Threatened King Island Birds Conservation Action Plan

Version 1
31 March 2021

birdlife
AUSTRALIA

i. Acknowledgements

Development and implementation of the Threatened King Island Birds CAP has been possible because of the enthusiasm, skill and effort of many people, in particular the King Island Landcare Group. This first version is itself an acknowledgement of their contributions.

This Conservation Action Plan was funded through the generosity of BirdLife Australia's supporters nationwide and received financial support from the Australian Bird Environment Foundation of BirdLife Australia.

2019 Workshop participants: Graeme Batey, Margaret Batey, Margaret Bennett, Sally Bryant, Luke Diddams, Stephen Florence, Robbie Gaffney, Rod Graham, Carolyn Hogg, Mark Holdsworth, Fiona Hume, Kirsty Kay, Jenny Lau, Kate Ravich, Helen Strickland, Janelle Thomas, Peter Volker, Pip Walsh, Matthew Webb, Alan Wiltshire, Anna Wind

Front cover: King Island Brown Thornbill, image by Barry Baker

ii. Recommended citation

March (2021) Threatened King Island Birds Conservation Action Plan Version 1. BirdLife Australia, Melbourne.

iii. Abbreviations

Species

KIBT	King Island Brown Thornbill
KIS	King Island Scrubtit
TKIB	Threatened King Island Birds

Organisations

ANU	Australian National University
BLA	BirdLife Australia
BoKI	Birds of King Island
CAP	Conservation Action Plan
CCA	Cradle Coast Authority
DAWE	Department of Agriculture, Water and the Environment, Australia
DPIPWE	Department of Primary Industries, Parks, Water and Environment, Tasmania
FPA	Forestry Practices Authority
KIC	King Island Council
KIFMC	King Island Fire Management Committee
KINRM	King Island Natural Resource Management Group
HYDRO	Hydro Tasmania
PWS	Tasmanian Parks & Wildlife Service
STT	Sustainable Timber Tasmania
TFGA	Tasmania Farmer and Graziers Association
TFS	Tasmania Fire Service
TLC	Tasmanian Land Conservancy
WoK	Wings on King

CONTENTS

Figures & Tables

King Island coastal landscape. Image: Dejan Stojanovich

EXECUTIVE SUMMARY

This first version of the Threatened King Island Birds Conservation Action Plan (TKIB CAP) is a direct and coordinated response to the very high risk that, without urgent action, the King Island Brown Thornbill *Acanthiza pusilla archibaldi* and King Island Scrubtit *Acanthornis magna greeniana* will become extinct in the next 20 years (Geyle *et al.* 2018).

The conservation action planning process, initiated by King Island Natural Resource Management Group and BirdLife Australia, brought together key stakeholders to assess the reasons for the parlous state of King Island's most threatened birds and agree on a multi-partner program to generate the recovery of these birds' populations. The planning process is based on best available information and a principle of shared capacity, and addresses two threatened King Island bird taxa:

1. King Island Scrubtit (KIS)
2. King Island Brown Thornbill (KIBT)

At the conclusion of the planning workshop, participants (excluding representatives from the Tasmanian Forest Practices Authority) agreed on the following key workshop messages:

The King Island Scrubtit and King Island Thornbill are nationally significant, and they are a unique part of King Island's biodiversity.

Populations of both birds are now fewer than 50 individuals each, and without intervention they are facing imminent extinction.

In addition, the conservation of King Island forest systems is essential to the conservation of these threatened birds.

Taking decisive action now is essential to saving these two species from extinction.

Successful recovery will rely on strong partnerships between the King Island community, State and Federal Governments, NGOs and specialist scientists to address their key threats.

We urgently need to:

- *Complete surveys of potential habitats to better understand both species' distribution and requirements*
- *Update State and Federal assessment processes with improved habitat descriptions, vegetation mapping and on-ground assessment methods*
- *Increase the level of protection at Pegarah State Forest and focus management on strengthening this area as a stronghold for both species*

- *Increase capacity to prevent and respond to fire in key habitat*
- *Identify and protect critical areas on private land through a range of measures, including incentives to maximise landholder participation.*

This CAP outlines strategies to address key threats to TKIB. The priority strategies (not in order of priority) and activities for the first 12 months of TKIB CAP implementation are:

Change status of Pegarah – increase protection of Pegarah by establishing political support from decision makers, and community support through appropriate reservation status and ongoing management.

- **Advocacy to make Pegarah a conservation reserve.** Importantly, this will require the support of the King Island community, noting that many King Islanders may wish to see continued use of 'the forestry' for activities such as landfill or gradual removal of pines. *In kind*.

Establish insurance populations - including genetic assessment across the species' distribution to develop an overall population management strategy to inform future translocations.

- **Complete comprehensive island-wide surveys for both species.** A comprehensive understanding of the distribution and abundance of both species and their habitat is urgently required as a foundation for almost all of the programs. $100,000

Improve fire management - including improving fire planning, suppression capacity and responsiveness and community education.

- **Update KI Fire Management Plan** to prioritise protection of important habitat through improved preparedness and suppression activities.
- **Community engagement[#]**. Improved fire management, particularly on properties adjacent to important bird habitat (e.g. Pegarah) that may increase the capacity and timing of fire suppression efforts.

Improve land clearing controls (improve policy settings) - including the development of more accurate vegetation maps, improving policy settings, recognising the importance of intact native vegetation on King Island, and educating landholders and corporate farms about the benefits of natural values.

- **Urgent updating of TASVEG maps at an appropriate resolution to support conservation planning**. $150,000

Landholder support/Stewardship incentive scheme - developing a range of programs and incentives for landholders to retain and improve native vegetation (forest systems) to support TKIB conservation.

- **Community education[#]**. Gain access to private lands for bird and vegetation surveys.

Wallaby management program - through strategic fencing of key areas and targeted culling programs.

- **Community engagement[#].** Support for wallaby management, particularly in priority areas where birds and their habitat may benefit from strategic fencing and culling.

Fallow Deer management program – via an island-wide eradication program.

- **Community engagement[#].** Support the Tasmanian Government's plans to eradicate Fallow Deer.

[#] Community engagement. Island-based Project Officer $50,000.

King Island Brown Thornbill. Image: Catherine Young

Threatened King Island Birds Conservation Action Plan

1. INTRODUCTION

1.1 Context

In June 2019, King Island Natural Resource Management Group and BirdLife Australia convened a Conservation Action Planning process (see Section 1.3) involving key stakeholders and species experts to assess the reasons for the parlous state of TKIB and agree to a multi-partner program based on best available information and a principle of shared capacity.

Bringing together a variety of government, non-government and research organisations, the Threatened King Island Birds Conservation Action Plan (TKIB CAP) is a response to the very high extinction risk for the King Island Scrubtit and King Island Brown Thornbill, largely as a result of the very high levels of land clearing on King Island and the threat of individual fires impacting on a large proportion of remaining habitat, which occurred to the King Island Scrubtit in Nook Swamps in 2007.

This newly formed group also recognises that actions previously identified in the KI NRM Strategy 2010-2020 have not been adequately supported or implemented, escalating the extinction risk of these two species.

The group came together to determine the immediate and ongoing actions and funding needed to prevent these species from becoming extinct, and to align and prioritise actions across both species aided by the King Island Biodiversity Management Plan objectives. Using a multi-species approach, the process leads to an efficient and cost-effective Conservation Action Plan, tackling both broader landscape threats and individual species' threats for the two threatened taxa.

The CAP model comprises a cyclical and iterative conservation planning and management cycle.

As a static record, the CAP document is complemented by information on activity and progress which is updated on an ongoing basis and recorded in a CAP software platform called 'Miradi'. Further detailed information can be obtained from that source maintained by BirdLife Australia.

1.2 Project area

The Threatened King Island Birds CAP area covers all of King Island (Figure 1).

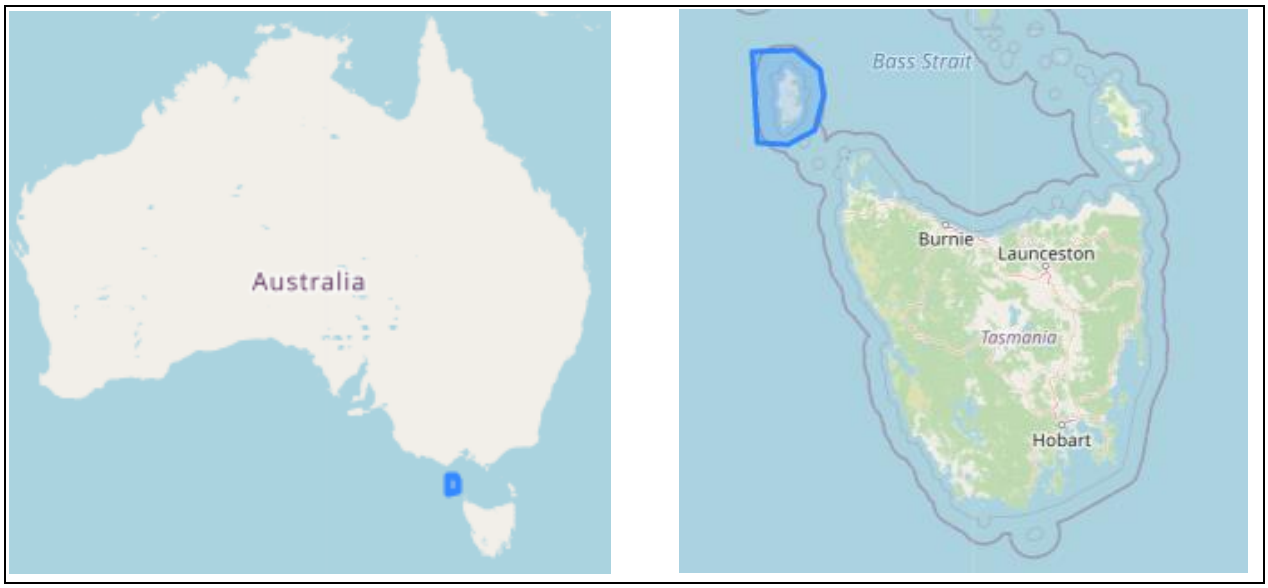


Figure 1. CAP Coverage: King Island, Australia

1.2.1 Climate and rainfall

The Island experiences a maritime climate, strongly influenced by exposure to the Southern Ocean and the Roaring 40s. Temperatures are generally cool to moderate. King Island Airport records an average daily maximum temperature of around 13°C in July and 21°C in February. Average annual rainfall is less than 1000mm, most of which falls between April and October (Grose 2019).

