Assessing the effectiveness of Forest Practices Code provisions for the threatened Marrawah skipper *Oreisplanus munionga larana*

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Marrawah skipper habitat at Christmas Hills, southwest of Smithton. Luxuriant Carex appressa in a clearing adjacent to Acacia melaleuca and Melaleuca ericifolia swamp forest.

Citation

Cover Photo
Toni Ogilvie (Forest Planner, Sustainable Timber Tasmania) searching for Marrawah skipper larval/pupal shelters in a coupe near Kunannah Bridge, Arthur River
### Contents

1 Summary ............................................................................................................................. 4
2 Background ........................................................................................................................ 6
  2.1 Conservation status ...................................................................................................... 6
  2.2 Description and taxonomy ......................................................................................... 6
  2.3 Life history .................................................................................................................. 7
  2.4 Habitat and population biology .................................................................................. 7
  2.5 Distribution and abundance ....................................................................................... 9
  2.6 Aim of the current study ........................................................................................... 11
3 Methods ............................................................................................................................ 12
4 Results ............................................................................................................................... 14
  4.1 Descriptions of new sites .......................................................................................... 14
    4.1.1 Sumac Road ......................................................................................................... 14
    4.1.2 Eldridge Road ..................................................................................................... 15
    4.1.3 Riseborough Road .............................................................................................. 15
    4.1.4 Marrawah North ................................................................................................. 15
    4.1.5 Farnhams Creek ............................................................................................... 16
    4.1.6 Blackwood Road ............................................................................................... 16
    4.1.7 Jollys Corner .................................................................................................... 17
    4.1.8 Redpa ................................................................................................................ 17
    4.1.9 Dixons Road .................................................................................................... 18
    4.1.10 Tayatea Road ................................................................................................. 19
    4.1.11 Oldina ............................................................................................................. 19
5 Discussion ......................................................................................................................... 21
6 Recommendations ............................................................................................................ 24
7 References ........................................................................................................................ 26
8 Appendix 1 ....................................................................................................................... 27
  8.1 Project Brief: Systematic survey of potential habitat within the potential range of Marrawah skipper Oreisplanus munionga larana .............................................................................. 27
9 Appendix 2 ...................................................................................................................... Error! Bookmark not defined.
  9.1 Procedures for the management of threatened species under the forest practices system... Error! Bookmark not defined.
1 Summary

- Little is known of the conservation ecology and historic distribution of Marrawah skipper in Tasmania. Therefore, surveys of the range and habitat of the species were identified as a priority project by the Forest Practices Authority for monitoring the effectiveness of the biodiversity provisions of the forest practices system.
- The current potential range boundary for Marrawah skipper used in forest practices planning extends along the northwest coast of Tasmania from the Pieman River to Mawbanna. The species was only known from the far northwest until it was discovered at Penguin in 2005 suggesting that its distribution may have been more extensive along the northwest coast prior to European settlement.
- The aim of the current project was to undertake a systematic survey for Marrawah skipper in potential habitat throughout the current known range, and to gather information on the species’ ecology to inform the development of appropriate management prescriptions for use within the forest practices system. The project was funded by the FPA in 2016-17.
- Since listing of Marrawah skipper as threatened in 2001, the species has been found at several new locations, mostly during surveys undertaken as part of the planning process for Forest Practices Plans. That new sites were being discovered prompted the FPA to undertake a more systematic approach to survey for the species and to investigate the potential for the species to occur between Penguin and the core of its range in the far northwest of Tasmania.
- To guide surveys for Marrawah skipper, a simple habitat and distribution map was developed based on locality records of the species, locality records of its foodplant *Carex appressa*, and the mapped distribution of vegetation types associated with locality records. Fortunately Marrawah skipper can be identified at any time of the year, not just when adults are flying, as the caterpillars build characteristic shelters in the foodplant that are present year round.
- The current survey for Marrawah skipper was conducted in June 2017 and involved searching in potential habitat on public land, including Permanent Timber Production Zoned Land, throughout the species’ potential range.
- The current survey substantially increased the number of known localities of Marrawah skipper and extended the inland range south to Kununnah Bridge on the Arthur River. No evidence of Marrawah skipper was found at the location of historic records at Penguin, Mawbanna and Stanley, and no evidence of the species was found between Penguin and the most eastern currently known site at Christmas Hills, near Smithton. New locations for the species included Dixons Road (Christmas Hills), Farnhams Creek and Blackwood Road (Montagu Plains), Riseborough Road and Eldridge Road (Montagu Swamp), Jollys Corner (Welcome Swamp), Redpa, Marrawah (north of the town), Tayatea Road and Sumac Road (near the Arthur River).
- In April 2018 a forest planner discovered Marrawah skipper at Oldina near Wynyard. This find has added support to the proposition that the species once occurred throughout the lowlands of northwest Tasmanian, probably from at least the Pieman River on the west coast, and east to at least Penguin on the north coast. Loss of the species from much of its previous range is likely to have been the result of extensive land clearance for agricultural and residential purposes along the northwest coast since European settlement.
- The current survey found that Marrawah skipper occupies a broad range of vegetation types though most new records were in habitat typical of its foodplant *Carex appressa*. New records of the species were found in *Eucalyptus brookeriana* wet forest, *Acacia melanoxylon* swamp forest or in disturbed habitat such as on roadsides and the edges of farm paddocks adjacent to these forest communities.
- The results of the current survey suggest that the area of occupancy and area of occurrence of Marrawah skipper has been substantially diminished since European settlement, particularly in the coastal agricultural belt between Mawbanna and Penguin. However, the survey also found that the species is more common than originally thought within the far northwest extent of its range between Smithton, Tayatea, Temma and Woolnorth.
- Observations during the current study suggest that Marrawah skipper is appropriately managed in plantation and native forest operations and that the major ongoing threat to the species is the degradation of habitat from cattle grazing and the ongoing clearance and conversion of potential habitat for agricultural purposes.

Recommendations

Management of Marrawah skipper via the procedures agreed between FPA and DPIPWE

**Range and habitat descriptions**

- Extend the core range of Marrawah skipper to reflect current known colonies.
- Adjust the potential range boundary for Marrawah skipper used in forest practices planning to capture the historic known locality at Penguin and current known localities at Oldina (near Wynyard), Tayatea (west of the Arthur River) and Sumac Road (near Kununnah Bridge on the Arthur River).
- Revise the description of potential habitat for Marrawah skipper used in forest practices planning to include the additional vegetation types where the species has been found and emphasise key vegetation...
associations including *Melaleuca ericifolia* swamp forest, *Eucalyptus brookeriana* forest and *Acacia melanoxylon* swamp forest.

