

A 2024 survey of Slender-billed (Samphire) Thornbill *Acanthiza iredalei rosinae* in Gulf St. Vincent

Sam Gordon, December 2024



Figure 1. Slender-billed (Samphire) Thornbill *Acanthiza iredalei rosinae* at Wills Creek Conservation Park, 4th October 2024.

Acknowledgements

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Introduction

The Slender-billed Thornbill *Acanthiza iredalei* is a small species of insectivorous bird found across southern Australia, consisting of three subspecies inhabiting different types of low shrubland. The subspecies *A. i. rosinae* – sometimes called the Samphire Thornbill – is restricted to coastal samphire saltmarsh around South Australia’s upper Gulf St. Vincent, particularly in areas of extensive dense Shrubby Samphire *Tecticornia arbuscula*, upon which it relies almost exclusively for nesting. Due to this taxon’s limited distribution, it is at continued risk of habitat loss as a result of land use changes and sea level rise, and is listed as Vulnerable both at a state level within South Australia under the National Parks and Wildlife Act 1972 (DEW 2023), and federally under the EPBC Act 1999 (DCCEEW 2024).

The Slender-billed (Samphire) Thornbill *A. i. rosinae* (hereafter referred to simply as *rosinae*) has been the focus of some survey effort in the Gulf St. Vincent over the past decade, particularly after the recognition of extensive dieback of *Tecticornia arbuscula* around the Light River area by Carpenter (2015), and the potential for further *Tecticornia* dieback to impact *rosinae* populations. These concerns were reinforced by an assessment of *Tecticornia arbuscula* in the eastern Gulf St. Vincent by Coleman et al. (2017), which identified more widespread dieback of the species and changes in saltmarsh composition in the region, further highlighting the threat to *rosinae* given *Tecticornia*’s critical role in providing habitat for nesting and foraging, as well as shelter and a perching substrate. Further assessments of *rosinae* populations in the following years (Carpenter 2018, Carpenter et al. 2020) found no immediately obvious impact on *rosinae* populations, with the subspecies still continuing to nest in traditional areas including those heavily affected by dieback (albeit at times with more exposed nests), and no evidence of movement into adjacent habitats to breed. Additionally an apparent end to the large-scale *Tecticornia* dieback event of 2015-16 was noted, and an infestation of borers was identified as a likely primary cause of dieback (Carpenter et al. 2018, Carpenter et al. 2020).

In 2020, the first systematic range-wide survey of *rosinae* was undertaken, covering 101 sites spread across the entire range of the subspecies (Allan 2020) – from Barker Inlet in the southeast, up around the top of Gulf St. Vincent, and down to Price in the southwest. This approach, with the intention of forming an up-to-date baseline dataset for potential future monitoring, with powerful potential to detect changes in population, has not yet been revisited, and no formal *rosinae* surveys were conducted for the next four years.

This report details a survey conducted in spring 2024 across a number of previously surveyed sites in the upper Gulf St. Vincent, with the aim of assessing *rosinae* populations to detect any obvious changes in breeding trends, and in habitat condition and/or use by *rosinae*.

Methods

Field surveys were conducted from late August to early October 2024, across 12 locations in the upper Gulf St. Vincent (**Table 1, Figure 2**). Survey locations were largely selected based on previous *A. i. rosinae* records, particularly those from recent surveys (**Carpenter 2015 & 2018, Carpenter et al. 2020, Allan 2020**).

Location	2014	2018	2019	2020	Location	2014	2018	2019	2020
Torrens Island	x			x	Baker Creek	x		x	x
St. Kilda	x			x	Bald Hill Beach			x	x
Buckland Park	x		x	x	Port Wakefield				x
Port Gawler CP	x		x	x	Clinton CP		x	x	x
Middle Beach	x	x	x	x	Wills Creek CP				x
Lower Light			x	x	Price Saltfields				x

Table 1. Locations surveyed in spring 2024 for *rosinae*, with the years each location was previously surveyed marked by an x.

Sites within each location were broadly defined, and typically chosen by following extensive dense *Tecticornia arbuscula* and other similar vegetation. Due to a high level of variation in topography, hydrology, and extent of vegetation between sites, it is difficult to standardise surveys for *rosinae* while also covering a meaningful amount of habitat, and a repeat of systematic range-wide surveys as per **Allan (2020)** was beyond the scope of this project given the extensive survey effort required. As a result, sites were surveyed by one observer (the author) meandering on foot through suitable habitat, listening and watching for birds (including individuals flushed from shrubs), and actively looking for nests – an approach consistent with that of **Carpenter (2015 & 2018)** and **Carpenter et al. (2020)**.

Upon detection of *rosinae*, birds were observed from a distance to determine any potential presence of nests or young, and the locations and numbers of all detected birds and nests were recorded via GPS along with any behaviour related to breeding or otherwise of note. Any detected nests were briefly investigated to determine the presence of eggs and/or nestlings. The extent of *Tecticornia* dieback around nests was also broadly estimated, and photos were taken of each nest as well as the surrounding habitat. All other bird species detected in and around each site were also recorded.

Due to the brittle nature of *Tecticornia arbuscula* and other samphire species, access through samphire saltmarsh was restricted and altogether avoided where possible to reduce physical damage to vegetation, though the nature of some sites meant that careful navigation through *Tecticornia* and other samphire species was occasionally unavoidable. Each site was, however, only visited once during the survey period, minimising any potential disturbance. Surveys were conducted from early morning (typically commencing shortly after dawn), and in most cases continued into the early afternoon, though this was dependent on weather conditions – strong winds and significant rain were deemed likely to negatively impact the detection of birds, and were therefore avoided. Considerations were also given to tidal levels, as access to a number of areas can be significantly limited by high water levels in tidal channels.



Figure 2. Map showing 2020 baseline records (red) of *rosinae* across its entire distribution in the upper Gulf St. Vincent, overlaid with 2024 records (green) from this survey.

