

Astragalus tener var. *titi*
(Coastal Dunes Milk-vetch)

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



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

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5-YEAR REVIEW

Astragalus tener var. *titi* (Coastal Dunes Milk-vetch)

I. GENERAL INFORMATION

Purpose of 5-Year Review:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act (ESA) to conduct a status review of each listed species at least once every 5 years to ensure that its classification as threatened or endangered provides the appropriate level of protection. We consider the best available scientific and commercial data on the species, and focus on new information since the species was listed. The purpose of our review is to evaluate whether or not the species' status has changed since listing, and whether reclassification or delisting should be considered. Our original listing of a species as endangered or threatened is based on the existence of one or more of the five threat factors described in section 4(a)(1) of the ESA, and we must consider these same five factors in any subsequent reclassification or delisting of a species. A 5-year review contains an analysis of updated information on the species' biology and threats, and we interpret progress towards recovery in the context of eliminating or reducing the five threat factors. 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 ESA that includes public review and comment.

Species Overview:

As summarized in the recovery plan for this species, *Recovery Plan for Five Plants from Monterey County, California* (U.S. Fish and Wildlife Service 2004), coastal dunes milk-vetch (*Astragalus tener* var. *titi*) is a small annual plant in the pea family (Fabaceae). Historically, populations occurred in San Diego, Los Angeles, and Monterey counties. It is currently known from one highly fragmented population located on a coastal terrace grassland along 17-Mile Drive in Pebble Beach on the Monterey Peninsula, Monterey County, California. Annual population numbers have fluctuated between less than 100 and approximately 7,000, depending on winter and spring climatic conditions. The population is bordered along one side by the Pacific Ocean and the other side by a golf course; 17-Mile Drive bisects the population. The small size of the population and its proximity to a variety of human recreation activities makes it vulnerable to stochastic extinction.

Methodology Used to Complete the Review:

This review was prepared by the Ventura Fish and Wildlife Office (VFWO), following the Region 8 guidance issued in March 2008. We used information from the recovery plan, survey information from experts who have been monitoring various localities of this species, and the California Natural Diversity Database (CNDDDB) maintained by the California Department of Fish and Game. The recovery plan and personal communications with experts were our primary sources of information used to update the species' status and threats. 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.

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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). The Service received one response to the notice, which we have considered in preparing this 5-year review.

Listing History:

Original Listing

FR Notice: 63 FR 43100

Date of Final Listing Rule: August 12, 1998

Entity Listed: *Astragalus tener* var. *titi* (variety)

Classification: Endangered

State Listing

Astragalus tener var. *titi* was listed as endangered by the State of California in 1982.

Associated Rulemakings: N/A

Review History: N/A

Species' Recovery Priority Number at Start of 5-Year Review: The recovery priority number for *Astragalus tener* var. *titi* is 6C according to the Service's 2007 Recovery Data Call for the Ventura 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 taxon is a subspecies 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

Name of Plan or Outline: *Recovery Plan for Five Plants from Monterey County, California*

Date Issued: 2004

II. REVIEW ANALYSIS

Application of the 1996 Distinct Population Segment (DPS) Policy:

The 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 limits listing as distinct population segments to vertebrate species of fish and wildlife. Because the species under review is a plant and the DPS policy is not applicable, the application of the DPS policy to the species' listing is not addressed further in this review.

Updated Information on Current Species Status, Biology, and Habitat:

Species Biology and Life History

Astragalus tener var. *titi* is a small annual herb in the pea family (Fabaceae). Individuals can reach 4.7 inches (12 centimeters) in height (Spellenberg 1993). Leaves are pinnately compound into 7 to 11 leaflets. Up to 12 lavender-purple flowers are borne on the ends of the racemes. Crossing studies conducted by Liston (1992) indicate that the plants are self-compatible and capable of self-fertilization. Doak et al. (2000) investigated reproductive biology. They found that seed set could be high; mean seed set in plants not damaged by gophers or other herbivores was 44 seeds per individual, and of 207 pods checked for seed production, approximately 70 percent had a seed set of between 4 and 7 seeds per pod. At the same time, they observed only one pollinator in the field over the course of 3 years, and also that greenhouse-grown plants without access to pollinators set high numbers of seed. Based on these combined observations, they concluded that this species is a successful self-pollinator and that pollinators are not a strong concern in the establishment and maintenance of populations (Doak et al. 2000).

