U.S. FISH AND WILDLIFE SERVICE SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: Cicindela albissima

COMMON NAME: Coral Pink Sand Dunes Tiger Beetle

LEAD REGION: Region 6

INFORMATION CURRENT AS OF: March 2008

STATUS/ACTION:

_____ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status

____ New candidate

<u>X</u> Continuing candidate

____ Non-petitioned

____ Petitioned - Date petition received: <u>April 25, 1994</u>

- X 90-day positive FR date: September 15, 1994
- ____12-month warranted but precluded FR date:
- _ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

- a) Is listing warranted (if yes, see summary of threats below)? <u>YES</u>
- b) To date, has publication of a proposal to list been precluded by other higher priority listing actions? <u>YES</u>
- c) If the answer to a. and b. is "yes," provide an explanation of why the action is precluded.

We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, almost our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations, and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (<u>http://endangered.fws.gov/</u>).

<u>**X**</u> Listing priority change

Former LP: 8_

New LP: <u>2</u>

Date when the species first became a Candidate (as currently defined):<u>11/15/1994</u> Candidate removal: Former LPN: ____

- ____ A Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.
- U Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
- ____ F Range is no longer a U.S. territory.
- ____ I Insufficient information exists on biological vulnerability and threats to support listing.
- ____ M Taxon mistakenly included in past notice of review.
- N Taxon does not meet the Act's definition of "species."
- ____ X Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Insect, Cicindelidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Utah

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Kane County, Utah

LAND OWNERSHIP: Over 90 percent of the species' population occurs on Utah's Coral Pink Sand Dunes State Park. The remainder of the species' population occurs on adjacent Bureau of Land Management (BLM) managed public land.

LEAD REGION CONTACT: Ann Carlson, (303) 236-4264

LEAD FIELD OFFICE CONTACT: Marianne Crawford, (801) 975-3330

BIOLOGICAL INFORMATION

Species Description

The Coral Pink Sand Dunes (CPSD) tiger beetle (*Cicindela albissima*) has been determined to be a full species, not a subspecies (*C.l. albissima*) of (*Cicindela limbata*) (Morgan et al. 2000). It has striking coloration; the large wing cases (known as elytra) are predominantly white and much of the body and legs are covered in white hairs. The upper thorax has a metallic sheen and the eyes are particularly large. Adult beetles are 11 to 15 millimeters (0.4 to 0.6 inches) in size.

Taxonomy

The species was originally described as *Cicindela limbata albissima* by Rumpp (1961). It shared the typical characteristics of other members of the *maritima* group and was most similar in morphology to other subspecies of *C. limbata*, but distinguished by Rumpp (1961) on the basis of its unique expanded maculation pattern and its disjunct geographic distribution. He reported it

was found only at the CPSD, and was separated from the closest related subspecies by over 600 kilometers (km) (378 miles (mi)). The taxonomy of *C. l. albissima* was subsequently studied along with other members of the *maritima* group using mitochondrial deoxyribose nucleic acid (mtDNA). The results of that study revealed distinct haplotypes for the CPSD tiger beetle, which elevated it to a full species, *C. albissima*. The study also showed that *C. albissima* was less closely related to *C. limbata* subspecies than to several other species in the group ((Morgan et al. 2000). The three other recognized subspecies of *C. limbata* range from mid-United States to Canada (Hill and Knisley 1991). The ranges of these three subspecies and the CPSD tiger beetle do not overlap, and they differ primarily in elytral maculation or pigmentation of the wing cases.

Habitat/Life History

The CPSD tiger beetle appears to have been isolated at a high elevation, and, like other members of the species group, is restricted to a cool, sandy habitat. The species is restricted mostly to a relatively small part of the approximately 13-km (8-mi) long dune field, situated at an elevation of about 1,820 meters (m) (5,970 feet (ft)).

Adults utilize habitats from the swales between the dunes to the upper slopes. They are active predators, attacking and eating prey with their large and powerful mandibles. These beetles are active during the day, preying and scavenging on live and dead insects. At night, the beetles bury into the sand dunes. When mating, the male is able to tightly clasp the female with his mandibles on grooves along her side (Conservation Committee 1997).

