Conservation status of *Petalura hesperia* Watson in Western Australia

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Summary

This report outlines the current distribution and conservation status of *P. hesperia*, and makes some recommendations for preservation, management and further study of the species.

Introduction

The petalurids are a small relict family of dragonflies. Of the ten species of petalurid dragonflies worldwide, four occur within Australia. *Petalura hesperia* is the sole representative of the family in Western Australia.

All the petalurids require specialised breeding areas which by their very nature are restricted in extent. In addition, the adults are usually sedentary and hence the colonies are very localised. Thus all the species including *P. hesperia* are regarded as being rare.

Of the four Australian species, only *P. gigantea* has been closely studied. Taxonomically this species is very similar to *P. hesperia*, and observations by Tony Watson, Magnus Peterson and Jan Taylor indicate that the biology and ecology of the two species may be quite similar. In order to breed, *P. gigantea* requires fast flowing, permanent streams with beds suitable for the larvae to burrow into. In south western Australia similar conditions are usually restricted to the headwaters of permanent streams. The recorded distribution of adults and the single locality where a number of exuvae have been observed (Bull Creek) support this hypothesis.

Methods

There is little published information on the status of *P. hesperia*. In order to determine the conservation status of *P. hesperia*, a number of people were approached, and asked to provide the following information:

* Distributional data, from specimens held or from personal observations;

* Information or comments regarding the conservation status of extant populations of *P. hesperia*;

* Perceived priorities for preservation of populations (i.e. which populations are at greatest risk, which are most secure, and which are the highest priority for preservation);

* Any management practices seen as relevant to successful management, and any priorities seen for research into management of the species.

The following people were approached:

* Magnus Peterson, a private contractor associated with the W.A. Museum (WAM), who has collected information on the distribution of dragonflies, including *P. hesperia*, in Western Australia. Magnus has also monitored the Bull Creek population and searched for other populations of *P. hesperia*;

* Dr. J. A. L. (Tony) Watson, Division of Entomology, CSIRO Canberra, who described the species;

* Jan Taylor, an amateur interested in photographing dragonflies;

* Dr. Terry Houston, curator of entomology, WAM; and

* Members of the W.A. Insect Study Society (WAISS) were asked at a general meeting to provide any information that they had concerning sightings or distributional information on *P. hesperia*.

In addition, the WAM, Dept. of Agriculture and CALM collections, and Tony Watson's original description of the species, were examined and label information recorded.

Results

Because the adults are sedentary and the populations local, observed localities for adults almost certainly indicate nearby breeding locations. On this basis, known distributional data for *P. hesperia* is tabulated below and summarized in figure 1.

