Re-evaluation of the Bitter-bush Blue butterfly (*Theclinesthes albocinctus*) and host plant Coast Bitter-bush (*Adriana quadripartita*)

Post 2024/2025 Drought Period

Photo: *Theclinesthes albocinctus*, credit Matt Endacott

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Summary

Surveys were conducted of the butterfly species, *Theclinesthes albocinctus* (Bitter-bush Blue butterfly), of the Adelaide region in the northern areas from Parham to the southern Fleurieu Peninsula, including Hindmarsh Island during November 2025. The aim of these surveys was to establish the impacts of a prolonged drought period during the warmer months of 2024/2025 on the butterfly and its larval host plant *Adriana quadripartita* (Coast Bitter-bush).

The survey found variable impacts on the larval host plants across the range with subsequent outcomes on population densities (Table1). Some northern sites were heavily impacted by the drought conditions, especially in areas where soil holds poor water retention qualities.

The survey included two translocation sites of the butterfly: Hackham Creek and the Mclaren Vale Coast to Vines Rail Trail, with the aim of establishing plant health during this time and form a better understanding of the drought impacts, to aid in future translocation efforts.

This survey failed to find evidence of the butterfly at six locations previously recorded as present; Webb Beach, Middle Beach, Thompson Beach, Biodiversity Park, Mutton Cove and Torrens Island and one suspected as present at Goolwa (Glatz et al. 2017; Stolarski 2022). The absence of six populations across the survey range is concerning as natural recolonisation of some sites is highly unlikely. These sites include Torrens Island, Mutton Cove, Biodiversity Park in the metropolitan areas and Lady Bay areas on the Fleurieu Peninsula.

The prolonged drought period of 2024/2025 was found to affect the Port Gawler and Mutton Cove *Adriana* stands most severely with occurrence of the highest plant deaths.

The Torrens Island and Biodiversity Park *Adriana* stands were severely affected by a species of longhorn beetle, presumed to be *Rhytiphora pulverulens*. The *Adriana* stems were severely affected, resulting in their death as the beetle's exit strategy caused the stems to break off near the base of the plant.

Population numbers were found to be directly linked with *Adriana* plant growth stages, health, and site densities.

The butterfly's egg and larval presence was observed on male plants with inflorescence and no evidence was detected on female plants.

Population numbers were found highest at sites where male *Adriana* inflorescences were present at various development stages and available for use for longer periods of time.

Table 1: *Survey sites and observations.*

Location	Observations
Parham and Port Gawler	The two sites are the stronghold of the butterfly colonies.
Parham and Light Beach	The sites continue to support the major *Adriana* stands along the northern coastline.
Thompson Beach (Herron Cresent)	Supports healthy *Adriana* stands however the presence of the butterfly was not observed.
Light Beach	Support extensive *Adriana* stands with additional planting undertaken. The butterfly was found present.
Middle Beach	Was found not to support *Adriana* stands and the butterfly is no longer present at this location.
Port Gawler	Heavily impacted by the drought conditions continues to support the butterfly in areas where *Adriana* stands are suitable for butterfly's use. Whilst large number of *Adriana* plants have died, the overall size of the *Adriana* stands guarantees the longer term survival of the butterfly at this site.
Torrens Island	The butterfly population was not observed and this is attributed to the state of *Adriana* plants, habitat and the effects of long horn beetles.
Biodiversity Park	Was found to support healthy *Adriana* stands both mature and recently planted. The butterfly was not observed during this survey.
Mutton Cove	The site was found highly affected by the drought condition with all *Adriana* plants found dead.
Hackham Creek	The sites found *Adriana* stands in healthy conditions with the Onkaparinga River

Location	Observations
	Recreational Park *Adriana* plantings growing well.
Coast to Vines Rail Trail	Site was found to support healthy *Adriana* stands.
Lady Bay	Sites were found to support *Adriana* in suitable conditions for the use by the butterfly and unaffected by the drought conditions. However, the species was not detected during this survey and this outcome is very concerning should this population have demised.
Newland Head Conservation Park	*Adriana* stands were found unaffected by the drought conditions with the presence of the butterfly being observed.
Goolwa (Willmett Road)	The site was found not to support the butterfly with only four 4 plants present unaffected by the drought condition. This site is deemed too small for sustain a butterfly population.
Hindmarsh Island	Was found to support the butterfly population in good numbers with the *Adriana* plants found unaffected by the drought conditions.