**TFA management recommendations**

- Request specialist surveys for Marrawah skipper for proposed FPPs that involve clearance and conversion of potential habitat within the new core and potential range of the species with the aim to manage habitat supporting the foodplant *Carex appressa* within and around known colonies.
- Manage Marrawah skipper in FPPs for plantation management and native forestry by managing the cover of its foodplant *Carex appressa* at the FPP level, and where practical, considering the cover and distribution of potential habitat at the broader landscape level.

**Training**

- The key to managing Marrawah skipper within the forest practices system is to correctly identify the presence of its foodplant *Carex appressa* within the species’ potential range during the FPP planning process. Ensure that forest planners and ecological consultants can identify Marrawah skipper potential habitat by continuing to provide specialist advice and practical training opportunities through the forest practices system. The discovery of Marrawah skipper near Wynyard recently (by staff of Sustainable Timber Tasmania) is testament to the value of the FPA training program and the uptake of training opportunities by forest planners and natural resource management practitioners.
- It is recommended that important and vulnerable sites for Marrawah skipper set aside under certified FPPs be regularly monitored by the FPA to ensure intended conservation outcomes for the species. Important and vulnerable sites include Redpa, Christmas Hills, Salmon River Road and Woinnorah ‘colonies’. It is also recommended that the newly discovered site at Oldina Forest Reserve and the historic site on private land at Penguin be monitored and searches for Marrawah skipper conducted in the general area.
2 Background

2.1 Conservation status

Marrawah skipper Oreisplanus munionga larana was listed as Endangered in 2001 under the Tasmanian Threatened Species Protection Act 1995. The reason for listing was ‘an extremely localised distribution of the species, so few known colonies, and significant and ongoing threats at most known sites that have a high potential to result in local extinctions, restricted distribution, low population density and degradation of sites causing population decline’ (TSSAC 2001). The species was listed as Vulnerable in 2009 under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 as it has a limited geographic distribution which is precarious for its survival due to severe fragmentation and ongoing threats (TSSC, 2010).

2.2 Description and taxonomy

Marrawah skipper Oreisplanus munionga larana belongs to the family Hesperiidae, a family of butterflies that include the skippers, flats, awls and darts. This family represents about a third of the total Australasian butterfly fauna, with some 77 species, many of which are endemic. Most species have limited distributions and specific habitat preferences, forming localised and sedentary colonies, mainly along the Australian eastern coast and mountains. The adults are mainly small to medium sized and dull brown in colour (Braby 2000).

The genus Oreisplanus contains two species restricted to south-eastern Australia and Tasmania: O. munionga and O. perornata. Two sub-species of Oreisplanus munionga are recognised: Marrawah skipper O. m. larana and alpine sedge-skipper O. m. munionga. Marrawah skipper was discovered and described by Couchman in 1962. The adult is brightly coloured, rich caramel brown above with pale yellow wing-markings and pale yellow below. The female is paler and more yellowish on the underside. The female has a wingspan of 30 mm and the male 20 mm (Couchman 1962; Braby 2000).

The egg of Oreisplanus munionga is 1.1 mm by 1.5 mm, cream hemispherical and ellipsoidal, hollowed slightly at the apex and smooth. The larva is greenish-brown with a dark middorsal line, a broad white sub-dorsal line, and a white lateral line (Figure 2, 3). The head is brown with a narrow black median longitudinal band, bordered narrowly by a brown band and a black dorsoventral band. The pupa is 18-25 mm long, black to dark brown with the surface covered by a white waxy powder. The pupal cap has two black prominent divergent anterior projections (Braby 2000).

The colour and patterning of the wings of adult Marrawah skipper is shown in Figure 1.

Figure 1. Marrawah skipper Oreisplanus munionga larana: Left = Male; Right = Female. Photo courtesy of Michael F. Braby.
Figure 2. Young larva of Marrawah skipper in shelter on Carex appressa (approximately 12 mm long)

Figure 3. Mature larva of Marrawah skipper on Carex appressa (Photo by Hans Wapstra) (Approx. 25 mm long).

2.3 Life history

Foodplants recorded for alpine sedge-skipper on mainland Australia include Carex appressa, C. longibrachiata, Carex sp. and Scirpus polystachius, though the preferred food plant is considered to be C. appressa (Braby 2000). Carex longibrachiata has been recorded sometimes as the foodplant at Mt Hotham (Victoria), and the subspecies is found on Scirpus polystachias at Kanangra Walls (NSW), and Honeysuckle Creek in Namadgi National Park (ACT). Larvae have been raised successfully on Gahnia (Braby 2000).

Marrawah skipper adults fly in close proximity to the food plant Carex appressa. The species has an annual life cycle and on the mainland, alpine sedge-skipper adults are on the wing between January and March, with one female being collected in April at Mt Gingera (ACT). On the mainland eggs hatch soon after being laid and larvae develop slowly from autumn to early summer. However it is not known whether they feed during the winter period when the foodplants are covered by snow (Braby 2000). In Tasmania the adult flying period is from about mid January to mid February. The larvae rest in shelters in an upright position and pupation lasts about two to three weeks (Couchman 1965). Pupation in Tasmania occurs in January and varies between 14 and 18 days. Pupae collected by Couchman in 1965 emerged between 31 January and 8 February (Couchman 1965). A pupa collected with a larval shelter from Welcome Swamp in 2002 on 6 February emerged on 10 February (Bell personal observation).

2.4 Habitat and population biology

Marrawah skipper’s foodplant Carex appressa responds vigorously to disturbance and is usually gradually replaced in the absence of disturbance, and as the canopy closes over (Neyland 2001). The species is most abundant (indicated by the abundance of larval/pupal shelters in the foodplant) in open habitat where C. appressa plants are large and luxuriant (Figure 4.). Currently the most common disturbance is fire, roadside slashing, cattle grazing, land clearance and forestry activities. Prior to European settlement the most common forms of disturbance favouring C. appressa would have been fire, flood and windfall. Without fire or other disturbance most of the sites where Marrawah skipper has been found (except for Carex appressa dominated swamps that appear to be more enduring) revert to closed scrub or forest. Carex appressa under a closed or dense canopy appears to be unsuitable
habitat for Marrawah skipper. Even adjacent to known colonies larva/pupal shelters are usually absent only a few meters into a dense forest or scrub.

As a result of the requirement for disturbance to maintain habitat, the area of occupancy of Marrawah skipper must vary rapidly in space and time (Neyland 2001). It has been suggested that the species is reasonably mobile but there are no observations to suggest that this is the case. Marrawah skipper is small and has never been observed far from its foodplant so it is hard to imagine it undertaking extended journeys through extensive dense forest or scrub to locate small patches of suitable habitat. It is more likely the species takes advantage of fire and flood to move on quite local scales. River and swamp edges provide a more permanent habitat for Marrawah skipper and a pathway for dispersal. It may be that prior to European settlement the distribution of Marrawah skipper was very restricted to the margins of rivers, streams and swamps with a distribution waxing and waning in response to disturbance such as floods, windfalls and fire. Recent landuse and land management practices may have provided additional opportunities and habitat for the species to expand its area of occupancy. However, this is a double-edged sword as conversion of potential habitat and inappropriate fire regimes can cause rapid and irreversible extinctions in a now fragmented landscape.

