Developing a framework for the conservation of habitat of RFA priority species

Implementation of the *Biodiversity landscape planning guideline*: a summary of current progress and future work

Milestone 21: *Report on the implementation of a strategic landscape approach for the management of forest dependent threatened species and their habitats delivered via the forest practices system*

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Report to the Federal Government and the Forest Practices Authority

FPA
FOREST PRACTICES AUTHORITY

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Disclaimers

The information presented is a broad overview of information considered relevant (by the authors) to the brief.

Front page photograph: Participants on the landscape symposium, jointly run by the FPA and the CRC for Forestry in 2010, discussing plantation design on private land.

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Acknowledgements

List of Abbreviations

CAR reserve system	comprehensive, adequate and representative reserve system
CCU	coupe context unit
CFEV	conservation of freshwater ecosystem values
code	*Forest Practices Code*
DPIPWE	Department of Primary Industries, Parks, Water and Environment
EPBC	Environmental Protection and Biodiversity and Conservation
FPA	Forest Practices Authority
FPAC	Forest Practices Advisory Council
FPB	Forest Practices Board (now the Forest Practices Authority)
FPP	forest practices plan
FPO	Forest Practices Officer
HPG	habitat planning guideline (swift parrot)
IALE	International Association of Landscape Ecology
MEZ	management exclusion zone
NRM	Natural Resource Management
PNFE	permanent native forest estate
RFA	Tasmanian Regional Forest Agreement 2007
TFA	Threatened Fauna Adviser
WAFL	Water Allocation and Forest Land use Planning Tool
WHC	wildlife habitat clump
WHS	wildlife habitat strip

Glossary

Adaptive management: a process of responding positively to change. The term adaptive management is used to describe an approach to managing complex natural systems that builds on common sense and learning from experience, experimenting, monitoring, and adjusting practices based on what was learned.

Biodiversity: the variability among living organisms from all sources (including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part). This includes diversity within species and between species and diversity of ecosystems.

CAR reserve: comprehensive, adequate and representative reserve systems, based on nationally agreed criteria, also known as the 'JANIS criteria'. The CAR reserve system is made up of dedicated reserves, informal reserves and areas where values are protected by prescription.

Coupe: an area of forest that is planned for timber harvesting as a single unit. It may contain more than one silvicultural objective, such as a number of discrete gaps or clearfells or a combination of both.

EPBC Act: the *Environment Protection and Biodiversity Conservation Act 1999*, which relates to the protection of the environment and the conservation of biodiversity, and for related purposes.

Forest structure: the vertical and spatial distribution of the vegetation.

Habitat: the biophysical medium or media (a) occupied (continuously, periodically or occasionally) by an organism or group of organisms; or (b) once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced.

Land clearing: the removal and destruction of all native vegetation and vegetation types, including individual trees, woodlands, grasslands, forests and wetlands.

Monitoring: the regular observation and recording of activities taking place in a project or programme.

Monitoring – implementation: monitoring which is used to determine whether prescribed management is actually conducted.

Monitoring – effectiveness: monitoring which is used to determine whether the management specified has achieved its objective.

Operational planning: site-based management planning.

Planning tool: a tool that delivers information and guidelines on a particular subject, usually aimed at forest planners and forest managers.

Prescription: a detailed specification of the objectives, area, procedures and standards for a task to be undertaken.

Private land: a land tenure arrangement where the land is permanently owned and not leased.

Recovery plans: wildlife management programs that delineate, justify and schedule management actions necessary to support the recovery of a threatened species or ecological community.

RFA: regional forest agreements (RFAs) are 20-year plans, signed by the Australian and certain State governments, for the conservation and sustainable management of certain areas of Australia's native forests.

Riparian: pertaining to the banks of streams, rivers or lakes.

Strategic planning: making management decisions and allocating resources to pursue a long-term strategy at multiple spatial scales.

Threatened: when used in association with a species, population or community indicates that it is listed under one of the threat categories in the EPBC Act 1999.

Contents

Implementation of the *Biodiversity landscape planning guideline*: a summary of current progress and future work

Summary

- This document contributes to milestone 21 for Part 2 of the project entitled 'Developing a framework for the conservation of habitat of regional forest agreement priority species and a strategic species plan for the swift parrot', being a schedule signed between the Commonwealth and Tasmanian governments dated 2 February 2010 and its variants.

  Milestone 21 – Report on the implementation of a strategic landscape approach for the management of forest dependent threatened species and their habitats delivered via the forest practices system.

- A *Biodiversity landscape planning guideline* is being developed by the Forest Practices Authority (FPA) in response to a need for biodiversity (including RFA priority species) management at the landscape-scale in areas covered by the forest practices system. Landscape management principles, reported in background document 1, have been used as the basis for the development of the objectives (goals) of the guideline. The guideline links management targets to each goal which are based on perceived threats to achieving the goal. The goals and management targets are being developed and will be communicated in a separate but complimentary document to this report.

- This report provides three examples of the implementation of current landscape-scale policies and planning tools relating to forest biodiversity, including RFA priority species, and a report on one currently being developed. This includes a report on implementation of the Permanent Native Forest Estate Policy, the FPA's *Flora technical note No. 12: Management of gene flow from plantation eucalypts* and the wildlife habitat strip provisions of the *Forest Practices Code*. A report on the development and testing of a draft FPA technical note on management of mature habitat is also provided.

