



# Recovery Plan for *Elaeocarpus williamsianus*



**Draft for Public Comment**  
**February 2004**



**Natural Heritage Trust**  
*Helping Communities Helping Australia*  
A Commonwealth Government Initiative

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This plan should be cited as follows:

Department of Environment and Conservation (NSW) 2004, *Draft Recovery Plan for Elaeocarpus williamsianus*, Department of Environment and Conservation (NSW), Hurstville.

**ISBN: 0 7313 6728 6**

# Recovery Plan for *Elaeocarpus williamsianus*

## Foreword

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The New South Wales Government established a new environment agency on 24 September 2003, the Department of Environment and Conservation, 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 National and New South Wales State Recovery Plan for *Elaeocarpus williamsianus* and, as such, 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 *Elaeocarpus williamsianus* in nature and the parties who will undertake these actions.

*Elaeocarpus williamsianus* is listed as Endangered on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Endangered on the New South Wales *Threatened Species Conservation Act 1995*. *Elaeocarpus williamsianus* is a small rainforest tree with a highly restricted distribution in the north-east of NSW. Eight of the nine known populations consist of a single clone, the other population consists of two clones which form two sub-populations separated by a creek line. Only two populations of *E. williamsianus* occurs within a conservation reserve, one occurs in a council road reserve and all other populations occur on private property that have been subject to clearing.

The future recovery actions detailed in this Recovery Plan include: (i) surveys and monitoring, (ii) habitat and threat management, (iii) research into the biology and ecology of the species, and (iv) investigating the need for translocation.

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).



**TONY FLEMING**

Acting Director-General

## Acknowledgments

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Preparation of this Recovery Plan has involved the combined effort of a number of people who have contributed to the survey and research on the species. The Department of Environment and Conservation (NSW) would like to thank these people:

Property owners who have supported and assisted in the management of populations of *Elaeocarpus williamsianus* on their land.

Kersten Tuckey (Department of Environment and Conservation (NSW)) who prepared this Recovery Plan. Maria Matthers and Andrew Steed (Department of Environment and Conservation (NSW)) who contributed to the management of the species and the development of recovery actions. Katrina McKay for formatting and editing.

Maurizio Rossetto (Botanic Gardens Trust), Caroline Gross (University of New England), Rebecca Jones (Southern Cross University) and John Hunter (Department of Environment and Conservation (NSW)) who have undertaken research into the genetic composition, seed production and viability of the species and assisted in the development of recovery actions for the species.

Rob Kooyman who assisted in the development of recovery actions for the species.

Hank Bower (Byron Shire Council) who discussed management actions and undertook weed control work for the population managed by Byron Shire Council.

Leza Bennets, Daryl Wittica, Chris Kupsch and Anni Bundock who provided information on population locations and propagation.

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## 1 Introduction

*Elaeocarpus williamsianus* Guymmer (Guymmer 1983) is only known from nine populations occurring in north-eastern New South Wales (NSW). Each population consists of a number of clonal stems with usually one genetic individual occurring at each site. Only one population is known to contain two genetic individuals. The species was first recorded in 1980 and was named in honour of Mr J. B. Williams for his contribution to rainforest botany in NSW.

This document constitutes the formal National and State Recovery Plan for *Elaeocarpus williamsianus* and, as such, considers the requirements of the species across its known range. It identifies the actions to be taken to ensure the long-term viability of *E. williamsianus* in nature and the parties who will undertake these actions. The attainment of the objectives of this Recovery Plan is subject to budgetary and other constraints affecting the parties involved. The information in this Recovery Plan is accurate to December 2003.

This plan has been prepared by the Department of Environment and Conservation (NSW) (DEC) in consultation with the Botanic Gardens Trust, Byron Shire Council, Tweed Shire Council, private land holders and other interested parties.

## 2 Legislative Context

### 2.1 Legal Status

*Elaeocarpus williamsianus* is listed as Endangered on the NSW *Threatened Species Conservation Act 1995* (TSC Act) and as Endangered on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The species is also listed as Endangered on the International Union for Conservation of Nature and Natural Resources (IUCN) Red List 2002.

Recent research on *Elaeocarpus williamsianus* suggests the species qualifies for a conservation status of Critically Endangered under the IUCN Red List 2002 and the EPBC Act (Appendix 1).

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

#### Recovery plan preparation, exhibition and implementation

The TSC Act and the NSW *Threatened Species Conservation Amendment Act 2002* (hereafter referred to jointly as the TSC Act) provides a legislative framework to protect and encourage the recovery of Endangered and Vulnerable Species,

Endangered Populations and Endangered and Vulnerable Ecological Communities in NSW. Under this legislation the Director-General of the DEC has a responsibility to prepare Recovery Plans for all species, populations and ecological communities listed as Endangered or Vulnerable on the TSC Act schedules. The TSC Act includes specific requirements for both the matters to be addressed by Recovery Plans and the process for preparing Recovery Plans. This Recovery Plan satisfies these provisions.