1.2.2 Vegetation

King Island's geographic isolation and low physical variation has led to vegetation that is relatively low in structural and floristic diversity. About 470 native vascular plant species have been recorded on the Island. The distribution of vegetation across the Island are influenced by soil fertility, drainage, exposure to marine influences, and fire history (DPIPWE 2012). The flora contains elements with affinities to both mainland Tasmania and Victoria.

1.2.3 Key Biodiversity Area

The King Island Key Biodiversity Area (KBA) includes the coastline, Lavinia State Reserve and three inshore islands. However, as KBA criteria do not recognise subspecies, the King Island KBA is not based on the King Island Brown Thornbill or the King Island Scrubtit.

The following site description and biodiversity information is taken from BirdLife International's King Island Important Bird Area (IBA) factsheet (IBAs are now also recognised by BirdLife Australia as KBAs) (BirdLife International 2019):

Site description

The IBA includes the entire coastline of King Island, which supports significant numbers of Hooded Plovers; Lavinia State Reserve, which supports Orange-bellied Parrots and endemic subspecies of bush birds; and three inshore islands which support large numbers of nesting seabirds. These islands are Christmas Island (a 63 ha Nature Reserve), New Year Island (a 98 ha Game Reserve, on which harvesting of shearwaters is allowed) and Councillor Island (11 ha Nature Reserve). Lavinia State Reserve, a designated Ramsar site, is located 12 km north of Naracoopa on the north-eastern coast of King Island and is comprised of long sandy beaches, coastal heathlands, wetlands and the Sea Elephant River estuary.

The IBA is defined as the coastal strip extending from the low water mark to 1 km inland of the high-water mark around the entire island; this is intended to capture most significant habitat for shorebirds and Orange-bellied Parrots.

Table 1. Key Biodiversity Areas listed on the basis of their significance for 19 birds. (BirdLife International 2019)

KBA Name	***Area km²***	***Species contributing to basis for designation***
King Island KBA	193.37	Short-tailed Shearwater, Black-faced Cormorant, Pied Oystercatcher, Sooty Oystercatcher, Hooded Plover, Pacific Gull, Fairy Tern, Green Rosella, Orange-bellied Parrot, Yellow-throated Honeyeater, Black-headed Honeyeater, Strong-billed Honeyeater, Yellow Wattlebird, Scrubtit, Tasmanian Scrubwren, Tasmanian Thornbill, Black Currawong, Dusky Robin, Flame Robin

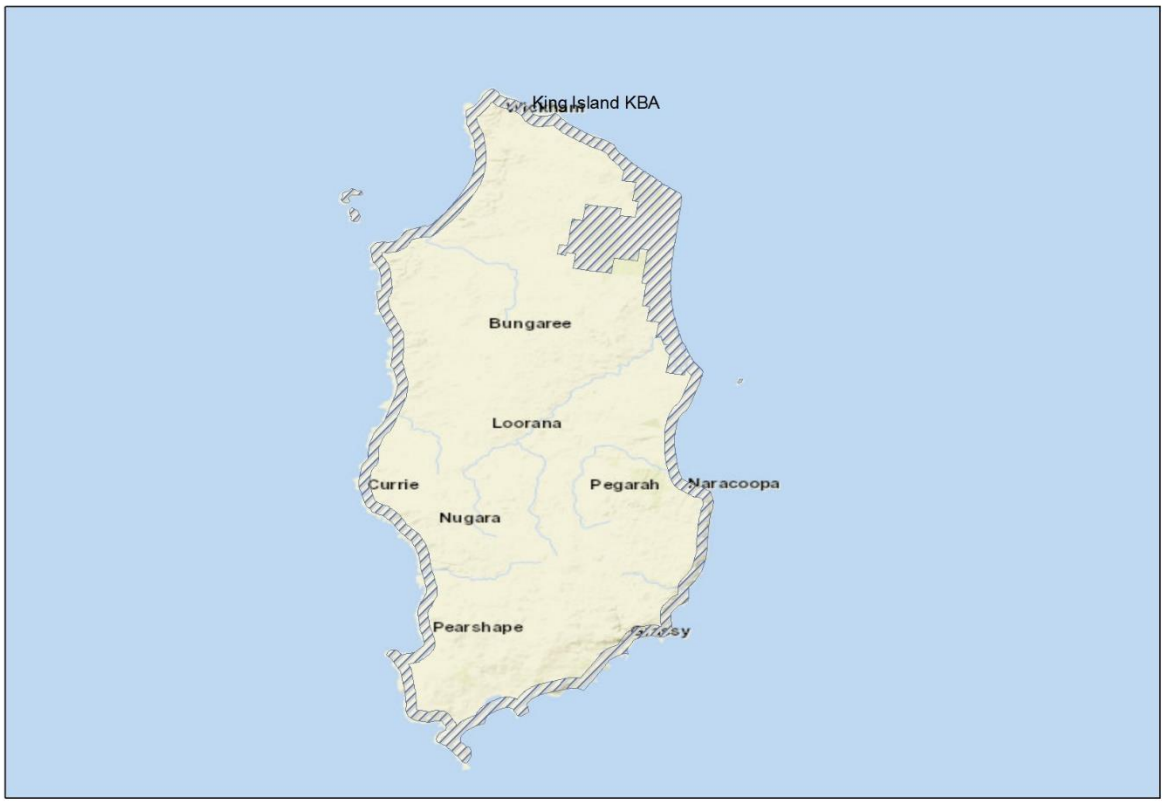


Figure 2. Location of Key Biodiversity Areas on King Island (from BirdLife International 2019)

1.2.4 Land use history

There is no evidence that Tasmanian Aboriginals inhabited King Island at the time of European settlement. However, scattered middens on the west coast and the 1989 discovery of a human skeleton in a cave on the island, which was dated to approximately 14,000 years ago, indicate the Island was periodically inhabited by Tasmanian Aboriginals (Sim and Thorne 1990).

King Island was first named by Mr John Black, who arrived on the *Harbinger* in 1801, but it was not settled permanently until nearly a century later, in 1888, when it was sectioned off for farming (Donaghey 2003).

King Island's history of settlement, farming and associated burning regimes have all played an important role in influencing the biodiversity of the Island. Eight fauna species and at least four plant species have become locally extinct and one globally extinct since European settlement (Donaghey 2003). Other species, particularly little-known invertebrate species, may have also become extinct since settlement.

Since permanent settlement, approximately 70% of the native vegetation has been cleared to support a prosperous beef and dairy industry (DPIPWE 2012).

1.2.5 Protected areas

Protected area data is available from Collaborative Australian Protected Area Database (Australian Government 2018). Future versions of the CAP will contain protected area information.

Canopy of *Melaleuca* spp, King Island. Image: Dejan Stojanovich

1.3 Conservation Action Planning

The planning process for the Threatened King Island Birds CAP uses *the 'Open Standards for the Practice of Conservation'* (*Conservation Standards* hereafter), developed by the *'Conservation Measures Partnership'*.

The *Conservation Standards* assist conservation teams to systematically plan, implement, and monitor their conservation initiatives as part of an adaptive management cycle. The approach is being increasingly adopted as standard planning practice in Australia and has been used by BirdLife Australia to inform program design for several bird groups.

The *Conservation Standards* are organised into a five-step project management cycle. Steps are used as a guide and will vary under different conditions and between projects. Although presented as a sequential series of steps, the entire process is rarely applied in a linear fashion. The *Conservation Standards* process typically involves a series of conservation planning workshops with participants from multiple organisations. The process is often facilitated by a trained *Conservation Standards* or CAP coach and uses a standard step-by-step methodology (Conservation Measures Partnership 2020).

Box 1. Key steps in the Conservation Action Planning process

STEP 1 Assess
- Define Purpose and Identify Project Team
- Define Scope, Vison, and Conservation Targets
- Identify Critical Threats
- Assess the Conservation Situation

STEP 2 Plan
- Develop a Formal Action Plan: Goals, Strategies, Assumptions, and Objectives
- Develop a Formal Monitoring, Evaluation and Learning Plan
- Develop an Operational Plan

STEP 3 Implement
- Develop a Detailed Short-term Work Plan and Timeline
- Develop and Refine your Project Budget
- Implement your Plans

STEP 4 Analyse and Adapt
- Prepare your Data for Analysis
- Analyse and Reflect on Results
- Adapt your Strategic Plan

STEP 5 Share
- Document what you learn
- Share what you learn
- Foster a Learning Environment

CLOSE THE LOOP

2. PROJECT VISION AND CONTEXT

2.1 Project team

The TKIB CAP requires collaborative conservation action across organisations, individuals and land tenures. Successful implementation of the CAP will depend on good communication, coordination, and a commitment to shared objectives and priorities among the diverse group of implementation partners.

A TKIB CAP Steering Committee is being established to oversee the development and implementation of the CAP. As at October 2020, Terms of Reference have been drafted and draft membership identified.

Table 2 lists the organisations actively involved in planning, coordination and implementation of the TKIB CAP. These organisations and individuals represent a diverse set of skills and expertise, allowing them to tackle some of the broader landscape actions needed to conserve these species.

Table 2. Organisations involved in CAP planning, coordination and implementation

Organisation	***Type***	***Jurisdiction***
Australian National University	Research Institution	National
BirdLife Australia	NGO	National
BirdLife Tasmania	NGO	Tasmania
Cradle Coast Authority	NRM Body	NW Tasmania
Dept of Primary Industries, Parks, Water and Environment	Govt Department	Tasmania
Dept of Agriculture, Water and the Environment	Govt Department	National
King Island Natural Resources Management Group	NGO	Tasmania
King Island Field Naturalists	NGO	Tasmania
University of Sydney	Research Institution	National
Tasmania Parks & Wildlife Service	Govt agency	Tasmania
Tasmanian Land Conservancy	NGO	Tasmania

2.2 Scope

The scope of the TKIB CAP is:

> To protect and maintain threatened King Island birds through management of habitat quality, control and mitigation of threats, and active species-focused interventions for two critically threatened King Island taxa (Table 3):
> 1. King Island Brown Thornbill *Acanthiza pusilla archibaldi*
> 2. King Island Scrubtit *Acanthornis magna greeniana*

Participants noted that management and restoration of King Island forest systems are inextricably linked with the task of recovering threatened bird populations. The scope and subsequent vision statement place greater emphasis on habitat retention and restoration as a focus for the CAP program.

