

Astragalus claranus
(Clara Hunt's milkvetch)

**5-Year Review:
Summary and Evaluation**



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**U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
Sacramento, California**

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5-YEAR REVIEW

Astragalus claranus (Clara Hunt's milkvetch)

I. GENERAL INFORMATION

Purpose of 5-Year Reviews:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Federal Endangered Species Act (Act) to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review). Based on the 5-year review, we recommend whether the species should be removed from the list of endangered and threatened species, be changed in status from endangered to threatened, or be changed in status from threatened to endangered. Our original listing of a species as endangered or threatened is based on the existence of threats attributable to one or more of the five threat factors described in section 4(a)(1) of the Act, and we must consider these same five factors in any subsequent consideration of reclassification or delisting of a species. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process defined in the Act that includes public review and comment.

Species Overview:

Astragalus claranus (Clara Hunt's milkvetch) is a low-growing annual herb in the pea family (Fabaceae). It was historically found on thin, rocky clay soils derived from volcanic or serpentine substrates in grasslands and openings in *Arctostaphylos manzanita* (whiteleaf manzanita) - *Quercus douglasii* (blue oak) woodlands (Liston 1990) in Napa and Sonoma Counties across an elevation range of 75 to 225 meters. The species is now restricted to five localities in northwestern Napa and eastern Sonoma County, four of which were known at the time of listing. Habitat destruction and modification due to urbanization and competition from invasive plant species pose the most significant threats to this species.

Methodology Used to Complete This Review:

This review was conducted by a fish and wildlife biologist within the Sacramento Fish and Wildlife Office (SFWO), using information from species surveys, personal communications with species experts, and the California Natural Diversity Database (CNDDDB) maintained by the California Department of Fish and Game. We received one public comment letter in response to our Federal Register Notice initiating this 5-year review. That comment letter was from the California State Department of Justice and the issues discussed therein are addressed under the appropriate section below. This 5-year review contains updated information on the species' biology and threats, and an assessment of that information compared to that known at the time of listing or since the last 5-year review. We focus on current threats to the species that are attributable to the Act's five listing factors. The review synthesizes all this information to evaluate the listing status of the species and provide an indication of its progress towards

recovery. Finally, based on this synthesis and the threats identified in the five-factor analysis, we recommend a prioritized list of conservation actions to be completed or initiated within the next 5 years.

Contact Information:

Lead Regional Office: Diane Elam, Deputy Division Chief for Listing, Recovery, and Habitat Conservation Planning, and Jenness McBride, Fish and Wildlife Biologist, Pacific Southwest Region; (916) 414-6464.

Lead Field Office: Kirsten Tarp, Recovery Branch, Sacramento Fish and Wildlife Office 916-414-6600.

Federal Register (FR) Notice Citation Announcing Initiation of This Review: A notice announcing initiation of the 5-year review of this taxon and the opening of a 60-day period to receive information from the public was published in the Federal Register on March 5, 2008 (73 FR 11945). We received one public comment letter in response to the Federal Register Notice initiating this 5-year review. That comment letter was from the California State Department of Justice and the issues discussed therein are addressed under the appropriate section below.

Listing History:

Original Listing

FR Notice: 62 FR 55791

Date of Final Listing Rule: October 22, 1997

Entity Listed: *Astragalus claranus* (Clara Hunt's milkvetch), a plant species

Classification: Endangered

State Listing

Astragalus claranus (Clara Hunt's milkvetch) was listed by the State of California as threatened in 1990.

Associated Rulemakings: None applicable.

Review History: No relevant reviews have been conducted since listing.

Species' Recovery Priority Number at Start of 5-Year Review: The recovery priority number for *Astragalus claranus* is 5C according to the Service's 2008 Recovery Data Call for the Sacramento Fish and Wildlife Office, based on a 1 to 18 ranking system where 1 is the highest-ranked recovery priority and 18 is the lowest (Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 FR 43098, September 21, 1983). This number indicates that the taxon is a species that faces a high degree of threat and has a low potential for recovery. The "C" indicates conflict with construction or other development projects or other forms of economic activity.

Recovery Plan or Outline: No recovery plan or outline for this species has been completed.

