

*Plagiobothrys strictus*  
(*Calistoga allocarya*)

*Poa napensis*  
(Napa bluegrass)

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



© Mark W. Skinner

*Plagiobothrys strictus* (Mark Skinner, USDA)



POA

*Poa napensis* (Sandy Long, University of Utah)

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

**February 2010**

## 5-YEAR REVIEW

*Plagiobothrys strictus* (Calistoga allocarya)

*Poa napensis* (Napa bluegrass)

### 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 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' statuses have changed since they were 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:

*Plagiobothrys strictus* and *Poa napensis* co-occur in alkaline sites near thermal springs at two extant sites on private land within a radius of 6 kilometers (4 miles) of Calistoga in Napa County, California.

*Plagiobothrys strictus* is an annual herb in the Boraginaceae (borage family). The species inhabits pools and swales adjacent to and fed by hot springs and small geysers in grasslands between 90 and 160 meters (300 to 500 feet) in elevation. The extant populations occur on clay soils characterized by high concentrations of boron, arsenic, and sulfate (California Department of Fish and Game 2005a). It grows from 10 to 40 centimeters (4 to 16 inches) tall from a single stem at the base.

*Poa napensis* is an erect, tufted perennial bunch grass in the Poaceae (grass family). The species inhabits grasslands and moist, alkaline meadows fed by hot springs between 100 and 120 meters (340 to 400 feet) in elevation (California Department of Fish and Game 2005b). It grows from 30 to 100 centimeters (12 to 39.4 inches) tall. Longer basal leaves grow to about 20.3 centimeters (8 inches) long, upper leaves to about 15.2 centimeters (6 inches). A few erect flowering stems appear in May and can grow to 69 centimeters (27 inches) tall.

## **Methodology Used to Complete This Review:**

This review was prepared by the Sacramento Fish and Wildlife Office, following the Region 8 guidance issued in March 2008. We used information from the 1997 Federal Register, survey information from experts who have conducted site visits for the two localities of these species, the California Natural Diversity Database (CNDDDB) maintained by the California Department of Fish and Game, and the California Native Plant Society online database. Personal communications with experts and plant surveys were our primary sources of information used to update the species' status and threats. We received one letter from the public in response to our Federal Notice initiating this 5-year review. 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 provides an indication of their 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, Region 8, Pacific Southwest; (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 these taxa 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]. One comment letter was received from the Attorney General, Department of Justice, State of California (E. Ochoa and J. Potter, Deputy Attorney General, State of California, *in litt.* 2008), recommending that we fully explore and evaluate the impact of global warming on *Plagiobothrys strictus* and *Poa napensis*. The Attorney General's comments have been addressed in this 5-year review.

## **Listing History:**

### **Original Listing**

**FR Notice:** 62 FR 55791

**Date of Final Listing Rule:** October 22, 1997

**Entity Listed:** *Plagiobothrys strictus*, a listed plant species

**Classification:** Endangered

**Entity Listed:** *Poa napensis*, a listed plant species

**Classification:** Endangered

### **State Listing**

*Plagiobothrys strictus* was listed by the State of California as threatened in 1990.

*Poa napensis* was listed by the State of California as endangered in 1979.

**Associated Rulemakings:** Not applicable

**Review History:** We have not conducted any status reviews for these species since their listing.

**Species' Recovery Priority Number at Start of 5-Year Review:** The recovery priority number for both *Plagiobothrys strictus* and *Poa napensis* is 2C according to the Service's 2008 Recovery Data Call for the Sacramento Fish and Wildlife Office, based on a 1-18 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 taxa are species that face a high degree of threat, but also have a high potential for recovery. The "C" indicates conflict with construction, other development projects or other forms of economic activity.

### **Recovery Plan or Outline**

No recovery plan or outline has been completed for either *Plagiobothrys strictus* or *Poa napensis*.

## **II. REVIEW ANALYSIS**

### **Application of the 1996 Distinct Population Segment (DPS) Policy**

The 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 their Status**

#### **Species Biology and Life History**

*Plagiobothrys strictus* grows from 10 to 40 centimeters (4 to 16 inches) tall in clay soils that are characterized by high boron, acidity, arsenic and sulfate concentrations. It is found in foothill grasslands, in mesic areas including vernal pools, next to and fed by hot springs and small geysers. It is a nearly hairless plant and has either a single stem or branches from the base. Small, usually paired, white flowers appear in March to April in a slender, unbranched inflorescence. The fruit is an egg-shaped nutlet about 0.15 centimeter (0.06 inch) long, keeled on the back and covered with smooth, wart-like projections (California Department of Fish and Game 2005a; Service 2008a).

*Poa napensis* grows 30 to 100 centimeters (12 to 39.4 inches) tall and is an erect, tufted perennial bunch grass. Longer basal leaves grow to about 20.3 centimeters (8 inches) long,

upper leaves to about 15.2 centimeters (6 inches). A few erect flowering stems appear in May and grow as much as 69 centimeters (27 inches) in height. Pale green to purple flowers bloom in condensed, round-shaped clusters at the end of the few flowering stems. It is found in foothill grasslands, in mesic areas including vernal pools, next to and fed by hot springs and small geysers (California Department of Fish and Game 2005b; Service 2008b).

