

Survey of Little Penguins *Eudyptula minor* at Low Head 2019 - 2021

Report to Friends of the Low Head Penguin Colony, April 2021
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Executive Summary

Surveys of Low Head mapped over 500 features (burrows, nestboxes etc) indicative of the presence of Little Penguins *Eudyptula minor* during six visits. Based on the surveys undertaken in 2019 – 2021, the breeding population of Little Penguins at Low Head is conservatively estimated to be between 200 and 250 pairs in the area northwest of East Beach Road between Pilots Bay and East Beach. It is not possible to make any comparison with previous population estimates of Little Penguins at Low Head as to the current status and trend of the Low Head Little Penguin breeding population. Four recommendations are offered to address the immediate conservation and management needs for the Little Penguin colony.



Little Penguin in burrow under African Boxthorn, Low Head, November 2019.
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Introduction

The Little Penguin *Eudyptula minor* is found along the coasts of southern Australia from near Perth in Western Australia to central New South Wales, with a small breeding population in New Zealand (Grosser et al. 2017). The Low Head colony was subject to an oil spill following the grounding of the MV *Iron Baron* on nearby Hebe Reef in July 1995. The ship is believed to have released approximately 325 tonnes of bunker fuel oil before being towed and scuttled east of Flinders Island 20 days later. High numbers of oiled penguins from Low Head and adjacent islands were recovered for cleaning, rehabilitation and translocation (Hull et al. 1998, Giese et al. 2000, Goldsworthy et al. 1998, 2000a, b).

Before the *Iron Baron* spill, it was believed that there were approximately 1000 breeding Little Penguin adults present at Low Head, with the total population estimated at c.2320 individuals based on surveys undertaken in the mid-1980s (Goldsworthy et al. 2000a). No subsequent population estimates exist for the colony. Following the *Iron Baron* spill, an approximate colony polygon was generated for the Oil Spill Response Atlas (OSRA) by DPIPWE, Figure 1.

The colony has suffered multiple dog attacks, with recent attacks in November 2017 (13 penguins killed), June 2018 (12) and October 2018 (58). A series of dog kills in March – May 2019 (c.20 penguins killed) prompted a public meeting in George Town in March 2019 that supported the formation of a community-based “*Friends of*” group to collaborate with Tasmania Parks & Wildlife Service under Wildcare (<https://wildcarea.org.au/>).

The aims of the current surveys were to:

- map the current extent of the Little Penguin breeding colony northwest of East Beach Road (Pilots Bay),
- provide an estimate of the current breeding population,
- map all evidence of penguins on Low Head northwest of East Beach Road (between Pilots Bay and East Beach), and
- distribute the results and analyses of the surveys and mapping efforts to the *Friends of the Low Head Penguin Colony* Wildcare group and the broader Low Head community to provide guidance for potential future surveys and monitoring on site using the recently-developed Little Penguin Toolkit (2020) (<https://dppwet.gov.au/wildlife-management/marine-conservation-program/little-penguins-in-tasmania/monitoring-and-protection/little-penguin-survey-and-monitoring-toolkit>).

Methods

All field surveys were undertaken by the senior author, and all survey data were recorded in real time while in the field. The surveys were confined to Low Head northwest of East Beach Road, which extends between Pilots Bay to the west in the Tamar River and East Beach to the northeast.

Ten features were mapped that reflected the presence and/or evidence for Little Penguins at Low Head, consistent with surveys for Little Penguins elsewhere in Tasmania (EJ Woehler, unpubl data). The features were tracks and runways through the vegetation, splash (a combination of faeces and urine), wooden nest boxes, concrete igloos and natural burrows, active moult sites, the presence of moult feathers (ie an inactive moult site) and penguins in burrows. Burrows were not inspected to determine occupancy, but in many cases, penguins could be seen close to the burrow entrances.

A number of carcasses were located during the surveys but the cause(s) of death could not be determined and no carcasses or samples were collected. All GPS data were captured with a Garmin 12-channel GPS receiver. The coordinates of all features were recorded as UTM coordinates based on the WGS 84 datum and converted to latitude °S and longitude °E for mapping.

