

PTUNARRA BROWN BUTTERFLY

RECOVERY PLAN

1998 - 2003



Tasmania

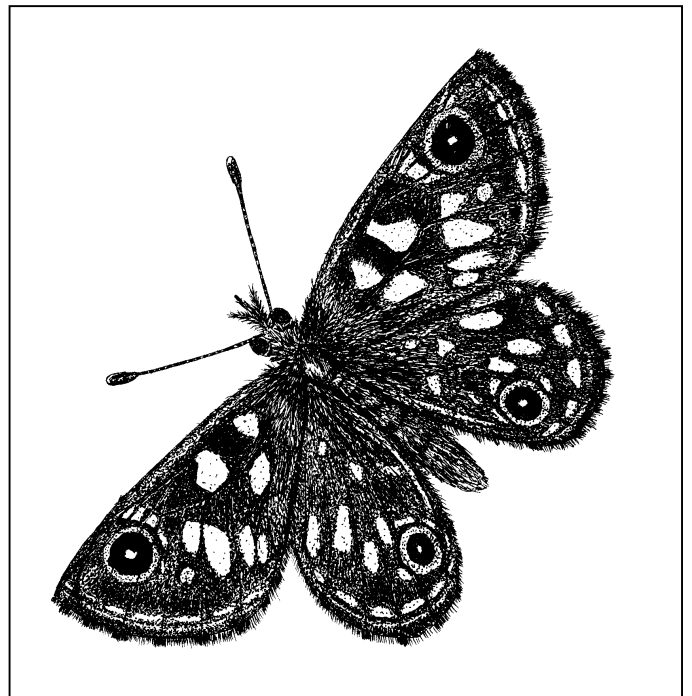
DEPARTMENT of
PRIMARY INDUSTRIES,
WATER and ENVIRONMENT



Natural Heritage Trust
Helping Communities Helping Australia



**Environment
Australia**



Prepared by **Phil Bell**

**PTUNARRA BROWN BUTTERFLY
RECOVERY PLAN
1998-2003**

Prepared by

Phil Bell

Nature Conservation Branch
Resource Management and Conservation Division
Department of Primary Industries, Water and Environment
GPO Box 44A, Hobart, Tasmania 7001

In conjunction with the Ptunarra Brown Butterfly Recovery Team
July 1999

ISBN: 0 7246 6215 4

CONTENTS

Summary	3
Introduction	5
Description and Taxonomy	5
Distribution and Abundance	5
Life History and Ecology	7
Habitat	8
‘ <i>Oreixenica ptunarra</i> north west’	8
‘ <i>Oreixenica ptunarra ptunarra</i> ’	8
Reasons for Conservation Status	8
Existing Conservation Measures	9
Past and Ongoing Recovery Actions	9
Strategy for Recovery	10
Recovery Objectives and Criteria.....	12
Recovery Actions.....	13
1. Protect Habitat at Specific Populations	13
2. Provide Advice and Information to Land Owners and Managers.....	13
3. Monitor Habitat and Population Density at Selected Sites	13
4. Revise Taxonomy of Species	13
5. Establish New Colony by Translocation	13
6. Review Conservation Status	13
Implementation Schedule.....	14
References	15

Front cover illustration by Karen Richards.

Endangered Species Unit Project Number 394. Funded under the Endangered Species Program, a program of the Natural Heritage Trust, and administered by the Biodiversity Group, Environment Australia. The views expressed are those of the authors.

Citation: Bell, P.J. (1998) Ptunarra Brown Butterfly Recovery Plan 1998-2003. Department of Primary Industries, Water and Environment, Hobart.

Copyright © The Director, Parks and Wildlife Service, Department of Primary Industries, Water and Environment, GPO Box 44A, Hobart, Tasmania 7001.

Apart from fair dealing for the purposes of private study, research, criticism or review as permitted under the Copyright Act, no part may be reproduced by any means without permission of the Director, Parks and Wildlife Service.

SUMMARY

Current Species Status

The Ptunarra brown butterfly *Oreixenica ptunarra* is listed as vulnerable under Schedule 4 of the Tasmanian *Threatened Species Protection Act* 1995.

Habitat Requirements and Limiting Factors

O. ptunarra is an endemic Tasmanian butterfly with a fragmented and restricted distribution. All known colonies of the butterfly are found in open habitats at altitudes above 450m (most above 600m) that support a healthy cover of *Poa* grass, usually in excess of 25%. Habitats range in structure from grassy *Eucalyptus* woodland through grassy shrubland to grassland. A considerable reduction and/or modification of the butterflies' habitat has occurred throughout its range since European settlement, particularly throughout the agricultural region of the Midlands. Reduction and/or modification of its habitat continues in some areas.

Recovery Objectives

Overall Objective

To achieve down listing of *O. ptunarra* to a Lower Risk category within five years based on the IUCN (1994) criteria of population size and trends, area of occupancy and security of habitat.

Specific Objectives

1. Increase habitat protection for specific populations.
2. Ensure the species persists long-term throughout its area of occupancy.

Recovery Criteria

1. The population measured at selected monitoring sites indicate overall sustainability or increase long-term.
2. Security for specific populations by reservation or management agreement with land owners/managers.

