

Cercocarpus traskiae
(Catalina Island mountain-mahogany)

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

**U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
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Carlsbad, California 92011-4213**

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FIVE-YEAR REVIEW

Species reviewed: *Cercocarpus traskiae* (Catalina Island mountain-mahogany)

TABLE OF CONTENTS

I.	GENERAL INFORMATION	1
	A. Methodology	
	B. Reviewers	
	C. Background	
II.	REVIEW ANALYSIS	2
	A. Application of the 1996 Distinct Population Segment (DPS) Policy	
	B. Recovery Criteria	
	C. Updated Information and Current Species Status	
	1. Biology and Habitat	
	2. Five-Factor Analysis	
	D. Synthesis	
III.	RESULTS	12
IV.	RECOMMENDATIONS FOR FUTURE ACTIONS	12
V.	REFERENCES	13

FIVE-YEAR REVIEW
***Cercocarpus traskiae* (Catalina Island mountain-mahogany)**

I. GENERAL INFORMATION

I.A. Methodology used to complete the review: This review was conducted by Gary D. Wallace at the Carlsbad Fish and Wildlife Office, U.S. Fish and Wildlife Service (Service). We relied on our 1997 listing rule, available literature, and reports and information in our files. A report titled: “Catalina Island Mountain-Mahogany (*Cercocarpus traskiae*) Status and Monitoring Report” by Knapp (2006) provides the most recent information on the species. The species status and threats at the time of listing are compared to current status and threats.

I.B. Reviewers

Lead Regional Office: Diane Elam and Jenness McBride, California-Nevada Operations Office, 916-414-6464.

Lead Field Office: Gary D. Wallace, Carlsbad Fish and Wildlife Office, 760-431-9440.

I.C. Background

I.C.1. FR Notice citation announcing initiation of this review: A notice of review announcing initiation of the five-year review for this species and the opening of a 60-day comment period was published in the Federal Register (FR) on March 22, 2006 (71 FR 14538). No comments were received during the comment period.

I.C.2. Species status: In the 2006 Recovery Data Call for the Carlsbad Fish and Wildlife Office, the status of this species was reported as “stable”.

I.C.3. Recovery achieved: This was reported as a value of “1” (0-25 percent) in the 2006 Recovery Data Call for the Carlsbad Fish and Wildlife Office. This indicates that we estimate 0 to 25 percent of the recovery objectives for this species have been met.

I.C.4. Listing history

Original Listing

FR notice: 62 FR 42692

Date listed: August 8, 1997

Entity listed: *Cercocarpus traskiae* (Catalina Island mountain-mahogany), a plant species.

Classification: Endangered

This species was listed as Endangered by the State of California in 1982.

I.C.5. Associated rulemakings: None

I.C.6. Review History: None

I.C.7. Species' Recovery Priority Number at start of review: The recovery priority number for this species is "8" according to the 2006 Recovery Data Call for the Carlsbad Fish and Wildlife Office. This number indicates that the taxon is a species that faces a moderate degree of threat and has a high potential for recovery.

I.C.8. Recovery Plan or Outline: None

II. REVIEW ANALYSIS

II.A. Application of the 1996 Distinct Population Segment (DPS) policy

II.A.1. Is the species under review listed as a DPS? No. The Endangered Species Act (Act) defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This definition limits listing as DPS to only 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.

II.B. Recovery Criteria

II.B.1. Does the species have a final, approved recovery plan containing objective, measurable criteria? No. No recovery plan exists for this species.

II.C. Updated Information and Current Species Status

II.C.1. Biology and Habitat

Description

Cercocarpus traskiae (Santa Catalina mountain-mahogany) is an evergreen tree or shrub in the Rosaceae (Rose family) that reaches 4.6 meters (15 feet) tall and produces basal sprouts. Plants are believed to be long-lived and may take several years to reach reproductive maturity. The distinctive leathery leaves are densely hairy on their lower surfaces. Individual plants do not necessarily flower each year. The flowers occur in clusters of 4 to 10 and each produces a single-seeded dry fruit. For this discussion and in most references, the term seed refers to the whole fruit because the fruit wall is fused to the seed. There appears to be cyclic production of abundant fruits (Knapp 2006).