![Typical Marrawah skipper habitat supporting an abundance of larval/pupal shelters. Note the open vegetation structure and luxuriant Carex appressa.](image)

**Figure 4.** Typical Marrawah skipper habitat supporting an abundance of larval/pupal shelters. Note the open vegetation structure and luxuriant *Carex appressa*.

![Carex appressa under a closed canopy of Melaleuca ericifolia swamp forest where the foodplant is typically sparse in occurrence and often in poor condition.](image)

**Figure 5.** *Carex appressa* under a closed canopy of *Melaleuca ericifolia* swamp forest where the foodplant is typically sparse in occurrence and often in poor condition.

![Carex appressa sedgeland in a poorly drained flat. This habitat type may provide a reservoir population of Marrawah skipper for dispersal into neighbouring vegetation types following a disturbance such as fire.](image)

**Figure 6.** *Carex appressa* sedgeland in a poorly drained flat. This habitat type may provide a reservoir population of Marrawah skipper for dispersal into neighbouring vegetation types following a disturbance such as fire.
2.5 Distribution and abundance

On mainland Australia alpine sedge-skimmer (*Oreisplanus munionga munionga*) occurs in the mountains between 1060 and 1600 m a.s.l. where it is restricted to open woodland and grassland in the alpine and subalpine zones favouring soaks, swamps and damp areas where the larval foodplant grows (Braby 2000).

Following the initial discovery of Marrawah skipper, Couchman commented that the species had a ‘highly localised distribution as it remained undiscovered in Tasmania until 1962’. He predicted it might occur ‘north of Marrawah to Cape Grim but not south of Marrawah as the vegetation changes to heathland’ (Couchman 1962).

![Figure 7. Records of Marrawah skipper as at May 2017 (Source: NVA, DPIPWE).](image)

In 1993 Neyland (1994; 2001) undertook a dedicated survey for Marrawah skipper. At the time the species was only known to occur at Marrawah and Stanley. The locations were not well known, as the historical data provided no precise site information. He was guided by the descriptions of sites as being swampy and dominated by *Carex appressa*, and targeted his searches along the coast from Temma to Stanley. He confirmed the colonies at Marrawah and Stanley and discovered the species at a further four locations including Welcome Swamp, Mount Cameron West (Preminghana), Mawson Bay and Nelson Bay (see Figure 7 for locations).

Bell (2002) resurveyed sites visited by Neyland in 1993 but was unable to detect butterflies at Stanley, Mawson Bay or Nelson Bay. However he found further new locations at Harcus River Road, Arthur River and Temma, and additional sites at Mawson Bay and Nelson Bay.

Since 2002 all new colonies of Marrawah skipper (except for those found on Tasmanian Aboriginal land at Preminghana in 2008 and at Marrawah, Nelson Bay, Mawson Bay and Temma by the Threatened Species Section, DPIPWE in 2008) have been discovered during surveys for proposed Forest Practices Plans (FPPs) for native forestry, plantations, and clearance and conversion for agricultural purposes. These locations include Woolnorth, Redpa, Christmas Hills, Montague Plains, Salmon River Road, Roger River, Mawbanna and Penguin.

**Stanley** - In 1993 Marrawah skipper was found along a creekline on private land in less than half a hectare of *Carex appressa*. At the time there were very few other patches of *C. appressa* in the Stanley area and all were less than 0.1 ha in size (Neyland 1993; 2001). In 2002 habitat had been all but cleared for cattle grazing and there was no evidence of the butterfly. There were some degraded stands of *C. appressa* but most plants had been grazed to less than 10 cm in height (Bell 2002). The site was visited in the mid 2000s and a single old larval/pupal shelter was found (Bell pers. obs.). In 2016 a single old shelter was discovered (in a paddock on the edge of a *E. brookeriana* forest remnant) 7 km to the southwest during assessment of a proposed FPP for clearance and conversion for agricultural purposes (Bell pers. obs.).

**Harcus River Road** - In 2002 butterflies were found on both sides of the Harcus River along a man-made clearing beside the Welcome River. Luxuriant *Carex appressa* had colonised a track used for machinery access for maintenance of the river channel (Bell 2002). All locations of the species were on Crown Land (River Reserve). Additional occurrences of Marrawah skipper were subsequently found on private land and along the Harcus River Road near Preminghana (Richard Barnes, FPA 2007; NVA records), on private land near the Welcome River (Phil Bell, DPIPWE 2004; NVA records), west of Preminghana (Phil Bell, DPIPWE 2004 and Richard Barnes, FPA 2007; NVA records) and on private land south of Preminghana (Bill Brown, DPIPWE 2008; NVA records).

**Preminghana** – Preminghana is Tasmanian Aboriginal land. Neyland found the species in 1993 in an area of *Carex appressa* of < 0.5 ha (Neyland 1994; 2001). By 2002 much of the *C. appressa* had been eliminated though there were remnants along the roadside where there had been regular slashing. The habitat in a dune swale had decreased since 1993 following regeneration of *Leptospermum lanigerum* and *Melaleuca ericifolia* dominated
Assessing the Forest Practices Code provisions for Marrawah skipper June 2018

scrub (Bell 2002). The site was visited on two further occasions during the 2000s as part of forest practices training activities and fresh larval shelters were observed on both occasions. A more detailed survey was conducted on Preminghana in association with the Tasmanian Aboriginal community in 2008. Marrawah skipper was found at several new locations across the property, mainly associated with streams and wetland fringes. A substantial colony was found in the north of the property associated with a large swamp. The property was not fully searched in 2008 and is likely to support additional localities for the species (DPIW and TALSC 2008).

**Mawson Bay** - In 1993 butterflies were found to be spread through an extensive patch of about 4 ha of *Carex appressa* extending along swales behind foredunes within the Arthur Pieman Conservation Area. There was evidence the area has had a history of frequent fires. *Carex appressa* was also noted to extend around tea-tree thickets and swampy ground to the south (Neyland 1993; 2001). This habitat patch could not be relocated in 2002 however a patch of about 1.5 ha of *C. appressa* was located near Eagle Rock on private land, approximately 400 m to the southeast. The sites occur on both reserved land (Arthur Pieman Conservation Area; APCA) and on private land. There was evidence of grazing by cattle and the area has been responsible for the degradation of habitat observed by Neyland in 1993 (Bell 2002). In 1993 less than 0.1 ha of habitat was described as occurring along drainage lines at Tiger Flat within the APCA. *Carex appressa* was considered to be declining in area due to slashing, and grazing and trampling by cattle (Neyland 1993; 2001). The habitat patch had disappeared by 2002 however more than 1 ha of *C. appressa* dominated vegetation was found 300 m to the south (Bell 2002).