### Spatial Distribution

Currently, there are two extant occurrences, both in Napa County, California. The most recent surveys for the species on the former Calistoga glider airport property (airport property) were conducted during spring 2009 by EcoSystems West Consulting Group and by WRA Environmental Consultants. The most recent visit to the second locality, Myrtdale Hot Springs, which is also near the City of Calistoga in Napa County was in 2007 (Occurrence #1, CNDDDB 2009b). At that time there were six *Poa napensis* plants. No other official surveys and occurrence submissions to the CNDDDB have been made since the 2007 observation because the species' populations occur on private land and access for surveys was not available. Sightings for both species at the edge of the airport property were made from the side of the road for *P. napensis* on the second property (M. Kasparian, U.S. Fish and Wildlife Service, pers. obs. 2008; K. Symonds, U.S. Fish and Wildlife Service, pers. obs. 2008).

### *Plagiobothrys strictus*

Historically, three populations of *Plagiobothrys strictus* were documented within a 3-kilometer (2-mile) radius of Calistoga, Napa County, California. Prior to listing one population had been extirpated due to urbanization and agricultural land conversion (California Native Plant Society 2008a). In 2005, Steve Zalusky of Northwest Biosurvey, mapped *P. strictus* on the airport property during the blooming season between March and May. Mr. Zalusky conducted plant surveys between February and July 2005 (EcoSystems West Consulting Group 2009). Tony Bomkamp of Glen Lukos Associates conducted another survey on 21 and 22 April 2008 and mapped *P. strictus* locations on the airport property. Mr. Bomkamp noted that though many plants were flowering, a few were at the end of their flowering period (EcoSystems West Consulting Group 2009). Roy Buck of Ecosystems West Consulting Group surveyed for and mapped *P. strictus* on 18 and 19 April 2009 on the airport property. During these two survey dates, Mr. Buck noted that most of the plants were already past their flowering period, however a small portion were flowering (Ecosystems West Consulting Group 2009). No plants were observed south of the former runway on the airport property during the 2005, 2008, and 2009 surveys even though it is assumed suitable habitat does exist there (Ecosystems West Consulting Group 2009). In 2009, *P. strictus* was found in areas with sparse vegetation (cover less than 60 percent, occasionally 80 percent or more) and low surrounding vegetation (less than 1 foot high) (Ecosystems West Consulting Group 2009).

## *Poa napensis*

There are only two populations of *Poa napensis* documented and all are found within a 3-kilometer (2-mile) radius of Calistoga, Napa County, California. Both populations are limited to private land (California Native Plant Society 2008b; Service 2008b). The airport property was most recently surveyed for *P. napensis* during the blooming period in March 2009 (WRA 2009). Historically, the range of this plant has been diminished by the development of recreational hot springs and the growth of the town of Calistoga (Service 1997). Currently neither property is being developed. The airport property remains vacant and the second property contains an abandoned house and barn structure which seem vacant as well (Kasparian, pers. obs. 2008).

At the time of listing we stated that if combined, the remaining populations of *Plagiobothrys strictus* and *Poa napensis* would occupy an area of less than 0.5 hectare (1 acre) each. In 2005 Mr. Zalusky estimated that *P. strictus* colonies occupied 0.22 hectare (0.54 acre) on the airport property. Mapped colonies from Mr. Bomkamp (2008) and Mr. Buck (2009) surveys confirmed the 2005 colony locations. In 2008, Mr. Bomkamp mapped colonies occupying a total of 0.05 hectares (0.13 acres), whereas the colonies mapped by the 2009 survey occupied a total of 0.02 hectares (0.05 acres) (EcoSystems West Consulting Group 2009).

*Plagiobothrys strictus* and *Poa napensis* are currently known from only two populations occurring on private lands in Calistoga, Napa County, California. One population of each species occurs on a property with a hot springs, and both are found at the airport property.

### Abundance

#### *Plagiobothrys strictus*

Near the time of listing, the *Plagiobothrys strictus* population at the airport property had approximately 5,000 plants counted in an area of about 180 meters square (2,000 square feet) in 1994 (J. Ruygt, consultant botanist, pers. comm. 1996). The number of individuals in this population fluctuates considerably between years, perhaps due to variations in spring rainfall (California Department of Fish and Game 1988). Survey data from 2007, identified a small population of six plants in the City of Calistoga, which included former occurrence #2 from the California Natural Diversity Database (CNDDDB) records (Occurrence #1, CNDDDB 2009b).

Mr. Zalusky's 2005 plant survey did not estimate the total number of plants occurring on the airport property. Kate Symonds (Service) observed the airport property in April and May 2008 and based on her observations, *P. strictus* was present on the edge of a vernal pool. Formal, protocol-level botanical surveys to assess plant abundance were not conducted during the April and May 2008 visits (Symonds, pers. comm. 2008). Glen Lukos Associates mapped 10 *P. strictus* colonies in 2008 on the airport property, and these colonies either overlap or are within proximity to the colonies identified in the 2009 EcoSystems West Consulting Group survey. The 2009 survey identified 26 *P. strictus* colonies on the airport property (EcoSystems West Consulting Group 2009).

