

Rediscovering Recherche Bay



It was there in 1791–1793 that many of Australia's unique plants were collected by botanists for the first time; a joyous encounter occurred between visiting French explorers and the Tasmanian people; and critical experiments on the earth's magnetic field were conducted by French scientists. Long forgotten, the place hit the news in 2001 with the discovery of remains thought to be from the French expedition. A public campaign to save the site from logging was resolved through the generosity of businessman Dick Smith, who underwrote its purchase by the Tasmanian Land Conservancy. To celebrate that outcome a symposium was held in 2007 in Hobart with experts in several disciplines exploring the historical, scientific and cultural significance of Recherche Bay. This book is the outcome.

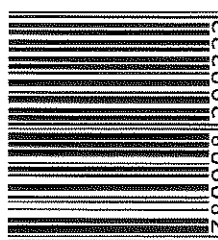
It begins with a review of the historical context of the French expedition, followed by assessments of its scientific contributions to cartography, botany and zoology. The French encounter with the Tasmanians is examined and its significance to later studies on archaeology and the origin of language discussed. This is followed by a review of the subsequent history of Recherche Bay as a centre of whaling.

The remaining chapters deal with contemporary matters. A report on the current archaeological assessment of the stone structure purported to be the French garden is followed by examinations of the concept of place, the basis of public versus private values and the legal aspects of the controversy over Recherche Bay. The final chapter looks to the future: how best to conserve the several values represented at Recherche Bay.

Published by The Academy of Social Sciences in Australia on
behalf of the National Academies' Forum. www.assa.edu.au

National
Academies

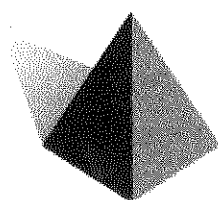
ISBN 978-0-7042990-22-2



9 780908 290222

Rediscovering Recherche Bay

Edited by
John Mulvaney & Hugh Tyndale-Biscoe



**National
Academies**
F • O • R • U • M

First published December 2007

by The Academy of the Social Sciences in Australia (ASSA)

GPO Box 1956, Canberra ACT 2601, Australia

Email: assa.secretariat@anu.edu.au

Copyright © The Academy of the Social Sciences in Australia 2007

ASSA is not responsible, as a body, for the opinions expressed in any of its publications.

National Library of Australia Cataloguing-in-Publication data

Rediscovering Recherche Bay

Edited by John Mulvaney and Hugh Tyndale-Biscoe

Bibliography

ISBN 9780908290222 (pbk.)

1. Recherche Bay (Tas.)--History. 2. Recherche Bay (Tas.)--Antiquities. 3. Recherche Bay (Tas.)--Discovery and exploration--French. I. Mulvaney, DJ (Derek John), 1925- II. Tyndale-Biscoe, Hugh.

994.62

Production editor and designer: Freya Job

Printed by Instant Colour Press, Belconnen ACT 2617

Typeset in Adobe Jensen Pro and Arial Narrow

Copying for educational purposes

The Copyright Act 1968 (Cth) allows a maximum of one chapter or 10% of this book, whichever is the greater, to be copied by any educational institution for its educational purposes provided that the educational institution (or the body that administers it) has given a remuneration notice to the Copyright Agency Limited (CAL) under the Act.

For details of the CAL licence for educational institutions, contact:

CAL, 19/157 Liverpool Street, Sydney NSW 2000

Tel: (02) 9394 7600; Fax: (02) 9394 7601

Email info@copyright.com.au

Copying for other purposes

Except as permitted under the Act—for example a fair dealing for the purposes of study, research, criticism or review—no part of this book may be reproduced, stored in a retrieval system or transmitted in any form or by any means without prior written permission. All enquiries should be made to the publisher at the above address.

Cover image: Detail of *Sauvages du Cap de Diemen préparant leur repas*, engraving by Jacques Louis Copia, after a sketch by J Piron. A friendly meeting near Black Swan Lagoon, 1793. Plate 5, de Labillardière. NK3030 National Library of Australia.

Contents

- | | | | |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Introduction
Recherche Bay, Tasmania
A site of great significance in the
history of science in Australia
<i>John Mulvaney &
Hugh Tyndale-Biscoe</i> | 69 | 06
Tasmanian Aborigines and the
origins of language
<i>Iain Davidson</i> |
| 9 | 01
From the hills of Provence to the
coast of Van Diemen's Land: The
expedition of Antoine-Raymond-
Joseph Bruny d'Entrecasteaux,
1791-1793/94
<i>Alan Frost</i> | 87 | 07
The technology of whaling:
Why they did it and how
<i>Iain D Rae</i> |
| 17 | 02
'Nothing left undone':
The hydrographic surveys of
Beautemps-Beaupré
<i>Michael Pearson</i> | 99 | 08
The lost garden of Recherche
<i>Jean-Christophe Galipaud,
Antoine de Biran, Greg Jackman,
Anna Gurnhill, Rufino Pineda &
Angela McGowan</i> |
| 35 | 03
Labillardière and the beginnings of
botanical exploration in Tasmania
<i>Gintaras Kantvilas</i> | 119 | 09
A land mapped by stories
<i>Joan Domicelj</i> |
| 45 | 04
'J'étais convaincu qu'il dormait':
European views of a unique
Australian mammal
<i>Stewart Nicol</i> | 125 | 10
Right deeds and wrong reasons:
The politics of nature, history and
the preservation of Recherche Bay
<i>Aynsley Kellow</i> |
| 59 | 05
Meeting the Tasmanians
<i>John Mulvaney</i> | 135 | 11
Legal lessons from the recent
history of Recherche Bay
<i>Tom Baxter</i> |
| | | 145 | 12
The conservation and management
of ecological communities
<i>David Lindenmayer</i> |