Table 3. National and state conservation status of the two target taxa

	King Island Brown Thornbill	King Island Scrubtit
Environment Protection and Biodiversity Conservation Act 1999	E	CR
Threatened Species Protection Act 1995 (Tasmania)*	E	E
Garnett *et al*. (2011)	CR	CR

CR Critically Endangered; E Endangered
* Endangered is the highest threat category under the *Tasmanian Threatened Species Protection Act 1995*.

2.3 Vision

The TKIB CAP adopts as its vision:

> Protect, improve and conserve threatened King Island bird species and appropriate habitat to increase the species' resilience and decrease their extinction risk.

2.4 Identification of targets

Three conservation targets were identified during the TKIB CAP workshop. In addition to the two threatened taxa (Table 3), participants identified the conservation of King Island forest systems as essential to the conservation of these threatened birds.

At the time of writing, the two taxa do not have individual national recovery plans but are the subject of the King Island Biodiversity Management Plan (BMP; DPIPWE 2012) which was formally adopted by the Commonwealth as the recovery plan for both birds. The BMP informed the development of the TKIB CAP. There are no National Recovery Teams for these taxa.

BOX 2. Method for Identifying Conservation Targets
(From: Conservation Measures Partnership 2020)

All projects should select a limited number of conservation targets (also known as biodiversity targets). These targets are specific, tangible entities that the project is working to conserve that represent and encompass the ultimate aims of the project. They form the basis for setting goals, selecting actions, and measuring effectiveness.

2.5 Target descriptions

In CAP terminology, a '*conservation target*' is an element of biodiversity (species, habitat, or ecological system) at a project site on which a project has chosen to focus. They are the basis for setting goals, carrying out conservation actions, and measuring change. As noted earlier, each of the species addressed by the CAP comprises a conservation target. In addition, King Island forest systems are a conservation target.

The following is intended as a brief introduction to the three conservation targets addressed by the TKIB CAP. For full species accounts please refer to the following sources:

- Species Profile and Threats Database King Island Brown Thornbill[1]
- Species Profile and Threats Database King Island Scrubtit[2]
- National King Island Biodiversity Management Plan (DPIPWE 2012)

[1] Species Profile and Threats Database, King Island Brown Thornbill
https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59430
[2] Species Profile and Threats Database, King Island Scrubtit
http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=82329

2.5.1 King Island Brown Thornbill (Acanthiza pusilla archibaldi)

King Island Brown Thornbill. Image: Barry Baker

Brown Thornbills *Acanthiza pusilla* occur in south-eastern mainland Australia and Tasmania. The King Island Brown Thornbill *Acanthiza pusilla archibaldi* is a subspecies and differs from the Tasmanian mainland subspecies, *Acanthiza pusilla diemensis*, by having a distinctly longer bill — 16.2 mm compared to 11 –13 mm (Higgins and Peter 2002).

The King Island Brown Thornbill is a small bird, 9–11.5 cm long and weighing about 7 grams, with a russet-brown forehead with indistinct pale scalloping, red eyes, olive-brown upperparts, a grey-brown tail with a dark band near the end, and off-white underparts with bold blackish streaks on the chin, throat and breast. Sexes appear the same, but males are possibly larger than females (Bryant and Jackson 1999). Brown Thornbills on mainland Tasmania usually occur singly, in twos or in small family groups, and this is also likely to be true of the King Island subspecies.

Very little is known about King Island Brown Thornbill. The Tasmanian mainland subspecies feeds mainly on small insects in the canopy foliage, and this is also likely to be the case for the King Island subspecies. A domed nest consisting of shredded bark, grass and moss is usually built near the ground, and the clutch size is usually 3–4 eggs, which are white with fine reddish-brown spots. The breeding season is thought to run from September to December (Bryant and Jackson 1999).

Distribution and Habitat
The King Island Brown Thornbill is endemic to King Island. Before 2012, the only confirmed records of the subspecies were of four birds collected in 1902, one bird collected in Pegarah State Forest in 1968, two birds mist-netted at Loorana in 1971, and two birds seen in Pegarah State Forest in 2002. Sightings made by amateurs between 2012 and 2018 gave hope for the future of the taxa.

Webb and Crates (2019) provided the first systematically collected data on the King Island Brown Thornbill's occurrence. In their March 2019 surveys, Webb and Crates (2019) recorded the King Island Brown Thornbill at 38 sites, mostly in Pegarah State Forest and surrounding habitat. While the King Island Brown Thornbill occurs at relatively low densities, it is likely that most (if not all) suitable habitat is utilised in this area. Using the maximum number of birds counted at a site, the mean number of birds recorded at occupied sites was estimated as 1.68 (range 1–3 birds).

King Island Brown Thornbills were found in remnant eucalypt forest in the agricultural matrix, over 7km from Pegarah, and another location 2km away. Sampling intensity outside of Pegarah was minimal due to available resources for the study, but visual and remote assessments of unsampled forest remnants near Pegarah and elsewhere on the island warrant urgent surveys (Webb and Crates 2019).

The King Island Brown Thornbill appears to be linked to the presence of eucalypt forest/woodland and other communities where *Eucalyptus* species are present, including *E. obliqua* plantations in Pegarah State Forest (Webb and Crates 2019). Eucalypts (including *E. brookeriana, E. viminalis, E. globulus, E. obliqua* and *possibly E. ovata*) were present at all sites the King Island Brown Thornbill was detected, either dominating the canopy or occurring as a subdominant component of the canopy. Midstorey and understorey cover varied from zero to >50% cover.

Birds were regularly observed feeding on the trunks and limbs of eucalypts, probing their long bills into crevices and under bark. Foraging was also observed in other tree species (e.g. *Melaleuca ericifolia, Banksia marginata*). Structural complexity in the understorey or midstorey may be an important factor influencing habitat quality or functionality for particular purposes (e.g. nesting, feeding, predator avoidance) but further research is required to determine this (Webb and Crates 2019).

Populations
The King Island Brown Thornbill is thought to have once been widespread across King Island (Garnett and Crowley 2000). The subspecies in now thought to be restricted to a few remaining habitat remnants (see above). The number of mature individuals has been estimated to be fewer than 50 breeding birds. All known subpopulations on King Island, and any new subpopulations found, are considered important for the survival of the species.

Habitat critical to the survival of the species
Habitat which is critical to the survival of the King Island Brown Thornbill on King Island includes all remaining patches of potential habitat (eucalypt forest, woodland and tea tree thickets; Threatened Species Section 2012), including wet forest and wet scrub (Webb and Crates 2019).

2.5.2 King Island Scrubtit (*Acanthornis magna greeniana*)

King Island Scrubtit. Image: Adrian Boyle

The King Island Scrubtit *Acanthornis magna greeniana* is about 11–12 cm long and weighs around 8.5–11 grams. The adults are brown above with a black nape, prominent cream throat and breast, with a white ring around each eye, yellowish irides, a grey 'mask', a greyish-black bill, two white spots on the shoulder of each wing, white margins on some feathers of the wings, a black band across the end of the tail, and pinkish-brown to grey feet and legs. If viewed at close range, juvenile birds can be distinguished from the adults on the basis of their duller plumage, smaller and less prominent white spots on the wings, finer white margins on the feathers of the wings, and a pale nape.

The King Island Scrubtit has been recorded in pairs and family parties of three or four birds. It is often difficult to see due to its secretive nature and can be easily confused with the Tasmanian Thornbill and Tasmanian Scrubwren.

The King Island Scrubtit feeds on insects and other invertebrates among bark, litter and foliage. It breeds from September to December, laying three white, lightly spotted eggs in a woven, domed nest.

Distribution and Habitat
The King Island Scrubtit may have formerly occurred across much of King Island but has undergone a significant reduction in range since European settlement (Garnett *et al*. 2011). The King Island Scrubtit was recorded at Yellow Rock, the Nook Swamps, Pass River and Pegarah State Forest in the late 1960s and early 1970s.

Habitat modelling by Webb *et al*. (2016) identified old growth Swamp Paperbark (*Melaleuca ericifolia*) forest with structural complexity in the understorey as key habitat for this bird species. Habitat requirements included: (1) *M. ericifolia* forest and other forest communities where *M. ericifolia* is subdominant; (2) the presence of at least some *relatively* mature *M. ericifolia* trees; and (3) the presence of a complex understorey and/or forest debris (e.g. fallen trees and branches) (Webb *et al*. 2016).

Recent studies by Webb and Crates (2019) indicate King Island Scrubtit now occurs at Nook Swamps, Colliers Swamp and Pegarah State Forest - which is one of the largest remnant patches of native forest on King Island, and which is connected to Lavinia State Reserve by corridors of suitable habitat.

Wherever Webb and Crates (2019) detected the King Island Scrubtit: *M. ericifolia* was present in the canopy at 80% of sites; canopy cover was >30% at all sites; only 46% of sites supported any notable midstorey vegetation (i.e. >20% cover); and 88% supported a moderate to dense understorey (i.e. >30%).

Importantly, Webb and Crates (2019) found King Island Scrubtits at a proportion of sites where *M. ericifolia* was absent or not a canopy species; however, *M. ericifolia* was generally present close by.

They noted that this reinforces the need to recognise that the King Island Scrubtit occupies sites that would not be identified as *M. ericifolia* Swamp Forest using standard on ground or remote vegetation mapping techniques and/or accepted vegetation classifications, and that *M. ericifolia* often occurs as a subdominant species, or in small patches (e.g. <1 ha) embedded within other vegetation communities (Barnes *et al*. 2002). Webb and Crates (2019) noted that vegetation mapping is rarely undertaken at the resolution required to accurately identify potential King Island Scrubtit habitat.

Populations
The population of King Island Scrubtit has been estimated to consist of 50 or fewer mature individuals (Garnett *et al*. 2011). More recently, Webb *et al*. (2016) indicated that a population size of 50 mature individuals may in fact be optimistic. The small size of the King Island Scrubtit population makes all surviving subpopulations crucial to the long-term survival of the subspecies.

Habitat critical to the survival of the subspecies
Habitat critical for the survival of the King Island Scrubtit includes sites with known subpopulations including Nook Swamps, Colliers Swamp and Pegarah State Forest and all patches of wet sclerophyll forest and swamp forest (DPIPWE 2012). The combined estimated area of occupancy (AOO) is less than 1 km^2 (Webb *et al*. 2016). Swamp Paperbark is an essential habitat element for this species (Webb *et al*. 2016).