Results

1 Survey effort

Six visits were undertaken to Low Head between June 2019 and March 2021. No surveys were undertaken between March and December 2020 due to COVID-19 restrictions in Tasmania. Surveys were undertaken on foot, covering all public land on Low Head, the golf course, several areas of Crown Land comprising the Low Head Historic Site, Low Head Coastal Reserve and the Low Head Conservation Area, and a number of private properties with the permission of owners (Table 1, Figure 2). Just under 20km of ground surveys were undertaken on these visits.

Date	Features mapped	Survey effort (km)
20 June 2019	72	3.34
26 November 2019	260	5.44
27 November 2019	0	2.12
8 February 2020	8	1.59
9 February 2020	93	3.38
4 March 2021	8	0.74
5 March 2021	63	3.35
Total	504	19.96

Table 1 Survey effort for Little Penguins at Low Head, 2019 – 2021, see Figure 2.

2 Mapping of penguin evidence

A total of 504 features indicating the presence of Little Penguins at Low Head was mapped (Table 2). Figures 3 – 5 show the various features and Figure 6 shows the location of all features mapped during the six visits to Low Head, excluding carcasses.

The most frequently mapped feature was splash, typically outside burrows or burrow access points under African Boxthorn *Lycium ferocissimum* and along runways. Forty runways through the vegetation and nine tracks in open areas were located during surveys (Table 2). With very few exceptions, all splash, runways and tracks were within 150-200m of the foreshore, and often within 100m (Figure 3).

Feature	Mapped
Track	9
Runway	40
Splash	178
Burrow	97
Igloo	10
Nest box	30
Moult feathers	33
Moult site	38
Penguin	53
Carcasse	16
Total	504

Table 2 Frequency of features mapped at Low Head, 2019 – 2021, see Figures 3 – 6.

A total of 42 wooden nest boxes was located and mapped during the surveys. Many were in disrepair, overgrown with native and invasive vegetation; only 12 were occupied and subsequently mapped as 'penguin'. Twelve concrete igloos were also located and mapped; splash and feathers were recorded at two igloos suggesting possible recent use, and two were occupied when mapped. Most concrete igloos were derelict and unable to be used.

Just under 100 natural burrows were located during the surveys – these were under native and introduced vegetation, into soil or under rocks throughout the survey area. Many of the burrows were located under African Boxthorn, particularly around the Pilot Station and the foreshores overlooking the Tamar River, within the Low Head Historic Site, Figures 1 and 4.

More than 50 active nests were located during surveys (Figure 5). These active nests contained one or two adults and/or one or two chicks. The majority of nests were located within the Low Head Historic Site and Low Head Conservation Area. A total of 38 moult sites was located and mapped; typically these were small spaces unsuitable for nesting but provided sufficient safety for moulting penguins. An additional 33 sites were mapped where large collections of moult feathers were observed, potentially indicating a recently moulting penguin may have been present, Figure 5.

Discussion

1. Little Penguin population status and trends

Based on the surveys undertaken in 2019 – 2021 for this study, the breeding population of Little Penguins at Low Head is conservatively estimated to be between 200 and 250 pairs in the area northwest of East Beach Road between Pilots Bay and East Beach. This estimate is based on the presence of 97 burrows of unknown status (no nest checks were undertaken during the surveys) and the 53 active burrows located during the surveys. Assuming an occupancy rate of between 25% - 50% for the unchecked burrows, this generates an estimate of between 75 and 125 breeding pairs.

Large areas of Low Head are covered by African Boxthorn that prevented mapping of burrows, in particular around the northeast and northwest flanks of the Pilot Station within the Low Head Historic Site and to a slightly lesser extent, within the Low Head Conservation Area. Dense stands of large boxthorn bushes provide extensive habitat suitable for nesting by Little Penguins.