Distribution

According to records available through the California Natural Diversity Data Base (CNDDDB 2008) and the California Consortium of Herbaria (Consortium 2008), all collections and unvouchered observations of *Astragalus tener* var. *titi* occur in three general areas: 1) southern coastal San Diego County, 2) coastal and near-coastal Los Angeles County, and 3) on the Monterey Peninsula, Monterey County. On the Monterey Peninsula, two historical locations (Moss Beach and Pebble Beach) are within 1 mile (mi) (1.7 kilometer (km)) of the current extant population (Ferreira 1992), and likely represent its previous extent. Additionally, Barneby (1964) reported a specimen from San Luis Obispo County without specific locality or date. No collections have been made from San Diego County since 1933, and no observations have been

made from there since 1975. No collections have been made from Los Angeles County since the early 1900s.

At this time, *Astragalus tener* var. *titi* is known only from one location on the Monterey Peninsula, in Monterey County, California. One population is scattered in patches along a 1-mile (1.7-km) stretch of coastline along 17-Mile Drive on the western edge of the Peninsula. The population is bisected by 17-Mile Drive, and plants are found scattered on both sides of the road. Up until 1995, patches of plants had only been located in close proximity to 17-Mile Drive. In 1995, two additional patches were found approximately 0.13 mi (0.2 km) inland from 17-Mile Drive; one is located on the edge of a horse jump area and the other is along a road that runs perpendicular to 17-Mile Drive (Service 1998).

In 2001, three additional patches of individuals were located up to 0.75 mi (1.2 km) north of the main concentration of individuals (Zander Associates 2002). Habitat on the ocean-side of the road is owned by Pebble Beach Company; habitat on the inland side of the road is owned by Monterey Peninsula Country Club. The entire distribution of the population occurs on patches of remaining habitat that is interspersed with roads, trails, golf greens, and other recreational facilities, and is scattered over approximately 41 acres (ac) (17 hectares (ha)), though patches that support plants total less than 1.0 ac (0.4 ha) (Zander Associates 2002, 2006).

Abundance, Population Trends

Population estimates are not available for any of the populations recorded from San Diego and Los Angeles Counties because historical records did not include population information and none of the populations have been observed in over 30 years nor collected in over 80 years. Some of these locations have been surveyed extensively (Oberbauer in Ferreira 1992, DOD 2007). Although the CNDDDB lists the current trend for some of these populations as “presumed extant” and “possibly extirpated” (see Table 1 below), habitat conversion and changes in land use make it likely they are extirpated.

The population estimates for the Monterey Peninsula population prior to 1995 were focused primarily on one area that supported a high density of individuals and which was surrounded by an enclosure in 1989. Population estimates for the area within the enclosure range from a low of 15 individuals in 1988 to a high of 2,300 in 1995 (Jones and Stokes 1996). Annual fluctuation in the reported population numbers is not surprising considering that *Astragalus tener* var. *titi* is a short-lived annual species and therefore highly influenced by climatic conditions, particularly during the winter and early spring months when germination occurs. In addition, surveys have been performed by various biologists using varying methods.

In 1995, two additional patches of individuals on the Monterey Peninsula were located (see Distribution section above). 1995 was the first year in which censusing of individual patches was undertaken. While the enclosure supported 2,300 individuals in that year, the 10 other patches supported a total of 1,670 individuals (Zander Associates 2002). In 2006, a total of 2,185 individuals were counted in all patches (Zander Associates 2006). While no population trend is discernable with available annual census data, the small numbers of individuals restricted to a small geographic area contributes to the vulnerability of the species.

Table 1: Population Records for *Astragalus tener* var. *titi* Extracted from CNDDDB (2008)