Management Actions Needed

1. Protect habitat at specific populations.
2. Provide advice and information to land owners and managers.

Research Actions Needed

1. Monitor habitat and population density at selected sites.
2. Revise taxonomy of the species.
3. Establish a new colony by translocation.
4. Review the conservation status.

Estimated Cost of Recovery (1998 prices in \$000s/year)

Actions	1	2	3	4	5	6	Total
1998	2.40	1.21	9.47	0.50			13.58
1999	2.40	1.21	8.97		0.45		13.03
2000	2.40	1.21	8.97		0.28		12.86
2001		1.21	8.97		0.28		10.46
2002			8.97			0.96	9.93
Total	7.20	6.05	45.35	0.50	1.01	0.96	59.86

Biodiversity Benefits

Protection and management of *O. ptunarra* populations will have benefits for the conservation of remnant *Poa* grassland habitats in Tasmania which are floristically diverse and support a number of rare and threatened plants. Little is known of the status of fauna of these grassland communities, however, only about 2% of the total area of *Poa* grassland is reserved in Tasmania.

INTRODUCTION

Description and Taxonomy

Ptunarra brown butterfly *Oreixenica ptunarra* is a small endemic Tasmanian butterfly belonging to the family Nymphalidae. Males have a wing span of 25-33cm. They are brown to dark brown with a white to yellow ground colour. Females are similar in size but their wings are light orange-yellow with faint light brown basal areas and two short bars on the frontal margins of the fore wings.

The egg is bright green in colour, spherical in shape but slightly flattened at the base (measuring about 0.75mm in diameter) and very finely ribbed from base to micropyle (Couchman 1953).

The fully-fed larvae is about 19mm long and 4.5mm wide (at its greatest width) and tapers sharply towards the head and bifid tail. The head is about 2mm wide. The segments are greenish-grey in colour lightening in tone towards the head and tail. An olive dorsal line is present (about 0.5mm wide), bounded on either side by a narrow cream line. There is a narrow median line, olive brown in colour, a narrow subspiracular line and a spiracular band, cream in colour (Couchman 1953).

The pupa is about 9.5mm in length and 3.5mm wide at the level of the wing covers. It is greenish grey in colour, flecked with black and carries a pair of black spots on each body segment (Couchman 1953).

The first recovery plan 1992-1997 (Neyland 1991) addressed the conservation of *O. ptunarra* according to the original description by Couchman (1953) which identifies three distinct subspecies: *O. p. roonina*, *O. p. angeli* and *O. p. ptunarra*. Whereas *O. p. angeli* can be readily identified in the field because of its geographic separation from the other two subspecies, identification of *O. p. roonina* and *O. p. ptunarra* can be difficult because they overlap in their distribution (Neyland 1992).

Since the original description a large range extension for *O. ptunarra* was discovered in north-western Tasmania and field surveys have revealed a large number of additional populations. Further, with considerable additional data, and the application of computer based biogeographic modelling techniques the actual and potential range of the butterfly is now far better understood (Neyland 1992). Recently, McQuillan and Ek (1996) used morphometric analyses to support an argument for revision of the

subspecies taxonomy. They propose *angeli* Couchman and *roonina* Couchman be reduced to synonymy with nominotypical *ptunarra* Couchman, and a new subspecies be recognised encompassing populations from the montane grasslands of north-western Tasmania (McQuillan & Ek 1996).

McQuillan and Ek (1996) identified significant correlations between the morphology of *O. ptunarra* and environmental variables, particularly climate and elevation, and provide evidence supporting the existence of a longitudinal cline in wing pattern and size phenotype of the adult. Butterflies from warmer, less cloudy eastern Tasmania tend to be larger and less dark in colour than those from the west, with the smallest and darkest populations found in the Northwest Plains. They suggest that selection for efficiency in thermoregulation becomes more important as conditions become more marginal for adult activity of butterflies i.e. from east to west Tasmania.

McQuillan and Ek (1996) based their study only on the adult male phenotype. In 1998 adult female specimens were taken from a range of sites across Tasmania and are now being examined to confirm their taxonomic proposition. A formal revision of the species' taxonomy will follow.

During the interim it would be prudent to base conservation strategies for *O. ptunarra* on the newly proposed taxonomy. So, for the purposes of this plan '*Oreixenica ptunarra north-west*' will be used to refer to the geographically separated populations of the Northwest Plains and '*Oreixenica ptunarra ptunarra*' will be used to refer to all other known populations of the species including those from the Central Plateau, Steppes, Midlands and East Coast and Tiers (biogeographic regions used by Neyland 1991, 1992 and 1993).

Distribution and Abundance

The range of *O. ptunarra* extends over three biogeographical regions, the Centre, Southern Midlands and the East Coast and Tiers (Orchard 1998). For the purposes of this plan the Centre is divided into three subregions, the northwest portion which extends north and west of Cradle Mountain (Northwest Plains), the central portion (Central Plateau) and the southern portion lying south and east of the Steppes Reserve (Steppes).