The estimated number of *Plagiobothrys strictus* plants on the airport property for 2008 was 6,250. The 2009 plant surveys estimate the 26 colonies have 3,310 to 5,000 *P. strictus* plants occupying this property (EcoSystems West Consulting Group 2009).

The other population of *Plagiobothrys strictus* is scattered over 4 hectares (10 acres) bisected by an asphalt road on the private property with the barn. The number of individuals in this population has fluctuated between 100 and 10,000 plants. During one observation in 2009, Mr. Rugyt estimated approximately several hundred plants were present on this property (Rugyt, pers. comm. 2009). In recent years, access to the site has been unavailable, and so the current size of this population is unknown.

### *Poa napensis*

At the time of listing, *Poa napensis* was only known from two populations in the vicinity of Calistoga (California Native Plant Society 2008b). A 2008 survey conducted by Glenn Lukos Associates identified approximately 520 *P. napensis* plants at 26 locations on the airport property. A March 9, 2009 EcoSystems West Consulting Group survey identified 244 individual *Poa napensis* plants at 31 locations on the airport property (WRA 2009).

The second population of *Poa napensis* is scattered over a 4 hectare (10 acre) area bisected by an asphalt road on private land in Calistoga. In recent years, the landowner has denied access to the site, and no current information on the size of this population is available (Symonds, pers. comm. 2008).

During the airport property observations in April and May 2008, Ms. Symonds also confirmed *Poa napensis* was present. She noted that plants were growing on the rim of a vernal pool as well as along the property fence line. Formal protocol-level, botanical surveys to assess plant abundance were not conducted during the April and May 2008 visits (Symonds, pers. comm. 2008). Additional observations by Ms. Symonds and other biologists in September 2008, confirmed *P. napensis* is present on the edge of the property and was observed growing on either side of the property fence line (Kasparian, pers. obs. 2008).

### Habitat or Ecosystem

*Plagiobothrys strictus* is typically found in foothill grasslands and mesic areas including vernal pools next to and fed by hot springs and small geysers. One of the private parcels on which this species is found contains a hot spring, which is part of the hydrologic requirements for its growth. *Plagiobothrys strictus* co-occurs with species such as *Hordeum geniculatum* (mouse barley), *Mimulus guttatus* (common Monkey flower), *Juncus* spp. (rushes), and other rare species such as *Astragalus breweri* (Brewer's milk vetch) and *Poa napensis*. *Poa napensis* is typically found in alkaline meadows and grasslands, mesic areas including vernal pools, next to and fed by hot springs and small geysers.

During the September 2008 site observations by Service biologists, it was noted that invasive, non-native plants were common on both properties. The most common plants observed include *Avena sativa* (wild oat), *Centaurea solstitialis* (yellow star thistle), and *Lolium multiflorum* (Italian rye grass), *Lepidium latifolium* (perennial pepperweed) (Kasparian, pers. obs. 2008),

*Festuca pratensis* (meadow fescue) and *Dipsacus fullonum* (common teasel) (Rugyt, pers. comm. 2009).

The 2009 WRA survey identified *Poa napensis* growing in short, sparsely vegetated areas as well as in tall and densely vegetated upland grassland and wetland swales on the airport property. Although *P. napensis* is known to grow in wetlands, it occurs on the airport property in sparsely vegetated bare soil ‘scald’ areas which are associated with *Plagiobothrys strictus* (WRA 2009).

#### Changes in Taxonomic Classification or Nomenclature

Since the time of listing, no changes in taxonomy or nomenclature have been made to either of these species.

#### Genetics

At the time of this review, a literature search of current research resulted in no publications specifically about either species. At present, there are no known studies investigating genetic drift and inbreeding for each of the remaining two populations on these private lands. However, broader studies of the genus have been completed. A phylogenetic study of the bluegrass genus *Poa* by Gillespie and Soreng (2005) analyzed the chloroplast DNA of 77 *Poa* species from the world’s major regions and found that *P. napensis* was most closely related to *P. secunda*, of North America, and *P. stenantha* of southern South America.

#### Species-specific Research and/or Grant-supported Activities

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 *Plagiobothrys strictus* and 60 other plant species. At the time of this review, seeds from *Plagiobothrys strictus* and *Poa napensis* have yet to be collected; there are no other known studies being conducted on either of these species through section 6 grants. The most recent population surveys for *Poa napensis* were conducted in 2007 (Occurrence #1, CNDDDB 2009b) and in 1996 for *Plagiobothrys strictus* (Occurrence #3, CNDDDB 2009a). Recovery decisions and management for these species would benefit from official rare-plant surveys for both species conducted directly at the two properties with survey results presented to California Department of Fish and Game and the Service.

