

National Environmental Science Programme



Recovery Planning in Australia Learning from two case studies

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Threatened Species Recovery Planning in Australia: Learning from two case studies

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Threatened species recovery planning in Australia: Learning from two case studies.

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Front cover: Bridled Nailtail Wallaby. Image: Bernard Dupont. FlickrCC

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This document (Chapter 5) includes extracts from interviews conducted with personnel involved in recovery efforts. These quotes have been made anonymous, as per the human ethics approval. Where material stated particular information that could have helped identify individuals (e.g. names of organisations or locations), such information is redacted.

Executive Summary

Recovery plans are considered an important policy instrument for threatened species recovery efforts. The effectiveness of recovery plans is influenced, among many other factors, by a system of multiple, interacting governing institutions. This report presents the results of the first institutional gap analysis for threatened species conservation, employing two native Australian species listed as 'endangered' under the EPBC Act (1999) as case studies; the bridled nailtail wallaby (Onychogalea fraenata) (BNTW) and the eastern bristlebird (Dasyornis brachypterus) (EBB). These two species were selected because they have been subject to conservation management for more than 20 years, each exhibits some contrasting periods or locations of success and of lack of success, a range of agencies are involved in their management, they are affected by a complex mix of threatening factors, and they are managed by a diverse set of possible responses.

We developed two approaches to documenting factors related to management and its effectiveness: an analysis of fit to policy frameworks, and a series of structured interviews with key personnel involved in the species' conservation management. For each species the strength of the institutional framework (formal documentation including legislation, regulations, policies and plans and implementation processes) was assessed using mixed methods according to a pre-determined socio-ecological systems model for each species. An assessment of 'rules on paper' designed for the protection of the case study species, and those that regulate the human and natural processes that indirectly or directly threaten these species, revealed few institutional gaps. Nevertheless, while the Central EBB population is at present considered stable across the majority of its locations and the NSW BNTW population has shown substantial increase, the Northern EBB population and Queensland BNTW populations have experienced significant declines in recent years.

A qualitative analysis of the implementation processes of recovery programs based on 17 in-depth interviews with various key stakeholders revealed some shared enablers and barriers to success based on principles of good environmental governance. For both species, success has been enabled by a commitment and dedication of people and availability of research and specialist knowledge. Key barriers identified ranged from under-resourcing, personal preferences and biases of some managers, lack of coordination and effective collaboration, to departmental restructures and staff changes. We conclude by identifying important interactions between key barriers. A quantitative and qualitative analysis of the institutional frameworks for threatened species reveals opportunities to improve the design and implementation of recovery plans and provides valuable information for the development of future institutional provisions or reforms.



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Chapter 1: Introduction

Australia's unique flora and fauna is in decline. Since European settlement, 27 mammals, 22 birds, 4 frogs, one earthworm and 36 plant species have been declared extinct - and over 1500 of our remaining species are listed as threatened (Department of Energy and the Environment 2017). Australia also has the greatest number of mammalian extinctions globally recorded since 1500 (Baillie et al., 1996). To counter this loss, almost 18% of the Australian land surface has been protected under the National Reserve System. The Australian Government has also listed as threatened around 440 species of fauna under the Environment Protection and Biodiversity Conservation Act (1999) of which about 45% have a recovery plan (Watson et al., 2011). Recovery plans formulated at the level of the Federal government are often considered a critical policy instrument for threatened species recovery efforts.

There are numerous elements thought to influence the effectiveness of recovery plans for threatened species and recent research has assessed a variety of potentially contributing factors (Boersma et al., 2001, Moore and Wooller, 2004, Taylor et al., 2005, Ferraro et al., 2007). The factors range from those that are independent of the recovery plan, such as the time since the species was listed as threatened, the initial designated threat status, and the taxonomy and life history traits of the species, through to intrinsic properties of the recovery plan, such as level of understanding of the species biology and threats, proposed strategies for implementing and evaluating recovery actions, and the actual resourcing and execution of the plan, its component actions and subsequent review of its efficacy. The likelihood of positive recovery outcomes for threatened species has also been related to whether the plans include specific, measureable, achievable, relevant, and time-bound (SMART) objectives (Watson et al., 2011).

A recurring theme from the analyses that have been conducted of threatened species recovery is the need for sound planning in the drafting of the recovery plan and a thorough implementation process. Nevertheless, the existence of a recovery plan itself has been found to have no statistically significant bearing on the ongoing survival of threatened species (Bottrill et al., 2011). Whilst Bottrill et al. (2011) lamented a lack of accessible and current data on threatened species population trends, and also acknowledged that a multitude of possible covariates could have influenced the results, the overall conclusion was that there is significant uncertainty about the overall impact of recovery plans on the persistence of threatened species.

Recovery plans do not operate in isolation, and the impact of recovery plans is influenced by a system of multiple, interacting governing institutions (Young et al., 2008, Lubell, 2013). Institutions are the human-devised formal rules, procedures and norms that govern relationships among humans (individuals and groups), and between humans and the natural system (Young et al., 2008). For threatened species, these governing institutions are not limited to those designed solely for their protection (i.e. specific recovery plans and associated implementation processes) but also extend to the entire social-ecological system in which the species occurs, including those institutions intended to regulate the human and natural processes that indirectly or directly threaten species (e.g. land development policies, invasive animal control plans, etc.). Thus, an understanding of the entire institutional framework affecting the viability of a threatened species is important for determining the effectiveness of threatened species recovery plans. It could, for example, reveal opportunities to improve the design and implementation of recovery plans to mitigate the impact of institutional gaps, and at a higher level, could provide valuable information for the development of future institutional provisions or reforms.

This report presents the results of the first institutional gap analysis for threatened species employing two native Australian species listed as endangered under the EPBC Act (1999) as case studies: the bridled nailtail wallaby (*Onychogalea fraenata*) (BNTW) and the eastern bristlebird (*Dasyornis brachypterus*) (EBB). These two species were selected because they have been subject to conservation management for more than 20 years, each exhibits some contrasting periods or locations of success and of lack of success, a range of agencies are involved in their management, they are affected by a complex mix of threatening factors, and they are managed by a diverse set of possible responses.

Chapter 2 provides overviews of the historical and current status and distributions of each species.

Chapter 3 elaborates the methodology used for conducting the institutional analysis, outlining how the strength of the institutional framework (all formal documentation including legislation, regulations, policies and plans and implementation processes) was assessed according to a pre-determined socio-ecological systems model for each species.

Chapter 4 presents the results of the institutional gap analysis, focusing on the regulatory, policy and planning aspects of the institutional framework for each species.

Chapter 5 presents the results of the analysis of implementation processes – the processes by which plans, regulations and policies (the 'rules on paper') are put into practice.

Chapter 6 provides recommendations arising from this research, with a focus on the barriers and/or enablers of threatened species recovery programs.

Chapter 2: Case study species

2.1. Eastern Bristlebird (EBB)

Distribution and abundance

The EBB is a small, brown, ground-dwelling bird measuring about 18 to 21 centimetres in length (Higgins and Peter 2002). It is a shy and cryptic species that inhabits low, dense vegetation and it is rarely seen in the open. Since European settlement, the distribution and abundance of the EBB has declined due to extensive clearing and habitat degradation, and it is now confined to three regions on the east coast of Australia (OEH, 2012) comprising four genetically isolated populations (Roberts et al 2011). The northern population occurs in south-eastern Queensland and north-eastern NSW, two central populations occur in the Illawarra region and the Jervis Bay region of eastern NSW, and the southern population occurs in the NSW/Victorian border coastal region. Figure 1 shows the historical distribution of the EBB. Schodde et al. (1999) concluded that the northern population is a distinct subspecies (Dasyornis brachypterus monoides), an approach followed by Garnett et al. (2011) when assessing the status of Australian birds against the IUCN categories and criteria. While the genetic structure of the population is complex (Roberts et al. 2012) and Australian legislation does not distinguish the two. For the purposes of this study we focussed on the northern and central populations.

In 1988 the northern population was estimated at 206 breeding pairs. This dropped to just 16 breeding pairs in 1997 and in 2006 the population was estimated at 13 breeding pairs (Garnett et al. 2011). The most recent documented estimate for the northern population is fewer than 50 individuals (IUCN 2013). Since 2015, northern populations of EBBs have been detected in the wild only at locations with active habitat management directed specifically at recovery (Interviewed informant, personal communication, July 2016).

The central populations' numbers have remained steady since documentation began in the 1990s at around 2,100 individuals (OEH, 2012). In 2012 the total population of the EBB was estimated at approximately 2500 birds (OEH, 2012).

Threats

The main threat to the EBB is the loss, fragmentation and/or degradation of suitable habitat. Inappropriate fire regimes are believed to be the major cause behind the decline of the northern population. Habitat loss has also been the result of clearing for urban or agricultural development, and was a major threat to the central population, before the designation of conservation reserves in EBB habitat, including both southern and northern populations. Other potential threats to the EBB include feral predators, habitat degradation caused by disturbance from feral animals, weed invasion and inappropriate grazing, genetic bottlenecks and inbreeding, climate change, and human disturbance (OEH, 2012, Stewart, 2012)

Recovery efforts

Recovery efforts for the northern population have been documented in various recovery plans, most of which are unpublished reports (Stewart, 2012). These recovery efforts have been complemented by extensive surveys, monitoring and public outreach programs undertaken by Bird Queensland volunteers (since 1998), the Queensland Parks and Wildlife Service (QPWS) and the NSW National Parks and Wildlife Service. A pilot captive breeding program was initiated for the Northern population at the David Fleay Wildlife Park in the Gold Coast in 2004 but was discontinued in 2009. In 2008 four captive-bred birds were released in NSW and four in Queensland. Since 2014 a conservation dog trained to search for EBB in the wild has found birds in locations not previously known to have contained the species, and has permitted the translocation of eggs and young birds into the re-established captive breeding program. In 2015, a captive breeding program for the northern population was established at Currumbin Wildlife Sanctuary. Several research projects have been completed or are underway including long-term monitoring of the released captive-bred birds, an analysis of vegetation regeneration after fire, and a study into appropriate fire management strategies.

Recovery efforts for the central population have been facilitated by the central working group of the National Recovery Team which was established in 1997. The last 20 years have also seen considerable involvement of Birdlife Australia and other volunteer groups to assist in recovery efforts that include long term-monitoring programs and habitat mapping. There has been extensive research into the species ecology, particularly into its relationship with fire. The population is largely confined to National Parks, Nature Reserves and on Defence Land and is therefore subject to various management plans and strategies that focus on fire, habitat, and pest management. Between 2003 and 2005, 45 birds were translocated within the central population from Bherwerre Peninsula to Beecroft Peninsula and were estimated in 2012 to have increased to 94 birds (Baker et al. 2012). A later translocation was undertaken in 2008, with 50 birds taken from the Barren Grounds Nature Refuge to the Woronora Plateau (Baker et al. 2012). Current recovery efforts for the central population include the ongoing management of habitat and emerging threats to ensure the ongoing stability of the current populations (OEH 2012, Baker et al. 2012 and communication with experts).

A historical timeline of key events for the EBB is shown in Table 2.1.



Figure 2.1. Past (o) and recent (•) distribution of the Eastern Bristlebird (from the National Recovery Plan for the Eastern Bristlebird and based on Baker 1997).

Table 2.1. Eastern Bristlebird historical timeline. Based on the national recovery plan (OEH, 2012) unless otherwise referenced.

Year	Event
1968	Barren Grounds National Park (NP) population assumed to be almost eliminated by wildfire
1980	Nadgee population (Southern) almost eliminated by wildfire
1988	Listed as 'Threatened' in Victoria under Schedule 2 of the Flora and Fauna Guarantee Act 1988 Listed as 'Threatened' under IUCN Red List Northern Population estimated at 206 pairs
1995	Listed as 'Endangered' in NSW under Schedule 1 of the Threatened Species Conservation Act 1992
1996	NSW Recovery program commences
1997	Northern Population estimated at 16 pairs National Recovery Team established by Queensland Department of Environment, now convened by the NSW Office of Environment and Heritage
1998	Draft National Recovery Plan prepared (Holmes 1998)
2000	Listed as 'Endangered' under the EPBC Act 1999 Listed as 'Endangered' under IUCN Red List
2003 – 2005	45 individuals were successfully translocated from Bherwerre Peninsula to Beecroft Peninsula for Central Population (Bain et al. 2012)
2004	Draft State Recovery Plan prepared for the Eastern Bristlebird in NSW Pilot captive breeding program for Northern Population at David Fleay Wildlife Park begins
2006	Listed as 'Endangered' in Queensland under Nature Conservation (Wildlife) Regulation 2006, Schedule 2, subordinate legislation to the Nature Conservation Act 1992. Draft National Recovery Plan prepared for the Northern Population (Stewart 2006) Northern Population estimated at 13 pairs
2007	NSW Threatened Species Conservation Act Priorities Action Statement released with recovery actions consistent with the 2004 NSW Draft Recovery Plan
2008	50 individuals translocated from Barren Grounds Nature Reserve to Woronora Plateau (central) 8 captive-bred birds from David Fleay Wildlife Park translocated to various areas in the Northern Population habitat
2009	Beecroft population (Central) estimated at 73 individuals
2010	Two individuals from David Fleay Wildlife Park 2008 translocation spotted in north-east NSW
2011	Northern Population estimated at a total of fewer than 50 mature individuals Central population estimated at around 2500 mature individuals (1250 at Barren Grounds NR, 1200 at Jervis Bay NP, 300 at Nadgee/Howe Flat, 50 at Cataract Dam, and 10 at Red Rocks NP). Estimated 3800 individuals in total
2012	Total Population estimated at 2500, with two populations of around 1000 mature individuals Beecroft population (Central) estimated at 94 individuals Woronora Plateau (Central) estimated at more than> 15 individuals
2015	Currumbin Sanctuary bird supervisor Clancy Hall claims there are fewer than 50 EBB in Gold Coast Region during interview with ABC (http://www.abc.net.au/local/photos/2015/03/10/4194928.htm) EBB identified as a priority for action by the Federal Government's five year Threatened Species Strategy (2015) Currumbin Wildlife Sanctuary starts the captive breeding program for the Northern Population EBB detected in the wild at locations with active habitat management directed specifically for the bristlebirds (northern population)

2.2. Bridled Nail-Tail Wallaby

Distribution and abundance

The Bridled Nail-Tail Wallaby (BNTW) had an extensive distribution in eastern Australia at the time of European settlement, but declined rapidly thereafter. Between 1937 and 1973 the BNTW was believed to be extinct before being 'rediscovered' near the town of Dingo in central Queensland. The area where the last remnant population existed was acquired by the state government between 1979 and 1984 and named Taunton National Park. The population was estimated at around 1,400 individuals in the early 1990s, when a captive breeding program was initiated at Pallarenda near Townsville. Subsequent translocation programs ensued and in 1996, 133 BNTWs were introduced to Idalia National Park in mid-west Queensland. Further translocations occurred from the Pallarenda facility to Scotia Nature Reserve, NSW (12 individuals in the late 1990s) and Avocet Nature Reserve, Queensland (166 individuals between 2001 and 2005).

In 2015, the Idalia population crashed, with drought thought to be an important contributing factor. Current population estimates are over 150 individuals at Taunton, 70 - 100 at Avocet, and 2,500 at Scotia (Burbidge et al. 2016).

Current threats

The recovery plan for the BNTW (Lundie-Jenkins and Lowry 2005) lists competition with domestic herbivores, habitat alteration and predation by feral predators as the main reasons for the decline of the species. Drought, disease and parasites, exotic weed invasion and fire are also listed as threats. These threats are thought to affect all current populations with the exception of the Scotia population which is managed intensively through exclosure fencing to exclude predators.