CNDDB #	Name	CNDDB Current trend	Year collected/observed	Pop size/Year surveyed	Reference
San Diego County occurrences					
1	Silver Strand (DOD Miramar Naval Weapons Center)	Possibly extirpated	Collected by Edith Purer 1938	--	Consortium 2008 CNDDDB 2008
2	Mouth of Santa Margarita River	Presumed extant	No herbarium collections; Observed by Beachamp in 1970s	--	CNDDDB 2008
9	Soledad Valley	Presumed extant	1882 collection by Marcus E. Jones; Observed by Beachamp in 1975	--	Consortium 2008 CNDDDB 2008
Los Angeles County occurrences					
3	Santa Monica	Possibly extirpated (heavily urbanized)	Collected by W. Fasier, Davidson in 1930; collection by Hasse (circa 1891)	--	Consortium 2008 CNDDDB 2008
4	Hyde Park (Inglewood)	Possibly extirpated (heavily urbanized)	Collected by Abrams 1903	--	Consortium 2008 CNDDDB 2008
Monterey County occurrence					
11	Pebble Beach, Monterey Peninsula (17-Mile Drive) (includes Moss Beach and Pacific Grove)	Extant	Collected by Clemens 1904 Yadon 1969, 1982, 1998 Helen Lind 1982	50 *(1982 Allen) 15* (1988 Allen) 172* (1992 Allen) 356* (1993 Allen) 142* (1994 Allen) 476* (1995 Allen) 3,980 (1995 Jones & Stokes) 477 (1997) ~1,000 (1998) ~1,200 (2000) 1,982 (2002) 2,185 (2006) 6,779 (2007) 78 (2008)	Doak 2000 Doak 2000 Doak 2000 Doak 2000 Doak 2000 Doak 2000 Doak 2000 CNDDDB 2008 CNDDDB 2008 Zander 2002 Zander 2006 Huettmann 2008 Huettmann 2008

* within enclosure only

CNDDDB identification # = occurrence number assigned by the California Natural Diversity Database (CNDDDB 2008).

Habitat or Ecosystem Conditions (e.g., amount and suitability)

On a broad scale, habitat for *Astragalus tener* var. *titi* is comprised of coastal terrace grassland. So little of the habitat for *Astragalus tener* var. *titi* remains that it is difficult to ascertain what comprised historical habitat. A description of historical habitat in the coastal plain of Los Angeles is contained in Mattoni and Longcore (1997). On the Monterey Peninsula, frequent associated species include California oatgrass (*Danthonia californica*), tufted hairgrass (*Deschampsia cespitosa* ssp. *holciformis*), and goldfields (*Lasthenia minor*) (Jones and Stokes 1996). Researchers have observed that vernal moist depressions within grasslands may be the most suitable microhabitat sites for the taxon. However, in a study on density of individuals throughout a 180-foot by 85-foot (55-meter by 26-meter) enclosure, Doak et al. (2000) did not detect a significant correlation between density and elevation or soil moisture.

Doak et al. (2000) also did not detect a significant correlation between the presence of *Astragalus tener* var. *titi* and other species, and noted that the taxon may be less restricted in its habitat requirements than previously thought. In particular, they checked whether the nonnative cutleaf plantain (*Plantago coronopus*) was competing with *Astragalus tener* var. *titi*. They

concluded that there was no competitive relationship between these two taxa (Doak et al. 2000). Cutleaf plantain is listed in the Invasive Plant Inventory (California Invasive Plant Council (Cal-IPC) 2008); however, its degree of invasiveness is listed as “unknown.” Vern Yadon reports that the cover of cutleaf plantain within *Astragalus tener* var. *titi* habitat has continued to increase over the years (Yadon pers. com. 2008).

Changes in Taxonomic Classification or Nomenclature

No changes in taxonomy or nomenclature have been made since the time of listing.

Genetics

No new studies concerning the genetics of this taxon have been done since the time of listing.

Species-specific Research and/or Grant-supported Activities

In 1997, federal funds were awarded to the University of California at Santa Cruz (UCSC) through the Service’s Endangered Species Act section 6 grant program to identify the ecological factors affecting the recovery of *Astragalus tener* var. *titi* as well as four other plant taxa endemic to the Monterey Peninsula area (Doak et al. 2000). Specific to this species, research focused on characterizing occurrence patterns and habitat needs, evaluating the limitation imposed by competing species, and assessing the relative costs and benefits of disturbances caused by foot traffic and gopher activities. Results of these studies have been incorporated into this report.

Five-Factor Analysis

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

At the time of listing *Astragalus tener* var. *titi* in 1998, we discussed trampling associated with recreational activities, including hiking, picnicking, ocean viewing, wildlife photography, equestrian use, and golfing, as a threat to the taxon at Pebble Beach, Monterey Peninsula, Monterey County, California, the last known location for the plant. Even by then, the Pebble Beach Company had instituted certain measures to protect habitat for the plant on their property west of 17-Mile Drive and the ocean; the Monterey Peninsula Country Club had taken similar measures to protect remaining habitat between 17-Mile Drive and the golf course. Such measures have included establishing one enclosure to protect a portion of the population, removing nonnative species from *Astragalus tener* var. *titi* habitat, and installing sensitive habitat signs along the road margins. Although we believe these measures have contributed to the protection of remaining habitat for *Astragalus tener* var. *titi*, no compliance monitoring has been done to evaluate the effectiveness of these measures.