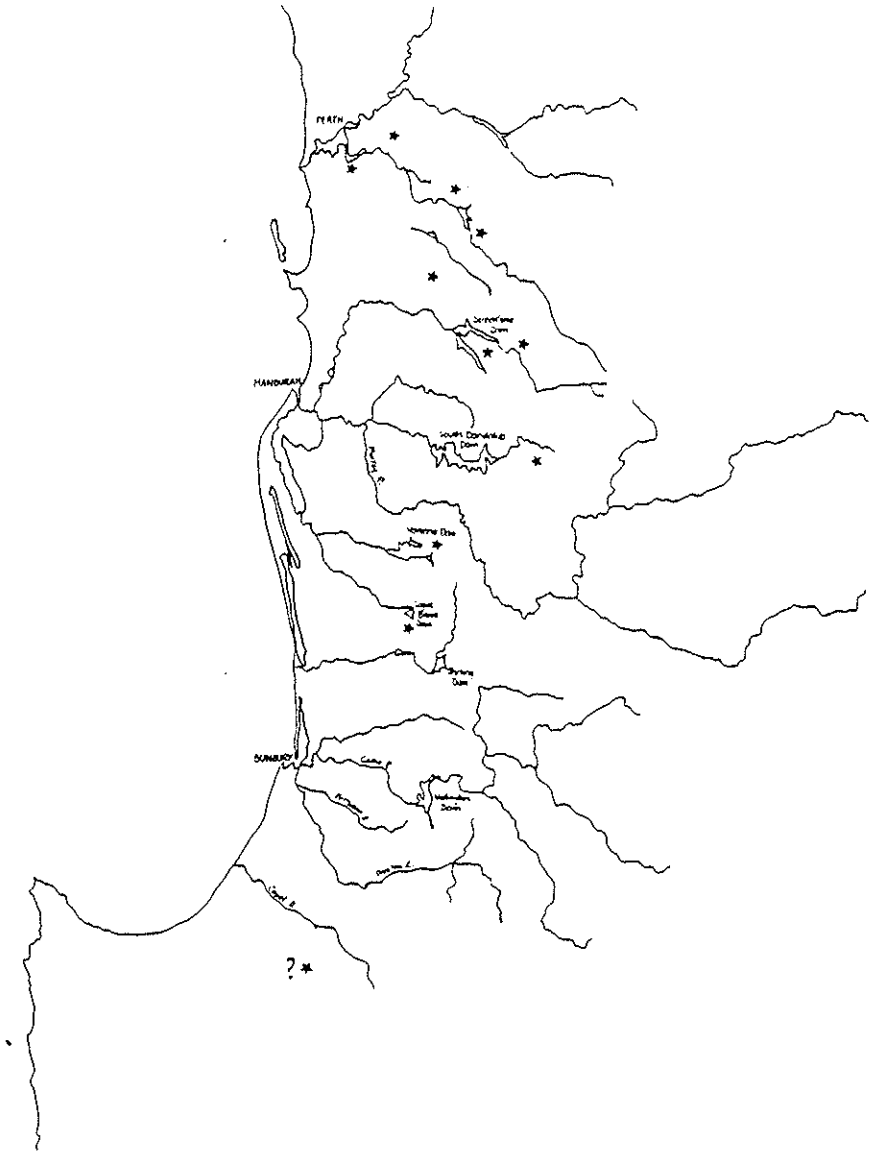

Fig. 1. Distribution of *Petalura hesperia* Watson in Western Australia.

Specimens held in the WAM, Department of Agriculture and CALM, or referred to in the original description, bear the following data:

BULL CREEK AREA:

BULL CREEK:
4 December 1957 (LM Saunders and JAL Watson)
(6 adults, 20 exuvae, including allotype female)
10 December 1965 (JAL Watson) (3 adults, 2 exuvae)
14 December 1965 (JAL Watson) (4 adults, 3 exuvae)
18 December 1965 (JAL Watson) (5 adults)
8 January 1966 (L O'Halloran) (2)
12 December 1991 (TE Burbidge) (1)

ROSSMOYNE:
28 December 1970 (L McKay) (1)
4 January 1970 (RJ McKay) (1)*
* ?Possibly mis-labelled and should be 4 Jan 1971?

LESMURDIE:
October-November 1956 (M Hawking) (Paratype)

KARRAGULLEN:
1 and 3/4 MILES SW OF KARRAGULLEN:
30 November 1957 (JAL Watson) (1) (Paratype)
1 December 1957 (JAL Watson) (1) (Holotype)

MANJEDAL BROOK:
MANJEDAL CAMP:
12 December 1965 (JAL Watson) (1)
8 January 1993 (MR Williams) (4)

OTHER AREAS:
QUILICUP*:
28 January 1966 (GH Teale) (1)
* There is no such locality as "Quilicup" in Western Australia: Magnus Peterson believes that the intended locality is Quilergup, near Jarrahwood, south of the Capel River.

KELMSCOTT:
1 December 1987 (S Williams) (1)

SOUTH DANDALUP DAM:
30 January 1975 (SJ Curry) (1)

Near SOUTH DANDALUP R., E of ALCOA alumina refinery: Label info. ~~5th. January 1993.~~
5 January 1993 (J Taylor) (1)
5th. January 1993. J.C. Taylor
East of Alcoa Alumina Refinery at Pinjarra on Scarp Road, 2.5km North of North Spur Rd.

NORTH BANNISTER:
15 December 1975 (L O'Halloran) (1)

Observational data for additional localities, specimens collected but held elsewhere, adults observed by people sufficiently acquainted with the species to provide a positive identification, and observations relevant to the above localities (the bulk of this information has been provided by Magnus Peterson):

Near SERPENTINE DAM and Near MOUNT COOK (M Peterson)

Near HARVEY DAM (M Peterson)

TURTLE BROOK, near Canning Dam (M Peterson)

MUNDAY BROOK, near Canning Mills (M Peterson)

Near LOGUE BROOK DAM (J Taylor, M Peterson)
(Jan Taylor is now unsure of whether he has in fact
seen specimens at this location)

NANGA BROOK, near Waroona Dam (M Peterson)

Two members of the WAISS believed that they had seen large dragonflies: Peter Ray had observed a large, vertically perching dragonfly at his home in Mahogany Creek on a few occasions; however, he did not recall observing the specimen in sufficient detail to be sure it was a petalurid. Another member had observed large dragonflies in Admiral Road, Bedfordale, below Wungong Dam. However, in the absence of specimens from these sites, these records must be treated cautiously. Both people have been asked to attempt to capture or photograph any further specimens they observe at these sites.