2.5.3 King Island forest systems

In the early twentieth century, a number of significant lagoons and swamp forests in the north of King Island were drained, impacting on *Melaleuca ericifolia* swamp forest and *Acacia melanoxylon* swamp forest in particular. Extensive *Eucalyptus globulus* forests on the Island's 'plateau' have also been lost, their demise being aided by a series of major burns in the late 19th and early 20th centuries (Finzel 2004). Frequent and intense fires over King Island's European history have eliminated most flora and fauna associated with rainforest and wet forest from areas of the island. More recently, fires in 2001 and 2007 burnt extensive tracts of the Island's remaining native vegetation, in particular within Lavinia State Reserve. The remaining remnant native vegetation is scattered throughout a rural landscape and most patches are small, fragmented, and isolated — at least 8% occur in narrow bands and as small remnants (Barnes *et al*. 2002). Most patches of vegetation are separated by pasture, with limited or no connectivity, particularly for native species with low mobility, such as snails (KI BMP 2012).

Remaining native vegetation on King Island covers an area of 36,456 ha, made up of 36 vegetation mapping units (TASVEG), 29 of which are native. Recognised forest communities make up about 7,274 ha (20%) of the remaining vegetation and 'Scrub Complex on King Island' about 19,021 ha (53%) (TASVEG 3.0, DPIPWE 2018).

The Tasmanian Forests and Woodlands dominated by Black Gum *Eucalyptus ovata* or Brookers gum *E. brookeriana* ecological communities are listed as Critically Endangered under the EPBC Act.

Threatened forest communities listed on the Nature Conservation Act 2002:

- *Eucalyptus ovata* forest and woodland (DOV); 596 ha
- *Eucalyptus brookeriana* wet forest (WBR); 952 ha
- King Island Eucalypt woodland (DKW); 508 ha
- *Eucalyptus globulus* King Island forest (WGK); 1523 ha
- *Melaleuca ericifolia* swamp forest (NME); 769 ha

Non-threatened forest vegetation communities

- *Acacia melanoxylon* swamp forest (NAF); 88 ha
- *Leptospermum* forest (NLE); 2839 ha

Scrub communities are the most common vegetation type on King Island and make up almost 73% of the remaining native vegetation on the island. 'Scrub Complex on King Island' is endemic to King Island and comprises a successional series of vegetation communities from sedgeland through heathland to scrub. It is by far the most extensive vegetation community mapped on the Island, comprising about 53% of the Island's extant vegetation. The scrub component of Scrub Complex on King Island is dominated by *Melaleuca* and *Leptospermum*, and in wetter sites the canopy can often be dense, shading out the heath species. *Eucalyptus viminalis* and *E. brookeriana* can be emergent above the tall shrubs. Succession to woodland and forest vegetation

occurs, albeit slowly, and is determined by soil fertility, waterlogging and fire frequency (Barnes *et al*. 2002).

Before European settlement Scrub complex on King Island was thought to occupy much of the undulating plains on the Island, but much of it has been cleared for pasture. Analysis of non-forest vegetation types suggest that up to 40% of its pre-1750 distribution has been lost (RPDC 2003). While some large blocks of this vegetation type occur, it is also subject to gradual deterioration and continuing decline. The mapping of Scrub complex on King Island is difficult and it is likely that areas of other vegetation communities are found within the current mapped extent. This suggests that the actual extent of this community is probably less than is currently thought (Bell and Casey 2018).

2.6 Viability of Conservation Targets

The next step is an assessment of the '*viability*' (or overall health) of the conservation targets. Viability analysis asks you to look at each of your conservation targets carefully to determine how to measure its "health" over time (indicator) (see Box 3), and then to identify how the target is doing today and what a "healthy state" might look like (goal) (see Box 4). This step identifies which of your targets are most in need of immediate attention.

The viability assessment involved a seven-step process that began with definition of key ecological attributes (KEAs) for each conservation target. KEAs are aspects of a target's biology or ecology that, if present, defines a healthy target and, if missing or altered, would lead to the outright loss or extreme degradation of that target over time. They can be grouped into three classes:

- ***Size*** - a measure of the area or abundance of the conservation target's occurrence.
- ***Condition***- a measure of the biological composition, structure and biotic interactions that characterise the target.
- ***Landscape context*** - an assessment of the target's environment, including ecological.

A small number of indicators were selected that allowed the planning process to define the current and preferred future status of each KEA. These were in turn used to assign a current status that could be used to evaluate relative change in health. The resulting indicators, status measures and target viability conclusions are detailed in Table 4.

Box 3. Assessing the viability of conservation targets
(From: Conservation Measures Partnership 2020)

At the most basic level, this step involves using available evidence to develop an overall assessment of the health or "viability" of each conservation target. More detailed status assessments involve specifying key attributes of each conservation target, determining indicators for each attribute, outlining the acceptable range of variation for each indicator, and finally determining the current status (i.e., baseline value or trend) of the attribute in reference to this range of variation. This information sets the foundation for developing good goals for your conservation targets, monitoring target status, and understanding key threats to your targets. In some cases, however, it may be better to address target viability later in the Conservation Standards process, especially if you need to consult with subject experts and/or you are still refining your targets.

A complete viability assessment involves seven steps:

Step 1. Select a target and identify a limited set of key ecological attributes
Step 2. Select indicators for each key ecological attribute
Step 3. Determine acceptable range of variation and rating scale for each attribute
Step 4. Determine current and desired future status of each attribute
Step 5. Record any assumptions
Step 6. Repeat this process for all your targets
Step 7. Review viability assessments and adjust as necessary

Assigning one rating to represent the overall status of most conservation targets is a difficult task that involves making many assumptions. As a general rule, this rating process involves determining one or more attributes and/or indicators that represent the health of the target and then assessing the status of these indicators against a predetermined rating scale:

Very good: Ecologically desirable status; requires little intervention for maintenance.
Good: Within acceptable range of variation; some intervention required for maintenance.
Fair: Outside acceptable range of variation; requires human intervention.
Poor: Restoration increasingly difficult; may result in extirpation of target.

Box 4. Setting goals
(From: Conservation Measures Partnership 2020)

Developing a clear idea of what you would like to accomplish is the essential first part of putting together your action plan. Goals are linked to your project's conservation targets and represent the desired status of those targets over the long term. They are formal statements of the ultimate impacts you hope to achieve. A good goal meets "SMART" criteria: specific, measurable, achievable, results-oriented, and time-limited.

If you conducted a viability assessment, you have already defined the elements of a good goal because you know the key attributes needed for a healthy conservation target, you know by when you hope to achieve the desired status, and you know what you need to measure to assess its health. Developing a goal is simply a matter of converting this information into a goal statement.

Table 4. Goals, Indicators and target viability assessment for Threatened King Island Birds

Target/Goal/Indicator	Overall Status
KING ISLAND BROWN THORNBILL **Goal** Five sustainable populations on King Island (*~More than 500 birds at 5 separate locations)*	**Poor**
Indicators 1. Number of birds (currently <50)	Poor
2. Number of locations (currently ~2)	Poor
KING ISLAND SCRUBTIT **Goal** Five sustainable populations on King Island (*~More than 500 birds at 5 separate locations)*	**Poor**
Indicators 1. Number of birds (currently <50)	Poor
2. Number of locations (currently 3)	Poor
FOREST SYSTEMS **Goal** Increase, protect, and enhance KIS and KIBT habitat	**Poor**
Indicators 1. Area of forests with mature trees	Poor
2. Area of forests with understory/midstorey	Poor
3. Area of forest	Poor

2.7 Threats to Conservation Targets

Both birds have been widely recognised as being at high risk of extinction for over two decades. Initiation of the TKIB CAP process was the result of:

- Ongoing advocacy efforts by members of the King Island Natural Resource Management Group
- The work of Matthew Webb, Mark Holdsworth and other key ornithologists indicating that King Island Scubtit is likely to be Australia's next avian extinction (Webb *et al*. 2016)
- A recent systematic assessment that ranked the King Island Brown Thornbill and King Island Scrubtit as the first and third (respectively) most likely Australian avian extinctions to occur within the next 20 years, with respective estimated extinction probabilities of 94% and 83% (Geyle *et al*. 2018)
- BirdLife Australia initiating a Preventing Extinctions Program with a specific focus on Australia's 20 birds most likely to become extinct in the next 20 years (Geyle *et al*. 2018).

Workshop participants identified eight key threats (Table 5), of which the most pressing four relate to habitat loss.

Box 5. Methodology for Assessing Threats

After defining a series of conservation targets, the next step is to identify the high priority or critical threats to each. There are a number of threat rating and ranking tools that can be used to help in this prioritisation process. Most of these assess the scope or extent of the threat and its severity on the conservation targets. Taken together, these two criteria assess overall threat magnitude.

The CAP methodology assesses the impact of direct threats on targets. 'Summary Threat Ratings' are derived using a rule-based system based on combining values for the 'scope', 'severity' and 'irreversibility' of the threat upon each target.

Scope – Defined spatially as the proportion of the target that can reasonably be expected to be affected by the threat within ten years, given the continuation of current circumstances and trends. For species, measured as the proportion of the target's population.

Very High: The threat is likely to be pervasive in its scope, affecting the target across all or most (71100%) of its occurrence/population.
High: The threat is likely to be widespread in its scope, affecting the target across much (31–70%) of its occurrence/population.
Medium: The threat is likely to be restricted in its scope, affecting the target across some (11–30%) of its occurrence/population.
Low: The threat is likely to be very narrow in its scope, affecting the target across a small proportion (1–10%) of its occurrence/population.

Severity – Within the scope, the level of damage to the target from the threat that can reasonably be expected if current circumstances and trends persist. For species, usually measured as the degree of reduction of the target population within the scope.

Very High: The threat is likely to destroy or eliminate the target, or reduce its population by 71–100% within 3 years or 3 generations.
High: The threat is likely to seriously degrade/reduce the target, or reduce its population by 31–70% within 10 years or 3 generations.
Medium: The threat is likely to moderately degrade/reduce the target, or reduce its population by 11–30% within 10 years or 3 generations.
Low: The threat is likely to only slightly degrade/reduce the target, or reduce its population by 1–10% within 10 years or 3 generations.

Irreversibility – The degree to which the effects of a threat can be reversed and the target affected by the threat restored.

Very High: The effects of the threat cannot be reversed and it is very unlikely the target can be restored, and/or it would take more than 100 years to achieve this.
High: The effects of the threat technically can be reversed and the target restored but it is not affordable and/or it would take 21–100 years to achieve this.
Medium: The effects of the threat can be reversed and the target restored with a reasonable commitment of resources and/or within 6–20 years.
Low: The effects of the threat are easily reversible and the target can be easily restored at a relatively low cost and/or within 5 years.