Based on surveys elsewhere at Low Head, and the burrowing of Little Penguins beneath African Boxthorn, it is estimated that there may be another 100 ± 25 nesting pairs of penguins using the dense boxthorn areas within the Low Head Historic Site. *In toto*, the estimate of 200 – 250 nesting pairs is believed to be conservative, and requires additional survey efforts if greater precision and accuracy are required.

Brief surveys along the foreshore southeast of Pilots Bay to She Oak Point and farther identified evidence of the presence of Little Penguins, indicating breeding sites were present well outside the survey area (Figures 1 – 6). Further surveys would provide data on the spatial extent of breeding penguins on the foreshore between Pilots Bay and George Town.

The previous estimates of 1000 breeding adults and a total population of 2320 from the mid-1980s are both too coarse and too old to be useful as a basis for investigating population trends. The mapping surveys identified breeding and penguin presence well outside of the OSRA polygon produced following the *Iron Baron* spill in 1995 (Figure 6). There are no data available as to the basis of the polygon, or what criteria were used to establish the polygon's bounds. Whether this difference is due to differences in survey effort or an expansion of the Little Penguin population at Low Head can not be determined.

Consequently, it is not possible at present to make any comparison with previous population estimates of Little Penguins at Low Head as to the current status and trend of the Low Head Little Penguin breeding population.

2 Vegetation

Much of the Low Head survey area is heavily modified, with extensive clearing of native vegetation for public open space, golf course, roads and housing, and historical livestock grazing. Most of the native vegetation has been replaced with exotic species such as African Boxthorn, Blackberry *Rubus fruticosus*

and a range of garden escapees. Small and isolated remnant stands of native vegetation are present around the Pilot Station within the Low Head Historic Site and behind East Beach.

African Boxthorn is a declared noxious weed in all Australian states and territories, and is a Weed of National Significance (WoNS: <https://weeds.org.au>). African Boxthorn is regarded as one of the worst weeds in Australia because of its invasiveness, potential for spread and its economic and environmental impacts. African Boxthorn was originally introduced to Australia from South Africa and planted as hedges for fencing and windbreaks (<https://dpiwwe.tas.gov.au/Documents/AfricanBoxthornWeedMgmtGuide.pdf>).

African Boxthorn is widely distributed throughout the survey area, with large stands throughout the Crown Land areas. Inspection of historical imagery clearly shows an expansion in the distribution of, and ground cover by African Boxthorn at Low Head over the last 60 – 80 years (T Smith, FOLHPC, unpubl. data), in particular within the Low Head Historic Site and the Low head Conservation Area. There is no doubt that the penguins have, and continue to benefit from the presence of the boxthorn as it provides shelter to nesting birds from some terrestrial predators such as dogs and cats.

Despite the benefit to breeding Little Penguins, there are compelling arguments for its staged removal as a WONS species, and subsequent replacement with native vegetation within the Low Head Historic Site and Low Head Conservation Area. A community-based program drawing on expertise within Wildcare, PWS and other community groups to remove African Boxthorn from Low Head and to provide additional nesting habitats for Little Penguins (see below) is feasible.

3. Artificial habitats: nest boxes, igloos and breakwater

More than 50 wooden nestboxes and concrete igloos were located and mapped during the six surveys. The vast majority of these were in disrepair and derelict condition, unable to be used by Little Penguins; many were overgrown and choked with vegetation. There are no data available as to how many nestboxes and igloos have been established on Crown Land or where they were sited, and it is likely that the mapping data collected for this survey represent the only inventory of these structures.

There was extensive evidence of Little Penguins using the breakwater, with numerous records of fresh splash (Figure 3). No nest searches were undertaken, but it is highly likely that there are penguins nesting within the voids amongst the boulders as they do elsewhere (Woehler 2015).

Conclusions and recommendations

The following recommendations are offered to the Friends of the Low Head Little Penguin Colony (FOLHPC) for their consideration based on the results of the surveys reported herein:

Recommendation 1 – immediately remove all decrepit wooden nestboxes and concrete igloos from the Low Head Historic Site and Low Head Conservation Area, and replace them with current design nest boxes (ie floorless design) – see <https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/birds/nest-box-design.pdf>. Note that additional ventilation holes are required in the nestboxes. Where considered necessary, concrete igloos can also be used as additional breeding sites for Little Penguins.

