Approved NSW Recovery Plan

# Davidson's Plum (*Davidsonia jerseyana*)

February 2004





Department of Environment and Conservation (NSW) © Department of Environment and Conservation (NSW), 2004.

This work is copyright. However, material presented in this plan may be copied for personal use or published for educational purposes, providing that any extracts are fully acknowledged. Apart from this and any other use as permitted under the *Copyright Act* 1968, no part may be reproduced without prior written permission from the Department of Environment and Conservation (NSW).

Department of Environment and Conservation (NSW) 43 Bridge Street (PO Box 1967) **Hurstville NSW 2220** Tel: 02 9585 6444 www.nationalparks.nsw.gov.au

Requests for information regarding the recovery program for the Davidsonia jerseyana are best directed to:

The *Davidsonia jerseyana* Recovery Co-ordinator Threatened Species Unit, North East Branch Department of Environment and Conservation (NSW) Locked Bag 914 **Coffs Harbour NSW 2450** Tel: 02 6651 5946

Cover illustrator: Ann Sheppard from photographs by Hugh Nicholson

This plan should be cited as follows:

Department of Environment and Conservation (NSW) 2004, *Recovery Plan for the Davidson's Plum* (Davidsonia jerseyana), Department of Environment and Conservation (NSW), Hurstville.

ISBN 0731367790

#### Foreword

The New South Wales Government established a new environment agency on 24 September 2003, the Department of Environment and Conservation (NSW), which incorporates the New South Wales National Parks and Wildlife Service. Responsibility for the preparation of Recovery Plans now rests with this new department.

This document constitutes the formal New South Wales State Recovery Plan for *Davidsonia jerseyana* Bailey (Davidson's Plum) and considers the conservation requirements of the species across its known range. It identifies the actions to be taken to ensure the long-term viability of the species in nature and the parties who will undertake these actions.

The Davidson's Plum is included as Endangered on the NSW *Threatened Species Conservation Act* 1995, and Endangered on the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999. The Davidson's Plum is a slender tree to 10 m high, with few branches or with several stems from the base, and is restricted to the Tweed and Brunswick River catchments of the north coast of NSW.

The future recovery actions detailed in this Recovery Plan include: (i) plan coordination, (ii) surveys, (iii) research, (iv) identification of cultural significance, (v) habitat management and protection, and (vi) the development of a contingency plan.

It is intended that this Recovery Plan will be implemented over a five year period. Actions will be undertaken by the Department of Environment and Conservation (NSW).

Usa Corbon

LISA CORBYN

Director-General

**BOB DEBUS MP** Minister for the Environment

#### Acknowledgments

The Department of Environment and Conservation (NSW) would like to thank Dr Barbara Stewart, Andrew Benwell, Frances Eliott, Lance and Sally Fitzgerald, Hugh Nicholson, Kris Kupsch, Clive Sable and Graham Watson for providing valuable information on the Davidson's Plum and support and assistance with the development of this Recovery Plan.

#### **Table of Contents**

Fo	Forewordi						
A	Acknowledgmentsii						
1		Introduction	1				
2		Legislative Context	1				
	2.1	Legal status	1				
	2.2	Responsibilities under the Threatened Species Conservation Act 1995	1				
	2.3	Environment Protection and Biodiversity Conservation Act 1999	2				
	2.4	Relationship to other legislation	2				
3		Species Information	3				
	3.1	Description	3				
	3.2	Distribution and abundance	3				
	3.3	Land tenure	3				
	3.4	Zoning	3				
	3.5	Habitat	4				
	3.6	Life history and ecology	5				
	3.7	Age/size structure	5				
	3.8	Reproductive biology	5				
	3.9	Seed ecology	6				
	3.10	Ability of species to recover	6				
4		Threats and Management Issues	6				
	4.1	Habitat alteration and fragmentation	6				
	4.2	Loss of genetic variation	7				
	4.3	Genetic pollution	7				
	4.4	Collection for the bush food and nursery industry	8				
5		Previous Recovery Actions	8				
	5.1	Surveys	8				
	5.2	On-ground management	8				
	5.3	Genetics	8				
6		Proposed Recovery Objectives, Actions and Performance Criteria	8				
7		Implementation	12				
8		Social and Economic Consequences	12				
9		Biodiversity Benefits	13				
10		Preparation Details	13				
11		Review Date	13				
12		References	13				
13	;	Acronyms Used in this Document					
Appendix 1: Summary of Advice from the NSW Scientific Committee							
Aj	Appendix 2: Public Authority Responsibilities1						
Aj	Appendix 3: Environmental Impact Assessment Guidelines						
Aj	Appendix 4: Species Profile for the Davidson's Plum ( <i>Davidsonia jerseyana</i> )						

#### 

#### Figures

Figure 1.	The known	distribution of the	Davidson's Plum4
-----------	-----------	---------------------	------------------

#### Tables

Table 1.	Zoning of land on which Davidson's Plum sub-populations occur.	5
Table 2.	Estimated costs of implementing the actions identified in the Davidson's Plum Recovery Plan 1	5

#### 1 Introduction

*Davidsonia jerseyana* Bailey (Davidson's Plum) is endemic to the Northern Rivers region of New South Wales (NSW) and is currently only known from the Tweed and Brunswick River catchments. The species has been documented as occurring at a total of 118 point locations, which can be roughly grouped into 24 naturally occurring subpopulations<sup>1</sup>.

This document constitutes the formal NSW State Recovery Plan for this species, and considers the requirements of the species across its known range. It identifies the actions to be taken to ensure the long-term viability of the Davidson's Plum in nature and the parties who will undertake these actions. The attainment of this Recovery Plan's objectives is subject to budgetary and other constraints affecting the parties involved.

The information in this Recovery Plan is accurate to February 2004. This plan has been prepared by the Department of Environment and Conservation (NSW) (DEC).

#### 2 Legislative Context

#### 2.1 Legal status

The Davidson's Plum is listed as Endangered on both the NSW Threatened Species Conservation Act 1995 (TSC Act) and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Until recently, the Davidson's Plum was listed on the TSC Act and the EPBC Act as Davidsonia pruriens var. jerseyana, but has now been described and named as Davidsonia jerseyana (Harden & Williams 2000).

Some individuals occur within areas of Lowland Subtropical Rainforest on Floodplain in the NSW North East Bioregion, which is listed as an Endangered Ecological Community under the TSC Act.

### 2.2 Responsibilities under the *Threatened Species Conservation Act* 1995

The TSC Act and the NSW *Threatened Species Conservation Amendment Act* 2002 (hereafter referred to jointly as the TSC Act) provides a framework to protect and encourage the recovery of Threatened Species, Endangered Populations and Endangered Ecological Communities in NSW. Under this legislation the Director-General of the DEC (formerly the National Parks and Wildlife Service) has a responsibility to prepare Recovery Plans for all species, populations and ecological communities listed as Endangered or Vulnerable on the TSC Act schedules. Similarly, the EPBC Act requires the Commonwealth Minister for the Environment to ensure the preparation of a Recovery Plan for Nationally listed species and communities, or adopt plans prepared by others including those developed by State agencies.

This Recovery Plan was placed on public exhibition from 7 March 2003 to 11 April 2003.

The *Threatened Species Conservation Amendment Act* 2002 states that an approved Recovery Plan must include a summary of advice given by the NSW Scientific Committee with respect to the plan, details of any amendments made to the plan to take account of that advice and a statement of the reasons for any departure from that advice. This summary is provided in Appendix 1.

The TSC Act requires that a government agency must not undertake actions inconsistent with a Recovery Plan. The actions identified in this plan for the recovery of the Davidson's Plum in NSW are the responsibility of the DEC. Other public authorities may have statutory responsibilities relevant to the conservation and protection of the Davidson's Plum. Public authorities with core legislative responsibilities relevant to the protection and management of the Davidson's Plum and its habitat are listed in Appendix 2.

#### Consultation with indigenous people

Local Aboriginal Land Councils, Elders and other groups representing indigenous people in the areas where the Davidson's Plum occurs have been identified and a copy of the Recovery Plan will be sent to them. It is the intention of the DEC to consider the role and interests of these indigenous communities in the implementation of the actions identified in this plan.

#### **Critical Habitat**

The TSC Act makes provision for the identification and declaration of Critical Habitat for species, populations and ecological communities listed as Endangered. Once declared, it becomes an offence to damage Critical Habitat (unless the action is specifically exempted by the TSC Act) and a Species Impact Statement (SIS) is mandatory for all developments and activities proposed within Critical Habitat.

<sup>&</sup>lt;sup>1</sup> The following definitions of "population", "sub-population", and "mature individuals" are consistent with IUCN (Hilton-Taylor 2000).

#### **Key Threatening Processes**

As of January 2004 there are 20 Key Threatening Processes listed on the TSC Act. Of these 'clearing of native vegetation' (NSW Scientific Committee 2001) is relevant to the Davidson's Plum. In addition to this Key Threatening Process, a range of other processes are recognised as threatening the survival of the species in NSW and are discussed in Section 4.

#### Licensing

Any activity not requiring development consent under the NSW *Environmental Planning and Assessment Act* 1979 (EP&A Act) or the NSW *Native Vegetation Conservation Act* 1997 (NVC Act), which is likely to result in the pick' of Davidson's Plum, or damage to its habitat, requires a licence from the DEC under the provisions of the TSC Act or NSW *National Parks and Wildlife Act* 1974 (NPW Act) as a defence against prosecution. If the impact is likely to be significant, a Species Impact Statement (SIS) is required.

#### Other conservation measures

The TSC Act includes provision for other measures that may be taken to conserve the Davidson's Plum and its habitat, including the making of a Stop Work Order or Joint Management Agreement.

#### 2.3 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides a legislative framework for the protection of threatened species across Australia. An important role of the EPBC Act is to facilitate the preparation and implementation of Recovery Plans for species listed under the Act in co-operation with the States and Territories in which populations of listed species occur. In preparing a Commonwealth Recovery Plan, consideration must be given to the role and interests of indigenous people in the conservation of Australia's biodiversity. The Act also seeks to impose the obligation (arising from the listing) for responsible agencies (particularly Commonwealth) to adopt protective measures. This Recovery Plan will be submitted to the Commonwealth for approval under the EPBC Act.