Recovery efforts

The national recovery plan for the BNTW was published in 2005 (Lundie-Jenkins and Lowry 2005). This plan, however, has no official follow-up, or evaluation of documented targets and goals (communication with experts). Past recovery efforts documented in the national recovery plan include a captive breeding program by the Queensland Environment Protection Agency (EPA) and QPWS at Pallarenda Research Station in Townsville, which was followed by translocations and the establishment of additional breeding colonies at Idalia National Park, the David Fleay Wildlife Park, Rockhampton City Zoo, and Gregory Mine Site in Emerald. Following site closure of the Gregory Mine, individuals from this location became the founding individuals of the Avocet population. In October 2015, following an episode of severe decline in BNTW numbers at Idalia National Park, the Department of Environment and Heritage Protection (DEHP) announced that the remaining population, just 7 individuals, would be transferred to Safe Haven, an Australian Wildlife Sanctuary in Gladstone (Queensland Government 2015). Recovery efforts remain ongoing at Taunton National Park and Avocet Nature Refuge and focus primarily on improving feral predator control and the provision of fodder during periods of drought. In 2015 a new nursery was constructed at Avocet Nature Refuge to reduce mortality of vulnerable young BNTWs due to predators, and along with neighbouring landowners, volunteer teams and local NRM groups, the QPWS are creating habitat corridors at Taunton National Park in an effort to increase their range. A metapopulation plan is also due for completion in 2016 and will set clear protocols for future integration of the Queensland and Scotia populations (communication with experts).



Figure 2.2. Past and present (•) *distribution of the bridled nailtail wallaby* (adapted from Lundie-Jenkins and Lowry 2005). Past distribution is based on literature sources (▲) and museum specimens (□).

Table 2.2. Bridled nail-tail wallaby historical timeline. Based on the national recovery plan (Lundie-Jenkins and Lowry 2005) unless otherwise referenced. Earlier recovery plans were not available. The analysis excludes trends on the population at Scotia as that is driven by quite different dynamics.

Year	Event
1937 – 1973	BNTW believed to be extinct with no confirmed sightings
1973	BNTW "rediscovered" by Mr Challacombe near the town of Dingo, Queensland
1979	Taunton property acquired by the Queensland government and named Taunton Reserve
1982	IUCN Redlisted as Endangered for the first time
1984	Redhill property acquired by the Queensland government and becomes part of Taunton Reserve
1991	Taunton population estimated at 1400 (Clancy and Porter 1994) Total population estimated at 1200-1500 (Horsup & Evans 1993) State run captive breeding program started at Pallarenda near Townsville, Queensland
1992	Queensland Nature Conservation Act passed and Taunton Reserve declared Taunton National Park
1994	Taunton population estimated to have reduced to 450 owing to prolonged drought (Clancy and Porter 1994) Queensland: Listed as Endangered (Queensland Nature Conservation (Wildlife) Regulation 1994)
1996	133 BNTW reintroduced to Idalia NP from Pallarenda facility (Australian Government – Department of Environment)
1999	National: Listed as Endangered (Environment Protection and Biodiversity Conservation Act 1999) Idalia population estimated around 400 (Pope et al. 2001) Idalia population estimated around 450 (Recovery Plan 2005-2009)
2001 – 2005	166 BNTW translocated to Avocet Nature Refuge from captive breeding program at Gregory Mine
2001	Idalia population peaks at an estimated 600 (NPRSR Queensland)
2003	Australian Animals Care & Education (AACE) begin transferring 130 BNTWs from Gregory Mine to a private property 'Kial' in Marlborough, Queensland for rehabilitation.
2005	Gregory Mine breeding facility operations close down
2005 – 2009	State recovery program implemented worth \$3.39M (Lundie-Jenkins and Lowry 2005)
2006	Project Kial (AACE) submit proposal to Queensland EPA for a BNTW captive breeding and release program
2008	Taunton population estimated at 75 (Kearney et al. 2012) Avocet population estimated at 40 (Kingsley 2009)
2011	66 individuals identified at Avocet from Hair Trapping study (J. Lowry – DEHP & Leanne Henry in her Master's Thesis) Taunton population estimated at fewer than 150 (Augusteyn et al.; DERM 2011a referenced by L. Henry – Page No Longer Found) Idalia population estimated at less than 150 (DERM 2011a referenced by L. Henry – Page No Longer Found)
2013	Taunton population estimated at 200 (DEHP Queensland last updated 7 May 2013) Avocet population estimated at 100 (DEHP Queensland last updated 7 May 2013) Idalia population estimated at 100 (DEHP Queensland, last updated 7 May 2013)
2015	Idalia population crashes - 7 individuals of an estimated remaining population of 20 transferred to AACE Safe Haven site at Mount Larcom, Queensland (DNPSR Queensland) QPWS survey captures 160 BNTWs over 4 night survey at Taunton (Fitzroy Basin Association)
2016	ABC news quotes Wild Mob NGO as claiming less than 500 BNTWs remain in the wild (ABC News) Latest population estimate from Taunton Avocet population estimated between 70 – 100 (H. Spooner personal correspondence)

Chapter 3: Methodological approach

3.1. Analytical Framework



Figure 3.1. Summary of methodological approach

Step 1: Constructing a social-ecological systems model

Our analytical approach starts with a systems conceptualisation of the problem. A social-ecological systems approach permits an analysis of the broad spectrum of drivers and impacts related to the viability of a species (Anderies et al., 2004). One social-ecological approach used to assess environmental problems from a systems perspective is the Driver-Pressure-State-Impact-Response (DPSIR) framework (Eurostatf 1999). This framework permits a description of the causal effects (or social-ecological interactions) between the different human and environmental components of the environmental problem being assessed. Drivers include the social, cultural and economic activities (e.g. agricultural development, recreational activities) that increase (or mitigate) pressures on the environmental system (e.g. vegetation clearing, human disturbance). State refers to the current condition of the environment (e.g. degradation of habitat) and impacts are the effects of environmental degradation (e.g. species' population decline). Responses capture the current responses to the environmental problem (e.g. management actions). Following this framework we constructed a conceptual model that includes the case study species' key threats and their drivers and corresponding recovery actions as a socio-ecological system (Figures 3.2 and 3.3). A key source for constructing the socio-ecological system models was the official Australian Government National Recovery Plans for both the EBB and the BNTW, which were validated through discussion with key experts in EBB and BNTW ecology (personal communications). The resulting models contain the key linkages (e.g. fire disturbance and degradation of habitat, or fire management and Eastern bristlebird in Jervis bay) that are expected to be represented in the institutional framework (see steps 2 and 3).



Figure 3.2. Conceptual model of the social-ecological system affecting the viability of the EBB.

Threats (orange), drivers (grey) and required responses (green). The conceptual model follows the DPSIR framework (Drivers-Pressures-States-Impact-Response; European Environment Agency) and is based on the National Recovery Plan for the EBB and expert consultation. Key linkages are represented by the lines connecting each of the components. Terms were developed for each of the components of this model (Appendix C). The linkages and terms were used to determine the extent to which the social-ecological system impacting the conservation of the EBB is captured by the institutional framework (step 3). The impact component is site specific (includes Conondale, Mount Barney, Mt Barney, Mt. Barney, Lamington, Main Ranges, Spicers Gap for the Northern population, and Jervis Bay, Budderoo, Booderee, Barren Grounds, Woronora, Cataract Dam, Bherwerre, Beecroft, Morton, Red Rock for the Central population). Elements marked with an asterisk * are relevant to the northern population only.



Figure 3.3. Conceptual model of the social-ecological system affecting the viability of the BNTW.

Threats (orange), drivers (grey) and required responses (green). The conceptual model follows the DPSIR framework (Drivers-Pressures-States-Impact-Response; European Environment Agency) and is based on the National Recovery Plan for the BNTW and expert consultation. Key linkages are represented by the lines connecting each of the components. Terms were developed for each of the components of this model (Appendix C). The linkages and terms were used to determine the extent to which the social-ecological system impacting the conservation of the BNTW is captured by the institutional framework (step 3). The impact component is site specific (includes Taunton, Avocet, Goonderoo and Idalia).

Step 2: The institutional framework

A species' institutional framework is defined as all legislation, regulations, policies, plans and other formal documentation that relate to the species socio-ecological system (Figure 3.3). Documents were sourced from online databases and websites of relevant government and non-government agencies at a national, state, regional and local level. All documents retrieved were published in the last 50 years. Early drafts of recovery plans (listed in tables 2.1 and 2.2) were not available. All documents were logged in a meta-data spreadsheet using Excel (Appendix A and B). The following criteria for each document was recorded: Document Title, Agency, Retrieval Source, Year of Publication, Document Type (Regulation, Act, etc. figure 3.3), and scale of application (National, State, Regional, Local). Our search returned 176 documents for the central population of the EBB, 89 documents for the Northern population of the EBB, and 91 for the BNTW. A manual appraisal of the MINOE analysis (step 3 below), returned four additional documents - two each for both the Central and Northern populations of EBB.

Act – Legislation passed by the Parliament. A statute enacted as primary legislation by the federal or state government of Australia that is either current or was effective during the period of interest. Can only be amended by another Act of Parliament.

Example: Game and Feral Animal Control Act 2002

Regulation – Subsidiary legislation published in the Government Gazette. Guidelines that dictate how the provisions of the Act are applied.

Example: Sustainable Planning Regulation 2009

Policy – legally binding International or Government backed document outlining generic desired outcomes and/ or designated actions to be followed to achieve outcomes. A statement of intent, a principle, plan or rule to guide decisions to achieve outcomes.

Example: Convention on Biological Diversity / NSW Wetlands Policy / Kiama Local Environment Plan 2011

Strategic Document - International, Government, Regional, or NGO backed document outlining generic desired outcomes and objectives across numerous criteria - typically aimed at a national, state, or regional scale and based on a statutory framework*.

Example: SEQ Regional Plan 2009-2031 / Building Natures Resilience A biodiversity strategy for Queensland

Management Guidelines – An International, Government, or NGO created decision-making tool to guide stakeholders in the application of best practice actions to achieve pre-determined desired outcomes. Typically aimed at a state, national or regional scale and based on a statutory framework*.

Example: Feral pig control: A practical guide to pig control in Queensland / NSW Bitou Bush Management Manual

Management Action Plan – State Government, Regional, Council/Shire, or NGO document outlining desired outcomes and actions to be undertaken within a specific area, within a specified time frame. May or may not be based on a statutory framework*.

Example: Idalia National Park Management Plan / Bundewallah Bushcare Action Plan

Report or Review – Document summarising or reviewing current state, or outcomes of previous actions *Example: SEQ State of the Environment Report 2008*

*document has been created to comply with/ be in line with existing laws / regulations / policies, and makes reference to the corresponding Acts / Regulations / policies throughout

Figure 3.3. Definitions of the types of documentation included in the institutional framework.

Step 3: Institutional gap analysis

This step identifies gaps in the institutional instruments that are in place to address the recovery of the two case study species. By testing if the key linkages between system components (see Figures 3.2 and 3.3) are represented or not in the legislation, regulations, policies and plans, the gap analysis reveals whether the institutional framework potentially address the key issues faced for the conservation of our case study species. An institutional gap is defined here as a situation where the legislation, regulations, policies and plans do not address a key linkage between two subcomponents of the system (Figures 3.2 and 3.3). Institutional gaps are an indication that the institutional alignment with the social-ecological processes affecting the viability of the species is suboptimal.

Our quantitative analytical method to undertake the institutional gap analysis was inspired by an approach developed by Ekstrom and Young (2009) to assess the 'functional fit' between any given ecosystem and the institutional framework that influences it. Whilst Ekstrom and Young's analysis was based on an institutional framework consisting solely of statutory legislation, our institutional framework was inclusive of a multitude of documentation types and a broader range of socio-ecological linkages.

We first identified terms that represent the key threats and socio-ecological linkages captured in the conceptual model for the two case study species (Figures 3.2 and 3.3). For example, 'Bridled nail-tail' and 'over-grazing', or 'bristlebird' and 'feral cat predation'. We employed the software MINOE, also used by Esktrom and Young (2009), to carry out the quantitative analysis. MINOE is a text-mining tool developed by Ekstrom to scan large volumes of digitised text for the co-occurrence (or lack of co-occurrence) of key words or phrases.

For MINOE to be able to search through the collated documentation, it was necessary to convert all documents of the institutional framework to .txt file format. These were then uploaded to MINOE, along with the list of terms to be searched. The results displayed how often a term was found to appear within 100 words of another term – 100 words assumed to be a suitable distance to infer that within most matches found, one term was being discussed with respect to the other term. A key assumption of our analysis was that the co-occurrence of terms indicates that the socio-ecological linkage had been addressed in the institutional framework (we tested this assumption by manually checking a number of co-occurrence thresholds).

To gauge the degree of system-wide fit of the institutional framework (referred to herein as the extent of the institutional framework) we calculated a similarity metric via:

Extent =
$$\frac{P_1}{(P_1 + P_2)}$$

Where

 P_1 is the total number of socio-ecological interactions described in the conceptual model (and represented by the pre-defined terms) that were represented in the institutional framework.

 P_2 is the total number of socio-ecological interactions described in the conceptual model (and represented by the pre-defined terms) that were **not** represented in the institutional framework (*institutional gaps*).

We documented chronological trends in the occurrence of terms in each institutional framework, and the frequency of their occurrence. The number of 'Document Types' in each institutional framework was recorded, paying particular attention to the number of terms addressed in legal documentation.

We manually investigated identified institutional gaps to ensure they had not arisen due to limitations of the approach (e.g. corruption of text during the conversion process, poor selection of terms). Possible reasons for each institutional gap was then identified (e.g. while a threat is significant to the overall population it may not be relevant to a subset of its distribution).

Step 4: Assessment of implementation processes

To identify the barriers and enablers of recovery efforts we conducted semi-structured interviews with key stakeholders involved in the recovery of each case study species. We contacted individuals across different stakeholder groups (i.e. government, NGOs, NRM groups, University and private organisations), known to have been involved in the recovery process. Of the 20 individuals invited, 2 did not answer and one was unable to participate. The development of the interview instrument (Appendix E) was guided by a review of environmental governance principles (Chapter 5). The interviews were conducted from April 2016 to June 2016 and each lasted from 45 to 90 minutes. Interviews were transcribed and de-identified in accordance to the ethics permit H16013 (Appendix D). Using the software NVIVO 11 and thematic analysis methods (Bround and Clarke 2006) data were coded and common themes were identified through an iterative process. Two people coded and reviewed the resulting themes.

Chapter 4: Institutional gap analysis

4.1. Institutional gap analysis results

Our analysis shows that the main socio-ecological linkages defined in the conceptual model for both species (Figures 3.2 and 3.3) across all locations of occurrence were substantially addressed in the corresponding institutional frameworks (Tables 4.1, 4.2 and 4.3), with a few exceptions that are described below.

4.1.1 Eastern Bristlebird – Northern population

Grazing management was found to constitute an institutional gap for the Conondale and Mt Barney National Park locations (Table 4.1) and prior to 2011 grazing management was not included in the institutional framework for the Northern EBB population (Table 4.2). Grazing is regulated either under the Land Act 1994, Nature Conservation Act 1992 and stock grazing permits are issued under the Nature Conservation Regulations 1994 or The Forestry Act 1959 (Department of National Parks, Sport and Racing 2016). Whilst grazing is not normally permitted in National Parks in Queensland, when a new National Park is declared on land currently used for grazing, grazing may be allowed to continue until the expiration of the existing lease or grazing permit. Grazing also occurs in some National Parks in NSW (NSW Office of Environment & Heritage 2016).

While grazing is not considered a major threat, livestock numbers need to be controlled to prevent destruction of habitat (Stewart, 2012). It is likely that conservation stakeholders are aware of the issue but might be restricted in what management actions they can take with current grazing authorities existing on the parks.

The Conondale National Park Management Statement acknowledges that the process of phasing out grazing leases that are currently operational in the park is underway. Mt Barney Management Plan acknowledges grazing as an historical issue, but has no mention of it as a contemporary management issue. DNPSR confirms that there is one current stock grazing permit operating at Mt Barney issued under the Forestry Act 1959. Main Range and Lamington National Park Management Plans list 'controlling livestock' from neighbouring properties as a current management issue, and therefore is not an institutional gap in this location. DNPSR confirmed there are no current grazing authorities at Lamington National Park, and one grazing authority remains at Main Range National Park. The 'Nature Conservation and Other Legislation Amendment Bill 2015' was amended in May 2016 to change the status of all Queensland national park grazing leases from 'rolling-term leases' to 'term leases'. This will result in it becoming more difficult for graziers to have their leases extended upon expiration and will phase out grazing in parks where it is detrimental to conservation outcomes (Ford 2016).