Larval CPSD tiger beetles inhabit inter-dunal swales, typically dominated by the leguminous plants *Sophora stenophylla* (silvery sophora) and *Psoralidium lanceolatum* (dune scurfpea), and several grasses, including *Sporobolus crptadndrus* (sand dropseed) and *Achnatherum hymenoides* (Indian ricegrass). The beetles also are closely associated with the threatened plant species *Asclepius welshii* (Welsh's milk-vetch). Swales are more productive micro-habitats than the surrounding sand dune slope habitat of the adults. The larvae of this beetle are found in individual burrows within the furrows of the dune system; from where they are able to ambush small invertebrate prey. Within their burrows, the larvae may become hosts to the parasitic wasp (*Methoca* spp.) (Knisley and Hill 1994, 1995). They take 2 years to mature to adults (Knisely and Gowan 2005).

Range/Distribution

The CPSD tiger beetle is known to occur only in dunes approximately 11 km (7 mi) west of Kanab, Kane County, in south-central Utah. The CPSD geologic feature covers approximately 1,416 hectares (ha) (3,500 acres (ac)). The southern 809 ha (2,000 ac) of the dunes is within the State of Utah's CPSD State Park. The northern 607 ha (1,500 ac) is Federal land managed by the BLM Kanab Resource Area, and is partly within the Moquith Mountain Wilderness Study Area (WSA). Designated areas to protect the CPSD tiger beetle habitat from off-road vehicle (ORV) use occur on both State Park and BLM lands: 1) 84 ha (207 ac) in the CPSD State Park constitute the core beetle habitat; 2) 150 ha (370 ac) on BLM land harbor a very small population of tiger beetles; and 3) a corridor joining these two sites is approximately 55 ha (137 ac).

At the CPSD State Park, the protected area includes a 13-km (8-mi) long dune field at 1,820 m (6,000 ft) elevation. The occupied habitat is approximately 1,800 by 400 m (5,900 by 1,000 ft). Over 90 percent of the CPSD tiger beetle's adult and larval populations are restricted to this small site. The second protected area is on BLM managed lands about 4.8 km (3 mi) north of the tiger beetle's main occupied habitat. This site has three known larval beds and a very small group of adults (Conservation Committee 1997). No other sites of the CPSD tiger beetle occurrence are known despite thorough searches; researchers are confident that no other populations are present at the CPSD (Knisely 2006).

Population Estimates/Status

Population estimates from 1992 to 1998 were conducted using a mark/recapture method. Since 1998, population estimates of adults have been based on a removal method. Studies were conducted in 2004 to compare the removal and the mark/recapture population estimate methods. The work involved assessing movement, adult burrowing, and other factors that affect methods of estimation. The results indicated that significant numbers of adults move over a several day period, resulting in a population overestimation by a factor of 4.8 when using the mark/recapture method. As a result, the 1992 to 1998 estimates of adult population size at the CPSD were significant overestimates (Knisley and Gowan 2005).

Abundance over time was evaluated based on data collected since 1997 in all swales at the CPSD. Estimates from 1997 and 1998 probably overestimated the population, so we reviewed estimates from 1999 to the present (see Figure 1). There is substantial year-to-year variation, which is typical of many desert arthropods that are greatly affected by climatic factors, especially rainfall (Knisley and Hill 2001). Populations in 2002 were the highest ever recorded (2,944), mainly due to very large populations in core habitat swales. One year later, in 2003, populations were the lowest ever recorded (595) (Knisley and Gowan 2005). This decline in the population is likely a result of drought (Knisley 2002). Studies have indicated that rainfall has a positive effect on both oviposition (recruitment) and survivorship, based on availability of prey food, and reduced mortality from desiccation and starvation (Knisley and Hill 2001). Soil moisture increases larval activity, attracts adults, and apparently increases oviposition. Watering of natural burrows several times in May and June increased survival of the larvae by 10 percent (Knisley and Gowan 2006).

Drought conditions since 2001 appear to have resulted in very low recruitment to the population. Although 2005 was a wet year, a positive population response would not be expected for 2 years. Adult abundance in any year is related to the recruitment of new individuals 2 years previous (because of a 2-year life cycle), and the survivorship of the developmental stages of that cohort. However, the total estimate of the adult population in 2007 was only 700 compared to 1,112 in 2006, indicating the population is not responding or recovering.

FIGURE 1.

Population estimates of the adult *Cicindela albissima* determined from various methods: removal method (1999-2007), mark recapture (1992-1998) and the corresponding index counts for all years Knisley and Gowan (2008).