Under the EPBC Act, Critical Habitat may be registered for any Nationally listed threatened species or ecological community. When adopting a Recovery Plan, the Commonwealth Minister for the Environment and Heritage must consider whether to list habitat identified in the Recovery Plan as being critical to the survival of the species or ecological community. It is an offence under the EPBC Act for a person to knowingly take an action that will significantly damage Critical Habitat (unless the EPBC Act specifically exempts the action). This offence only applies to Commonwealth areas. However, an action which is likely to have a significant impact on a listed species is still subject to referral and approval under the EPBC Act. Proposed actions within Critical Habitat on non-Commonwealth areas are likely to receive additional scrutiny by the Commonwealth Minister for the Environment and Heritage.

This Recovery Plan does not specifically identify habitat that is critical to the survival of the Davidson's Plum. However, the distribution, habitat and ecological information included in this plan (Section 3) will assist the Commonwealth Minister for the Environment and Heritage in identifying habitat that is critical to the survival of this species.

The DEC does not consider it appropriate that this Recovery Plan identifies or maps the occurrence of this species in the detail that would be required to define Critical Habitat.

As the species is listed Nationally under the EPBC Act, any person proposing to undertake actions likely to have a significant impact on this species should refer the action to the Commonwealth Minister for the Environment and Heritage for consideration. The Minister will then decide whether the action requires EPBC Act approval. This is in addition to any State or Local Government approval required.

Administrative guidelines are available from the Commonwealth Department of Environment and Heritage to assist proponents in determining whether their action is likely to have a significant impact.

#### 2.4 Relationship to other legislation

Additional legislation relevant to the conservation and recovery of the Davidson's Plum in NSW includes the following:

- National Parks and Wildlife Act 1974;
- Environmental Planning and Assessment Act 1979;
- Local Government Act 1993;
- Native Vegetation Conservation Act 1997;
- Rural Fires Act 1997;
- Forestry and National Park Estate Act 1998; and
- Rural Fires and Environmental Assessment Legislation Amendment Act 2002

#### **3** Species Information

#### 3.1 Description

The Davidson's Plum is a slender tree to 10 m high, with few branches or with several stems from the base.

The leaves are alternate and mostly 35–80 cm long and more or less covered with irritant hairs. Each leaf has 11–17 oblong-shaped leaflets, mostly 6–30 cm long and 3–10 cm wide.

The species has small dark pink to red flowers that are arranged on panicles. Panicles are usually borne on the main stem or older branches, and 4-10 cm long. Fruit are blue-black in colour, pear to ovalshaped and covered with golden-brown hairs. The fruit has dark red flesh, and usually two large seed cases that are fibrous on the surface, each with a single seed (Harden & Williams 2000).

A full taxonomic description of the species is available in Harden (2000).

The hairy leaves and pear to oval shaped fruit of Davidson's Plum allow it to be distinguished from *Davidsonia johnsonii* (Smooth Davidsonia). Further distinguishing features are the dense crown and stems surrounding clumps of root suckers in the Smooth Davidsonia.

#### 3.2 Distribution and abundance

The Davidson's Plum is restricted to the Brunswick and Tweed River catchments of the north coast of NSW. The southern-most confirmed record of the species is located near Mullumbimby. The known distribution of the species is shown in Figure 1.

Records extend only a short distance inland on the Brunswick River. The northern-most and westernmost confirmed record is at Chillingham. There is an unconfirmed record further north near the border gate at Tomewin (Watson 1987). There are no confirmed records for southern Queensland.

The species has been documented as occurring at a total of 118 point locations, which can be roughly grouped into 24 naturally occurring sub-populations, however the results of genetics research on the species may cause these groupings to be redefined. Further targeted surveys are required to determine the actual size and extent of the population.

#### 3.3 Land tenure

Davidson's Plum records are known from the following land tenures:

- Billinudgel Nature Reserve and Brunswick Heads Nature Reserve, managed by the DEC;
- Murwillumbah Cemetery, managed by Tweed Shire Council;
- Murwillumbah Saleyards, managed by Tweed Shire Council;
- roadside reserves, managed by Tweed and Byron Shire Councils;
- railway reserves, managed by Rail Infrastructure Corporation;
- within the areas impacted on by the Pacific Highway upgrade that are likely to be included within Byron Shire Council and Tweed Shire Council road reserves; and
- freehold land, owned and managed by various private landholders.

#### 3.4 Zoning

Table 1 shows the zoning of known Davidson's Plum sites. Many Davidson's Plum records occur on land that does not have zoning secure for conservation or consistent with nature conservation objectives. There are only two confirmed sub-populations of this species known from within conservation reserves (Brunswick Heads and Billinudgel Nature Reserves). An unconfirmed record exists from Couchy Creek Nature Reserve (Quinn *et al.* 1995).

#### 3.5 Habitat

#### Vegetation

The Davidson's Plum is found in coastal and lowland subtropical rainforest and wet sclerophyll forest. often with an overstorey including Lophostemon confertus (Brush Box), Araucaria cunninghamii (Hoop Pine) and/or eucalypt species. Species commonly occurring at Davidson's Plum sites include Acacia bakeri (Marblewood), Cupaniopsis newmanii (Longleaved Tuckeroo), Endiandra globosa (Black Eucalyptus microcorys (Tallowwood), Walnut). Flindersia bennettiana (Bennett's Ash), Flindersia schottiana (Cudgerie), Pentaceras australe (Crow's Ash), Synoum glandulosum (Scentless Rosewood) and the introduced Cinnamomum camphora (Camphor Laurel) (McKinley & Stewart 1999).

Several sub-populations of the Davidson's Plum are known from areas of regrowth rainforest with a high percentage of Camphor Laurel, *Lantana camara* (Lantana) and other exotic weeds. Some trees are isolated in paddocks or in road reserves (McKinley & Stewart 1999).



Figure 1. The known distribution of the Davidson's Plum

LGA	Zoning	Description		
Tweed	1(a)	General Rural		
	1 (b2)	Agricultural Protection		
2(c)		Urban Expansion		
	5(a)	Special Use – Railway		
	5(a)	Special Use – Cemetery		
Unzoned		Roadside Reserve		
	7(1)	Environmental protection (habitat)		
Byron	1(a)	General Rural		
	1(a) Hatched under clause 38	General Rural		
	1(c1)	Small Holding (minimum allotment size for subdivision 0.4ha)		
	1(c2)	Small Holding (minimum allotment size for subdivision 0.2ha)		
	8(a)	National Parks and Nature Reserve Zone		
	Unzoned	Roadside Reserve		

 Table 1.
 Zoning of land on which Davidson's Plum sub-populations occur.

#### Altitude, aspect and topographic preferences

The Davidson's Plum has been recorded at altitudes up to 300 m, however most records have been made at altitudes below 100 m. Slope and aspect vary, with the majority of known sub-populations occuring on south and east-facing slopes, with only a few individuals recorded from north-facing slopes (A. Benwell pers. comm.). Plants are generally located in clusters around sheltered lower hill slopes.

#### Geology and soil characteristics

Quinn *et al.* (1995) described the Davidson's Plum as occurring on red and yellow soils of poor structure, over Silurian greywacke, slate, phyllite and quartzite and most confirmed records are on these soils. Only one unconfirmed record (at Tomewin) is on krasnozem soils and two unconfirmed records are on podzols adjacent to krasnozems (Watson 1987).

#### 3.6 Life history and ecology

No systematic observations of growth and development in wild Davidson's Plum subpopulations have been conducted. In cultivation, seedlings are recorded as establishing quickly in good conditions, and attaining a height of 4 m in less than 10 years (A. McKinley pers obs.). The rate of development, and factors which influence branching patterns from the stem or from the base, is unknown. A stand at Uralba (probably planted) is known to be over 100 years old with no stem over 6 m in height. Watson (1987) regarded a diameter at breast height (dbh) of 9.5 cm to be typical for a tree of 6 m in height, but also recorded a dbh of 19.1 cm for a tree of the same height.

#### 3.7 Age/size structure

Detailed census information is available for only a small number of locations from which the species has been documented. Most sub-populations comprise small numbers of mature individuals with a few suckers or seedlings. Two of the largest known subpopulations surveyed are unusual in that they exhibit mixed size class distributions indicative of continuous regeneration. These sites occur in habitats that, though of limited area, are in reasonably good condition. In contrast, another subpopulation consists of more than 20 mature individuals that occur as scattered paddock trees with little or no regeneration.

#### 3.8 Reproductive biology

The Davidson's Plum frequently occurs in clumps with a number of stems separated at ground level. This is assumed to be due to a combination of root suckering plus seedlings developing from seeds dropped below the parent. There is no ready way to distinguish suckers from seedlings and their relative contributions to regeneration are unknown.

The age at which the Davidson's Plum is reproductively mature, and the time it takes the species to produce viable seed, are important biological variables. Mature individuals are those individuals known, estimated or inferred to be capable of reproduction (Hilton-Taylor 2000). There is currently no data available on the age at which wild individuals become reproductively mature, however trees in cultivation have been recorded as producing viable fruit after five years (N. Nicholson pers. comm.).

The Davidson's Plum is known to bear flowers and fruits when very small, especially when stressed. McKinley and Stewart (1999) adopted an arbitrary cut-off dbh of 3 cm to distinguish between mature and immature individuals in census data collected in preparation for the development of this Recovery Plan. More observations are required to establish size at maturity, and will enable a more accurate estimation of the mature individuals in the population.

#### Flowering

No systematic records of flowering phenology of the Davidson's Plum have been collected, but available information suggests some variation within and between sub-populations. Barry and Thomas (1994) recorded the flowering period as October to January, while Watson (1987) also noted flowering in September and in July. Flowering time apparently varies within a population, with some trees commencing flowering when others in the same area are setting fruit. A tree may also continue to produce flowers and buds even when the earliest fruit has ripened and fallen (Watson 1987). Site conditions may also influence the number of flowers produced. Trees in sheltered situations (under tree cover) have been recorded as producing more flowers than trees in paddock situations (F. Eliott pers. comm.).

#### Pollination

Little information is available on the pollination of the Davidson's Plum. The size and form of the flower suggest that vectors are likely to be small insects. Ants (species uncertain) were the only visitors to the flowers during diurnal and nocturnal observation of the flowers, however they are unlikely to act as pollinators for this species. Exclusion experiments demonstrated fruit with viable seed can be produced without cross-pollination (F. Eliott pers. comm.). It has been suggested that flies and native bees are likely pollinators of *D. pruriens* in north Queensland (T. Irvine pers. comm.).