Distribution

Cercocarpus traskiae is still known to occur naturally only in Wild Boar Gully on the southwestern coast of Santa Catalina Island off the coast of southern California. Plants are typically found on steep slopes and near drainage bottoms between 131 and 231 meters (430 and 700 feet) in elevation (the highest elevation on the island is 648 meters [2,125 feet]) (62 FR 42692). The known natural population is found on soils derived from igneous, saussurite gabbro rock (Knapp 2006), which is restricted to the southwestern coast of Santa Catalina Island. Plant species most commonly associated with *C. traskiae* include *Salvia mellifera* (black sage), *Rhamnus pirifolia* (island redberry), *Rhus integrifolia* (lemonadeberry), *Galium* spp. (bedstraw), *Heteromeles arbutifolia* (toyon), and *Opuntia littoralis* (coastal prickly pear) (Knapp 2006). No new natural populations of *C. traskiae* have been reported since listing.

Cercocarpus traskiae has hybridized locally with *C. betuloides* var. *blancheae*, which also occurs on the island. The hybrids have been characterized on morphological bases as well as on allozyme differences (Martin 1988, Rieseberg et al. 1989, Rieseberg 1991). Morphological assessments of hybridization have not always agreed with the results of random amplified polymorphic DNAs (RAPDs) and allozyme studies (Rieseberg and Swensen 1996).

Martin (1988) reported that *Cercocarpus* plants of hybrid origin were planted out at three sites prior to 1987. Between 1987 and 1996, about 30 plants, nearly all grown from cuttings, were planted out at eight locations on Santa Catalina Island (Knapp 2006). However, the genetic origin of the outplanted specimens is not clear. Five of the eight sites described by Knapp (2006) have specimens of *C. betuloides* var. *blancheae* growing nearby. This likely increases the chances for hybridization at these sites. Monitoring in 1997 revealed that five possibly hybrid plants among the eight sites had died (Knapp 2006). None of these outplanted sites is known to support a self-sustaining population of *C. traskiae* at this time. However, Rieseberg and Swensen (1996) reported finding seedlings at one site.

The Catalina Island Conservancy (Conservancy) intends to plant out individuals derived from cuttings, from each of the six “pure” *Cercocarpus traskiae* trees, at up to four locations on the island where this species has not been previously observed. These locations include Wild Boar Gully as a control. The other sites will be selected based on soil type, drainage aspect, and habitat type. The cuttings are being collected under a permit from the California Department of Fish and Game (Knapp 2006).

Currently there is no evidence that a self-perpetuating population of *Cercocarpus traskiae* exists anywhere except within the historical range known at the time of listing, Wild Boar Gully, on Santa Catalina Island.

Abundance and Population Trends

Cercocarpus traskiae is considered by some to be one of the rarest trees in North America. At the time of listing, only six mature trees of this species were extant in the wild. Blanche Trask found only 40 to 50 plants when she discovered this species in the Salta Verde area of southwestern Santa Catalina Island in 1897. The species is not known to occur naturally elsewhere.

At the time of listing in 1997, one hundred years after its discovery, *Cercocarpus traskiae* was known from only a single population of six mature trees in one watershed (Wild Boar Gully) in the Salta Verde area on Santa Catalina Island. Rieseberg and Gerber (1995) and Rieseberg and Swensen (1996) verified the genetic identity of the six mature trees as *C. traskiae* and identified the other five adult *Cercocarpus* trees in the watershed as of hybrid origin. A plant on the mainland in the Santa Monica Mountains initially thought to be *C. traskiae* was found not to be this species (Rieseberg and Swensen 1996).

Fencing erected in 1985 around two plants deemed the best examples of the species resulted in the establishment of 75 seedlings by 1987 (Martin 1988). Electrophoretic analysis indicated that 28 of the largest seedlings were *C. traskiae* (Rieseberg et al. 1989). However, this was based on a single locus. Subsequently, a RAPDs and isozyme analysis of five morphologically intermediate seedlings revealed that at least one of the parents was a hybrid individual and that some of the seedlings identified as *C. traskiae* in the earlier study may in fact have at least one hybrid parent (Rieseberg and Gerber 1995). Rieseberg and Swensen (1996), citing a high rate of mortality among juvenile plants, reported that approximately 50 of the original 75 remained. The identity (i.e., whether pure *C. traskiae* or hybrid) and the relative survival of those seedlings were unknown at the time of listing.