The Conservation Agreement and Strategy (Conservation Committee 1997) goal of showing self-sustaining or expanding populations has not been achieved (Knisley and Gowan 2003, 2005, 2008). Despite increased ORV management and restrictions since 1997, no corresponding increase in the population has occurred. The primary protected core swales designated in the Conservation Agreement provide refuge to the key viable breeding area and sustain the population during periods of low population abundance (Knisley and Gowan 2006). However, the dunes and swales shift due to wind and other climatic factors, and tiger beetles are not able to expand into additional habitats or adjust to more suitable areas as the dunes move. The tiger beetles are confined to the protected areas, which may or may not provide suitable habitat at any given time. Therefore, the major impact from ORV use is the overall reduction of habitat (Knisely 2007). It is unlikely that a viable population is being sustained in these limited areas based on beetle counts taken in the last 5 years (Knisely 2007).

THREATS

A. <u>The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range</u> The ORV activity has destroyed and degraded the beetle's habitat, especially the inter-dunal swales used by the larval population (Knisley and Hill 2001). The inter-dunal swales are the most biologically productive areas in this ecosystem, and have the greatest abundance of suitable prey species. Adult beetles are killed by ORVs, but more important impacts may be damage to vegetation, reduction in arthropod prey, and disturbance and increased desiccation of larval microhabitat (Knisley 2001). The BLM and State Parks have monitored ORV impacts to the majority of the species' habitat since 1998, enforced ORV restrictions, and designated Conservation Areas to protect beetle habitat by excluding ORV use (Knisley and Hill 1997, 1998, 2001; Knisley 1999, 2000, 2001, 2002).

Approximately 6,670 ha (1,656 ac) in the CPSD State Park, and 445 ha (1,100 ac) in the WSA managed by BLM, are open to ORV use. The southern portion and bulk of the CPSD tiger beetle population lies within the CPSD State Park, where 84 ha (207 ac) are closed to ORV use. An additional 55 ha (137 ac) were restricted for use only as an ORV travel corridor. The northern portion on BLM land includes 150 ha (370 ac) protected from ORV use for the tiger beetle.

Although 233 ha (577 ac) out of approximately 1,416 ha (3,500 ac) has been protected from ORV use, the CPSD tiger beetle population has failed to increase. This appears to be primarily due to natural population fluctuations in response to drought (Knisley and Gowan 2003; see discussion under Factor E). However, the ability for beetles to expand their range into additional habitats is limited because ORV use is destroying or modifying habitats (Knisley and Hill 2001). Therefore, we believe that ORV use threatens the species.

- B. <u>Overutilization for Commercial, Recreational, Scientific, or Educational Purposes</u> The species may be vulnerable to over-collecting by professional and hobby tiger beetle collectors. Tiger beetles are second only to butterflies among the insects that are desirable for natural history collections (Knisley and Hill 1995). The species has been collected, heavily at times, since its discovery and publication of its description (Rumpp 1961; Knisley and Hill 1994, 1995). Collection of adults, before they mate and lay their eggs, may severely reduce the population's reproductive capacity. Some collection may be legitimate, adding valuable knowledge of biogeography, taxonomy, and life history of the species, but this activity is controlled. Restrictions on collecting are enforced by Park and BLM personnel. Quantifying this threat is difficult, but at this time it is not considered to be of high magnitude (Conservation Committee 1997).
- C. Disease or Predation

Natural mortality through predation probably accounts for some population loss of both adult and larval CPSD tiger beetles (Knisley and Hill 1995). Wasps of the genus *Methoca* parasitize the CPSD tiger beetle larvae (Knisley and Hill 1995). However, we have no evidence that predation is a threat to the species.

D. The Inadequacy of Existing Regulatory Mechanisms

The CPSD geologic feature covers approximately 1,416 ha (3,500 ac). Jurisdictionally, the dune ecosystem is bisected. The southern 809 ha (2,000 ac) of the dunes is within the CPSD State Park, and is categorized as public land with a recreational emphasis. The northern 607 ha (1,500 ac) is Federal land managed by the BLM Kanab Resource Area with a rangeland emphasis (BLM 2000a), and is partly within the Moquith Mountain Wilderness Study Area (WSA). Most of the Moquith Mountain is designated as a WSA for watershed

protection; wilderness designation protects occupied tiger beetle habitat by restricting ORV use. Both BLM and State Park regulations prohibit harassment or collection of wildlife, plants, or geological or archaeological remains. Public education for both areas includes signage, brochures, and interpretive programs.

The CPSD tiger beetle is not directly protected by regulatory mechanisms. No State laws in Utah provide protection to insects. A Conservation Agreement and Strategy (Conservation Committee 1997) has been signed and is being implemented, although it is not a regulatory document. The Conservation Agreement and Strategy consists of a collaborative effort that details recommended conservation objectives and actions designed to protect and recover the tiger beetle within the CPSD.