About the authors

Emeritus Professor John Mulvaney, AO, FAHA, CMG
Australian National University, Humanities

Dr Hugh Tyndale-Biscoe, FAA
Australian Academy of Science

Professor Alan Frost, FAHA
La Trobe University, School of Historical and European Studies

Dr Michael Pearson
University of Canberra, Cultural Heritage Management

Dr Gintaras Kantvilas
Tasmanian Herbarium; Tasmanian Museum and Art Gallery

Associate Professor Stewart Nicol
University of Tasmania, Hobart, School of Zoology

Professor Iain Davidson, FAHA
University of New England, Armidale, Archaeology and Palaeoanthropology

Professor Ian D Rae, FTSE
University of Melbourne; Australian Academy of Technological Sciences and Engineering

Dr Jean-Christophe Galipaud
Research Institute for Development (IRD) Nouméa, New Caledonia

Dr Antoine de Biran
Consultant in geophysics

Greg Jackman
Port Arthur Historic Site Management Authority, Port Arthur, Tasmania

Anna Gurnhill
Heritage Tasmania, Department of Tourism, Arts and Environment

Rufino Pineda
University of the South Pacific, Santo, Vanuatu

Angela McGowan
Heritage Tasmania, Department of Tourism, Arts and Environment

Joan Domicelj, AM
Directeur par intérim, Programme du patrimoine international, ICOMOS
– Secrétariat international

Professor Aynsley Kellow
University of Tasmania, Hobart, School of Government

Tom Baxter
University of Tasmania, Hobart, School of Accounting and Corporate Governance

Professor David Lindenmayer
Australian National University, Centre for Resource and Environmental Studies

12 The conservation and management of ecological communities

David Lindenmayer

Much of the focus of modern conservation science has been on identifying and establishing national parks and nature reserves. Indeed, there is a well developed science underpinning reserve selection, much of it originating in Australia. Reserves are a core part of any credible conservation strategy. However, conservation efforts based on reserves alone will invariably be inadequate for a wide range of reasons. Off-reserve strategies are essential for biodiversity conservation, not only in forests but in all types of vegetation. In the case of forests, a multi-scaled hierarchy of conservation approaches is required. At the regional scale, management should ensure the establishment of large ecological reserves. At the landscape scale, off-reserve conservation measures should include: meso-scale protected areas within wood production forests; buffers for aquatic ecosystems; appropriately designed and located road networks; the careful spatial and temporal arrangement of harvest units; and appropriate fire management practices. At the stand level, off-reserve conservation measures should include: the retention of key elements of stand structural complexity (eg large living and dead trees with hollows, understorey thickets, and large fallen logs); long rotation times (coupled with structural retention at harvest); silvicultural systems alternative to traditional high impact ones (eg clearfelling in some forest types); and appropriate fire management practices and practices for the management of other kinds of disturbances.

Integrating commodity production with conservation outside reserves requires high quality empirical data to evaluate the effectiveness of many specific on-the-ground management actions. These data are lacking for almost all forested regions Australia-wide. Hence, considerable effort is needed to adopt adaptive management 'natural experiments' and monitoring to better identify the impacts of logging operations and other kinds of management activities on biodiversity, to quantify the effectiveness of impact mitigation strategies and to identify ways to improve management practices.

The management and conservation of forests has been one of the most socially divisive issues in Australia over the past four decades.¹ Heated public debates remain in several parts of the continent and most of these revolve largely around ongoing access to native

In Mulvaney, J and Tyndale-Biscoe, H (eds.) (2007) *Rediscovering Recherche Bay*. Canberra: Academy of the Social Sciences in Australia, pp 145-156.

forests for the production of wood products versus the reservation of land from industrial forestry. These debates have focused attention away from the fact that there is a complex but still rapidly evolving science associated with both the selection of reserves to best conserve biodiversity and other key attributes of native forests,² and conservation outside the formal reserve or protected area system.³

There is a very large and rapidly expanding literature on conservation science.⁴ It is not the intention (nor is it possible) to reproduce that extensive body of material here. Rather, the aim of this chapter is to very briefly outline some aspects of the scientific basis for the conservation and management of ecological communities in forests. To achieve this aim, the chapter contains three key sections. In the first, the importance of large ecological reserves as a key component of any credible conservation strategy is outlined. The importance of conservation outside reserves is the primary focus of the second section. The third and final part indicates where the conservation of Recherche Bay lies in a hierarchy of scientifically-based strategies aimed at the conservation of ecological communities.

Background—the need for multi-scaled conservation strategies

All credible plans for the conservation of biodiversity must embody a continuum of approaches from the establishment of large ecological reserves through to an array of off-reserve conservation measures spanning landscape, stand and individual tree levels.⁵ (Figure 12.1).