Recommendation 2 – investigate the potential for involving George Town High School students in the construction and deployment of nest boxes; deployment may require approval from PWS. It is recommended that all nest boxes and igloos are numbered and GPS mapped when deployed, and that FOLHPC maintain the register of nestbox GPS locations. Numbering of nest boxes and igloos will permit monitoring of breeding penguins.

Recommendation 3 – FOLHPC investigate the potential for the preparation of a vegetation management

plan for the Low Head Historic Site and Low Head Conservation Area. The vegetation management plan would aim to remove and replace all African Boxthorn and Blackberry from the Crown Land areas within 12 – 16 years, and supplement the use of native vegetation with nestboxes to provide additional nesting sites.

Recommendation 4 – FOLHPC to investigate options for future efforts regarding surveys and monitoring of the Little Penguins at Low Head using the methods recently developed for community groups – see <https://dpiwetastgovau/wildlife-management/marine-conservation-program/little-penguins-in-tasmania/monitoring-and-protection/little-penguin-survey-and-monitoring-toolkit> These methods include the use of alternative techniques such as arrival counts and the use of camera traps to investigate penguin activity at a site.

Acknowledgements

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Figure 1. Map of Low Head showing OSRA polygon (blue hatched area) and DPIPWE survey data (black symbols, October 2008, (R Monash unpubl data) – see text for further details. OSRA data from the Natural Values Atlas. Base map shows Crown Land (pale green), LHHS is Low Head Historic Site and LHCA is Low Head Conservation Area, Tidal Crown Land (dark blue), Private Freehold (pale yellow) and Local Council property (orange). Cadastre boundaries and 5m isobaths are also shown. Base map layers from the LIST (<https://mapsthejisttasgovau/listmap/app/list/map>).