Introduction

The butterfly *Theclinesthes albocinctus* (Bitter-bush Blue butterfly (BBB)), has a patchy South Australian distribution where it is restricted to areas that support its larval host plant *Adriana spp.* The coastal distribution of the butterfly is restricted to areas where its exclusive larval host plant *Adriana quadripartita* (Coast-bitter bush) is present in adequate numbers for sustaining populations.

Twelve populations (within the survey), some disjunct and isolated are recorded in the areas spanning from Parham to Hindmarsh Island (Glatz et al. 2017; Stolarski 2022) and display high degree of population dynamics resulting from environmental conditions affecting its larval host plant.

The survey for the butterfly and its larval host plant was undertaken in these areas with the aim of the establishing the occurrence status of the species and its larval host plant

quality post the drought conditions during 2024/2025 at known population sites (Stolarski 2022).

Additionally, the survey included two previous translocation sites; Hackham Creek and Coast to Vines Rail Trail with the aim of establishing plant health during this time and form a better understanding of the drought impacts, to aid in future translocation efforts.

Survey methodology

Surveys of the butterfly were conducted by observing adults, searching for larval activity and/or eggs on plants (Fig. 1-4). Observations of the butterfly's life cycle stages and general population density assessment were recorded. Plants were noted for their overall appearance (Fig. 5-6).

Sites were visited during November 2025 to assess plant health and butterfly populations (Fig. 7).

Figure 1. *Theclinesthes albocinctus* upper side. (Photo: Matt Endacott)

Figure 2. *Theclinesthes albocinctus* under side. (Photo: Matt Endacott)

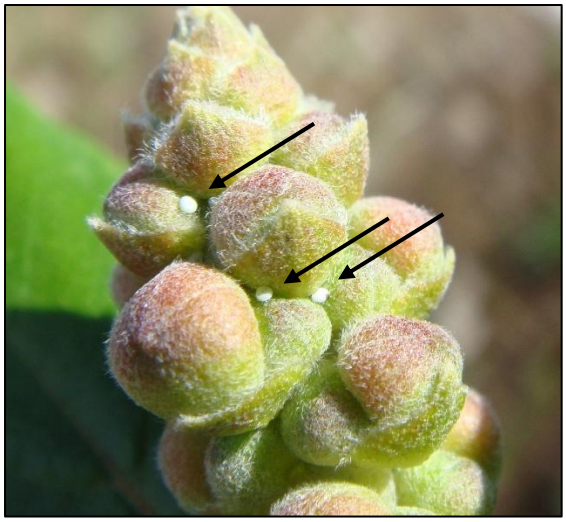

Figure 3. *Theclinesthes albocinctus* eggs.

Figure 4. *Theclinesthes albocinctus* larvae.

Figure 5. *Adriana quadripartita* healthy plant.

Figure 6. *Adriana quadripartita* poor plant health.

Bitter-bush Blue Butterfly Sites

Figure 7. Bitter-bush Blue butterfly Survey Sites.

Parham

Parham sites continue to support the most significant northern Adelaide plains BBB population predominantly on younger and/regrowth *Adriana* plants.

The effects of prolonged drought during the 2024/2025 summer period has not affected the quality of *Adriana* plants with the majority of larval host plants observed in good health displaying fresh growth and healthy male flower stalks (Fig. 8-9).