Multiple management scales are needed for three key reasons:

1. There are multiple ecological scales,⁷ not only for different ecological processes and different species, but also for the same species.⁸ Thus, there is no single 'right' or 'sufficient' scale for forest and conservation management. A single conservation strategy adopted at a single spatial scale will only meet a limited number of stand and landscape management goals⁹ and will provide suitable habitat for only a limited number of different taxa.
2. Different processes at different spatial scales are inter-dependent. What happens at the stand level cannot be divorced from what takes place at the landscape-level and vice-versa. For example, a stand of old-growth surrounded by other old-growth stands may behave quite differently (and support different species assemblages) than an old-growth stand embedded within an extensive region of continuous clearcutting.¹⁰ Similarly, a landscape is comprised of an array of stands and the structural composition of these stands can influence species occurrence at the landscape level. A lack of suitable habitat within many different stands may combine to preclude a species from entire landscapes.¹¹
3. Multi-scale conservation strategies may produce a heterogeneous landscape¹² containing the spatially dispersed array of resources needed by some species.¹³

Given the need for multi-scaled management strategies for conservation, the following sections briefly outline the basis for large ecological reserves and conservation outside reserves.

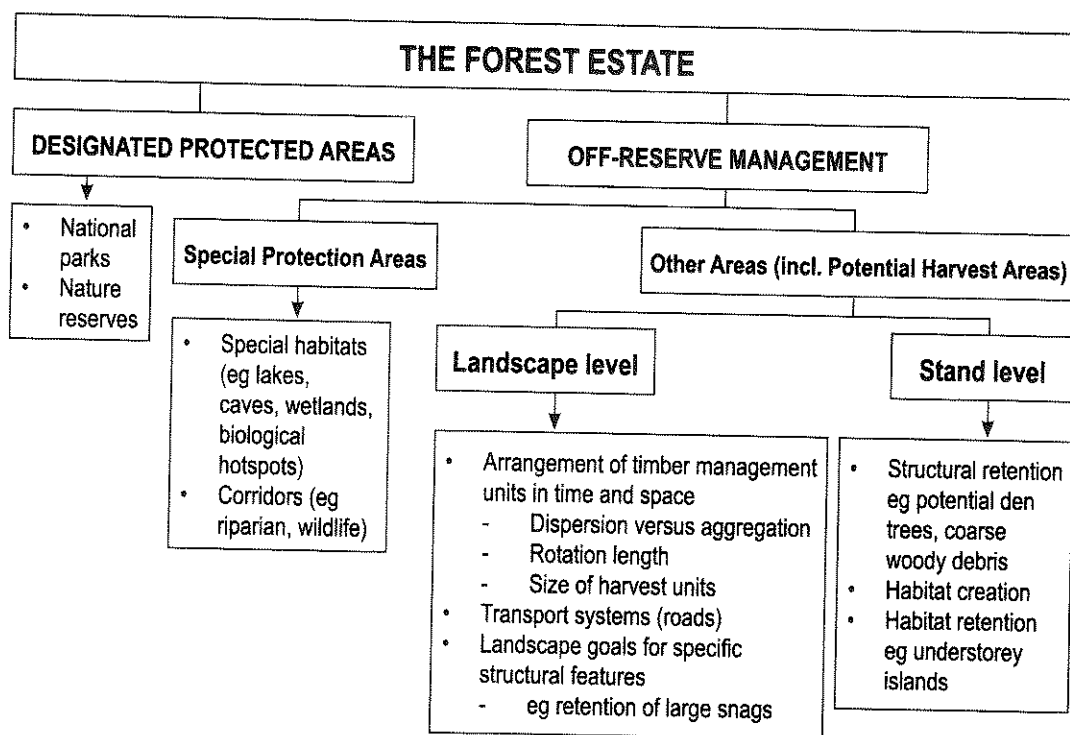


Figure 12.1. A framework for biodiversity conservation across protected areas (typically in public ownership) and off-reserve areas (including public and private native forests).⁶

Large ecological reserves

Large ecological reserves are an essential part of all comprehensive conservation plans. There are four key reasons why they are so important:

1. They support some of the best examples of ecosystems, landscapes, stands, habitat, and biota and their inter-relationships as well as opportunities for natural evolutionary processes.
2. Many species find optimum conditions only within large ecological reserves which become strongholds for these species.
3. Some species are intolerant of human intrusions, making it imperative to retain some areas which are largely exempt from human activity.
4. The effects of human disturbance on biodiversity are poorly known and some impacts may be irreversible. Others such as synergistic and cumulative effects can be extremely difficult to quantify or predict. These factors make large ecological reserves a valuable 'safety net' relatively free from human disturbance.

In 1890, Baron Ferdinand von Mueller called for a representative system of large ecological reserves in Australia—the first such recognition in the world. This sentiment was followed some eighty years later by similar calls by the Australian Academy of Science.¹⁴ There is now a strong and well developed science that underpins the selection of reserves and

much of it has developed in Australia.¹⁵ A key part of that science encompasses the process of systematic conservation planning which aims to make reserves comprehensive, adequate, and representative (CAR).¹⁶ The primary objective is to protect the full array of biodiversity of a region. Comprehensiveness refers to the need to include the complete array of biodiversity, ranging from species (and their associated genetic variation) to communities and ecosystems. Adequacy relates to the need to support populations that are viable in the long term. Representativeness means that a reserve system should sample species, forest types, communities, and ecosystems from throughout their geographic ranges.¹⁷

Systematic conservation planning is dominated by methods such as reserve selection algorithms¹⁸ and gap analysis.¹⁹ Three principles govern the use of these tools: complementarity, flexibility and irreplaceability.²⁰ Complementarity is the degree to which an area adds previously under-represented features (eg species, land units, ecosystem types or environmental climatic domains) to a reserve system. Most algorithms operate by identifying new reserves to be added to a set of protected areas until all species or units are represented, or are represented a number of times.²¹ It may be possible to develop a representative network of reserves from different combinations of areas—the principle of flexibility. Different areas can be substituted in a reserve system if they contribute the same conservation values.²² The concept of irreplaceability has two meanings in reserve selection: firstly, the degree to which an area is essential to achieving a completely representative reserve system, and, secondly, the contribution a given area makes to representativeness.²³ Irreplaceability provides a means to explore planning options.