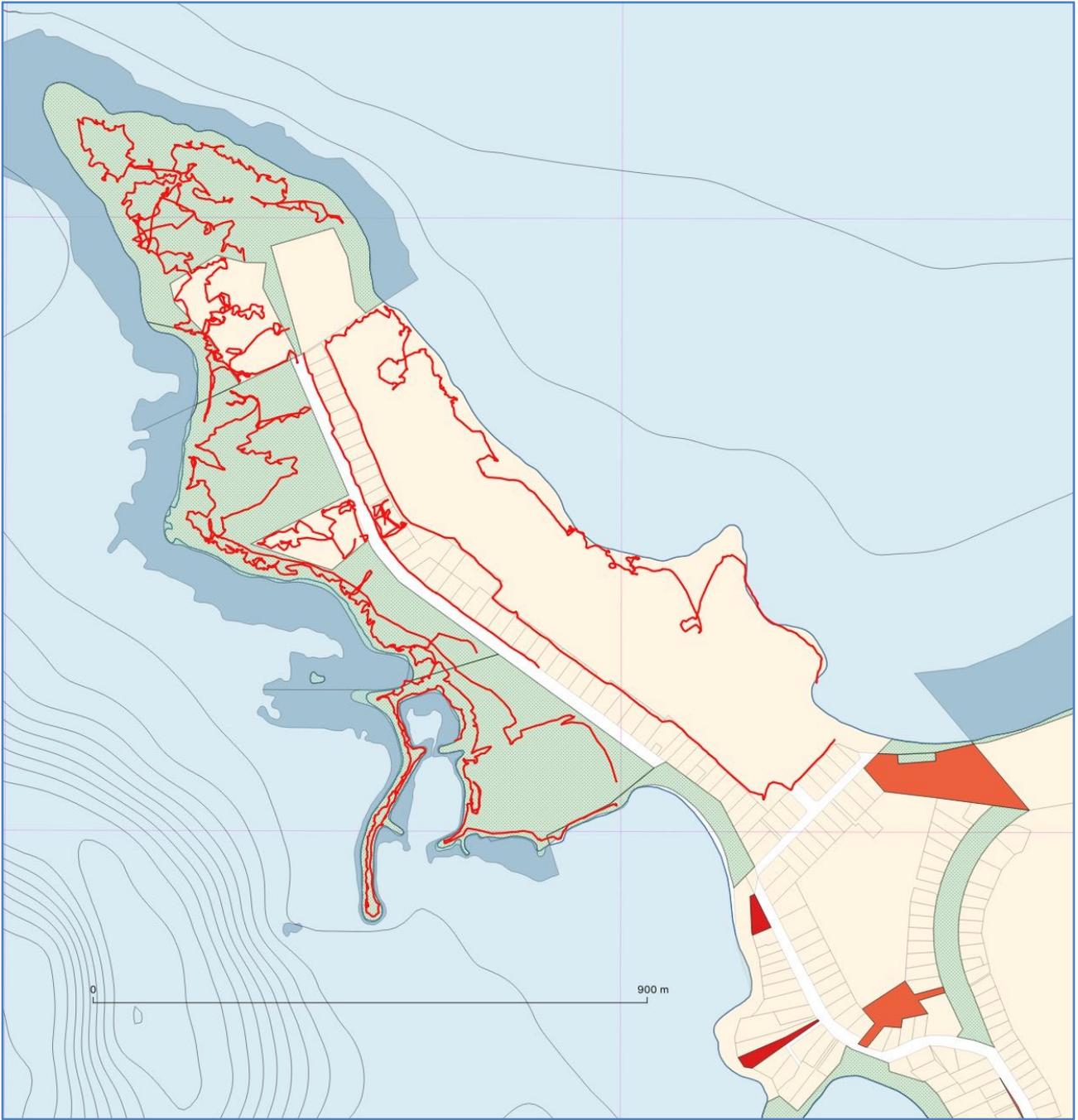


Figure 2. Map showing Low Head survey effort 2019 – 2021 – red tracks – see Table 1. Base map shows Crown Land (pale green), Tidal Crown Land (dark blue), Private Freehold (pale yellow) and Local Council property (orange). Cadastre boundaries and 5m isobaths are also shown. Base map layers from the LIST (<https://mapstheLISTtasgovau/listmap/app/list/map>)