- Further work is required before the *Biodiversity landscape planning guideline* can be fully implemented, including extensive consultation with stakeholders and practitioners. Some planning tools have been identified as necessary but have yet to be developed (e.g. remnant management and catchment management technical notes). Communication and training programs will be run to ensure the guideline is implemented correctly.

- The guideline will continue to be developed and implemented to enhance current conservation management within the Tasmanian forest practices system. However, the landscape-scale management actions recommended by the guideline will not always cater for all RFA priority species in all forestry situations and so species-

specific management will still be required. Threatened or priority species management, delivered through species-specific management plans and/or the Threatened Fauna Adviser, is a crucial part of any strategic landscape plan.

1. Background

A review of the management of biodiversity in areas covered by the Tasmanian forest practices system recommended a more landscape-scale approach (Biodiversity Review Panel 2008). A *Biodiversity landscape planning guideline* (herein referred to as 'the guideline') is currently being developed by the FPA, in response to this recommendation. The draft guideline outlines the strategic landscape approach for the management of biodiversity, with an emphasis on RFA priority species and their habitats. It complements current policy and legislation and builds on the conservation outcomes achieved through the existing CAR reserve system (Chuter, AE & Munks 2011a). It also applies ecological theory and takes into account landscape management strategies that have been adopted interstate and overseas (Koch, AJ, Chuter, AE & Munks, SA 2011).

The guideline is a key output from the project entitled 'Swift parrot and RFA priority species project – Part 2: Developing a framework for the conservation of habitat of RFA priority species.' The guideline is still under development, and feedback will be sought on the draft guideline from relevant stakeholders over the next 12 months. Section 3 of this report outlines future work, communication and training needed to implement the guideline.

Although the guideline is still under development, there are some components which are being implemented, either as management actions that are endorsed or management actions that are being trialled. The current report provides a brief overview of the guideline and reports on the implementation of the management approaches developed to date and planned future work.

This report meets the requirements of milestone 21 – *Report on the implementation of a strategic landscape approach for the management of forest dependent threatened species and their habitats delivered via the forest practices system.*

2. Developing the planning framework

The overarching objective of the guideline is '*to contribute to the maintenance of habitat for RFA priority species at multiple spatial scales across the landscape.*' To meet this objective the guideline outlines a set of six goals which were identified, through a review, as required to meet the primary objective of biodiversity conservation via the forest practices system.

Within each goal are a number of management targets which have been set as the benchmarks required to achieving the goal. The management targets have been developed in response to the foreseen 'threats' to achieving the goal. For example, a 'threat' to goal 4 '*Maintain the resilience of freshwater ecosystems within the range of natural variation over time*' is that an increased sediment input into streams would reduce water quality; therefore a management target for goal 4 is to maintain water quality. Management targets are still in draft form and require further work (see section 3.1 of this report). The guideline is being built within an adaptive management system, and therefore alternative approaches to meeting the goals of the guideline will be considered.

The six goals and their related draft management targets are shown in box 1.

Box 1. The six goals and associated management targets as outlined in the FPA's *Biodiversity landscape planning guideline*

1. Maintain an extensive and permanent native forest estate and avoid or minimise any permanent forest loss

   1.1 Maintain forest cover across Tasmania at no less than 95% of the 1996 CRA area

   1.2 Maintain 100% or enhance condition of all viable threatened forest communities

   1.3 Maintain 75% of the 1996 CRA area or a minimum of 2000 ha (whichever is higher) of non-threatened forest communities in each IBRA bioregion

   1.4 Maintain priority vegetation communities that are locally important for conservation

2. Maintain forest structural complexity and landscape heterogeneity

   2.1 Maintain seral stage pattern in native forest across the landscape

   2.2 Maintain remnant vegetation

   2.3 Ensure adequate regeneration in native forest harvest areas, including understorey, within harvest cycle

3. Maintain connectivity of habitat

   3.1 Maintain or enhance linkages along water courses and between water courses, capturing a range of habitat types and topographies

4. Maintain the resilience of freshwater ecosystems within the range of natural variation over time

   4.1 Maintain water quality and flow

   4.2 Maintain lateral and longitudinal connectivity

   4.3 Maintain and/or restore riparian vegetation

5. Maintain or improve the health of native habitats

   5.1 Manage the risk of introducing weeks or disease into a 'healthy' habitat

   5.2 Minimise harmful edge effects on reserves and sensitive vegetation communities

   5.3 Manage the risk of genetic pollution in native eucalypt populations and areas of high conservation value

   5.4 Maintain soil fertility and structure

6. Maintain or improve the conservation status of forest species, natural levels of genetic diversity and the capacity for adaptability

   6.1 Maintain habitats important for threatened and RFA priority species throughout their range to ensure maintenance of breeding populations.

Each management target has one or more actions to achieve the target. The management targets are designed to be measurable and the actions to be clear and practical to enable monitoring, review and adaptive management. Taking the above example again, an action to maintain water quality is to apply catchment harvesting thresholds to maintain natural water yield patterns and reduce the risk of storm flow damage to streams and associated biodiversity. The actions are delivered through the related planning tools. Figure 1 is a diagrammatic representation of the threats (management targets) and the strategies (actions) for goal 4. This illustrates to the users of the guideline how the management targets and

actions are developed for each goal. The diagram has been adapted from the 'threat and contributing factors' diagrams from *Conservation Measures* (2007)

It is recognised that there are many threats to achieving the goals which are not regulated by the forest practices system; e.g. land clearing for mine development will impact on goal 1 '*Maintain an extensive and permanent native forest estate and avoid or minimise any permanent native forest loss'*. Only those management targets and related actions which can be delivered and monitored in areas covered (both state and private) by the forest practices system are included in the guideline. The guideline, however, might provide a framework that could be used to deliver other management targets and actions for other areas that can be delivered and monitored through other systems (e.g. local government planning systems). In this way the planning guideline would contribute to the maintenance of biodiversity, including RFA priority species, at multiple scales and across land tenures.