Both Dr. Terry Houston and Jan Taylor know only of the records from what were the four original localities (viz. Bull Creek, Manjedal Brook, Lesmurdie and Karragullen) where specimens had been collected.

Status of known populations

The continued existence of at least nine distinct populations of *P. hesperia* is known or can be inferred from observations. These are listed below from north to south, together with an estimate of their size and viability:

Lesmurdie
Whether the population recorded from Whistlepipe gully still persists is unknown. However, there is insufficient data to conclude that it does not and it must be presumed to be extant. The creek running through the gully arises in urban Lesmurdie and passes through Regional Open Space before returning to urban areas in Forrestfield. Like Bull Creek it is threatened by urbanisation and consequent effects on water quality.

Bull Creek
This is the only site for which the precise breeding location (adjacent to Rossmoyne Senior High School) is known. This is also a large population, based both on the number of specimens known from the area and on the experience of observers familiar with other populations. It is atypical, being a coastal plain site. However, being surrounded by urbanisation means that it is also the site most under threat.

Karragullen
M Peterson has visited this locality, but found that the streamside vegetation had been cleared for agriculture and that the population is unlikely to persist.

Munday Brook
This site is adjacent to Karragullen and so far as is known is still extant, although it may be under threat from clearing for agriculture.

near Canning Dam
See below.

Manjedal Brook
Adults have been collected or observed on a number of occasions, the latest in 1993. Dr. Tony Watson collected a single exuvae at this site in summer 1991. Comparatively large numbers, about 20, were seen both in 1990 (by Dr. Allen Davies) and in 1993 (by M. Williams). This population appears to be both large and secure.

Serpentine Dam/ Mount Cook
See below.

Near South Dandalup Dam
Adults have been observed by Jan Taylor in December 1992 and January 1993, and a single specimen collected. About 20 were seen. This population appears to be both large and secure.

Waroona Dam
See below.

Logue Brook Dam/ Harvey Dam
See below.

Adults have been observed by M Peterson at each of the dams mentioned above. Presumably, one or more populations exist in the headwaters of streams above the dams. Current management of the catchment areas for each dam make all of these (presumed) populations secure.

"Quilicup" =?Quilgerup
This locality, if correct, would represent a considerable southward extension of the range of *P. hesperia*. However, further information is needed to confirm its existence.

Discussion

P. hesperia has an extensive though disjoint distribution along the Darling scarp between Perth and Harvey, and possibly occurs further south. Given that the dragonfly is known to be rare, local and sedentary, and hence difficult to locate, it is likely that further populations exist at localities interspersing those recorded here. Genetic interchange between populations is probably extremely low, and long term survival of the species may depend upon maintaining a chain of populations rather than preserving isolated populations. Unbiased estimates of the relative sizes of extant populations are currently impossible because of a lack of any systematic censusing.

There is no evidence nor has anyone suggested, that *P. hesperia* is in general decline, and any known reductions are attributable to habitat destruction through urbanisation or agriculture. However, no systematic population monitoring is currently conducted, and although there appears to be no cause for concern, it would be prudent to obtain better information regarding the number, distribution, size and extent of populations.

Recommendation 1: Consideration be given to establishing a project to map and census the distribution of *P. hesperia* in the south west.

Recommendation 2: In the absence of a strategy to preserve the species, priority should be given to protection of the northernmost populations near Perth, since these are under the most imminent threat.

There is no evidence that CALM's current management practices are anything but conducive to this (or any other) dragonfly's continued survival. Hence, it is possible that research into *P. hesperia* might not be seen as a high priority for internal CRF funding. However, because of its size (it is one of the largest species of dragonflies in the world) and its taxonomic status, potential exists to use *P. hesperia* as a flagship species for other dragonflies. Such a project also has the potential to increase CALM's public image by showing that it is beginning to give greater attention to the conservation of invertebrates.

Recommendation 3: External funding should be sought for any research project into *P. hesperia*.

Recommendation 4: Any project to study *P. hesperia* should consider other species of dragonflies or other taxa deemed worthy of attention, which occur in similar habitats or areas.

Recommendation 5: Consideration should be given to the use of volunteers in any such projects.

By CALM's criteria for the declaration of endangered fauna, *P. hesperia* may qualify for listing under criteria ii)(c) and ii)(d) (i.e. dependent on restricted habitats; and very uncommon, even if widespread). However, it is not under imminent threat from any source, and the Bull Creek site is already listed in the System Six report.

Recommendation 5: P. hesperia be proposed for listing as endangered fauna because of its limited distribution, restricted habitat requirements, and vulnerability to disturbance.