II. REVIEW ANALYSIS

Application of the 1996 Distinct Population Segment (DPS) Policy

The Federal Endangered Species Act defines “species” as including any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) of any species of vertebrate wildlife. This definition of species under the Act limits listing as distinct population segments to species of vertebrate fish or wildlife. Because the species under review is a plant, the DPS policy is not applicable, and the application of the DPS policy to the species’ listing is not addressed further in this review.

Information on the Species and its Status

Species Biology and Life History

Astragalus claranus is a low-growing annual herb in the pea family (Fabaceae). It is a slender, sparsely leafed plant on which small flowers appear from March through April. The petals are bicolored, with the wings whitish and the banner and keel purple in the upper third. The species is found on thin, rocky clay soils derived from volcanic or serpentine substrates in grasslands and openings in *Arctostaphylos manzanita* – *Quercus douglasii* woodlands across an elevation range of 75 to 225 meters.

Spatial Distribution/Abundance. Historically, *Astragalus claranus* was known from six occurrences in Sonoma and Napa Counties. It is possible that this plant has always been rare, but more common in the hills surrounding the Napa Valley and possibly on the valley floor itself, before the planting of vineyards (A. Howald, Garcia and Associates and California Native Plant Society, *in litt.* 2008).

By the time of listing, two of the six known occurrences had been extirpated due to urbanization and viticulture, leaving only four known localities in northwestern Napa and eastern Sonoma Counties. Since the time of listing, there has been one additional population found, at Spring Valley, just two miles from the Lake Hennessey population discussed in the listing rule. Therefore, the species is currently known from five localities: the four mentioned in the listing rule, plus one additional locality discovered since listing. Those five localities are:

Lake Hennessey. Sometimes referred to as the Conn Valley Road site, Napa County, a 2007 survey of the site revealed only 3 to 4 individuals (J. Ruygt, California Native Plant Society, pers. comm. 2008).

Spring Valley. This population, separated from the Lake Hennessey population by approximately 2 miles and a mountain ridge, was discovered in 1998 after the listing rule was published. This population was last surveyed in 1998 and found to support 290 individuals (CNDDDB 2008; Ruygt, pers. comm. 2008). Due to the time that has lapsed since that survey, the current population size may be different.

Bale Grist Mill State Historic Park. Sometimes referred to as the Bale Grist Mill State Historic Park/Bothe-Napa Valley State Park site, Napa County, this population exists on a hiking trail linking the two parks. Only 15 individuals were found during the most recent survey, in 2005 (CNDDDB 2008; Ruygt, pers. comm. 2008). The current population size is unknown.

Lewelling Lane. This population is thought to be the largest in Napa County. The most recent survey was conducted in 2002 and revealed 251 individuals (CNDDDB 2008; Ruygt, pers. comm. 2008). The current population size is unknown.

Saint Helena Road near Calistoga Road. Sometimes referred to as the Alpine School site, this is the only known population in Sonoma County. Historically, this was the largest of the populations (Ruygt, pers. comm. 2008). In April 2009, surveys at the site indicated 1,500 individuals (Herrick, *in litt.* 2009a).

Reconnaissance for *Astragalus claranus* on the nearby 388-hectare parcel to the south of the Alpine School site (Saddle Mountain Preserve), owned and managed by Sonoma County Agricultural Preservation and Open Space Preservation District, was also conducted in April 2009. Reconnaissance revealed a previously unreported colony which numbered roughly 300 individuals, though a formal survey was not conducted (Herrick, *in litt.* 2009c). Therefore *Astragalus claranus* numbers roughly 1,800 individuals in the area surrounding Saint Helena Road near Calistoga Road (Herrick, *in litt.* 2009c).

No new information in regards to ecosystem use, changes in taxonomic classification, or genetics has occurred since the time of listing. In 2007, California Department of Fish and Game was funded through section 6 of the Endangered Species Act to conduct a seed banking project for *Astragalus claranus* and 60 other plant species. In June 2009, seeds were collected from the several of the populations in Napa County, and the Saint Helena Road near Calistoga Road populations and stored at Rancho Santa Ana Botanic Garden (Herrick *in litt.* 2009b). No research or other grant-supported project on this species has been conducted since the time of listing.

Five-Factor Analysis

The following five-factor analysis describes and evaluates the threats attributable to one or more of the five listing factors outlined in section 4(a)(1) of the Act.