Results

From late August to early October, 11 days were spent surveying 19 sites across 12 locations in the upper Gulf St. Vincent (**Figure 2**). In total, 620 *A. i. rosinae* individuals were recorded over the entire survey period including 61 fledged young (**Table 2**), and eight active nests were recorded in late August and early September (**Table 3**).

Of the 19 sites surveyed, *rosinae* were detected at all but two – these being *PG1* (Port Gawler) and *MB2* (Middle Beach) (**Table 2**). Sites with the highest numbers of *rosinae* detected were *MB3* (Middle Beach) with 26 records comprising 100 individuals, and *LL* (Lower Light) with 27 records comprising 93 individuals. In addition to surveyed sites, an opportune record of a *rosinae* pair was made while investigating potential habitat by vehicle at Macs Beach, just south of Price Saltfields (**Appendix A, Figure 12**).

Location	Site	Date	Records	Individuals	Fledged young	Nests	Other breeding evidence
Torrens Island	TI1	29/08/24	4	7		1	
	TI2		3	7			
St Kilda	SK	05/09/24	8	18	4		carrying nesting material
Buckland Park	BP	07/10/24	12	39			carrying nesting material
Port Gawler CP	PG1	02/09/24	none	33		3	carrying food
	PG2		12				
Middle Beach	MB1	12/09/24	9	23	3	1	more young heard
	MB2	26/09/24	none	100	13		
	MB3		26				
Lower Light	LL	02/10/24	27	93	10		more young heard
Baker Creek	BC	10/09/24	18	50		3	courtship chasing, young heard
Bald Hill Beach	BH1	30/09/24	9	31	6		
	BH2		6	33	10		
Port Wakefield	PW		7	23	5		
Clinton CP	CL1	04/10/24	20	72	4		more young heard
	CL2		2	4	young heard		
Wills Creek CP	WC		5	12	2		more young heard
Price Saltfields	PR1	27/09/24	22	61	4		more young heard
	PR2		5	14	carrying food		
Total			195	620	61	8	

Table 2. Sites surveyed for *rosinae* in spring 2024, with numbers of all birds and nests recorded at each site.

Location	Site	Date	Stage	Plant species	Height (cm)	Direction	Dieback (%)
Torrens Island	TI1	29/08/24	3 eggs	<i>T. arbuscula</i>	40	NE	30
Port Gawler CP	PG2	02/09/24	building	<i>M. oppositifolia</i>	35	ENE	30
			3 eggs	<i>M. oppositifolia</i>	50	E	40
			2 hatchlings & 1 egg	<i>M. oppositifolia</i>	50	E	20-40
Middle Beach	MB1	12/09/24	complete, no eggs	<i>T. arbuscula</i>	55	E	20-40
Baker Creek	BC	10/09/24	building	<i>T. arbuscula</i>	40	N	30
			building	<i>T. arbuscula</i>	40	E	20-60
			2+ nestlings	<i>T. arbuscula</i>	50	SW	40

Table 3. Details of nests of *rosinae* found in spring 2024, including nesting stage, plant species, height and direction of nest, and estimated percentage of dieback in the plant and the surrounding area.

The size of *rosinae* groups varied from single birds up to a group of at least 13, with just over half of all records consisting of a pair. Breeding activity (including nests, fledged young, and indicative behaviour such as carrying nesting material or food) was observed at all sites where *rosinae* was detected with the exception of *TT2* (Torrens Island), where only adult birds were recorded.

Eight active nests were detected across four locations: one at Torrens Island, three at Port Gawler, one at Middle Beach, and three at Baker Creek (**Table 3**). Nests were only found between 29th August and 12th September, with no nests found over the six survey days between 26th September and 7th October. Nests were dome-shaped, consisting primarily of seagrasses and twigs, decorated with white spider egg sacs and lined with feathers. Five nests were constructed in relatively large *Tecticornia arbuscula* shrubs (**Figure 3**), while all three nests found at Port Gawler CP were in Heathy Bluebush *Maireana oppositifolia* (**Figure 4**), forming dense shrubs with a similar structure to that of *T. arbuscula* shrubs in which *rosinae* nests have typically been recorded (**Carpenter 2018, Carpenter et al. 2020**). One such nest at Port Gawler was still under construction, with a pair adding materials being raided from an old nest from a previous year, located in a *T. arbuscula* shrub around 15m away from the new nest.



Figure 3. Recently constructed *rosinae* nest (left) in *Tecticornia arbuscula* (right) at Middle Beach, 12th September 2024. While this shrub is only showing an estimated 15% dieback, the immediate surrounding area was scored as 20-40% dieback.

Fledged young were recorded at ten sites from 12th September onwards, with 61 individuals ranging from fresh fledglings to older dependent juveniles comprising nearly 10% of all recorded *rosinae* individuals over the survey period (**Figure 5**). Young *rosinae* were also heard (identified by distinctive squeaks) at a number of additional points, but in the cases where the observer was unable to locate young to differentiate between nestlings and fledglings, young were not counted and a note was simply added to the associated record of adult birds.



Figure 4. *Maireana oppositifolia* shrub intertwined with *T. arbuscula* (left) containing a *rosinae* nest, and a second nest with three eggs (center) in *M. oppositifolia* (right), Port Gawler Conservation Park, 2nd September 2024.



Figure 5. Recently fledged juvenile *rosinae* at Price Saltfields, 27th September 2024 (left), and older juveniles at Bald Hill Beach, 30th September 2024 (centre) and Lower Light, 2nd October 2024 (right). On multiple occasions during this survey, young birds were recorded sheltering in dune vegetation for extended periods of time.

Estimated percentage of *Tecticornia arbuscula* dieback varied widely across sites, ranging from around 10% at some sites up to 90% at CL2 (Clinton). Habitat descriptions of all 19 sites surveyed are as follows:

Torrens Island

T11: Mixed samphire saltmarsh with *T. arbuscula* in dense patches along tidal channels; mangroves around edges. 20-30% dieback.

T12: Extensive samphire saltmarsh; scattered mangroves throughout and around edges; mixed samphire with *T. arbuscula* along tidal channels. <20% dieback.