#### **Five-Factor Analysis**

The following five-factor analysis describes and evaluates the threats to survival and recovery of these two species 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**

At the time of listing, we stated that *Plagiobothrys strictus* and *Poa napensis* both occur at the same two sites where they are threatened by airport activities, including traffic and vehicle parking on the plants, grass mowing; and land use changes, including the construction of a hospital at one site. Both populations of the two species were also threatened by potential



alteration of hot springs hydrology. Since listing, mowing, parking, and grading have been discontinued with the end of the use of the property as a glider airport.

One of the populations of each species occurs at the airport property, and future development at this site could threaten these populations. The occurrences of the two species on the second private parcel (Myrtledale Hot Springs) in the City of Calistoga had been proposed for a new hospital. Because *Poa napensis* and *Plagiobothrys strictus* occur at both the airport property and on another private property, the threats from urbanization, including possible future development, are the same for both species. Future development at either site could threaten either or both species. The landowner of the airport property is presently having discussions with the California Department of Fish and Game, the U.S. Fish and Wildlife Service, and the City of Calistoga regarding a desire to develop the parcel. The City of Calistoga Planning Department required plant surveys to document the status of both species at the former glider airport location before engaging in discussions regarding the site (K. MacNab, City of Calistoga Planning Department, pers. comm. 2009).

The extant populations of both species are on private land and neither location of the two species is protected (CNDDB 2008 a, b; California Native Plant Society 2008a,b). The airport property populations of the two species were threatened by mowing, construction of a mobile home park, vehicle parking, grading, and fill to improve the airport facilities. However, the airport property has not been operated as an airport for several years (Rugyt pers. comm. 2009; Symonds pers. comm. 2008). Since mowing, parking, and grading have been discontinued with the end of the use of the property as a glider airport, a greater threat is potential land conversion. But, there is no agreement in place that would preclude mowing, parking, and grading and their threat from resuming.

*Poa napensis* is dependent on hot springs and geysers for its survival. Alterations in the hydrology of the hot springs or geysers overland flow would pose a threat to this plant by removing the supply of acidic water which maintains the suitability of the habitat. Such alterations would include, but not be limited to, new water well drilling into underground water sources or increasing the draw-down from existing wells (Service 1997).

At present the former airport parcel is unused and vacant. The landowner has made his intention of developing the property known to the City of Calistoga, the California Department of Fish and Game and the U.S. Fish and Wildlife Service (L. MacMillan, EcoSystems West Consulting Group, pers. comm. 2009). Commercial, residential and/or recreational activities could negatively affect the species' survival. The second private parcel with both species' populations is near an undeveloped area adjacent to hot springs and is bisected by a paved road. These populations depend on the moist habitat created by the hot spring. A decrease in spring waters or complete drying of the spring could lead to *Plagiobothrys strictus* and *Poa napensis* population decline or extinction.

#### Commercial/Residential Development:

The two *Plagiobothrys strictus* and *Poa napensis* populations exist on private land and could be developed. The airport property will be required by the City of Calistoga to be evaluated under the California Environmental Quality Act for the environmental effects to these species, and the

evaluation reviewed by the California Department of Fish and Game, if and when any development should ever be proposed. According to the City of Calistoga Zoning Map, one property is zoned as Rural-residential and the former airport property is zoned Commercial-airport (City of Calistoga 2003). Given that both species' population sizes are very small and restricted to two locations, development of these parcels could lead to the extinction of both species.

#### Potential Conservation Measures

The Napa County General Plan includes the following conservation goals and policies:

Goal #3 of the conservation goals in the 2007 Napa County General Plan, states:

*Protect the continued presence of special-status species, including special-status plants, special-status wildlife, and their habitats, and comply with all applicable state, federal, or local laws or regulations.*

Conservation Policy-17 of the 2007 Napa County General Plan states the following actions for protection of native grassland habitats and sensitive plant communities:

*Preserve and protect native grasslands, serpentine grasslands, mixed serpentine chaparral, and sensitive biotic communities and habitats of limited distribution through a variety of measures, including:*

- a) Prevent removal or disturbance of sensitive natural plant communities that contain special-status plant species or provide critical habitat to special-status animal species.*
- b) In other areas, avoid disturbances to or removal of sensitive natural plant communities and mitigate potentially significant impacts where avoidance is infeasible.*
- c) Promote protection from overgrazing and other destructive activities.*
- d) Encourage scientific study and require monitoring and active management where biotic communities and habitats of limited distribution or sensitive natural plant communities are threatened by the spread of invasive non-native species.*
- e) Require no net loss of sensitive biotic communities and habitats of limited distribution through avoidance, restoration, or replacement where feasible. Where avoidance, restoration, or replacement is not feasible, preserve like habitat at a 2:1 ratio or greater within Napa County to avoid significant cumulative loss of valuable habitats.*

The City of Calistoga lists conservation goals within the Open Space and Conservation Element of its General Plan (2003) with regards to special-status species, as follows:

*Element B, Objective OSC-1.1, Policy 3: The City should encourage efforts to identify and map biological resources on the gliderport property, which provides an important and unique habitat area within the city limits.*

*Element B, Objective OSC-1.1 Policy 4: The City shall explore the possibility of designating parcels as Natural Resource Preservation Areas in areas of the City known to contain sensitive and unique species, in order to protect these resources. Examples of such sensitive natural resource areas include the gliderport, Mount Washington, geothermal marshland areas and the Napa River corridor. Any such designation would respect property rights*

*Element C, Objective OSC-1.5, Policy 1: The City shall protect and enhance the freshwater marsh areas associated with Calistoga's geothermal resources that provide habitat for endemic and unique species.*

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

Overutilization for commercial, recreational, scientific, or education purposes was not known to be a factor in the 1997 final listing rule (62 FR 54791). Overutilization for any purpose does not appear to be a threat at this time.