FACTOR A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

The loss and modification of suitable habitat for *Astragalus claranus* was the primary reason for the original listing of the species in 1997, specifically the construction of a reservoir. In addition, agricultural conversion, recreational activities and residential development all contributed to the reduction or elimination of the habitat. Today, these types of threats, specifically urbanization and degradation of habitat due to recreational activities, uprooting by feral pigs (*Sus scrofa*), and potential vineyard development continue to threaten the species. For

example, future vineyard expansion described in the newly revised Napa County General Plan (NCGP), may impact *A. claranus*, although mitigation measures for avoidance and minimization are included (PMC 2007; NCGP 2008). Vineyards could potentially be expanded in the South St. Helena area near existing *A. claranus* populations.

Lake Hennessey

Prior to listing, the Lake Hennessey population was reduced in size when the creation of Lake Hennessey in the 1950's inundated much of the site. Then, in 1990, the remnant population was nearly destroyed when dredge spoils from the lake were deposited directly on top of the population (Howald, *in litt.* 2008). Though the dredge spoils were removed, and the remaining population fenced, invasive weed seed was left behind, as described below under Factor E, further threatening the population. Spoils derived from dredging of the lake are no longer deposited within the area of this plant population (Howald, *in litt.* 2008).

By the time of listing, discussions had been put to rest involving the raising of the dam to increase water storage capacity at the lake. Presently, discussions are not known to be occurring regarding increasing water storage, so this is not currently considered a threat to the species. However, in the future, the Service would consider any direct impact of increases in water storage near the population and any associated increase in urban growth in the area a potential threat to the species.

Also at Lake Hennessey, fishing access near the *Astragalus claranus* population had been thought to be resulting in degradation of habitat for the species. By the time of listing, the City of Napa had fenced the two acre area containing the population, installed a gate to allow controlled fishing access to the area, and repaired damage to the fence several times. The extent to which fishing access currently threatens the population at this location is unknown.

This site is not in conservation ownership, but is owned by the City of Napa and is not being specifically managed for the conservation of *Astragalus claranus*. In addition, the newly revised Napa County General Plan states that vineyard expansion in the general vicinity of this population may occur (PMC 2007; NCGP 2008)

Spring Valley

The Spring Valley population of *Astragalus claranus* was not known at the time of listing, so no threats under Factor A were discussed. The California Natural Diversity Database states that nearby vineyard expansion may threaten the population (CNDDDB 2008) and the newly revised Napa County General Plan states that vineyard expansion in the general vicinity of this population may occur under one potential development scenario (PMC 2007). Other threats under Factor A currently facing the population at Spring Valley are unknown. This site is in private ownership and is not being specifically managed for the conservation of *A. claranus*.

Bale Grist Mill State Historic Park

At Bale Grist Mill State Historic Park, according to the listing rule, discussions were taking place involving the development of a campground within the population of *Astragalus claranus*, however the threat was not considered imminent because of lack of funding and possible revisions to the park plan (W Grummer, California Department of Parks and Recreation, pers.

comm. 1996). Currently, specific plans to expand the park are not being discussed, however, the Service would consider any direct impact of future development near the population and any associated increase in recreational use of the area a potential threat to the species. Although located within a State Park, which affords protection from large-scale development, this population is not fenced nor is the habitat being managed specifically for the conservation of the species. Brush piles have, however, been placed to discourage foot traffic near the population. It is not known whether recreational use of the trail in this area is causing negative impacts to the population (C. Shaffer, California Department of Parks and Recreation, pers. comm. 2008).

Lewelling Lane

In the listing rule, degradation of habitat at Lewelling Lane due to the uprooting of plants by feral pigs was considered to be a threat to the population (Ruygt, pers. comm. 1996). According to the CNDDDB, a 2002 survey indicated that uprooting was still occurring and, in addition, noted light grazing at the population site (CNDDDB 2008). In the absence of information since 2002 that this threat has been reduced or ameliorated, we must assume that uprooting of plants by feral pigs may still threaten the population of *Astragalus claranus* at Lewelling Lane. Whether the magnitude of grazing at the site is a threat to *A. claranus* is unknown.