In spring 2005, habitat along the shoulder of 17-Mile Drive was vandalized by drivers that illegally drove into the area occupied by the plant and performed “doughnuts” (spinning the vehicle in a circle) in the wet soil. The Pebble Beach Company responded by installing boulders and large logs between a vehicle turnout area and the sensitive habitat (B. Huettmann in litt. 2005); there have been no problems reported from this area since then. This event exemplifies the difficulty of managing sensitive habitat that is adjacent to areas that receive high levels of

both authorized and unauthorized recreational use. Although vehicles have been prevented from entering the habitat of the plant in one roadside area, the individuals remain vulnerable to vehicles as well as trampling from other recreational activities along other portions of the roadside.

A severe storm event during the winter of 2007-2008 deposited large beach cobble as well as smaller-sized gravel on the terrace immediately adjacent to the ocean bluffs where *Astragalus tener* var. *titi* occurs (Rutherford, pers. obs. 2008). Cobble deposition could affect habitat by reducing space where plants can occur. However, as far as we know, the winter storms of 2007-2008 are the first time that depositions of beach cobble onto the terrace have been noted in recent years. In addition, the deposition of cobble signifies that this portion of the terrace was also inundated by salt water. Not enough is known about the hydrology of the coastal sites that *Astragalus tener* var. *titi* occupies to know if such inundation would result in short-term or long term effects to the soil (e.g., raise salinity levels that then become inhospitable to persistence of the native plant community). We also do not have specific information on the tolerance of *Astragalus tener* var. *titi* to different levels of soil salinity, although Jones and Stokes (1996) observed that, because of the exposure to ocean spray, it appeared that *Astragalus tener* var. *titi* is likely tolerant of slightly saline soil conditions. See Factor E for more discussion on sea level change.

In summary, although some measures have been undertaken to reduce the extent of recreational impacts, threats to the habitat for *Astragalus tener* var. *titi* remain similar to what they were at the time of listing. Inundation by salt water and beach cobble during storm events may be new threats that may affect the portion of the population closest to the ocean. Little opportunity for population expansion is available adjacent to the existing population because habitat has already been converted to other uses, including roads, trails, and golf courses.

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

Overutilization for commercial, recreational, scientific, or educational purposes was not known to be a factor in the 1998 final listing rule (63 FR 43100). Overutilization for any purpose does not appear to be a threat at this time.

FACTOR C: Disease or Predation

Disease or predation was not discussed as a threat at the time of listing in 1998. The recovery plan, published in 2004, includes a discussion of herbivory and predation that is assumed to occur or has been observed. California voles (*Microtus californicus*), which are known to harvest seeds of many species in general (Martin et al. 1951, Peronne 2002), are known to occur in the area occupied by the plant (Yadon in litt. 2002; Stromberg in litt. 2002). No data have been gathered to determine the extent of this threat. Since the time of listing, herbivory by snails (various species), slugs (various species), and aphids (*Aphis* spp.) has also been observed on both vegetative and reproductive structures (Doak et al. 2000, Stromberg in litt. 2002).

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

At the time of listing, regulatory mechanisms thought to have some potential to protect *Astragalus tener* var. *titi* included: (1) listing under the California Endangered Species Act (CESA); (2) the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA); (3) the California Coastal Act; and (4) local land use laws, regulations, and policies. The listing rule (62 FR 42698) provides an analysis of the level of protection that was anticipated from those regulatory mechanisms. This analysis appears to remain currently valid. *Astragalus tener* var. *titi* was listed as endangered by the State of California in 1982. As such, projects that would affect *Astragalus tener* var. *titi* are subject to CESA and CEQA requirements. Protection of listed species through CEQA is dependent upon the discretion of the lead agency involved.