Figure 1: Threats and strategies for maintaining resilience of freshwater ecosystems (Goal 4). Only those threats which are related to activities covered by the forest practices system are shown here.
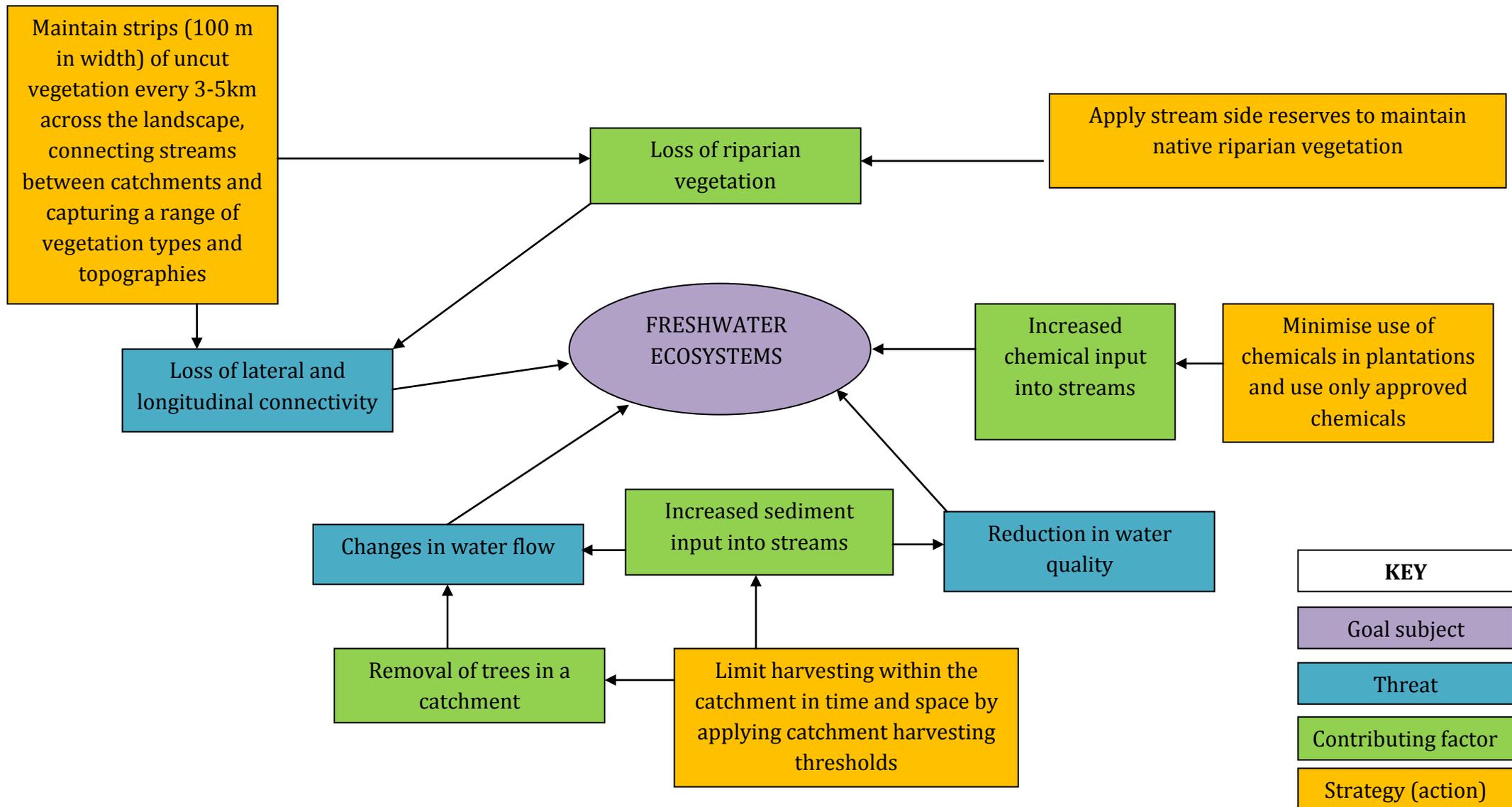
2. Implementation

The FPA together with the DPIPWE are primarily responsible for the implementation of the guideline. The guideline and associated planning tools have been developed in accordance with the *Forest Practices Act 1985,* threatened species legislation and other relevant legislation and policies and are implemented through the forest practices system. The process for the development and continual improvement of this guideline is provided in Appendix A.

The guideline is primarily intended for strategic planning at the landscape scale (e.g. three-year plans on state forest, whole property planning on private) by forest managers. However, many of the associated planning tools, such as the Threatened Fauna Adviser, can be used in both strategic and operational planning. By designing the guideline to be used at the two levels of planning it will accommodate issues such as individual threatened species management requirements, or private property where strategic planning may not be possible.