#### Fruiting

Fruiting times apparently vary between subpopulations. Floyd (1989) recorded fruit as ripening mainly in January and February, while Harden (2000) noted the fruiting period as April to October.

Trees grown *ex-situ* in protected situations (with mulch and regular fertilising and watering) may set

fruit in 3 to 4 years of age (Nicholson & Nicholson 1985). The age at which individual plants reach their peak fruiting is unknown.

#### 3.9 Seed ecology

#### Seed predation and dispersal

Little is known of seed dispersal in the Davidson's Plum. Maiden (1899) referred to flying foxes eating unripe Davidson's Plum fruit. Watson (1987) noted distinct bird bill imprints and rodent teeth marks on ripe fruit and Eliott (pers. comm.) observed King Parrots eating the seeds. Rodents are seed predators, but movement of undamaged seeds from the parent tree has been observed in other rainforest species (Floyd 1990), and may also occur occasionally in the Davidson's Plum.

#### Dormancy, viability and germination

The Davidson's Plum is easily grown from seed, and is readily established (Quinn *et al.* 1995). The seeds have a very high viability rate, at around 80% (Watson 1987). There is no dormancy period in Davidson's Plum seeds and there is no evidence of soil storage of seeds, although specific trials are required to confirm this. F. Eliott (pers. comm.) carried out germination trials at 24°C and found that, while most seeds germinated within three weeks, a small proportion took several months to germinate.

#### 3.10 Ability of species to recover

Habitat clearing and fragmentation are believed to be the primary causes of past decline in the Davidson's Plum. A substantial reforestation effort is under way through government, community and private initiatives, and the long term may see replacement habitat created. However, the Davidson's Plum is presently not regenerating in many locations and the collection of seed from the wild sub-populations decreases the likelihood of the species successfully re-colonising potential habitat, at least in the short-term.

#### 4 Threats and Management Issues

#### 4.1 Habitat alteration and fragmentation

Habitat alteration and fragmentation through the clearing of large areas of natural habitat for agricultural activities and urban development has destroyed or isolated many Davidson's Plum sub-populations.

As a result of isolation, the function of pollinators, seed dispersers, seed predators and herbivores may

have been interrupted and gene flow between many areas may have ceased.

A continuation of current trends in land clearing and urban expansion in Byron and Tweed Shires may result in further destruction and isolation of some sub-populations.

The Pacific Highway upgrade has isolated parts of the population and scheduled works will further fragment habitat.

#### Exotic weed infestation

Several Davidson's Plum sites located in remnant vegetation are threatened by exotic weed invasion. Exotic species compete with, and interrupt the recruitment of, seedlings, thus preventing them from reaching reproductive maturity. The most common weed species in Davidson's Plum habitat are Lantana and Camphor Laurel. In particular, Lantana is capable of overtopping and smothering both juvenile and adult plants.

#### Weed control activities

Bush regeneration activities involve the clearing and removal of weeds and the encouragement of natural regeneration. Unskilled clearing of weeds could damage individual plants of the Davidson's Plum, or its habitat. Such damage has been previously documented.

#### Fire

Although the Davidson's Plum is fire sensitive, fire is not considered to be a serious threat to the taxon as the species mainly occurs in riparian and rainforest areas. As fire has been recorded only infrequently in Brush Box forest, sub-populations in this vegetation community are unlikely to be threatened in the long term. Rail Infrastructure Corporation on occasion use fire as a tool to manage vegetation alongside railway tracks. This may negatively impact on individual Davidson's Plum plants.

#### **Road works**

The Davidson's Plum could be impacted upon by roadside slashing or road widening activities on road reserves at several localities.

Roadwork associated with the Pacific Highway upgrade has required the removal and translocation of 16 Davidson's Plum individuals during the Yelgun-Chinderah Pacific Highway Upgrade (Sinclair Knight Merz 1993) and up to 45 Davidson's Plum plants along the Brunswick - Yelgun section (Sinclair Knight Merz 1998). In this case translocation was undertaken in the absence of any other alternative. The overall effectiveness of the translocation effort has not yet been determined, however current records show that there has been a low rate of survival.

Further scheduled works for the Pacific Highway (Brunswick to Yelgun Upgrade) will impact on a further 12 individuals. Individuals will either be destroyed or translocated as they are located directly under the road footprint.

#### Grazing

Many Davidson's Plums occur as remnant trees in paddocks. A combination of dense pasture grass, grazing and trampling inhibit or prevent regeneration from isolated paddock trees, and open sites provides unfavourable conditions for seedling development. Flowers on the lower section of the trunks of paddock trees are often rubbed off by cattle (F. Eliott pers. comm.).

#### 4.2 Loss of genetic variation

Reduced and fragmented sub-populations are likely to suffer loss of genetic variation as a result of the loss of individuals containing unique genetic variants, inbreeding and genetic drift (Ellstrand & In the long term, loss of genetic Elam 1993). variation may threaten the evolutionary potential of the Davidson's Plum and reduce its ability to respond to alterations in its environment, including climate change. Further studies are required to measure the extent and spatial distribution of genetic variation, to relate such variation to fitness and reproductive success, and to understand determinants of the flow of genes within the population (pollination and seed dispersal systems). In the long term, the introduction of new genetic material to subpopulations may be considered.

#### 4.3 Genetic pollution

Genetic "pollution" of wild sub-populations is possible where Davidson's Plum is cultivated close to wild sub-populations. In the case of Davidson's Plum, genetic pollution is considered to occur where cultivated individuals sourced from other areas are introduced and pollination occurs between these individuals and naturally occurring individuals. Genetic pollution can also occur in the form of hybridisation between Davidson's Plum and Davidsonia pruriens.

While the introduction of new genetic material may be desirable where wild plants are isolated and in danger of losing variability through inbreeding and drift, such actions need to be carried out deliberately and only after suitable genetic investigation.

There is a more serious threat of the transfer of genetic material from the north Queensland D.

*pruriens,* also widely cultivated, into wild subpopulations of *D. jerseyana.* Slight overlap in flowering times between the two species make this possible (F. Eliott pers. comm.).

### 4.4 Collection for the bush food and nursery industry

Collection of fruit and seed from wild subpopulations may reduce the occurrence of natural regeneration. The increasing popularity of the Davidson's Plum as a bush food and as an ornamental plant has led to a subsequent rise in the collection of fruit and propagation material (mainly seed) from the wild sub-populations. Davidson's Plum trees are readily available through many nurseries and local markets. Plantations are being set in place to supply the demand for jam and other products.

#### 5 Previous Recovery Actions

#### 5.1 Surveys

Surveys of many sub-populations were carried out by Watson (1987) and by John Williams during studies supporting taxonomic revision of the genus Davidsonia (Harden & Williams 2000). In 1999, field surveys to establish the extent and health of the Davidson's Plum population were undertaken prior to writing of the Preliminary Draft Recovery Plan (McKinley & Stewart 1999). Due to funding constraints, surveying of all recorded populations was not possible. Priority was given to populations on public lands but where possible populations on easily accessible private lands were also surveyed. During these surveys, the numbers of individuals within each population were counted, population structure was assessed, opportunistic observations of flowering and/or fruiting were recorded, and habitat and threatening process details were recorded.

#### 5.2 On-ground management

No specific management of Davidson's Plum habitat has been undertaken apart from the translocation of plants affected by the Yelgun-Chinderah Pacific Highway upgrade and the Brunswick–Yelgun Pacific Highway duplication and upgrade. However, general habitat management (weed removal and fencing from stock) by private landowners and local Landcare groups has assisted the regeneration of Davidson's Plum habitat.

#### 5.3 Genetics

Although there is currently no information on genetic variation within the Davidson's Plum, preliminary comparisons of *Davidsonia* taxon at the species and variety level have been undertaken (F. Eliott pers. comm.). As protocols for DNA analysis in the genus have already been developed, future genetic studies will be cost effective.

An understanding of genetic variability in the Davidson's Plum is important for several reasons, including:

- detecting genetic structure within the species and identifying population boundaries;
- complementing information about pollination and breeding systems obtained through pollination studies;
- detecting fragmentation effects which may require management (e.g. elevated levels of selfpollination in isolated populations compared with connected patches);
- understanding the genetic significance of small sub-units and isolated individuals;
- ensuring that appropriate source material is used to adequately represent the genetic diversity of the species, should an *ex-situ* program be necessary; and
- understanding and managing the taxon's long term evolutionary potential.

#### 6 Proposed Recovery Objectives, Actions and Performance Criteria

The overall objective of this Recovery Plan is to arrest the decline of the Davidson's Plum and to return the species to a position of viability in nature in the long term.

Specific objectives of the Recovery Plan for the species are listed below. For each of these objectives a number of recovery actions have been developed, each with a performance criterion.

### Specific Objective 1: Co-ordinate the recovery of the Davidson's Plum

A co-ordinated approach is essential to oversee and assist in the implementation of the actions outlined in this Recovery Plan in a timely, cost-effective and efficient manner.

#### Action 1.1

The DEC will co-ordinate the implementation of the actions outlined in this Recovery Plan.

Performance criterion: The DEC has co-ordinated the recovery actions throughout the life of the Recovery Plan.

#### Action 1.2

The DEC will co-ordinate the establishment of a Davidson's Plum working group. This group will comprise relevant community representatives, and a representative from the DEC.

The Davidson's Plum populations are located across a wide range of tenures and many are located on private land. Effective implementation of the recovery actions for this plan will require the cooperation of landholders and managers. A Davidson's Plum working group will enable landholders and managers to be involved in the implementation of the recovery actions.

Performance criterion: A working group has been established and is operating within one year of the commencement of this Recovery Plan.

#### Action 1.3

The DEC will integrate recovery actions for the Davidson's Plum with those of other threatened species, population or ecological communities occurring in similar habitats.

A number of other threatened species, population or ecological communities are known or likely to occur in similar habitats to the Davidson's Plum. By integrating the recovery actions of other threatened biota with the Davidson's Plum, limited resources can be used more effectively.

Performance criterion: Where practicable, recovery actions have been integrated with those of other threatened species, populations or ecological communities.

#### Specific objective 2: Determine whether further wild sub-populations exist in NSW, and implement protective measures as appropriate.