St Kilda

Extensive large *T. arbuscula* in excellent condition around tidal channels, mixed with other dense samphires, grading into lower samphire saltmarsh with *Maireana* spp.; lined with mangroves and drier shrubland over dunes and shellgrit ridges. <20% dieback.

Buckland Park

Mixed samphire saltmarsh directly adjacent to Port Gawler CP with areas of decent *T. arbuscula* along tidal channels; with areas of dune and shellgrit shrubland; lined with mangroves and levee banks. Additional habitat to southeast not surveyed. 20-40% dieback.

Port Gawler Conservation Park

PG1 (*rosinae* not detected): Strip of low samphire and mudflats between mangroves and mixed shrubland; very little *T. arbuscula*, marginal habitat surveyed briefly due to old records.

PG2: Mixed samphire saltmarsh with decent *T. arbuscula* along tidal channels, grading in north into mixed samphire saltmarsh and drier shrubland; lined with mangroves. 20-60% dieback.

Middle Beach

MB1: Extensive *T. arbuscula* along drainage lines and around mudflats and ephemeral ponds, grading into mixed samphire saltmarsh and other shrubland; mangroves along main creek to south. 20-40% dieback.

MB2 (*rosinae* not detected): Strip of dense *T. arbuscula* and other samphire between shacks/shrubland and mangroves. <20% dieback.

MB3: Extensive *T. arbuscula* along drainage lines and around mudflats and ephemeral ponds, grading into mixed samphire saltmarsh and other shrubland; lined with mangroves and dune shrubland. Habitat extends much further northwest, across Light River and to Lower Light. <20% dieback.

Lower Light

Extensive lush *T. arbuscula* and other samphire saltmarsh along tidal channels and over flats, with dune shrubland and mangroves. Habitat extends much further southeast than area surveyed, across Light River and to Middle Beach. 10-40% dieback.

Baker Creek

Extensive lush *T. arbuscula* along drainage lines and creek, grading gently into lower samphires; lots of excellent habitat close to creek, some patches further away. 10-70% dieback.

Bald Hill Beach

BH1: Areas of tall, dense *T. arbuscula* interspersed with lower, sparser *T. arbuscula* and other samphires over tidal flats. 10-60% dieback.

BH2: *T. arbuscula* varying in size and density with patches of other samphire over tidal flats. Habitat extends much further to east than area surveyed. 10-30% dieback.

Port Wakefield

Mixed samphire saltmarsh with *T. arbuscula* in dense patches along tidal channels; lined with shrubland and mangroves. Habitat extends much further southeast than area surveyed; additional extensive habitat west of township not surveyed. 20-60% dieback.

Clinton Conservation Park

CL1: Extensive area of tidal channels, flats and ponds with large amounts of *T. arbuscula* and other samphires. 20-60% dieback.

CL2: Tidal saltmarsh area with extensive *T. arbuscula*; very high levels of dieback in some areas. Additional habitat extends along much of coast between Clinton township and top of gulf. 20-90% dieback.

Wills Creek Conservation Park

Small roadside area of extensive *T. arbuscula* along tidal channels and flats, continuing south towards Price Saltfields, where very extensive habitat can be seen northeast of ponds. 20-60% dieback.

Price Saltfields

PR1: Extensive *T. arbuscula* up to 2m and very dense in areas; lined with dune shrubland and mangroves near salt ponds. 10-50% dieback.

PR2: Dense and all *T. arbuscula* lined with dune shrubland and mangroves near salt ponds. 10-30% dieback.



Figure 6. *Tecticornia arbuscula* habitat showing an impressive variety of colours at Bald Hill Beach, 30th September 2024.

In addition to Slender-billed (Samphire) Thornbill *Acanthiza iredalei rosinae*, 72 other bird species were recorded within the 19 surveyed sites, and an additional 29 species were recorded in nearby areas outside sites during surveys. Those most often encountered in and directly associated with *rosinae* habitat were Superb Fairywren *Malurus cyaneus* (14 sites), Spotted Scrubwren *Sericornis maculatus* (16 sites), Inland Thornbill *Acanthiza apicalis* (12 sites), White-fronted Chat *Epthianura albifrons* (17 sites), Singing Honeyeater *Gavicalis virescens* (all 19 sites), Grey Fantail *Rhipidura albiscapa* (12 sites), and Welcome Swallow *Hirundo neoxena* (13 sites).

Other noteworthy records include three Eastern Curlew *Numenius madagascariensis* at Torrens Island (29th August) and one more at Port Gawler (2nd September), five individual White-bellied Sea Eagle *Ichthyophaga leucogaster* across four locations, a Black Falcon *Falco subniger* over Middle Beach (26th September), several Shining Bronze Cuckoo *Chalcites lucidus* in mangroves at Price Saltfields (27th September), and a small flock of Budgerigar *Melopsittacus undulatus* flying over Buckland Park (7th October). Additionally, an estimated 500 Little Pied Cormorant *Microcarbo melanoleucos* and 80 Great Egret *Ardea alba* were observed flushing from a mangrove roost along Baker Creek (10th September). A full list of recorded bird species for each site is included in **Appendix B (Table 4)**.

Discussion

With nearly 200 records of *A. i. rosinae* representing over 600 individuals, the data collected throughout this survey may be helpful for better understanding population density and distribution of this taxon at different sites across its range, as well as gaining better knowledge around nesting preferences and breeding success. It should be noted that numbers were estimated conservatively, and more birds were likely present at many points than directly counted, especially in larger groups where fledglings were present and behaving cryptically. Similarly, it was not always possible to determine the maturity (i.e. adult or juvenile) of all birds in each group, so individuals were only counted as young (including recently fledged birds and older juveniles) upon confirmation to avoid over-representing breeding success.

New records of *rosinae* southeast of 2020 Torrens Island records (**Figure 8**) and south of 2020 Macs Beach records (**Figure 12**) appear to now represent the southernmost plausible records of this taxon on either side of Gulf St. Vincent.