The actions are the drivers of the guideline and it is envisaged that the planning tools (the delivery system) will be the most utilised part of the guideline. Some planning tools, such as the FPA's draft *Management of mature forest habitat technical note* have been developed specifically for managing a value across the landscape (see section 2.1.2 of this report). Other planning tools, already being used within the forest practices system, currently deliver landscape-scale management provisions – such as FPA fauna technical note 8 which provides guidelines on the implementation of wildlife habitat strips in the landscape.

2.1 Implementation of current landscape planning tools

The planning tools are the mechanism for delivering the actions in a way that can be implemented within the forest practices system. The degree to which the planning tools are currently being implemented varies, see table 1 for the draft list of planning tools referred to in the guideline and stage of development.

Table 1: Planning tools referred to in the draft guideline and their status.

Planning tool	Related goal (management target)	Status
Permanent Native Forest Estate Policy	1 (1.1 – 1.3)	Developed – being applied and monitored
FPA Planning guideline 2008/1	1 (1.4)	Developed – being applied
Forest botany manual	1 (1.4); 5 (5.1–5.2)	Developed – being applied
FPA draft technical note: *Management of mature forest habitat technical note*	2 (2.1)	Under development
FPA Mature Habitat Availability Map	2 (2.1)	Developed – being used in decision-making
FPA draft technical note: *Management of remnant vegetation technical note*	2 (2.2)	Priority for development
Native forest silviculture – technical bulletin No. 5	2 (2.3)	Developed – being applied
FPA Fauna technical note 8: *Wildlife habitat strip location and management guidelines*	3 (3.1)	Developed – being applied
Catchment Management Tool	4 (4.1–4.2)	Priority for development
Soil and water guidelines of the *Forest Practices Code*	4 (4.1–4.3)	Developed – being applied
Plantation catchment management guidelines	4 (4.1–4.2)	Priority for development
FPA Flora technical note 8: *Phytophthora*	5 (5.1)	Developed – being applied and quarry management section being monitored
FPA Flora technical note 4: *Relict rainforest management*	5 (5.2)	Developed – being applied
FPA Flora technical note 6: Sphagnum *communities*	5 (5.2)	Developed – being applied
FPA Flora technical note 12: *Management of gene flow from plantation eucalypts*	5 (5.3)	Developed – being applied

A brief summary of the implementation of four of the planning tools is provided below. One example of the implementation of species-specific management actions is also provided in this section. This has been highlighted as a case study as species-specific management actions and planning tools are not individually referred to in the guideline but are a component of goal 6 and critical for the management of biodiversity, and in particular RFA priority species.

2.1.1 Permanent Native Forest Estate Policy

The Permanent Native Forest Estate (PNFE) Policy is the main planning tool to deliver the actions for goal 1 from the draft *Biodiversity landscape planning guideline*, which is: '*maintain an extensive and permanent native forest estate and avoid or minimise any forest loss*.' The PNFE policy is implemented during the development of forest practices plans (FPPs) where forest practices officers (FPOs) are required to take account of this policy following administrative instruction from the CFPO.

The PNFE policy was established as part of the Tasmanian Regional Forest Agreement and implemented through the *Forest Practices Act 1985*, which requires the Forest Practices Authority to monitor and report on the maintenance of a permanent native forest estate. The PNFE policy constrains native forest loss at multiple scales through the implementation of threshold limits at the State, bioregional and forest community scales.

An overview of the PNFE policy is provided in 'Developing a framework for the conservation of habitat of RFA priority species – background report 2' (Chuter, AE & Munks 2011a) and a summary of implementation of this policy is included in 'Developing a framework for the conservation of habitat of RFA priority species – background report 3'(Chuter, A & Munks 2011b).

Since completion of the background documents the PNFE policy has been revised to define certain terms including 'substantial public benefit'. This amendment requires the Minister to determine and advise the FPA on whether the project has substantial public benefit after consideration of a socio-economic analysis of the proposal and any conservation benefits arising. These amendments have not changed any of the conversion limits in the previous policy. As provide for in the previous policy, if a project demonstrates substantial public benefit it is only exempt from the forest community and annual property limits of the policy and does not remove the need for the FPA to consider other policy and legislative requirements, such as the *Threatened Species Protection Act 1995*.

2.1.2 FPA draft technical note: Management of mature forest habitat

The draft FPA technical note: *Management of mature forest habitat* is a planning tool which delivers actions which contribute to goal 2, which is: '*Maintain forest structural complexity and landscape heterogeneity*.'

Tree hollows are currently managed within the forest practices system through the retention of wildlife habitat clumps within harvested areas, as prescribed by the *Forest Practices Code*.

Research has been conducted on the types of trees that contain hollows, the availability of hollows in different forest types, the use of hollows by fauna, and the longevity of retained trees. Research has also led to the development of a mapping layer to reflect relative hollow availability (Koch, A. J. & Baker in press). This map is referred to as the mature habitat availability map as it indicates the relative availability of mature eucalypt trees and associated habitat elements (e.g. coarse woody debris), not just tree hollows. This map allowed the FPA to develop a more landscape-scale approach to managing mature habitat elements, such as tree hollows, with in-coupe prescriptions varying according to the amount of habitat available in the surrounding landscape. Details of the approach are outlined in the draft FPA technical note: *Management of mature forest habitat* (Forest Practices Authority 2011).