T. albocinctus was observed in three life cycle stages; adults, eggs and larvae in all areas containing *Adriana* plants around the township.

Population sizes fluctuate seasonally at Parham with survey results being variable, however during this survey the butterfly population is deemed as stable and in good numbers.

Figure 8. *Adriana quadripartita*, Parham.

Figure 9. *Adriana quadripartita*, Parham.

Webb Beach

Webb Beach, during previous surveys was found to support a small colony of butterflies on a number of isolated *Adriana* plants. This colony has been observed to fluctuate seasonally and subject to the quality of the larval host plants.

The use of younger plants has been observed during previous surveys at this site especially slashed plants growing on the sides of road within the township.

During some site visits no evidence of the butterfly was found and this survey failed to find the species. Regrowth plants, post roadside slashing, were found in good health however the mature *Adriana* stands were in poor health (Fig. 10-11).

Figure 10. Webb Beach, roadside site.

Figure 11. Webb Beach, mature plant stressed.

Thompson Beach

Thompson Beach has been recorded as supporting the butterfly (Glatz et al. 2017) on a small number of *Adriana* plants along road verges and empty housing blocks within the township (Fig. 12-13).

The survey found healthy *Adriana* plants as mature stands and post slashing regrowth plants on the roadside verges and housing blocks.

No evidence of the butterfly was found.

Figure 12. Roadside verge, Thompson Beach.

Figure 13. Housing block, Thompson Beach.

Light Beach

Light Beach sites continue to support the butterfly population on all growth stages *Adriana* plants.

The effects of prolonged drought during the 2024/2025 summer period have affected the quality of some *Adriana* plants, however due to the large distribution area of larval

host plants and associated variable soils, the majority of larval host plants were observed in good health, displaying fresh growth and healthy male flower stalks (Fig. 14). *T. albocinctus* was observed in two life cycle stages as eggs and larvae.

Recent *Adriana* plantings (in tree guards) were found to support the butterfly with larvae present. These additional plantings in open areas will aid in supporting this population (Fig. 15).

Figure 14. *Adriana* stands, Light Beach.

Figure 15. *Adriana* stands, Light Beach.

Middle Beach

Middle Beach was recorded as supporting a small colony of the butterfly (Glatz 2017), however this survey failed to find evidence of plants or the butterfly (Fig. 16).

Figure 16. Middle Beach historic *Adriana* site.

Port Gawler

Port Gawler is an extensive *Adriana quadripartita* site with a strong butterfly population over numerous surveys and visits (A. Stolarski *pers obs*.).

Adriana is found growing in shell grit and sandy areas with seed germination evident in this soil type during the 2021/2022 visits (A. Stolarski *pers. obs*.). These young plants will complement the senescing plants that were extremely stressed during 2016-2020 period when plants displayed poor health (A. Stolarski *pers. obs*.).

Stressed plants were found to have recovered following substantial rain events during 2021 that also triggered *Adriana* germination observed in December 2021. The December 2023 site visit observed healthy plant growth and a thriving butterfly population, including evidence of egg-laying and many juvenile larvae.

The prolonged drought period during 2024/2025 affected the *Adriana* stands substantially with many regrowth and mature plants dying due to lack of water (Fig. 17-18). Soil profile appears to have played an important role in water retention during this dry period with some *Adriana* plant stands surviving this dry period and sustaining the butterfly population.

This survey found the recovery of some plants; however the majority were either dead or in very poor health (Fig. 19-20).

The butterfly was observed as eggs and larvae in areas where *Adriana* was able to survive the drought period and has slightly recovered with last winter's (2025) rains.

As part of longer-term butterfly and plant recovery, a transect measuring 5 m x 50 m has been set up at the site to monitor outcomes (Table 1).

Figure 17. Port Gawler Site

Figure 18. Plant death, Port Gawler.

Figure 19. Plant recovery, Port Gawler.