The BLM Kanab Field Office completed an amendment to the Vermilion Management Framework Plan (MFP), updating management of the CPSD, Moquith Mountain, and surrounding area. The plan amendment (BLM 2000a) included continued implementation of conservation actions per the Conservation Agreement and Strategy for the CPSD tiger beetle, management of ORV use, and coordination of management with the State of Utah and the CPSD State Park (65 FR 2000). Conservation actions defined in the Conservation Agreement and Strategy include the formation of two conservation areas to maintain and protect tiger beetle populations in the CPSD geologic feature:

- The first conservation area is in the CPSD State Park, and contains the bulk of the tiger beetle population. Of the 809 ha (2,000 ac), 84 ha (207 ac) are closed to ORV use to provide protection for the core tiger beetle habitat. The protected area is defined by signs placed 6 m (20 ft) apart around the perimeter of the habitat. Protection for the tiger beetle is enforced according to the CPSD special closure and restrictions (R615-633-2 "1"). The CPSD officers patrol the area daily during times of high recreational use (Slater 2006). An additional 55 ha (137 ac) functions as an ORV travel corridor between the CPSD State Park and BLM land. The remaining 670 ha (1,656 ac) of the CPSD State Park provides no protection for the beetle.
- 2. A second conservation area is managed by BLM, and includes 150 ha (370 ac) closed to ORV use to protect a smaller known population of the tiger beetle. Approximately 445 ha (1,100 ac) is available for ORV use, but with the stipulation that ORVs stay on open dunes and maintain a 3-m (10-ft) buffer around vegetation. Enforcement is minimal and primarily relies on voluntary compliance (Conservation Committee 1997).

The CPSD tiger beetles do not occur outside these conservation areas. Additional potentially suitable habitat is not occupied, and is designated for ORV use (Hill and Knisley 1991; Knisley and Hill 1995). Expansion of tiger beetles into habitats outside the conservation areas is limited by habitat modification and destruction resulting from ORV activity. These habitats could be important to support refuge populations of the beetle during times of drought.

An additional complication to managing the protected habitat is movement of the swales due to dunal shifts. Dune movement can result in a decline in suitable habitat conditions within the designated protected areas (Knisley and Gowan 2008). To effectively manage conservation areas, boundaries should be reviewed and evaluated periodically.

E. Other Natural or Manmade Factors Affecting its Continued Existence

The distribution and abundance of the CPSD tiger beetle are very restricted. The species probably has been in existence several thousand years and has persisted despite flood and drought events that have occurred over time. Drought conditions since 2001 appear to have resulted in very low recruitment to the population. Although 2005 was a wet year, a positive population response would not be expected for 2 years because adult abundance in any year is related to the recruitment of new individuals 2 years previous and the survivorship of the developmental stages of that cohort (Knisley and Gowan 2005). Therefore, the ability of the population to respond positively to the 2005 precipitation is currently unknown (Knisley 2006).

In times of drought, the overall habitat availability on the dunes is much reduced. The existence of additional habitats that could serve as refuge habitat areas could be crucial for long-term population maintenance (Knisley and Gowan 2005). The species requires additional habitat acreage to persist when the availability of suitable habitats is reduced due to climatic conditions (Knisley 2006). Current ORV use on unprotected areas restricts expansion of the occupied habitat during drought (Knisley 2002). Although naturally-occurring flood and drought events are not by themselves a threat to the species, coupled with additional human-related impacts such as ORV use, they constitute a threat (Knisley 2006).

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

A Conservation Agreement and Strategy (Conservation Committee 1997) has been signed and is being implemented. The Conservation Agreement and Strategy consists of a collaborative effort that details recommended conservation objectives and actions designed to protect and recover the tiger beetle. The Utah Department of Natural Resources, which oversees State Parks and the Division of Wildlife Resources, and the BLM, the U.S. Fish and Wildlife Service, and the County Commissioner are signatories. A Conservation Agreement and Strategy Technical Committee was established to coordinate activities involving management of the CPSD tiger beetle. The committee meets on an informal basis to evaluate management actions and needs. The tiger beetle is monitored on a yearly basis, and has been since 1992. Research on tiger beetle life history and biology is part of the annual monitoring.

The BLM and State Park personnel have promoted public awareness and conservation of the tiger beetle. Visitors to the sand dunes and other interested persons have access to two brochures on the tiger beetle prepared by State of Utah's Division of Park and Recreation. The State Park has posted tiger beetle interpretation signs at various locations at the dunes.