Systematic conservation planning in Tasmania

Systematic conservation planning approaches (which had their origin in Tasmania)²⁴ have underpinned the evolution of the reserve system in that state over the past few decades. Indeed, the protected area network is now more representative than virtually anywhere else in the world.²⁵ Prior to the early 1970s, the reserve system was biased toward areas of unproductive land of high scenic and aesthetic but low economic value—a trend typical of reserve systems in Australia and worldwide. Over the following decades there was a substantial increase in the area of the reserve system, with an improvement in the level of representation of many vegetation communities, including economically valuable ones.²⁶ For example, by 1992, the reserve system supported fifteen percent of the pre-European land cover of one-third of Tasmania's plant communities. Some of the gaps in the representation of the reserve system have been filled since then, particularly during the Regional Forest Agreement (RFA) process in the late 1990s. Mendel and Kirkpatrick²⁷ found that the RFA identified gaps in the reserve system and attempted to achieve representative levels of forest reservation according to set criteria of fifteen percent of pre-European area.²⁸ After the end of the RFA, there was an increase from sixteen to twenty-seven forest communities (out of fifty) that had fifteen percent reservation levels or higher.²⁹

Despite the outstanding conservation gains in Tasmania, there are still some vegetation communities that are poorly represented in the reserve system, especially ones that have experienced large rates of loss since European settlement. In addition, there are some major remaining conservation problems, such as land clearing for plantation establishment,³⁰ and within-reserve management issues, including altered fire regimes and the spread of

pathogens such as Cinnamon Fungus. These problems, as well as a number of others, highlight the importance of conservation outside reserves—the key topic of the following section.

Off-reserve conservation

Although large ecological reserves are a fundamentally important part of any credible conservation strategy, there are significant limitations of a reserve-only focus for conservation. They include:

- The area available for reserves is limited.
- The size of most reserves is limited.
- Many reserves are on steep terrain or infertile soils, which are not always suitable habitats for many elements of the biota.
- There are social and economic impediments to the expansion and management of reserve systems.
- Mobile taxa such as migratory or nomadic species and species with patchy distributions are not contained in conventional reserves.
- Abiotic and biotic conditions within reserves can be unstable.
- Human exploitation in the surrounding off-reserve areas may intensify once reserve systems are established.

In the case of forests managed under Regional Forest Agreements (or other arrangements), even if a reserve system includes fifteen percent of the pre-European extent of each forest type in Australia, a large proportion of each vegetation community and its associated biodiversity will still remain outside the reserve system. Even for threatened species known to occur on reserves, many important populations may not be on protected lands. For example, of all the Australian plant species considered to be endangered, vulnerable or rare in 1996, about half were represented on conservation reserves.³¹ These factors indicate that off-reserve conservation is critical for the conservation of biodiversity.

Off-reserve conservation measures at the landscape-level

Off-reserve conservation strategies can be conceived at two broad spatial scales—the landscape level—typically hundreds to thousands of hectares, and the stand level (individual trees to tens of hectares). Five broad categories of approaches to landscape-level off-reserve forest management can be recognised:

- Establishment of landscape-level goals for retention, maintenance, or restoration of particular habitats or structures as well as limits to specific problematic conditions (eg the amount of a forest landscape subject to prescribed burning³²).
- The design and subsequent management of transportation systems (generally a road network) to take account of impacts on species, critical habitats, and ecological processes.³³

- The selection of the spatial and temporal pattern for harvest units or other management units.³⁴
- The application and/or management of appropriate disturbance regimes such as those involving fire³⁵ or grazing.³⁶
- The protection of aquatic ecosystems and networks (such as rivers, streams, lakes and ponds), specialised habitats (eg cliffs and caves), wildlife corridors, biological hotspots (eg spawning habitats, roosting areas for birds or camps for flying foxes), and remnants of late-successional or old-growth forest and disturbance refugia found within off-reserve forests.³⁷

It is important to distinguish between large ecological reserves³⁸ and the protection of smaller areas *within* landscapes broadly designated for wood production.³⁹ Such systems of scattered small reserves provide increased protection of habitats, vegetation types, and organisms poorly represented or absent in large ecological reserves; they promote the protection for aquatic and semi-aquatic ecosystems; they maintain refugia for forest organisms that subsequently provide propagules and offspring for recolonising surrounding forest areas as they recover from timber harvesting; and they act as 'stepping stones' to facilitate the movement of biota across managed landscapes.

Off-reserve conservation measures at the stand-level

The objective of off-reserve management at the stand level is to increase the contribution of logged and regenerated areas to the conservation of biodiversity. Harvest units can be managed to sustain species, increase habitat diversity, improve connectivity, buffer sensitive areas, and sustain ecosystem processes including site productivity.