This site is in private ownership and is not being specifically managed for the conservation of *Astragalus claranus*. In addition, the newly revised Napa County General Plan states that vineyard expansion in the general vicinity of this population may occur under one potential development scenario (PMC 2007)

St. Helena Road

At the time of listing, the St. Helena Road population was in private ownership, under a voluntary protection agreement with The Nature Conservancy. At that time, the population was faced with the threats of nearby development of the approved Saddle Mountain housing subdivision to the south (Ruygt 1994). Specifically, it was anticipated that soil erosion from proposed road and pad construction for house lots would affect the general area to the detriment of nearby *Astragalus claranus* (Ruygt 1994).

In 2006, as part of Saddle Mountain development planning, the Sonoma County Agricultural Preservation and Open Space District purchased the 960 acre parcel south and east of the St. Helena Road population. Purchased for its recreational and natural resource values, a management plan is currently being developed for the property (Gledhill, *in litt.* 2008). Though the housing development has not yet been constructed and the surrounding area is now designated open space, it is not clear whether development within the site will negatively affect (*i.e.*, via soil erosion or changed hydrological regime) that open space or the St. Helena Road population to the north.

The Sonoma County Agricultural Preservation and Open Space District in 2007 purchased a conservation easement from the private landowner to the north of the Saddle Mountain development, on whose land an occurrence of *Astragalus claranus* was known to exist in 1999 (CNDDDB 2008). Therefore, though not in public ownership, it is now protected from large-scale development by conservation easement. The species, however, may already be extirpated from this site based on results of the last two survey efforts.

In 1999, light grazing was known to be occurring at the site, but was not considered a threat. Threats due to grazing at the site since 1999 are unknown.

Factor A Summary

In summary, the loss and modification of *Astragalus claranus* habitat via development, recreational activities and uprooting by feral pigs, continue to threaten the species, especially in areas where urbanization is expected to expand further. The St. Helena Road population has been protected under conservation easement and a large area of suitable habitat adjacent to the population has been protected in conservation ownership. This and the population on State land are protected from large-scale, land-use conversion. The other three are located on private lands where potential development is not precluded. On private lands, the general trend of habitat loss due to urbanization has continued and will likely continue at or adjacent to known populations. Even at the St. Helena Road population, where the population itself is protected, habitat to the north and west is not protected and urbanization of these surrounding lands could quickly degrade remaining habitat (e.g., via the alteration of surrounding hydrological conditions).

FACTOR B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Overutilization for commercial purposes was not known to be a factor in the 1997 final listing rule (62 FR 55791). Overutilization for any purpose does not appear to be a threat at this time.

FACTOR C: Disease or Predation

Disease or predation was not known to be a factor in the 1997 final listing rule (62 FR 55791), nor does it appear to be a threat at this time.

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

At the time of listing, regulatory mechanisms thought to provide inadequate protection to *Astragalus claranus* included: (1) listing under the California Endangered Species Act (CESA); (2) the California Environmental Quality Act (CEQA); and (3) the California Native Plant Protection Act (NPPA). The listing rule (62 FR 55791) provides an analysis of the level of protection that was anticipated from those regulatory mechanisms. This analysis remains currently valid.

Federal Laws and Regulations

Endangered Species Act: The Endangered Species Act of 1973, as amended (Act), is the primary Federal law that provides protection for *Astragalus claranus*. Section 7(a)(2) requires Federal agencies to consult with the Service to ensure any project they fund, authorize, or carry out does not jeopardize a listed species. Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the “take” of federally-endangered wildlife, however, the take prohibition does not apply to plants. Instead, plants are protected from harm in two particular

circumstances. Section 9 prohibits (1) the removal and reduction to possession (i.e. collection) of endangered plants from lands under Federal jurisdiction, and (2) the removal, cutting digging, damage, or destruction of endangered plants on any other area in knowing violation of a state law or regulation, or in the course of any violation of a state criminal trespass law. Section 9 also makes illegal the international and interstate transport, import export and sale or offer for sale of endangered plants and animals. The protection of Section 9 afforded to endangered species is extended to threatened wildlife and plants by regulation. Federally listed plants may be incidentally protected in areas where they co-occur with federally listed wildlife species. In some cases, federally listed plants are included as covered species in habitat conservation plans (HCPs) prepared by non-Federal applicants as part of the terms and conditions for issuance of an incidental take permit for federally listed wildlife under section 10(a)(1)(B).