Border Ranges is classed as a NSW National Park and falls under the Parks and Reserves of the Tweed Caldera Management Plan. The Border Ranges Management Plan (Department of Environment 2010) states that there are several cattle-grazing leases existing in the Border Ranges National Park. Guidelines and actions listed in the plan state that these leases will be phased out along with associated uses to improve environmental integrity. There are also plans to undertake rehabilitation. These actions, however, are listed as 'Low Priority' in the management plan, which perhaps explains why grazing is under-represented in the institutional framework.

Table 4.1 Institutional gap analysis for the northern population of the EBB. The first column shows the number of times each key threat (response to threat) is accounted for in the institutional framework. The second column shows the total number of key linkages modelled in Figure 3.2, relevant to threat responses that were found to be represented in the institutional framework. These are based on the total number of locations (sites) assessed (n=6) with the exception on those linkages related to captive breeding, translocation and education. Sites assessed for the Northern Eastern Bristlebird were Conondale, Border Ranges, Main Range, Mount Barney, and Lamington National Park. The two institutional gaps for grazing management relate to the Conondale and Mt Barney National Park locations.

Threats to the Northern Population of EBB	Total No. of Times Threat Accounted for at Least Once in an Institutional Framework Document	Total No. of Key Socio-Eco Linkages Represented in Institutional Framework	Total No. of Institutional Gaps	Extent Value
Fire Management	18	6	0	1.00
Grazing Management	4	4	2	0.67
Habitat Alteration Management	43	6	0	1.00
Weed Control	11	6	0	1.00
Dieback Control	7	6	0	1.00
Feral Cat Control	6	6	0	1.00
Feral Fox Control	7	6	0	1.00
Captive Breeding	1	1	0	1.00
Translocation	1	1	0	1.00
Education of Landowners	2	1	0	1.00
Total	100	43	2	0.96

Table 4.2. Temporal occurrence of documents addressing key threats to the Northern population of the EBB.

Northern Population of EBB		No. of Documents TI	nreat Addressed In:	
Year	Fire Management	Grazing Management	Feral Cat Control	Feral Fox Control
2004	2	-	-	-
2008	-	-	1	1
2010	5	-	2	2
2011	3	1	1	1
2012	2	2	1	3
2013	6	1	3	1

4.1.2 Eastern Bristlebird – Central population

A potential institutional gap was found for 'Grazing Management' at Woronora and weed, feral cat, and feral fox control on private land at the Bherwerre Peninsula¹ and at the Woronora Plateau² (Table 4.3). Overall, we found that for the Central EBB population, all three major threats (fire management, cat and fox predation) have been addressed by the institutional framework since 1998 (Table 4.4).

Table 4.3 Institutional gap analysis for the central population of EBB. The first column shows the number of times each key threat (response to threat) is accounted for in the institutional framework. The second column shows the total number of key linkages modelled in Figure 3.2, relevant to threat response, that were found to be represented in the institutional framework. These are based on the total number of locations (sites) assessed (n=10) with the exception on those linkages related to captive breeding, translocation and education. Sites assessed for the central EBB population were Jervis Bay, Budderoo, Booderee, and Morton National Parks, Barren Grounds and Red Rocks Nature Reserves, Woronora Plateau² and Bherwerre¹ and Beecroft Peninsulas*.

Threats to the Central Population of EBB	Total No. of Times Threat Accounted for at Least Once in an Institutional Framework Document	Total No. of Key Socio-Eco Linkages Represented in Institutional Framework	Total No. of Institutional Gaps	Extent Value
Fire Management	39	10	0	1.00
Grazing Management	9	9	1	0.90
Habitat Alteration Management	85	10	0	1.00
Weed Control	31	8	2	0.80
Feral Cat Control	17	8	2	0.80
Feral Fox Control	25	8	2	0.80
Captive Breeding	1	1	0	1.00
Translocation	3	1	0	1.00
Education of Landowners	2	1	0	1.00
Total	195	56	7	0.89

Table 4.4. Temporal occurrence of documents addressing key threats to the central population of the EBB.

Central Population of EBB	No. of I	Documents Threat Addressed Ir	n:
Year	Fire Management	Feral Cat Control	Feral Fox Control
1998	4	3	3
2001	6	1	2
2002	6	1	2
2008	9	-	2
2009	3	1	2
2010	3	-	-
2011	8	6	4
2012	_	-	10

¹ The Bherwerre Peninsula is classed as a separate location despite the fact that it contains Jervis Bay and Booderee National Parks. This was done in an attempt to capture in our analysis the Jervis Bay population that purportedly occurs on private land (10 percent).

² The Woronora Plateau population size is estimated at just over 15 individuals, a total of 0.6 percent of the Central EBB population. Woronora became EBB habitat in 2008 following a translocation program from Barren Grounds National Park during which 50 individuals were transferred (EBB National recovery Plan 2012)

4.1.3 Bridled Nail-tail wallaby

No institutional gaps were found for Idalia and Taunton National Parks locations where the Bridled Nail-tail Wallaby occurs (or occurred) (Table 4.5). However, temporal analysis (Table 4.6) shows that while drought was first addressed in the institutional framework in 2004 and fox predation in 2005, cat predation was only included in the institutional framework in 2010.

Table 4.5. Institutional gap analysis for the BNTW. The first column shows the number of times each key threat (response to threat) is accounted for in the institutional framework. The second column shows the total number of key linkages modelled in Figure 3.3, relevant to threat response, that were found to be represented in the institutional framework. These are based on the total number of locations (sites) assessed (n=3) with the exception on those linkages related to captive breeding, translocation and education.

Threats to the BNTW	Total No. of Times Threat Accounted for at Least Once in an Institutional Framework Document	Total No. of Key Socio-Eco Linkages Represented in Institutional Framework	Total No. of Institutional Gaps	Extent Value
Fire Management	14	3	0	1.00
Livestock Management	1	3	0	1.00
Habitat Alteration Management	36	3	0	1.00
Weed Control	13	3	0	1.00
Rabit Control	5	3	0	1.00
Feral Cat Control	5	3	0	1.00
Feral Fox Control	11	3	0	1.00
Drought Control	6	3	0	1.00
Captive Breeding	8	1	0	1.00
Translocation	9	1	0	1.00
Education of Landowners	3	1	0	1.00
Total	111	27	0	1.00

Table 4.6. Temporal occurrence of documents addressing key threats to the BNTW.

BNTW	No. of Do	ocuments Threat Addressed In	1:
Year	Drought Management	Feral Cat Control	Feral Fox Control
2004	1	-	-
2005	2	-	3
2008	-	-	1
2010	-	5	4
2011	3	-	2
2013	_	-	1

4.1.4 How threats are addressed by the institutional framework

Habitat protection and fire management have been most frequently referenced in the institutional framework for the EBB, with captive breeding receiving comparatively less attention (Figure 4.1a-b). For the BNTW, habitat protection and predator control have dominated the institutional framework, along with monitoring and research (Figure 4.1c).



Figure 4.1. The extent to which key terms for threats and socio-ecological linkages are captured in the different document types.

4.2. Discussion

While the Central EBB population is at present considered stable across the majority of its locations, the Northern EBB population and Queensland BNTW populations have experienced significant declines in recent years (Chapter 2). Whilst we may be witnessing an extinction debt (i.e. a delay in the impact of historical factors detrimental to the population) for the Northern EBB and the Taunton BNTW's, the Idalia BNTW population was the outcome of a translocation program that occurred in 1996. Despite the temporal analysis showing that the vast majority of threats to the BNTW had been addressed in the institutional framework by 2011, the Idalia population numbers crashed to zero in 2015, from a high of 450 estimated individuals in 1999. Cat predation is considered a key threat for the BNTW but was only addressed in the institutional framework in 2010.

The reported extent of each institutional framework can be considered conservative for both the EBB and BNTW. First, there are likely to be documents that have been excluded from our analysis with ramifications particularly for the temporal analysis prior to 1998 (as documents prior to the proliferation of the worldwide web are less likely to be available), and because previous versions of documents (particularly non-statutory documents) are often not retained in public repositories. Second, it was found that the process of converting documents to the .txt format from PDF was error-prone, meaning MINOE was unable to always capture the wording order that would have occurred in the original document, thus we had to manually investigate the identified institutional gaps to ensure they had not arisen due to limitations of the approach. Third, there will undoubtedly be activities planned by various stakeholders that remain either undocumented or unavailable online. Overall we found that the method is useful where large amounts of documentation needs to assessed, however, it is error prone and thus manual checks might be necessary.

As stated in Chapter 1, the impact of recovery efforts is influenced by a system of multiple, interacting governing institutions. In this chapter we have assessed the 'rules on paper' designed for the protection of the case study species, and those that regulate the human and natural processes that indirectly or directly threaten these species. In the next chapter we assess the undocumented institutions; we discuss the findings of a qualitative analysis of the implementation processes of recovery programs based on interviews with various key stakeholders involved in the recovery efforts of the EBB and the BNTW.

Chapter 5: Assessment of implementation processes

This chapter presents the results of 17 in-depth interviews with stakeholders involved in the recovery of the EBB and the BNTW (Table 5.1). While we recognise that a variety of biological factors can influence the effectiveness of recovery programs, here we focus on the characteristics of recovery planning and implementation processes that either hinder or enable the achievement of conservation outcomes.

5.1. Applying governance principles to threatened species recovery processes

Governance arrangements that foster multi-actor collaborations are increasingly regarded as essential mechanisms for addressing collective environmental problems such as the recovery and conservation of threatened species (Berkes & Turner 2006; Armitage 2012; Mcallister & Taylor 2015). We conducted a literature review of governance principles used to foster multi-actor collaboration in environmental fields. The review pointed to different governance aspects associated with the institutional context surrounding a planning and implementation process, the inputs needed to undertake that process, the process itself or the outputs arising (Figure 5.1). The results of this review guided our evaluation of the implementation and stakeholder processes for the case study species. The results of interviews with key stakeholders (Table 5.1) were analysed using thematic analysis and quantified to identify key enablers and barriers of the effectiveness of recovery programs.

Table 5.1. Types of stakeholders interviewed. Names of organisations are not been included to ensure confidentiality of interview participants.

Stakeholder type	EBB	BNTW
State government	3	4
NGO	1	2
NRM Group	1	-
University	2	2
Private organisation	1	1



*SMART: Specific, Measurable, Achievable, Relevant and Time-bound

Figure 5.1 Understanding the recovery process as a governance system. Under each component we list different governance aspects that may impact on the effectiveness of recovery programs. These criteria was drawn from a literature review on principles of good governance (Black et al 2011, Dale et al 2013, Dale et al 2014, Emerson et al 2012, Lockwood et al 2014, Lebel et al 2013, Pannell 2016, Young 2008).

5.2. What is "success" in threatened species recovery programs?

A critical component of any management plan is a clear articulation of the fundamental goal being pursued. Ecological outcomes such as the delisting of species, improvement of listing status or even prevention of extinction are examples of what can constitute success in threatened species recovery programs (Doremus and Pagel, 2001, Watson et al., 2011). However, some measures of success are adopted to reflect not achievement of end results, but the means to achieving those results (e.g. a reduction in threats over time), or, even further from end results, success may be measured as on-ground implementation of conservation actions (Salafsky and Margoluis, 1999, Kapos et al., 2009).

When multiple stakeholders are not aligned in their vision or understanding of the fundamental goal being sought, it becomes very difficult for planning processes to achieve outcomes (Collins and Porras, 1996, Kaplan and Norton, 2006). For threatened species recovery planning, this is particularly constrained by the multiple organisational values and interests represented. This lack of alignment in the definition of success was reflected in our interview results (Figure 5.2).



Figure 5.2. Different meanings of success across stakeholders involved in recovery efforts for the BNTW (n=8) and EBB (n=7). Some respondents provided more than one definition of success.

5.3. Factors that lead to a successful recovery program

Interview results on key enablers are shown in Figures 5.3 and 5.4 revealing that there are two common enablers of success across the two studied species. Commitment and dedication of people was mentioned as an enabler of success by 6 (out of 8) stakeholders interviewed for the EBB and by 6 (out of 9) stakeholders interviewed for the BNTW. Availability of research and specialist knowledge was mentioned as an enabler of success by 7 (out of 8) stakeholders interviewed for the EDB and by 6 (out of 9) stakeholders by 7 (out of 8) stakeholders interviewed for the EDB and by 6 (out of 9) stakeholders interviewed for the BNTW.

Other enablers of success found for the EBB were community and organisational engagement (mentioned by 7 out of 8 stakeholders interviewed), effective collaboration, and the availability of financial support (both mentioned by 6 out of 8 stakeholders interviewed) (Figure 5.3 and 5.4).



Figure 5.3. Barriers and enablers of success for the EBB recovery program. Percentage denotes the proportion of interviewees who identified each aspect as a barrier to success (n=8). Aspects mentioned by less than 50% of interviewees are not shown.



Figure 5.4. Barriers and enablers of success for the BNTW recovery program. Percentage denotes the proportion of interviewees who identified each aspect as a barrier to success (n=9). Aspects mentioned by fewer than 50% of interviewees are not shown.

Commitment and dedication of people

Our analysis suggests that having committed and dedicated people is a key ingredient of recovery programs because it facilitates attainment of other key enablers identified as necessary for achieving positive on-the-ground outcomes. Such roles include, for example, securing of funding, lobbying or negotiating with other stakeholders, overcoming impediments, implementing actions on the ground, engaging key organisations or community members, or leading and supporting other team members in their role. Importantly, for the case study species, this level of commitment seems to be intrinsically motivated rather than purely associated to extrinsic rewards (Table 5.2).

Table 5.2. Quotes by stakeholders interviewed related to commitment and dedication of staff.

"They've decided that they want to save the species that they're responsible for and I get quite - I just think they're amazing people and I think that's the key." (BNTW)

"Well I believe the reason why is because of the remarkable dedication and passion and interest by a few of the people that have been involved in it for a long period of time" (BNTW)

"The input of a lot of people has been the reason that the project has been, what I would consider, successful."(BNTW)

"They have been committed to the species rather than committed to their job. They have decided not to progress their careers up the career chain when they could well have done that. They've decided that they want to save the species that they're responsible for" (BNTW)

"What's enabled it, I guess, is the passion of the people involved" (BNTW)

"Just an absolute commitment. A total belief that what we set out to do was doable" (EBB)

"The personal drive and dedication of people both in Queensland and New South Wales" (EBB)

"It has been really important to have long term dedicated staff to make sure these programs continue "(EBB)

"It is essential to have an individual or individuals who take responsibility" (EBB)

"Well we wouldn't have gotten anywhere if we hadn't had those various people involved and supporting for over a long period of time" (EBB)

"I firmly believe that the species will get recovered by people, not by processes." (EBB)

"Because we've had people come in who have been dedicated to the project they've then been able to support funding applications which then has funded what we do and on a consistent basis"(EBB)

"There have been impediments in the way but I think there's been an ongoing commitment from members of the recovery team to overcome those, to seek ways past them, to find other ways of doing things and to still continue to make things happen by persisting and not giving up on this species." (EBB)

Availability of research and specialist knowledge

This aspect seems to be a key enabler of success because it provides the instruments that people involved need to solve problems. In addition to producing the knowledge, a key aspect is making it accessible, if possible, by direct involvement in the group or team who is in charge of leading recovery efforts.

Table 5.3. Quotes by stakeholders interviewed related to availability of research and specialist knowledge.