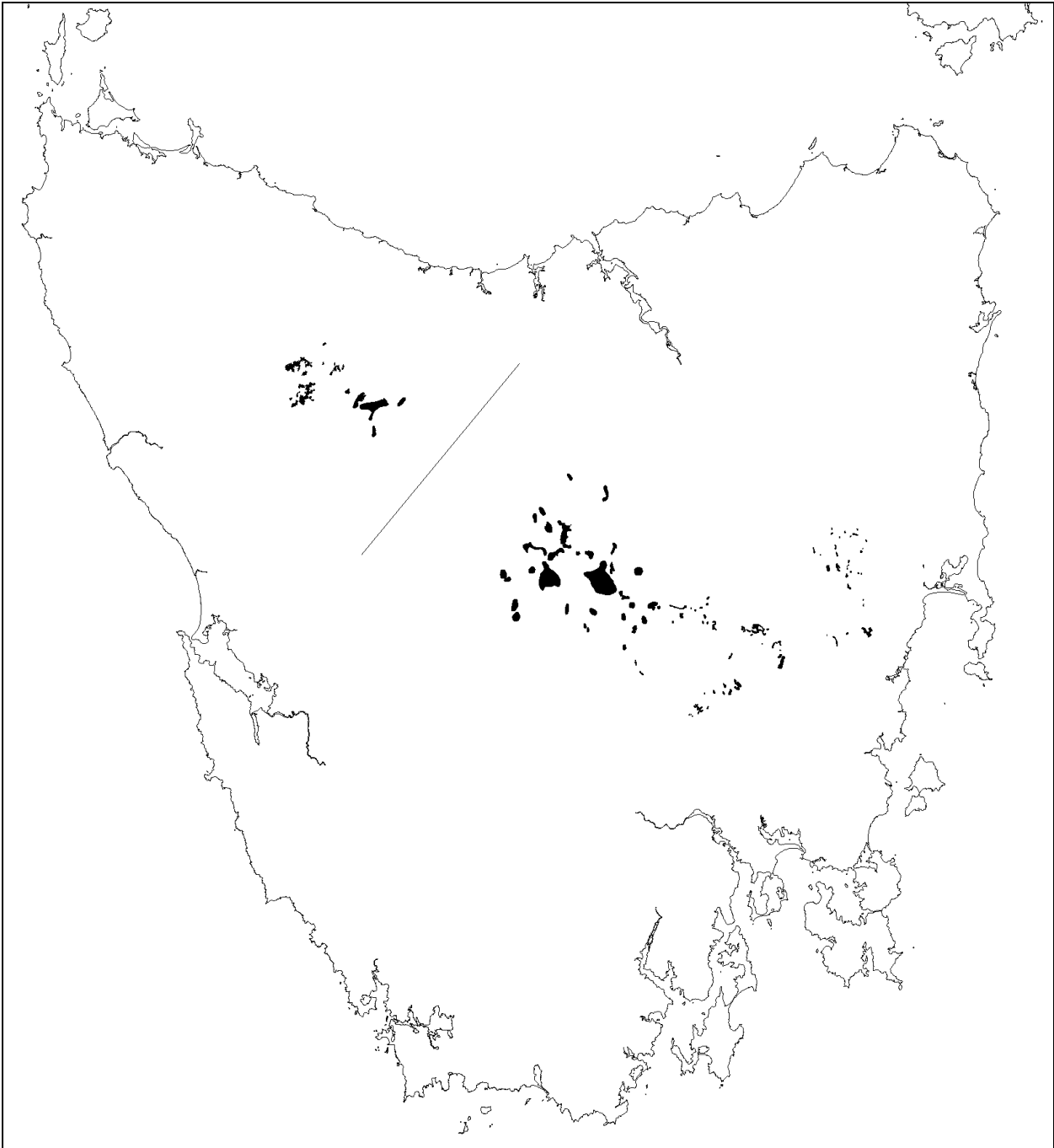


Figure 1 *Orioxenica ptunarra* Distribution and extent of known populations.
 Northwest of solid line = '*O. p. north west*'; southeast of solid line = '*O. p. ptunarra*'.

The range of the butterfly is determined by a variety of environmental factors. It is generally an alpine species, being restricted to sites above 400 m. It does not extend into the lowland plains of the Midlands, where it may be too warm for the butterfly and where it is too dry for its food plant to flourish. In the Northwest Plains the butterfly is limited by the availability of habitat (Neyland 1992).

Throughout its range *O. ptunarra* is found in areas where there is a significant cover of tussock grass, *Poa* spp. Some apparently excellent sites do not carry butterflies and this may be a function of the past history of the site. It is possible that the species has been eradicated from the western Central Plateau by a European history of over-firing and overgrazing. The preferred habitat ranges from *Poa*

tussock grassland to grassy shrubland to *Eucalyptus* grassy open woodland (Neyland 1992).

Most potential habitat of *O. ptunarra* has now been surveyed. There are a few exceptions in the east of the butterflies range and on the central plateau, however, it is likely that more than 90% of the actual area of occupancy has now been identified. The following details on distribution and abundance are based on that assumption.

'*O. p. ptunarra*' occurs in the Central Plateau, Steppes, Southern Midlands and East Coast and Tiers (Figure 1). About 120 populations are now known. The area of actual habitat is about 11 100 ha. By region this represents about 4 300 ha in the Central Plateau, 1 500 ha in the Steppes, 4 100 ha in the Midlands, and 1 200 in the Eastern Highlands.