The internal structure and composition of harvested units can have a significant influence on the degree to which a managed forest can sustain biodiversity and maintain ecosystem processes. Several broad types of strategies can contribute to the maintenance of structural complexity:

- Structural retention at the time of regeneration harvest (eg large hollow trees and associated recruit trees;⁴⁰ understorey thickets,⁴¹ and large fallen logs⁴²). In other cases, specifically targeted strategies may be required to add or create particular structures such as girdling trees to increase quantities of dead wood⁴³ or installing nest boxes.⁴⁴
- Management of regenerated and existing stands to create specific structural conditions (eg through novel kinds of thinning activities⁴⁵). This may include the maintenance of open areas as well as heath and grassland habitats within forests that can be critical for some key elements of biota.⁴⁶
- Long rotations or cutting cycles.⁴⁷
- Application of appropriate disturbance management regimes such as prescribed burning to reduce fuel loads and reduce the risk of a high-intensity fire.

The various stand-level strategies can often be effectively combined to address a broader range of objectives as part of innovative silvicultural systems that address the twin objectives of commodity production and biodiversity conservation.⁴⁸ For example, the advantages of long rotations can be multiplied when accompanied by structural retention at the time

of harvest. Conversely, rotation times may be shortened if greater levels of retention characterise logged stands at the time of harvest.

Data deficiencies and other issues

Although the need for a combination of large ecological reserves and an array of off-reserve conservation strategies is intuitive, empirical data on the effectiveness of most specific on-the-ground management actions are limited. Indeed, there have been over seventy-five enquiries into the timber industry since World War II and virtually all of them have highlighted the lack of empirical data on logging effects and the efficacy of strategies designed to mitigate them.⁴⁹ Given this, considerable effort is needed to implement true active adaptive management 'natural experiments',⁵⁰ and monitoring to better identify the impacts of logging operations and other kinds of management of biodiversity and quantify the efficacy of impact mitigation strategies and ways to improve practices where necessary. True adaptive management involves rigorous monitoring and a commitment to change when negative impacts of current practices are identified. Unfortunately, although active adaptive management is widely discussed in the literature, it is only very rarely implemented on the ground. In addition, the record on forest monitoring, which is a fundamental part of active adaptive management, is generally poor in forests around the world.⁵¹ This needs to be rectified as part of attempts to make transitions to ecologically sustainable forest management not only in Tasmania but elsewhere in Australia.

The case of Recherche Bay

So far, this chapter has outlined the scientific basis underpinning a multi-scaled approach to conservation, but where does the specific case of Recherche Bay sit in such an overarching hierarchical approach?

Recherche Bay clearly qualifies as a meso-scale protected area within a larger area broadly designated primarily for timber and pulpwood production. As outlined above, these kinds of areas can have considerable conservation value either singly or in combination with other meso-scale protected areas and/or landscapes-scale and stand-level conservation strategies.

There is considerable precedent for the protection of meso-scale forest reserves which are specially managed for cultural and social reasons.⁵² The Aboriginal and European significance of Recherche Bay is well recognised in the draft management plan for the area⁵³ and one of its explicitly stated aims is 'to conserve sites or areas of heritage significance'. The draft plan recommends such actions as limiting vegetation removal and 'encasement' of sites particularly sensitive to human interference to protect the Aboriginal and European significance of Recherche Bay area.

Notably, although some meso-scale reserves are managed primarily for cultural reasons these same areas also can have considerable value for many elements of biodiversity.⁵⁴ For example, cemeteries and other religious sites have functioned as refugia for many species including significant subsets of biotic communities.⁵⁵ Similarly, railroad and road right-of-ways sometimes function as refugia for communities or particular organisms of conservation concern.⁵⁶ In the particular case of Recherche Bay, the area is known to be used by and

to provide habitat for four species listed as threatened or endangered in Tasmania. These include the White-bellied Sea Eagle (*Haliaeetus leucogaster*), the Grey Goshawk (*Accipiter novaehollandiae*), the Masked Owl (*Tyto novaehollandiae*) and the Swift Parrot (*Lathamus discolor*).⁵⁷ The status of these species means that careful management is required to ensure their persistence in the area. This is in keeping with a broad aim of the draft management plan for Recherche Bay⁵⁸ which is to 'conserve the natural biological diversity of the area'.

Small and medium-sized reserves, although often valuable for cultural and conservation reasons, can be highly susceptible to an array of factors that can degrade them and undermine the values which led to their protection. For example, the size and location of logged areas and associated road networks in the surrounding (unreserved) areas may produce deleterious impacts on adjacent small and medium-sized reserves.⁵⁹ Strategies such as the establishment of buffers, planning the size and location of logged areas in space and time, and the deconstruction of roads once timber harvesting is finished, are among a suite of strategies that can be employed in an attempt to limit negative landscape context effects on small and medium-sized reserves. These kinds of considerations and allied management strategies are relevant at Recherche Bay and need to be an integral part of well informed forest planning. The case of the conservation of the Swift Parrot at Recherche Bay is particularly important because the long-term conservation of the species depends almost entirely on management actions outside large ecological reserves.⁶⁰ Indeed, it has been estimated that less than two percent of the nesting habitat of the species occurs in dedicated conservation reserves with the rest on private and publicly-owned production forests.⁶¹ Even the best formulated plans at a local level can fail if inappropriate practices are applied in the broader landscape. In the case of Recherche Bay, this means, for example, that logging schedules in the adjacent areas may need to be designed to ensure the broader persistence of wide ranging species such as the Swift Parrot. Thus, there needs to be close co-ordination between the plans for the conservation and management of Recherche Bay and those for adjacent areas, particularly where extensive logging operations have occurred or are scheduled in the future.