"I think in terms of the keys to success we've certainly got a very strong level of knowledge about the species ecology from previous research, about the methods for successful translocation. I think that has been key; just having that strong scientific background and information available to do management for those populations." (EBB)

"Well definitely research is definitely an enabler. For example, up at [location], we're using that data to guide fire management in the area. So there are fires that have to be lit and we can use that data to look at where the birds are, what the populations are like, and prioritise different areas with burning to achieve certain goals" (EBB)

"The most critical thing that we have had has been the baseline data on the population and the habitat quality." (EBB)

"I think - yeah communicating what the monitoring is telling you - to people that can make decisions about increasing pest control or what they should be doing with their fire control or burning and other things that might help. There's no point in just monitoring if you don't tell anybody about it that can do something and make decisions."(EBB)

"So in terms of the research stuff, we know some stuff and we're using that and I think it's making a bit of a difference. But there's a lot of stuff we don't know which could make a much greater difference in terms of recovery." (EBB)

"We couldn't have done that without a whole set of knowledge coming in from a whole series of players and under research as well. At the end of the day, knowledge underpins [unclear] all decisions."(EBB)

"Good scientific skills and contacts within the team enable us to reach out to people working on cat control monitoring techniques, all those sort of things to continue to improve both the management and the monitoring around that."(BNTW)

"Apart from the funding, we seem to have access to a lot of skilled people. When we came to build the nursery we looked at another nursery that had been built for a different species, so we were able to access that. With the nursery there's a drafting area which is electronically controlled scales and cameras and stuff. The skills to install that we were able to access." (BNTW)

"The other really, really important thing is if you're purporting to do science, then you must report it. So every single thing that I've done with eastern bristlebirds, and that [person] has done with eastern bristlebirds, has been reported both in interim reports to agencies and landholders, and has been published in the scientific literature. Everything. Absolutely essential."(EBB)

"I think the reason it is successful is because they have the researchers that are working currently on that species involved in the team, so you're getting direct knowledge coming into it, rather than people that may have had a distant involvement or maybe not even involvement at all, but have an interest in that species" (BNTW – referring to the Golden –shouldered parrot team)

"Having people involved who have a very good knowledge of the ecology of the animal. Long term knowledge of that ecology and the habitats is critical. Having some folk sit on the recovery team who have that level of knowledge is important as well. Critical." (BNTW)

5.4. Barriers to a successful recovery program

Our analysis suggests recovery programs can face a diversity of barriers (Figures 5.3 and 5.4). Given the particular biological, geographic and socio-political context, each recovery process will face different challenges that will constrain the success of the recovery program in different ways. Contextual characteristics include land tenure, occurrence in transboundary areas, and spatial distance across populations (Table 5.4).

Table 5.4. Quotes by stakeholders interviewed related to contextual aspects.

"I do think the fact it's occurred on the border between New South Wales and Queensland is a little bit of a problem ... the levels of communication between different departments and enthusiasm for ongoing senior bureaucrats"

"So the vast majority of the habitat in all of these more southern populations is in National Park tenure. So there's not development pressures and things like that. There are many other species that are probably more wide-ranging that have bigger threats to them in terms of habitat loss, whereas habitat loss for Bristlebirds in the southern part of its range is pretty much sorted out. It's not an issue."

"The context of the actual problem itself can be a barrier. In terms of there being these four really kind of different spatially separated populations that they're trying to manage. So I think from a management perspective, it's quite hard. Because each member of the team is invested in their particular population. Because they're separated by such big distances, they very rarely would actually have a chance to spend time with the different groups managing each population. I think just like the spatial separation of all the people was definitely an issue."

Under-resourcing

Under-resourcing is a common barrier across our two case study species; both in terms of time and money (Table 5.5). Limited funding seems to prevent actions from being implemented. It also seems to affect the number of staff available, which can constrain the ability to respond to ecological changes on the ground in a timely manner. Under-resourcing can also result in short-term projects that do not fit the time that is required to conduct work on the ground given the ecological complexity of some tasks. It is recognised, however, that government funding is a limited resource and that there are many other priorities that need attention. Thus, other type of funding have helped fill the funding gap. While it is positive that other funding sources have been tapped, an imbalance between government and non-government funding, and across government agencies, can also create conflict.

"But there was certainly a time where unfortunately the operating budgets and [agency department] is just getting cut year by year, so they really had very little money to do all the works that were required, so I think that would have been another key barrier. It's not like we've ever stopped doing certain things for the species, but yeah there's always been some constraints around how much we could really do " (EBB)

"Probably the last 10 years have just slowly had money taken away from them. So their ability to participate in conservation-style work has actually diminished because their pressure is to do more land management. So yeah. I think that that also did play a role, because when a lot of the Bristlebird work kicked off on the ground, National Parks, who are the land managers in the vast majority of cases down here, actually had the capacity to be a part of it. Whereas now, as much as they may want to, they don't have nearly the capacity to be able to do that" (EBB)

"That's been an absolute disaster particularly in Queensland where the government both Labor and Liberal have just not been interested whatsoever. They've put absolutely no money into it and no support. They don't support their staff. It's been an absolutely appalling shame where public groups and councils, local government, have been putting money in" (EBB)

"What we are lacking in some areas is the funding to assist with research, to assist with habitat management and securing areas, to fund the captive breeding program as well, that's pretty high cost being borne primarily, or being borne a reasonable amount by Currumbin Wildlife Sanctuary who are doing the captive breeding there. But also they've been receiving funding from New South Wales Government to assist them. So it would be good to see the Queensland Government put some funding into this species as well, and help make things happen." (EBB)

"You don't get funding for a five or a ten-year program anymore and you can't - nature doesn't work like that." (BNTW)

"If it had followed the Queensland model where there's been no support and no funding and no consistency, we'd be nowhere. We wouldn't have a captive breeding program. We wouldn't have most of the habitat work and we wouldn't have the population monitoring. In Queensland they have relied on volunteers, which has been essential but they've had to rely on volunteers. If you don't have that interest and support high up it won't get anywhere." (EBB)

"What we are lacking in some areas is the funding to assist with research, to assist with habitat management and securing areas, to fund the captive breeding program as well, that's pretty high cost" (EBB)

"In the end we're a community with a lot of needs but there's only so much money to go around. So I kind of get that and I don't ever want to come across as being critical of the people that give us the money or don't give us the money. It's the reality of it. (BNTW)

"It's really hard these days to have a five-year long project. You have to have a 12-month project and it has to be delivered by 30 June and if you get a really late wet season and that compromises the ability to do it" (BNTW)

" I suppose there's also money [laughs]. So there are some things that we'd like to do. It's also that they don't have the money for and they have to compromise." (BNTW)

"At the beginning they did a good job of it. Then just the money has dried up a bit. They were doing annual dingo baiting. Some of it might carry over to cats - really not much cat control. But yeah they did a very thorough job when they were trying to get them established obviously. There was somebody living on site doing it all the time. But then - that just goes by the wayside eventually" (BNTW)

"I think lack of resourcing is certainly an issue, particularly when you think about the [site] population, who is paying for that? So there's definitely a resourcing issue" (BNTW)

"I think possibly the people involved thought the population was dispersing and that's why they weren't seeing the animals so they weren't ringing the alarm bells, perhaps like they should have. I think the crash could have been prevented, yeah. I think just more people involved and relevant people probably involved." (BNTW)

"The typical reason is probably because people are very stretched. So they're doing a whole range of other things. They're torn in all sorts of directions. So things can take a bit longer than they probably should. So I reckon it would be helpful for recovery teams, where it's possible, and lots of cases it's probably not, to have someone whose main focus in life is that particular species." (BNTW)

"I think lack of resourcing is certainly an issue, particularly when you think about "off park" populations in Queensland" (BNTW)

Personal preferences and interests

The recovery process can be hampered by differences in preferences and by personal agendas of those involved in the recovery program. This can hamper collaboration and result in poor coordination, driving particular actions on the ground that may not reflect the needs of the species as whole. It can also lead to a lack of an adaptive management approach where actions are reviewed and adapted, a waste of resources (time and money), and frustration and disengagement across the team group (Table 5.6).

Table 5.6. Quotes by stakeholders interviewed related to personal characteristics and biases.

"Again, because there are a number of separate organisations involved, inevitably we do have our own focus for the patches that we're looking after. So that probably means we don't always have a singularity of purpose that's as strong as it should be... But [stakeholder] was very wedded to [site] and the work they're doing there ... Different groups will have - their attention will be on particular things, and it doesn't always mean it's necessarily the best outcome for the entire meta-population." (BNTW)

"So I think they are very fixed in their ideas of which populations they need to improve and which things they need to manage, so they were pretty risk averse, I think, in terms of wanting to look at new actions or very tied to the populations in the wild that were doing really, really poorly. So they really emotionally invested" (BNTW)

"It normally comes down to one person - one or two people's opinions. And they may not be basing their opinions on any evidence or science or be willing to change their opinions of what's going on. It's just that a small number of people that have an opinion and they just keep following that. They're not really that interested in following up whether it's working or what else could work." (BNTW)

"I think each organisation was acting a little bit myopically. They were each more interested in their own programs at their own sites for different reasons I think. I think that hampered - yeah, I think that would have contributed to the lack of success." (BNTW)

"That is a reason why it's a good idea to have some researchers bring those sorts of things up in a meeting and discuss a bit broader communication or - yeah it's not just down to one or two people's opinions and they just stick to them. They get defensive if other people try to broaden the view of what things might or might not work and also how you can tell if something is working." (BNTW)

"I think one of the real challenges is that you tend to get a couple of people who have very dogmatic opinions and they will not bend. They will not change or not bend. There's no discussion. That can create quite a lot of tension and when you've got limited time available for meetings and people hold the floor for a long time; a lot of time is wasted quite frankly. I think that you really is a very strong chair, somebody neutral but also just strong and can say, we've dealt with that, we need to move on." (BNTW)

"People with very strong dogmatic opinions which really, in some ways, precluded collaboration because if you're not willing to bend a little and to sway with the wind it becomes quite hard" (BNTW)

"I think also that there were internal politics in the sense that people had agendas; people wanted to see certain things achieved. And what they felt needed to be achieved was always a priority. It was hard to find discussions where we could work on several things concurrently instead of just putting everything on one issue. One of those issues was the genetic - there was a call for more genetic studies. I wasn't necessarily of that opinion but those things really chewed up a lot of time. (BNTW)

"it was almost like people took certain sentences from the genetics report and used that to reinforce their own views" (BNTW)

"I think it probably comes down to a bit of personality...We've got people that want to keep hold of their patches and people that you develop relationships with, and they want to maintain that. They get used to that relationship and so often when the change happens, they don't probably adapt quite as quickly as they probably should."(BNTW)

"The key barrier was, from my understanding, an individual or certain individuals within the Queensland Government who had apparently very personal biases against doing captive breeding and release type work" (EBB)

"The first hurdle that we found for that is that they weren't very open to thinking about actions that they hadn't already done, that they hadn't already put a lot of thought or investment into. So they were a bit scared of - definitely scared of thinking of new options" (BNTW)

"They get one sort of protocol and they just keep with it without really thinking what needs to change or what we need to do with it or getting advice on it." (BNTW)

Lack of coordination and continuity

It is well recognised that the lack of integration across space and time can hamper environmental programs especially when they span different management and ecological scales (Briggs 2001, Cash et al 2006, Folke et al 2008, Guerrero et al 2013). This is the case for the BNTW where different spatially-distant populations are managed by different groups of stakeholders and where the implementation of certain actions requires the agreement across these groups. Integration also seems to have been affected by diminished communication due to departmental restructures and staff changes (see section "Departmental restructures and staff changes" below). This lack of coordination across groups is perceived to result in disconnected efforts on the ground and also impacts on the ability to acquire new knowledge and account for past actions. As a result, there is a perceived lack of continuity in data and information, and a perception that future actions are not strategically planned (Table 5.7).

A lack of coordination does not appear to be a barrier for the EBB (Figure 5.3), even when jurisdictional boundaries are crossed in the management of the northern population. In spite of previous impediments and lack of success the efforts of the northern recovery group have recently gained momentum with different actions being coordinated across the various stakeholders involved.

Table 5.7. Quotes by stakeholders interviewed related to lack of coordination and continuity.

"It's also a barrier that I think at the beginning it was probably a bit of a scattergun approach. It's kind of been co-ordinated but it's been a bit little bit haphazardly co-ordinated I suppose. I guess that people had in their mind what they were going to do. They were going to start this population here, and get that population there. Once again, I'm not being critical. We can have a recovery program and have these all good intention and plans laid out but when it comes down to delivering, if you haven't got all the resources that you need to deliver it properly then you just do your best."(BNTW)

"That is major barrier - continuity. I suppose some turnover is an inevitable thing but yeah continuity with previous data and information and what other people have previously done and their plans I think..." (BNTW)

"The level of implementation of actions has been very patchy. That is quite related to the amount of staff turnover and changes in direction at various times, I think so. Some of it can be done by the park staff. They're all quite thinly spread though. It is good to use students. There has been NGOs helping at [site]. But it needs somebody to organise them. You need some sort of longer term plan. It seems to be just quite ad hoc and patchy." (BNTW)

"I think we probably could have done with more with a stronger coordination across the whole population, not just at [de-identified site]. We didn't have anyone providing that sort of countrywide nail-tail coordination perspective when we started doing this. We would probably have advanced discussions about some of the proposed actions further than they've got. It's not all other people, it's us as well, we would have learnt from others" (BNTW)

"Because there are a number of separate organisations involved, inevitably we do have our own focus for the patches that we're looking after. So that probably means we don't always have a singularity of purpose that's as strong as it should be." (BNTW)

Lack of effective collaboration

A lack of effective collaboration was recognised as a key barrier for the BNTW recovery program (Figure 5.3). While there have been efforts to establish collaboration across a wide range of stakeholders, and people involved in recovery team meetings appreciated people's willingness to collaborate and have the opportunity to discuss different issues, they also recognised the inability of the group to achieve a shared purpose. Others reflected on the competition that can sometimes exist between different groups due to organisational needs needing to be prioritised over collaborative objectives. It also seems that personal preferences (e.g. attachment to particular actions) have also hampered collaboration (Table 5.8).

Collaboration is essential for the development of a shared purpose – a key ingredient for the implementation of an integrated program. Thus this lack of effective collaboration has inevitably affected the ability to deliver an integrated program.

Table 5.8. Quotes by stakeholders interviewed related to lack of effective collaboration.

"One of the major gaps that I perceived was that people were really not talking to each other very well. We had very different stakeholders. There really seemed to be very little co-ordination amongst any of these stakeholders and they all seemed to have various levels of success. They're all really a piece of the jigsaw." (BNTW)

"There is not enough collaboration, only just – occasionally, it's just somebody has decided to send out information or organise a workshop or a meeting or something. So there's not really a process. It's just up to whoever is running it at the time. The recovery team has only re-formed recently and it's limited with who's involved in it". (BNTW)

"At the beginning when I first got involved it was very difficult. People were just not talking to each other. The recovery group, as it was led and structured, I think facilitated a lot of that. It went a long way to getting that collaboration. We could sit down in a room and there was good leadership in the recovery team. I think all of the mechanisms were there to collaborate. But I think it comes back down to people with very strong dogmatic opinions which really, in some ways, precluded collaboration because if you're not willing to bend a little and to sway with the wind it becomes quite hard." (BNTW)

"think the recovery group if we'd have had it there all along we might not have had any different direction but we would have been much better able to tap into thde other stakeholders and share experiences, so we'd probably be further along if we hadn't have died." (BNTW)

"There were researchers there who were making recommendations about what should be done with the animals which were in conflict with what other groups were saying should be done. Other groups were in conflict with each other." (BNTW)

"There's a tension between the needs of the recovery team and then the needs of the organisation that the individuals in the team represent. You'll come across some people in some organisations that are totally can do and they're very collaborative and they'll work with the team to try to make things happen for the greater good and then you get other situations where that just - it doesn't happen. It prevents individuals collaborating effectively in the team. It stops them from doing things on the ground" (BNTW)

"I think for [de-identified actor] it is that issue of needing to prioritise their activities from their own perspective and part of that is needing to be very competitive because they're asking for money. Part of their marketing - this is true for any NGO - is to demonstrate that they're doing it better than anyone else. So there's inherently a conflict there in a collaborative model, because how to you collaborate with [de-identified actor] if at the same time you're trying to demonstrate that you're better than them." (BNTW)

Departmental restructures and staff changes

For the BNTW departmental restructures and staff changes seems to have affected the recovery program in different ways. The interviews revealed a perception that this has affected cohesion across some groups, the continuity of the program, and ability to implement actions due to a shift in focus (Table 5.9).