The current known distribution of the Davidson's Plum is detailed in Section 3.3 of this Recovery Plan. Survey for the preparation of this Recovery Plan concentrated on investigating and confirming existing records, and limited survey in identified potential habitat. Managers of the Davidson's Plum habitat need to have a clear understanding of the actual and potential distribution of this species to make appropriate land-management decisions. There is therefore a need to conduct further survey in suitable habitat for Davidson's Plum that has not previously been targeted.

Future survey for the Davidson's Plum should be conducted in such a way that it:

- targets unconfirmed historic records and areas of suitable habitat in the Brunswick and Tweed catchments;
- involves all of the authorities and landholders responsible for managing the Davidson's Plum habitat; and
- results are communicated to the landholders/managers.

#### Action 2.1

The DEC will collate and review the results of all previous surveys, opportunistic records and monitoring programs that have been undertaken for the Davidson's Plum in order to identify and prioritise areas for future surveys.

Since the pre-recovery planning Davidson's Plum surveys were undertaken, additional information on sub-populations and habitat locations are likely to have become available. To ensure that future surveys are undertaken in the most efficient manner, it will be necessary to ensure that all current records are collated and priority areas for further work are identified.

Performance criteria: All available records are collated and a report provided to the species recovery coordinator and appropriate landholders and managers within the first year of the commencement of this Recovery Plan. Any records not already recorded on the Atlas of NSW Wildlife are placed into the Atlas.

Action 2.2 Subsequent to Action 2.1, the DEC will coordinate systematic surveys for new sub-populations of the Davidson's Plum.

To meet the Recovery Plans overall objective to arrest the decline of the Davidson's Plum, it is important that all remaining sub-populations are located and managed appropriately.

Any new sub-populations of the Davidson's Plum will be managed according to the actions in this Recovery Plan. An Atlas of NSW Wildlife data card will be lodged with the DEC Wildlife Data Unit upon the recording of any new sub-populations.

Performance criteria: Surveys to locate new subpopulations of Davidson's Plum are completed within one year of the commencement of this Recovery Plan. A report on all surveys conducted has been supplied to the species recovery coordinator and appropriate land holders and managers within two months of completion of the surveys. All new records are lodged with the Atlas of NSW Wildlife within two months of the surveys being completed.

### Specific objective 3: Research into the biology, ecology and genetics of the Davidson's Plum.

Key attributes of the biology of the Davidson's Plum and cultural heritage are currently unknown. A program of biological research, combined with *in-situ* measurement and observation, is required to systematically collect and analyse biological information concerning the Davidson's Plum and its habitat. This information will assist landholders/managers in making informed and appropriate management decisions.

#### Action 3.1

The DEC will encourage research into aspects of Davidson's Plum biology, ecology and genetics that will result in improved management of the species.

Areas of research will include but not be restricted to:

- research into gene-flow within and between stands of the Davidson's Plum with the long-term aim of guiding appropriate population enhancement and preventing genetic pollution of naturally occurring sub-populations;
- assessing natural recruitment at each subpopulation; and
- research into the breeding system of the Davidson's Plum to determine pollination ecology and seed dispersal mechanisms and biology.

Best management practice for protecting and conserving the Davidson's Plum is currently constrained by lack of knowledge regarding the species' biology, ecology and genetics. Appropriately designed research could significantly contribute the improved management practices and the long-term viability of the species.

Performance criterion: A research program has been developed within one year of the commencement of this Recovery Plan that encompasses these identified areas of research. This research program is underway within two years of the commencement of this Recovery Plan.

Specific objective 4: Gain an understanding of the cultural importance of the Davidson's Plum to Local Aboriginal Land Councils, Elders and other groups representing indigenous people.

Action 4.1

The DEC will support community consultation to identify the cultural importance of the Davidson's Plum

to Local Aboriginal Land Councils, Elders and other groups representing indigenous people from the area within which the Davidson's Plum has been recorded. This knowledge will be incorporated into the management of the species subject to consultation with and approval by the Aboriginal communities.

A number of Local Aboriginal Land Councils, Elders and other groups representing indigenous people occur in the area from which the Davidson's Plum has been recorded. These groups will be offered the opportunity to undertake internal research regarding the views and interests of the Aboriginal people they represent in relation to the Davidson's Plum.

Performance criterion: Research programs to identify the cultural importance of the Davidson's Plum has been initiated within two years of the commencement of this Recovery Plan. The information gained through these programs is incorporated into the management of this species for the life of this Recovery Plan.

## Specific objective 5: Manage and protect the Davidson's Plum and associated habitat from threatening processes.

Protecting the Davidson's Plum and its habitat from threatening processes will involve a combination of both long-term strategic planning initiatives and short-term direct on-ground activities. Habitat management in relation to the Davidson's Plum should aim to:

- maintain the current distributional range;
- maintain the continuity and connectivity of habitat supporting individuals within existing subpopulations;
- expand and connect existing small habitat islands;
- control exotic weeds in the habitat of the Davidson's Plum;
- exclude livestock from the habitat of Davidson's Plum;
- control collection of seed and propagating material from wild sub-populations; and
- minimise the impact of activities on the Davidson's Plum individuals and habitat.

#### Action 5.1

The DEC will notify all relevant landholders/managers that the Davidson's Plum is present on their land, and ensure they have access to information relevant to the conservation of the species. The DEC will liase with relevant landholders/managers to ensure that they are aware of the long-term voluntary protection measures and incentive programs available. Conservation management options include:

- the identification, nomination and declaration of Critical Habitat;
- the development of Voluntary Conservation Agreements (VCAs) under the NPW Act;
- Land for Wildlife and Wildlife Refuges under the NPW Act;
- Joint Management Agreements (JMAs) under the TSC Act; and
- Property Agreements under the NVC Act.

All protective measures will be developed in conjunction with, and require the consent of, the relevant landowner/manager.

Performance criterion: All landholders/managers are informed of the presence of Davidson's Plum on their land within six months of the commencement of this Recovery Plan and where landholders/managers are interested, consultation with regard to conservation management agreements have commenced.

#### Action 5.2

The DEC will distribute standard survey and environmental guidelines (Appendix 3) and the Davidson's Plum species profile (Appendix 4) to relevant councils and other landholders/managers.

A standard methodology and minimum survey effort should be undertaken when determining if the Davidson's Plum is present in or near an area of potential development. Presence of the species or its habitat should require implementation of effective mitigation measures, including protection of identified habitat, to reduce the impact of the proposed development or activity.

Performance criterion: That the guidelines and profiles have been distributed to all relevant landholders and managers within six months of the commencement of the Recovery Plan.

#### Action 5.3

The DEC will encourage the development of site-specific management plans for each population of the Davidson's Plum. The DEC will provide assistance in the preparation of these plans where requested.

Site-specific management plans will ensure that on ground works are designed to address the specific threats to Davidson's Plum at each location and that rehabilitation works are undertaken in a way which does not negatively impact on the species.

Strategies included in management plans for the species may consider habitat rehabilitation and

expansion, fire management, erosion control, and protection from livestock.

Performance criterion: That site-specific management plans are prepared and implemented for each sub-population within the life of the Recovery Plan.

#### Action 5.4:

The DEC will determine definitive buffer zone widths around naturally occurring sub-populations of the Davidson's Plum and will provide this information to relevant landholders/managers. The DEC will encourage landowners/managers to maintain buffer zones around naturally occurring sub-populations of the Davidson's Plum.

Buffers zones should be maintained to prevent the movement of genetic material between cultivated individuals (Davidson's Plum and Davidsonia pruriens) and naturally occurring sub-populations of the Davidson's Plum in order to prevent genetic Until results from research into the pollution. reproductive biology of the species allows definitive buffer zone widths to be determined (see Action 3.1), a precautionary approach will be adopted whereby the DEC will encourage landholders/managers to maintain buffer zones that are as wide as is practically possible.

Performance criteria: The DEC has encouraged landholders/managers to maintain buffer zones around naturally occurring sub-populations of the Davidson's Plum within one year of the commencement of this Recovery Plan. The DEC has determined definitive buffer zone widths within six months of results from relevant research becoming available (see Action 3.1) and provided this information to relevant landholders/managers.

#### Action 5.5

The DEC will ensure that collection of fruit and propagation material from the wild does not occur in an unsustainable manner, or in a manner which inhibits the recovery of the Davidson's Plum. The existing Guidelines for the Collection of Davidson's Plum species (Davidsonia johnsonii and Davidsonia jerseyana) for Produce and Propagation Purposes (Appendix 5) will be reviewed during 2004.

The DEC will, in consultation with the bush food and nursery industries, continue to implement the current licensing program for control of the collection of fruit and propagation material from wild sub-populations of the Davidson's Plum. The DEC will apply these guidelines when licensing the collection of fruit and propagation material. The review of the guidelines will be based on an assessment of the previous and current licensing of Davidson's Plum for commercial use.

Performance criterion: The DEC has implemented the current licensing program. The DEC has reviewed the guidelines during 2004.

#### Action 5.6

The DEC will develop and implement a community awareness strategy that will provide information on the species and threats to its conservation. Mechanisms and incentives available to ameliorate or eliminate these threats will be identified. This strategy will aim to identify a variety of target groups and provide relevant information at a level appropriate for each group.

Given the wide variety of tenure supporting the Davidson's Plum it is important that landholders, managers and the broader community are well informed about and involved with the management and conservation of the species.

Performance criterion: A community awareness strategy has been developed and implemented within the life of the plan.

#### Specific objective 6: Develop a contingency strategy to ensure the long-term survival of the Davidson's Plum

A contingency strategy will assist in preserving subpopulations should areas of habitat be unavoidably destroyed by development or other events, and will ensure the preservation of genetic material should catastrophic stochastic events occur.

#### Action 6.1

The DEC will encourage the maintenance of an ex-situ representative from each genetically distinct sub-population in an appropriate location.

The *ex-situ* sub-populations will be established and maintained at locations that are spatially remote from each other in order to reduce the potential occurrence of genetic pollution.

Performance criterion: That *ex-situ* representatives of each genetically distinct population are established within secure locations within two years of the commencement of this Recovery Plan.

#### Action 6.2

Representative genetic material from each subpopulation of the Davidson's Plum will be collected and stored at an appropriate institution.

Genetic material is stored as a security against destruction of sub-populations through development or catastrophic stochastic events.

Performance criterion: That genetic material from all genetically distinct sub-populations are collected and

held at an appropriate research institution within two years of the commencement of this Recovery Plan.