During this survey period, a number of *rosinae* groups were recorded in what may be considered atypical habitat. **Carpenter et al. (2020)** documented use of sites dominated by *M. oppositifolia* and *Atriplex paludosa* with scattered *T. arbuscula*, as well as some consisting largely of low samphire saltmarsh. In addition to some records closely matching these habitat types at Port Gawler and Bald Hill Beach, this survey also located a number of *rosinae* groups foraging in drier dune shrubland and adjacent habitat types away from saltmarsh. Multiple records from late September and early October at Middle Beach, Lower Light, and Price Saltfields consisted of mid-sized groups – in most cases, seemingly one or two pairs with fledglings and/or older juveniles – in these habitat types, with young often sheltering in dune vegetation for extended periods of time (**Figure 5**). These cases appear to represent early stages of dispersal away from nesting sites in search of additional food resources and shelter for fledglings.

While recent surveys targeting nesting birds (**Carpenter 2018, Carpenter et al. 2020**) have only found *rosinae* nests in Shrubby Samphire *Tecticornia arbuscula*, the discovery of three active nests in Heathy Bluebush *Maireana oppositifolia* at Port Gawler is of interest. The dense shrubby structure of *M. oppositifolia* at this site is notably similar to that of *T. arbuscula*, so it may be reasonable to assume it provides an equivalent function in terms of shelter for nests, and habitat for foraging. Considering the condition of *T. arbuscula* at Port Gawler during this survey was not recognised to have obviously declined since 2019, it is unclear whether these records represent a responsive shift in breeding habitat, or simply some flexibility in nesting preferences – **Matthew (1994 & 2002)** does mention this species as a potential nesting choice for *rosinae*. Another survey with a greater focus on nests at Port Gawler and/or other key locations in the near future may be valuable for determining whether *rosinae* nesting behaviour is indeed shifting to any extent. Overall, no obvious degradation of sites due to dieback since 2019 surveys was observed, but given the potential vulnerability of this subspecies to rapid changes in coastal environments, monitoring of *rosinae* sites should continue in future years where logistically possible.

Given the relatively opportunistic nature of this survey and lack of built-in repeatability, it is difficult to make any meaningful inferences on overall population trends. Up-to-date population data is, however, vital for the ongoing conservation of a threatened taxon such as *A. i. rosinae*, and management should strongly consider prioritising a more comprehensive and systematic approach to better inform conservation practices in the near future. Fortunately, the core framework for a range-wide monitoring program of this nature has already been designed by **Allan (2020)**, and the approach of the five year mark (August to December 2025) since baseline data was collected may provide a neat opportunity to revisit this approach. **Coleman & Coleman (2024)** also specifically stated in their recovery plan for *T. arbuscula* that annual monitoring of *rosinae* should be undertaken at sites in eastern Gulf St. Vincent where revegetation works have been conducted, a recommendation that this author echoes.



Figure 7. A territorial Slender-billed (Samphire) Thornbill *A. i. rosinae*, Wills Creek Conservation Park, 4th October 2024.

References

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Appendix A – maps of survey sites