'*O. p. north-west*' only occurs in the Northwest Plains (Figure 1). Approximately 30 populations are known, comprising an area of about 3, 300 ha of actual habitat.

Most measures of abundance for individual populations prior to 1990 are categorical (e.g. butterflies occasional or common) though several populations have been regularly visited since the mid 1980's. In the early 1990's counts at a number of populations were undertaken based on the method of Pollard (1977) (Neyland 1992). These counts were made only under favourable weather conditions and only between 10.00 am and 3.00 pm when butterflies on the wing would be expected to be at their greatest abundance. Neyland found considerable variability among sites and noted several difficulties in the ability of the technique to produce a reliable index of abundance. In 1998 a counting technique based on permanent transect routes was initiated at a number of sites throughout the range of the butterfly. This technique involves repeated counts at each site and uses the highest counts obtained during the flying season to estimate the density of butterflies.

Life History and Ecology

The following account of the life history of *O. ptunarra* is based primarily on Couchman (1953) and Neyland (1991; 1992; 1993).

The flight period of *O. ptunarra* is in autumn and lasts for two to three weeks at any one site. Unfavourable weather conditions (such as strong wind and heavy cloud cover) may prolong the flight period while good weather appears to reduce it. The date of first emergence varies between years and

among sites and may be related to the weather during the preceding spring and/or during pupation. Previous records indicate that the butterfly first emerges between the last week of February and the middle of March each year.

Adult males emerge before females and upon emergence the females are soon mated. Egg-laying follows shortly after mating. The eggs are non-sticky and are dropped into grass tussocks, often by butterflies on the wing. The larva hatch after about six weeks and feed sporadically through the winter and into the following summer. Pupation takes place in February and lasts for four to five weeks.

During the flight season butterflies are most abundant on days of clear mild weather with little wind. Furthermore, the number of butterflies on the wing is closely controlled by local changes in weather conditions (e.g. numbers may quickly drop in response to increased cloud cover). On a seasonal basis the number of butterflies follows a skewed normal distribution, with numbers increasing rapidly shortly after initial emergence and later more gradually declining. The number of butterflies on the wing also follows a diurnal pattern where flying begins about 10.00 am, builds quickly to a peak during the middle of the day (11.00 am - 2.00 pm) then declines rapidly after about 3.30 pm.

The flight of *O. ptunarra* is weak in comparison to other butterflies though males have been observed to fly for up to five minutes without rest. The flight of females is usually shorter though both sexes appear to fly a searching pattern, wandering between tussocks and often turning back on their own path. Unlike *O. lathoniella* (a co-occurring species with a similar appearance), which flies quite high on occasion, *O. ptunarra* remains amongst the tussocks and rarely lifts above the top of the tussocks.

Adult *O. ptunarra* has been observed to feed on the flowers of *Hypochoeris radicata* (an introduced Dandelion) and *Bracteantha subandulata* (Golden Everlasting). The larvae feed at night on the tips of *Poa* grasses. They have been collected from *Poa labillardieri* (var. *labillardieri* and var. *acris*), *P. rodwayi* and *P. gunnii*. However, *P. clelandii*, *P. sieberiana* and *P. bookeri* are also likely to be food plants.

There are few observations of predation by vertebrates however a small web spinning spider and the introduced wasp *Vespula germanica* have been observed to frequently take adult *O. ptunarra*.

Habitat

'*Oreixenica ptunarra* north west'

The Northwest Plains ranges from 500 to 900 metres a.s.l. The soils are generally fertile but a combination of frosts and fire has perpetuated a mosaic of grasslands, eucalypt forests and rainforests. The butterfly is usually found in grassy open woodland dominated by either *Eucalyptus rodwayi* and/or *E. delegatensis*, open grasslands dominated by *P. labillardieri* or grassy shrubland dominated by *Hakea microcarpa*.

'*Oreixenica ptunarra ptunarra*'

The Southern Midlands ranges from 250 to 600 metres a.s.l. where populations of the butterfly are found only in lowland *P. labillardieri* tussock grasslands. Prior to European settlement the Midlands was a mosaic of grasslands, woodlands and open forests though about 90% of this habitat has now been converted to improved pasture (Fensham 1989). In the East Coast and Tiers the butterfly is found mainly in poorly drained areas which support grassy and/or sedgy communities. These are often dominated by *E. rodwayi*. At some sites *E. pauciflora* is also present, usually on the margins of *E. rodwayi* woodlands. The Central Plateau ranges from 900 to 1400 metres a.s.l. with a topography that is undulating and rugged. The butterfly is not extensively distributed across the Central Plateau but occurs in a range of grassy communities including *Hakea microcarpa* grassy shrubland, *Poa gunnii* montane tussock grassland and *Richea acerosa* grassy shrubland. The Steppes ranges from 500 to 900 metres a.s.l. and supports large areas of suitable habitat. Here it is usually found in *E. rodwayi* grassy open woodlands.