#### Action 6.3

In the event of a sub-population becoming threatened with extinction, the DEC will investigate the option of undertaking a translocation program.

In the event that a translocation program is deemed necessary, the DEC will negotiate with the appropriate landholder/manager or Botanic Garden to maintain the *ex-situ* collection. Translocation as a means of population conservation should only be considered when all other available options have been exhausted. Any translocation program should conform to the "Guidelines for the Translocation of Threatened Plants in Australia" (Australian Network for Plant Conservation Translocation Working Group 1997).

Performance criterion: Any translocation is undertaken using best practice and in accordance with the above guidelines.

#### 7 Implementation

Table 2 outlines the implementation of recovery actions specified in this plan for the period of five years from publication. The DEC will be responsible for the implementation of the Recovery Plan.

#### 8 Social and Economic Consequences

Implementation of the Recovery Plan should have social benefits for local communities, by increasing general public awareness of natural heritage values in NSW. The implementation of this Recovery Plan supports the principle of intergenerational equity.

The Davidson's Plum has cultural significance for many people of the north coast of NSW. The conservation of this species will allow the continuation of any cultural practices that relate to the species.

The implementation of this Recovery Plan supports the ongoing commercial use of this species by the bush food and the nursery industries within the constraints of the existing guidelines (Appendix 5).

The Recovery Plan promotes the conservation of threatened species on both public and private lands. Some minor alteration to land management practices will be encouraged to be undertaken by landholders/managers. This will lead to an increase in the biodiversity values of their land.

#### 9 **Biodiversity Benefits**

The preparation and long term implementation of Recovery Plans for threatened species, subpopulations and ecological communities, contributes to, and highlights the importance of, conserving biodiversity. The conservation of biodiversity has a number of wider community benefits. These include:

- provision and maintenance of a range of ecosystem processes;
- contributing to increased ecological knowledge of species, habitats and broader ecosystems; and
- cultural, aesthetic and spiritual biodiversity values.

The appropriate ecological management of the Davidson's Plum habitat will contribute to the conservation of several other Threatened and ROTAP species (Briggs and Leigh 1996) which have been recorded in, and adjacent to, known subpopulations. These include Crystal Creek Walnut (Endiandra floydii), Boppel Nut (Hicksbeachia Pea pinnatifolia), Thorny (Desmodium acanthocladum), Red Lilly Pilly (Syzygium Walnut hodgkinsoniae), Green-leaved Rose (Endiandra muelleri subsp. bracteata), Marblewood (Acacia bakeri) and Spiny Gardenia (Randia moorei).

#### **10** Preparation Details

The preliminary draft of this Recovery Plan was originally prepared by Annette McKinley and Barbara Stewart (Landmark Ecological Services P/L). The draft was finalised and taken through to approval stage by Pamela Gray, Threatened Species Officer (Northern), DEC.

#### **11 Review Date**

A major review of this Recovery Plan will occur within five years of the date of its publication.

#### **12 References**

Australian Network for Conservation Translocation Working Group 1997, *Guidelines for the Translocation of Threatened Plants in Australia,* Network for Plant Conservation, Canberra.

Barry, S. & Thomas, G. 1994, *Threatened Vascular Rainforest Plants of South-east Queensland*, A report submitted to the Australian Nature Conservation

Agency Endangered Species Program, Queensland Dept of Environment and Heritage.

Briggs, J.D. & Leigh, J.H. 1996, *Rare or Threatened Australian Plants*, CSIRO, Collingwood.

Ellstrand, N.C. & Elam, D.R. 1993, Population genetic consequences of small population size: Implications for plant conservation, *Annual Review of Ecology and Sytematics* 24, 217-42.

Floyd, A. G. 1989, *Rainforest Trees of Mainland South-eastern Australia*, Inkata, Melbourne.

Floyd, A. 1990, *Australian Rainforests in NSW*. vol. 1, Surrey Beatty, Chipping Norton.

Harden, G.J. (ed.) 2000, *Flora of NSW* vol. I, Revised edition, NSW University Press, Sydney.

Harden, G. J. & Williams, J.B. 2000, A revision of Davidsonia (Cunoniaceae), *Telopea* 8(4), pp. 413-28.

Hilton-Taylor, C. 2000, 2000 IUCN Red List of *Threatened Species*, IUCN, Gland, Switzerland and Cambridge, UK, xviii + 6c1 pp.

Maiden, J.H., 1899, *Native food-plants*, Agricultural Gazette of New South Wales, vol. 10, pp. 279-90.

McKinley, A.L. & Stewart, B.C. 1999, Field surveys to determine locations and distribution of Davidson's Plum (*Davidsonia pruriens var. jerseyana*), Report to NSW DEC, Landmark Ecological Services P/L, Suffolk Park.

Nicholson, N.J. & Nicholson, H.R.W. 1985, *Australian Rainforest Plants*, Terania Rainforest Publishing, The Channon.

NSW Scientific Committee 2001, Final determination to list 'Clearing of native vegetation' as a Key Threatening Process in Schedule 3 of the *Threatened Species Conservation Act* 1995 (gazetted 21/09/01).

Sinclair Knight Merz 1993, Yelgun-Chinderah Pacific Highway Upgrade Species Impact Statement, Report prepared for the NSW Roads and Traffic Authority.

Sinclair Knight Merz 1998, Proposed Duplication of the Brunswick Heads Bypass and Upgrade of the Pacific Highway Brunswick to Yelgun, Working Paper No. 7, Flora and Fauna Assessment, Report prepared for the NSW Roads and Traffic Authority.

Quinn, F.C., Williams, J.B., Gross, C.L. & Bruhl, J.J. 1995, *Report on Rare and Threatened Plants of Northeastern NSW*, NSW NPWS and Nature Conservation Agency. Watson, G.C. 1987, A Comparative Study of the New South Wales Members of the Family Davidsoniaceae (Bange) with a View to their Conservation and Development, course requirement for the Diploma in Natural Resources at the University of New England, Armidale.

#### 13 Acronyms Used in this Document

**dbh** – diameter at breast height

**DEC** – Department of Environment and Conservation (NSW)

**DIPNR** – Department of Infrastructure Planning and Natural Resources

**EP&A Act** – NSW Environmental Planning and Assessment Act 1979

**EPBC Act** – Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999

ESD – Ecologically Sustainable Development

**FNPE Act** – NSW Forestry and National Park Estate Act 1998

IFOA – Integrated Forestry Operations Approval

**LEP** – Local Environmental Plan

LG Act – NSW Local Government Act1993

**NPW Act** – NSW National Parks and Wildlife Act 1974

**NVC Act** – NSW Native Vegetation Conservation Act 1997

RF Act – NSW Rural Fires Act 1997

**ROTAP** – Rare or threatened Australian plant

**SEPPs** – State Environmental Planning Policy Policies

**SIS** – Species Impact Statement

TSL – Threatened Species Licence

**TSC Act** – NSW Threatened Species Conservation Act 1995

VCA – Voluntary Conservation Agreement

Action No:	Action Title	Priority	Estimated Cost/yr			Total Cost	Responsible party	In-Kind	Cash		
			Year 1	Year 2	Year 3	Year 4	Year 5				
1.1	Plan coordination	1	1 750	1 750	1 750	1 750	1 750	8 750	DEC	8 750	-
1.2	Develop working group	1	1 750	1 750	1 750	1 750	1 750	8 750	DEC	8 750	-
1.3	Coordination with other Recovery Plans	2	-	-	-	-	-	-	DEC	-	-
2.1	Review of previous surveys	1	1 750	-	-	-	-	1 750	DEC S	1 750	-
2.2	Survey identified areas	1	7 350	-	-	-	-	7 350	DEC	1 750	5 600
3.1	Research: biology, ecology, genetics	1	20 000	20 000	20 000	20 000	20 000	100 000	DEC	-	100 000
4.1	Cultural importance of the Davidson's Plum	1		9 000				9 000	DEC	-	9 000
5.1	Landholder/manager liaison	1	1 750	350	350	350	350	3 150	DEC	3 150	-
5.2	Survey and assessment guidelines	1	350	-	-	-	-	350	DEC	350	-
5.3	Management plans	1	1 050	1 050	1 050	1 050	1 050	5 250	DEC	5 250	-
5.4	Buffer zones	1	1 750	350	350	350	350	3 150	DEC	3 150	-
5.5	Industry consultation	2	1 050	1 050	1 050	1 050	1 050	5 250	DEC	5 250	-
5.6	Education and awareness	2	6 050	-	-	1050	-	7 100	DEC	2 100	5 000
6.1	Ex-situ sub-populations	1	2 750	1 000	1 000	1 000	1 000	6 750	DEC	1 750	5 000
6.2	Storage of genetic material	1	1 200	-	-	-	-	1 200	DEC	700	500
6.3	Translocation investigation*	3	-	-	-	-	-	-	DEC	-	-
Total			48 550	36 300	27 300	28 350	27 300	167 800		42 700	125100

#### Table 2. Estimated costs of implementing the actions identified in the Davidson's Plum Recovery Plan

Priority ratings are: 1- Action critical to meet plans objectives, 2-action contributes to meeting plans objectives, 3-desirable but not essential action

'In-Kind' Funds represent salary component of permanent staff and current resources, 'Cash' Funds represent the salary component for temporary staff and other costs such as the purchasing of survey and laboratory equipment \* To only be implemented in exceptional circumstances. Funding to be determined as required.

