

***Euproserpinus euterpe* Edwards, 1888**  
**Kern Primrose Sphinx Moth**  
**(Sphingidae: Macroglossinae: Macroglossini)**



**Photo by Larry Orsak.**  
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## SUMMARY

The Kern Primrose Sphinx Moth is known from only two sites at the southern end of California's Central Valley. Until its rediscovery in Kern County in 1974, this moth had been thought to be extinct. A second population has recently been discovered in San Luis Obispo County. Habitat for this moth is desert scrub, particularly in and around washes, where its hostplant, an evening-primrose, grows. There are several threats to this species, including habitat disturbance from grazing and recreation activities and over-collection of adults, but possibly the most insidious is the spread of filaree, a weed introduced from Europe. Although an excellent nectar source for adult moths, females will lay eggs on filaree in addition to the evening-primrose: eggs laid on filaree will hatch but the larvae cannot feed on it and will starve.

### CONSERVATION STATUS

**Xerces Red List Status: Critically Imperiled**

**Other Rankings:**

Canada – Species at Risk Act:	N/A
Canada – provincial status:	N/A
Mexico:	N/A
USA – Endangered Species Act:	Threatened
USA – state status:	None

NatureServe:  
IUCN Red List:

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N/A

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## SPECIES PROFILE

### DESCRIPTION

The Kern Primrose Sphinx Moth is a day-flying moth in the Sphingidae (sphinx) family. These are small sphinx moths with a wingspan of 3 inches (75mm) from tip to tip.

The uppersides of their forewings appear gray overall with a pattern of black and white markings and a paler submarginal band. Hindwings are gray to white with black marginal banding. Males are slightly smaller than the females and are difficult to distinguish.

Early instar larvae are green with dark-brown to black heads, legs, lateral spiracles shields, and blunt anal horns. Fourth and fifth instar larvae have red to dark red heads, green to red rust green bodies accented with black areas around spiracles, anal shield, and anal horn. The legs are green and the prolegs (appendages that are not true legs) are red in these mature larvae.

### TAXONOMIC STATUS

*Euproserpinus euterpe* Edwards, 1888.

### LIFE HISTORY

Habitat for this moth is desert scrub, particularly in and around washes. Adults emerge from underground pupae in early spring and fly between late-February and early-April, with a peak in mid to late March. The light green eggs are laid on a subspecies of the plains evening-primrose, *Camissonia contorta epilobioides*, and on filaree (*Erodium cicutarium*; also called redstem stork's bill), a European weed. There is some confusion over the taxonomy of *Camissonia*, and it is possible that the moth can use several closely related evening-primroses. The larvae on evening-primrose feed on the flowers and apical growth areas of the plant; those on filaree do not feed and starve.

Larvae emerge from the eggs after a week or so and the caterpillars pass through five instars before pupation in May. A pupation chamber is constructed in the soil near the surface or under rocks. The pupal period may last only a few months with the adults emerging the following spring but they may also remain dormant for several years.

Adults nectar on a variety of flowering species that occur in the region, including filaree, California goldfields (*Lasthenia californica*), baby blue-eyes (*Nemophila menziesii*) and bicolor lupine (*Lupinus bicolor*).

### DISTRIBUTION

Kern Primrose Sphinx Moth has a very restricted distribution and is currently known from only two sites at the southern end of California's Central Valley: a privately owned ranch in the Walker Basin, Kern County, and the Carrizo Plains National Monument, San Luis Obispo

County. The Walker Basin is an agricultural region, with grain and cattle the primary crops. Here, the moth is frequently found along the edges of washes through the agricultural lands but is also found in cultivated barley fields or disturbed areas in association with its larval and adult food plants. The Carrizo Plains, sometimes called “California’s Serengeti,” are the largest undeveloped remnant of Central California’s grassland ecosystem.

### **THREATS**

California’s Central Valley is one of the world’s most productive agricultural regions and conversion of undeveloped land to agriculture is always a threat. Associated with this habitat loss is the use of pesticides and herbicides on farmland that may drift into adjacent habitat.