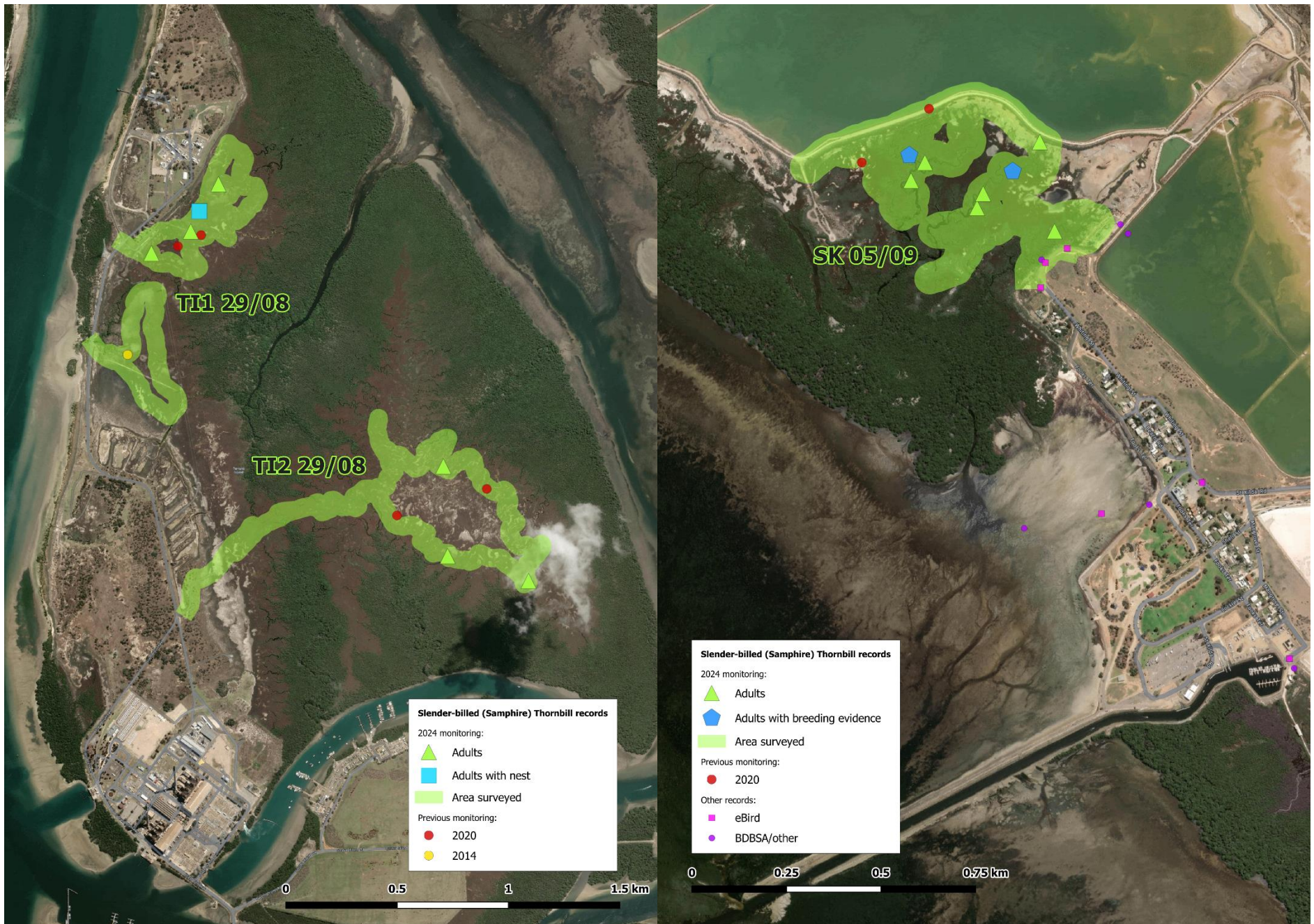


Figure 8. Maps showing sites surveyed for *rosinae* in spring 2024 at Torrens Island (left) and St. Kilda (right), with surveyed areas shaded green, and 2024 records in green and blue. Points towards the southeast of Torrens Island (left) represent the now southernmost plausible records of this subspecies in the eastern Gulf St. Vincent.

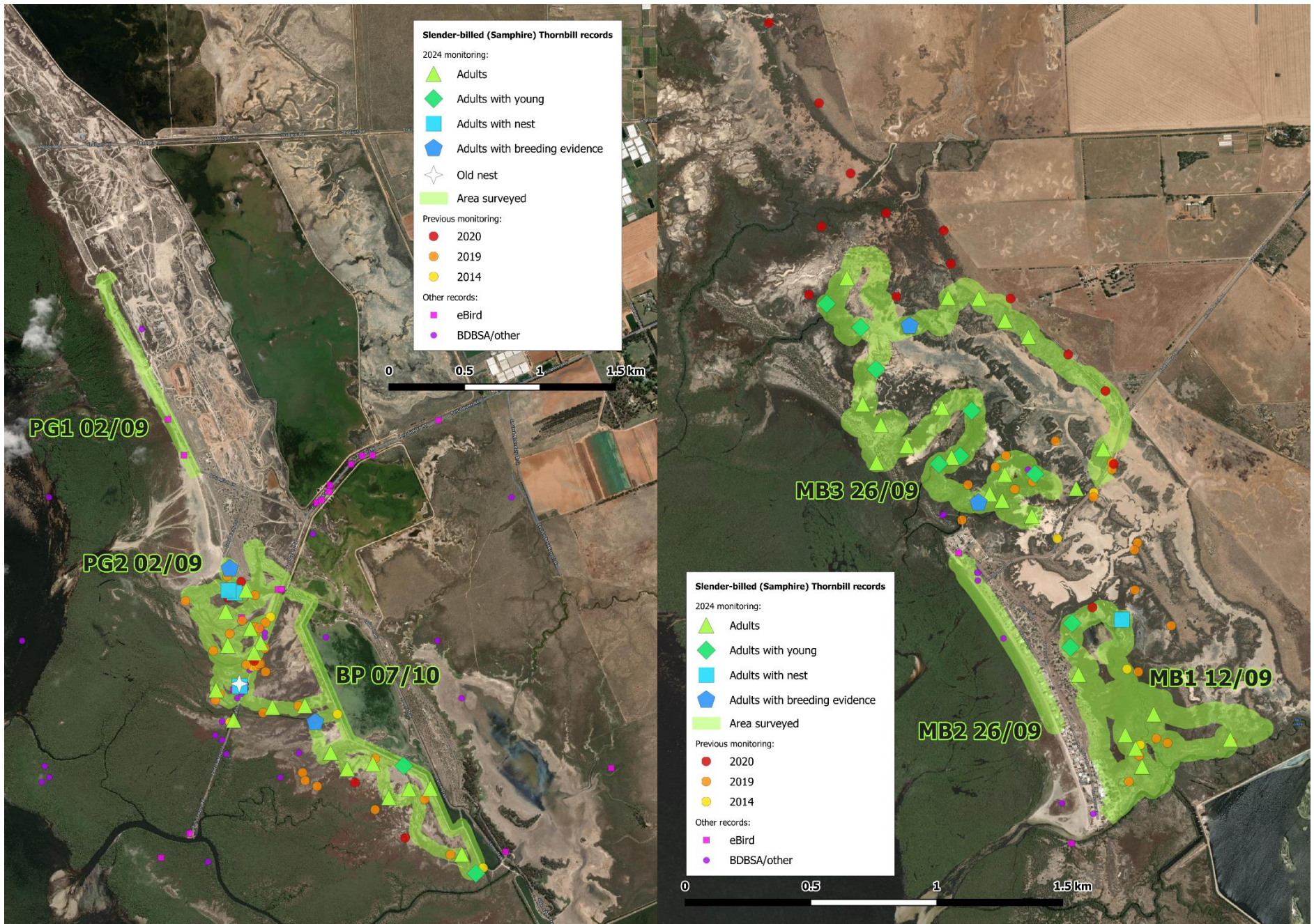


Figure 9. Maps showing sites surveyed for *rosinae* in spring 2024 at Port Gawler Conservation Park and Buckland Park (left), and Middle Beach (right), with surveyed areas shaded green, and 2024 records in green and blue.