Figure 20. Poor plant health, Port Gawler,

Table 2: *Port Gawler transect GPS locations.*

Latitude	Longitude
-34.64958	138.44537
-34.64962	138.44532
-34.64998	138.44567
-34.64999	138.44562

Mutton Cove

Mutton Cove area supported a small number of *Adriana* plants growing on a tidal mitigation levee bank in shell grit sandy soil.

The prolonged drought period during 2024/2025 affected these *Adriana* stands substantially with all plants dying due to lack of water. One regrowth plant was observed, and no evidence of the butterfly was found (Fig. 21-22).

Figure 21. Dead mature *Adriana* plant Mutton Cove.

Figure 22. Regrowth Adriana plant, Mutton Cove.

Biodiversity Park

Biodiversity Park has been recorded as supporting the butterfly (Glatz et al. 2017; M. Endacott, *pers. obs.* 2021).

Biodiversity Park contains a mixture of mature and newly planted *Adriana* plants. The recent plantings growing in the south-eastern corner of the park appear to be establishing well (Fig. 23-26).

The prolonged drought period during 2024/2025 appears not to have affected the mature *Adriana* stands, with the newly planted stands being watered.

No evidence of the butterfly was found during this survey.

Figure 23. Plant recovery, Biodiversity Park.

Figure 24. Mature plant health, Biodiversity Park.

Figure 25. New planting, Biodiversity Park.

Figure 26. Established new planting, Biodiversity Park.

Torrens Island

As noted in the BBB Action Plan (Glatz et al. 2017), this Torrens Island population was the last substantial population remaining along the Metropolitan coastline. The butterfly colony was assessed in April, October, December 2021 and again in March 2022 and found population numbers to be low.

Adriana plants are growing amongst scattered wattles (*Acacia spp.*) associated with Perennial veldt grass (*Ehrharta calycina*). The BBB Action Plan notes a level of threat to this colony;" most *of the plants are old and subject to heavy pressure from grass, and fire has a high chance of removing the entire Adriana patch*". During 2022 surveys the butterfly was not found present, and the habitat situation had not changed (Fig. 27-28).

Subsequently the plants are recovering with good regrowth (Fig. 29-30).

To further negatively compound the quality of larval host plants, an infestation of a longhorn beetle, presumed to be *Rhytiphora pulverulens* (Fig. 31-32) affected nearly all *Adriana* plants to the point of stem death that occurred to near base of plant. This outcome would have severely restricted the availability of larval food for successful population continuation.

The survey failed to find evidence of the butterfly.

Figure 27. Encroached *Adriana*, Torrens Island.

Figure 28. Encroached *Adriana*, Torrens Island.

Figure 29. Regrowth Adriana, Torrens Island.

Figure 30. Regrowth *Adriana*, Torrens Island

Figure 31. Beetle pupa, Torrens Island.

Figure 32. Emerged adult, Torrens Island.

Hackham Creek

Hackham Creek site supports a remnant stand of *Adriana quadripartita* plants comprising of 50+ young and old individuals. Being a small site, plants are restricted to soil type comprising of a limestone outcrop situated on a southern slope (Fig. 33).

Translocation of the butterfly using larvae from Parham and Port Gawler populations was undertaken during 2022, however the population failed to establish long-term.

The adjacent area directly west of this site located within Onkaparinga River Recreation Park was subject to additional *Adriana* planting for the provision of additional habitat in the area with the view of future translocations of the butterfly (Fig. 34).

The plants were found not to be affected by the prolonged drought conditions of 2024/2025. The butterfly was not detected during this survey.

Figure 33. Hackham Creek stands.

Figure 34. Onkaparinga River Recreational Park.

Coast to Vines Rail Trail

A disused railway line corridor refurbished into a walking/bike riding trail, known as Coast to Vines Rail Trail, supports approximately 150+ *Adriana quadripartita* plants. These plants comprise of remnant, naturally regenerating and planted stands growing along a 270 m stretch on both sides of the trail.