The habitats occupied by *O. ptunarra* have been described floristically by Neyland (1992). Butterflies have been recorded from the following plant communities:

Eucalyptus rodwayi - *Lagenifera stipitata* grassy woodland (Kirkpatrick et al. 1988)

Poa labillardieri lowland tussock grassland (Kirkpatrick 1991)

Poa labillardieri montane tussock grassland (Kirkpatrick 1991)

Gymnoschoenus sphaerocephalus grassy sedgeland (Kirkpatrick et al. 1988).

Hakea microcarpa - *Solenogyne* grassy shrubland (Kirkpatrick et al. 1988)

Poa gunnii montane tussock grassland (Kirkpatrick et al. 1988)

Richea acerosa grassy shrubland (Kirkpatrick 1991)

Poa rodwayi grassland (Neyland 1992)

Alpine grassy complex (Kirkpatrick et al. 1988)

Reasons for Conservation Status

Ptunarra brown butterfly *Oreixenica ptunarra* is listed as vulnerable under Schedule 4 of the Tasmanian *Threatened Species Protection Act* 1995.

The major reasons for its listing as vulnerable were:

Historically, the range of *O. ptunarra* is thought to have been widespread in *Poa* grassland, shrubland and open woodland habitats across central Tasmania but has undergone a substantial reduction in area of occupancy since European settlement. In the Midlands less than 3% of the original extent of native grasslands remains intact (Fensham & Kirkpatrick 1989) and throughout the State 40% of the original area of *Poa* grassland has been lost since 1802 (Kirkpatrick et al. 1995).

In the Northwest Plains large areas of *Poa* dominated grasslands and grassy woodlands, which are naturally restricted in their extent, have in the past been converted to eucalypt plantations (Neyland 1992).

O. ptunarra is absent from areas which have been converted to pasture. Consequently, butterfly habitat has been lost as large areas of native grassland and grassy woodland have been converted to pasture. Many extant populations are now found on the fringes of areas which once would have supported large colonies of the butterfly (Neyland 1992).

Grazing pressure affects the population size of *O. ptunarra* but the exact relationship between grazing pressure and butterfly numbers is not fully understood. Few butterflies are found on sites which are heavily grazed but in areas where there has been little or no grazing and where the tussocks have become large and overgrown butterfly numbers are also low (Neyland 1992).

O. ptunarra is a weak flyer, and the probability of recolonising sites, unless suitable habitat corridors exist, appears low. If small remnant populations are

lost, through overgrazing, fire or clearing, then those sites may never be recolonised.

The bulk of *O. ptunarra* habitat occurs on private land with only about 6% contained within formal reserves.

Existing Conservation Measures

By the 1980's it was recognised that *O. ptunarra* was in decline. The recovery process began in 1986 with an assessment of the butterfly's habitat requirements and conservation status (funded by the Australian Heritage Commission's National Estate Grants Program). In 1988 only 33 site locations were known for the butterfly and based on IUCN criteria (Wells *et al.* 1983) *O. p. ptunarra* was considered secure, while *O. p. roonina* and *O. p. angeli* were considered endangered (Prince 1988). The research phase of the recovery began in 1990, funded by the Australian National Parks and Wildlife Service's Endangered Species Program, and culminated in a Conservation Research Statement (Neyland 1992). Neyland reported 117 additional colonies of the butterfly but considered all subspecies to be endangered based on IUCN criteria because all known colonies were to some extent threatened. *O. ptunarra* was subsequently listed as vulnerable in Schedule 4 of the Tasmanian *Threatened Species Protection Act* 1995.

The initial recovery plan was prepared for the butterfly in 1991 (Neyland 1991) and its implementation was funded by the Australian Nature Conservation Agency's, Endangered Species Grants Program and supported by the Tasmanian Parks and Wildlife Service. A recovery team was established and its inaugural meeting was held in April 1994. The recovery plan set out the objectives to down list *O. p. angeli* to vulnerable within five years and to stabilise *O. p. roonina* within five years with possible down listing to vulnerable within ten years. Many of the actions have now been successfully implemented, substantially progressed and/or are ongoing.

Using the most recent information on the extent of occurrence, area of occupancy and known threats, *O. ptunarra* does not fit the criteria for rare, vulnerable or endangered as set out in 'Guidelines for the listing of species under the Tasmanian *Threatened Species Protection Act* 1995'. However, applied at the proposed subspecies level, '*O. p. northwest*' satisfies criteria for rare under the *Act*. It has a limited distribution (i.e. extends less than 100X100 km and occupies 20 or less 10X10 km Australian Metric Grid squares) and is threatened by on-going

processes occurring over sufficient of its range to suggest that they would satisfy the indicative criteria for vulnerable unless the threatening process was abated. '*O. ptunarra ptunarra*' does not satisfy criteria for rare, vulnerable or endangered.

Six known colonies of *O. ptunarra* are formally protected comprising about 600 ha within the Central Plateau Protected Area and 50 ha within Cradle Mountain/Lake St Clair National Park, all within the World Heritage Area. This represents about 6% of the area of occupancy of the species with a further 18% on other State owned land, including State Forest and HEC land. The remaining 76% occurs on private land.