#### Appendix 1: Summary of Advice from the NSW Scientific Committee

Comment	Amendments made to Recovery Plan				
Section 1	Section 1				
1. Citing is for 2002. Plan exhibited in 2003.	<ol> <li>Text updated to include correct date.</li> <li>Text amended to reflect suggested changes.</li> </ol>				
2. Incorrect form of citing species and authority.	00 0				
Section 2	Section 2				
3. ROTAP listing is an unnecessary confusion.	3. Text amended to reflect suggested changes.				
Section 3	Section 3				
4. Description of fruit is confusing.	4. Noted. Text amended.				
5. Ants are unlikely to be pollinators.	5. Noted. Text amended.				
Section 4	Section 4				
6. Has there been a detailed study of the translocated trees?	6. Available information is provided in Section 4 of the Recovery Plan.				
<ol> <li>Quarantine zones are likely to be a major issue.</li> </ol>	7. Text amended to include actions that include research to assist in determining buffer zone widths and requiring the DEC to provide this information to landholders/managers as it becomes available.				
8. Is there a policy on when to allow collection? How were protocols determined? How many licences have been issued?	8. Protocols were developed through negotiation between the bush-food and nursery industries and the DEC. Seven licences have been issued				
Section 5	Section 5				
9. Survey priority to public land is practical in the short term but information is required on private land for long term management.	9. Noted. Recovery Plan includes actions to conduct further survey (see Action 2.1 and 2.2)				
Section 6	Section 6				
10. Will information on the Wildlife Atlas constitute a threat to the species?	10. Atlas records publicly available have a low level of accuracy. This is to provide site security.				
11. Do we know the conditions for and duration of seed storage?	11. Available information is outlined in Section 3.10 of the Recovery Plan.				
Section 8	Section 8				
12. No mention of Aboriginal interests or liaison.	12. Text amended to reflect suggested changes. Implementation of recovery actions under this plan will include consideration of the role and interests of indigenous communities in the region.				
19 More detail required on the networked	13. These concerns are addressed in Section 4, and Actions 4.4 and 4.5 of the Recovery Plan.				
<ul> <li>13. More detail required on the potential problems from commercial exploitation and widespread garden planting.</li> </ul>	14. The Recovery Plan recognises that two sub-populations are currently included within the reserve system.				
14. How many populations are present in conservation reserves?					

Appendix	2:	Public	Authority	Resp	onsibilities
· · · · · · · · · · · · · · · · · · ·	~ •	I UDIIC	1 Kutholity	Tropp	Unsignation

Public authority	Relevant responsibilities			
DEC	<ul> <li>Assessment of Section 91 licence applications under the TSC Act.</li> <li>Assessment of Section 120 licence applications under the NPW Act.</li> <li>Assessment of Section 132C licence applications under the NPW Act</li> <li>Assessment of proposed developments on DEC estate.</li> <li>Advice to determining and consent authorities, with a possible concurrence role under the EP&amp;A Act or NVC Act.</li> <li>Preparation of Recovery Plans and co-ordination of implementation.</li> <li>Regulation of certain forestry operations under the Integrated Forestry Operations Approval.</li> </ul>			
Relevant local governments	<ul> <li>Preparation of Local Environmental Plans under Part 3 of EP&amp;A Act.</li> <li>Consent authorities for development proposals under Part 4 of EP&amp;A Act.</li> <li>Approval authorities for council works under Part 5 of EP&amp;A Act.</li> <li>Responsibilities under the RF Act.</li> <li>Management of council reserves with potential habitat.</li> <li>Consideration of the content of Recovery Plans when preparing plans of management for community land under <i>Local Government Act</i> 1993.</li> </ul>			
Department of Infrastructure, Planning and Natural Resources	<ul> <li>Approval authority for native vegetation clearance applications under the NVC Act.</li> <li>Administration of property plans under the NVC Act.</li> <li>Management of crown land with potential habitat.</li> <li>Co-ordination of Regional Vegetation Committees, Catchment Management Boards and Landcare programs.</li> <li>Development of policy and strategies, including SEPPs, for land use planning and environmental assessment.</li> <li>Advice and assistance on environmental planning matters.</li> <li>Assessment of major development applications.</li> <li>Administration of the general conditions of IFOA.</li> <li>Concurrence role under the EP&amp;A Act for certain developments and activities.</li> <li>Making of SEPPs and LEPs under Part 3 of EP&amp;A Act.</li> <li>Determining certain development proposals under Part 4 of the EP&amp;A Act.</li> <li>Approval of certain activities under Part 5 of EP&amp;A Act.</li> </ul>			
State Forests of New South Wales	• Implementation of prescriptions detailed in IFOA terms of threatened species licence granted under Part 4 of the FNPE Act.			
Rural Fire Service	<ul> <li>Preparation of Bush Fire Risk Management Plans and Plans of Operations.</li> <li>Fire management.</li> </ul>			
Other State government agencies	<ul> <li>Management of public lands with potential habitat.</li> <li>Approval authorities for activity proposals under Part 5 of EP&amp;A Act.</li> </ul>			

#### **Appendix 3: Environmental Impact Assessment Guidelines**

#### Davidson's Plum (Davidsonia jerseyana)

#### **Introduction**

The following information is provided to assist authors of Species Impact Statements, development and activity proponents, and determining and consent authorities, who are required to prepare or review assessments of likely impacts on threatened species pursuant to the provisions of the NSW *Environmental Planning and Assessment Act* 1979 (EP&A Act).

#### **Description**

The Davidson's Plum is a slender tree to 10 m high, with few branches or with several stems from the base.

The leaves are alternate and mostly 35-80 cm long with irritant hairs present. Each leaf has 11-17 oblong-shaped leaflets, mostly 6-30 cm long and 3-10 cm wide.

The species has small dark pink to red flowers that are arranged on leaf stalks, usually borne on the main stem or older branches, and 4-10 cm long. Fruit are pear to oval-shaped, 33-45 mm long, 31-37 mm wide and 27-35 mm deep, blue-black, sparsely covered with golden-brown hairs. The fruit has a dark red flesh, and usually two large seed cases that are fibrous on the surface, each with a single seed (Harden & Williams 2000).

A full taxonomic description of the species is available in Harden (2000).

*Davidsonia jerseyana* may be distinguished from *D. johnsonii* (the other species of *Davidsonia* known from NSW) by its hairy leaves and pear shaped fruit.

#### Survey methods

Surveys for the Davidson's Plum may be undertaken at any time of year as presence of fruit or flowers is not necessary for accurate identification.

Survey for the Davidson's Plum should not be limited to areas within the existing distributional limits, and should have two objectives:

- 1. to determine presence/absence; and, where the plant is present,
- 2. to determine the size class structure at a site.

Targeted survey for this plant should be conducted in suitable habitat as outlined below. If a gully or side slope is being searched, the survey team should be spaced equally apart and survey along the slope of the gully. Surveys should include sheltered lower slopes, creek-lines, intermittent drainage lines, gully slopes, creek flats and flood plains in sheltered situations.

Where the Davidson's Plum is encountered, the number of stems in each clump should be counted and the plant heights measured. The size classes should be indicated by recording dbh (diameter at breast height) of all stems > 1 cm dbh. The number of stems < 1 cm dbh should be counted. The Davidson's Plum produces suckers and seedlings that are not easily differentiated in the field. It is often difficult to ascertain whether a clump of stems represents one clonal individual or a number of individuals. In these cases distance from the parent tree should be noted. Evidence of fruiting or flowering (eg. stalks of old fruit still remaining on the tree) should be noted for all sites.

#### Suitable habitat

#### Vegetation

The Davidson's Plum is found in coastal and lowland subtropical rainforest and wet sclerophyll forest, often with an overstorey including *Lophostemon confertus* (Brush Box), *Araucaria cunninghamii* (Hoop Pine) and/or eucalypt species. Species commonly occurring at Davidson's Plum sites include *Acacia bakeri* (Marblewood), *Cupaniopsis newmanii* (Longleaved Tuckeroo), *Endiandra globosa* (Black Walnut), *Eucalyptus microcorys* (Tallowwood), *Flindersia bennettiana* (Bennett's Ash), *Flindersia schottiana* (Cudgerie), *Pentaceras australe* (Crow's Ash), *Synoum glandulosum* (Scentless Rosewood) and the introduced *Cinnamomum camphora* (Camphor Laurel) (McKinley & Stewart 1999).

In several localities the Davidson's Plum is found in regrowth rainforest with a high percentage of Camphor Laurel, *Lantana camara* (Lantana) and other exotic weeds. Some trees are isolated in paddocks or in road reserves (McKinley and Stewart 1999).

#### Altitude, aspect and topographic preferences

The Davidson's Plum has been recorded at altitudes up to 300 m, however most records have been made at altitudes below 100 m. Slope and aspect vary. The majority of known sub-populations occur on south and east-facing slopes, with few individuals recorded from north-facing slopes (A. Benwell pers. comm.). Plants are generally found in clusters around sheltered lower hill slopes.

#### Geology and soil characteristics

Quinn *et al.* (1995) described the Davidson's Plum as occurring on red and yellow soils of poor structure, over Silurian greywacke, slate, phyllite and quartzite and most confirmed records are on these soils. Only one unconfirmed record (at Tomewin) is on krasnozem soils and two unconfirmed records are on podzols adjacent to krasnozems (Watson 1987).

#### Limit of known distribution

The Davidson's Plum is restricted to the Brunswick and Tweed River catchments of the north coast of NSW. The southern-most recorded is from near Mullumbimby.

Records extend only a short distance inland on the Brunswick River. The northern-most and western-most confirmed record is at Chillingham. There is an unconfirmed record further north near the border gate at Tomewin (Watson 1987).

There are no confirmed records for southern Queensland although Bailey (1895; 1898; 1900; 1909) recorded the taxon as occurring in that region.

The restricted distribution of the Davidson's Plum may be the result of large-scale clearing of its lowland sub-tropical rainforest habitat. The remaining habitat is fragmented and degraded.

The loss of individuals from the limits of the plant's distribution may result in a range contraction, further isolation, and potentially the loss of genetic diversity.

#### Life cycle of the species

The lifecycle of the Davidson's Plum is likely to be disrupted should any of the following occur:

Physical destruction of plants - The Davidson's Plum reproduces vegetatively but the extent that damaged plants may sucker is unknown. The plant's persistence may depend on the production and germination of viable seed. There is no dormancy period in seed of the Davidson's Plum and seed does not persist in the soil. Damage to plants may result from trampling and browsing by stock or inadvertently during land-clearing operations associated with agricultural activities. Plants may also be damaged during roadside or railway maintenance operations.

**Habitat modification** affects the lifecycle of the Davidson's Plum by altering the ecological processes that underpin the fitness of suitable habitat. Habitat modification may include: weed invasion, alteration to drainage, and introduction of grazing by domestic animals. Effects on other species which interact with the Davidson's Plum in processes such as pollination, herbivory and seed dispersal and predation will have indirect effects on the Davidson's Plum, although these are difficult to predict.

#### **Threatening processes**

As of February 2004 there are 20 Key Threatening Processes listed on the TSC Act. Of these, 'clearing of native vegetation' (NSW Scientific Committee 2001) is relevant to the Davidson's Plum. In addition to this Key Threatening Process, a range of other processes are recognised as threatening the survival of the species in NSW.