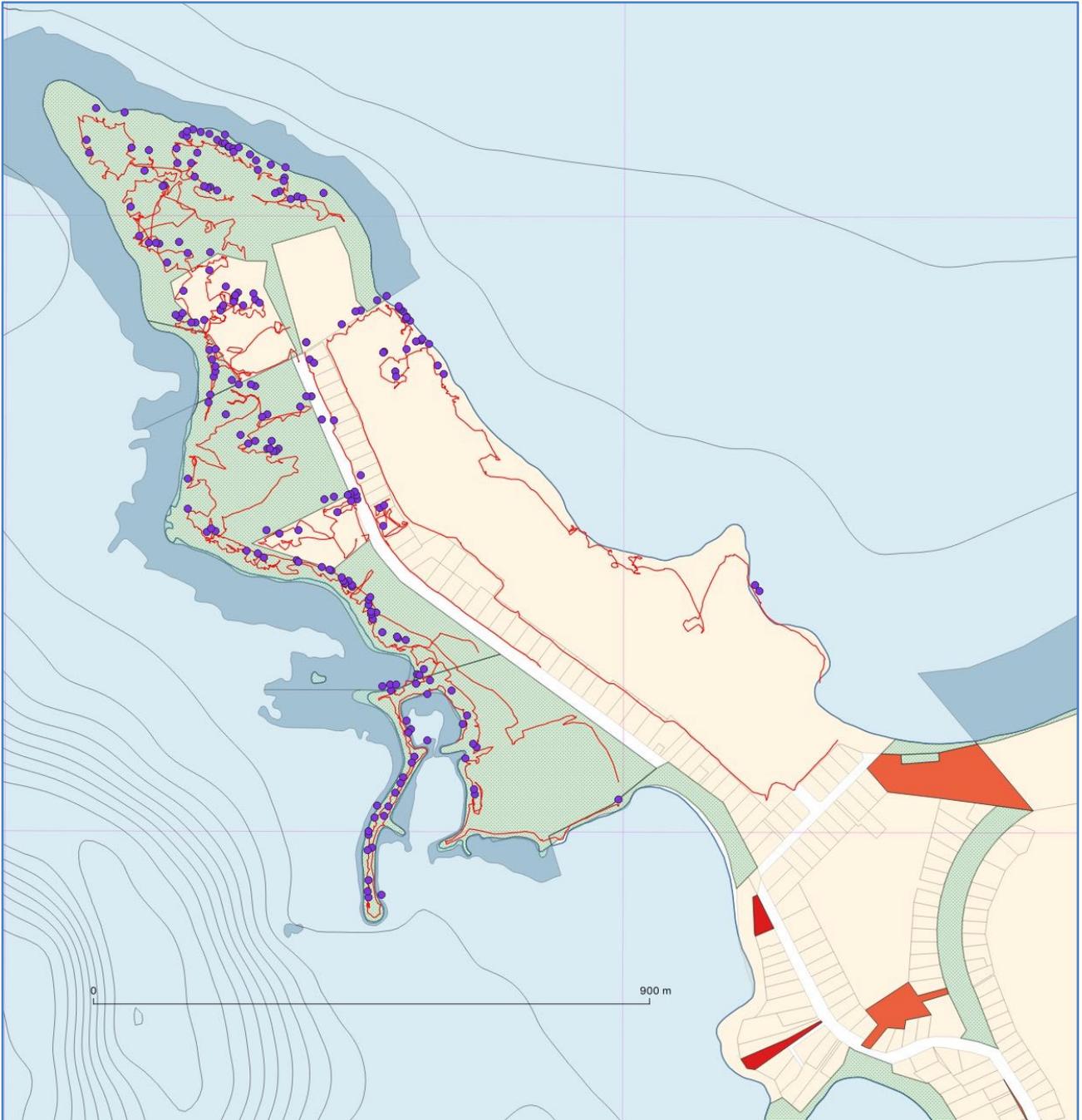


Figure 3. Map showing Little Penguin tracks (9), runways (40) and splash (178). Base map shows Crown Land (pale green), Tidal Crown Land (dark blue), Private Freehold (pale yellow), Local Council property (orange) and survey effort 2019 – 2021 (red tracks). Cadastre boundaries and 5m isobaths are also shown. Base map layers from the LIST (<https://mapstheLISTtasgovau/istmap/app/list/map>)



Figure 4. Map showing Little Penguin derelict/empty nest boxes (30), derelict/empty igloos (10) and natural burrows (97). Burrow contents were not inspected (see Methods). Base map shows Crown Land (pale green), Tidal Crown Land (dark blue), Private Freehold (pale yellow), Local Council property (orange) and survey effort 2019 – 2021 (red tracks). Cadastre boundaries and 5m isobaths are also shown Base map layers from the LIST (<https://mapsthehlisttasgovau/listmap/app/list/map>)