O. ptunarra is wholly protected under the *Threatened Species Protection Act* 1995 which prohibits the taking or possession except under permit. Under the *Forest Practices Act* 1985, the Forest Practices Code (Forestry Commission 1993) provides a set of standards for the protection of threatened fauna during forest operations. Timber Harvesting Plans must be prepared for forest harvesting operations. Conservation of *O. ptunarra* during forest operations is guided in general by the Forest Practices Code and specifically by the Threatened Fauna Manual for Production Forest (Jackson & Taylor 1994; review in progress). The manual also provides a protocol for land managers to gain information on the location, and seek management advice on, populations on State Forest and private land.

Past and Ongoing Recovery Actions

The major actions of the original recovery plan were to:

- Take active steps to conserve existing colonies.
- Co-operate with landowners and managers in the adoption of sound management practices to protect all butterfly habitat.
- Raise the public profile of the species.
- Establish new colonies in suitable areas through translocation.
- Monitor and report.

Tasks involving identification of areas suitable for fencing trials and construction of fencing were discontinued when it was found that the exclusion of grazing stock led to weed and introduced grass invasion of fenced areas and a decline in butterfly

abundance. Nonetheless, initial fencing trials provided a better understanding of the ecological relationship between grazing pressure and butterfly abundance. This was particularly evident in the Midlands where grazed tussock grasslands were favoured by the butterfly over ungrazed areas and well grazed pasture was favoured over weed infested tussocks on roadsides.

The montane grasslands of north-western Tasmania at Surrey Hills, (owned by North Forest Products), have been extensively surveyed for the butterfly and the extent of habitat converted to plantation has been assessed. A co-operative relationship with North Forest Products has been established for ongoing management and reservation from plantation of identified butterfly habitat. The bulk of six populations of the butterfly are currently contained within North Forest Products' private reserve system. Ongoing liaison and co-operative management of butterfly habitat in Surrey Hills is considered to be necessary over the period of the new plan.

Initial field investigations in the East Coast and Tiers revealed grasslands that were fired frequently and heavily grazed by native, feral and introduced stock animals. In this area a reduction in the frequency of fires was seen as essential for the long term maintenance of butterfly habitat. However, subsequent monitoring revealed that in the absence of fire there was a gradual attrition of grassy communities due to shrub and tree invasion. Ongoing contact is maintained with landowners and/or managers in this area and a pilot program of habitat burning, such as has been instigated at Flagstaff Marsh in co-operation with Forestry Tasmania, will be canvassed for other areas of grassy habitat. Liaison with landowners and provision of advice on management prescriptions is ongoing and it is envisaged that fire management of butterfly habitat on State Forest in the eastern highlands will become part of the normal forestry management program in this area.

Most farmers that have populations of the butterfly on their property were contacted during the course of the original recovery plan. In response to the recovery program some farmers have reduced the size of their flocks over butterfly habitat and/or now consider the butterfly as part of their farm management practices. Nonetheless, ongoing liaison with land owners is considered important to assist in the long-term conservation of the butterfly.

Population and density estimates are an essential element in understanding population trends and the

impacts of grazing, land clearing and fire frequencies on butterfly abundance. However, accurate population estimates have been difficult to achieve because of the short duration of the flying season (2-3 weeks per annum), long travelling distances for observers between populations and large variations in the number of butterflies on the wing in relation to weather, stage of emergence and time of day. Estimates of the size of some populations have been made since 1991 based on the method of Pollard (1977). These data have provided some useful information on the relative abundance of butterflies. 'Mark and recapture' trials were conducted in the Midlands in 1994 to assess the mobility of the butterfly, but also as a potential for assessing population size. During the 1997 flight season a permanent transect counting technique involving repeated counts at individual sites was trialed, then implemented for the first time in the 1998 flying season.

A brochure detailing the biology and conservation of *O. ptunarra* was prepared in 1996 and distributed to landowners, councils and other interested groups and individuals within the area of occupancy of the butterfly. The brochure will continue to be used for the promotion of butterfly conservation, education and information..

The feasibility of a translocation program was investigated during the period of the original recovery plan. Some areas in the Northwest Plains which were destined to become plantation were identified from which gravid butterflies could be collected. Two sites were considered suitable for translocation. Both were very large areas of potential habitat but despite repeated searches the butterfly was never found. In the wake of several new colonies being discovered in the Northwest Plains and the ethical considerations of introducing the butterfly to areas from which it has not been previously recorded, no translocations were undertaken.

Strategy for Recovery

Identification of previously unknown areas of butterfly habitat, coupled with a program of education and co-operative management of butterfly habitat allowed the original recovery plan to meet its objectives. The major threats identified and addressed in that plan include degradation of habitat by grazing, adverse fire regimes and forestry activities, and the conversion of butterfly habitat to pasture of exotic species or eucalypt plantation. In order to meet the objectives of the new plan i.e.

down listing of the species to a Lower Risk category, ongoing contact with landowners and managers of butterfly habitat is necessary.

The strategy for recovery of the species is based on ensuring protection on private land for specific populations of *O. ptunarra* and continuing to encourage land management practices throughout the range of the butterfly that are sympathetic to the butterfly.

Population monitoring of selected sites will be ongoing in order to gauge the effects of grazing and fire on the abundance of butterflies and to quantify butterfly numbers and fluctuations over a period of several years. Data provided by the monitoring program will ultimately be used to support a case for delisting of *O. ptunarra* from the *Threatened Species Protection Act* 1995.