### **FACTOR C: Disease or Predation**

Neither disease nor predation was known to be a factor in the 1997 listing rule for either *Plagiobothrys strictus* or *Poa napensis* (62 FR 55791). Currently, we have no information to indicate that disease or predation threatens the two plant species.

### **FACTOR D: Inadequacy of Existing Regulatory Mechanisms**

At the time of listing, regulatory mechanisms thought to provide inadequate protection for *Plagiobothrys strictus* and *Poa napensis* included: (1) listing under the California Endangered Species Act (CESA); (2) the California Environmental Quality Act (CEQA); (3) the California Native Plant Protection Act; and (4) the Clean Water Act. The listing rule (Service 1997) provides an analysis of the level of protection that was anticipated from those regulatory mechanisms. This analysis appears to remain currently valid for those laws with the exception of the Clean Water Act.

### **Federal Laws**

The Endangered Species Act: The Endangered Species Act of 1973, as amended (Act), is the primary Federal law that provides protection for *Plagiobothrys strictus* and *Poa napensis*. 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 listed wildlife, however, plants are not protected against take. 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 any state law or regulation or in the course of violation of a state criminal trespass law. 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 if they co-occur with federally listed wildlife species.

Under the terms of section 7(b)(4) and section 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of an incidental take statement. Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species because take of plants is not prohibited. However, limited protection of listed plants from take is provided to the extent that the Act and the implementing regulations prohibit the removal and reduction to possession of federally listed threatened or endangered plants or the malicious damage of endangered plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas when in violation of state law or regulation or in the course of any violation of a State criminal trespass law.

Currently there are no completed final regional or county-wide Habitat Conservation Plans (HCPs) authorized under section 10 of the Act, or Natural Community Conservation Plans (NCCPs) authorized under the California Natural Community Conservation Planning Act, in Napa County, thereby leaving populations of plants on private land without adequate protection under these laws.

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.

Clean Water Act: Under section 404, the U.S. Army Corps of Engineers (Corps or USACE) regulates the discharge of fill material into waters of the United States, which include navigable and isolated waters, headwaters, and adjacent wetlands (33 U.S.C. 1344). In general, the term “wetland” refers to areas meeting the Corps’s criteria of hydric soils, hydrology (either sufficient annual flooding or water on the soil surface), and hydrophytic vegetation (plants specifically adapted for growing in wetlands). Any action with the potential to impact waters of the United States must be reviewed under the Clean Water Act, National Environmental Policy Act, and Endangered Species Act. These reviews require consideration of impacts to listed species and their habitats, and recommendations for mitigation of significant impacts.

The Corps interprets “the waters of the United States” expansively to include not only traditional navigable waters and wetlands, but also other defined waters that are adjacent or hydrologically connected to traditional navigable waters. However, recent Supreme Court rulings have called into question this definition. On June 19, 2006, the U.S. Supreme Court vacated two district court judgments that upheld this interpretation as it applied to two cases involving “isolated” wetlands. Currently, Corps regulatory oversight of such wetlands (e.g., vernal pools) is in doubt because of their “isolated” nature. In response to the Supreme Court decision, the Corps and the U.S. Environmental Protection Agency (USEPA) have recently released a memorandum providing guidelines for determining jurisdiction under the Clean Water Act. The guidelines provide for a case-by-case determination of a “significant nexus” standard that may protect some, but not all, isolated wetland habitat (USEPA and USACE 2007). The overall effect of the new permit guidelines on loss of isolated wetlands, such as vernal pool habitat or thermal springs is not known at this time.

### **California State Laws**

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. *Plagiobothrys strictus* is California State listed as threatened. *Poa napensis* is California State listed as endangered.

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. Salvage of *Poa napensis* would probably be more successful since it produces obvious, distinct and numerous seed heads per plant and it has been seen growing outside the edge of one of the property boundaries where it is found. Salvage of *Plagiobothrys strictus* may be less successful because its existence and population size on one of the parcels is unknown. However, for either species, successful collection or salvage of plants or seeds must occur during the growing season (March-June).

California Environmental Quality Act: Because *Plagiobothrys strictus* and *Poa napensis* are listed under CESA, both species must be considered as rare species under the California Environmental Quality Act (CEQA) (Section 15380, Public Resources Code). CEQA (chapter 2, section 21050 *et seq.* of the California Public Resources Code) requires government agencies to consider and disclose environmental impacts of projects and to avoid or mitigate them where possible. Under CEQA, public agencies must prepare environmental documents to disclose

environmental impacts of a project and to identify conservation measures and project alternatives. Through this process, the public can review proposed project plans and influence the process through public comment. However, CEQA does not guarantee that such conservation measures will be implemented.