The occurrence of filaree (*Erodium* sp.) in Kern Primrose Sphinx Moth habitat and the moth’s use of for egg laying is a serious threat. Eggs laid on filaree will hatch but the larvae will not feed on the plant and will starve.

Disturbance of habitat during the adult flight period or the larval feeding period by grazing or recreation activities may reduce the availability of suitable hostplants.

Over-collection may be a significant threat to an insect with such a restricted range and small populations. Kern Primrose Sphinx Moths are valuable to insect collectors. Collection tends to affect females more than males. The females fly more slowly and stop to lay eggs, making them an easier target to net. In the six years between its rediscovery in 1974 and its listing in 1980, fifty-four of the seventy-four specimens known to be taken by collectors were female. Removal of females from the populations adversely impacts population growth—those fifty-four females represent approximately sixteen hundred lost eggs.

### **CONSERVATION STATUS**

Kern Primrose Sphinx Moth is known from only two sites. This species is extremely rare and in most years field surveys of the Walker Basin population have found few or no individuals. However, desert Lepidoptera often show great natural variations in population size in response to climatic conditions, and surveys may more accurately reflect population status in years with above-normal rainfall.

It was listed as a federal threatened species on April 8, 1980 (*Federal Register* 45:24090). A recovery plan, *Kern Primrose Sphinx Moth Recovery Plan*, was approved on February 8, 1984. However, this recovery plan was never finalized and two decades later much of the information is out of date.

Recovery Plan (ESA): *Kern Primrose Sphinx Moth Recovery Plan* (Approved 2/8/1984)  
Critical Habitat: none designated.

The California Endangered Species Act does not allow listing of insects, so despite its precarious status, Kern Primrose Sphinx Moth has no protection under state legislation. The California Department of Fish and Game includes this moth on its Special Animals list.

## CONSERVATION NEEDS

The key conservation need is protection and appropriate management of occupied habitat areas. It appears that the hostplant prefers disturbed soil hence it being found in washes and plowed fields. (Part of the colony rediscovered in 1974 was on a fallow field. This was left fallow yet over time it appears that the evening-primrose hostplant is becoming less abundant, presumably because of the vegetation succession to a more stable community.)

Since so little is known of the ecology and biology of this moth it is hard to identify specific conservation needs. The Bureau of Land Management is managing habitat at Carrizo Plains by excluding livestock, vehicles, bicycles, and hikers during critical periods of the year.

## RESEARCH NEEDS

Surveys of potential habitat during its February to April flight period to identify new colonies and assess the status of currently known populations would be valuable. (It is likely that repeat surveys will be necessary over several years due to the natural fluctuations in populations.) Detailed biology and life history studies of the moths should also be undertaken. Studies should look at the *Camissonia* hostplant to clarify the taxonomy of the plants and whether it is a single subspecies or a group of closely related species that the moth can utilize. In addition, little is known of the ecology of this plant, information that would be valuable for managing, or possibly restoring, habitat. The relationship between the moth and filaree should be investigated and appropriate management for this weed identified.

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## RESOURCES

### CONTACTS

U.S. Fish & Wildlife Service: Alison Anderson, Carlsbad Fish and Wildlife Office, 2730 Loker Avenue West, Carlsbad, California, 92008. Telephone: (760) 431-9440.

Richard Arnold: Entomological Consulting Services, Ltd., 104 Mountain View Court Pleasant Hill, California 94523-2188, (925) 825-3784.

### REFERENCES

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#### WEBSITES

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U.S. Fish & Wildlife Service, Sacramento Fish & Wildlife Office; Endangered Species Division: Kern Primrose Sphinx Moth

[http://sacramento.fws.gov/es/animal\\_spp\\_acct/kern\\_primrose\\_sphinx\\_moth.htm](http://sacramento.fws.gov/es/animal_spp_acct/kern_primrose_sphinx_moth.htm)

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<http://www.natureserve.org/explorer/>

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Urban Wildlands Group; Kern Primrose Sphinx Moth.

<http://www.urbanwildlands.org/kpsm.html>

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- Information Sheet on Kern Primrose Sphinx Moth at Carrizo Plain National Monument.  
<http://www.urbanwildlands.org/Resources/KPSM.pdf>