**Nelson Bay** - In 1993 Marrawah skipper was found in the Arthur Pieman Conservation Area covering an area of more than 10 ha of *Carex appressa*. The site had experienced a history of fires as the dominant *C. appressa* cover was littered with dead stems and trunks of tea-trees (Neyland 1993; 2001). In 2002 no butterflies were found after several hours of searching over two separate visits to the site during the flying season. The site had retained a significant cover of *C. appressa* over many hectares. However, the entire swamp had been burnt in a wildfire in the previous winter and all *C. appressa* was young regrowth. The fire was reported to have been intense and was not extinguished for three days. It seemed likely that the wildfire had burnt the entire area of habitat and consequently eliminated Marrawah skipper from the site (Bell 2002). A single butterfly was found near stacks at Nelson Bay and an additional site was found at Sundown Point within a State Reserve. Additional sites were found north of the shack sites and at Sundown Point in 2008 (Bill Brown, DPIPWE 2008; NVA records).

**Arthur River** - Marrawah skipper was found at three sites near the town of Arthur River in 2008 (Bill Brown, DPIPWE 2008; NVA records). All locations were on private property including Church Rock, and adjacent to the Arthur Pieman Road at Sawards Creek and Arthur River.

**Temma** – Marrawah skipper was found on private land where *Carex appressa* fringes *Melaleuca ericifolia* closed forest. Butterflies were present in some large patches of habitat adjacent to Templars Creek. The site was subject to trampling and grazing by cattle. Butterflies were also observed in *C. appressa* sedgeland within the Arthur Pieman Conservation Area (APCA). Most observations of the species were in habitat with a luxuriant and high cover of *C. appressa* adjacent to remnant patches of *M. ericifolia* closed scrub. Additional localities were found in this area (private land), around Rebecca Lagoon, north of Temma (APCA), 4 km northeast of Temma (private land) and around the township of Temma in 2008 (Bill Brown, DPIPWE 2008; NVA records). Larval/pupal shelters were found on PTPZL 5 km northeast of Temma in 2010 (David Fulford, STT; NVA records).

**Welcome Swamp** - In 1993 Marrawah skipper was observed alongside the Bass Highway adjacent to the Welcome River where forest/scrub vegetation has been cleared under powerlines. The species was also observed along narrow defunct tramlines which were cleared during past logging operations (Neyland 1993; 2001). No adults were observed at this location in the 2002 flying season following several visits to the site (although some larval/pupal shelters were observed in *Carex appressa*) (Bell 2002). Locations of Marrawah skipper were on Crown Land (road reserve and within PTPZL).

**Mawbanna** - A single larval/pupal shelter was found beside Mawbanna Road on PTPZL in 2014 (James Ferguson, STT 2014; NVA records). The site was revisited in 2016 and the surrounding area surveyed in detail though no evidence of the species was found (Bell and Richards pers. obs.).

**Woolnorth** - A large area of habitat supporting Marrawah skipper was found at Swan Bay Plain on Woolnorth (private property) in 2010 (Richard Barnes, Private 2010; NVA records). This site was resurveyed in 2012 (Karen Richards and Chris Spencer 2012; NVA records).

**Montagu Swamp** – In 2010 Marrawah skipper (larval/pupal shelters) was found at sites on the margins of the Montagu Swamp, on PTPZL and on private land (David Fulton, STT 2010; Samuel Robertson, STT 2010; NVA records). One of these sites on PTPZL is actively managed for the conservation of the butterfly by STT and the local landcare group.

**Salmon River Road** - A large colony (based on the abundance of larval/pupal shelters) was found in *Carex appressa* dominated sedgeland and *Melaleuca ericifolia* open shrubland on private land at the southern end of
Assessing the Forest Practices Code provisions for Marrawah skipper June 2018

Montagu Swamp in 2007 (Colin McCoull, FPA and Phil Bell, DPIPWE 2007; NVA records). Suitable habitat covered an area of over 20 ha and was reserved within a FPP for clearance and conversion for agricultural purposes. The site was revisited in 2017 and the retained area found to be intact. However, the abundance of larval/pupal shelters had declined dramatically (Bell pers. obs.).

**Roger River** - Marrawah skipper shelters were found in a *Carex appressa* dominated sedgeland on PTPZL between plantation forests in 2013 (Toni Ogilvie, STT, 2013; NVA records). The locality is managed for conservation of Marrawah skipper by Sustainable Timber Tasmania (STT).

**Penguin** - A single shelter (containing a live pupa) was identified while assessing a proposed Forest Practices Plan (FPP) for the expansion of a farm dam in 2005 (Bell 2005). No further assessment of the site was made in 2005 however an opportunistic visit was made to the area in the late 2000s but no evidence of Marrawah skipper was found (Bell pers. obs.). This record extended the potential range of Marrawah skipper by over 100 km. It also raised the possibility that the species may have been more widely distributed in coastal northwest Tasmania in the past and eliminated in the wake of a history of extensive land clearing for agricultural and residential development.

### 2.6 Aim of the current study

The potential range for Marrawah skipper (as agreed by the FPA and DPIPWE for the purposes of land management planning within the forest practices system) extends along the northwest coast of Tasmania from the Pieman River to Mawbanna and inland to Tayatea (see Figure 8; FPA and DPIPWE 2012). The potential range is not well known as there have been no dedicated surveys for the species south of the Arthur River or west of Stanley, except for an incidental discovery of the species at Penguin in 2005 and Mawbanna in 2014 (Bell, 2005). The potential range boundary is used as a guide for forest planners as to when to consider the species during planning for FPPs.

![Figure 8. Marrawah skipper range boundaries used for planning purposes within the Tasmanian forest practices system, June 2018 (Pink shading = potential range; Red outline = core range).](image)

The core range of the Marrawah skipper (as agreed by the FPA and DPIPWE for the purposes of land management planning within the forest practices system) is an arbitrary buffer of 2 km around known sites for the species (see Figure 8; FPA and DPIPWE 2012). The current core range comprises nine polygons capturing known sites recorded up to about 2010. Between 2010 and the current study many additional sites have been found that are not captured by the core range.