The development and refinement of the mature habitat management approach has followed the process outlined in Appendix A. The initial approach was developed from the research, and then introduced to two Forest Practices Officers (FPOs) who provided feedback. The revised approach was then applied (theoretically only) to some forest practices plans (FPPs) by FPA staff. The next revision was introduced to DPIPWE's Threatened Species Section staff and a group of experienced high-level industry planners for feedback. A small, select group of practitioners (FPOs and other planners) were then trained on the approach in order to trial it when planning operations. The practitioners invited to participate in the trial period represented the different management regions of the state, the main industry organisations, planners involved in strategic planning and coupe planning, and planners representing both public and private land. Initial feedback was received on the day and the approach was adjusted as a result. All FPOs involved in the training day were asked to help trial the approach in the field. To date field trials have been conducted with three FPOs on two coupes.

The proposed approach continues to be revised according to feedback received and as the practicalities and implications of the approach are identified through testing. The trial period will run for several months. When the approach is finalised, it will be submitted to the Board of the FPA for endorsement. The board may seek advice from the Forest Practices Advisory Council on socio-economic implications. If the approach is endorsed training days for planners will be held in three locations around the state. The range of practitioners involved in the current trial process will help ensure that at least one person in each district/organisation has a good understanding of the approach. However, implementation monitoring will be done to ensure that the approach is understood correctly.

2.1.3 FPA's Flora technical note No. 12: Management of gene flow from plantation eucalypts

The FPA's *Flora technical note No. 12: Management of gene flow from plantation eucalypts* is a planning tool to deliver actions which contribute to goal five from the guideline, which is: '*Maintain or improve the health of native habitats.*' This technical note has been implemented since 2010 through the FPA biodiversity evaluation process where forest planners are required to take account of the management recommendations within the gene-flow management technical note when developing a FPP.

Pollen dispersal from exotic eucalypt plantations in Tasmania creates the potential for hybridisation and exotic gene flow into native eucalypt populations. This issue has been the subject of research conducted by the University of Tasmania and the Co-operative Research Centre for Forestry. Such exotic gene flow could impact on the genetic diversity and integrity of native eucalypt populations, particularly in the case of rare species (e.g. *Eucalyptus perriniana*) or fragmented populations (e.g. *E. ovata*) (Barbour, Potts & Vaillancourt 2005). When dominant organisms such as trees are involved, hybridisation may not only affect the tree population but could have broader consequences for biodiversity, due to the diverse plant and animal communities that trees support.

The expansion of the Tasmanian hardwood plantation estate using *E. nitens* or genetic races of *E. globulus,* some of which are not native to Tasmania (Strzelecki Ranges, Otway Ranges and Furneaux races), exposes many native Tasmanian eucalypt populations to the potential impacts of hybridisation and gene flow from non-native species or populations (Barbour, Potts & Vaillancourt 2005). While it may take many decades or even centuries for the full impact of such hybridisation to be seen due to the long-generation cycle of eucalypts, research in this area is on-going and seeks to establish the extent to which hybridisation is occurring, how vigorous new hybrid combinations may be in the wild, as well as identifying priority areas, populations and species for monitoring.

To minimise the risk of genetic pollution from exotic to native eucalypt populations the FPA in collaboration with scientists from the University of Tasmania developed the FPA's *Flora technical note No. 12: Management of gene flow from plantation eucalypts* to aid forest planners in identifying when additional management or site monitoring is required (Forest Practices Authority 2009).

The technical note requires that forest planners and FPOs seek management advice from the FPA (in collaboration with University based specialists) to determine the appropriate management for sites that are considered high-risk for hybridisation. This management can be done strategically, through spatial analysis techniques, and management actions can be delivered at the landscape scale.

To promote awareness of the issue of hybridisation and to encourage a strategic approach to management, the FPA is planning a training day with the University of Tasmania. The training day will be aimed at forestry managers and practitioners to raise the profile of hybridisation and to educate the audience on the actions and monitoring required in managing the emerging issue.

2.1.4 FPA's Fauna technical note 8: Wildlife habitat strip location and management guidelines

Wildlife habitat strips (WHSs) are a provision of the *Forest Practices Code*. They are considered a landscape action as they are used to maintain habitat and promote connectivity across the landscape. Within the *Biodiversity landscape planning guideline*, WHSs contribute to achieving goal 3: '*maintain connectivity of habitat*.'

Wildlife habitat strips are corridors of uncut forest that are reserved from timber harvesting for fauna and flora conservation purposes. They are implemented through the *Forest Practices Code* and are a requirement on both public and private land (Forest Practices Board 2000). WHSs were first implemented in Tasmania in the late 1980s with the following objectives (Taylor 1991a, 1991b):

1. to cater for species of restricted distribution

2. to provide a network of oldgrowth forest

3. to act as a source of individuals to recolonise regenerating areas

4. to ensure populations in the larger reserves do not become isolated

5. to provide shelter and nesting areas for those species which can utilise regrowth for feeding but only do so if mature forest sites are nearby.

On public land, implementation was achieved strategically across the landscape. WHSs were designated as informal reserves and used to create a network across the landscape capturing a range of habitats and connecting large ecological reserves (Figure 2).

Figure 2: WHSs (outlined in pink) are based predominately on water courses, but also include a range of habitats. They are used to form an informal reserve network between harvest units (green areas) that connect ecological reserves (brown areas) and provide connectivity between catchments.

On private land the implementation of WHSs at the landscape-scale has been challenging. This is due to private tenures having multiple landowners, differing land management, and ranging property sizes. A strategic approach to WHS implementation has been achieved on a handful of large properties (e.g. Surrey Hills and Woolnorth) where planning for multiple coupes and special values was done at the property scale, rather than on a coupe-by-coupe basis.