National Environmental Policy Act (NEPA): NEPA (42 U.S.C. 4371 *et seq.*) provides some protection for listed species that may be affected by activities undertaken, authorized, or funded by Federal agencies. Prior to implementation of such projects with a Federal nexus, NEPA requires the agency to analyze the project for potential impacts to the human environment, including natural resources. In cases where that analysis reveals significant environmental effects, the Federal agency must propose mitigation alternatives that would offset those effects (40 C.F.R. 1502.16). These mitigations usually provide some protection for listed species. However, NEPA does not require that adverse impacts be fully mitigated, only that impacts be assessed and the analysis disclosed to the public.

State Laws and Regulations

California Endangered Species Act (CESA) and Native Plant Protection Act (NPPA): The CESA (California Fish and Game Code, section 2080 *et seq.*) prohibits the unauthorized take of State-listed threatened or endangered species. The NPPA (Division 2, Chapter 10, section 1908) prohibits the unauthorized take of State-listed rare or endangered plant species. The CESA requires State agencies to consult with the California Department of Fish and Game on activities that may affect a State-listed species and mitigate for any adverse impacts to the species or its habitat. Pursuant to CESA, it is unlawful to import or export, take, possess, purchase, or sell any species or part or product of any species listed as endangered or threatened. The State may authorize permits for scientific, educational, or management purposes, and to allow take that is incidental to otherwise lawful activities. *Astragalus claranus* was listed by the State of California as threatened in 1990.

Furthermore, with regard to prohibitions of unauthorized take under NPPA, landowners are exempt from this prohibition for plants to be taken in the process of habitat modification. Where landowners have been notified by the State that a rare or endangered plant is growing on their land, the landowners are required to notify the California Department of Fish and Game 10 days in advance of changing land use in order to allow salvage of listed plants. Salvaging is unlikely to be beneficial for *Astragalus claranus*, an annual species, as no evidence exists that the species would survive transplantation (62 FR 55791).

California Environmental Quality Act (CEQA): The CEQA requires review of any project that is undertaken, funded, or permitted by the State or a local governmental agency. If significant

effects are identified, the lead agency has the option of requiring mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA section 21002). Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved.

In summary, the Federal Endangered Species Act is the primary Federal law that provides protection for this species since its listing as endangered in 1997. Other Federal and State regulatory mechanisms provide discretionary protections for the species based on current management direction, but do not guarantee protection for the species absent its status under the Act. Therefore, we continue to believe other laws and regulations have limited ability to protect the species in absence of the Federal Endangered Species Act.

FACTOR E: Other Natural or Manmade Factors Affecting Its Continued Existence

At the time of listing, threats to *Astragalus claranus* under Factor E were competition with introduced plants, community succession, and loss of occurrences from natural events because of small population size. An additional threat to the species noted since the listing is climate change. Impacts to the species under predicted future climate change are unclear.

Competition with introduced species

In the original listing rule, an infestation of *Centaurea solstitialis* (yellow star-thistle) was indicated to be threatening, by way of competition for resources, the Lake Hennessey population of *Astragalus claranus*, the seed source of which was likely dredge spoils deposited on top of the population, as discussed under Factor A above (Howald, pers. comm. 1993). The Bale Grist Mill State Historic Park population also faced the threat of competition from *C. solstitialis* (Ruygt 1994). Though there is no ecologist specifically for Bale Grist Mill State Historic Park, we contacted the District Ecologist and learned that there is no new information to suggest *C. solstitialis* has been controlled at either site. We must assume this introduced species remains a threat both here and at Lake Hennessey. Climate change may exacerbate the threat posed by introduced species. Rapid climate change may place native species with long generation times at a disadvantage because they cannot quickly move into newly suitable habitat. Invasive plants that are capable of rapid dispersal and are tolerant of a wide range of climates will be at an advantage as they will be able to shift ranges quickly (Dukes and Mooney 1999). In addition, invasive species, such as *Bromus tectorum* (cheatgrass), *Pueraria lobata* (kudzu), and *Lonicera japonica* (Japanese honeysuckle) have been shown to respond positively to increased carbon dioxide concentration when grown under controlled conditions (Dukes and Mooney 1999). It is difficult to predict which species now co-occurring with *Astragalus claranus* may become invasive and which invasive species may become more severe.