Conclusion

There is a well-developed (although still rapidly evolving) science that underpins conservation. It is complex because it entails considerations at multiple spatial scales from regions to individual stands and trees. The primary focus of most conservation efforts has been on the establishment of networks of large ecological reserves, which is in part guided by systematic conservation planning tools such as reserve design algorithms and gap analysis. The science behind off-reserve conservation is less well developed but is at least equally important as the establishment of large ecological reserves. There is an increasing realisation that medium and small protected areas within landscapes and regions broadly designated for wood production can have important conservation and cultural values and these values should not be discounted simply because these areas are not large. However, small and medium-sized areas such as the one at Recherche Bay may require special additional management because they are potentially vulnerable to negative effects emanating from surrounding unreserved areas. However, the effectiveness of impact mitigation strategies in off-reserve areas remains poorly known because of a chronic paucity

of empirical studies backed by rigorous monitoring programs. The landscapes and region which contains Recherche Bay provides no exception to this systemic problem which is characteristic of wood production forests elsewhere in Australia and worldwide.

Acknowledgements

The ideas for this chapter have developed from past collaborations with many colleagues, in particular Professor Jerry Franklin and Dr Joern Fischer. I thank Dr Hugh Tyndale-Biscoe and the organisers of the Recherche Bay conference in Hobart for encouraging me to write this chapter.

References

1. Dargavel, J (1995) *Fashioning Australia's Forests*. Oxford University Press, Melbourne; and DB Lindenmayer and JF Franklin (eds) (2003) *Towards Forest Sustainability*. Island Press, Washington DC
2. Reviewed by Margules, CR and Pressey, RL (2000) 'Systematic Conservation Planning', *Nature* 405, pp 243-253.
3. Hale P and Lamb D (eds) (1997) *Conservation Outside Reserves*. Centre for Conservation Biology, University of Queensland, Brisbane; Hunter, ML (2000) *Fundamentals of Conservation Biology*. Blackwell, Cambridge; Lindenmayer, DB and Franklin, JF (2002) *Conserving Forest Biodiversity: A Comprehensive Multiscaled Approach*. Island Press, Washington.
4. For example, see reviews by Caughley, GC and Gunn, A, (1995) *Conservation Biology in Theory and Practice*. Blackwell Science, Cambridge, Massachusetts; Hunter, ML op cit; Groom, MJ, Meffe, GK and Carroll, RC (eds) (2005, 3rd ed) *Principles of Conservation Biology*. Sinauer Associates, Sunderland Massachusetts; Lindenmayer, DB and Burgman, MA (2005) *Practical Conservation Biology*. CSIRO Publishing, Melbourne.
5. Lindenmayer, DB and Franklin, JF op cit.
6. Redrawn from ibid.
7. Poff, NL (1997) 'Landscape Filters and Species Traits: Towards Mechanistic Understanding and Prediction in Stream Ecology', *Journal of the North American Benthic Society* 16, pp 391-409; Elkie, PC and Rempel, RS (2001) 'Detecting Scales of Pattern in Boreal Forest Landscapes', *Forest Ecology and Management* 147, pp 253-261.
8. Hokit, DG, Stith BM and Branch LC (1999) 'Effects of Landscape Structure in Florida Scrub: A Population Perspective', *Ecological Applications* 9, pp 124-1134; and Lindenmayer, DB (2000) 'Factors at Multiple Scales Affecting Distribution Patterns and its Implications for Animal Conservation—Leadbeater's Possum as a Case Study', *Biodiversity and Conservation* 9, pp 15-35.
9. Christensen, N, Bartuska, AM, Brown, JH, Carpenter, S, D'Antonio, C, Francis, R, Franklin, JF, MacMahon, JA, Noss, RF, Parsons, DJ, Peterson, CH, Turner, MG and Woodmansee, RG (1996) 'The Report of the Ecological Society of America on the Scientific Basis for Ecosystem Management', *Ecological Applications* 6, pp 665-691; Tang SM, Franklin JF and Montgomery DR (1997) 'Forest Harvest Patterns and Landscape Disturbance Processes', *Landscape Ecology* 12, pp 349-363.
10. Harris, LD (1984) *The Fragmented Forest*. University of Chicago Press, Chicago.
11. Lindenmayer, DB, Cunningham, RB and McCarthy, MA (1999) 'The Conservation of Arboreal Marsupials in the Montane Ash Forests of the Central Highlands of Victoria, South-Eastern Australia. VIII. Landscape Analysis of the Occurrence of Arboreal Marsupials in the Montane Ash Forests', *Biological Conservation* 89, pp 83-92.
12. Forman, RTT (1995) *Land Mosaics: The Ecology of Landscapes and Regions*. Cambridge University Press, New York.