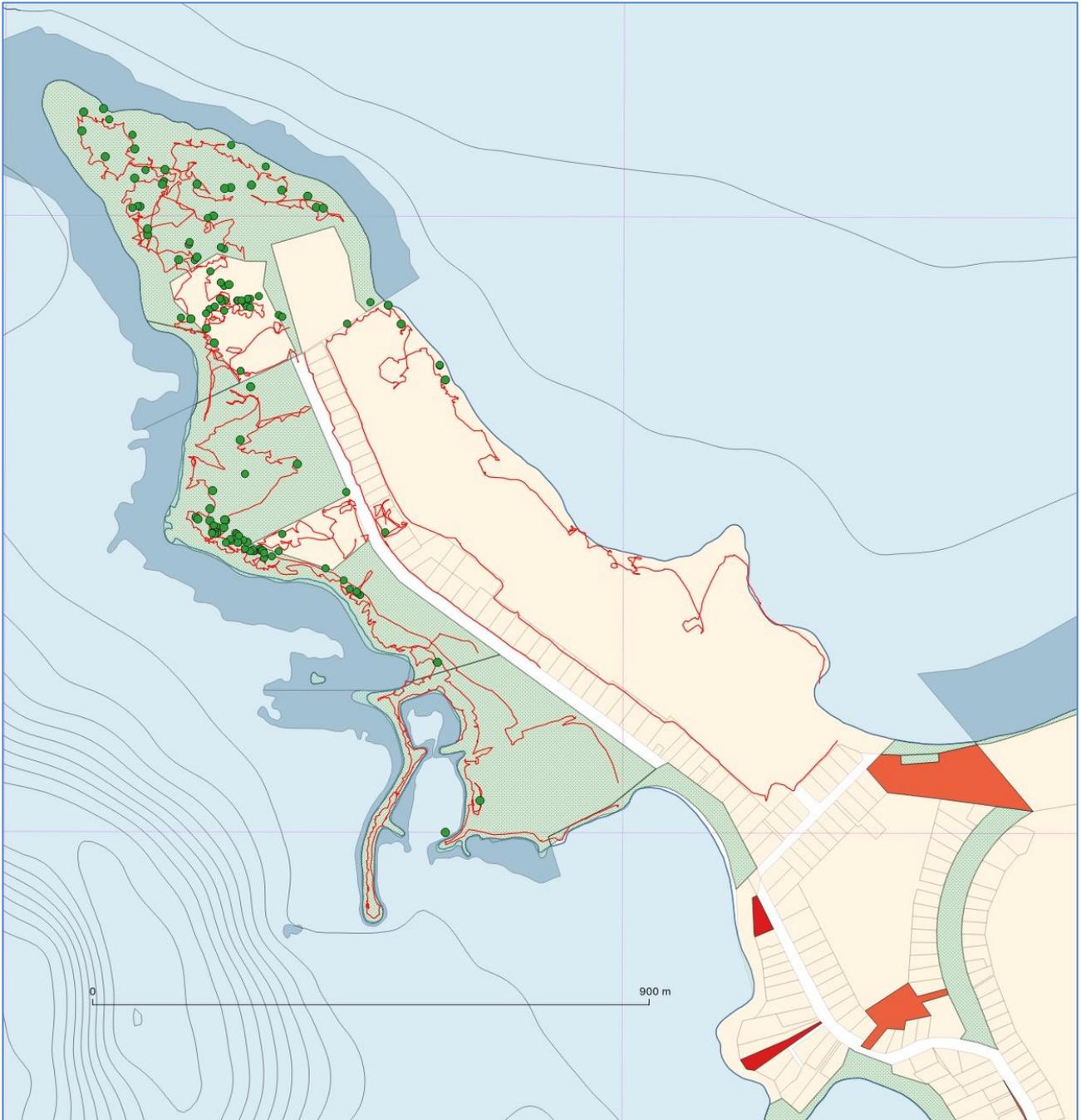


Figure 5. Map showing occupied Little Penguin burrows (53), moult sites (38) and moult feathers (33). Base map shows Crown Land (pale green), Tidal Crown Land (dark blue), Private Freehold (pale yellow), Local Council property (orange) and survey effort 2019 – 2021 (red tracks). Cadastre boundaries and 5m isobaths are also shown Base map layers from the LIST (<https://mapstheLISTtasgovau/listmap/app/list/map>)