Changes in responsibility can also result in catastrophic outcomes for populations where management has shifted. However, the latter may also be associated to issues with communication and systematic failures where skills do not match the task at hand (Table 5.12).

Table 5.9. Quotes by stakeholders interviewed related to departmental restructures and staff changes.

"Yes, [de-identified actor] was providing a lot of support to [de-identified site]. Because [de-identified actor] used to be a part of Queensland Parks and Wildlife Service or National Parks and then after the election in 2012 it got hived off into another silo. So I think the loss of that cohesion, and creating one department to do (a) while the other department does (b), when beforehand they were all doing (a) and (b) and mixing it up and helping each other out. I think that could have had something to do with it." (BNTW)

"We've had turnover of staff. That has been a problem on the political side, which means that if we have an issue here we're talking to somebody in head office who knows nothing about their project because they're new there."(BNTW)

Up until about 2010, the [agency department] which I belong to, we were involved pretty heavily with the [site] population. But that changed. We had a regional boundary change, so there was a different group of people got involved for a while. We also had a new director who wasn't supportive of us being involved in the [site] project. Then that's come back again. The park then came back to central region. So different directors and different teams of people have been responsible for it over the years" (BNTW)

"You'll get someone up the chain saying look, that's not one of our core responsibilities now. Because the political landscape changes. The focus changes as well. I think that is an impediment." (BNTW)

"That is major barrier - continuity. I suppose some turnover is an inevitable thing but yeah continuity with previous data and information and what other people have previously done and their plans I think..." (BNTW)

"The level of implementation of actions has been very patchy. That is quite related to the amount of staff turnover and changes in direction at various times, I think so. Some of it can be done by the park staff. They're all quite thinly spread though. It is good to use students. There has been NGOs helping at [site]. But it needs somebody to organise them. You need some sort of longer term plan. It seems to be just quite ad hoc and patchy." (BNTW)

"Government departments change. Both in name and who's in it...I think it's a while for people to get their head around that and trying to determine the boundaries between there and then okay, that's our role and that's your role" (BNTW)

"We had a specific problem at [de-identified site] where we, [de-identified actor], had been leading that project and then our operational counterparts in the region wanted to assume leadership of that project so we let them, we stepped right back from it and in three years the population went extinct at [de-identified site]." (BNTW)

Bureaucracy

Together with under-resourcing, aspects of bureaucracy seems to have been the main barrier to success for stakeholders involved in the recovery of the EBB and bureaucracy also appears to have been a contributing barrier for stakeholders involved in the recovery of the BNTW. Bureaucratic inertia, constraints and transaction costs can stop or inhibit actors from doing what they need to do to recover a species. Detrimental policies and making approval processes difficult can create inaction, frustration and affect collaboration. Leadership can be a mitigating force against the negative aspects of bureaucracy. It can help groups to find ways to make things happen within the limits placed by regulations and policies (Table 5.10).

Table 5.10. Quotes by stakeholders interviewed related to bureaucracy.

"One of the barriers was the fact that there was a government-run captive breeding facility which was doing a great job but then for decisions made by individuals in bureaucracy that program was stalled. We had several recovery team meetings where the most relevant recovery team members from Queensland were not allowed to attend. So there were certainly some bureaucratic mechanics going on there to I guess sort of avoid the whole issue of actually committing to that captive breeding component which was absolutely essential." (EBB)

"To get things done there was so much bureaucracy. Say for example there was an absolutely anti-fire process if you're in the bureaucratic and policy system that it was very hard for us to get burns proposed to actually - to implement burns which then would allow us to recover the species. That got to a stage where we actually had to threaten to say if you don't do anything it's in breach of the Act because you're not allowing us to recover the species by not allowing us to burn." (EBB

"Bureaucracy isn't flexible enough. Once they lock onto something it's locked in there for years and you've got to have - especially in species management - you've got to have management that adapts pretty quickly to changes" (EBB)

"The staff in the Department of Environment involved in the program have been fantastic but they're just hamstrung by their bureaucracy and the government."(EBB)

"There are constrictions that you have to work through for getting approvals ... It is a bit of a circle that you come round. To protect a threatened species you have to burn for it, but you can't burn for it because there's a threatened species there."(EBB)

"The Queensland Government changed its policy and shut down a captive breeding facility and required us to leave the released birds and to stop birds from breeding. There was a very large political, social hiccup around that stage. We, as a recovery team in 2009/2010, really struggled as a northern working group. For me, that was the pivotal turning point and because of the politics in Queensland at the time, a lot of the driving of the program shifted to New South Wales where we were better placed to push forward." (EBB)

"The New South Wales legislation and the policies around that, prescribe what a plan would look like. It was far too rigorous. The Commonwealth was even worse. A plan didn't need to be as rigorous as the requirement in New South Wales. The result of that requirement was that of course none of the - not none - very, very few of the threatened species recovery plans were ever finalised." (EBB)

"With no leadership, what you'll get is vested interest and bureaucratic inertia which is a nice way of going backwards."(EBB)

"I think there were regulatory barriers. So there's a reluctance to translocate animals. It was very slow moving riskaverse regulatory structure which in our really urgent situation - emergency situation - is was stifling. There were just so many barriers to doing what we needed to do, like paying for it, getting approvals for it." (BNTW)

"At one time earlier on in the piece, so in the earlier years there was on particular individual in Queensland Parks who was very anti-translocation. So the whole concept of getting approval - you just didn't even bother trying to get approval to move a batch of animals. It just wasn't going to happen." (BNTW)

So [de-identified actor] would go to these meetings and I could see that [de-identified actor] would have various ideas about ways of working together with other people in the team to achieve various things, but [de-identified actor] couldn't actually act on them unless approval was obtained and that never happened. It's within [de-identified actor] there are approvals for everything. So you just don't get stuff coming back down the line. As a result [de-identified actor] couldn't really engage effectively." (BNTW)

"Whether it was moving animals into Queensland, establishing another population and working with [de-identified actor] for example. Whether it was putting cattle on [de-identified site]. Whether it was moving animals between the parks. There was a lot of bureaucracy. There were also some significant resource constraints... I think this amplified the arguments between people. People really had quite strong ideas but because they couldn't move forward with anything it got very frustrating. We wanted to get people together to take a series of actions to get things moving within the realms of the current legislation but I think by that stage pulling people together and really getting them to work together was quite a challenge." (BNTW)

5.5. How barriers lead to lack of success

The different aspects of a recovery program interact with one another to facilitate or constrain on- the-ground outcomes (Figure 5.3). Identifying important interactions between key barriers and other aspects of a recovery program permit a greater understanding of how a lack of success can unfold. For example personal agendas can affect collaboration and thus lead to poor coordination of actions on the ground, driving actions that may not reflect the needs of the species as whole which ultimately can result in ineffective management of the species. Personal agendas and preferences (e.g. risk aversion) can also prevent an adaptive management approach where new ideas can be trailed and reviewed, and actions adapted (Figure 5.3. and Table 5.6).

A lack of clear accountability and responsibility can also impact on the ability to review actions and adapt to changes in the system, particularly when there is a lack of leadership. This can lead to poor management, which in some instances can have catastrophic results (Figure 5.3. and Table 5.11).

Leadership is important to bring people together and set a clear direction. A lack of leadership can thus lead to uncoordinated actions. The presence of a neutral leader can help mitigate personal agendas making sure that these do not prevail over the needs of the species as a whole and that time is not wasted. Without leadership the constraints placed by under-resourcing, lack of political support and bureaucracy can stop a program from moving forward (Figure 5.3 and Table 5.12). Systematic failures can unfold when the skills of people involved do not match the task at hand, knowledge is not readily accessible, and contingency systems are not in place (Figure 5.3 and Table 5.13).

Table 5.11. Quotes by stakeholders interviewed related to accountability and responsibility.

"There wasn't really anyone particularly responsible for keeping a really close eye on what was going on with nail-tail work and whether it was effective or not."

"Probably having clearer terms of reference as a recovery team maybe. Maybe a stronger level of responsibility. Or maybe empowering is the word, to guide and direct some of the recovery efforts."

"I think it would be really beneficial if all levels of government right through, there was a really clear line of sight and direction...There's actually no big stick from above to make sure - well no big stick and no resourcing to make sure that an agreed approach is actually implemented."

"There was no group that said 'let's have a look at this or review it'. To be fair, I suppose, a drought is a fairly short period, so the opportunities to really look at those sorts of things are limited. But I think groups like the goldenshouldered parrot team, with the practitioners and the researchers having that conversation probably could act a bit more quickly than we probably did with nail-tails."

Table 5.12. Quotes by stakeholders interviewed related to leadership.

"Not just direction for [unidentified site] but broadly. So we're all singing on the one song sheet, working towards the same thing."

"I think the recovery group if we'd have had it there all along we ...would have been much better able to tap into the other stakeholders and share experiences, so we'd probably be further along if [the recovery team] hadn't have died. I think the value is in ... getting stakeholders together and having decisions made by consensus across those and having a shared understanding of what's going on, I think that's the value of those guys."

"There were researchers there who were making recommendations about what should be done with the animals which were in conflict with what other groups were saying should be done. Other groups were in conflict with each other."

Table 5.13. Quotes by stakeholders interviewed related to inadequate skills and access to knowledge.

"Perhaps they weren't quite aware of what the data was showing them. That there were these big increases in predators and they weren't letting the relevant people know about that. But that's a fault of the system, not necessarily those people that were acting in those roles. Someone should have been keeping an eye on it."

"We've just lost the other day a population. It comes down to the guys doing the work, their voice or their message is being lost between the recovery team and regional directors and the support's not coming through to ensuring that what we said we were going to do is happening."

"So there was no communication about what this was for or understanding of what was going to happen. The rangers have got no training of this sort of thing and it was up to them."

"Where it was the skills - and people - that were lacking were genetic - was genetic management... the people that tend to be involved in recovery teams are the hands-on conservation practitioners... and as soon as they had to confront an issue like genetics they were all at sea ... So you would get quite different approaches and aims being propagated by different agencies ... Whereas if you talk to a geneticist they'll be a lot more pragmatic about when you should mix and when you shouldn't mix and all that kind of stuff."

"Often the problem is, a lot of those reports were done prior to computers, so tracking in the information means you actually have to read [laughs] which is surprising, is that a problem. "

"It would help to have some knowledge of what other people have done - they just don't have any access at all in more remote places"



the implementation and stakeholder process). Diagram shows interviewees' perceptions about how interaction of these aspects can lead to ineffective or poor management. Thus, the barriers (in grey) of different types (human figure represent aspects to do with people, rectangles represent aspects to do with the system and ovals represent resulting characteristics of Figure 5.3. How barriers lead to lack of success. Thematic analysis of interviews with stakeholders was used to identify relationships between key barriers (in orange) and less prominent absence of a link from the diagram does not mean that there is no link, it only reflects the fact that they did not emerge in the interviews. Similarly, aspects of the structure presented in the figure may not align with the reader's preconceptions.

5.6. Conclusions

This chapter presents an analysis of implementation processes of threatened species recovery programs. We focused our analysis on the characteristics of recovery processes that either hinder or enable the attainment of conservation outcomes.

Having committed and dedicated people involved in a recovery process is essential to the success of the program. It facilitates attainment of other key enablers identified as necessary for achieving positive on-the-ground outcomes.

Even with committed and dedicated people, a well-funded program seems to be essential to successful protection or recovery of threatened species. The reality is however that sufficient funds are not always available due to shifting priorities and funding needs.

Beyond budget and people, there are several other key factors influencing the success of these programs. Influential individuals who were seen to lack flexibility and an openness to new information were felt to adversely affect the BNTW (and to a lesser extent the EBB) effort in several ways. They can hamper a collaborative process. Attachment to particular sites or actions, combined with strong personal agendas can cause conflict in a group and can drive resources to actions that might not reflect the needs of the species as a whole. Personal biases can magnify the effect of other constraints such as the lack of collaboration, poor use of scientific knowledge, and inability to coordinate actions across sites and populations. Personal biases can result in an unwillingness to try new things and hamper an adaptive management process.

Since its rediscovery the BNTW has benefited by the commitment and dedication of many people that have worked for its recovery. Measures to protect the species - including a series of captive breeding programs and ensuing translocations along the way - have had mixed fortunes. The various stakeholders we spoke to described numerous factors that may have hindered conservation efforts over the last 20 years. At the institutional level, departmental restructures and staff changes seem to have impacted negatively on the recovery process. Added to this, underresourcing and limited use of available data and knowledge has hindered people's ability to respond to ecological changes in a timely manner. Personal biases have hampered the collaborative process and the ability to coordinate actions. All of this has led to delayed or lack of much needed on-the-ground actions and perceptions that resources have been wasted.

The EBB has also benefited from dedicated people and champions that despite many impediments have been able to lead the implementation of a number of actions considered critical for the survival of the species. A lack of coordination doesn't seem to be a barrier for the EBB, even when jurisdictional boundaries are crossed in the management of the northern population. In spite of this, and in spite of previous unsuccessful attempts, the efforts of the northern recovery group have recently gain momentum with different actions being coordinated across the groups involved. Leadership, collaboration and a common sense of purpose seem to be characteristics driving current implementation of actions. The recovery process for the central population, the EBB has resulted in the implementation of actions that seems to be benefiting the species. For this population, the commitment, dedication and leadership of the people involved combined with a well laid out plan have enabled them to obtain support and resulted in the implementation of key actions, including the production of critical knowledge for the management of the species, safeguarding of key habitat, and the successful translocation and management of new populations.

Chapter 6: Conclusions and recommendations

6.1. Conclusions

The recovery of threatened species may be a formidable challenge. Typically, there are well-entrenched ecological factors that have caused, and may be continuing to cause, severe decline. Sometimes, the primary threat may be difficult to ameliorate, such that much management effort may produce little progress, and realistic short-term objectives may relate more to reducing the rate of decline rather than recovery. Sometimes the relative impacts of multiple putative threats are poorly resolved, such that management intervention may be poorly targeted, at least initially.

But these ecological issues represent only part of the challenge of conservation management for threatened species. Most recovery projects are conducted by agencies and organisations with many competing priorities, constrained funding and propensity for planning processes and budgeting to be susceptible to short-term oscillations. Furthermore, relevant government agencies typically operate in a context set by many overlapping, and sometimes contradictory, policies and laws; and even this context may be fluid, with ongoing modifications of those policies and laws. Our study suggests that this broad institutional context will not always allow for the optimal delivery of actions required for the recovery of a threatened species.

Furthermore, recovery programs for threatened species almost always involve a range of stakeholders, with varying perspectives, priorities and other interests, with such diversity often being beneficial but sometimes a cause of conflict. Even regardless of their stakeholder representations, the mix of recovery team and project personnel (and their managers) involved, with varying levels of authority and expertise, in recovery programs may also represent a cumbersome and complex organisational challenge. Attitudinal differences may be especially pronounced between those in the field devoted to the care of the threatened species in their charge and those remote from the immediate day-to-day action, who may have more need to balance commitments to the project within a broader organisational strategic setting. The potential for such complex collaborative and interdependent systems to fray may be most pronounced, and detrimental, when expectations of success are not readily realised, and the program is suffering setbacks. Our study demonstrated that governance factors and organisational settings and commitment can substantially influence the likelihood of success of recovery efforts. This finding was evident in the results of our qualitative study of the recovery implementation process, involving interviews with key personnel (Chapter 5), despite obtaining a positive result for the assessment of institutional gaps within the policy framework (Chapter 4). Thus, through the integration of the two approaches we were able to take in to account the system of interacting governing institutions and identify, for our two cases, the factors having an effect on the success of recovery efforts.