Knapp (2006) has summarized the status of *Cercocarpus traskiae* on Santa Catalina Island since the listing in 1997. About 55 to 65 seedlings and saplings of unknown identity were present between 1994 and 1997. After the installation in 1999 of a 2.7-meter (9-foot) high fence to exclude herbivores, the number of seedlings and saplings within the enclosure increased each year, reaching a peak of 113 individuals in 2002. After that time the number dipped to 102 in 2003. It is not known what portion of the seedlings and saplings are *C. traskiae* and what portion are of hybrid origin.

Ninety-six of the 102 seedlings and saplings reported in 2003 were associated with a single reproductive mature individual of *Cercocarpus traskiae* (Knapp 2006). This may reflect stringent habitat requirements for seedling establishment or indicate that the species is self-incompatible (SI) and that this individual is genetically better suited for successfully mating than are other individuals in the population. A self-incompatible species is unable to produce seed through self-fertilization and requires fertilization by an individual with a different genetic

makeup at certain loci (i.e., different SI alleles). If *C. traskiae* is self-incompatible and seedlings are consistently associated with only one of the adult plants, the loss of that individual would likely severely threaten the species. This situation would imply that only one of the adult plants had SI alleles different from the other mature plants. At this time, we have no information addressing whether the species is self-incompatible or not or whether seedling production is genetically or ecologically constrained.

Twenty-seven of the 102 individuals reported in 2003 are saplings. Three of these are considered large enough to be adults. One appears morphologically to be “pure” *Cercocarpus traskiae* while the other two appear to be of hybrid origin (Knapp 2006). However, except for five individuals examined by Rieseberg and Gerber (1995), these 102 individuals have not been assessed to determine their genetic identity.

The number of mature *Cercocarpus traskiae* plants currently known in Wild Boar Gully is now seven. Six of these were known at the time of listing. The seventh individual is a recruit now considered mature and morphologically pure *C. traskiae* by Knapp (2006). This single individual may represent the only addition to the population of mature trees of *C. traskiae* in almost 40 years or perhaps in about 100 years. There is no evidence of recruitment prior to the mid 1980s. These mature plants are very old and the reproductive population apparently increases very slowly. We have no data of the natural life span of plants of this species.

Habitat or Ecosystem Conditions

As it was at the time of listing, *Cercocarpus traskiae* is restricted to a single watershed, Wild Boar Gully, on the southwestern coast of Santa Catalina Island, California. The soils there, derived from igneous, saussurite gabbro rock, are restricted to the southwestern coast of the island (Martin 1988, Knapp 2006).

Since the mid-1970s, progressively more inclusive fences have been erected around one or more of the mature *Cercocarpus traskiae* plants to protect the plants and their habitat from herbivores. Encouraged by improvements in the vegetative health of two fenced plants, a larger area was fenced in 1985 (62 FR 42692). The first signs of significant recruitment were within this 0.3-hectare (0.8-acre) area. This was the condition at the time of listing (62 FR 42692).

In 1999, after the listing, about 40 hectares (100 acres) of the watershed of Wild Boar Gully was fenced to exclude the remaining herbivores (Knapp 2006). The Service contributed to the cost of the fencing. The enclosed area has proven suitable to sustain seedlings of *Cercocarpus* spp. This is a result of protection from herbivores and likely the accumulation of some leaf litter near the mature plants. Most of the seedlings and saplings reported in 2003 were associated with a single tree that had a partially bare slope behind it (Knapp 2006). The effects of

the fencing on the density of enclosed vegetation and *Cercocarpus traskiae* recruitment are unknown. A significant increase the density of vegetation within the enclosure is likely to increase the susceptibility to fire as well as increase the potential for competition from encroaching non-native and native plants. A vegetation management plan to address this and related issues should be incorporated in a Recovery Plan for this species.

Fencing has provided needed short-term protective benefits. There is a management program in place that addresses control of some of the non-native invasive plants in the area. The magnitude of threat to *Cercocarpus traskiae* from potential increases in invasive non-native plants and associated threats from fires is unknown.