The Lewelling Lane population, at the time of listing was threatened by competition from *Genista monosperulana* (French broom) (CNDDDB 1996). There is no new information to suggest *G. monosperulana* has been controlled at the site, so we must assume this introduced species remains a threat.

Though it has not been specifically documented, it is likely that the Spring Valley and St. Helena Road populations of *Astragalus claranus* are also threatened by competition from introduced plant species (Howald, *in litt.* 2008).

Though not mentioned in the listing rule, based on its annual habit and size, like other small annual *Astragalus* species, it is thought that *A. claranus* has difficulty competing with introduced annual grasses (Howald, *in litt.* 2008). This may have resulted in its becoming restricted to areas with thin soils or serpentine where the introduced grasses don't do very well (Howald, *in litt.* 2008).

Community Succession

At Bale Grist Mill State Historic Park, plant succession was indicated in the listing rule to be excluding or reducing the population of *Astragalus claranus* (Ruygt 1994). The rule stated that though periodic fire reduces manzanita cover and creates openings for other species, fire suppression has reduced fire frequency in the manzanita community. As established manzanita plants continue to grow, and new manzanita seedlings become established, less space is available for *A. claranus*. There is no new information regarding wild or controlled fires or other habitat restoration at the site, so we must assume that community succession remains a threat to the species.

Small population size

Small population size was identified as a threat due to increased susceptibility to extirpation from random events and increased genetic drift and inbreeding leading to a loss of fitness (genetic contribution to future generations). Reduced genetic variation in small populations may make any species less able to successfully adapt to future environmental changes (Ellstrand and Elam 1993).

Although exact population numbers of *Astragalus claranus* were not known at the time of listing, it was a species for which two or more populations supported only 100 or fewer individuals. Currently, three occurrences support fewer than 100 individuals (CNDDDB 2008). Having few individuals leaves *A. claranus* susceptible to extirpation throughout a significant portion of its range from random events and increases the threat of genetic drift and inbreeding. Since the time of listing, no new information has become available that population sizes have increased to the extent that this threat has lessened. Therefore, because of its small population sizes, this species is still threatened with extinction or extirpation throughout a significant portion of its range due to random events such as flood, drought, disease or other events.

Global Climate Change

We received one comment letter in response to our Federal Register Notice announcing the review for *Astragalus claranus* and that for 57 other plant and animal species. In that comment letter from the California Department of Justice it was noted that there is a danger that “hydrological modifications to wetland areas, as from drought, sea-level rise or salt-water intrusion could threaten the continued existence of these plants” In addition, we were urged to

“take an expansive and comprehensive view of the threats posed by global warming and, as part of each 5-year review conducted under the Act, broadly consider all potential effects of global warming on the listed species” (James Potter, California Department of Justice, *in litt.* 2008). Additionally, the Attorney General urged that the Service consider the effect of drought, changing water tables and other global warming impacts on *A. claranus*.

An additional threat to the species noted since the listing is climate change. Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field *et al.* 1999; Cayan *et al.* 2005; IPCC 2007). Similarly, California’s climate is expected to become considerably warmer, with expected average temperatures statewide increasing by 3 to 10.5 degrees Fahrenheit by 2100 (CCCC 2006). Current projections show little change in annual precipitation in California; however, increased air temperatures will result in a sharply decreasing snowpack in the Sierra Nevada (CCCC 2006). These alterations to California’s climate may have significant impacts on native plant communities. Recent research suggests that up to 66 percent of California’s endemic flora will experience range reductions of greater than 80 percent in the next century (Loarie *et al.* 2008). While the particular impacts of climate change on *Astragalus claranus* have not been investigated, evidence suggests that the distribution of appropriate habitat elements (microclimate, community associations) may be altered in the coming decades resulting in a further decline of the species. Additional information, such as habitat suitability models and projections for future habitat and community shifts, is required before we can make accurate predictions about the specific impacts that climate change will have on *Astragalus claranus*.

Factor E Summary

In summary, competition with introduced species, community succession in the absence of wildfire, and risk of extinction or extirpation throughout a significant portion of its range due to small population size continue to threaten *Astragalus claranus*. Of the five known occurrences, at least three are threatened by introduced plant species and it is very likely that the remaining two are as well. One occurrence is threatened by community succession. Three occurrences have fewer than 100 individuals and are subject to loss occurrences from natural events because of small population size.