Each of the two case studies we examined included components that contributed to success and components that contributed to the lack of success. It is clear that, although influenced by challenging ecological factors, these differences in outcomes owed much to governance and policy context factors. Successful recovery is dependent upon: clear and realistic objectives within the management framework document (typically a recovery plan); enduring commitment to that plan by relevant agencies; project structuring based on longer and shorter term goals; transparent and good governance; an appropriate mix of expertise and stakeholder groups; a broad policy context that facilitates appropriate management; and an appropriate degree of project review, pragmatism and flexibility. Many of these factors are now being more explicitly articulated in new guidelines for the governance of recovery teams being formulated by the Department of the Environment and Energy.

6.2. Recommendations

Our study focused on two threatened species. There were some notable commonalities in conservation management issues between these two species, but also some ecological and other differences that influenced their recovery programs and the extent to which these were successful. There are more than 1600 threatened species in Australia, with much more markedly variable ecological and other characteristics. We cannot presume that the lessons from these two case studies will necessarily apply to all other cases, but some preliminary findings may find useful application more generally. These are:

- 1. Governance of recovery teams and project personnel is critical. Recovery effort can be subverted by disaffected individuals, by poor communication, and by apparently haphazard decision-making. Recovery teams should have well-defined governance principles that suitably encompass the varying levels of responsibility and perspectives held by people integral to the recovery effort. Project personnel should have clearly defined roles, and the opportunity to contribute to decision-making and review.
- 2. People are critical. The recovery of threatened species is dependent upon the ongoing contributions of people who are passionate and committed to the cause. Such champions should be treasured for their contributions, enthusiasm and capacity to inspire others. But managers of such personnel should be alert to such commitment leading to burn-out, and may need to be careful in guiding such personnel away from long-established approaches that may no longer be optimal.
- 3. Evidence is critical. Researchers have a key role in formulating, assessing and refining management practices. Recovery actions should be implemented in a manner that is testable. Managers should identify areas in which the evidence base is currently inadequate, and seek research input to remedy that failing. Researchers need to make their findings readily available to the recovery team and others with responsibility for implementation of the recovery program. Where possible, the presence of researchers in recovery teams would be most beneficial to ensure access to research and specialist knowledge in a timely manner.
- 4. Responsible agencies should make long-term commitments to at least the core components of a recovery plan or other relevant framework, and the appropriate levels of resourcing commitment to reflect such an obligation.
- 5. There should be more scope for regular external review of recovery plans, teams and programs, shaped in a manner that can help provide guidance and overcome entrenched but suboptimal protocols or practices.
- 6. Recovery plans need to have a vision to which all stakeholders can aspire and commit, and an integrated set of short-term and long-term goals. Short-term goals should be the basis for regular workplans and internal annual reviews.
- 7. Recovery plans need to consider the complex broader mix of policies and laws that may facilitate or impede conservation management practice, and be alert to such context when formulating their actions and expectations. Where possible, conducting an institutional analysis early in the recovery process can help identify potential barriers and or opportunities to recovery efforts; this has the potential to save resources in cases where key policy barriers are identified and they need to be addressed for recovery efforts to be able to produce outcomes.
- 8. Some extension of our study would be desirable, especially to other threatened species with contrasting ecologies, trends and management milieux.

Appendix A

Document Library Metadata for the Eastern bristlebird:

BUDDEROO NATIONAL PARK, MACQUARIE PASS NATIONAL PARK, BARREN GROUNDS NATURE RESERVE.. Draft New South Wales Biodiversity Strategy 2010 - 2015 Threat abatement plan for dieback caused by the root-rot fungus Phytophthora cinnamomi 2001. Threat abatement plan for predation by feral cats SACKGROUND DOCUMENT for the THREAT ABATEMENT PLAN for predation by the European red fox Biodiversity Priorities for Widespread Weeds - Statewide framework Biodiversity Priorities for Widespread Weeds - Statewide framework Regional document orestry Act 1916 - Forestry Regulation 1999 (1999-454) [GG No 98 of 27.8.1999, p 7028] 3ackground document for the threat abatement plan for the predation by feral cats Sitou bush (Chrysanthemoides monilifera ssp. rotundata) weed management guide Invasive Animals Cooperative Research Centre Annual Report 2007 – 2008 Invasive Animals Cooperative Research Centre Annual Report 2008 – 2009 Invasive Animals Cooperative Research Centre Annual Report 2009 – 2010 Invasive Animals Cooperative Research Centre Annual Report 2010 – 2011 Invasive Animals Cooperative Research Centre Annual Report 2011 – 2012 Invasive Animals Cooperative Research Centre Annual Report 2005 – 2006 Invasive Animals Cooperative Research Centre Annual Report 2006 – 2007 ment Protection and Biodiversity Conservation Regulations 2000 iental Planning and Assesssment Amendment...Regulation 2005 3est Practice Management Guide for Environmental Weeds - Bitou bush UCN Guidelines for Applying Protected Area Management Categories ntroducing the NSW Threatened Species Priorities Action Statement Slackberry (Rubus fruticosus aggregate) weed management guide Vational Biodiversity and Climate Change Action Plan 2004–2007 invironment Protection and Biodiversity Conservation Act 1999 THREAT ABATEMENT PLAN for predation by the European red fox invironmental Planning and Assesssment Act 1979 Regulation nvasive Animals Cooperative Research Centre Strategic Plan udawang and Morton national parks plan of management Australia's Biodiversity Conservation Strategy 2010–2030 invironmental Planning and Assessment Act 1979 No 203 invironmental Planning and Assessment Regulation 1994 .antana (Lantana camara) weed management guide National Recovery Plan for Eastern Bristlebird 2012 Plan to Protect Environmental Assets from Lantana 300DEREE NATIONAL PARK MANAGEMENT PLAN Game and Feral Animal Control Act 2002 No 64 Habitat Management Guide - Riparian areas 3ITOU BUSH AND BONESEED Strategic Plan Habitat Management Guide - Rainforests The IUCN Red List of Threatened Species ire Brigades (General) Regulation 1997 Document Title Convention on Biological Diversity Australian Pest Animal Strategy FIRE BRIGADES ACT 1989 No. 192 Quarantine Regulations 2000 Australian Weeds Strategy antana Strategic Plan. orestry Act 1916 No 55 Quarantine Act 1908 inviro

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The role and use office for biodiversity conservation in south-east Queensland - Fire management guidelines Biodiversity Recovery Plan for Gatton and Laidley Shires, South-East Queensland 2003-2008 Vincentia - Violet Clark & Orion Beach Reserves - Bushcare Action Plan - March 2013 Vincentia Bushcare - Plantation Point & Stuart King Reserve Bushcare Action Plan 2008 Sunshine Coast Local Government Area Pest Management Plan 2012-2016 (Part 1) Sunshine Coast Local Government Area Pest Management Plan 2012-2016 (Part 2) Sunshine Coast Local Government Area Pest Management Plan 2012-2016 (Part 3) Sunshine Coast Local Government Area Pest Management Plan 2012-2016 (Part 4) Sunshine Coast Local Government Area Pest Management Plan 2012-2016 (Part 5) Warden Head Bushcare Action Plan - 2011 Wowley Creek (Callala Bay) Bushcare Group Action Plan - July 2014 Wrights Beach Bushcare Action Plan - 2010 Vincentia - Collingwood Beach Reserve Bushcare Action Plan - 2008 Upper Kangaroo River - Bushcare Action Plan - June 2012 Living in Somerset PROPERTY MANAGEMENT HANDBOOK Ulladulla Reserves Bushcare Action Plan - June 2012 Sunshine Coast Biodiversity Strategy 2010 - 2020 Gympie Regional Council Environment Strategy Vigilant Street Reserve Parkcare Action Plan Ulladulla North Head Bushcare Action Plan Best Practice Fire Management Manual 2011-2015 Pest Management Plan

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Appendix B

Document Library Metadata for the Bridled nailtail wallaby:

Background document for the threat abatement plan for predation by the European red fox 2008 Approved Conservation Advice for the Brigalow (Acacia harpophylladominant and co-dominant) 3ack on track actions for biodiversity - Desert Channels Natural Resource Management Region Background document for the threat abatement plan for the predation by feral cats 2008 Threat abatement plan for predation by the European red fox (2008). Five yearly review. 3ack on track actions for biodiversity - Fitzroy Natural Resource Management Region Recovery plan for the bridled nailtail wallaby (Onychogalea fraenata) 2005–2009 Land Protection (Pest and Stock Route Management) Regulation 2003 Vature Conservation (Protected Areas Management) Regulation 2006 Environment Protection and Biodiversity Conservation Act 1999 Vol 1 Environment Protection and Biodiversity Conservation Act 1999 Vol 2 IUCN Guidelines for Applying Protected Area Management Categories National Biodiversity and Climate Change Action Plan 2004–2007 The Action Plan for Threatened Australian Macropods 2011- 2021 Land Protection (Pest and Stock Route Management) Act 2002 Nature Conservation (Wildlife Management) Regulation 2006 Australia's Biodiversity Conservation Strategy 2010–2030 Building Natures Resilience A biodiversity strategy for QLD Nature Conservation (Protected Areas) Regulation 1994 Threat abatement plan for predation by feral cats 2008 Threat abatement plan for the European red fox 2008 Nature Conservation (Wildlife) Regulation 2006 Regional Planning Interests Regulation 2014 Planning and Environment Court Rules 2010 IUCN Assessment - Bridled Nailtail Wallaby Vegetation Management Regulation 2012 Taunton National Park Management Plan The IUCN Red List of Threatened Species Stock Regulation 1988 (Current as 2009) dalia National Park Management Plan Sustainable Planning Regulation 2009 Regional Planning Interests Act 2014 Convention on Biological Diversity Vegetation Management Act 1999 Stock Act 1915 (Current as 2015) Sustainable Planning Act 2009 Nature Conservation Act 1992 Threatened species Strategy Integrated Planning Act 1997 Land Regulation 2009 Stock Act 1915 - 1987 Document Title Land Act 1994

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Document Library Metadata for the Bridled nailtail wallaby (continued):

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Appendix C

Eastern bristlebird Northern population Conceptual Model 'Terms' defined for MINOE analysis:

off-road vehicle" 4WD "motor bike" "motorcycle" "motorbike" bushwalking "bird watching" "horse riding" recreation tourism "human impact*" "human disturbance"

vildfire* 'uncontrolled fire" "uncontrolled fires" bushfire* "accidental fire" "accidental fires" arson* "illegal fire" "illegal fires" "arge-scale fire" "intensive fire" "inappropriate fire regime" "fire frequency" frequency of fire

habitat clearance" "habitat cleared" "habitat clearing" logg* "clearance of habitat" clearing of habitat" pastoralization "cultivation of land" "Land cultivation" "land cultivated" "urbanisation" "removal of vegetation" vegetation clearing" "vegetation cleared" deforest" "land clearance" "land clearing" "clearing of vegetation" "clearing of land" "clearence of land" removing vegetation "habitat destroyed" "habitat destruction" "vegetation removed" "vegetation removal" "destruction of habitat" "removal of native vegetation" "removing native vegetation" "clearance of native vegetation" "clearing of native vegetation"

inappropriate grazing regime" "inappropriate grazing regimes" "competing with livestock" "competition with livestock" "competition with livestock" "competing against livestock" "overgrazing livestock" "competing with cow" "competing against cow." "competition from cows" "competing with cattle" "competing against cattle" "competition from cattle" "competition from Bos " "competition from Bos " "competition from Bos " "competing with 8. "competing against B." competition from B." overgrazing cows" overgrazing Bos "overgrazing Bos "competing with sheep" competing against sheep" competition from sheep competing with Ovis " competing against Ovis " competition from Ovis " competing with O. " competing against O. " competition from O. " " overgrazing Ovis" "overgrazing Ovis" " overgrazing Ovis" " " overgrazing Ovis" " " overgrazing Ovis" " overgrazing Ovis" " overgrazing Ovis" " competing with domestic." "competition from domestic" "competing against domestic" "competing with herbivores" "competition from h

weed* "invasive plant" "invasive plants" "invasive vegetation" "crofton weed" mistflower* "balloon cotton"

"predators" "feral animal" "feral animals" "introduced predators" "feral cat" "feral cats" Felis "F. catus" "foxe" foxes" vulpes

nbreed* "genetic bottleneck"

native vegetation" "degrading native vegetation degradation" vegetation degraded" "degraded" "nabitat degradation" "nabitat degraded" "nabitat disturbed" "nabitat vegetation damage" "vegetation damaged" "damaging of native vegetation" "damaged native vegetation" "destruction of native vegetation" "destroyed native vegetation" habitat loss "loss of habitat" "vegetation loss" "loss of vegetation" degradation of habitat" "degraded habitat" "degraded habitat" "degraded of habitat" "degraded destroyed "destroyed habitat" "destruction of habitat" "vegetation destruction" "vegetation destroyed vegetation" "destroyed vegetation" "destroyed vegetation" destruction of vegetation" destruction of vegetation" destroyed vegetation" destroyed vegetation "destroyed vegetation" destroyed vegetation" destroyed vegetation "destroyed vegetation" destroyed vegetation "destroyed vegetation" destroyed vegetation " disturbance" disturbance of habitat" "vegetation disturbad" "vegetation disturbance" disturbance" disturbance of vegetation" damaged habitat" "Abitat damage" "habitat destruction" habitat loss of native vegetation" "habitat fragmentation" "habitat fragmented"

"Bristlebird" "Dasyornis brachypterus"

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"Mount Barney" "Mt Barney" "Mt. Barney

"Lamington"

Main Ranges" "Main Range" "Spicers Gap" "Spicer's Gap"

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conservation of habitat" "preservation of habitat" "protection of land" "preservation of land" "protected area" conserved area" "habitat management" "habitat managing" "habitat managed" nature reserve" "national reserve" "nature park" "habitat rehabilitation" "habitat rehabilitated" reveget* "conservation agreement" refug* "rehabilitation of habitat" "rehabilitation of land" "vegetation ehabilitation." "vegetation rehabilitated" "land rehabilitated" "rehabilitation of vegetation" "rehabilitation of native vegetation" "regeneration of habitat" "regeneration of habitat" "regeneration of habitat protected" "habitat protection" "habitat conservation" "habitat conserved" "habitat conserving" "habitat preservation" "habitat preservation" "habitat preservation" "habitat preservation" "habitat preservation" "habitat preservation" "habitat conservation" "habitat native vegetation" "regenerating native vegetation" "regenerating habitat" "habitat restoration" "restoration of habitat"

Eastern bristlebird Northern population Conceptual Model 'Terms' defined for MINOE analysis (continued):

grazing permit. "grazing regime" "livestock removal" "livestock removal of livestock" "exclusion of livestock "livestock exclusion" "livestock managed" " ivestock "managing of livestock" "fenced livestock" "livestock fenced" "livestock fencing" "removal of domestic" "exclusion of domestic" "excluding domestic" "managing domestic" management of domestic" "stock removal" "stock removed" "removal of stock" "exclusion of stock"

invasive vegetation" "invasive vegetation" "removal of invasive vegetation" "removing of invasive vegetation" "removing invasive vegetation" "control" "control of crofton weed" "crofton weed removal" "remove crofton weed" "removal of crofton weed management" "management of crofton weed" "mistflower control" "control " "remove invasive vegetation" control" "control of invasive vegetation" "invasive vegetation management" "manage invasive vegetation" "managing of invasive vegetation" "management of weeds. "remove weeds" "invasive plant control" "control of invasive plant" "invasive plant management" "manage invasive plant" "manage invasive plants" "manage invasive plant" "manage invasive weed control " "control of weed" "control of weeds" "weed management" "manage weeds" "management of weed" "management of weed" "weed removal" "removal of weed" "removal of invasive plants" "managing invasive plant" "management of invasive plants" "invasive plant removal" "removal of invasive plants" "remove of invasive of mistflower. "mistflower" "removal" "removal of mistflower" "mistflower" "mistflower" "mistflower" "balloon cotton control" "control of balloon cotton " balloon cotton removal" "remove balloon cotton" "removal of balloon cotton " balloon cotton management " management of balloon cotton" "manage balloon cotton"

of cats" "baiting of cats" "baiting of cats" "eradication of feral cats" "eradication of cat" "eradication of cats" "eradication of feral cats management of f. catus" "manage f. catus" "management of feral cat" "management of feral cats" "management feral cat" "control of feral cats" "trapping of cat" "trapping cat control" "control of cat" "control of Felis" "control of F. catus" "cat management" "management of cat" "management of cats" "manage cat" "manage cats" "control of cats" "control of cats" "manage cat eradicating felis" "culling cat" "culling cats" "culling of cats" "culling of feral cat" "culling of feral cats fox control "control of fox*" "control of vulpes" "control of v. vulpes" "fox management" "management of fox" "manage fox" "manage foxes" "management of foxes" "management of foxes" "management of foxes" "control of foxes" "control of foxes" "control of foxes" "management of foxes" "management of foxes" "management of foxes" "control of foxes" "control of foxes" "control of foxes" "management of foxe eradication of feral fox" "eradication of fox" "eradicating fox" "eradication of v. vulpes" "eradication of vulpes" "eradicating vulpes" "culling of v. vulpes" "culling of v management of v. vulpes" "manage vulpes" "management of feral fox" "management of feral foxes" "manage feral foxes" "control of feral fox" "control of feral foxes" culling feral foxes. "culling of feral fox" "culling of feral foxes" "culling of fox" "culling of foxes" "culling foxes"

survey* monitor* "habitat mapping" "mapping of habitat" research

landowner volunteering "land-owner volunteers" "land-owner volunteers" "participating landowners" "participating land-owners" "community education" "educating community" educate landowners. "educating landowners." educating land-owners." "education of landowners." "education of land-owners" "landowner participation" "land-owner participation" "educating the community" "education of the community" "public awareness" "incentive scheme" "incentive schemes