Once threats have been identified and ranked it can be useful to brainstorm the contributing factors (Indirect threats and Opportunities) for each. This enables the preparation of a conceptual model showing the relationships between each underlying circumstance that leads to one or more direct threat.

Table 5. Threat ratings for each of the three TKIB CAP targets

Threats\Targets	Forest Systems	King Island Brown Thornbill	King Island Scrubtit	Summary Threat Rating
1. Fire‡	**High**	**Very High**	**High**	**High**
2. Land clearing‡	**High**			**High**
3. Grazing by wallabies‡	**High**			**High**
4. Grazing by Fallow Deer	**High**			**High**
Threats not assessed				
Predation				
5. Cats				
6. Rats				
7. Ravens				
Other				
8. Ticks, disease and genetic suppression				
Overall threat rating for each target	**High**	**Very High**	**High**	**Overall Project Rating**
				VERY HIGH

‡*Contributing factors were subsequently identified for these threats. See Appendix 1.*

2.7.1 Fire (large scale, high proportion of reserve)

Workshop participants nominated fire as a key threat, specifically large-scale fires that may impact a high proportion of Threatened King Island Birds habitat (e.g. Pegarah). While fire was found to have a 'high' summary threat rating overall, the risk to the King Island Brown Thornbill was ranked as 'very high' based on the threat to Pegarah.

It is well documented that changes in fire regimes have drastically affected the age, structure, and composition of remaining vegetation on King Island (Donaghey *et al*. 2011). Large-scale fires, such as the fires in Nook Swamps of 2007 that burnt for many weeks, have the potential to drastically reduce the amount of available habitat and to make it unsuitable for many years. In some cases, it is unlikely that the vegetation has the capacity to return to the original swamp forest after the deep organic soils have

also been eliminated by fire. It is possible that where fires trigger further degrading processes, such as soil acidification in areas with acid sulfate soils, the impacts may be practically irreversible (Webb *et al*. 2016).

There is an urgent need to determine the species' response to fire (e.g. fire response curves) and to understand factors affecting post-fire recovery of species' habitat. Fire response curves indicate the extent to which a species depends on particular post-fire ages and may also identify time-since-fire thresholds necessary to ensure required habitat resources are available.

2.7.2 Land clearing

Land clearing was given a 'medium' threat rating based on the scope of the threat (i.e. only impacting a proportion of the species' extent).

Since European settlement, King Island has been highly modified by human activities. Clearance and conversion to agriculture has reduced the extent of native vegetation to approximately one third of the Island's area (Barnes *et al*. 2002). The King Island Scrubtit and the King Island Brown Thornbill rely on fragmented, isolated, and often degraded relict patches of native vegetation.

A key risk to both birds is the lack of clear descriptions of their habitat requirements that are needed to guide decision-making processes on applications for land clearing. The high economic value of agricultural products to both the King Island and Tasmanian economies places remaining vegetation on the Island at risk. This is clearly demonstrated in the Tasmanian Government's support for the majority of the island to be zoned for agriculture, and in its policy of allowing land owners to clear up to 40 hectares of non-threatened forest vegetation every year. Clearing of non-threatened forest vegetation requires an approved forest practices plan, but there are nolimits or permit requirements for the clearance and conversion of non-threatened, non-forest vegetation. Threatened native vegetation communities listed under the Tasmanian *Nature Conservation Act* 2002 are generally not available for clearance and conversion.

It is therefore urgent that critical habitat for both taxa is clearly identified and mapped. Both birds are Matters of National Environmental Significance, and any clearing (or other action) that is likely to have a significant impact on them will need to be referred to the Federal Government for assessment under the *Environment Protection and Biodiversity Conservation Act 1999*. There is a requirement to get a permit to take a species listed under the Tasmanian *Threatened Species Protection Act 1995*.

Further to planning reforms, the King Island Planning Scheme is still under review and the King Island Interim Planning Scheme 2013 is in force until reforms are finalised. Although the State Planning Provisions came into effect in 2017, they will have no practical effect until a Local Provisions Schedules is made by council. Under the Tasmanian Planning Scheme and guided by the Natural Assets Code, King Island Council should be able to use 'Priority vegetation areas' (in combination with other legislation such as the *Nature Conservation Act 2002* and the *Threatened Species*

Protection Act 1995) to protect threatened species, significant habitat for threatened fauna, and other locally important native vegetation. The 'priority vegetation area' overlay is to be based on the Department of Primary Industries, Parks, Water and Environment's TASVEG mapping for threatened native vegetation communities and Natural Values Atlas for threatened species. Nonetheless, King island Council should also have the ability to prepare an alternate 'priority vegetation area' overlay based on more recent or detailed local assessment of the mapping and data, or native vegetation of local importance, including habitat for native fauna. The Natural Assets Code is expected to consolidate the requirements for the assessment of impacts of developments on natural values associated with native vegetation into a single code. However, note that the 'priority vegetation area' overlay, and hence the Natural Assets Code, will not apply to the 'Agriculture Zone' or to land clearing conducted in accordance with a forest practices plan certified under the *Forest Practices Act 1985*.

2.7.3 Grazing by wallabies

Workshop participants identified intense grazing pressure by wallabies, particularly where habitat is close to pasture, as a key threat. Seedling establishment and understorey development is prevented, or limited, by grazing pressure. Wallaby grazing was given a 'medium' threat rating based on the scope of the threat (i.e. only impacting a proportion of the species' extent).

Webb *et al*. (2016) noted extensive damage to habitat from wallaby browsing which can have a strong effect on the structure of native vegetation. This is recognised as a major problem on King Island (Norton and Johannson 2010) and suppression of the understorey by browsing herbivores may diminish habitat quality for King Island Scrubtits. Given the small area of occupied habitat available, these processes may pose a serious risk to local persistence of King Island Scrubtit subpopulations (Webb *et al*. 2016).

2.7.4 Grazing by Fallow Deer

During the workshop, the overall threat to Forest Systems from Fallow Deer was assessed as 'Medium' (Scope 'Medium', Severity 'High and Irreversibility 'High'). Workshop participants discussed the emerging threat from Fallow Deer and initially rated this as a 'low' overall threat to KITB's. In subsequent discussions, participants reflected that without urgent action, the Fallow Deer population will increase dramatically and spread across the entire island with a 'severe' impact on Forest Systems.

Participants strongly support the Tasmanian Government's plans to eradicate this invasive pest species from the Island and urge the government to undertake the program as soon as possible. Legislation (Wildlife Regulations) relating to deer management are currently under review (as at September 2020). Amended legislation is expected to permit more hunting than currently the case. In addition, an overarching Deer Management Plan for the State is due to be finalised in 2022. Although focused on mainland Tasmania, King Island is included in the scope of the Deer Management Plan.

2.7.5 Other threats

Little is known about how predation pressure associated with cats, rats and ravens are impacting on TKIBs or how ticks may be impacting their health. The general consensus of workshop participants was that these threats are unlikely to be as significant as threats leading to habitat loss, and they were therefore not assessed. Increased parasite burdens often reflect increased stress from other threats such as from habitat loss and degradation.

Contributing factors were identified for each of the highest ranked threats (high and medium).

Tree ferns in a gully, King Island. Image: Catherine Young

3. ASSESSMENT OF CONSERVATION SITUATION

BOX 6. Methodology for assessing the conservation situation
(From: Conservation Measures Partnership 2020)

This sub-step builds on work you have already done related to your project context (scope, conservation targets, and direct threats). These are all elements of a situation analysis – a process that will help you and your project team create a common understanding of your project's context, including describing the relationships among the social, economic, political, and institutional systems and associated stakeholders that affect the conservation targets you want to conserve.

In this sub-step, you should review available evidence to complete your situation analysis, identifying the key factors that drive the direct threats or maintain poor viability and ultimately influence your conservation targets. These include indirect threats (also known as root causes and drivers), opportunities, and enabling conditions. These factors can range in scale from local to global. To the degree that it is feasible and useful, you should identify the actors behind key factors for clarity and strategic purposes.

Stakeholders include those individuals, groups, or institutions that have a vested interest in or can influence the natural resources of the project area and/or that may be affected by project activities and have something to gain or lose. Having a good understanding of the stakeholders is a crucial part of a situation analysis. You should use your stakeholder analysis to select target audiences whose behaviour you want to affect.

One way to capture threats, opportunities, and key actors identified in your situation analysis is to construct a situation model (also known as a conceptual model). A situation model is a tool that visually portrays the relationships among the different factors in your situation analysis.

Participants worked together to capture their shared understanding of factors that contribute to the key threats to TKIB and associated Forest Ecosystems (See Appendix 1). They identified a total of more than 30 contributing factors, including a complex range of socio-economic and biophysical factors.

Participants then considered key strategies that could be used to address contributing factors and reduce the most significant threats to these highly threatened birds.

4. DEVELOPMENT OF STRATEGIES

BOX 7. Methodology for developing and prioritising Conservation Strategies

The next phase in CAP development is to identify strategies to achieve the intended goals. Once you determine what you want to accomplish (your goals), you should think about what you need to do (strategies and activities). Strategies are linked to chains of factors showing the sequence of contributing factors affecting direct threats and, ultimately, targets.

Step 1: Using your conceptual model determine at what points intervention will occur, prioritising where action is needed.

Step 2: Brainstorm draft strategies that a team could use at various points along the chain. A '*strategy*' describes a group of actions with a common focus that work together to reduce threats, capitalise on opportunities, or restore natural systems.

Step 3: Rate each draft strategy in terms of its *Potential Impact* and *Feasibility*

Potential Impact – If implemented, will the strategy lead to desired changes in the situation at your project site?

Very High: Strategy is very likely to completely mitigate a threat or restore a target.
High: Strategy is likely to help mitigate a threat or restore a target.
Medium: Strategy could possibly help mitigate a threat or restore a target.
Low: Strategy will probably not contribute to meaningful threat mitigation or target restoration.

Feasibility – Would your project team be able to implement the strategy within likely time, financial, staffing, ethical, and other constraints?

Very High: Strategy is ethically, technically, and financially feasible.
High: Strategy is ethically and technically feasible but may require some additional financial resources.
Medium: Strategy is ethically feasible, but either technically or financially difficult without substantial additional resources.
Low: Strategy is not ethically, technically, or financially feasible.