The aim of the current project was to conduct a systematic survey for Marrawah skipper to better determine potential range and core range, and to gather additional information on the species’ ecology to inform the development of improved management prescriptions for the forest practices system.
3 Methods

A crude habitat and distribution map was constructed from information associated with known records of Marrawah skipper (Figure 9), TASVEG vegetation types associated with locality records i.e. *Melaleuca ericifolia* swamp forest (Figure 9), and the distribution of the key foodplant of the species, *Carex appressa* (Figure 9). Information was compiled from several sources including the Natural Values Atlas (DPIPWE 2017), published and unpublished literature, and personal observations.

![Figure 9](image1.png)

**Figure 9.** Mapped distribution of *Melaleuca ericifolia* swamp forest (light blue shading) and records of *Carex appressa* (red circles) in northwest Tasmania overlain on the potential range (pink shading) and core range (red outline) of Marrawah skipper (Source: Natural Values Atlas, DPIPWE May 2017).

The habitat and distribution map was used to guide a survey for Marrawah skipper. Roadside searches were conducted in suitable habitat between the 12th and 19th June 2017. Thirty-three sites supporting the foodplant (*Carex appressa*) between Penguin and Marrawah, and inland south to the Arthur River were searched for Marrawah skipper (Figure 10).

![Figure 10](image2.png)

**Figure 10.** Locations where searches were undertaken for Marrawah skipper in June 2017 (blue circles).

Searching involved the examination of *Carex appressa* for larval shelters that are characteristic of Marrawah skipper. No shelters were disturbed during the present survey because the presence of a skipper shelter in *Carex appressa* is likely to belong to Marrawah skipper (Figure 11). All determinations of Marrawah skipper were based on the structure of the larval shelter and were considered to be made with a high degree of confidence.
Figure 11. Characteristic shelter of Marrawah skipper *Oreisplanus munionga larana* in *Carex appressa*.
4 Results

Marrawah skipper was found at 10 of the 33 sites searched during the current survey including: Farnhams Creek and Blackwood Road (Montagu Plains), Riseborough Road and Eldridge Road (Montagu Swamp), Jollys Corner (Welcome Swamp), Redpa, Marrawah (north of the town) and Sumac Road (near the Arthur River). The species was also found at two sites in 2016 during surveys for proposed FPPs including Redpa and at Dixons Road, (Christmas Hills) (Bell pers. obs.), and at Tayatea Road near the Arthur River (Toni Ogilvie STT) in December 2017 (see Figure 12).

4.1 Descriptions of new sites

4.1.1 Sumac Road

Marrawah skipper was found in a small area of *Carex appressa* adjacent to a logging track on PTPZL west of Sumac Road and north of Kununnah Bridge, Sumac (GR E329943 N5448392). The area of suitable habitat was about 0.5 ha in size, flat and dominated by *Gahnia grandis* and *Carex appressa* with regenerating eucalypts, mainly *Eucalyptus brookeriana* (see Figure 13). The site had been a landing for forest operations and abuts *Acacia melanoxylon* swamp forest. It is likely the site was suitable for Marrawah skipper prior to being used as a landing and the suitability of the site may endure due to impeded drainage. The location is within a current FPP area and habitat for Marrawah skipper will be managed by Sustainable Timber Tasmania (STT) during the harvesting operation and subsequent reforestation activities. There is potential habitat elsewhere in the FPP area and in the wider area, mainly associated with flats along the Arthur River. Marrawah skipper is unlikely to occur in the neighbouring Trowutta Forest Reserve due to the topography but highly likely to occur on neighbouring private land to the west, particularly adjacent to the Arthur River. Planning for forest operations in this area should consider the management of potential habitat for Marrawah skipper.

![Figure 12. New locations of Marrawah skipper from the current survey including new locations at Dixons Road (Christmas Hills) and Redpa in 2016, and Tayatea Road in late 2017 (Yellow triangles = new locations of Marrawah skipper; Blue triangles = NVA records of Marrawah skipper, May 2017).](image)

![Figure 13. Marrawah skipper habitat on PTPZL west of Sumac Road.](image)
4.1.2  **Eldridge Road**
Marrawah skipper was found in two locations adjacent to Eldridge Road, *Montagu Swamp*, south of the Bass Highway. Larval/pupal shelters were found in a drain on the western side (private land) and a depression on the eastern side (PTPZL) of Eldridge Road, approximately 900m south of the Bass Highway (GR E326506 N5462386). Habitat was created by the construction and ongoing maintenance of the road and adjacent drain. Both sides of the road comprised disturbed habitat with *Gahnia grandis*, *Lepidosperma* sp., *Carex appressa* and blackberry common in the understorey (Figure 14). Marrawah skipper was also found adjacent to the road branching west from Eldridge Road (GR E326181 N5462214). The location is adjacent to an extensive area of potential habitat on PTPZL resulting from failed regeneration of Blackwood forest following harvesting (Figure 15). A further site is known for Marrawah skipper on adjacent private land near GR E324060 N5461624. This site was the subject of an FPP compliance matter in 2017. Most habitat for the species had been cleared and converted for agricultural purposes.

![Figure 14. Marrawah skipper habitat along Eldridge Road.](image)

4.1.3  **Riseborough Road**
Marrawah skipper was found in *Carex appressa* associated with a drain adjacent to the Bass Highway east of Riseborough Road, *Montagu Swamp* (GR E325057 S5N5463728). A detailed assessment of the site was not possible due to a large amount of water in the drain during the current survey however it is likely Marrawah skipper extends some distance along the highway. Habitat has been created through construction and ongoing maintenance of the highway and drain. Vegetation adjacent to the highway on PTPZL is *Acacia melanoxylon* swamp forest (Figure 15). No shelters were found on the southern side of the road adjacent to pasture.

![Figure 15. Marrawah skipper habitat in drain and power easement beside the Bass Highway near Riseborough Road. Habitat is weedy and dominated by exotic grasses directly adjacent to the road surface.](image)

4.1.4  **Marrawah North**
Marrawah skipper was found in *Carex appressa* on a roadside adjacent to improved pasture north of *Marrawah*. Only a single old larval/pupal shelter was found. Habitat comprised a narrow strip of *C. appressa* that had recolonised the previously cleared roadside (Figure 16). This site is only 2 km north of the town of Marrawah and a similar distance south of historic records associated with the Harcus River road and Welcome River.
4.1.5 Farnhams Creek
Marrawah skipper was found in Carex appressa adjacent to Barcoo Road near Farnhams Creek, Montagu Swamp (GR E325040 N5474979). The site is approximately 4.5 km from the nearest recorded locality for the species in Montagu Swamp. There was evidence of recent land clearing although a small swampy area supporting a high cover of C. appressa appeared to have been retained. The site was adjacent to Eucalyptus brookeriana wet forest (Figure 17).