Genetics

We are not aware of any papers addressing this topic published since the listing in 1997. At the time of listing, Rieseberg and Swensen (1996) using RAPDs identified 6 of 11 mature *Cercocarpus* plants in Wild Boar Gully as *C. traskiae*. The remaining five plants were determined to be of hybrid origin, including one tree that Rieseberg et al. (1989) previously considered to represent *C. betuloides* var. *blancheae*. A plant from the Santa Monica Mountains was identified as genetically similar to *C. traskiae* but lacked a diagnostic RAPDs marker for that species (Rieseberg and Swensen 1996).

Knapp (2006) proposes to study the potential for self-compatibility in this species. This will help assess the reproductive output, currently centered on a single plant. Determination of the breeding system of this species would shed light on the role of hybrids in conservation efforts. The listed status of *Cercocarpus traskiae* has aided the Conservancy efforts to fund these studies (D. Knapp, Catalina Island Conservancy, pers. comm. 2006).

Taxonomy

No papers addressing this topic relative to *Cercocarpus traskiae* have been published since the listing.

II.C.2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

III.C.2.a. Present or threatened destruction, modification or curtailment of its habitat or range: In the 1997 listing rule, we discussed the impact of introduced herbivores on *Cercocarpus traskiae* and its habitat (62 FR 42692). Large introduced herbivores have historically altered the flora and the landscape of Santa Catalina Island. Goats, pigs, bison, and deer were noted at the time of listing. The small size of the current *C. traskiae* population is attributed to the historical presence of goats, deer, and pigs (Rieseberg et al. 1989, Knapp 2006).

Goats are known to consume coarse vegetation, including shrubs and trees. This results in reduced vegetation cover and less of a mulch layer (dead herbaceous vegetation) to hold moisture and slow erosion (Coblentz 1980). Lack of plant cover can result in the formation of gullied badlands (Thorne 1967). Pigs create a network of bare trails with compacted soils. The vegetation loses its tiered overlapping structure as shrubs become isolated by the trail network (Martin 1988). In addition to retaining soil moisture for adult plants, surface litter may hold seeds on the steep slopes. We did not elaborate on the threats from bison and deer in the final listing rule. However, these animals are generally found in the area where *C. traskiae* grows.

In 1999, after the listing, the Conservancy erected a 2.7-meter (9-foot) high fence around Wild Boar Gully and the population of *Cercocarpus traskiae* (Knapp 2006). Seedlings and saplings of *Cercocarpus* are present within the enclosure although the specific identities of all of these are unknown. The fence has been effective in excluding goats, pigs, and bison. Removal of all of the goats from the island was completed in February 2003 and the estimated number of pigs remaining is one to four, but about 2,400 deer remain (Knapp, pers. comm. 2007). Deer are a managed game species regulated by the California Department of Fish and Game and as such a permit is necessary to remove them from the fenced area when they are found. There have been instances where deer have gained access to the fenced enclosure. The impact of even these rare events is magnified by the small size of the *C. traskiae* population.

The threats from introduced herbivores to *Cercocarpus traskiae* habitat identified in the listing rule have been effectively eliminated by the fencing and associated management activities. However, evidence of the historical erosion remains. Goats have been eliminated from the island, pigs are nearly gone, and the fenced enclosure in the Wild Boar Gully watershed has greatly decreased the threat from deer and bison. This has allowed the *C. traskiae* plants and other vegetation cover to increase. The cover of leaf litter has also increased. The indirect impact of this vegetation increase on fire susceptibility is unknown. No additional threats attributable to this factor have been identified since the listing.

The protections afforded this species under the Act are outlined in the listing rule (62 FR 42692). These include additional protections for this State listed species under section 9 of the Act. The listing status of this species has contributed to its educational value and has aided in conservation funding efforts for the species (Knapp pers. comm. 2006). Conservation of *Cercocarpus traskiae* is the focus of a voluntary status and monitoring program supported by the Conservancy (Knapp 2006). The species occurs in a remote, physically protected site. It is unlikely that changes in development or land use for the area will take place in the foreseeable future.

II.C.2.b. Overutilization for commercial, recreational, scientific, or educational purposes: We cited the potential threat from unauthorized collection

in the listing rule (62 FR 42692). However, there is no current evidence that overcollection poses a threat. The remoteness of the occurrence, the fence surrounding the entire watershed, and travel limitations on Conservancy lands likely contribute to minimization of this threat.