In summary, the California and Federal Endangered Species Acts are the primary State and Federal laws, respectively, that provide 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 Endangered Species Act.

### **FACTOR E: Other Natural or Man-made Factors Affecting Its Continued Existence**

The 1997 listing rule states that restricted habitats/ranges and small population size are a threat to *Plagiobothrys strictus* and *Poa napensis* populations. The remaining extant localities of both species are threatened by direct destruction of the plants and their habitats or through hydrologic changes in their vernal pool and grassland habitats. Current threats include those discussed in the 1997 final rule, as well as, competition from invasive plant species, and climate change. These threats are still imminent by the property owners themselves, or by activities conducted by the owners of adjacent parcels. Such activities potentially include mowing the parcel, ditch construction, off highway vehicle use, surface paving, and trampling by domestic livestock.

#### Human Activities

*Poa napensis* individuals within the Myrtdale Hot Springs population could be lost to trampling should the number of hikers increase to the hot spring, the paved road is widened, or the property owner decides to alter the landscape causing the alteration of hydrology. Because the most recent observation of six *Poa napensis* individuals was in 2007 and conducted from outside the property boundary (Occurrence #1, CNDDDB 2009b), the risk of human activities may be even greater since a more accurate count of individuals does not exist currently. The former Calistoga airport parcel could be mowed or its hydrology could be altered presenting unknown magnitude of risk to the populations of either species since neither population has been thoroughly surveyed since 1996 (*P. napensis* Occurrence #3 and *Plagiobothrys strictus* Occurrence #3, CNDDDB 2009a).

#### Restricted Habitat, Range, and Few Numbers of Populations

Species in natural habitats face threats both from deterministic facts such as habitat loss, overexploitation, pollution, introduced species, and stochastic events associated with small population size. Such events may be of a demographic genetic or environmental nature, including catastrophes (World Conservation Monitoring Centre 1992). The estimated population size for *Plagiobothrys strictus* was over 5,000 individuals in 1994 (Occurrence # 3, CNDDDB 2009a) and six plants in 2007 as observed from the edge of the second property boundary for *Poa napensis* (Occurrence #1, CNDDDB 2009b). Both species' populations could be susceptible to extirpation from random events due to their restricted range. Increased homozygosity

resulting from genetic drift and inbreeding may lead to a loss of fitness (ability of individuals to survive and reproduce) in small populations (Menges 1991; Ellstrand and Elam 1993).

#### Invasive Plant Species:

Competition from invasive plant species poses a potential threat to both species. Exotic and/or invasive, weedy plant species reduce native plant diversity and diminish the habitat suitability for native species; this is particularly the case in sensitive habitats (G. Cooley, California Department of Fish and Game, pers. comm. 2008). The consistent pattern of heavy growth of nonnative grasses when not controlled by grazing or other management can 'smother' native plants, resulting in the subsequent crowding out, outcompeting, or overshadowing of native annuals. A common consequence of such heavy annual grass growth is development of thatch, which adds to the strong smothering effect by inhibiting annuals' germination and growth (Weiss *et al.* 2007).

#### Climate Change and Drought:

Impacts to species under future climate change scenarios are unclear. A trend of warming in the mountains of western North America is expected to decrease snowpack, hasten spring runoff, and reduce summer stream flows, and increased summer heat may increase the frequency and intensity of wildfires (IPCC 2007). While it appears reasonable to assume that these species may be affected, we lack sufficient certainty to know how and how soon climate change will affect species, the extent of average temperature increases in California/Nevada, or potential changes to the level of threat posed by drought and fire. The most recent literature on climate change includes predictions of hydrological changes, higher temperatures, and expansion of drought areas, resulting in a northward and/or upward elevation shift in range for many species (IPCC 2007). We have no knowledge of more detailed climate change information specifically for these species' range.

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). However, predictions of climatic conditions for smaller sub-regions such as California remain uncertain. It is unknown at this time if climate change in California will result in a warmer trend with localized drying, higher precipitation events, or other effects. While we recognize that climate change is an important issue with potential effects to listed species and their habitats, we lack adequate information to make accurate predictions regarding its effects to particular species at this time. A severe drought, if compounded by other factors such as development, invasive plant species, and other unforeseen circumstances, could contribute to the extirpation of both species given their extremely small population sizes.

A modeling study completed by Loarie *et al.* (2008) provides an evaluation of potential trends to California's floristic communities under climate change scenarios. In general, plant diversity will shift in two divergent directions: along the coast and northwards at higher elevations; and southwards at higher elevations of the Sierra Nevada. The models suggest that climate change has the potential to break up local floras, resulting in new species combinations, with new patterns of competition and biotic interactions (Loarie *et al.* 2008). Based on these modeling

results, *Plagiobothrys strictus* and *Poa napensis* plants could be unable to shift their range because of their isolated, small populations, whose growth depend upon particular hydrological regimes, and the limited available, suitable habitat surrounding the two private parcels.

