima*, native annual herb), white-headed navarretia (*Navarretia leucocephala*, native annual herb) and water pygmyweed (*Crassula aquatica*, native annual herb). Nonnative invasive grasses that can colonize the upper edges of vernal pools and encroach on Ahart’s dwarf rush habitat include facultative wetland species Italian rye-grass (*Lolium multiflorum*) and Mediterranean barley (*Hordeum marinum* var. *gussoneanum*) (Hickman 1993, USFWS 2005, Calflora 2007, CNDDDB 2007).

A.28.4 Life History

The life history of Ahart’s dwarf rush has not been studied in detail (USFWS 2005). Flowering occurs in mid-spring (late March-May), and flowers are wind-pollinated, but conditions necessary for germination are unknown (Ertter 1986, USFWS 2005). The Recovery Plan states that in dry years individual plants have a single stem, and that populations tend to be larger in wet years than dry (USFWS 2005).

A.28.5 Threats

Threats to vernal pool and surrounding habitat in the Plan Area, including Ahart’s dwarf rush habitat, are described in the Recovery Plan (USFWS 2005) and include the following:

- Habitat loss and fragmentation consequent to urbanization, agricultural conversion, and mining; and habitat alteration and degradation due to changes to natural hydrology, invasive species, incompatible grazing regimes (including insufficient grazing for prolonged periods), infrastructure projects (such as roads and utility projects), recreational activities (such as off-highway vehicles and hiking), erosion, climatic and environmental change, and contamination.
- Conversion of land uses from intact natural communities (primarily grasslands) or livestock pastures to more intensive agricultural uses, such as croplands; or from one crop-type to another (USFWS 2005).
- Competition from invasive species is a factor contributing to the decline of plant species in these habitat types. Ahart’s dwarf rush may be threatened by increasing dominance by competitors such as Italian rye-grass, Mediterranean barley, and waxy mannagrass (*Glyceria declinata*), which may in turn contribute to changes in hydrology and livestock grazing practices (USFWS 2005).
- Changes in hydrology that result in a change in the timing, frequency, and duration of inundation in vernal wet Ahart’s dwarf rush habitat can reduce suitability for the species. The hydrology in vernal pool and adjacent habitats has been altered by

construction of flood control structures, such as levees and other water barriers, and by changes in runoff caused by activities such as irrigation or construction of roads and culverts (USFWS 2005).

- The decline of pollinator species due to habitat fragmentation and the loss of upland habitats that support pollinators is a potential threat. Specific insects that pollinate Ahart’s dwarf rush have not yet been identified; therefore, it is not possible at this time to assess their status and determine if protection of pollinators or their habitat is necessary. If essential pollinators are declining through habitat loss, however, Ahart’s dwarf rush may be declining in response (USFWS 2005).
- Ahart’s dwarf rush populations are geographically restricted, isolated, and some have small numbers of individuals in some populations and years (CNDDDB 2007). Genetic drift, inbreeding, and reduced gene flow may result from small numbers of populations or small number of individuals per occurrence (Elam 1998). Additionally, small populations are threatened with extirpation from random events such as extreme weather and lack of genetic diversity. Small and/or less genetically diverse populations are less likely to adapt and survive environmental changes, even relatively minor events (USFWS 2005).
- Several other threats to vernal pool habitat and associated species were identified in the Recovery Plan. Water contamination can occur from use of herbicides, fertilizers, and other chemicals commonly used in urban and agricultural settings. At the time of discovery, some populations of Ahart’s dwarf rush were in or adjacent to agricultural fields. Fertilizers may contribute to the growth of invasive plants (USFWS 2005). Habitat alteration may also occur due to large-scale climate and environmental changes, such as global warming, that lead to changes in precipitation pattern and atmospheric conditions (USFWS 2005).
- Inappropriate timing, intensity, kind/class of animal, or duration of livestock grazing may also negatively impact vernal pool species, including Ahart’s dwarf rush (Barry 1998, Marty 2005).

A.28.6 Relevant Conservation Efforts

Red Bluff dwarf rush is proposed for coverage under the Placer County Conservation Plan (Placer County 2011 draft). The only other documented effort has been the establishment of a preserve near the Oroville Municipal Airport, where plants were lost during a runway expansion project (CNDDDB 2007).

A.28.7 Species Habitat Suitability Model

A.28.7.1 Habitat

Ahart’s dwarf rush habitat includes areas in the following BRCP mapped land cover types:

- Vernal pools;
- Altered vernal pools; and
- Grassland with vernal swale complex.

Vernal pools that may support Ahart’s dwarf rush habitat may also occur as inclusions in mapped grassland, blue oak savanna, ranchettes—open, and disturbed ground land cover types. These inclusions were not mapped because they did not meet the mapping criteria for vernal pool, altered vernal pool, and grassland with vernal swale complex land cover types.

A.28.7.2 Assumptions

Ahart’s dwarf rush is restricted to swales and shallow areas within low elevation Northern Basalt Flow, Northern Claypan, Northern Hardpan, and Northern Volcanic Mudflow vernal pool types (Sawyer and Keeler-Wolf 1995, USFWS 2005). The species specialize on higher, less mesic edges of vernal pools but has also been documented in deeper parts of vernal pools (USFWS 2005). Microhabitats from which the plants have been reported are the edges of vernal pools, bottoms of intermittent drainages, and on pocket gopher (*Thomomys* species) and ground squirrel (*Spermophilus* species) mounds (USFWS 2005).

Given these habitat preferences, suitable habitat for the Ahart’s dwarf rush is defined as the vernal pool, altered vernal pool, and grassland with vernal swale complex land cover types within the Plan Area.

A.28.8 Recovery Plan Goals

A general statement for recovery of Ahart’s dwarf rush and the other rare and listed vernal pool species is presented in the Recovery Plan: to ensure protection of the full geographic, genetic and ecological extent of this species and to improve the circumstances that caused its decline. Declines must be halted and reversed, and the taxon must be restored to the point where populations are stable or increasing without active human intervention (USFWS 2005). Little is known about Ahart’s dwarf rush population dynamics and many aspects of its lifecycle; therefore, restoration must be iterative and management adaptive.

A.28.9 References

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