"captive breeding" "captive-breeding" "captive-bred" "captive bred"

translocat* reintroduc* re-introduc*

dieback control" "control dieback" "control of dieback" "dieback" "temoval of dieback" "dieback" "dieback" "dieback" "management of dieback" "control" "control"" "control" "control" "control" "control" "control"" "control"" "control"" "control" "control"" "control" "control"" "control"" "control"" "control" "control"" "control" "control"" "control" "control" "control"" "control" "control"" "control"" "control"" "control"" "control"" "control"" "control"" "control"" control." control P. cinnamomi" "control of Phytophthora" "Phytophthora P. cinnamomi" "removel of Phytophthora" "Phytophthora" "Phytophthora" cinnamomi management" "management of Phytophthora" manage Phytophthora" "dieback control" "control P. cinnamomi" "P. cinnamomi" "P. cinnamomi" "remove P. cinnamomi" "P. cinnamomi" "P. cinnamomi" management of P. cinnamomi" "manage P. cinnamomi"

dieback Phytophthora cinnamomi "P. cinnamomi"

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off-road vehicle" 4WD "motor bike" "motorcycle" "motorbike" bushwalking "bird watching" "horse riding" recreation tourism "human impact*" "human disturbance"

wildfire* "uncontrolled fire" "uncontrolled fires" bushfire* "accidental fire" "accidental fires" arson* "illegal fire" "illegal fires" "large-scale fire" "intensive fire" "inappropriate fire regime" "fire frequency 'frequency of fire'

"habitat clearance" "habitat cleared" "tabitat clearing" logg* "clearance of habitat" "clearing of habitat" pastoralization "cultivation of land" "Land cultivation" "tubanisation" "removal of vegetation" vegetation clearing" "vegetation clearance" "vegetation cleared" deforest" "land clear" "land clearing" "clearing of vegetation" "clearance of vegetation" "clearing of land" removing vegetation. "habitat destroyed" "habitat destruction" "vegetation removed" "vegetation removal" "destruction of habitat" "removal of native vegetation" "removing native vegetation" "clearance of native vegetation" "clearing of native vegetation

inappropriate grazing regime" "inappropriate grazing regimes" "competing with livestock" "competition with livestock" "competing up with cow" "competing with cow" "competing up with cow" "competing up with cow" "competing up with com" "competing up with "competing" "competing up with com" "competing up with "competing" "competing up with "competing" "competing up with "competing" "competing up with "competing up with "competing" "competing up with "competing up with "competing" "competing up with "competing up with "comp against cow" "competition from cows" "competing with cattle" "competing against cattle" "competition from from Bos " "competition from Bos " "competition from Bos " "competition from Bos " "competing with "overgrazing cows" "overgrazing cattle" "overgrazing Bos " "overgrazing B. " "competing with sheep" "competing against sheep" "competition from sheep" competing with Ovis "competing against Ovis" "competition from Ovis" "competing with O." "competing against O." "competition from O." "overgrazing sheep" "overgrazing Ovis" "overgrazing O. competing with domestic" "competition from domestic" "competing against domestic" "competing with herbivores" "competition from herbivores" "competing against herbivores" overgraz" B. "competing against B." competition from B."

dieback Phytophthora cinnamomi "P. cinnamomi"

weed* "invasive plant" "invasive plants" "invasive vegetation" Bitou*

predators" "feral animal" "feral animals" "introduced predators" "feral cat" "feral cats" Felis "F. catus" "fox

Inbreed* "genetic bottleneck"

anative vegetation" "degradation" "vegetation degradation" "vegetation degradation of land" "land degradation" "habitat vegetation damage" "vegetation damaged" "damaging of native vegetation" "destruction of native vegetation" "destroyed native vegetation" habitat loss" "loss of habitat" "vegetation loss" "loss of vegetation" "degradation of habitat" "degraded habitat" "degraded habitat" "degraded of habitat" "degraded habitat " destroyed habitat" "destruction of habitat" "vegetation destruction" "vegetation destroyed" "destroyed vegetation" destruction of vegetation" "damaged vegetation" damaged vegetation" damaged vegetation" damaged vegetation" damaged vegetation" damaged vegetation "damaged vegetation" damaged vegetation" damaged vegetation "damaged vegetation" damaged vegetation "damaged vegetation" damaged vegetation "damaged disturbance" disturbance of habitat" "vegetation disturbance" "disturbance" disturbance of vegetation" "damaged habitat" "damaging of habitat" "Habitat damage" "habitat destruction" "habitat loss of native vegetation" "habitat fragmentation" "habitat fragmented"

Bristlebird "Dasyornis brachypterus" "D. brachypterus"

"Jervis Bay" "Budderoo" "Booderee"

"Barren Grounds"

"Cataract Dam"

"Woronora"

"Bherwerre"

"Beecroft"

"Morton"

"Red Rock"

fire break. "fire breaks. "management of fire." for control." fire controlled. "fire controls." fire management." fire regime. "managing fire." controlled burn." "management of fire. management of fires" "controlled burning" fire prescriptions" "suppression of fire" "fire exclusion" "fire exclusion of fire" "exclusion" "exclude fire" "supress fire" "supression of fire" "suppression of fire" "fire exclusion" "fire

Eastern bristlebird Central population Conceptual Model 'Terms' defined for MINOE analysis (continued)

conservation of habitat" "preservation of habitat" "protection of land" "preservation of land" "protected area" "conserved area" "habitat management" "habitat managing" "habitat managing nature reserve" "national park" "nature park" "habitat rehabilitation" "habitat rehabilitated" reveget" conservation agreement" refuge "rehabilitation of habitat" "rehabilitation of land" "vegetation rehabilitation." "regeneration rehabilitated" "rehabilitated" "rehabilitation of vegetation" "rehabilitation of native vegetation" "regeneration of habitat" "regeneration" "regeneration" "regeneration of habitat" "regeneration" "regeneration" "regeneration" "regeneration of habitat" "regeneration" "regeneration" "regeneration of habitat" "regeneration" "regeneration" "regeneration" "regeneration" "regeneration of habitat" "regeneration" "regeneration" "regeneration" "regeneration" "regeneration of habitat" "regeneration" "regeneration" "regeneration" "regeneration" "regeneration" "regeneration" "regener habitat protected" "habitat protection" "habitat conservation" "habitat conserved" "habitat conserving" "habitat preservation" "habitat preserving" "habitat preserving" "habitat preserving" "habitat preserving" "habitat preserving" "habitat conserving" "habitat conserving" "habitat preserving" "habitat conserving" "habitat conserving" "habitat conserving" "habitat preserving" "habitat conserving" "habitat conserving" "habitat preserving" "habitat preserving native vegetation" "regenerating native vegetation" "regenerating habitat" "habitat restoration" "restoration of habitat"

grazing permit. "grazing regime" "livestock removal" "twestock "emoval of livestock" "exclusion of livestock "livestock exclusion" "livestock management" "management of livestock" "managing of livestock" "fenced livestock" "livestock fenced" "livestock fencing" "removal of domestic" "excluding domestic" "managing domestic" 'management of domestic" "stock removal" "stock removed" "removal of stock" "exclusion of stock"

remove invasive vegetation control" "control of invasive vegetation" "invasive vegetation management" "manage invasive vegetation" "managing of invasive vegetation" "management of invasive invasive plants" "managing invasive plant" "management of invasive plants" "invasive plant removal" "removal of invasive plants" "remove invasive plants" "remover of invasive plants" "remover invasive plant" not a since plants" "remover of invasive plan weeds" "remove weed" "remove weeds" "invasive plant control" "control of invasive plant" "control of invasive plant" "nanage invasive plant" "manage regetation" "invasive vegetation "removal" "removal of invasive vegetation" "removing of invasive vegetation" "removing invasive vegetation" "bitou bush control" "control of bitou weed control "control of weed" "control of weeds" weed management" manage weed" "management of weed" "management of weeds" "weed removal of weed" "removal of bush" "bitou bush removal" "remove bitou bush" "removal of bitou bush" "bitou bush management" "management of bitou bush" "manage bitou bush"

"dieback control" "control dieback" "dieback" "dieback" "temoval "removal of dieback" "dieback" "dieback" "dieback" "manage dieback" "hytophthora cinnamomi "control P. cinnamomi" "control of Phytophthora" "Phytophthora removal" "remova P. cinnamomi" "removal of Phytophthora" "Phytophthora cinnamomi management" "management of Phytophthora" manage Phytophthora" "dieback control P. cinnamomi" "Control of P. cinnamomi" "P. cinnamomi "remove P. cinnamomi" "P. cinnamomi" "P. cinnamomi" " 'management of P. cinnamomi" "manage P. cinnamomi" control" ·

of cats" "baiting of cat" "baiting of cats" "eradication of feral cats" "eradication of cat" "eradication of cats" "eradication of feral cats" "eradication of erats" "eradication of erats" "eradication of feral cats" "eradication of erats" management of f. catus" "manage f. catus" "management of feral cat" "management of feral cats" "management feral cat" "control of feral cats" "trapping of cat" "trapping cat control" control of cat" control of cats" control of Felis" control of F. catus" cat management" management of cat" management of cat" management of cat" management of cats" management of cats" management of cats" management of cats eradicating felis" "culling cats" "culling of cat" "culling of cats" "culling of feral cat" "culling of feral cats" "culling felis" "culling of f. catus" "culling felis" "culling of feral cats" "culling of feral cats" "culling cats" "culling of feral cats" "culling of feral cats" "culling felis" "culling cats" "culling cats" "culling of feral cats" "culling cats fox control. "control of fox*" "control of vuese" "control of v. vulpes" "fox management" "management of fox" "manage fox" "manage foxes" "manage foxes" "manage foxes" "management of foxes" "control of foxes" "control of vexes" "management of foxes" "control of foxes" "control of foxes" "control of foxes" "control of vexes" "control of vexes" "management of foxes" "control of foxes" "control of vexes" "management of foxes" "control of foxes" "control of vexes" "management of foxes" "control of foxes" "control of vexes" "control of vexes" "control of vexes" "control of vexes" "management of foxes" "control of vexes" "management of vexes" "control of vexes" "control of vexes" "control of vexes" "management of foxes" "control of vexes" "management of foxes" "control of vexes" "management of vexes" "control of vexes" "management of vexes" "control of vexes" "control of vexes" "control of vexes" "control of vexes" "management of vexes" "control of vexes" "management of vexes" "control of vexes" "control of vexes" "management of vexes" "control of vexes" "control of vexes" "management of vexes" "control of vexes" "management of vexes" "control of vexes" "management of vexes" "control of vexes" "control of vexes" "control of vexes" "management of vexes" "control of vexes" "control of vexes" "management of vexes" "control of vexes" "management of vexes" "control of vexes" "management of vexes eradication of feral fox" "eradication of foxes" "eradicating fox*" "eradication of v. vulpes" "eradication of vulpes" "eradication of vulpes" "culling of vulpes" "eradication of vulpes" "eradication of feral fox" management of v. vulpes" "manage vulpes" "management of feral fox" "management of feral foxes" "manage feral fox" "control of feral fox" "control of feral fox" "banage feral fox" "b culling feral foxes. "culling of feral fox." culling of feral foxes." culling of fox. "culling of foxes." culling fox."

survey* monitor* "habitat mapping" "mapping of habitat" research

landowner volunteering "land-owner volunteers" "land-owner volunteers" "participating landowners" "participating land-owners" "community education" "educating community" educate landowners. "educating landowners." educating land-owners." education of landowners." "education of land-owners" "landowner participation" (land-owner participation") educating the community" "education of the community" "public awareness" "incentive scheme" "incentive schemes"

"captive breeding" "captive-breeding" "captive-bred" "captive bred"

translocat* reintroduc* re-introduc*

Bridled nailtail wallaby Queensland population Conceptual Model 'Terms' defined for MINOE analysis:

habitat clearance" "habitat cleared" "habitat clearing" logg* "clearance of habitat" clearing of habitat" pastoralization "cultivation of land" "Land cultivation" "land cultivated" "urbanisation" "removal of vegetation" vegetation clearing" "vegetation cleared" deforest* "land clearance" "land clear" "land clearing" "clearing of vegetation" "clearance of vegetation" "clearing of land" removing vegetation "habitat destroyed" "habitat destruction" "vegetation removed" "destruction of habitat" "removal of native vegetation" "removing native vegetation" "removing native vegetation" "removed" "between the vegetation removed of habitat" removal of native vegetation "removing native vegetation" removing native vegetation removed of habitat destroyed" "between the vegetation removed of habitat destroyed" "between the vegetation removed of habitat" removal of habitat destroyed removing native vegetation removed removed of habitat destroyed removing native vegetation removed n native vegetation" "clearing of native vegetation

inappropriate grazing regime. "inappropriate grazing regimes." "competing with livestock" "competition with livestock" "competing against livestock" "overgrazing livestock" "competing with cow*" "competing against cow*" "competition from cows" "competing with cattle" "competing against cattle" "competition from cattle" "competing with Bos " "competition from Bos " "competing with B. "competing against B." competition from B." overgrazing cows" overgrazing Bos "overgrazing Bos "competing with sheep" competing against sheep" competition from sheep competing with Ovis " competing against Ovis " "competition from Ovis " "competing with O. " "competing against O. " "competition from O. " "overgrazing Ovis" "overgrazing Ovis competing with domestic" "competition from domestic" "competing against domestic" "competing with herbivores" "competition from herbivores" "competition fro

with European rabbits" "competition from European rabbit" "competition from European rabbits" "competing against European rabbits" "competing against Oryctolagus competing with rabbit" "competing with rabbits" "competition from rabbit" "competing against rabbit" "competing against rabbit" "competing with European rabbit" "competing subit" "competing with O. cuniculus" "competition from O. cuniculus" "competing against O. cuniculus" "overgrazing rabbit" "overgrazing rabbit" "overgrazing European rabbit rabbits" "overgrazing Oryctolagus" "overgrazing O. cuniculus" "competing with introduced" "competition from introduced" "competing against introduced"

wildfire* "uncontrolled fire" "uncontrolled fires" bushfire* "accidental fire" "accidental fires" arson* "illegal fire" "illegal fires"

weed* "invasive plant" "invasive plants" "invasive vegetation"

buffel* "Cenchrus ciliaris" "C. ciliaris"

parthenium "p. hysterophorus"

"mother of millions" "Bryophyllum delagoense" "B. delagoense"

"predators" "feral animal" "feral animals" "introduced predators"

"feral cat" "feral cats" Felis "F. catus"

fox" "foxes" "vulpes"