4.1.6 Blackwood Road
Marrawah skipper was found in Carex appressa in a drain adjacent to Blackwood Road 700 m south of the junction with Barcoo Road, Montagu Swamp. Only the occasional C. appressa plant was present within and along the drain. This is not a significant site for the species though is suggestive of the species dispersal from a nearby source population. A substantial area of habitat is present on PTPZL 800 m to the north (Figure 18).
Assessing the Forest Practices Code provisions for Marrawah skipper June 2018

Figure 18. Location of new record of Marrawah skipper adjacent to Blackwood Road south of the Barcoo Road junction (Yellow triangle = new record of Marrawah skipper Oreisplanus munionga larana GR E324264 N5469931; Red circle = NVA record of Carex appressa; Small yellow triangle = known record of Marrawah skipper; Yellow circle = additional search site; Yellow boundary = PTPZL; Scale = 1:10,000).

4.1.7 Jollys Corner
Marrawah skipper was found in Carex appressa at Jollys Corner south of the Bass Highway, Welcome Swamp. The species was recorded adjacent to (GR E314725 N5464338) and within a recently harvested coupe of Acacia melanoxylon swamp forest (GR E314791 N5464122) (Figure 19). Within the coupe, a single shelter was found within an area that had been clearfall harvested recently. The presence of Marrawah skipper within the coupe had not been identified during preparation of the FPP however, prescriptions for management of potential habitat was considered and incorporated in the FPP. In consultation with the FPA, Sustainable Timber Tasmania recently developed management prescriptions for Marrawah skipper habitat as part of a subsequent planned burn within the coupe.

Figure 19. Marrawah skipper habitat at Jollys Corner

4.1.8 Redpa
Marrawah skipper was found in Carex appressa sedgeland in a flat, and along an access and maintenance track in Eucalyptus nitens plantation. The site is east of Redpa on private land and is approximately 4 km north of the Neyland (1994) record of the species on the Welcome River, adjacent to the Bass Highway (Figure 20). The species was found during surveys for a proposed FPP for clearance and conversion for agricultural purposes. A substantial area of C. appressa identified outside the proposed clearance area, and supporting abundant larval/pupal shelters, was subsequently included in a ‘reserve’ for Marrawah skipper within the FPP (Figure 21). Only incidental occurrences of the species were found elsewhere within the area proposed for clearance and conversion (noting that the proposal area is mainly on a slope and had been previously cleared and converted to plantation in the early 2000s). The Marrawah skipper ‘reserve’ is only 500m from the Welcome River where private land has been largely cleared to farmland.
4.1.9 Dixons Road

Marrawah skipper was found at Christmas Hills during an inspection of a proposal for clearance and conversion of native forest for agricultural purposes. The species was in Carex appressa sedgeland on the boundary between farmland and Acacia melanoxylon swamp forest. The density of larval/pupal shelters was high. The forest immediately surrounding the colony was dominated by Melaleuca ericifolia though Acacia melanoxylon swamp forest dominated the remainder of the vegetation on private land to the south (Figure 23). The area supporting Marrawah skipper was set aside under the FPP with a condition in the FPP that the site would be fenced to protect it from gazing and trampling by cattle.
Figure 23. Marrawah skipper habitat at Christmas Hills. Comprises a dense sward of *Carex appressa*, possibly the result of past forest clearing, adjacent to *Acacia melanoxylon* swamp forest and *Melaleuca ericifolia* swamp forest.

4.1.10 Tayatea Road

Marrawah skipper was found by Toni Ogilvie (Forest Planner, Sustainable Timber Tasmania) on a plantation edge on PTPZL (leased PTPZ land) at Tayatea (GR E341931 N5454005). The site is 9 km east of the town of Roger River. A few shelters were found on a small strip of *Carex appressa* (approximately 20 plants) growing along a drainage line (Figure 24). Sustainable Timber Tasmania has incorporated an area within the adjacent coupe into a Wildlife Habitat Clump to provide a buffer and protection for the species and its habitat.

Figure 24. Marrawah skipper habitat at Tayatea Road. Small line of *Carex appressa* along a plantation edge.

4.1.11 Oldina

Marrawah skipper larval/pupal shelters were discovered in *Carex appressa* at Oldina Forest Reserve by Toni Ogilvie (Forest Planner, Sustainable Timber Tasmania) in April 2018 (GR E388328 N5459048). The location is disturbed and partially cleared for recreational purposes. *Carex appressa* occurs along the banks of Blackfish Creek with swards of *C. appressa* in a forest clearing adjacent to *Acacia melanoxylon* swamp forest (Figure 25). The area of habitat is small and larval/pupal shelters occur at a very low density. It is likely that there are additional occurrences of Marrawah skipper near Oldina Forest Reserve and further searches for the species in the area are recommended.
Figure 25. Marrawah skipper habitat at Oldina Forest Reserve. *Carex appressa* along the banks of Blackfish Creek and swards of *Carex appressa* in forest clearing adjacent to *Acacia melanoxylon* swamp forest (Photo by Toni Ogilvie).
5 Discussion

The current survey has substantially increased the number of known colonies of Marrawah skipper in northwest Tasmania. In view of the time and property access constraints it is surprising so many new locations for the species were found during the survey. It suggests that additional colonies are likely to be found with further survey on private property and public land within the heartland of the species’ distribution in far northwest Tasmania. Indeed, given that the historic distribution of Marrawah skipper extended to at least Penguin in the east, then other small pockets of habitat in lowland areas along the northwest coast could support remnant colonies of the species.

Given the historic known distribution of Marrawah skipper within the Woolnorth Bioregion, inshore and Bass Strait islands are considered to be within the potential range of the species. Nonetheless, although no strategic or dedicated surveys have been conducted, the author has not detected the species during several visits to King Island. Further, a detailed survey by the author for butterflies on Three Hummock Island in 2005 did not detect Marrawah skipper even though an extensive area of suitable habitat was present. The apparent absence of the species from the Bass Straight islands is likely to be a reflection of a history of land clearing, grazing and frequent fires.

In combination with the recent discovery by Sustainable Timber Tasmania of a breeding colony at Oldina (near Wynyard) the present survey has substantially extended the known distribution of Marrawah skipper in Tasmania. The historic discovery of the species at Penguin could not be confirmed as extant by the current survey though extensive searching was undertaken in the vicinity of the original record. Nonetheless, the new record of Marrawah skipper at Oldina Forest Reserve eliminates any doubt that the species’ distribution was considerably greater in the past than it is today. It is likely Carex appressa dominated sedgeland communities, and swamp forest and scrub communities such as Melaleuca ericifolia swamp forest and Acacia melanoxylon swamp forest, were more widespread along the lowland coastal areas between Smithton and Penguin than they are today. Although largely restricted to roads the current survey detected only a few small remnants of vegetation supporting C. appressa between these localities.