Results chains are a key tool for developing strategies as they clarify assumptions about how conservation activities are believed to contribute to reducing threats and achieving the conservation of biodiversity or thematic targets. They are diagrams that map out a series of causal statements that link factors in an "if...then" fashion.

Results chains are composed of a strategy, desired outcomes including intermediate results (blue rectangle) and threat reduction results (purple rectangle), and the ultimate impact that these results will have on the biodiversity target.

Workshop participants identified 16 strategies that could be used to address factors that contribute to the impacts of fire, land clearing and wallaby grazing on TKIBs and their habitat (see conceptual diagram, Appendix 1).

Participants were then asked to determine the strategies most likely to be effective in mitigating threats. These were then ranked based on their potential impact, technical feasibility, and likely cost (Table 6). Note: some 'sub-strategies' have been nested under over-arching strategies (e.g. 'Updating King Island Fire Management Plan' under 'Improve fire management').

Participants then chose the most highly ranked strategies and developed results chains (see Appendix 2) together with key actions or activities required to achieve long-term recovery goals.

The highly ranked strategies (not in order of priority) are:

1. Change status of Pegarah to reserve
2. Establish insurance populations
3. Improve fire management
4. Improve land clearing controls (improve policy settings)
5. Landholder support/Stewardship incentive scheme
6. Wallaby management program
7. Fallow Deer management program

Table 6. Strategy ratings for each of the three TKIB CAP targets
(for context, see Appendix 1: Conceptual Model)

Strategy/Sub-strategies/Activities	Impact	Feasibility	Cost	Total
Change status of Pegarah to reserve	VH	M	H	**M**
Establish insurance populations	H	H	H	**H**
Improve fire management				
Develop new Fire Management Plan for Parks and Wildlife Service Reserves	M	VH	H	**H**
Education & community engagement re fire as a threat	M	VH	VH	**H**
Increase support for firefighting, especially for neighbours of bird sites	H	H	H	**H**
Improve land clearing controls (improve policy settings)	VH	M	H	**M**
Landholder engagement				
More accurate mapping				
Landholder support/Stewardship incentive scheme	H	H	M	**M**
Wallaby management program				
Strategic culling program	L	H	M	**L**
Wallaby-proof fencing	H	VH	H	**H**
Fallow Deer management program				
Community education (about benefits of natural values)*	M	H	H	**M**
Corporate farm education about benefits of natural values				
Landholder education about benefits of natural values				

* Incorporated within other strategies

5. CONSERVATION STRATEGIES, OBJECTIVES AND ACTIVITIES

For each priority strategy, workshop participants identified priority activities and developed associated work programs and budgets and subsequently updated via stakeholder engagement during September – October 2020.

Some activities are required across one or more strategies. For example, island-wide, seasonal bird surveys are required to determine the distribution and abundance of both birds, and to gain a better understanding of species' habitat requirements. The results of these studies will underpin any translocation program and determine priority areas for protection from land clearing, wallaby and deer grazing, and fire. Likewise, community and corporate education about the birds is needed to garner community support across programs.

6. MONITORING PLAN

A monitoring plan is to be developed, documenting indicators, methods, spatial scale and locations, timelines, roles and responsibilities for collecting data.

BOX 8. Development of a monitoring plan
(From: Conservation Measures Partnership 2020)

Your monitoring plan will help you track progress toward stated goals and objectives, evaluate progress along and key assumptions associated with your theory of change, and address information needs related to uncertainties in your situation analysis, strategy selection, and/or theories of change.

To start developing your monitoring plan, you should specify your audiences and their information needs. Effective monitoring uses the minimum amount of financial and human resources to provide you with the information needed to address key uncertainties and/or determine if your project is on track and achieving stated objectives.

By focusing your monitoring efforts squarely on the core assumptions you have made (illustrated in your situation model and results chains) and the key uncertainties you have identified, you are more likely to collect only the information that will be useful for addressing specific information needs (e.g. status of threats, achievement of results, areas of uncertainty). If your monitoring is designed to help understand why actions are working or not, you should be sure to monitor not just specific results, objectives, or goals, but also key factors that may contribute to or detract from your ability to achieve your desired results.

With your audiences and information needs identified, the next step is to define the specific indicators and/or data you should collect to address your information needs. As you develop your indicators and identify key information needs, you will need to think about how you will measure them (i.e. the methods you will use).

7. OPERATIONAL PLAN

Operational elements of the CAP are to be further developed, including a capacity and resourcing strategy, and risk assessment and associated mitigation.

BOX 9. Development of an operational plan
(From: Conservation Measures Partnership 2020)

This step involves developing an operational plan for your project. Key components of an operational plan include analyses of:

- Funding required to implement your project and an accounting of your current and potential sources of these funds.
- Human capacity, skills, and other non-financial resources required to implement your project and what you need to do to develop those resources, including cultivating partnerships.
- Risk factors of concern for your project and how they can be addressed.

8. WORK PLAN

A 1-year Work Plan was drafted during October – November 2020.

9. ANALYSE AND ADAPT

BOX 10. Analyse and adapt
(From: Conservation Measures Partnership 2020)

This step of the Conservation Standards involves managing your data as they come in and regularly analysing them to convert them into useful information and knowledge. In particular, you need to analyse your project's results, core assumptions, key uncertainties, and relevant operational and financial data, and then adapt your work plan as necessary.

10. SHARE

BOX 11. Share
(From: Conservation Measures Partnership 2020)

This final step in the Conservation Standards cycle involves sharing lessons and formal products with key internal and external audiences. It also involves giving and receiving feedback and promoting a learning culture.

REFERENCES

Australian Government (2018). Collaborative Australian Protected Area Database (CAPAD). https://www.environment.gov.au/land/nrs/science/capad (accessed 10 March 2021).

Barnes, R.W., Duncan, F., and Todd, C.S. (2002). *The Native Vegetation of King Island, Bass Strait*. Nature Conservation Report 02/6, Nature Conservation Branch, Department of Primary Industries, Water and Environment, Hobart.

Bell, P. & Casey, S., 2018. Review of the conservation status of native vegetation communities on King Island, s.l.: Tasmanian Forest Practices Authority.

BirdLife International (2019) *Important Bird Areas factsheet: King Island.* http://datazone.birdlife.org/site/factsheet/king-island-iba-australia (accessed 30 July 2019).

Conservation Measures Partnership (2020) *Open Standards for the Practice of Conservation, Version 4.0*. https://conservationstandards.org/wp-content/uploads/sites/3/2020/10/CMP-Open-Standards-for-the-Practice-of-Conservation-v4.0.pdf (accessed 23 February 2021).

DPIPWE (2018). Tasmanian Vegetation Monitoring and Mapping Program TASVEG 3.0. Department of Primary Industries, Parks, Water and Environment.

DPIPWE (2012). Threatened Species Section, *King Island Biodiversity Management Plan.* Department of Primary Industries, Parks, Water and Environment.

Donaghey, R. (Ed) (2003). *The Fauna of King Island. A guide to identification and conservation management*. King Island Natural Resource Management Group, Currie, King Island.

Finzel, E. (Ed.) (2004). From gentle giants to green pastures: A history of environmental change on King Island. King Island Natural Resource Management Group, Currie, King Island

Garnett, S.T., and Crowley, G.M. (2000). *The Action Plan for Australian Birds 2000*. Environment Australia, Canberra.

Garnett, S. T., Szabo, J., and Dutson, G. (2011). *The Action Plan for Australian Birds 2010.* CSIRO Publishing, Melbourne.

Geyle, H.M., Woinarski, J.C.Z., Baker, G.B., Dickman, C.R., Dutson, G., Fisher, D.O., Ford, H., Holdsworth, M., Jones, M.E., Kutt, A., Legge, S., Leiper, I., Loyn, R., Murphy, B.P., Menkhorst, P., Reside, A.E., Ritchie, E.G., Roberts, F.E., Tingley, R., and Garnett, S.T. (2018). *Quantifying Extinction Risk and Forecasting the Number of Impending Australian Bird and Mammal Extinctions*. Pacific Conservation Biology 24:157–167

Grose, M. *Local climate profile: King Island Municipality.* Antarctic Climate and Ecosystems Cooperative Research Centre,
Hobart. http://www.dpac.tas.gov.au/__data/assets/pdf_file/0006/160998/King_Island.pdf. (accessed 23 December 2019).

Higgins, P.J., and Peter, J.M. (Eds) (2002). *Handbook of Australian, New Zealand and Antarctic Birds. Vol. 6: Pardalotes to Shrike-thrushes*. Oxford University Press, Melbourne.

Norton, T., and Johannson, N. (2010). *Implications of browsing by native wildlife on improved pastures and native vegetation communities on King Island, Tasmania*. Tasmanian Institute of Agricultural Research, University of Tasmania, Hobart.