The evolutionary potential of the Davidson's Plum may be threatened as a consequence of (i) habitat alteration, (ii) habitat degradation, (iii) loss of genetic variation, (iv) genetic pollution, and (v) collection for the bush food and nursery industry.

#### Significant area of habitat

In assessing whether a significant area of habitat is to be modified or removed, the focus on assessment should be with reference to the areas of *known* habitat within the current distribution (ie is the area of habitat significant in relation to the existing distribution). The following factors should be considered in relation to determining whether a significant area of Davidson's Plum habitat exists:

- whether identified Davidson's Plum habitat is present and the area of habitat present;
- whether the habitat in question is located within or outside of the current distributional limits<sup>2</sup>;
- whether the habitat in question supports an apparent Davidson's Plum population, and the number, density and age structure of the individuals occurring there;
- the proximity of the habitat in question to the remainder of the Davidson's Plum population;
- whether the habitat in question is continuous between existing Davidson's Plum individuals and facilitates pollinator movement and recruitment;

 $<sup>^{\</sup>rm 2}$  If Davidson's Plum is located outside the current distributional limits, it is likely that such habitat would be considered significant.

- whether the habitat in question is subject to threat and the likelihood of ameliorating any existing threatening processes; and
- whether the habitat in question will be permanently or temporarily modified/removed.

#### Isolation/fragmentation

As a result of habitat fragmentation, many subpopulations have become isolated, thus interrupting the genetic flow between sub-populations. Isolated sub-populations are likely to suffer loss of genetic variation as a result of the loss of individuals containing unique genetic variants, inbreeding and genetic drift (Ellstrand & Elam 1993). In the long term, loss of genetic variation may threaten the evolutionary potential of the Davidson's Plum and reduce its ability to respond to alterations in its environment, including climate change.

#### **<u>Regional distribution of the habitat.</u>**

Davidson's Plum habitat occurs in coastal and lowland subtropical rainforest. Such vegetation communities are scarce within the range of Davidson's Plum, having largely been cleared for agriculture and development. The Davidson's Plum has also been found in regrowth rainforest with a high percentage of Camphor Laurel, Lantana and other exotic weeds. Remnant trees are often left in paddocks or in road and rail reserves. All lowland rainforest and wet sclerophyll forest communities on metasediments and soils derived from metasediments within and surrounding the range of the Davidson's Plum should be regarded as potential habitat.

#### **Critical habitat**

Critical Habitat has not been declared for Davidson's Plum.

#### For further information contact:

Davidsonia jerseyana Recovery Co-ordinator Threatened Species Unit (Northern) Department of Environment and Conservation Locked Bag 914 Coffs Harbour NSW 2450

#### **References**

Harden, G.J. 2000, (ed.) *Flora of NSW* Vol. I. Revised edition. New South Wales University Press, Sydney.

Harden, G. & Williams, J. B. 2000. A revision of Davidsonia (Cunoniaceae). *Telopea* 8(4), 413-428.

Quinn, F.C., Williams, J.B., Gross, C.L. & Bruhl, J.J. 1995, *Report on Rare and Threatened Plants of Northeastern NSW*. NPWS and Nature Conservation Agency.

McKinley, A.L. & Stewart, B.C. 1999. Field surveys to determine Locations and distribution of Davidson's Plum (*Davidsonia pruriens* var. *jerseyana*). Unpublished report to NPWS, Landmark Ecological Services P/L, Suffolk Park.

Watson, G.C. 1987. A Comparative Study of the New South Wales Members of the Family Davidsoniaceae (Bange) with a View to their Conservation and Development. Unpublished Report submitted in partial fulfilment of the requirements for the Diploma in Natural Resources at the University of New England, Armidale.

#### **IMPORTANT DISCLAIMER**

The Department of Environment and Conservation (NSW) expressly disclaim all liability and responsibility to any person, whether a purchaser or reader of this document or not, in respect of anything done or omitted to be done by any person in reliance upon the contents of this document although every effort has been made to ensure that the information presented in this document is accurate and up to date.

#### Appendix 4: Species Profile for the Davidson's Plum (Davidsonia jerseyana)

#### **Conservation Status**

The Davidson's Plum is listed as Endangered on both the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) and the NSW *Threatened Species Conservation Act* 1995 (TSC Act). The Davidson's Plum also has an assigned conservation code of 2ECi<sup>\*</sup> on the Rare or Threatened Australian Plants (ROTAP) species list (Briggs & Leigh 1996).

#### **Description**

The Davidson's Plum is a slender tree to 10 m high, with few branches or with several stems from the base.

The leaves are alternate and mostly 35-80 cm long, with irritant hairs present. Each leaf has 11-17 oblong-shaped leaflets, mostly 6-30 cm long and 3-10 cm wide.

The species has small dark pink to red flowers that are arranged on leaf stalks, usually borne on the main stem or older branches, and 4-10 cm long. Fruit are pear to oval-shaped, 33-45 mm long, 31-37 mm wide and 27-35 mm deep, blue-black, sparsely covered with golden-brown hairs. The fruit has a dark red flesh, and usually two large seed cases that are fibrous on the surface, each with a single seed (Harden and Williams 2000).

A full taxonomic description of the species is available in Harden (2000).

*Davidsonia jerseyana* may be distinguished from *D. johnsonii* (the other *Davidsonia* species known from NSW) by its hairy leaves and pear-shaped fruit.

#### **Distribution**

The Davidson's Plum is restricted to the Brunswick and Tweed River catchments of the north coast of NSW. The southern-most record is from near Mullumbimby.

Records extend only a short distance inland on the Brunswick River. The northern-most and western-most confirmed record is at Chillingham. There is an unconfirmed record further north near the border gate at Tomewin (Watson 1987).

There are no confirmed records for southern Queensland although the taxon has been recorded from that region.

The restricted distribution of Davidson's Plum may be the result of large-scale clearing of its coastal and lowland sub-tropical rainforest habitat. The remaining habitat is fragmented and degraded.

The loss of individuals from the limits of the plant's distribution may result in a range contraction, further isolation, and potentially the loss of genetic diversity.

#### Occurrences in conservation reserves

Davidson's Plum occurs within Brunswick Heads Nature Reserve and Billinudgel Nature Reserve. Other sites are on roadside reserves, lands managed by Tweed Shire Council, Byron Shire Council and on private lands.

#### <u>Habitat</u>

#### Vegetation

The Davidson's Plum is found in coastal and lowland subtropical rainforest and wet sclerophyll forest, often with an overstorey including Lophostemon confertus (Brush Box), Araucaria cunninghamii (Hoop Pine) and/or eucalypt species. Species commonly occurring at Davidson's Plum sites include Acacia bakeri (Marblewood), Cupaniopsis newmanii (Longleaved Tuckeroo). Endiandra globosa (Black Walnut), Eucalyptus microcorys (Tallowwood), Flindersia bennettiana (Bennett's Ash), Flindersia schottiana (Cudgerie), Pentaceras australe (Crow's Ash), Synoum glandulosum (Scentless Rosewood) and the introduced Cinnamomum camphora (Camphor Laurel) (McKinley & Stewart 1999).

In several localities the Davidson's Plum is found in regrowth rainforest with a high percentage of Camphor Laurel, *Lantana camara* (Lantana) and other exotic weeds. Some trees are isolated in paddocks or in road reserves (McKinley & Stewart 1999).

#### Altitude, aspect and topographic preferences

The Davidson's Plum has been recorded at altitudes up to 300 m, however most records have been made at altitudes below 100 m. Slope and aspect vary. The majority of known sub-populations occur on south and east-facing slopes, with only a few individuals recorded from north-facing slopes (A. Benwell pers. comm.). Plants are generally found in clusters around sheltered lower hill slopes.

<sup>\*</sup> **<u>ROTAP code</u>** - 2 = Geographic range in Australia less than 100 km, E = Endangered, C = at least one population in a conservation reserve, i = Less than 1000 plants are known to occur within a conservation reserve.

#### Geology and soil characteristics

Quinn *et al.* (1995) described the Davidson's Plum as occurring on red and yellow soils of poor structure, over Silurian greywacke, slate, phyllite and quartzite and most confirmed records are on these soils. Only one unconfirmed record (at Tomewin) is on krasnozem soils and two unconfirmed records are on podzols adjacent to krasnozems (Watson 1987).

#### **Threats**

As of February 2004 there are 20 Key Threatening Processes listed on the TSC Act. Of these 'clearing of native vegetation' (Scientific Committee 2001) is relevant to the Davidson's Plum. In addition to this Key Threatening Process, a range of other processes are recognised as threatening the survival of the species in NSW.

The evolutionary potential of Davidson's Plum may be threatened as a consequence of (i) habitat alteration, (ii) habitat degradation, (iii) loss of genetic variation, (iv) genetic pollution, and (v) collection for the bush food and nursery industry.

#### **Management**

A Recovery Plan including management actions has been prepared for the Davidson's Plum. The responsible party for carrying out these actions is the DEC.

#### For further information contact:

The *Davidsonia jerseyana* Recovery Co-ordinator Threatened Species Unit (Northern) Department of Environment and Conservation Locked Bag 914 Coffs Harbour NSW 2450

#### **References**

Briggs, J.D. & Leigh, J.H. 1996. *Rare or Threatened Australian Plants*. CSIRO, Collingwood.

Harden, G.J. (ed.) 2000. *Flora of NSW* Vol. I. Revised edition. New South Wales University Press: Sydney.

Harden, G. & Williams, J. B. 2000. A revision of Davidsonia (Cunoniaceae), *Telopea* 8(4), 413-428.

Quinn, F.C., Williams, J.B., Gross, C.L. & Bruhl, J.J. 1995. *Report on Rare and Threatened Plants of Northeastern NSW*. NPWS and Nature Conservation Agency.

McKinley, A.L. & Stewart, B.C. 1999. Field surveys to determine locations and distribution of Davidson's Plum (*Davidsonia pruriens* var. *jerseyana*). Unpublished report to NPWS, Landmark Ecological Services P/L, Suffolk Park.

Watson, G.C. 1987. A Comparative Study of the New South Wales Members of the Family Davidsoniaceae (Bange) with a View to their Conservation and Development. Unpublished report submitted in partial fulfillment of the requirements for the Diploma in Natural Resources at the University of New England, Armidale.