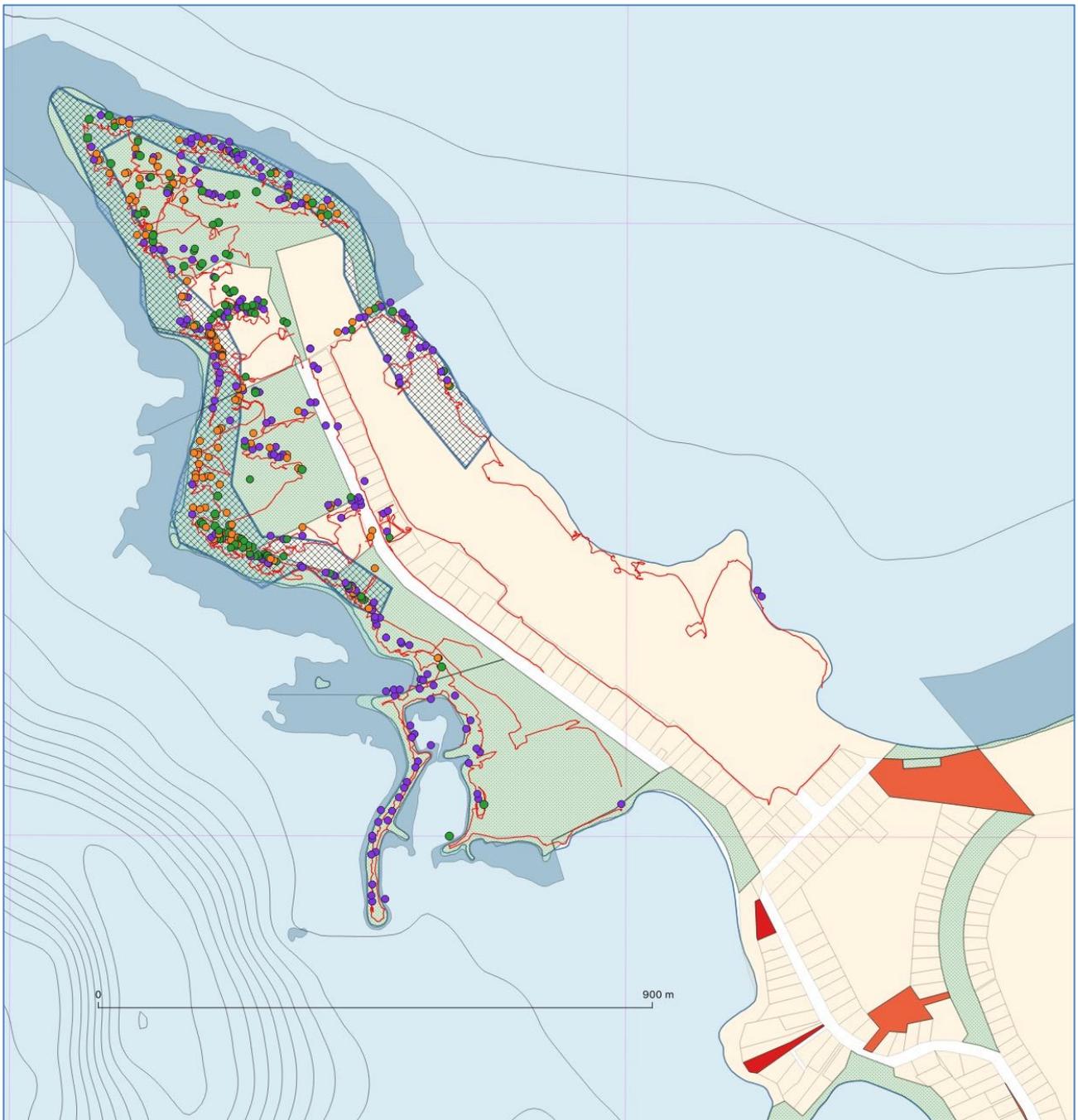


Figure 6. Map showing all features mapped during six surveys at Low Head 2019 - 2021 (n = 488: Table 2 excluding Little Penguin carcasses, n=16). Base map shows Crown Land (pale green), Tidal Crown Land (dark blue), OSRA colony polygon (blue hatch), Private Freehold (pale yellow), Local Council property (orange) and survey effort 2019 – 2021 (red tracks). Cadastre boundaries and 5m isobaths are also shown Base map layers from the LIST (<https://mapsthejisttasgovau/listmap/app/list/map>)