The site was subject of butterfly translocation using larvae from Parham and Port Gawler populations and was undertaken during 2022, however the population failed to establish long term.

The plants were found not to be affected by the prolonged drought conditions of 2024/2025. The butterfly was not detected during this survey (Fig. 35-36).

Figure 35. Trail with *Adriana* plants present.

Figure 36. Healthy well hydrated *Adriana* plants.

Lady Bay

The Lady Bay site, within the Normanville South Dunes system is the largest southern *Adriana* stand in the survey area with approximately 50 plants. Majority of *Adriana* plants are senescing with some dead due to age and vegetation encroachment being observed during the 2022 survey. Mature plants were found stalky in appearance with low green leaf matter and are displaying signs of water stress.

The butterfly has been recorded at this site with the last survey indicating its presence in low numbers in 2022.

Additional plantings have been undertaken at site to improve the habitat quality and the removal of some encroaching vegetation onto *Adriana* stands had been undertaken (Fig. 37-39).

Recent *Adriana* plantings located along the Main South Road roadside revegetation strip near the corner of Lady Bay Road have attained maturity. These were found to support the butterfly during the 2022 survey (Fig. 40).

This survey found that the prolonged drought conditions during 2024/2025 did not further negatively affect plant health as majority of plants have been surviving in poor health for a number of years. The evidence of the butterfly in the Lady Bay area was not found.

Figure 37. New *Adriana* plants, Lady Bay.

Figure 38. Mature *Adriana*, Lady Bay.

Figure 39. *Adriana* plants, Lady Bay.

Figure 40. Roadside *Adriana*, Lady Bay.

Newland Head Conservation Park

Newland Head Conservation Park is known to support the butterfly population and this survey found evidence of the butterfly in three life cycle stages: adults, eggs and larvae.

This survey found that the prolonged drought conditions during 2024/2025 did not adversely affect plant health (Fig. 41-42) and the population is deemed stable with good numbers of the butterfly present in various stages of the life cycle.

Figure 41. Healthy plants, Newland Head CP.

Figure 42. Healthy Male *Adriana,* Newland head CP.

Goolwa

Goolwa (Willmett Road) was suspected to support the butterfly (Glatz et al. 2017) with a small number of plants present (Fig. 43-44).

The survey found four plants at site unaffected by the drought conditions of 2024/2025, however no evidence of the butterfly was found.

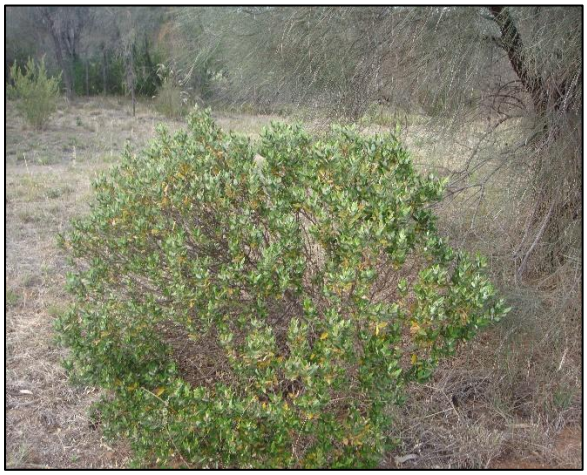

Figure 43. Willmett Terrace, Goolwa.

Figure 44. Willmett Terrace, Goolwa.

Hindmarsh Island

The butterfly has been recorded from Hindmarsh Island (Glatz et al. 2017) along the main road verges (Randell Road) that traverses the Island east west.

This survey found that the prolonged drought conditions during 2024/2025 did not adversely affect the mature *Adriana* plant health and the population is deemed stable with good numbers of the butterfly found present in various stages of the life cycle as eggs and larvae (Fig. 44-45).

Figure 44. *Adriana* plants, Hindmarsh Island.

Figure 45. *Adriana* plants, Hindmarsh Island.