II.C.2.c. Disease or predation: The threat from introduced herbivores was cited in the listing rule (62 FR 42692). Herbivore impact to habitat is discussed above under II.C.2.a. However, the fence erected in 1999 has reduced the incidence of direct browse damage to *Cercocarpus traskiae* (Knapp 2006). Specific examples of damage to *C. traskiae* by pigs and mule deer prior to listing are given in Knapp (2006). In addition to browsing impacts, the rooting activity of pigs was considered to be directly responsible for low numbers of *C. traskiae* plants (Rieseberg et al. 1989). Pigs uproot seedlings and churn up soil in some canyons (Thorne 1967). At the time of listing most of the plants did not have pig-proof fencing around them and the perimeter fence in place at that time did not exclude pigs (62 FR 42698). At that time, it was estimated that 2,000 to 3,000 pigs were on the island. As noted above, the number of pigs has now been reduced to one to four animals (Knapp, pers. comm. 2007). A potential concern is that the fence does not completely exclude deer, because evidence of browsing on the *Cercocarpus* was seen in 2003. Also, following rain damage in 2005, several deer were sighted within the fenced area (Knapp 2006). Seedling heights indicated that some browsing had taken place, and the California Department of Fish and Game was unwilling to issue a depredation permit to dispatch the deer (Knapp 2006). Elimination of this game species in a timely manner before plants are damaged may be a recurring problem. Nonetheless, the threat from browsing has effectively been eliminated, except for the occasional deer getting into the enclosure.

II.C.2.d. Inadequacy of existing regulatory mechanisms: At the time of listing, regulatory mechanisms thought to have some potential to protect *Cercocarpus traskiae* included: (1) listing under the California Endangered Species Act (CESA); (2) the California Environmental Quality Act (CEQA) and the National Environmental Quality Act (NEPA); and (3) the Federal Endangered Species Act (Act) in those cases where *C. traskiae* occurs in habitat occupied by a listed wildlife species. The final listing rule (62 FR 42698) provides an analysis of the level of protection that was anticipated from those regulatory mechanisms. The rule (63 FR 42701) also includes an analysis of protections for plants under section 9 of the Act. These analyses appear to remain currently valid.

This species is covered as an endangered species under the California Endangered Species Act (CESA) of 1984 (Fish and Game Code Section 2050-2116). Although “take” of State listed plants is prohibited, as a private landowner, the Conservancy, after providing the required 10-day notification, could remove the plants (subject to salvage) as a result of habitat modification or change in land use.

II.C.2.e. Other natural or manmade factors affecting its continued existence: We noted in the listing rule that because of habitat degradation on the Channel Islands, the proportion of invasive exotic plants has increased (62 FR 42699). Currently the Conservancy has incorporated 2005 Private Stewardship Grant Program funding into an existing 2005 Partners for Fish and Wildlife Grant, Wildlife Extension Agreement. The purpose of the project is to systematically control and eradicate 12 invasive plant taxa from 17 watersheds on 6,000 acres of the west end of the island. This includes removing the invasive exotics *Ehrharta calycina* (Veldt grass) and *Phalaris aquatica* (Harding grass), from Wild Boar Gully. This project should eventually counter balance any threats associated with an increase of encroaching invasive exotics as a result of the fencing that excludes herbivores. Encroaching native plants may prove to be a threat.

The listing rule identified fire as a potential threat. Since listing, the construction of the enclosure fence has excluded herbivores and resulted in local increases of vegetative cover. In general, it is not known to what extent the resulting increase of vegetative cover within the fenced area poses a threat of increased fire frequency for *Cercocarpus traskiae*. Fire is likely infrequent on the island although lightning strikes are known. The fire history of Wild Boar Gully is unknown and the direct effects of fire on *C. traskiae* are still unknown. Knapp (2006) does infer a potential benefit of fire in opening up suitable habitat for the establishment of seedlings of *C. traskiae*. The fact that some of the mature plants produce basal sprouts is suggestive that at least some of the plants might sprout after a fire depending upon the severity of the fire. Fire remains a threat to seedlings and saplings of the species. The current program for elimination of non-native grasses will likely further reduce the threat from fire to the mature *C. traskiae* plants and the seedlings and saplings of *Cercocarpus* in the area. A related threat is that if the non-native grasses present are burned, their soil-holding capacity is gone and the steep slopes are subject to landslides or slumping, both of which could impact *C. traskiae*.