13. Krusic, RA, Yamasaki, M, Neefus, CD and Pekeins PJ (1996) 'Bat Habitat Use in White Mountain National Forest', *Journal of Wildlife Management* 60, pp 625-631; Laiolo, P (2004) 'Spatial and Seasonal Patterns of Bird Communities in Italian Agroecosystems', *Conservation Biology* 19, pp 1547-1556; Law, B and Dickman CR (1998) 'The Use of Habitat Mosaics by Terrestrial Vertebrate Fauna: Implications for Conservation and Management', *Biodiversity and Conservation* 7, pp 323-333; Cunningham, RB, Lindenmayer, DB, Crane, M, Michael, D and MacGregor, C (2007) 'Reptile and Arboreal Marsupial Response to Replanted Vegetation in Agricultural Landscapes', *Ecological Applications* 17, pp 609-619.
14. Fenner F (ed) (1975) 'A National System of Ecological Reserves in Australia', *Proceedings of a Symposium of the Australian Academy of Science, 31 October 1974, Canberra*, Australian Academy of Science, Canberra.
15. Reviewed by Margules CR and Pressey, RL op cit.
16. Dickson, R, Aldred, T and Baird, I (1997) 'National Forest Conservation Reserves: Recent Developments' in JJ Pigram and R Sundell (eds) *National Parks and Protected Areas: Selection, Delimitation and Management*. Centre for Water Policy Research, University of New England, Armidale, pp 359-368.
17. Pressey, RL and Tully, SL (1994) 'The Cost of Ad Hoc Reservation: A Case Study in Western New South Wales', *Australian Journal of Ecology* 19, pp 375-384.
18. Kirkpatrick, JB (1983) 'An Iterative Method for Establishing Priorities for the Selection of Nature Reserves: An Example from Tasmania' *Biological Conservation* 25, pp 127-134.
19. Scott, JM Davis, F, Csuti, B, Noss, R, Butterfield, B, Groves, C, Anderson, H, Caicco, S, D'Erchia, F, Edwards, T, Ulliman, J and Wright, R (1993) 'Gap Analysis: A Geographic Approach to Protection of Biological Diversity', *Wildlife Monographs* 123, pp 1-41; Burke, VJ (ed) (2000) 'Gap Analysis for Landscape Conservation', Special Issue, *Landscape Ecology* 15.
20. Pressey, RL, Humphries, CJ, Margules, CR, Vane-Wright, RI and Williams, PH (1993) 'Beyond Opportunism: Key Principles for Systematic Reserve Selection', *Trends in Evolution and Ecology* 8, pp 124-128.
21. Kirkpatrick op cit; Margules, CR, Nicholls, AO and Pressey, RL (1988) 'Selecting Networks of Reserves to Maximise Biological Diversity', *Biological Conservation* 43, pp 663-676.
22. Pressey RL et al op cit.
23. *ibid.*
24. Kirkpatrick op cit.
25. Mendel, LC and Kirkpatrick, JB (2002) 'Historical Progress of Biodiversity Conservation in the Protected-Area System of Tasmania, Australia', *Conservation Biology* 16, pp 1520-1529.
26. *ibid.*
27. *ibid.*
28. Dickson et al op cit.
29. Mendel LC and Kirkpatrick, JB op cit.
30. Lindenmayer, DB and Hobbs RJ (2004) 'Fauna Conservation in Australian plantation Forests - A review', *Biological Conservation* 119, pp 151-168.
31. Burgman, MA, and Lindenmayer, DB (1998) *Conservation Biology for the Australian Environment*. Surrey Beatty and Sons, Chipping Norton, Sydney.
32. Gill, AM (1999) 'Biodiversity and Bushfires: An Australia-Wide Perspective on Plant-Species Changes After a Fire Event', in AM Gill, J Woinarski and A York (eds) *Australia's Biodiversity—Responses to Fire, Environment Australia Biodiversity Technical Paper 1*. Department of Environment and Heritage, Canberra, pp 9-53.
33. Forman, RT, Sperling, D, Bissonette, JA, Clevenger, AP, Cutshall, CD, Dale, VH, Fahrig, L, France, R, Goldman, CR, Heanue, K, Jones, JA, Swanson, FJ, Turrentine, T and Winter, T (eds) (2002) *Road Ecology: Science and Solutions*. Island Press, Washington.