The current survey revealed that Marrawah skipper occurs in a broad range of vegetation types though all new locations supported habitat typical of its foodplant Carex appressa. The species has been found in wet eucalypt forest including E. obliqua and E. brookeriana dominated communities, Melaleuca ericifolia swamp forest and Acacia melanoxylon swamp forest but never under a significant canopy cover. Usually Marrawah skipper is present in an open sedgeland dominated by Carex appressa within one of these communities, or in disturbed habitat adjacent to one of the communities. The species occurs in a disturbance dependent seral community (relying on wind, fire or flood to provide light to the forest floor for C. appressa to flourish) or in highly disturbed situations associated with human development of some kind (such as roading, timber harvesting, farming, and swamp draining). Marrawah skipper can also survive in highly weedy conditions providing its foodplant can still flourish. Most of the discoveries of the species during the present survey were on roadsides that experience disturbance on a frequent basis and share this habitat with common weeds such as blackberry and scotch thistle. Some roadsides supporting Marrawah skipper are subject to spraying for weed control and this is the case for at least two of the known sites for the species, yet the species has prevailed.

Notwithstanding the high likelihood of finding more colonies of Marrawah skipper in Tasmania the distribution of breeding colonies remains fragmented and most colonies are separated by large distances of unsuitable habitat. The distances between known localities and between areas of suitable habitat probably exceeds the potential dispersal capacity of the species. Historically patches of habitat, although probably small, would have been scattered across the massive swamp forests of the far northwest and along the major river systems including the Welcome, Harcus, Montagu and Arthur Rivers. Today the species is for the most part relegated to the margins of the major swamps locked between inhospitable habitats of improved pasture and dense forests on hill slopes. Outlying and remnant colonies are at the mercy of ongoing clearance and conversion for agricultural development (see Figure 26 and 27). In 1977 Len Couchman (the forefather of butterfly studies in Tasmania) was of the view that Marrawah skipper ‘is a highly localised skipper in Tasmania’ and ‘has a most tenuous hold now that the coastal heathlands are being rapidly destroyed for cattle raising’ (Couchman 1977). Ongoing development of lowland flats in the far northwest for agricultural development will more than likely drive an ongoing downward trend in abundance and distribution of Marrawah skipper. Land clearance on private land also remains a threat to the species while the clearance and conversion of non-threatened forest communities for agricultural purposes is acceptable under Tasmanian forest policy (Tasmanian Government 2017) and the clearance and conversion of non-threatened, non-forest vegetation is neither regulated nor monitored in Tasmania.
In the absence of more detailed information (but recognising the contrasting impacts of fire on habitat), staggering the burning of patches or a mosaic pattern of burning is probably the most suitable strategy to maintain availability of habitat for Marrawah skipper. Fire is potentially the greatest threat to the viability of colonies through killing larvae and pupae. Therefore, it is important to maintain a range of fire ages including unburnt areas to ensure a reservoir of developmental stages to recolonise burnt areas. Surveys by Bell (2002) support the notion of Marrawah skipper as a fire succession species with the capacity to recolonise sites from nearby unburnt sites. Nonetheless, wildfires such as at Nelson Bay in 2001 may be detrimental to the long-term viability of Marrawah skipper in that area. At Nelson Bay it is likely that a few butterflies surviving around the shacks may have been sufficient to recolonise the area of intense and extensive fire inland. Anecdotal observations by the author of the impacts of fire support a ‘hedging of bets approach’ to fire management in potential habitat.

Planning for Marrawah skipper within the Tasmanian forest practices system relies on the identification of potential habitat (vegetation communities supporting the food plant Carex appressa) within the potential range, and/or within the core range of the species (within 2 km of a known location). The presence of potential habitat within a proposed Forest Practices Plan (FPP) area requires forest planners to use the Forest Practices Authorities’ Threatened Fauna Adviser (TFA) to deliver a management recommendation.

TFA management recommendations for Marrawah skipper are based on whether the proposed FPP area is within the core range or potential range, and if within the potential range, whether potential habitat is ‘patchy’ or ‘extensive’. A proposed FPP within the core range supporting potential habitat or within the potential range supporting extensive potential habitat requires advice to be sought from the Forest Practices Authority. This allows the Forest Practices Authorities’ ecologists to consider such FPPs on a case-by-case basis. In some circumstances advice can be provided without a specialist site assessment due to the type of forestry operation. However, in some cases a specialist survey may be required to determine the presence of the species within the FPP and the surrounding area. The results of the current survey support the requirement to seek advice from the Forest Practices Authority, however given the likelihood of finding further breeding colonies within the potential range, specialist surveys should also be required for proposed FPPs remote from known localities of Marrawah skipper.
A proposed FPP within the potential range of Marrawah skipper supporting patchy potential habitat currently receives a management recommendation to target potential habitat within Wildlife Habitat Clumps (WHCs), applied at the standard requirement by the Forest Practices Code, and to target mature habitat rather than younger habitat. The placement of WHCs as small patches of retained habitat within the harvest area is considered acceptable where the distribution of potential habitat is compatible with this, and while distributing WHCs across the harvested area is considered desirable, consolidation of patches is acceptable if potential habitat is concentrated in a particular area. The management recommendation indicates that habitat set-aside for Marrawah skipper is intended for long-term retention, and should be identified on a planning map and flagged in the field prior to the operation. The habitat set aside should be protected from disturbance from forestry activities and low intensity fuel reduction burning and top disposal burning should be minimised but is acceptable. In the light of the results of the current survey and more recent observations on the impact of fire on colonies, and the ecology of Marrawah skipper and its foodplant, it is recommended that the current management recommendations be revised to accord with this new information.
6 Recommendations

Management of Marrawah skipper via the procedures agreed between FPA and DPIPWE

Range and habitat descriptions

- Extend the core range of Marrawah skipper to reflect the current known colonies.
- Adjust the potential range boundary for Marrawah skipper used in forest practices planning to capture the historic known locality at Penguin and current known localities at Oldina (near Wynyard), Tayatea (west of the Arthur River) and Sumac Road (near Kununnah Bridge on the Arthur River).
- Revise the description of potential habitat for Marrawah skipper used in forest practices planning to include the additional vegetation types where the species has been found and emphasise key vegetation associations including Melaleuca ericifolia swamp forest, Eucalyptus brookeriana forest and Acacia melanoxylon swamp forest.
  - Current description:
    - Potential habitat for the Marrawah skipper is any vegetation type, including forest (native and plantation) and non-forest native and non-native types, with an understorey either dominated by Carex appressa or supporting Carex appressa in patches (as small as 20 square metres).
  - Proposed new description:
    - Potential habitat for the Marrawah skipper is any vegetation type, including forest (native and plantation) and non-forest native and non-native types, with an understorey either dominated by Carex appressa or supporting Carex appressa in patches (as small as 20 square metres). Key vegetation communities include (but are not limited to) Melaleuca ericifolia swamp forest, Eucalyptus brookeriana forest and Acacia melanoxylon swamp forest.