SUMMARY OF THREATS

The CPSD tiger beetle is known to occur only at the CPSD, about 11 km (7 mi) west of Kanab, Kane County, in south-central Utah. The CPSD encompass 3,500 ac but the beetle is currently restricted to a small portion of that habitat (234 ha/577 ac) (Kinsley and Gowan 2006).

Recreational ORV use in protected beetle habitat areas is managed by both the Utah Department of Parks and Recreation and the BLM. An approximately 13-km (8-mi) long dune field was established as the CPSD State Park in 1963, to serve as access to the dunes for recreation, and, ostensibly, to protect the dune resources. However, ORV recreational activity has destroyed and degraded much of the beetle's habitat, especially the most productive inter-dunal swales. Although conservation areas were established in 1997 to protect the known area occupied by the CPSD tiger beetles, population expansion into additional suitable habitats outside the conservation areas is restricted by habitat modification and destruction resulting from ORV activity. This threatens the species in two ways:

- Drought is negatively affecting the tiger beetle populations. The CPSD were in a drought from 2001 to 2005, and precipitation levels in the Kanab area are currently below normal. The tiger beetles are limited to the habitat available in the conservation areas, and this habitat is reduced during drought years due to reduced soil moisture and productivity in swales. Although naturally occurring drought events are not by themselves a threat to the species, coupled with OHV impacts, they constitute a cumulative and substantial threat to the existence of the species.
- 2. The occupied swales containing the CPSD tiger beetles are subject to dunal shifts. Dune movement can result in a decline in suitable habitat conditions within the conservation areas (Knisley and Gowan 2008). To be effective, conservation area boundaries should be periodically evaluated and altered to maintain habitat protected from ORV activity.

THREAT			
MAGNITUDE	IMMEDIACY	TAXONOMY	Priority
High		Monotypic genus	1
	Imminent	Species	2*
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

LISTING PRIORITY

RATIONALE FOR LISTING PRIORITY NUMBER

Magnitude: High

This species is restricted to one small population threatened by recreational ORV use. That threat is currently managed to some degree by restrictions on ORV use in known occupied habitat on Utah Parks and Recreation and BLM lands. However, no ORV restrictions exist in immediately adjacent habitats. The species' population remains small, and does not appear to be improving despite efforts prescribed in the Conservation Agreement and Strategy to provide areas protected from ORV use, increased public awareness, and research.

In addition, the species' habitat has undergone prolonged drought conditions. Tiger beetle population levels have been shown to decline with drought conditions. Naturally-occurring drought events alone should not threaten the species, but combined with ORV activity, impacts are compounded. Population expansion into additional suitable habitats outside the conservation areas is limited by habitat modification and destruction resulting from ORV activity. Tiger beetle populations may be threatened if they are unable to persist in refuge habitats during unfavorable environmental conditions (Knisley 2006).

The ongoing threat from ORV activity, in tandem with drought, continues to cause steady declines in the tiger beetle population, and the magnitude of these combined threats is high. Ongoing monitoring and research has documented that conservation measures have failed to lessen population declines.

Imminence: Imminent.

The threat to the species is imminent because it is a narrow endemic and is intrinsically vulnerable to climatic factors such as drought and flood, and ORV use restricts the species' natural ability to adapt. The ORV use is ongoing within the CPSD, particularly in areas immediately adjacent to known occupied habitats. The effects of this activity are still being studied and monitored.

YES Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? NO. The Conservation Agreement and implementing Conservation Committee continue to some level of protection for the CPSD tiger beetle.

DESCRIPTION OF MONITORING

The CPSD tiger beetle continues to be monitored on a yearly basis by Dr. Barry Knisley of Randolph-Macon College. Dr. Knisley's studies have documented changes in the tiger beetle populations since 1992. Prior to 1999, methods of estimating population size by the mark-recapture method resulted in an overestimation of population size, especially when compared to the removal method used since (Knisley and Gowan 2005). The Conservation

Agreement and Strategy goal of showing self sustaining or expanding populations has not been achieved. Overestimates of adult numbers from 1992 to 1998 influenced an unrealistically high target of 2,000 adults, which needs to be reevaluated (Knisley and Gowan 2006).

COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment--Utah.

Indicate which State(s) did not provide any information or comments—Not applicable.

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approv Regional Director, Fish and Wildlife Service

Concur:

Deputy Director, Fish and Wildlife Service

<u>11/26/2008</u> Date

Do not concur:

Director, Fish and Wildlife Service

Date