34. Franklin, JF, Forman, RT (1987) 'Creating Landscape Patterns by Forest Cutting: Ecological consequences and Principles', *Landscape Ecology* 1, pp 5-18; Lindenmayer et al (1999) op cit.
35. Rülcker, C, Angelstam, P and Rosenberg, P (1994) 'Natural Forest-Fire Dynamics Can Guide Conservation and Silviculture in Boreal Forests', *SkogForsk* 2, pp 1-4; Keith, D, Williams, J and Woinarski, J (2002) 'Fire Management and Biodiversity Conservation: Key Approaches and Principles', in R Bradstock, J Williams and AM Gill (eds) (2001) *Flammable Australia. The Fire Regimes and Biodiversity of a Continent*. Cambridge University Press, Cambridge, pp 401-425.
36. Vera, FW (2000) *Grazing Ecology and Forest History*. CABI Publishing, New York.
37. McCarthy, MA and Lindenmayer, DB (1999) 'Incorporating Metapopulation Dynamics of Greater Gliders into Reserve Design in Disturbed Landscapes', *Ecology* 80, pp 651-667.
38. Noss, RF and Cooperrider, AY (1994) *Saving Nature's Legacy: Protecting and Restoring Biodiversity*. Island Press, Covelo, California.
39. Gustaffson, L, de Jong, J and Noren, M (1999) 'Evaluation of Swedish Woodland Key Habitats Using Red-Listed Bryophytes and Lichens', *Biodiversity and Conservation* 8, pp 1101-1114.
40. Fries, C, Johansson, O, Pettersson, B. and Simonsson, P (1997) 'Silvicultural Models to Maintain and Restore Natural Stand Structures in Swedish Boreal Forests', *Forest Ecology and Management* 94, pp 89-103.
41. Ough, K and Murphy, A (1998) 'The Effect of Clearfell Logging on Tree-Ferns in Victorian Wet Forest', *Australian Forestry* 59, pp 178-188.
42. Harmon, M, Franklin, JF, Swanson, F, Sollins, P, Gregory, SV, Lattin, JD, Anderson, NH, Cline, SP, Aumen, NG, Sedell, JR, Lienkaemper, GW, Cromack, K and Cummins, K (1986) Ecology of Coarse Woody Debris in Temperate Ecosystems', *Advances in Ecological Research* 15, pp 133-302; Lindenmayer DB, Claridge, AW, Gilmore, AM, Michael, D and Lindenmayer, BD (2002) 'The Ecological Role of Logs in Australian Forest and the Potential Impacts of Harvesting Intensification on Log-Using Biotra', *Pacific Conservation Biology* 8, pp 121-140.
43. Bull, EL, Partridge, AD (1986) 'Methods of Killing Trees for Use by Cavity Nesters', *Wildlife Society Bulletin* 14, pp 142-146.
44. Petty, SJ, Shaw, G, Anderson DIK (1994) 'Value of Nest Boxes for Population Studies and Conservation of Owls in Coniferous Forests in Britain', *Journal of Raptor Research* 28, pp 134-142.
45. Carey, AB, Lippke, BR and Sessions, J (1999) 'Intentional Systems Management: Managing Forests for Biodiversity', *Journal of Sustainable Forestry* 9(3/4), pp 83-125.
46. Bowman, DM (1999) *Australian Rainforests: Islands of Green in a Land of Fire*. Cambridge University Press, Melbourne; Jäggi, C and Baur, B (1999) 'Overgrowing Forest as a Possible Cause for the Local Extinction of *Vipera aspis* in the Northern Swiss Jura Mountains', *Amphibia-Reptilia* 20, pp 25-34.
47. Seymour, RS, Hunter, ML (1999) 'Principles of Ecological Forestry', in ML Hunter (ed) *Maintaining Biodiversity in Forest Ecosystems*. Cambridge University Press, Cambridge, pp 22-61.
48. Hickey, JE, Neyland, MG, Edwards, LG, Dingle, JK (1999) 'Testing Alternative Silvicultural Systems for Wet Eucalypt Forests in Tasmania', in RC Ellis and PJ Smethurst (eds) *Practising Forestry Today: 18th Biennial Conference of the Institute of Foresters of Australia*. 3-8 October. Institute of Foresters of Australia, Hobart, Tasmania, pp 136-141; Beese, WJ, Dunsworth, BG, Zielke, K and Bancroft, B (2003) 'Maintaining Attributes of Old Growth Forests in Coastal B.C. Through Variable Retention', *The Forestry Chronicle* 79, pp 570-578.
49. Reviewed by Margules CR and Pressey, RL op cit.
50. Sensu Walters, CJ and Holling, CS (1990) 'Large Scale Management Experiments and Learning by Doing', *Ecology* 71, pp 2060-2068.
51. Lindenmayer DB, Franklin, JF and Fischer, J (2006) 'Conserving Forest Biodiversity: A Checklist for Forest and Wildlife Managers', *Biological Conservation* 129, pp 511-518.
52. Flood, J (1980) *The Moth Hunters: Aboriginal Prehistory of the Australian Alps*. Australian Institute of Aboriginal Studies, Canberra; Bynre, D (1991) 'Aboriginal Archaeology in Forests—Circles Around the Past', in D Lunney (ed) *Conservation of Australia's Forest Fauna*. Royal Zoological Society of NSW,

- Sydney, Australia, pp 385-392; Douglas, M (1997) 'Forests of East Gippsland Before Europeans', in J Dargavel (ed) *Australia's Everchanging Forests III. Proceedings of the Third National Conference on Australian Forest History*. Australian Forest History Society, Canberra, pp 231-246.
53. Tasmanian Land Conservancy (2007) *Draft Management Plan. Recherche Bay northeast Peninsula*. Tasmanian Land Conservancy, Hobart, Tasmania.
 54. Daubenmire, R (1970) 'Steppe Vegetation of Washington', *Washington State University Agricultural Experiment Station Technical Bulletin* 62. Pullman, Washington; USDA Forest Service and USDI Bureau of Land Management (1994a) *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl*. Volumes I and II. USDA Forest Service and USDI Bureau of Land Management, Portland, Oregon; and USDA Forest Service and USDI Bureau of Land Management (1994b), *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and Standards and Guidelines for Development of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl*. USDA Forest Service Region 6, Portland, Oregon.
 55. Prober, S and Thiele KR (1995) 'Conservation of the Grassy White Box Woodlands: Relative Contributions of Size and Disturbance to Floristic Composition and Diversity of Remnants', *Australian Journal of Botany* 43, pp 349-366.
 56. Bennett AF (1991) 'Roads, Roadsides and Wildlife Conservation: A Review', in DA Saunders and RJ Hobbs (eds), *Nature Conservation 2: The Role of Corridors*. Surrey Beatty and Sons, Sydney, pp 99-117; and Forman, RT et al op cit.
 57. Tasmanian Land Conservancy op cit.
 58. *ibid.*
 59. Lindenmayer, DB and Franklin JF op cit.
 60. Brown, MJ and Hickey J (1990) 'Tasmanian Forest—Genes or Wilderness', *Search* 21, pp 86-87; Swift Parrot Recovery Team (2000) *Draft Swift Parrot Recovery Plan 2001-2005*. Hobart, Tasmania, Parks and Wildlife Service.
 61. Brereton, R (1997) *Management Prescriptions for the Swift Parrot in Production Forests. Report to the Tasmanian Regional Forest Agreement and Heritage Technical Committee*. Hobart, Tasmania, Tasmanian Parks and Wildlife Service.