III. RECOVERY CRITERIA

No final recovery plan has been completed for this species.

IV SYNTHESIS

At the time of listing in 1997, four populations of *Astragalus claranus* were known in Napa and Sonoma Counties; currently there are five known populations. Very little progress toward recovery has been made on the species since its listing. All five of the populations have been surveyed at least once since the time of listing in 1997, however, most have not been surveyed recently. The latest surveys at St. Helena Road indicate the species may have been extirpated from that locality. Combined with the fact that *A. claranus* is an annual species with typically

fluctuating annual population levels, it is clear that, during years of small population size, the species is susceptible to extirpation due to random events and genetic drift and inbreeding. Neither has data been collected recently to indicate the nature and severity of threats to the species. The most current information available indicates that competition from introduced plant species continues to threaten most, or possibly all populations and that management of habitat to reduce or eliminate introduced plant species is not occurring at any locality. In addition, uprooting of habitat by feral pigs continues to occur within the largest population of *A. claranus* in Napa County.

Of the five known occurrences, two are located on either State land or are under conservation easement protecting them from large-scale land-use conversion. The other three are located on private lands where large-scale development is not precluded. Though management to conserve the species may happen less readily on private land, habitat even on protected land is not currently being conserved or managed for the species. Taking all these factors into account, therefore, the status of the species remains endangered due to small population size and significant ongoing threats. Therefore, we believe *Astragalus claranus* still meets the definition of endangered, and recommend no status change at this time.

V RESULTS

Recommended Listing Action:

- Downlist to Threatened
- Uplist to Endangered
- Delist (indicate reason for delisting according to 50 CFR 424.11):
 - Extinction*
 - Recovery*
 - Original data for classification in error*
- No Change

New Recovery Priority Number and Brief Rationale: No change in Recovery Priority Number for *Astragalus claranus* is recommended because the species still faces a high degree of threat, a low potential for recovery and conflict with construction or other development projects or other forms of economic activity. The most current information available indicates low numbers of individuals, low numbers of populations, and significant ongoing threats, including competition from introduced plant species at most, or possibly all populations.

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

- 1) Complete a recovery plan for *Astragalus claranus*.
- 2) Develop habitat suitability model for *Astragalus claranus* and then project anticipated shifts in range and occurrences under various climate change scenarios.
- 3) Secure landowner agreements with property owners at the Lake Hennessey, Spring Valley, Lewelling Lane and St. Helena Road populations to facilitate the management of *Astragalus claranus* habitat to reduce or eliminate competition with introduced plant species and uprooting by feral pigs (at Lewelling Lane).
- 4) Conduct three consecutive years of surveys at each of the five localities to better understand population sizes and inter-annual population fluctuations. Surveys should also include an assessment of current threats facing the *A. claranus* populations.
- 5) Work with California Department of Parks and Recreation at Bale Grist Mill State Historic Park to manage habitat (e.g., conduct introduced species control) near the *A. claranus* population in the park.

VII. REFERENCES CITED

- Cayan, D., M. Dettinger, I. Stewart, and N. Knowles. 2005. Recent changes towards earlier springs: early signs of climate warming in western North America? U.S. Geological Survey, Scripps Institution of Oceanography, La Jolla, California.
- [CCCC] California Climate Change Center. 2006. Our changing climate, assessing the risks to California. The summary report of the Climate Scenarios Project released by CalEPA and CEC.
- [CNDDDB] California Department of Fish and Game, Natural Diversity Data Base. 1996. Element Occurrence Reports for *Astragalus claranus*. Unpublished cumulative data current to [March 30, 1996].
- [CNDDDB] California Department of Fish and Game, Natural Diversity Data Base. 2008. Element Occurrence Reports for *Astragalus claranus*. Unpublished cumulative data current to [March 30, 2008].
- Dukes, J. S. and H. A. Mooney. 1999. Does global change increase the success of biological invaders? Trends in Ecology and Evolution. 14(4): 135-139.
- Ellstrand, N.C., and D.R. Elam. 1993. Population genetic consequences of small population size: implications for plant conservation. Annual Review of Ecology and Systematics 24: 217-242.