#### IMPORTANT DISCLAIMER

The Department of Environment and Conservation (NSW) and the editor expressly disclaim all liability and responsibility to any person, whether a purchaser or reader of this document or not, in respect of anything done or omitted to be done by any person in reliance upon the contents of this document although every effort has been made to ensure that the information presented in this document is accurate and up to date.

### Appendix 5: Guidelines for the Collection of Davidson's Plum Species (*Davidsonia johnsonii* and *Davidsonia jerseyana*) for Produce and Propagation Purposes

#### **Introduction**

The collection of plants from the wild can represent a potential threat to threatened species as well as local sub-populations of more common plants.

In order to guide persons wanting to collect plants from the wild and to facilitate the processing of licence applications for the collection of threatened plants, the NSW Department of Environment and Conservation (DEC) has developed a set of guidelines governing the collection of *Davidsonia* species (*Davidsonia johnsonii* and *D. jerseyana*) for produce and propagation purposes only.

#### Legislative requirements

#### **Section 91 Licence**

Under the NSW *Threatened Species Conservation Act* 1995 (TSC Act), a licence is required for activities which may result in any of the following actions involving threatened plants:

- picking a threatened species, population or ecological community;
- damaging Critical Habitat;
- damaging the habitat of a threatened species, population or ecological community.

The Director-General cannot compel anyone to apply for a section 91 licence. This is the choice of potential applicants who must weigh up the risks of not being protected by a licence for actions which may result in the harming or picking a threatened species, population or ecological community, and/or the damaging of habitat (including Critical Habitat) of a threatened species, population or ecological community.

Pick a native plant (including a threatened species, population or ecological community) means gather, pluck, cut, pull up, destroy, poison, take, dig up, remove or injure the plant or any part of the plant.

#### Section 95 certificates

Despite section 91 of the TSC Act, section 95 states that:

"if the Director-General determines that an action proposed is not likely to significantly affect threatened species, populations or ecological communities, or their habitats, a licence under this Act is not required and the Director-General <u>must</u>, as soon as practicable after *making the determination, issue to the applicant a certificate to that effect.* <sup>"3</sup>

### When does the Director-General need to make a determination as to significant effect?

Section 94(1) of the TSC Act requires that where a proposed action is not on land that is Critical Habitat and the application is not accompanied by a Species Impact Statement, the Director-General must determine whether the action proposed is likely to significantly affect threatened species, populations or ecological communities, or their habitats.

The factors to be considered when making this determination are contained in section 94(2) of the TSC Act.

Where the Director-General determines that the action proposed is likely to have a significant effect, the applicant must be notified that a Species Impact Statement (SIS) is required.

#### **Recommended procedures**

The following guidelines have been prepared by the DEC to ensure that collection of material of threatened *Davidsonia* species for produce and propagation purposes will not further threaten the survival of these species or a population of these species.

Adherence to these guidelines means that the activity is unlikely to have a significant effect on the threatened flora or their habitats. This will simplify the assessment process and should enable a Section 95(2) certificate to be issued.

If work additional to that prescribed in these guidelines is proposed, the DEC must further consider the likely significance of impact of the proposal, and may require preparation of an SIS.

#### The application process

For activities that require a section 91 licence, a completed and signed application form is to be submitted. Attachment A contains a copy of the licence application form.

The application form specifies the information that must be provided in order for the DEC to determine the application.

Regardless of the type of action proposed, an applicant must address items 12 to 17. This is a

<sup>&</sup>lt;sup>3</sup> The functions of the Director-General have been delegated to the TSU Manager CPP (Northern) and Manager BMU.

statutory requirement pursuant to section 92(3) of the TSC Act where the action proposed is not on land that is Critical Habitat or where the application is not accompanied by a SIS.

Items 18 to 25 have been included in the application form to assist DEC officers make an assessment as to the significance of the potential impact of the proposed action. For activities involving the picking of threatened *Davidsonia* species for produce and propagation purposes, many of the items will not be relevant but can be addressed by reference to the guidelines.

#### Application fee

An application fee of \$30.00 has been set by the DEC for section 91 licence applications. This fee must accompany the application form.

#### Incorporation of guidelines into application

The DEC encourages applicants to incorporate the following guidelines into all aspects of the application as measures to avoid or ameliorate the effect of the action.

The guidelines should be attached to the completed application form to the DEC for processing.

The applicant should clearly articulate on the Section 91 licence application that he/she will comply with attached guidelines and that they form part of the application. This should be done in writing.

Where the guidelines are not attached to the section 91 licence application, the DEC is likely to require additional information and processing of the application is likely to be delayed.

#### **Processing the licence application**

#### Statutory consideration

As discussed previously, the TSC Act provides that the Director-General, when considering a section 91 licence application which is not accompanied by a SIS, must determine whether the action proposed is likely to significantly affect threatened species, populations or ecological communities, or their habitats.<sup>4</sup>

In making this determination, the Director-General must take into account the factors provided in section 94(2) of the TSC Act.

#### How do the guidelines apply?

The DEC has considered the following issues in developing the attached guidelines:

- The assumption that rats and birds take all the fruit that is not collected. It may be that this is natural dispersal and of benefit to the species.
- Any fruit that falls to the ground and germinates is generally not suitable for produce but may be for propagation.
- The people wild-picking the species can collect and already have invaluable information about the species.
- The long-term conservation outcomes from the implementation of the conditions of the guidelines.

Therefore, the DEC considers adherence, by applicants, to the guidelines is unlikely to have a significant effect on the threatened *Davidsonia* species in the long term.

Therefore, a Section 91 licence is unlikely to be required and a Section 95(2) certificate is likely to be issued.

#### **Duration of certificates**

Generally, certificates will only be issued for a maximum of 12 months. Consideration will be given to applications for periods beyond 12 months.

Any certificate issued may be revoked should the certificate holder fail to abide by the conditions the certificate was issued under or information becomes available that implies the activity is having a significant impact on the threatened *Davidsonia* species.

#### <u>Guidelines for the Collection of Material</u> <u>from Threatened Davidsonia species for</u> <u>Produce and Propagation Purposes</u>

#### **Basic guidelines**

- 1. Know the threatened species, populations and ecological communities likely to be in the area. Avoid any impacts to these species etc.
- 2. NO collections of material are to be made from lands controlled by the DEC (this includes National Parks, Nature Reserves and some State Recreation Areas).
- 3. Prior to commencing any collecting of material of the threatened plants on lands other than those controlled by DEC, permission should be obtained from the relevant landowner or land manager.
- 4. Avoid unnecessary damage to sites or plants. Beyond any existing formed roads, access to sites must be by foot. No more than 6 visits to a site

<sup>&</sup>lt;sup>4</sup> Section 94(1) TSC Act.

in one season. Unlimited visits may be made to isolated paddock trees.

#### **Collecting material for Produce Purposes**

- 1. No collections will be made from plants with less than 20 fruit.
- 2. No more than 90% of fruit will be taken from any one plant in a season. A minimum of 20 fruit will be left on individual plants.
- 3. Be alert to the presence of seedlings of threatened species, including *Davidsonia* species and avoid trampling them. Any seedlings observed will be reported to the DEC. No seedlings will be removed.
- 4. Avoid damage to the tree during harvesting. No native plants are to be damaged.
- 5. If using pruning poles, ensure collection is undertaken using clean secateurs.
- 6. Information on the sites that were harvested, the amount of fruit collected and left on tree is to be provided to the DEC after the harvesting season and before 30 June each year. The certificate will be revoked if this reporting is not provided by this date.

#### **Collecting material for propagation purposes**

#### Cuttings

- 1. The following data are to be provided to the DEC by 30 June each year:
  - location of source material;
  - holding location of propagated plants;
  - propagation techniques; and
  - success.
- 2. Cuttings for propagation are only to be taken from healthy individuals.
- 3. A maximum of 10% of material may be taken from each plant for the purpose of taking cuttings for propagation.
- 4. No more than two (2) suckers of the Davidson's Plum are to be taken from a site where greater than 20 suckering stems are present. No suckers may be taken from sites with less than 20 stems.

Seed

1. Seed will be provided for propagation from wild collections for produce. Data to be provided to the DEC by 30 June each year includes: location of source material; distribution of seed; holding location of propagated plants; propagation techniques and success.

- 2. Material in plantations that originated from wild-picked seed or cuttings will be available to the DEC if requested. This material would be used for implementation of programs in the Recovery Plans for the species.
- 3. A maximum of 10% of fruit on the ground may be collected for propagation purposes.
- 4. No more than two visits to each site may be made for either seed or cutting collection for propagation purposes. If attempts at propagation are unsuccessful the DEC should be advised and written permission obtained for further visits.

### Collecting samples for voucher herbarium specimens

- 1. For all sites visited where no herbarium specimens exist, collections are to be made of the *Davidsonia* species. A specimen is to be lodged with the National Herbarium at the Royal Botanic Gardens Sydney.
- 2. Specimens are to be removed using clean, sterile secateurs to ensure a clean and neat cut scar is left on sampled plants and that the possibility of transferring plant diseases is reduced.
- 3. When collecting a cutting for a specimen, take one sample large enough to identify the species and to make a standard size herbarium specimen.
- 4. A site assessment form must be completed at each site and provided both to the DEC the National Herbarium (with the specimen for lodging).
- 5. A Wildlife Atlas card will be completed for other threatened species detected.

#### **Data Records**

- 1. Once identification has been confirmed, any records of threatened species will be provided to the DEC in a format appropriate for entry into the DEC Atlas of NSW Wildlife within three months of collection.
- Any person who becomes aware of new plant species records for NSW or populations considered likely to extend the known range of any species is to provide such information to the DEC and Royal Botanical Gardens within three (3) months of becoming aware of the new information.

#### **Additional Site Works**

1. Site improvement such as weed removal around plants will be undertaken.

2. *Davidsonia* plants will not be planted at wild subpopulations unless in accordance with a translocation program approved by the DEC.

#### Notes

The DEC may prohibit, condition, or limit collecting for some species at some sites if the collecting would affect research plots. Other conditions or prohibitions may apply after consideration of population estimates, age structure, viability and health of the population or individuals. Where any doubt exists as to the advisability of permitting the collection or the level of collection to be permitted, a precautionary approach shall be enforced.

Should you require any further information please contact the DEC Threatened Species Unit (Northern), on (02) 66515946.



Department of Environment and Conservation (NSW)