The conservation status and strategy for the species' recovery is based on the newly proposed taxonomy for the butterfly. It is therefore important that formal recognition of this taxonomy is assisted by the recovery program. To this end researchers at the University of Tasmania (Dr Peter McQuillan, Department of Geography and Environmental Studies and Mr Joakim Ek, Department of Physiology, Faculty of Medicine) will undertake further taxonomic study of the species and publish the revision within the first year of implementation of this plan.

Translocation of butterflies is an action that was identified in the previous plan but has not been fully explored. Nonetheless, a knowledge of the feasibility of translocation and colony establishment could assist our understanding of factors controlling the distribution and abundance of the butterfly. It may also be a useful tool in the future, should the need arise, to boost population numbers or utilise potential habitat, presently unused or where *Poa* reinvades cleared land and/or improved pastures.

Given the small representation of *O. ptunarra* populations within formal reserves and other State owned lands the long term future for the species relies on the sympathetic management of habitat by private land owners. The development of agreements with land owners and/or managers is therefore seen as important to the long-term security of the butterfly. This situation is particularly evident in the Northwest Plains where less than 2% of the known habitat of *O. ptunarra* occurs within formal reserves. Over 80% of the populations occur on land owned by North Forest Products, representing over 50% of the area of habitat. Habitat security for *O. ptunarra* would benefit from the inclusion of additional butterfly habitat within North Forest Product's private reserve system and the development of an agreement between the Parks and Wildlife Service and North Forest Products for long-term management of those sites. Agreements with landowners could be equally sought for specific populations in the Midlands and in the north east of the butterfly's range.

RECOVERY OBJECTIVES AND CRITERIA

The overall objective is to achieve down listing of *O. ptunarra* to a Lower Risk category within five years based on the IUCN (1994) criteria of population size and trends, area of occupancy and security of habitat.

Specific Objectives	Criteria for Success		Actions
Increase habitat protection for specific populations	Security for specific populations by reservation or management agreement with landowners	1	Protect habitat at specific populations
		2	Provide advice and information to land owners and managers
Ensure the species persists long-term throughout its area of occupancy	The population measured at selected monitoring sites indicate overall sustainability or increase long-term	3	Monitor habitat and population density at selected sites
		5	Establish a new colony by translocation
Clarify taxonomy and assess conservation status of <i>O. ptunarra</i> subspecies	Publication of revision of <i>O. ptunarra</i> taxonomy	4	Revise taxonomy of the species
		6	Review the conservation status

RECOVERY ACTIONS

Costs of recovery actions are based on 1998 prices. Costs of a scientific officer (SO1) are based on a salary of \$39 087 with add-on costs of 28%; vehicle hire at \$1 000 per month and travel allowance at \$25 per day.

1. Protect Habitat at Specific Populations

Description: Continue to liaise with private land owners and/or managers, including North Forest Products, and develop agreements for the management of *O. ptunarra* habitat. Additional field-based work can be incorporated in action 3. Costs are associated with the employment of a scientific officer and vehicle hire.

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
2 400	2 400	2 400			7 200

2. Provide Advice and Information to Land Owners and Managers

Description: Continue to provide advice and information to land owners in regard to forestry (e.g. advice through the Timber Harvesting Plan process) and other land development activities, and in response to individual requests. Costs are associated with employment of a scientific officer.

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
1 210	1 210	1 210	1 210	1 210	6 050

3. Monitor Habitat and Population Density at Selected Sites

Description: Monitor habitat and population density at selected sites annually over 5 years. This action began in the 1998 flying season and will be concluded in 2002. Fifteen sites throughout the range of the butterfly have been included. Five sites are located in the Northwest Plains, 2 in the Central Plateau, 2 in the Steppes, 3 in the Midlands and 3 in the East Coast and Tiers biogeographic regions. The habitat ranges from *Poa* grassland to grassy shrubland to grassy woodland. Costs are associated with employment of a scientific officer for 6 weeks in each year of the plan, vehicle hire, travel allowance and survey consumables.

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
9 470	8 970	8 970	8 970	8 970	45 350

4. Revise Taxonomy of Species

Description: Morphometric studies on the butterfly will continue during the first year of the plan, culminating in the preparation of a manuscript for publication. The work will be undertaken by researchers at the University of Tasmania. Costs are associated with the field collection of butterflies, incidental laboratory costs and preparation of a manuscript.

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
500					500

5. Establish New Colony by Translocation

Description: There are many apparently suitable butterfly sites in the Northwest Plains that do not support butterflies. The reason for this is unclear, however, Neyland (1993) suggests that it may be the result of recent extinction or recent grassland invasion. Given the proximity of non-butterfly grasslands to grasslands that do support butterflies it is proposed to translocate butterflies over a short distance, as a feasibility study. Furthermore, some sites within the Northwest Plains support high densities of the butterfly and would be little affected by the removal of up to 100 butterflies, particularly where they occur at a high density over extensive areas of continuous habitat. The success of founding a new population can be monitored as part of action 3.