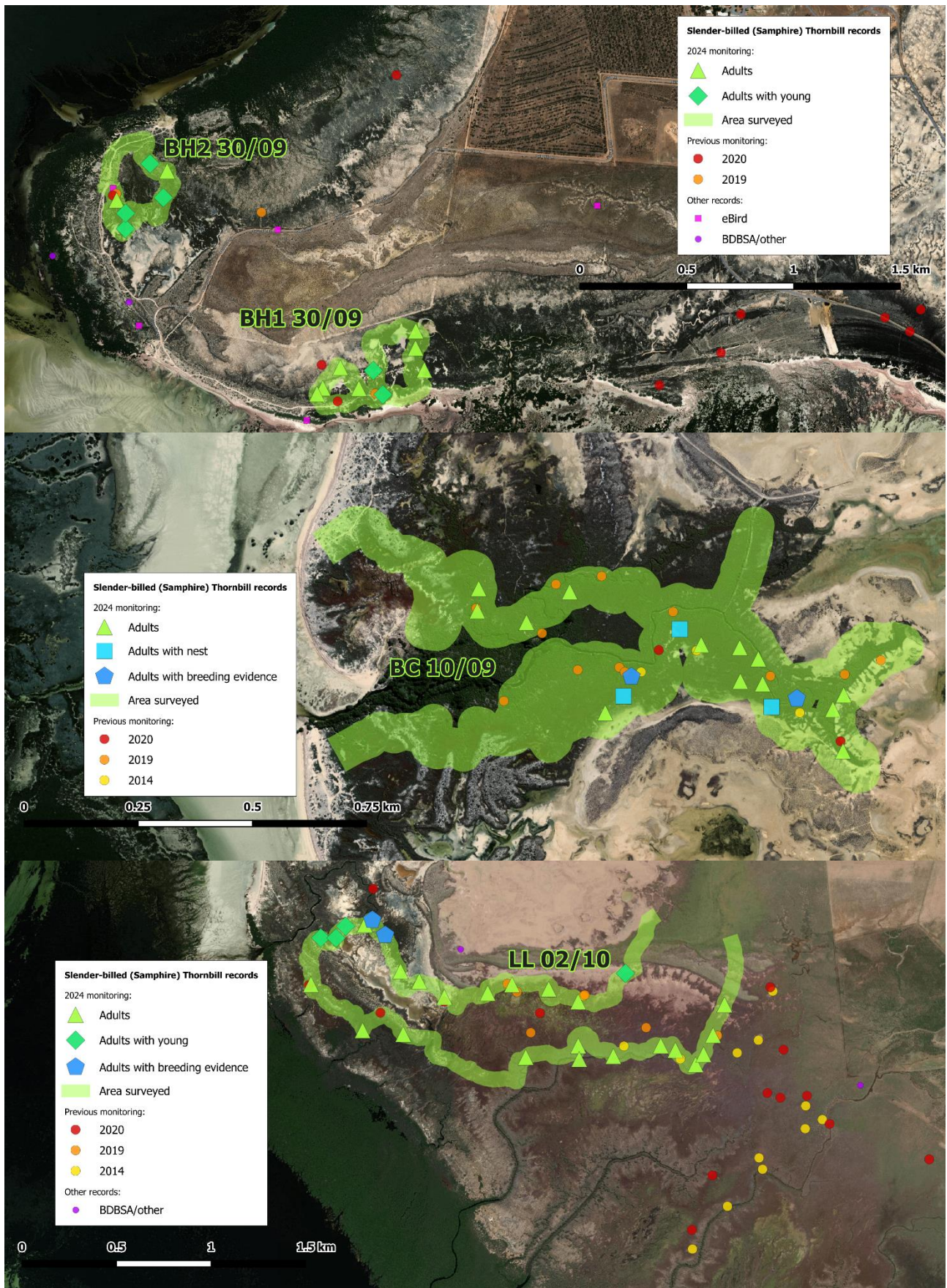


Figure 10. Maps showing sites surveyed for *rosinae* in spring 2024 at Bald Hill Beach (top), Baker Creek (centre), and Lower Light (bottom), with surveyed areas shaded green, and 2024 records in green and blue.