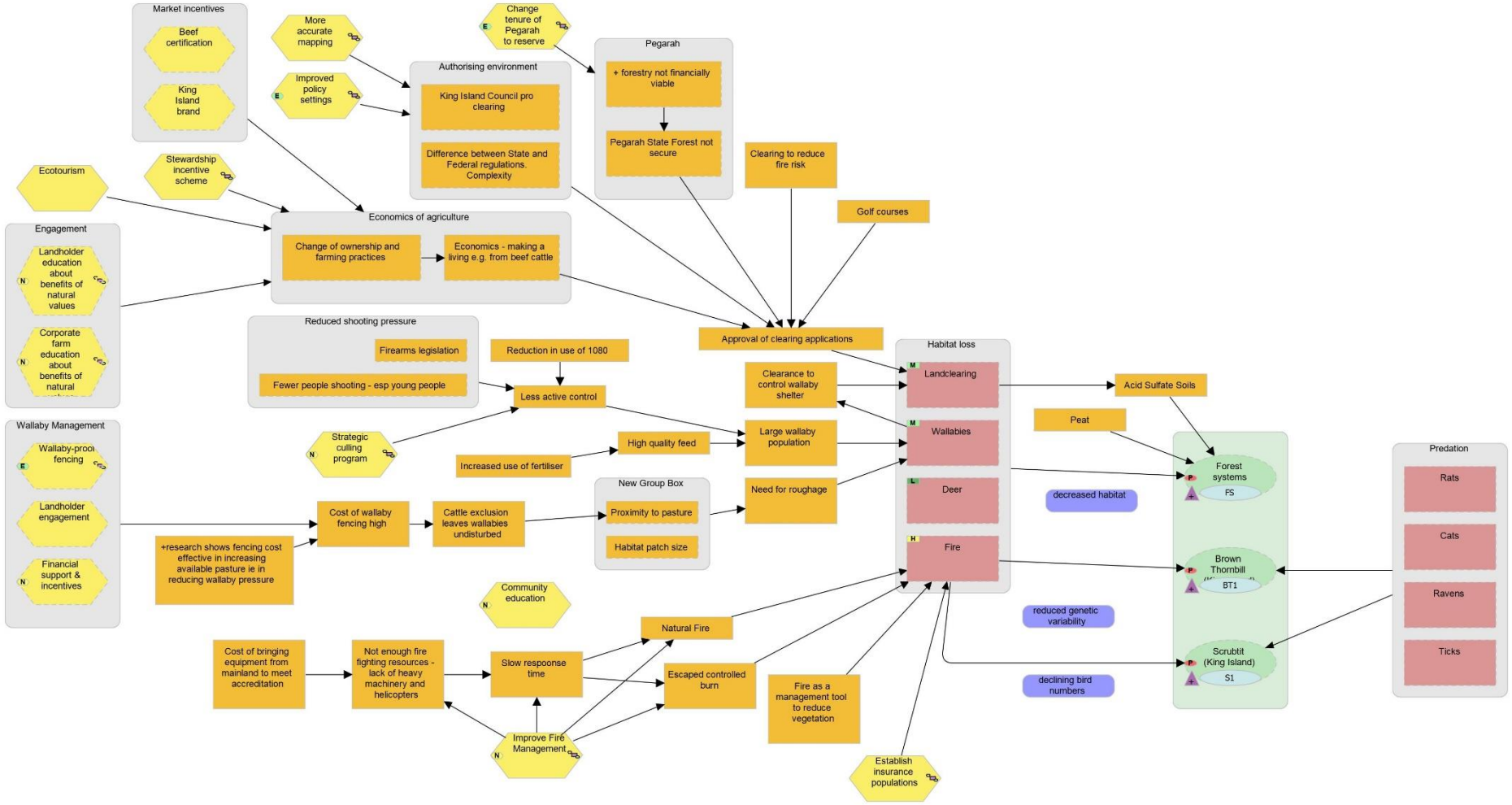
RPDC (2003). State of the environment report, Tasmania 2003. Resource Planning and Development Commission: Hobart.
Sim, R., and Thorne, A. (1990). Pleistocene human remains from King Island, southeastern Australia. *Australian Archaeology* 31: 44–51.

Webb, M H., Holdsworth, M., Stojanovic, D., Terauds, A., Bell, P., and Heinshon, R. (2016) Immediate action required to prevent another Australian avian extinction: the King Island Scrubtit. *Emu* 116: 223–229.

Webb, M H., and Crates, R. (2019) *King Island Scrubtit and Brown Thornbill Survey Results: March 2019*. Unpublished report to the Tasmanian Department of Primary Industries, Parks, Water and Environment, Hobart. http://www.birdlife.org.au/documents/PEX-M556545_Attachment_1-DPIPWE_King_Island_Bird_Report.pdf (accessed 23 December 2019).

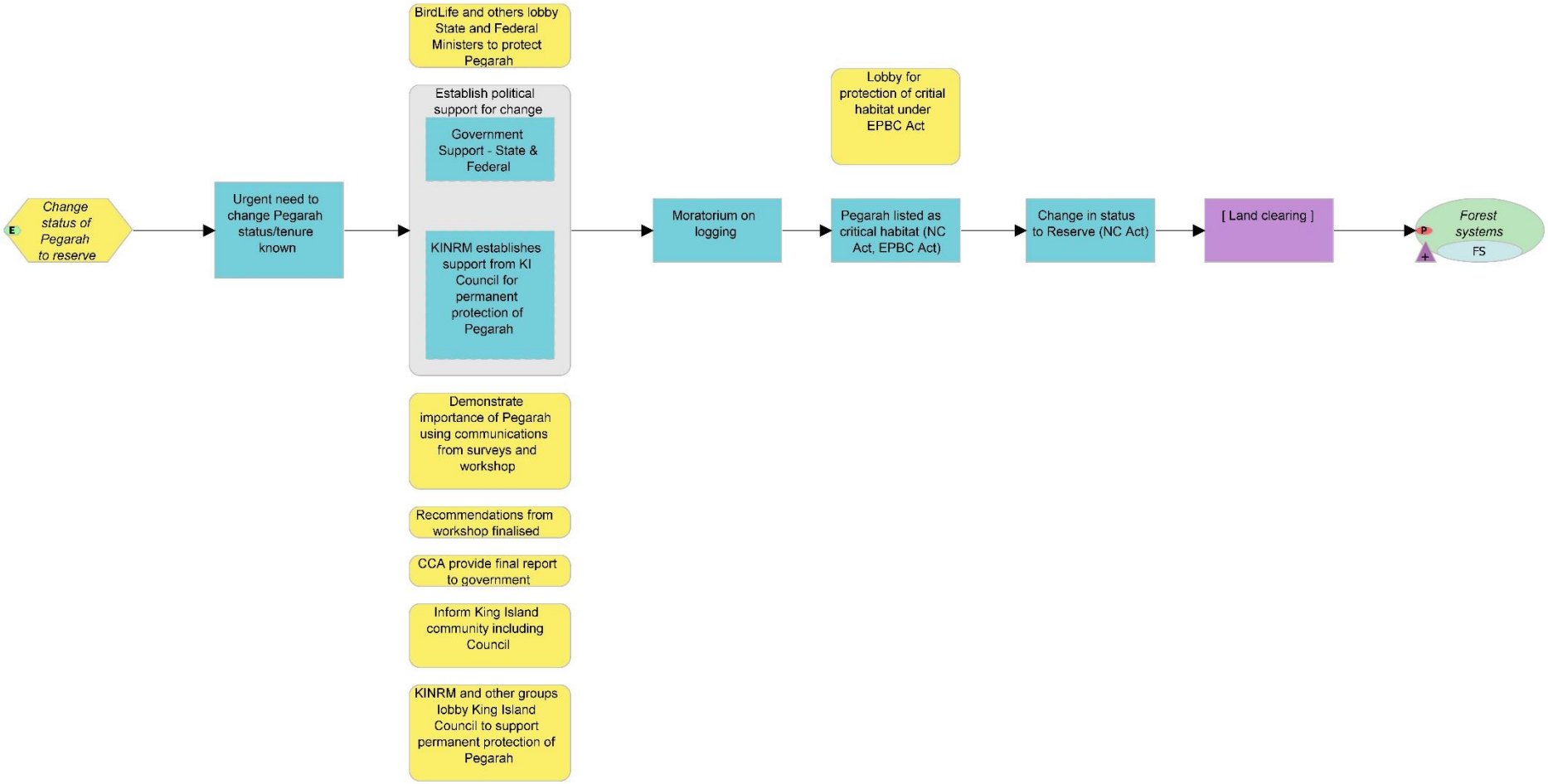
APPENDIX 1. CONCEPTUAL MODEL FOR CAP ANALYSIS AND PLANNING

Legend
Target
Strategy
Intermediate Result
Threat Reduction Result
Objective
Direct Threat
Contributing Factor
Indicator
Activity

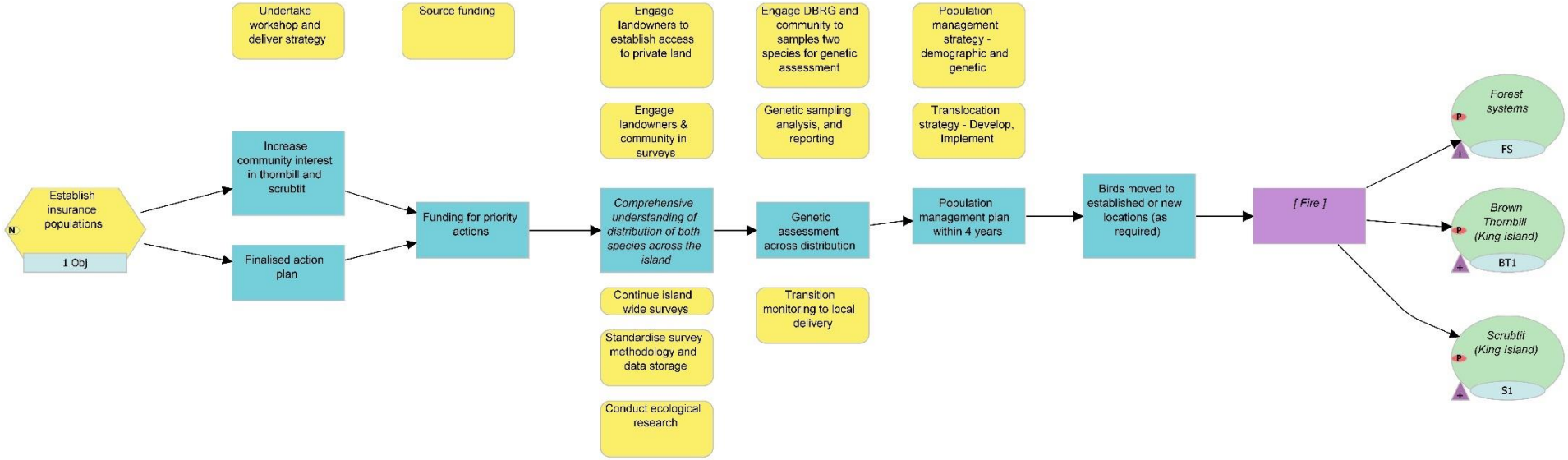

Market incentives
Beef certification
King Island brand
More accurate mapping
Improved policy settings
Change tenure of Pegarah to reserve
Authorising environment
King Island Council pro clearing
Difference between State and Federal regulations. Complexity
Pegarah
+ forestry not financially viable
Pegarah State Forest not secure
Clearing to reduce fire risk
Golf courses
Ecotourism
Stewardship incentive scheme
Economics of agriculture
Change of ownership and farming practices
Economics - making a living e.g. from beef cattle
Engagement
Landholder education about benefits of natural values
Corporate farm education about benefits of natural
Reduced shooting pressure
Firearms legislation
Fewer people shooting - esp young people
Reduction in use of 1080
Less active control
Approval of clearing applications
Habitat loss
Clearance to control wallaby shelter
Landclearing
Wallabies
Deer
Fire
Large wallaby population
Need for roughage
Strategic culling program
Increased use of fertiliser
High quality feed
Wallaby Management
Wallaby-proof fencing
Landholder engagement
Financial support & incentives
Cost of wallaby fencing high
Cattle exclusion leaves wallabies undisturbed
+research shows fencing cost effective in increasing available pasture ie in reducing wallaby pressure
New Group Box
Proximity to pasture
Habitat patch size
Community education
Natural Fire
Cost of bringing equipment from mainland to meet accreditation
Not enough fire fighting resources - lack of heavy machinery and helicopters
Slow respoonse time
Escaped controlled burn
Improve Fire Management
Fire as a management tool to reduce vegetation
Establish insurance populations
Acid Sulfate Soils
Peat
decreased habitat
reduced genetic variability
declining bird numbers
Forest systems
FS
Brown Thornbill
BT1
Scrubtit (King Island)
S1
Predation
Rats
Cats
Ravens
Ticks