"dingo" "dingoes"

drought* "environmental stress" "environmental stressors" "environmental stresses" "Climate stress" "Climate stressors"

disease* parasit* toxoplasmosis hydatid* tapeworm*

native vegetation" "degrading native vegetation degradation" "vegetation degraded" "degradation of land" "land degradation" "habitat degraded" "habitat disturbed" "habitat vegetation damage" "vegetation damaged" "damaging of native vegetation"" damaged native vegetation" destruction of native vegetation" destroyed native vegetation" disturbance of native vegetation" habitat loss" "loss of habitat" "vegetation" loss" "loss of vegetation" "degradation of habitat" "degraded habitat" "degraded habitat" "degraded of habitat" "degraded habitat"" " destroyed habitat" "destruction of habitat" "vegetation destruction" "vegetation destroyed vegetation" "destruction of vegetation" "damaged vegetation" "damaged vegetation" "damaged vegetation" "damaged vegetation" "damaged vegetation" "destroyed vegetation" "destro disturbance" disturbance of habitat" "vegetation disturbad" "vegetation disturbance" disturbance" disturbance of vegetation" "damaged habitat" "damaging of habitat" "Habitat damage" "habitat destruction" "habitat loss of native vegetation" "habitat fragmentation" "habitat fragmented"

BNTW* bridled* "Onychogalea fraenata" "O. fraenata" flashjack* merrin*

brigalow regrowth" ecotone*

taunton*

avocet*

goonderoo*

idalia*

Bridled nailtail wallaby Queensland population Conceptual Model 'Terms' defined for MINOE analysis (continued):

conservation of habitat" "preservation of habitat" "protection of land" "preservation of land" "protected area" "conserved area" "habitat management" "habitat managing" "habitat managed" nature reserve "national park" "national reserve" "nature park" "habitat rehabilitation" "habitat rehabilitated" reveget* "conservation agreement" refuge "rehabilitation of habitat" "rehabilitation of land" "vegetation ehabilitation. "vegetation rehabilitated" "land rehabilitated" "rehabilitation of vegetation" "rehabilitation of native vegetation" "regeneration of habitat" "regeneration of habitat" "regeneration of habitat protected" "habitat protection" "habitat conservation" "habitat conserved" "habitat conserving" "habitat preservation" "habitat preservation" "habitat preservation" "habitat preservation" "habitat preservation" "habitat preservation" "habitat conservation" "habitat conservation" "habitat conserving" "habitat conservation" "habitat native vegetation" "regenerating native vegetation" "regenerating habitat"

fire break. "fire breaks." management of fire." control of fire. "fire controlled." fire controls." "fire management." fire regime." managing fires." manage fire." controlled burn." management of fire. management of fires" "controlled burning"

livestock removal" "livestock removed" "removal of livestock" "exclusion of livestock exclusion" "livestock managed" "livestock management" "management of livestock" "management" " fenced livestock" "fencing of livestock" "livestock fencing" "removal of domestic" "exclusion of domestic" "excluding domestic" "management of domestic"

cattle removal" "cattle removed" "cattle exclusion" "exclusion of cattle" "removal of cattle" "cattle management of cattle" "fenced cattle" "fencing of cattle" "cattle fenced" "cattle fenced"

sheep managed" "sheep management" "management of sheep" "fencing of sheep" "sheep fencing" "sheep fenced" "sheep removal" "sheep removal" "sheep removal" "sheep removal" "sheep exclusion "exclusion of sheep"

eradication of european rabbits" "eradicating european rabbits" eradicating european rabbits" eradication of oryctolagus" "eradicating or cuniculus" "culling" eradicating or cuniculus" eradicating or cuniculus" "culling" eradicating or cuniculus" eradicating or cuniculus eradicating or rabbit" "baiting of european rabbits" "eradication of feral rabbits" "eradication of rabbit" "eradication of rabbit" "eradicating rabbits" "eradication of european rabbit" managing european rabbits" manage feral rabbits" manage feral rabbits" management of feral rabbits" management of feral rabbit" rabbit baiting of rabbits" baiting of rabbits" baiting of rabbits" baiting of rabbits" management of feral rabbits. rabbit control "control of rabbits" "control of rabbit" "european rabbit control of european rabbit" "control of european rabbits" "control of oryctolagus cuniculus" "control of O. cuniculus" "rabbit culling of feral rabbits" "culling oryctolagus" "culling of o. cuniculus" calcivirus* "rabbit-proof" "rabbit proof" "rabbit poison" "rabbit poisoning" "poisoning of rabbit" "poisoning of rabbits" "warren fumigation" european rabbit" "culling of european rabbits" "culling of feral european rabbit" "culling rabbit" "culling of rabbit" "culling of rabbits" management. "manage rabbit" "management of rabbit" "management of rabbits" "management of european rabbit" "management of european rabbit" warren fumigated" myxomatosis "warren destruction" "warren destroyed" "destruction of warren" "destruction of warrens" 1080

of cats" "baiting of cats" "baiting of cats" "eradication of feral cats" "eradication of cat" "eradication of cats" "eradication of feral cats" "eradication of eat" "eradication of cats" "eradication of cats" "eradication of feral cats" "eradication of cat management of f. catus" "manage f. catus" "management of feral cat" "management of feral cats" "management feral cat" "control of feral cats" "trapping of cat" "trapping cat control "control of cat" "control of Felis" "control of F. catus" "cat management" "management of cat" "management of cats" "manage cat" "manage cats" "control of cats" "control of cats" "manage cats eradicating felis" "culling cat" "culling of cat" "culling of cats" "culling of feral cat" "culling of feral cats" "culling feral" catus" "culling of f. catus" "culling felis" "culling of feral cats" "culling felis" "culling felis fox control " control of fox*" "control of foxes" "control of vulpes" "fox management" "management of fox" "manage fox" "manage foxes" "manage foxes" "manage foxes" "manage foxes" "manage foxes" "management of vulpes" eradication of feral fox "eradication of foxes" eradicating fox*" eradication of v. vulpes" eradication of vulpes" culling of v management of v. vulpes" "manage vulpes" "management of feral fox" "management of feral foxes" "manage feral fox" "manage feral foxes" "control of feral fox" "control of feral foxes culling feral foxes." "culling of feral fox." "culling of feral foxes." "culling of fox." "culling of foxes." "culling fox." "culling foxes"

control of dingoes" control of dingos" dingo control" "protection from dingo" "protection from dingoes" "protected from dingoes" "protected from dingoes" management of dingo" "management of dingoes" "management of dingos" "manage dingoes" "manage dingos" "protected from dingoes" "protected excluding dingo" "excluding dingos" "exclusion of dingo" "exclusion of dingoes" "exclusion of dingos" "controlling dingoes" "controlling dingoes" "controlling dingo" "controlling dingoes" "controlling dingo" "controlling dingoes" "controlling dingoes protect from dingo" "protect from dingos" "protect from dingoes"

plant" "remove invasive vegetation control" "control of invasive vegetation" "invasive vegetation management" "manage invasive vegetation" "management of weeds. "remove weed" "remove weeds" "invasive plant control" "control of invasive plant" "invasive plant management" "manage invasive plant" "manage invasive plants" "manage invasive plant" "manage invasive plants" "manage invasive plant" "manage invasive plant" "manage invasive plants" "manage invasive plant" "weed control" "control of weed" "control of weeds" "weed management" "manage weed" "management of weed" "management of weeds" "weed removal" "removal of weed" "removal of invasive plants" "managing invasive plant" "management of invasive plants" "invasive plant removal" "removal of invasive plants" "removal of invasive plants" "removal of invasive plants" "remove invasive plants" "remove invasive plants" "removal of invasive plants" "removal of invasive plants" "remove invasive plants" "remove invasive plants" "remove invasive invasive vegetation" "invasive vegetation removal" "removal of invasive vegetation" "removing of invasive vegetation" "remove invasive vegetation"

buffel control" "control of buffel" "buffel management" "buffel grass management" "manage buffel" "management of buffel" "buffel removal" "buffel grass removal" "removal of buffel" "remove buffel"

Bridled nailtail wallaby Queensland population Conceptual Model 'Terms' defined for MINOE analysis (continued):

Cenchrus ciliaris control." "control of Cenchrus ciliaris" "Cenchrus ciliaris" manage Cenchrus ciliaris" "management of Cenchrus ciliaris" "cenchrus ciliaris" "removal" "removal of Cenchrus ciliaris" remove Cenchrus ciliaris" "C. ciliaris control" "control of C. ciliaris" "C. ciliaris management" "manage C. ciliaris" "management of C. ciliaris" "C. ciliaris removal" "removal of C. ciliaris" "remove C. ciliaris"

management of Bryophyllum delagoense "Bryophyllum delagoense removal" "removal of Bryophyllum delagoense" "Benove Bryophyllum delagoense" "B. delagoense control" "control of B. delagoense of mother of millions. "remove mother of millions." Bryophyllum delagoense control." control of Bryophyllum delagoense. "Bryophyllum delagoense management." "manage Bryophyllum delagoense" mother of millions control" "control of mother of millions" "mother of millions management" "manage mother of millions" "management of mother of millions" "mother of millions" "mother of millions removal" "removal B. delagoense management "manage B. delagoense" "management of B. delagoense" "B. delagoense removal of B. delagoense" remove B. delagoense

hysterophorus control" "control of p. hysterophorus" "hysterophorus" manage p.hysterophorus" "management of p.hysterophorus" "hysterophorus" "removal" "removal of p.hysterophorus" parthenium control" "control of parthenium" "parthenium management" "manage parthenium" "management of parthenium" "removal of parthenium" "remove parthenium" remove p.hysterophorus"

"drought control" "drought feeding" "emergency fodder"

:ranslocat* reintroduc* re-introduc*

'captive breeding" "captive-breeding"

landowner volunteering. "land-owner volunteers" "land-owner volunteers" "participating landowners" "participating land-owners" "community education" "educating community" educate landowners. "educating landowners." "educating land-owners." "education of landowners." "education of land-owners." "landowner participation" "land-owner educating the community. "education of the community." "public awareness" "incentive scheme" "incentive schemes

survey* monitor* mapping sandplot* sand-plots* "radio-telemetry"

research* "life histories" "life-history" model*

Appendix D



CHARLES DARWIN UNIVERSITY Ellengowan Drive, Darwin, Northern Territory 0909 ABN 54030 513 649 | CRICOS Provider No. 00300K | RTD Provider No. 0373 COU.eOU.au

22 February 2016

Prof Stephen Garnett Research Institute for Environment and Livelihoods *Via Email*

stephen.garnett@cdu.edu.au

Dear Stephen,

RE: H16013 - Learning from success and failure in threatened species conservation

Human Research Ethics Committee - Proposal Approval

Thank you for submitting the above proposal for ethical review. The proposal has been considered under the auspices of the Charles Darwin University Human Research Ethics Committee (CDU-HREC) and is approved from the date of this letter to the expiry date listed below.

EXPIRY DATE: 31/12/2016

An annual progress report must be provided to the Ethics Office before each anniversary of the commencement date. This approval is contingent on submission of a satisfactory annual progress report.

APPROVAL IS SUBJECT TO the following:

- The safe and ethical conduct of this project is entirely the responsibility of the investigators and their institution(s).
- 2. The Principal Investigator must **report immediately any event or circumstance that might affect the ethical acceptability** of the project, including:
 - Adverse effects of the project on participants and the steps taken to deal with these;
 - All other unforeseen events that influence the protocol or participants; and
 - New information that may invalidate the ethical integrity of the study.
- 3. The Principal Investigator must obtain approval for any variation to the protocol (including the addition of new investigators) prior to implementation the proposed variations. Requests for approval of variations must be submitted in accordance with the procedures of the Ethics Office.
- The Principal Investigator must advise the University immediately of unapproved protocol deviations or protocol violations.
- 5. The Principal Investigator may request an extension of the project past the expiry date listed above. An extension may be requested at any time, however, the preferred time and method of requesting an extension of ethical approval is in the annual progress report.
- 6. The Principal Investigator must notify the Ethics Office of his or her **inability to continue as Principal Investigator**, including the name of and contact information for their replacement. The

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research may not proceed without an approved Principal Investigator.

- Confidentiality of personal information of research participants should be maintained at all times as required by law.
- 8. You must forward a copy of this letter to all investigators and to any associated organisations.

This letter constitutes ethical approval from the CDU Human Research Ethics Committee only.

Should you wish to discuss the above research project further, please contact the Executive Officer of the Ethics Office via email: <u>ethics@cdu.edu.au</u> or telephone: (08) 8946 6923.

Best wishes for the success of your project.

Yours sincerely

Dr Bev Turnbull Chair, Human Research Ethics Committee Charles Darwin University, NHMRC Registration No. EC00154 http://www.cdu.edu.au/research/ori/human-ethics

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research (2007).



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end	
App.	

	Question	Purpose of question	Link to research questino	Time expected
-	 Could you describe the role you played in recovery efforts for the [species]? Where (Are) you part of the recovery team? Which organisations/agencies where you representing in that role(s)? What is the length of time of your involvement? Who [within your organization] do you mainly work with for the recovery of the [species]? Who [outside of your organization] do you mainly work with? 	Descriptive Governance context: • Role and sector • Key actors	Governance context Actors involved Organisations involved 	5 mins
\sim	 From your perspective, what does a "successful" threatened species recovery program look like? (focus on OUTCOME) What do you think a successful recovery program would achieve? For a recovery program to be successful. What would it have to achieve? 	Clarifying question	What is "success"?	5 mins
М	Would you say that the recovery efforts for the [species] have been successful? Why? In which ways do you think the recovery program for the [species] has been successful (unsuccessful)? 	Clarifying question	Perceptions of program success	5 mins
4	 Thinking about your experience with the planning and implementation process for the recovery of the [species]: What aspects of this process do you think have enabled the program to be successful What aspects of this process do you think have acted as barriers (impediments) of success? What aspects of this process do you think have acted as barriers (impediments) of success? Ilike to now talk about distinct aspects of the recovery planning and implementation process for the [species]. Ilike to classify these into 5 different categories, which I will explain to you as I go through the questions, but they are: contextual aspects aspects that can be considered inputs to the recovery P & I process aspects to do with the outputs of the recovery P & I process and aspects to do with the P I process itself. So I will go through each of these, and as do so I like you to think back to your experience and consider whether any of these aspects have contributed to the program success [or lack of success]. 	Enabler/barrier	What are the barriers and enablers?	10 mins
S	 Contextual aspects are things like The legal and policy context Politics (concentrated or dispersed power or influence among the parties involved, presence of coalitions) 	[1] Contextual aspects	Recall interviewee's experience with the recovery process	5 mins
Q	Inputs Knowledge and research available of species biology and threats Knowledge and research available of species biology and threats Adequacy of resources (financial, human, physical) Adequacy of other type of resources and system to enable people to effectively deliver on their responsibilities Skills Skills Leadership Frameworks, systems or processes for setting objectives and actions Adequacy of recovery plan Scope Identification of key threats Clarity in the definition of objectives (SMART objectives - Specific, Measurable, Attainable/action or oriented, Relevant/realistic and Timely) 	[3] Inputs	Recall interviewee's experience with the recovery process	5 mins

	Question	Purpose of question	Link to research questino	Time expected
~	Process aspects • Stakeholder engagement • opportunities for engagement • opportunities for engagement • opportunities for engagement • opportunities for engagement • other endagement • other engagement	[4] Process	Recall interviewee's experience with the recovery process	15 mins
ω	 Outputs Extent of implementation of management actions Extent of monitoring and review of actions (practices that address matters of implementation review and amendment) Extent to which threats, opportunities and associated risks are anticipated and managed 	[4] Outputs	Recall interviewee's experience with the recovery process	5 mins
10	At beginning of this interview you identified the following aspects as reasons (key enablers/barriers) for the success/ lack of success of the program. After going through all the distinct aspects of the P & I process , would you add any to that list?		Confirmation of barriers and enablers.	5 mins
11	Is there anything else you would like to add?			5 mins

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Further information: http://www.nespthreatenedspecies.edu.au/

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