### III. RECOVERY CRITERIA

No final recovery plan has been completed for these species.

### IV. SYNTHESIS

When *Plagiobothrys strictus* and *Poa napensis* were listed as endangered in 1997, the threats to their survival and recovery included airport activities, development, potential alteration of hot springs hydrology, restricted range and number and size of populations, and inadequate existing regulatory mechanisms. Currently, these species are still threatened by potential habitat loss due to development, potential alteration of hot springs hydrology, restricted range and number and size of populations, and inadequate existing regulatory mechanisms. In addition, other factors, such as climate change and competition from weedy invasive plants may be adversely affecting these species and are considered threats to their survival.

A Recovery Plan has not yet been completed to provide guidance to obtain information through research, monitoring, management, and public participation and outreach about the status of either species' populations. Based on potential threats of habitat loss due development, climate change, competition by invasive plants, and very small population sizes restricted to only two parcels of land, we conclude that *Plagiobothrys strictus* and *Poa napensis* still meet the Act definition of endangered. No status change is recommended 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:** The recovery number for both of these species should be changed from 2C to 5C as the potential threat of extinction for either species is high and the chances for recovery are low. Changing the recovery number to 5C should be considered as there are only two extant populations of each species remaining within its geographic range. At this time, there are no known plant propagation efforts to ensure recovery for either species. The known *Plagiobothrys strictus* and *Poa napensis* populations are located on private lands, susceptible to habitat destruction by landowners should the property owners decide to remove the species or alter the hydrology of the land.



## **VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS**

It is important to conduct field surveys to assess current population size for each species since both populations are only found on two private parcels in Calistoga. To determine how eminent the threat of extinction is to both species, it is necessary to get a current count of individual plants and assess seed production. Because there are only two remaining populations of both *Poa napensis* and *Plagiobothrys strictus*, the following actions should be taken:

- 1) Work with the landowners, the California Department of Fish and Game, the City of Calistoga, and California Native Plant Society to ensure the protection of all known populations of *Plagiobothrys strictus* and *Poa napensis*.
- 2) Work with the landowners, the California Department of Fish and Game, the City of Calistoga, and California Native Plant Society to ameliorate or eliminate any threats to *Plagiobothrys strictus* and *Poa napensis* from hydrological changes and from competition from nonnative plants.
- 3) Collect seeds from both species from both parcel sites and store them in Center for Plant Conservation certified botanic gardens to guard against extirpation of populations from chance catastrophic events.
- 4) Follow conservation measures and policies as stated in the 2007 Napa County General Plan Update.
- 5) Follow conservation measures and policies as stated in the 2003 City of Calistoga General Plan for sensitive plant species.
- 6) Conduct a population assessment for each species and continue monitoring over the next 5 years.

## VII. REFERENCES CITED

- California Department of Fish and Game. 1988. Recommendation to the California Fish and Game Commission to List *Plagiobothrys strictus*. Unpublished report. 9 pp.
- California Department of Fish and Game. 2005a. The status of rare, threatened, and endangered plants and animals of California 2000-2004. *Plagiobothrys strictus* p. 287. Available on the internet at <[http://www.dfg.ca.gov/wildlife/species/t\\_e\\_spp/new\\_te\\_rpt.html](http://www.dfg.ca.gov/wildlife/species/t_e_spp/new_te_rpt.html)>. Accessed August 2008.
- California Department of Fish and Game. 2005b. The status of rare, threatened, and endangered plants and animals of California 2000-2004. *Poa napensis* sp. p. 290. Available on the internet at <[http://www.dfg.ca.gov/wildlife/species/t\\_e\\_spp/new\\_te\\_rpt.html](http://www.dfg.ca.gov/wildlife/species/t_e_spp/new_te_rpt.html)>. Accessed August 2008.
- [CNDDDB] California Department of Fish and Game, Natural Diversity Data Base. 2008a. Element Occurrence Report for *Plagiobothrys strictus*. Unpublished cumulative data current to August 2008.
- [CNDDDB] California Department of Fish and Game, Natural Diversity Data Base. 2008b. Element Occurrence Reports for *Poa napensis*. Unpublished cumulative data current to August 2008.
- [CNDDDB] California Department of Fish and Game, Natural Diversity Data Base. 2009a. Element Occurrence Report for *Plagiobothrys strictus*. Unpublished cumulative data current to August 2009.
- [CNDDDB] California Department of Fish and Game, Natural Diversity Data Base. 2009b. Element Occurrence Reports for *Poa napensis*. Unpublished cumulative data current to August 2009.
- California Native Plant Society, Online Rare Plant Inventory Plant Press. 2008a. Element Occurrence Report for *Plagiobothrys strictus*. Unpublished cumulative data current to August 2008.
- California Native Plant Society, Online Rare Plant Inventory Plant Press. 2008b. Element Occurrence Report for *Poa napensis*. Unpublished cumulative data current to August 2008.
- 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.
- City of Calistoga. 2003. General Plan. Available on the internet at <<http://www.ci.calistoga.ca.us/Index.aspx?page=519>>. Accessed July 22, 2009.