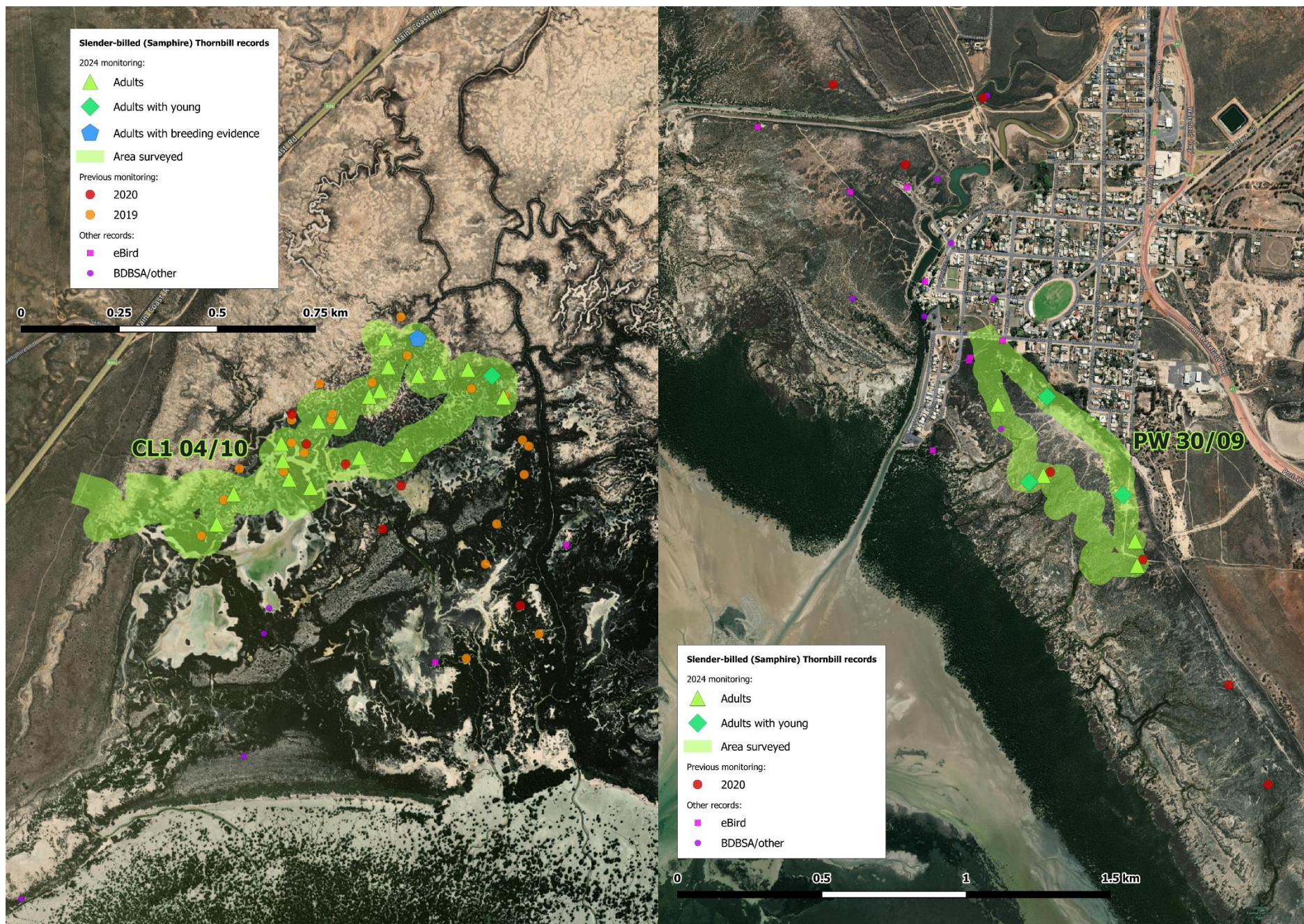


Figure 11. Maps showing sites surveyed for *rosinae* in spring 2024 at Clinton Conservation Park north (left) and Port Wakefield (right), with surveyed areas shaded green, and 2024 records in green and blue.

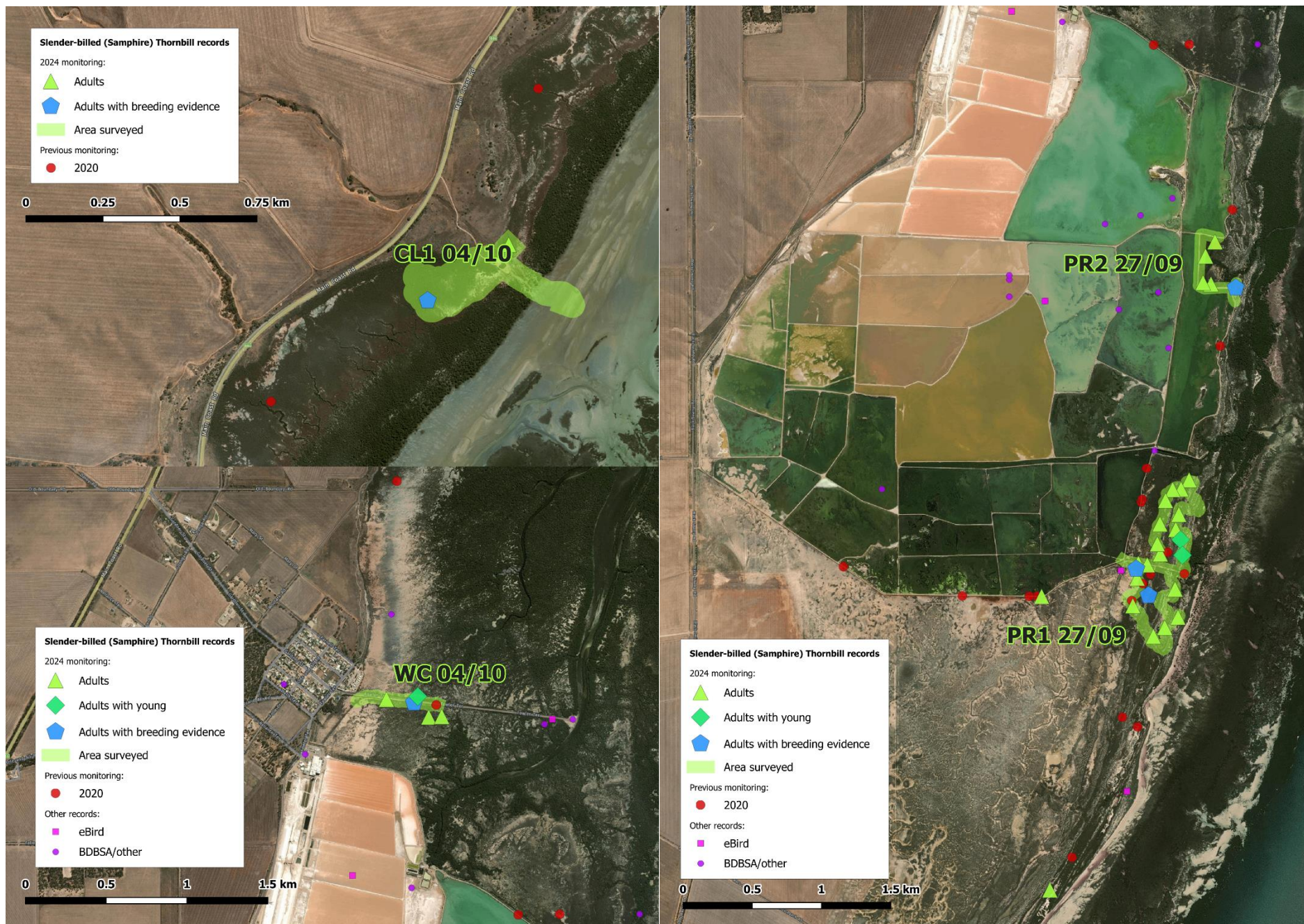


Figure 12. Maps showing sites surveyed for *rosinae* in spring 2024 at Clinton Conservation Park west (top left), Wills Creek Conservation Park (bottom left), and Price Saltfields (right), with surveyed areas shaded green, and 2024 records in green and blue. The green point at bottom right represents the southernmost plausible record of this subspecies on the Yorke Peninsula.