2.1.5 Case Study: Monitoring the implementation of swift parrot Lathamus discolor management prescriptions, in areas covered by the Tasmanian forest practices system

The information presented in this case study is sourced from a report produced by (Schofield 2011).The draft *Species habitat planning guideline for the conservation management of* Lathamus discolor *(swift parrot) in areas regulated under the Tasmanian forest practices system* (HPG) is a species-specific management tool that guides the development of management actions across the landscape to maintain breeding-habitat for the endangered
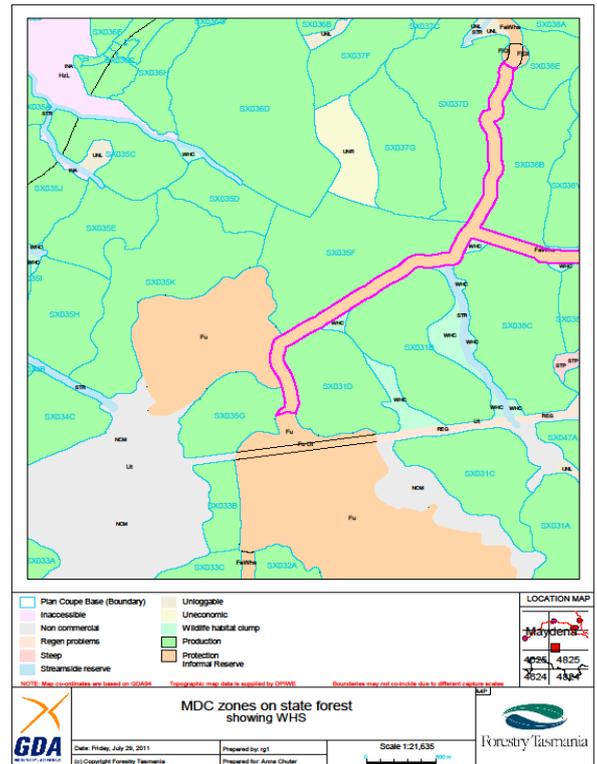
swift parrot in areas covered by the forest practices system in south-eastern Tasmania (Forest Practices Authority 2010).

Although it is still in 'draft' form the swift parrot HPG has been trialled by implementation through the agreed procedures for management of threatened species within the forest practices system since late 2009 – see for Chuter and Munks (2011b) for more information on the agreed procedures. In preparing FPPs within the range of the swift parrot, forest planners are required to evaluate the proposed operations for swift parrot habitat (following the swift parrot administrative instruction issued by the Chief Forest Practices Officer in December 2009) and if notification to the FPA was required. The study by Schofield (2011) evaluated the implementation of the administrative instruction and the subsequent incorporation of management prescriptions for swift parrot into the FPP. The key questions that the project aimed to answer were:

1) Are the swift parrot planning tools being interpreted and applied correctly?

2) Are the required management actions being included in the FPP?

To answer these questions, 31 randomly selected forest practices plans (FPPs) from within the eastern breeding range of the swift parrot were reviewed. The FPPs were selected across public and private land and included three different operation types: clearfell, partial harvest systems, and conversion of native forest to non-forest land use. From the desktop analysis, Schofield reported a high accuracy (93.5%) in use of the planning tools and swift parrot habitat identification by the forest planners. This result was also recorded in the translation of management advice into management actions within the FPP, with 29 out of 31 FPPs (93.5%) demonstrating correct planning for the swift parrot. The following paragraph is an extract from the report by Schofield (2011):

'*The implementation of prescriptions aimed at maintaining suitable foraging and nesting habitat for the swift parrot in areas subject to forest practices is important for the conservation of the species. This report indicates that forest planners are following the correct planning procedures, in terms of reviewing databases to gather information on known nest sites, habitat descriptions and guidelines. Based on a review of the databases, vegetation mapping and PI-types it is evident that forest planners are correctly applying the planning tools*'.

Schofield recorded an interesting result when he examined the time frame between planning a forestry operation and commencing the operation. There are often several months between planning and the commencement of operations, and only three out of the 31 FPPs assessed carried out a second database check for swift parrot records just before commencing operations. This highlighted a gap in the assessment process. Without a second database check just prior to operations commencing it would be easy to miss a new nest record for the swift parrot. This result has lead to a recommendation to improve the planning process, which is that databases are checked for new records prior to commencing the operation.

This case study is an example of monitoring the implementation of threatened species management prescription to provide information for adaptive management. The next phase of this project is to verify the implementation of the management action on the ground. Field work for the second part of the project will be completed in 2011.

3. Future work

The guideline is currently still in the development phase. A first draft will be provided to the Project Steering Committee for the swift parrot and RFA priority species project at the end of 2011 for early comment. Further work is needed before the guideline can be provided to stakeholders for feedback and testing. This section outlines the future work needed to finalise the guideline and the timeline for communication with stakeholders.

3.1 Management targets

Further work and consultation with specialists is required to ensure that the management targets within the guideline are ecologically sounds and are measurable to enable monitoring.

3.2 Planning tools

Through the process of developing the guideline, and taking into consideration relevant reports (Biodiversity Review Panel 2008; Koch, AJ, Chuter, AE & Munks, SA 2011), several gaps have been noted in terms of both knowledge and management actions. These gaps have been addressed as research and monitoring priorities (Koch, A.J. , Chuter & Munks 2011b). Two important planning tools that require future work are one on the management of remnant vegetation and one on catchment management.