In addition to the laws and regulations discussed above, local county regulations may also benefit *Astragalus tener* var. *titi*. This species occurs within a portion of the Monterey Peninsula included in the California Coastal Zone. The Del Monte Forest Land Use Plan of 1984 was developed to comply with the Coastal Act's requirement that all counties prepare a plan for those portions of the Coastal Zone within their jurisdiction. Once the Del Monte Forest Land Use Plan was certified by the Coastal Commission, development permits within the Del Monte Forest coastal zone became the responsibility of the County of Monterey. The County of Monterey also has designated certain areas, including where *Astragalus tener* var. *titi* grows, as Environmentally Sensitive Habitat Areas. Although Monterey County recognizes the importance of this area, protection of listed species through the California Coastal Act and local land use designations is dependent upon the discretion of the lead agency involved. Additionally, although no projects have been proposed for the small site where *Astragalus tener* var. *titi* grows, these State and local regulations may not protect the species from indirect impacts that occur from such threats as changes in hydrology in adjacent areas and the spread of nonnative species.

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

At the time of listing, we discussed competition with nonnative species and stochastic extinction due to small size of populations and numbers as threats to *Astragalus tener* var. *titi*. An analysis of these threats is contained in the final rule and appears to remain currently valid. In short, we believe that the existence of only one population and small number of individuals in the population place *Astragalus tener* var. *titi* at extreme risk of extinction from stochastic events. The conservation biology literature commonly notes the vulnerability of taxa known from one or very few locations and/or from small and highly variable populations (e.g., Shaffer 1981, 1987; Primack 2006; Groom et al. 2006). In particular, although the plants are apparently self-compatible and capable of self-fertilization, the small size of the population makes it difficult for this species to persist while sustaining the impacts of soil damage (compaction and erosion) and habitat alteration that favors non-native species.

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). In addition, an increase in the rate of sea level rise has been predicted for the coast of California (California Coastal Commission (CCC) 2001, California Climate Change Center 2006). In particular, ocean bluffs along the coast will be subject to greater and more frequent wave attack, resulting in erosion and shoreline retreat (CCC 2001). Under Factor A, we discussed that the severe winter storms of 2007-2008 deposited cobble and saltwater on terraces that support *Astragalus tener* var. *titi* located adjacent to ocean bluffs. The extent to which such events are caused by climate change and the extent to which it could affect *Astragalus tener* var. *titi* are unknown at this time.

III. RECOVERY CRITERIA

Recovery plans provide guidance to the Service, States, and other partners on ways to minimize threats to listed species and on criteria that may be used to determine when recovery is achieved. There are many paths to accomplishing recovery of a species and recovery may be achieved without fully meeting all recovery plan criteria. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished. In that instance, we may determine that, over all, the threats have been minimized sufficiently, and the species is robust enough, to reclassify the species from endangered to threatened or perhaps to delist it. In other cases, new recovery opportunities unknown at the time the recovery plan was finalized may be more appropriate. Likewise, new information may change the extent that criteria need to be met for recognizing recovery of the species. Overall, recovery is a dynamic process requiring adaptive management, and assessing a species' degree of recovery is likewise an adaptive process that may, or may not, fully follow the guidance provided in a recovery plan. We focus our evaluation of species status in this 5-year review on how progress toward achieving recovery criteria has contributed to eliminating or reducing the listing threats discussed in the five-factor analysis.

The recovery plan indicates that downlisting for *Astragalus tener* var. *titi* can be considered when all of the following criteria have been achieved:

1. At least five viable populations (i.e., populations that are stable or increasing based on multiple years of monitoring, including at least two populations in San Diego or Los Angeles Counties) occur on suitable habitat with few to no nonnative competitors, and no threats from trampling. The area surrounding each population should allow for movement and expansion (addresses Listing Factors A and E).

This criterion is relevant and up-to-date. No other populations have been discovered or re-introduced within the historic range of the species; therefore, this criterion has not been met.

2. A minimum of five populations are on land that is permanently protected from development (e.g., residential, commercial, recreational, etc.) including the population that currently exists on Pebble Beach Company and Monterey Peninsula Country Club property. Funds must be available for appropriate long-term management. Protected habitat must be of adequate size and configuration to ensure that ecosystem and community processes (e.g., hydrologic regime, food webs, pollinator fauna, coastal dune community associates, and associated species) are

maintained, and an adequate diversity of sites exist for colonization of new areas as microhabitat conditions change (addresses Listing Factors A and E).

This criterion is relevant and up-to-date. This criterion has not been met.

3. Site selection, restoration, and plant reintroduction has been initiated in at least two historical localities in Los Angeles or San Diego Counties. These two reintroduced populations will be considered as part of the five populations of plants described in 1 (a) and 1(b) above (addresses Listing Factors A and E).

This criterion is relevant and up-to-date. This criterion has not been met.