Discussion

The survey found the presence of the butterfly at five sites; Parham, Light Beach, Port Gawler, Newland Head Conservation Park (CP) and Hindmarsh Island.
Failure to find evidence of the butterfly is noted at six locations previously recorded as present at Webb Beach, Middle Beach, Thompson Beach, Biodiversity Park, Mutton Cove and Torrens Island and one suspected as present at Goolwa (Glatz et al. 2017, Stolarski 2022). This outcome may be attributed to the drought conditions affecting the quality of the larval host plants; however, it is highly likely that low population numbers at sites over longer periods of time have naturally collapsed with the additional negative environmental conditions and the reduction of habitat quality.

The butterfly population collapse at Middle Beach is directly linked to the demise of *Adriana* plants.

Webb Beach butterfly population is variable and the lack of presence during this survey is directly linked with the poor plant health. Recolonisation at this site is highly likely from the Parham population should plant health recover.

Thompson Beach butterfly population was not observed although plants were found in good health and densities for sustaining the butterfly. The reasons for the population demise may be attributed to a natural collapse.

Biodiversity Park and Mutton Cove populations were found in low numbers over a period of time. The use of these two sites was periodic and highly likely the result of temporary adult dispersion from the much larger population at Torrens Island during favourable years.

Torrens Island noted as the last substantial metropolitan Bitter-bush Blue butterfly populations have been steadily declining since the surveys undertaken by Glatz in 2017. This result was not unexpected as the habitat and the availability of suitable larval host plants has been in decline. It is likely that low population numbers and additional negative environmental impacts contributed to the demise of this population.

The Lady Bay butterfly population was not found during this survey, and this is not unexpected as the site supported a low population for a number of years. The plant health and associated poor habitat quality has contributed to the demise of this population. The additional works undertaken at the site through the provision of additional *Adriana* plants and the removal of encroaching vegetation onto larval host plants may have been too late for aiding the survival of this population.

The butterfly's absence at Goolwa is unsurprising, as Glatz only suspected its presence and there are just six plants recorded.

These results highlight how isolated butterfly populations are at risk, especially in their restricted habitats, if adverse environmental changes impact both their larval host plants and the butterflies themselves.

The reduction in habitat quality through the incursion or encroachment of vegetation into or around *Adriana* plants adversely affects the ability for their use by the butterfly.

Going forward, it is essential to prioritise the health, distribution, and density of *Adriana* plants, as these factors have been clearly shown to support robust butterfly populations at sites with significant *Adriana* presence. These sites were found to be resilient top negative environmental conditions with the butterfly populations being able to survive.

It is recommended that sites reported as not sustaining populations be resurveyed in 12 months to confirm the current status.

References

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Appendix 1.

Table 3: *Sites supporting Theclinesthes albocinctus, general GPS locations.*

Location	Latitude	Longitude
Parham	-34.42713	138.26037
Parham	-34.42976	138.26156
Parham	-34.43097	138.26074
Light Beach	-34.53551	138.34845
Light Beach	-34.53897	138.34792
Port Gawler	-34.64958	138.44537
Hindmarsh Island	-35.51055	138.82398
Newland Head CP	-35.62658	138.49812

Table 4: *Sites **not** supporting Theclinesthes albocinctus, general GPS locations.*

Location	Latitude	Longitude
Webb Beach	-34.44336	138.26250
Thompson Beach	-34.49180	138.29235
Middle Beach	-34.60230	138.41343
Mutton Cove	-34.77148	138.51319
Biodiversity Park	-34.78085	138.50102
Torrens Island	-34.79643	138.52165
Hackham Creek	-35.16428	138.50126
Onkaparinga River Recreational Park	-35.16441	138.50075
Vine Rail Trail	-35.20992	138.52265
Lady Bay	-35.47218	138.29095
Lady Bay roadside	-35.47244	138.29379
Goolwa	-35.50695	138.77398