Appendix B – all bird species data

species	TI1	TI2	SK	BP	PG1	PG2	MB1	MB2	MB3	LL	BC	BH1	BH2	PW	CL1	CL2	WC	PR1	PR2	#	species	TI1	TI2	SK	BP	PG1	PG2	MB1	MB2	MB3	LL	BC	BH1	BH2	PW	CL1	CL2	WC	PR1	PR2	#										
Brown Quail				x																	1	Nankeen Kestrel		x		x				out	out	out				x	x	out	out	4											
Black Swan				out		x	out	out										out			1	Brown Falcon								out				x	x			2													
Australian Shelduck		x	x	out		x	x	out	x												5	Australian Hobby												x	x			1													
Chestnut Teal			x	x															out		2	Black Falcon						out																							
Grey Teal	x		x	x	x	x					x				x		x	out	out		8	Galah				x	x				out								2												
Hoary-headed Grebe				out													out		out			Little Corella								out																					
Great Crested Grebe				out														out				Budgerigar				out																									
*Spotted Dove			x		x	x		x			out			x							5	Purple-crowned Lorikeet				out																									
*Rock Dove								x									out				1	Elegant Parrot					x		x		x			out					3												
Crested Pigeon		x	x	out	x	x	x	x	x		x			out		out					8	Purple-backed Fairywren															x		1												
Horsfield's Bronze Cuckoo	out	out		out		x														1	Superb Fairywren	x	x	x	x	x	x	x	x			x	x	x	x	x	x	14													
Shining Bronze Cuckoo																		x		1	White-winged Fairywren			x	x	x	x	x	x	x				out					8												
Australian (Spotted) Crake			x	x						x	x	x						x		6	Striated Pardalote				out		out	out	out									out													
Black-tailed Nativehen											x									1	Spotted Pardalote						out																								
Red-necked Avocet															x				out	out	1	Weebill								out																					
Banded Stilt																			out	out		x		x	x		x	x	x	x	x	x	x	x	x	x	16														
Pied Oystercatcher			x	out	x		out	out											out	out	2	Inland Thornbill	out	x	x	x		x	x	x	x	out	x	x			out	x	x	12											
Masked Lapwing	x		x	x	x	x		out	x	x	out		x						out		8	<i>Slender-billed Thornbill</i>	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	17												
Banded Lapwing																				1	White-fronted Chat	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	17												
Red-capped Plover			x	x	x	x			x	x	out	x			x					8	New Holland Honeyeater							out										x	1												
(Far) Eastern Curlew		x			x															2	White-plumed Honeyeater															out															
Sharp-tailed Sandpiper				x					x	x								x		5	Singing Honeyeater	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	19												
Red-necked Stint			x	x	x	x			x	x		x								8	Spiny-cheeked Honeyeater	out	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	18												
Common Greenshank				x																1	Little Wattlebird							out	out																						
Silver Gull	out		x	x	x	x	x	x	x		out			x	x				x	x	11	Red Wattlebird												out																	
Pacific Gull							out						out									White-browed Babbler					out					out																			
Caspian Tern	out				x		x	out			x	out	out		x				x	out	5	Grey Shrike-thrush	out	x	x	x	x	x	out	out		out		out	out			out	out	5											
Greater Crested Tern							out	out														Rufous Whistler	out		out	out	out	out	out	out								out													
Whiskered Tern			x							x									out		3	White-winged Triller																													
Fairy Tern																			out											x								2													
Australasian Darter																			out			Black-faced Cuckoo-shrike							x																						
Little Pied Cormorant	out	x		out	out		out	out			x								out	out	2	Masked Woodswallow								out						out															
Great Cormorant		out			out														out			White-browed Woodswallow								out																					
Little Black Cormorant		out			out			out											out		1	Australian Magpie						x		x	out	out							2												
Pied Cormorant			x	out	out			out											out	out	1	Grey Butcherbird			out		out		out		x	out	out						1												
											x								out		1	Willie-wagtail			x	out		x	x	x	x	x	out	x	x			x	9												
Great Egret		x	x		x						x								x		5	Grey Fantail	x	x	x	x	x	x	x	x	x	x		out			out	x	12												
Little Egret		x		x	x																3	Magpie-lark	x		x	x	x	x	out		out								6												
White-faced Heron	x	x	x	x	x	x	x	out	x	x	out	out		x	x		out	x		12	Little Raven	x	x	x	x	x	x	x	x	x	out	out	x	out	x			x	14												
Straw-necked Ibis			out																			Eurasian Skylark		x		x				x	x	out	out	out	x	x		out	6												
Australian White Ibis	out	x	x		x	x	x	out	out			out		out	out		out				5	Brown Songlark		x								x							2												
Royal Spoonbill		x																	out		1	Little Grassbird				x	x			x	x								7												
Australian Pelican	out	out	out	out			out	out	out		x		out						out	out	1	Welcome Swallow	x	x	x	x	x	x	x	x	x			x			x	x	13												
Black-shouldered Kite		x																			1	Tree Martin							x	x	x			x				out	x	5											
Wedge-tailed Eagle											out						out					Fairy Martin									x					out		1													
White-bellied Sea Eagle		x					out			x									x	out	3	Silvereye	x		x	out		x		x		x				out		x	x	7											
Whistling Kite						x	out			out	x										2	*Common Starling	x	x	x		x		x	x	x	out			x		out	out	x	9											
Black Kite						x				out	x										2	*Common Blackbird						out	x					x					2												
Spotted Harrier																	out		out			Australian Pipit					x		x		x		x	x					8												
Swamp Harrier							x		x								x			x	4	*House Sparrow						out	out	out				out																	
Brown Goshawk																		out				*European Goldfinch	x				x												3												
Sacred Kingfisher							out															Total in site										15	25	33	31	25	34	23	16	26	22	26	11	9	16	21	12	8	24	11	73
Rainbow Bee-eater														out		x					1	Total outside site only										10	4	4	15	7	4	17	16	6	10	14	8	6	10	5	8	9	21	11	29

Table 4. All bird species recorded in (marked x) and outside (marked out) of all 19 sites surveyed for *rosinae* in spring 2024. Number of sites each species was recorded is shown in # column, with total number of species recorded for each site at bottom.