3.2.1 FPA's Technical note: Management of remnant vegetation (to be developed)

Remnant vegetation has been defined as: the remaining native vegetation (>1 ha) in a landscape after land clearance or alteration (e.g. clearance to pasture or plantation) (Biodiversity Review Panel 2008). A remnant can be of any size or condition. Anything that is native and remaining from the 'original' forest or non-forest vegetation can be a remnant – including individual trees, both live and dead (dead trees are often important in supplying nesting hollows and rotten wood habitat for invertebrates and reptiles) (Davidson 2006). Individual trees (live or dead) are important in an agricultural landscape as they provide stepping-stones for movement of native animals across the landscapes (Salt, Lindenmayer & Hobbs 2004). The context of a remnant is important because the presence of surrounding remnants affect its value as a habitat or 'stepping stone'. In one sense remnants near large tracts of native forest or other remnants are more valuable because they can harbor greater biodiversity. Remote remnants may be important if they are repositories of rare species or communities for that region, although isolation often results in species loss (particularly if they are small) (Davidson 2006).

The *Forest Practices Code* requires remnants to be taken into consideration during the planning of forest practices (Forest Practices Board 2000):

'*In parts of the State where native forests occur mainly as remnants, consideration will be given to:*

- – *Retention of native forest remnants to aid the maintenance of local flora and fauna diversity and landscape values;*
- – *Restoration of habitat including widening and linking wildlife habitat strips, particularly where species and communications of high conservation significance are known to occur.*'

The code does not define a remnant; however the *Forest botany manual* does give a definition of a remnant (Forest Practices Authority 2005):

'*For the purposes of assessing FPP flora values, remnant forest and woodlands comprise stand that are:*

- • *Greater than 1 ha in area, and*
- • *Separated by more than 2 km from the closest area of native forest or woodland that exceeds 20 ha in area.*"

The Biodiversity Review Panel (2008)further refined the definition of remnant vegetation to:

The remaining vegetation (>1 ha) in a landscape after land clearance/alteration. A remnant can be of any size (above 1 ha) or condition. Anything that is native and remaining from the 'original' forest or non-forest vegetation is a remnant—including individual trees, both live and dead.

Neither the code nor the *Forest botany manual* specifies a state-wide approach to the management of remnants. They also do not consider non-forest remnants or paddock trees. The Biodiversity Review Panel (Biodiversity Review Panel 2008) recommended that the: '*forest practices system should specifically address the retention and management of remnant vegetation in different situations, with an emphasis on remnants of high conservation significance.*'

The *Biodiversity landscape planning guideline* has addressed this knowledge and management gap by recognising that a landscape approach to the management of remnant vegetation is required.

Goal 2 of the *Biodiversity landscape planning guideline* is to: *maintain forest structural complexity and landscape heterogeneity*. To achieve this goal, one of the management targets is to: *maintain remnant vegetation where considered high importance for maintaining RFA priority species habitat*. The planning tool for delivering the actions to meet this management target will be an FPA Technical Note: *Management of remnant vegetation*. This technical note has not yet been developed, and is a priority for 2011–12.

3.2.2 Catchment management tool

Freshwater ecosystems play an integral role in supporting biodiversity. They include surface features such as lakes, streams, rivers and wetlands as well as subterranean habitat.

Inappropriate harvesting regimes can have a negative impact on hydrological process and biodiversity in freshwater ecosystems, by changing surface and ground water flows and water quality (Lindenmayer & Franklin 2002).

Conservation of biodiversity through the CAR reserve system has largely focussed on terrestrial and marine conservation. While freshwater habitats have been incidentally protected within terrestrial reserves, there is no systematic conservation assessment and management process in place for these ecosystems (Hardie & Davies 2007).

The management of freshwater ecosystems is an important objective of forested catchments (Institute of Foresters of Australia 2007). Forest practices can have significant impacts on water quality and flow. Soil erosion, following disturbance associated with land management, can significantly reduce water quality. Similarly, the extent of harvesting and regeneration can change water yield from a catchment. The type of impacts will vary according to the area of the catchment that is affected by forestry disturbance and the type of silvicultural treatment (i.e. plantation will differ from native forestry).

The Biodiversity Review Panel noted that while the forest practices system did go a long way to managing water quality and quantity, not all requirements for in-stream biodiversity were currently met. A recommendation from the review was that (Biodiversity Review Panel 2008): '*The FPA should develop water-specific planning tools to maintain a proportion of unharvested headwater catchments and to maintain the spatial and temporal integrity of longitudinal and lateral connections of river headwater networks. These planning tools should take a flexible approach and the proportion of catchment required may be achieved as part of the CCU planning aim to maintain 30% of native vegetation. The effectiveness of the measures applied need to be monitored and the measures need to be further developed through research.*'

This recommendation has been integrated into the *Biodiversity landscape planning guideline* under goal 4: Maintain the resilience of freshwater ecosystems within the range of natural variation over time. Maintaining water quality and flow are two of the management targets under this goal, and the action to achieve these targets will be developed and delivered through the catchment management tool. Associated tools, including the Water Availability and Forest Land use Planning (WAFL) Tool, will provide the framework for assessing the potential impact of forestry in catchments at multiple spatial scales. The catchment management tool is a research priority for 2011/2012 and it will apply to native forest and plantation harvesting.