- Field, C.B., G.C. Daily, F.W. Davis, S. Gaines, P.A. Matson, J. Melack, and N.L. Miller. 1999. Confronting climate change in California. Ecological impacts on the Golden State. A report of the Union of Concerned Scientists, Cambridge, Massachusetts, and the Ecological Society of America, Washington, DC.
- [IPCC] Intergovernmental Panel on Climate Change. 2007. Climate change 2007: the physical science basis. Summary for policymakers. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, IPCC Secretariat, World Meteorological Organization and United Nations Environment Programme, Geneva, Switzerland.
- Liston, A. 1990. An evolutionary study of *Astragalus* sect. *Leptocarpi* subsect. *Californici* (Fabaceae). Ph.D. dissertation, Claremont Graduate School, Claremont, California.
- Loarie, S.R., B.E. Carter, K. Hayhoe, S. McMahon, R. Moe, C.A. Knight, D.D. Ackerly. 2008. Climate change and the future of California's endemic flora. PLoS ONE 3(6): e2502.
- [NCGP] Napa County General Plan. 2008. Napa County Department of Conservation, Development, and Planning, Napa CA. Adopted by Board of Supervisors resolution June 3, 2008.
- PMC. 2007. Final Environmental Impact Report for the Napa County General Plan Update. Prepared for Napa County. Dec 2007
- Ruygt, Jake. 1994. Ecological Studies of Clara Hunt's Milkvetch *Astragalus claranus* and a Proposal for Habitat Restoration at Conn Valley Road, Napa County. Prepared by California Native Plant Society for California Department of Fish and Game.

Personal Communications

- Grummer, William. 1996. Personal communication (previous to final listing rule). California Department of Parks and Recreation, Bothe-Napa Valley State Park.
- Herrick, John. Phone conversation between Valary Bloom and John Herrick (California Native Plant Society) regarding *Astragalus claranus*. June 27, 2008.
- Howald, Ann. 1993 (November 9, November 22). Garcia and Associates and California Native Plant Society.
- Ruygt, Jake. 1996 (September). California Native Plant Society, Napa Valley Chapter. As stated in the final rule for listing of *Astragalus claranus* (62 FR 55791).
- Ruygt, Jake. 2008. Phone conversation between Valary Bloom and Jake Ruygt (California Native Plant Society) regarding *Astragalus claranus*. April 4, 2008.

Shaffer, Cindy. 2008. Phone conversation between Valary Bloom and Cindy Shaffer (California Department of Parks and Recreation) regarding *Astragalus claranus*. June 2008.

In Litt

Gledhill, Katherine. 2008. Electronic mail from Katherine Gledhill (West Coast Watershed, San Anselmo, California) to Valary Bloom regarding acquisition and management of Saddle Mountain Preserve. June 23, 2008.

Herrick, John. 2009a. Electronic mail from John Herrick (California Native Plant Society) to Valary Bloom regarding results of Hayfork Ranch surveys. April 14, 2009.

Herrick, John. 2009b. Electronic mail from John Herrick (California Native Plant Society) to Valary Bloom regarding results of Hayfork Ranch surveys. July 20, 2009.

Herrick, John. 2009c. Electronic mail from John Herrick (California Native Plant Society) to Valary Bloom regarding results of Hayfork Ranch surveys. July 24, 2009.

Howald, Ann. 2008. Electronic mail from Ann Howald (Garcia and Associates and California Native Plant Society) to Valary Bloom in regards to *Astragalus claranus*. June 17, 2008.

Jane Valerius Environmental Consulting, Sebastopol, Ca. Letter dated May 20, 2003 to Merner Land Company, Santa Rosa, California regarding Saddle Mountain Ranch Plant Surveys conducted April 2003.

Potter, James. California Department of Justice. Comment letter dated May 5, 2008, to Sacramento Field Office sent in response to Federal Register Notice announcing *Initiation of 5-year Reviews of 58 Species in California and Nevada* (73 FR 11945).

**U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW**

Astragalus claranus (Clara Hunt's milkvetch)

Current Classification: Endangered

Recommendation Resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Review Conducted By: Valary Bloom, Sacramento FWO staff

FIELD OFFICE APPROVAL:

Lead Field Supervisor, U.S. Fish and Wildlife Service

Approve Susan C Moore Date 8/17/09