- EcoSystems West Consulting Group. 2009. August 2009 Report: Mapping of Calistoga popcorn flower on the Merchant Family property (formerly known as the glider port), Calistoga, California.
- 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.
- Gillespie, L. J. and R. J. Soreng. 2005. A phylogenetic analysis of the bluegrass genus *Poa* based on cpDNA restriction site data. *Systematic Botany* 30: 84-105.
- 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.
- Loarie, S.R., Carter, B.E., Hayhoe, K., McMahon, S., Moe, R., Knight, C.A., and D.D. Ackerly. June 2008. Climate change and the future of California's endemic flora. *PLOS One* 3:1-10.
- Northwest Biosurvey. 2005. Assessment of biological resources with botanical and herptile surveys and delineation of waters of the U.S. for Calistoga Square Project. Unpublished consultant's report, Northwest Biosurvey, Cobb, CA.
- Menges, E. S. 1991. Seed germination percentage increases with population size in a fragmented prairie species. *Conservation Biology* 5: 158-164.
- Napa County. 2007. Napa County General Plan Update. Available on the internet at <[www.napacountygeneralplan.com/library/](http://www.napacountygeneralplan.com/library/)>. Accessed September 2008.
- [Service] U.S. Fish and Wildlife Service. 1997. Endangered and threatened wildlife and plants; determination of endangered status for nine plants from the grasslands or mesic areas of the central coast of California. *Federal Register* 62: 55791-55808.
- [Service] U.S. Fish and Wildlife Service. 2008a. Calistoga allocarya species account from the Sacramento Fish and Wildlife Office. <[http://www.fws.gov/sacramento/es/plant\\_spp\\_accts/calistoga\\_allocarya.htm](http://www.fws.gov/sacramento/es/plant_spp_accts/calistoga_allocarya.htm)>. Accessed September 2008.

[Service] U.S. Fish and Wildlife Service. 2008b. Napa bluegrass species account from the Sacramento Fish and Wildlife Office. Available on the internet at <[http://www.fws.gov/sacramento/es/plant\\_spp\\_accts/napa\\_bluegrass.htm](http://www.fws.gov/sacramento/es/plant_spp_accts/napa_bluegrass.htm)>. Accessed September 2008.

[USACE] U.S. Army Corps of Engineers. 2008. Available on the internet at <<http://www/spk.usace.army.mil//organizations/cespk-co/regulatory/nwp.html>>. Accessed December 9, 2008.

USDA, NRCS. 2008. The PLANTS Database (*Plagiobothrys strictus* photo, <<http://plants.usda.gov>>, 13 May 2008). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

[USEPA and USACE] U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. 2007. Memorandum: Clean Water Act jurisdiction following the U.S. Supreme Court's decision in *Rapanos v. United States* and *Carabell v. United States*. June 5, 2007.

Weiss, S. B., Wright, D. H., and C. Niederer. 2007. Serpentine vegetation management project: Final report. FWS Grant Agreement No. 814205G240, pp. 1-47; p. 3.

World Conservation Monitoring Centre. 1992. Global biodiversity: status of the Earth's living resources. Chapman and Hall, London, United Kingdom.

WRA Environmental Consultants. 2009. Merchant Family property (formerly known Glider Airport) March 9, 2009 Napa bluegrass survey.

### *In Litteris*

Ochoa, Ed and James Potter. 2008. Deputy Attorney General, State of California. Letter to Field Supervisor of Sacramento Fish and Wildlife Office. May 5. Subject: Comments on 5-Year Reviews - Global Warming Impacts.

### *Personal Communications and Observations*

Cooley, Gene. September 24, 2008. California Department of Fish and Game, Sacramento, California.

Kasparian, Maral. September 24, 2008. U.S. Fish and Wildlife Service, Sacramento, California.

MacMillan, Lucy. 2009. E-mail correspondence to Ryan Olah, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, dated November 4, 2009. Subject: plant surveys.

MacNab, Kenneth. July 22, 2009. City of Calistoga Planning Department, Calistoga, California.

Rugyt, Jake. 1996. Public hearing transcript, California.

Rugyt, Jake. 2009. Telephone conversation with Kirsten Tarp, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, dated July 29, 2009.

Symonds, Kate. August 18, and September 24, 2008. U.S. Fish and Wildlife Service. Conservation Partnerships Program, Santa Rosa, California.

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

*Plagiobothrys strictus* (*Calistoga allocarya*)

**Current Classification:** Endangered

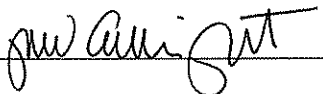
**Recommendation Resulting from the 5-Year Review:**

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

**Review Conducted By:** Sacramento Fish and Wildlife Office staff

**FIELD OFFICE APPROVAL:**

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

Approve  Date 2.16.10

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

*Poa napensis* (Napa bluegrass)

**Current Classification:** Endangered


**Recommendation Resulting from the 5-Year Review:**

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

**Review Conducted By:** Sacramento Fish and Wildlife Office staff

**FIELD OFFICE APPROVAL:**

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

Approve  Date 2-16-10