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
	450	280	280		1 010

6. Review Conservation Status

Description: A manuscript dealing with the results of the population monitoring program and its implications on the conservation status and long-term survival of *O. ptunarra* will be prepared for publication in an appropriate journal. Depending on the results of action 3, the publication will herald the removal of *O. ptunarra* from the *Threatened Species Protection Act* 1995 and its down listing to a lower risk category based on IUCN (1994) criteria.

Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total
				960	960

IMPLEMENTATION SCHEDULE

Action No.	Task Description	Priority	Feasibility	Responsible Party	Cost Estimate (\$000s/yr)					Total
					Year 1	Year 2	Year 3	Year 4	Year 5	
1	Protect habitat at specific populations	1	100%	PWS	2.40	2.40	2.40			7.20
2	Provide advice and information to land owners and managers	1	100%	PWS	1.21	1.21	1.21	1.21	1.21	6.05
3	Monitor habitat and population density at selected sites	1	100%	PWS	9.47	8.97	8.97	8.97	8.97	45.35
4	Revise taxonomy of the species	1	100%	UT	0.50					
5	Establish a new colony by translocation	1		PWS		0.45	0.28	0.28		1.01
6	Review the conservation status	1		PWS/SAC					0.96	0.96

REFERENCES

- Bell, P. J.** (1997) Ptunarra Brown Butterfly *Oreixenica ptunarra* Recovery Program - Summary of actions undertaken 1996/97 and recommendations for future management and monitoring. Internal Report, Threatened Species Unit, Parks and Wildlife Service, Tasmania.
- Bell, P. J.** (1997) Review of the recovery process for the Ptunarra Brown Butterfly. Report prepared on behalf of the Ptunarra Brown Butterfly Recovery Team for Environment Australia, Endangered Species Program.
- Couchman L. E.** (1953) Notes on some forms of *Oreixenica* Waterhouse and Lyell (Lepidoptera, Satyridae), with description of new forms. *Proceedings of the Royal Entomological Society of London. (B)* 22, 73-84.
- Couchman L. E. & Couchman R.** (1977) The butterflies of Tasmania. *Tasmanian Year Book 1977*, Tasmanian Govt. Printer, Hobart.
- Fensham, R. J.** (1989) The pre-European vegetation of the Midlands, Tasmania: a floristic and historical analysis of vegetation patterns. *Journal of Biogeography*. 16, 29-54.
- Fensham, R. J.** (1989) The conservation of original vegetation remnants in the Midlands, Tasmania. *Papers and proceedings of the Royal Society of Tasmania*,. 123, 229-246
- Kirkpatrick, J. B., Gilfedder, L. & Fensham, R.** (1988) City Parks and Cemeteries - Tasmania's Remnant Grasslands and Grassy Woodlands. Tasmanian Conservation Trust, Hobart.
- Kirkpatrick, J. B.** (1991) (Ed) Tasmanian Native Bush: A Management Handbook. Tasmanian Environment Centre, Hobart.
- McQuillan, P. B. & Ek, C. J.** (1997) A biogeographical analysis of the Tasmanian endemic Ptunarra Brown Butterfly, *Oreixenica ptunarra* Couchman, 1953 (Lepidoptera: Nymphalidae: Satyrinae). *Australian Journal of Zoology* 44: 21-37.
- Neyland, M. G.** (1996) The Ptunarra Brown Butterfly Recovery Plan Management Phase, Annual Report to Australian Nature Conservation Agency, Endangered Species Program.
- Neyland, M. G.** (1995) The Ptunarra Brown Butterfly Recovery Plan Management Phase, Annual Report to Australian Nature Conservation Agency, Endangered Species Program.
- Neyland, M. G.** (1994) Ptunarra Brown Butterfly Recovery Plan Management Phase, Annual Report to the Australian Nature Conservation Agency, Endangered Species Unit
- Neyland, M. G.** (1993) The ecology and conservation management of the Ptunarra Brown butterfly *Oreixenica ptunarra* (Lepidoptera; Nymphalidae; Satyrinae) in Tasmania, Australia. *Papers and proceedings of the Royal Society of Tasmania* 127: 43-48.
- Neyland, M. G.** (1992) *The ptunarra brown butterfly Oreixenica ptunarra*. Conservation Research Statement. Department of Parks, Wildlife and Heritage, Tasmania, Scientific Report, 92/2.
- Neyland, M. G.** (1991) The Ptunarra Brown Butterfly Recovery Plan: Management Phase. Department of Parks, Wildlife and Heritage, Tasmania.
- Orchard, A. E.** (1988) A natural regions map for Tasmania. *Papers and Proceedings of the Royal Society of Tasmania* 122, 47-51.
- Pollard E.** (1977) A method for assessing changes in the abundance of butterflies. *Biological Conservation* 12, 115-134.

Prince G. B. (1988) *The habitat requirements and conservation status of Tasmanian endemic butterflies* A report to the Tasmanian Department of Lands, Parks and Wildlife.

Wells, S. M., Pyle, R. M. & Collins, N. M. (1983) *The IUCN Invertebrate Red Data Book*. IUCN: Gland Switzerland.

PTUNARRA BROWN BUTTERFLY RECOVERY PLAN: 1998-2003

Prepared by **Phil Bell**