APPENDIX 2. RESULTS CHAINS FOR THREATS TO THREATENED KING ISLAND BIRDS

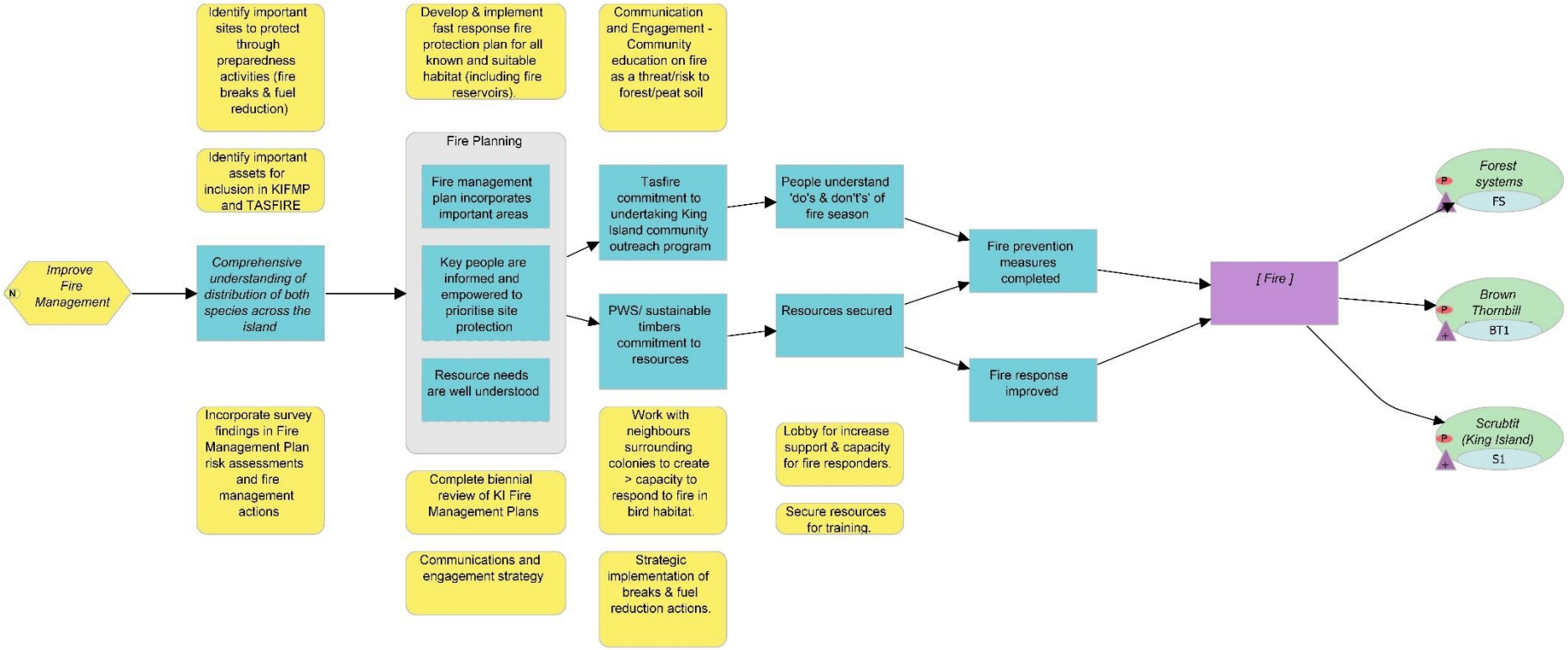
Change status of Pegarah to a reserve



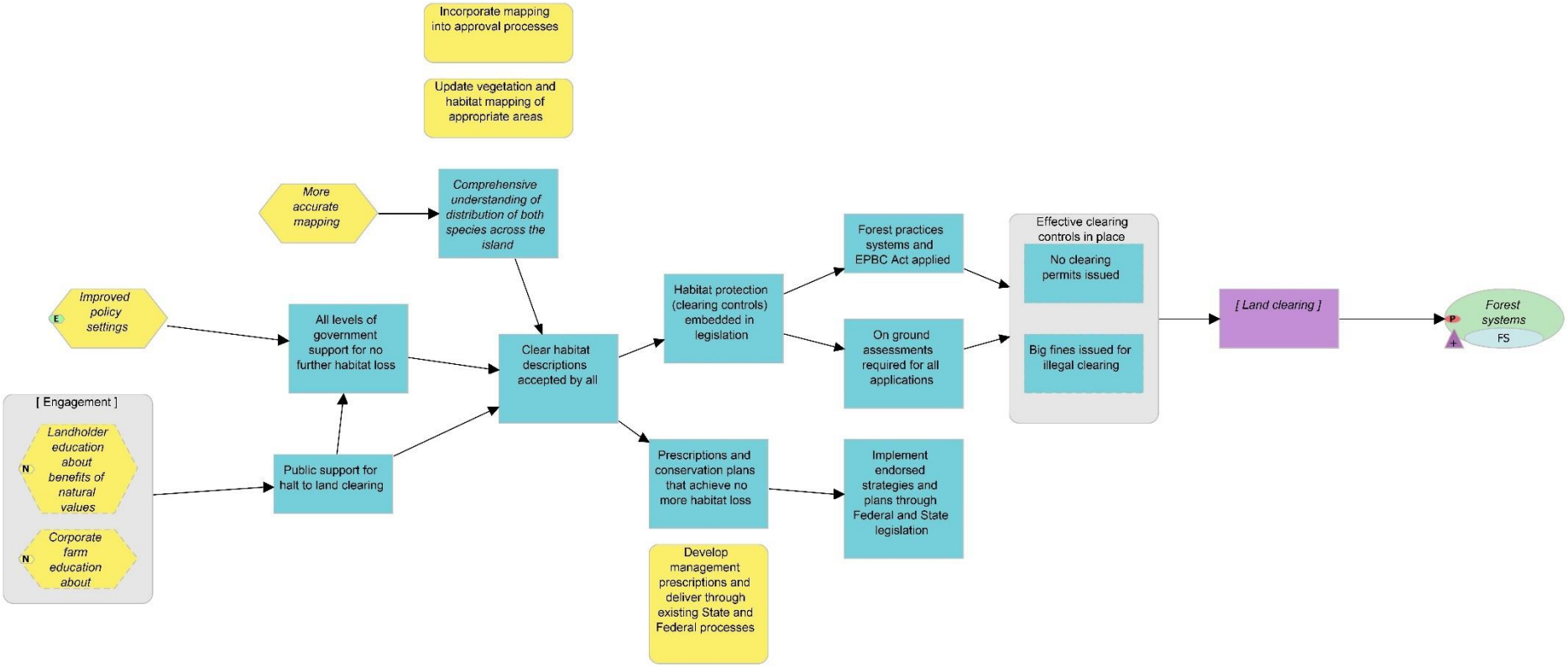
Establish insurance population



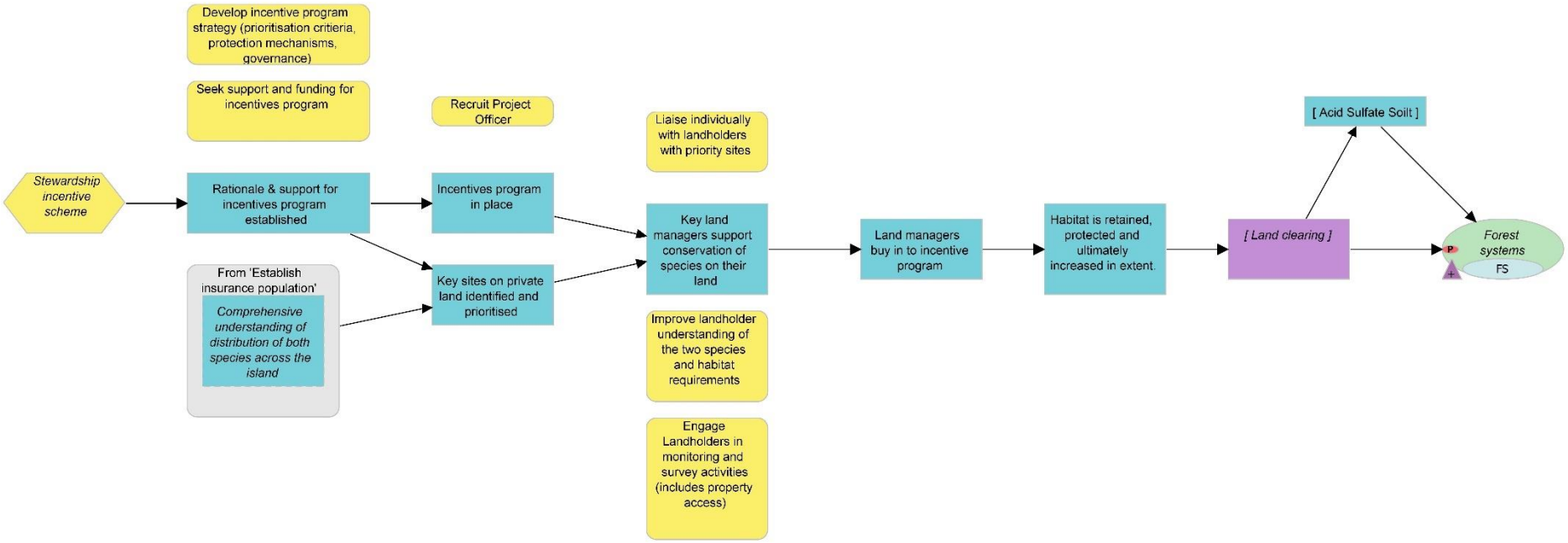
Improve fire management



Improve land clearing controls (improve policy settings)



Landholder support/Stewardship incentive scheme



Wallaby management program