3.3 Communication and training

Communication and training in interpretation and use of the *Biodiversity landscape planning guideline* and the associated planning tools is an essential component of the implementation strategy for the guideline.

3.3.1 Communication strategy

Communicating the intent of the guideline, through news articles and workshops, and working with input from the practitioners throughout the development of the guideline, will help to implement the actions into on-ground outcomes. A strategy for communication has been developed for the project entitled 'Swift parrot and RFA priority species project' and this forms the basis for the communication strategy for the guideline. It includes communication with the Project Steering Committee through project milestone reports (such as this report), and communication with stakeholders through workshops and publications.

A summary of the communication of the guideline up until September 2011, and an outline of the planned communication over the next 12 months has been provided to the project steering committee for the swift parrot and RFA priority species project. The communication summary table is in accordance with the communication strategy for the Swift parrot and RFA priority species project (DPIPWE 2011).

3.3.2 Training program

Training is an essential component of the communication strategy for the guideline. The users of the guideline (e.g. forest managers) will be trained to interpret the guideline through a series of workshops and training days.

Training will be provided to forest practitioners (e.g. forest practices officers and planners) for the interpretation and implementation of the planning tools associated with the guideline (such as the training provided for the approach to management of hollows outlined in section 2.1.2 of this report). Future training courses will be advertised in Forest Practices New, a quarterly newsletter produced by the FPA.

4. Discussion

The *Biodiversity landscape planning guideline* is a framework for the maintenance of biodiversity across multiple scales in areas covered by the Tasmanian forest practices system. It is based on ecological theory (Bunnell & Dunsworth 2004; Lindenmayer & Franklin 2002) and draws on the outcomes of the review of other landscape management approaches adopted interstate and overseas (Koch, AJ, Chuter, AE & Munks, SA 2011). The guideline will continue to be developed, trialled and implemented over the next 12 months. A final version of the guideline will be presented at the end of 2012 to the project steering committee for the project entitled 'Developing a framework for the conservation of habitat of regional forest agreement priority species and a strategic species plan for the swift parrot.'

The guideline utilises existing ecological theory and Tasmania-specific review recommendations to provide a framework which can be implemented through the forest practices system. It will be a point of reference for strategic planning for biodiversity and a place where new information can be integrated into existing systems and implemented and monitored. It will have limitations; for example it is developed for use within the forest practices system under existing policy and legislation which will limit the application of the

planning tools in other areas. However, the broad concepts will be applicable across all tenures and systems. The guideline will not individually cover all threatened and RFA priority species requirements. It will provide a foundation for management of threatened and RFA priority species habitat and direct land managers and forest planners towards the planning tools developed for threatened species. Species are listed as 'threatened' or of 'priority' because they have been recognised as rare and/or at risk of population decline and will require additional specialised management. The guideline will support management of threatened and priority species but will not replace the need for all current species-specific management actions and must be used in conjunction with the species management strategies (e.g. Threatened Fauna Adviser, recovery plans and public authority management agreements)

This report has outlined the current status of the guideline and the associated planning tools which are used to deliver the actions for the guideline. The planning tools are in varying stages of development and implementation. This report outlines which landscape management actions and planning tools are currently being implemented, trialled or are a priority for development. The aim over the next 12 months is to further develop these planning tools and, where possible, to evaluate their implementation for reporting and review. The report by Koch et al. (2011) outlines the effectiveness monitoring plan for the forest practices system and the Guideline and builds on current monitoring projects.

The communication of the guideline is a critical step in its implementation. There must be effective dissemination of information for the guideline to achieve its objective. The communication strategy for the project and the guideline includes stakeholder involvement, scenario testing and analysis of constraints (risk assessment). The guideline includes a communication strategy which is outlined in section 3 of this report. The communication in combination with the training program will facilitate the implementation of the guideline (and the associated planning tool) and the species-specific plans which have been developed for management of biodiversity (with an emphasis on RFA priority species) at multiple scales across the landscape.

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Appendix A

Process for the development, review and continual improvement of the provisions of the *Forest Practices Code*

The forest practices adaptive management process, in relation to many biodiversity values, can be summarised as follows:

a. The most up-to-date information is gathered from published and non-published sources to determine the 'expert opinion' with respect to the value in question and its likely response to various forms of forest management;

b. The science and expert opinion is used to develop management actions for the value. This may be done through a technical working group (e.g. fauna/flora strategic planning groups, hollows working group) convened for the particular value or issue;

c. Comment is sought from all stakeholders, particularly practitioners (FPOs), on the proposed management actions and any associated implementation tools (e.g. policies, DSS, technical notes, etc.);

d. The final decision on adoption or amendment of the management actions and any associated implementation tools is made by the Board of the Forest Practices Authority (and Secretary of DPIPWE in the case of actions relating to threatened species) who may seek advice from the Forest Practices Advisory Council, TSSAC and any other advisory bodies as required;

e. Training, education and awareness programs are conducted on a regular basis for forest practices officers, other planning and supervisory staff employed throughout the forest industry and landowners;

f. The management actions are implemented through effective and efficient planning tools and procedures;

g. Research is conducted to improve understanding of the value in question and its response to different impacts;

h. Monitoring is carried out by specialists to assess the efficacy of management actions;

The management actions are reviewed and revised on a regular basis to incorporate the findings of new research, results from monitoring and operational experience.