4. The populations of plants are being adequately maintained, such that encroachment by nonnative plants, excessive herbivory, fire prevention activities, or other threats are not negatively affecting *Astragalus tener* var. *titi* directly or indirectly (addresses Listing Factors A, C, and E).

This criterion is relevant and up-to-date. This criterion has not been met.

5. The 17-Mile Drive population and additional populations have been appropriately managed such that monitoring has determined that these populations are stable or increasing for a minimum of 3 consecutive years (addresses Listing Factors A and E).

This criterion is relevant and up-to-date. This criterion has not been met. Pebble Beach Company and Monterey Peninsula Country Club have initiated occasional monitoring for the Monterey Peninsula population.

6. A seed bank has been established at a recognized institution that is certified by the Center for Plant Conservation (CPC) (addresses Listing Factors A and E).

This criterion is relevant and up-to-date. This criterion has been partially met. Seeds have been collected and are stored at Rancho Santa Ana Botanic Garden, a CPC affiliate institution.

Criteria to delist the species were not included in the recovery plan. We stated that they would be developed after management was underway and specific data became available relating to population viability, effects of altered drainage, effects of nonnative species, and roles of competitor plants.

IV. SYNTHESIS

The status of *Astragalus tener* var. *titi* has not changed substantially since the time of listing in 1998. At that time, only one population was known from along the coast in Pebble Beach, Monterey County, California. Since 1982, annual population numbers have fluctuated between less than 100 and 7,000, depending on winter and spring climatic conditions; less than 100 individuals were observed in 2008. The population occurs on private lands owned by the Pebble Beach Company and the Monterey Peninsula Country Club. The two landowners have

undertaken measures to protect and manage the habitat for *Astragalus tener* var. *titi*, including establishing one enclosure to protect a portion of the population, removing nonnative species from *Astragalus tener* var. *titi* habitat, and installing sensitive habitat signs along the road margins. Research by Doak (et al. 2000) indicates that the taxon may not be as restricted in its habitat characteristics as previously thought. Nevertheless, *Astragalus tener* var. *titi* continues to be threatened by human activities such as hiking, picnicing, ocean viewing, wildlife photography, equestrian use, and golfing. In addition, there is little suitable habitat for the taxon to expand into adjacent to its current distribution because of habitat conversion that has already occurred. The existence of only a single known extant population and small number of individuals place *Astragalus tener* var. *titi* at extreme risk of extinction from stochastic events. Deposition of cobble and saltwater inundation appear to be a new event that threatens the continued existence of the individuals along the edge of the coastal bluffs. We conclude that this taxon continues to be in danger of extinction throughout its currently known range and therefore meets the definition of endangered under the Federal Endangered Species Act; no status change is recommended at this time.

V. RESULTS

Recommended Classification:

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

New Recovery Priority Number and Brief Rationale: No change

VI. RECOMMENDATIONS FOR FUTURE ACTIONS

1. Work with Pebble Beach Company and Monterey Peninsula Country Club to clarify current management practices within *Astragalus tener* var. *titi* habitat and determine if any modifications could be made to improve the status of the taxon.
2. Develop and implement a population monitoring design that focuses on aerial extent of populations rather than exact population counts, and includes the full range of the population.
3. Experiment with establishment of new populations in other coastal terrace habitat on the Monterey Peninsula or at Point Lobos State Reserve. If these efforts are successful, attempts to establish other populations could be undertaken in Los Angeles and San Diego Counties.

4. 2. Survey historical occurrence areas and potential habitat in San Luis Obispo, Los Angeles, and San Diego counties to detect populations and assess habitat for potential restoration and reintroduction. This effort should include a broader habitat definition to accommodate previously overlooked potential habitat.
5. Continue with research on seed characteristics, particularly to determine whether there is a difference in seed viability between those produced from self-fertilization and those produced by cross-pollination.

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

Coastal dunes milk-vetch (*Astragalus tener* var. *titi*)

Current Classification: Endangered

Recommendation Resulting from the 5-Year Review:

- Downlist to Threatened
 Uplist to Endangered
 Delist
 No change needed

Appropriate Listing/Reclassification Priority Number: N/A

Review Conducted By: Connie Rutherford

FIELD OFFICE APPROVAL:

Field Supervisor, U.S. Fish and Wildlife Service

Approve Diane K. Nole Date 1/14/09

REGIONAL OFFICE APPROVAL:

Assistant Regional Director, U.S. Fish and Wildlife Service, Region 8

Approve Melvin Date 2-4-09