Rieseberg and Gerber (1995) suspect that a critical factor leading to hybridization for a number of plants occurring on the Channel Islands has been habitat disturbance due to the introduction of non-native goats and pigs. We considered the potential for hybridization of *Cercocarpus traskiae* with the more common *C. betuloides* var. *blancheae* to be a threat in the listing rule. Genetic swamping of *C. traskiae* was suggested as a possible outcome of this hybridization. We also stated that Rieseberg et al. (1989) recommended elimination of mature hybrids as a means to preserve the species. Rieseberg and Swensen (1996) considered hybridization a significant threat where the frequency of interspecific mating is high and the population at risk is numerically smaller than the congener. They confirmed that this is the case in *C. traskiae* and suggested two possible management solutions. The first was to eliminate the less-desired species from the area of hybridization and the second was to relocate the rare population to a site lacking the less-desirable species. At one point the number of individuals of *C. traskiae* and hybrids combined was considered too low to justify eliminating

the hybrid individuals (Rieseberg and Gerber 1995). As noted above, there are seven *C. traskiae* and seven plants of hybrid origin (F1 or F2 generation) among the mature individuals in Wild Boar Gully (Rieseberg and Swensen 1996, Knapp 2006). Since the listing, the mature hybrid individuals are still present in the area, producing flowers and fruits. The identity of seedlings and saplings produced before and after the listing has not been verified. Consequently, hybridization continues to pose a threat to *C. traskiae*.

The persistence of *Cercocarpus traskiae* as only one small population was noted in the final listing rule under the “Background” section and in the “Summary of Factors Affecting the Species” section under Factor A. However, no discussion specific to the threat this posed to the species was included under Factor E. The conservation biology literature commonly notes the vulnerability of taxa known only from small populations (Primack 2006). *Cercocarpus traskiae* now has a population size of seven mature individuals. This is an increase in population size of one plant in the past 40 to 100 years. The greater vulnerability to extinction of small populations is generally attributed to demographic fluctuations, environmental variation, and loss of genetic variability and related problems of inbreeding depression and genetic drift; and/or to natural catastrophes (Primack, 2006; Barrett and Kohn 1991). Five categories of species most vulnerable to extinction are outlined in Primack (2006, p.159): (1) species with a very narrow geographical range; (2) species with only one or a few populations; (3) species in which population size is small (identified as one of the best predictors of species extinction rate); (4) species in which population size is declining; and (5) species that are hunted or harvested by people. *Cercocarpus traskiae* would be included in four (1-4) of the five categories described by Primack (2006). *Cercocarpus traskiae* is restricted to a single watershed, and exists as a single population of seven mature specimens reduced from the 40 to 50 individuals reported 100 years ago when the species was discovered. By these measures the species continues to be at considerable risk of extinction.

Currently the *Cercocarpus traskiae* population consists of a few old individuals and an unknown portion of about 25 saplings and 75 seedlings (Knapp 2006). The seedlings and saplings are of unverified genetic identity and likely include a number of plants of hybrid origin. There is a disparity in numbers of individuals of different age classes; i.e., plants are either very old or very young with few age classes in between. Individual plants and portions of their habitat have been protected for more than 20 years. However, in that time only a single individual morphologically identified as *C. traskiae* has been considered of sufficient size to be added to the category of mature specimens. It is possible that all of the extant mature plants were present when Blanche Trask discovered the species over 100 years ago. Although some species of the genus are known to live for well over 100 years, the natural life span of an individual tree of this species is not known. There is the potential for mature plants to die naturally before an adequate number of younger reproductive adults are present to maintain even the current genetic diversity and reproductive output.