TFA management recommendations

- Request specialist surveys for Marrawah skipper for proposed FPPs that involve clearance and conversion of potential habitat within the revised potential range of the species with the aim to manage habitat supporting the foodplant Carex appressa within and around known colonies.
- Manage Marrawah skipper in FPPs for plantation and native forestry by managing the cover of the foodplant Carex appressa at the FPP level and where practical considering the cover and distribution of potential habitat in the broader landscape. Combine TFA Recommendation 7 (Within potential range; potential habitat present; native forest silviculture; habitat patchy), Recommendation 8 (Within potential range; potential habitat present; native forest silviculture; habitat extensive) and Recommendation 9 (Within potential range; potential habitat present; plantation establishment and management) into a single recommendation with the pathway ‘Within potential range; potential habitat present’, require the development of a management prescription for Carex appressa within the FPP area that protects 30% of the cover of potential habitat from fire, harvesting or other disturbances during the proposed operation and require that ‘The Forest Practices Authority must be contacted for advice’. The FPA will determine whether a specialist survey needs to be undertaken to determine the presence/absence of Marrawah skipper and to assess the adequacy of the proposed management of the foodplant.

Training

- The key to managing Marrawah skipper within the forest practices system is to correctly identify the presence of its foodplant Carex appressa and typical habitat within the species’ potential range during the FPP planning process. Ensure that forest planners and ecological consultants can identify Marrawah skipper potential habitat by continuing to provide specialist advice and practical training opportunities through the forest practices system. The discovery of Marrawah skipper near Wynyard recently is testament to the value of the FPA training program and the uptake of training opportunities by forest planners.

Monitoring

- Marrawah skipper has been found at a number of new locations during surveys for FPPs involving clearance and conversion for agricultural purposes. In several cases these ‘colonies’ have been protected as ‘set asides’ under certified FPPs. Under the Forest Practices Act 1985 ‘areas of trees reserved from harvesting’ are protected for the life of the FPP and become vulnerable land within the meaning of the Forest Practices Regulations 2017. Vulnerable land requires the preparation of a FPP for intended forest practices. In some cases, management actions for protection of Marrawah skipper (e.g. fencing for exclusion of stock from habitat) are included in the certified FPP. It is recommended that important and vulnerable sites for the species set aside under certified FPPs be regularly monitored by the FPA to ensure intended conservation outcomes for Marrawah skipper. Important and vulnerable sites include Redpa, Christmas Hills, Salmon River Road and Woolnorth ‘colonies’. It is also recommended that the
newly discovered site at Oldina Forest Reserve and the historic site on private land at Penguin be monitored and searches for Marrawah skipper conducted in the general area.
7 References

Bell, PJ 2002, ‘Survey of known sites and potential habitat for the Marrawah skipper in northwest Tasmania’ Report to the Threatened Species Unit, Department of Primary Industries, Water and Environment, Hobart


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TSSC (Threatened Species Scientific Committee) 2010, Conservation advice for Oreisplanus munionga larana, Department of Environment, Canberra.

TSSC (Threatened Species Scientific Committee) 2010, Listing advice for Oreisplanus munionga larana, Department of Environment, Canberra.
Appendix 1

8.1 Project Brief: Systematic survey of potential habitat within the potential range of Marrawah skipper Oreisplanus munionga larana

Background

The current potential range boundary for Marrawah skipper, as agreed by the FPA and DPIPW for the purposes of planning within the forest practices system, covers an extensive area in Tasmania. Marrawah skipper’s potential range extends from the far northwest of Tasmania, east as far as Penguin. The application of such a large potential range is the result of a precautionary approach in the absence of dedicated and systematic surveys for this species.

Marrawah skipper is listed as endangered under the Tasmanian Threatened Species Protection Act 1995 and as vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. The key foodplant for Marrawah skipper is tall sedge, Carex appressa and although this plant has a wide distribution in Tasmania, current data and information suggest the skipper’s range is limited to northwest Tasmania. Marrawah skipper was only known from the far northwest of Tasmania until it was discovered at a single location on a farm in the hinterland south of Penguin. A cursory examination of potential habitat in this area at the time failed to locate any additional populations, although the foodplant was present at many sites. This limited amount of survey evidence suggested that Marrawah skipper could have been inadvertently transported to this site from the far northwest, perhaps in hay or other farm produce.

For survey purposes the presence of Marrawah skipper can be identified by the characteristic adult butterfly, or outside the flying season, by the characteristic tube shaped shelters that are found only on the foodplant Carex appressa.

8.1.1.1 Research objectives

1. Determine the actual range and extent of potential habitat of Marrawah skipper in order to review and revise the range boundary and potential habitat description for this species.

8.1.1.2 Methods

This project will review the known records and locations of Marrawah skipper throughout its known range. This information will be used to develop a model of potential habitat and a systematic survey approach to confirm the presence/absence of this species within its current agreed potential range. Data will be collected from all Marrawah skipper-present sites to inform the development of a refined description of potential habitat.

Dedicated and systematic surveys for Marrawah skipper will target the current potential range between Stanley and Penguin along the northwest coast. There are no current or historic known locations for the species between these locations. Penguin extends the potential range of the skipper by over 100 km. Its presence at Penguin raises the possibility that Marrawah skipper may have been more widely distributed in coastal northwest Tasmania and eliminated in the wake of a history of extensive land clearing for agriculture. Dedicated surveys for Marrawah skipper in potential habitat between Marrawah and Penguin may reveal further remnant populations, and if so, proposed forestry operations between these localities would need to consider this species. Reasonable support for the absence of the species between these centres would alleviate the need to consider this species in forest planning in this area.

8.1.1.3 Personnel and governance:

- Governance: Dr Phil Bell will be the project leader with assistance from FPA ecologists where available. Phil has over 20 years’ experience in the conservation ecology and management of butterflies in Tasmania.

8.1.1.4 Budget:

This project is planned as a one off study to be conducted in 2017. FPA are providing FPA ecologist in-kind time for this study and funding will be sought to cover consultant (Phil Bell) time to manage the project, undertake field surveys and report on the findings. Three days are required for review of NVA database records, development of a crude habitat model and design of a systematic field survey method ($1500), 10 days are required for field survey ($5000) and 2 days for data analysis and preparation of a report ($1000). Ten days are required for travel ($2000) and vehicle ($1000). Total cost for the project is $10,500.

8.1.1.5 Progress:

This project will commence in mid-January to coincide with Marrawah skipper’s flying season.

8.1.1.6 Outputs:

- FPA will publish the results of this research in FPNews.
- The results may also be of interest to a wider audience and publication in a scientific journal may be sought