As discussed above, genetic identification of the plants known at the time of listing indicated that there were only six plants of *Cercocarpus traskiae*. The concentration of extant seedlings and saplings around a single mature, genetically verified *C. traskiae* individual may point to the potential existence of self-incompatibility in this species. Limitations on the reproductive partners among the seven mature plants could be another considerable threat to the species' survival and may indicate lower genetic diversity among the mature individuals

Overall, threats attributable to other natural or manmade factors have changed little since the time of listing in 1997. Invasive non-native plants pose perhaps a greater threat than at the time of listing. The balance between effective control of invasive exotic non-natives and increased density of vegetation due to fencing is unknown. The invasive non-native plant management is focused on target species rather than vegetation cover. This and stochastic events such as fires and landslides still pose significant threats to the species. Individuals of hybrid origin still comprise about half of the mature *Cercocarpus traskiae* individuals in the watershed. As it was at the time of listing, this species is known from a single, small, natural population of seven mature individuals, distributed in one watershed on Santa Catalina Island. The plants are slow to reach maturity and the population has a low recruitment rate. High mortality rates for juvenile plants have been noted and only 102 seedlings and saplings were counted between 1985 and 2003. Most of these were associated with a single mature individual. Genetic factors (e.g., self-incompatibility) may also pose a significant threat to the species.

II.D. Synthesis:

Cercocarpus traskiae is a prime example of a species in danger of extinction. The species' native range and habitat is probably the same as it was 100 years ago when it was discovered. There is a single, small, remnant population of seven mature plants showing little recruitment and almost no population increase. Without the continued protections and conservation actions taken by the Conservancy, this species would not be able to persist. The Service, in conjunction with the State, needs to continue to assist the Conservancy in their efforts to conserve this rare California tree.

The primary threats to *Cercocarpus traskiae* and its habitat at the time of listing were those associated with introduced herbivores. Since the listing impacts from introduced herbivores have been reduced considerably by fencing installed in 1999. The threat of overcollection of specimens noted in the final listing rule has not been evident. State and Federal regulatory mechanisms available at the time of listing are still in place for protection of the species, and are still needed as incentives for its conservation.

Cercocarpus traskiae continues to face a number of threats known at the time of listing. Threats from invasive non-native plants and fires persist. These threats may be locally more severe than at the time of listing. The threat from hybridization persists because a significant portion of the population of mature plants is of hybrid origin. The population

is still small and demographically imbalanced and the range is still restricted. These make this species vulnerable to environmental catastrophes and stochastic events such as fires or landslides. Even considering the persistent nature of the old trees, the low and variable reproductive output of these individuals, potential for self-incompatibility, the low establishment rate, and slow maturation rate may make persistence of the species problematic. *Cercocarpus traskiae* falls within four of the five categories of species vulnerable to extinction noted by conservation biologists. Because of the magnitude of the remaining threats, we recommend that the status of *Cercocarpus traskiae* (Catalina Island mountain-mahogany) remain unchanged.

III. RESULTS

III.A. 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 is needed**

III.B. New Recovery Priority Number 8

No change in the recovery priority is proposed here. The degree of threat is considered moderate because it does not appear to be as severe as it would be if there was a development proposal for the site or evidence of immediate die-off of plants. Were it not for the fact that this is an apparently long-lived perennial species and each plant capable of producing lots of seeds, or if the species is shown to be SI, the degree of threat would be higher. The potential for recovery is high because the genetically pure plants may be identified and seeds and cuttings from these may be used to establish additional populations on the island. Removal of hybrid individuals will be possible after they have been identified. Analysis of the other threats identified above may lead to further refinement of the Recovery Priority Number.

IV. RECOMMENDATIONS FOR FUTURE ACTIONS:

Establish an effective seed banking program for this species that includes maintenance of genetic diversity and plans to facilitate out-plantings, including *ex-situ* populations of the species to protect against detrimental stochastic events.

Determine the incidence, nature, and management consequences of self-incompatibility in *Cercocarpus traskiae*.

Determine the genetic identity of all of the *Cercocarpus* seedlings and saplings present in Wild Boar Gully, as well as that of plants recently deemed to be adults and plants at older out-plantings.

Determine the potential threat from continuing hybridization of *Cercocarpus traskiae* and co-occurring *C. betuloides* var. *blancheae* and implement management actions to alleviate the threat.

Identify the micro-habitat requirements most conducive seedling production and establishment.

Determine the best method for establishing additional populations that are self-sustaining and capable of participating in the evolutionary future of the species. Establish success criteria and remediation measures for these established populations.

V. REFERENCES:

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