This draft Recovery Plan will be placed on public exhibition and submissions invited from the public. To make your submission as effective as possible, please:

- refer to the section or action of the plan you wish to address;
- briefly explain the reasons for your comments, providing source information or examples where possible; and
- provide your name and address to enable receipt of your submission to be acknowledged.

Submissions may be made as letters or other documents, or on the DEC form 'Submission: Draft Recovery Plan'. This is available in Appendix 2 of the plan, at the DEC Northern Directorate, or on the DEC website [www.nationalparks.nsw.gov.au](http://www.nationalparks.nsw.gov.au).

The DEC will consider all submissions to this Recovery Plan received during the exhibition period and must provide a summary of those submissions to the NSW Minister for the Environment prior to final approval of the plan. Submissions on this draft plan may contain information that is defined as 'personal information' under the NSW *Privacy and Personal Information Act 1998*, which identifies the person providing the submission. Following adoption of the Recovery Plan by the Minister copies of all submissions, including personal details, will be available for public inspection. If any person wishing to prepare a submission does not want personal details to become public, the submission needs to be clearly marked that personal details are to remain confidential. All submissions are stored in the DEC records system.

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 *Elaeocarpus williamsianus* in NSW are the responsibility of the DEC. Other public authorities may have statutory responsibilities relevant to the conservation and protection of *E. williamsianus*. Public authorities with core legislative responsibilities relevant to the protection

and management of *E. williamsianus* and its habitat are listed in Appendix 3.

### Consultation with indigenous people

Local Aboriginal Land Councils, Elders and other groups representing indigenous people in the areas where *Elaeocarpus williamsianus* occurs have been identified and a copy of the draft Recovery Plan sent to them. Their comments on this draft have been sought and will be considered in the preparation of the final Recovery Plan. It is also 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.

To date, Critical Habitat has not been declared for the species under the TSC Act. An assessment of the need to identify Critical Habitat will be undertaken as a recovery action in this plan.

### Key Threatening Processes

As of February 2004 there are 22 Key Threatening Processes listed on the TSC Act. Of these (a) high frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and (b) clearing of native vegetation are relevant to *Elaeocarpus williamsianus*. In addition to these Key Threatening Processes, a range of other processes are recognised as threatening the survival of the species in NSW and are discussed in Section 4.

### Licensing

Any development or activity not requiring consent or approval 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 pick *Elaeocarpus williamsianus*, or damage 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 SIS is required.

### Other conservation measures

The TSC Act includes provision for other measures that may be taken to conserve *Elaeocarpus*

*williamsianus* 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 National 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 that 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.

This Recovery Plan does not specifically identify habitat that is critical to the survival of *Elaeocarpus williamsianus*. However, the distribution, habitat and ecological information included in this plan (Sections 3.2, 3.4 and 3.6) would assist the Commonwealth Minister for the Environment 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 *Elaeocarpus williamsianus* is listed Nationally on 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 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 *Elaeocarpus williamsianus* includes the following:

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

The interaction of the above legislation with the TSC Act with respect to *Elaeocarpus williamsianus* is varied. The most significant implications are described below.

##### ***National Parks and Wildlife Act 1974***

The NPW Act is administered by the DEC. Under this Act it is an offence to ‘harm’, ‘pick’ or knowingly ‘damage the habitat of’ *Elaeocarpus williamsianus*. Certain circumstances may provide a defence from prosecution, including where actions are approved under the EP&A Act or NVC Act or licensed by the DEC under the NPW Act or TSC Act.

The NPW Act allows for the reservation of areas as national parks, nature reserves and other categories of protected area under the management of the DEC. Two reserves in NSW, Mooball National Park and Inner Pocket Nature Reserve, provide important habitat for *Elaeocarpus williamsianus*.

Owners of private property with significant habitat values for *Elaeocarpus williamsianus* may enter into Voluntary Conservation Agreements (VCAs) under the NPW Act whereby the DEC can provide assistance in the protection and management of these values on the property. Properties under VCAs may also qualify for rate exemptions.

##### ***Environmental Planning and Assessment Act 1979***

This Act provides for the consideration of *Elaeocarpus williamsianus* in land use planning issues. Areas providing important habitat for *E. williamsianus* can be protected under appropriate environmental zoning in Local Environmental Plans prepared under Part 3 of the EP&A Act.

Consent and determining authorities are required to consider potential impacts on *Elaeocarpus williamsianus* and its habitat when considering an activity or development proposal under Part 4 or Part 5 of the EP&A Act. An action included in this Recovery Plan is the preparation and dissemination of environmental impact assessment guidelines for *E. williamsianus*, to assist consent and determining authorities and environmental consultants in undertaking tests of significance under Section 5a of the EP&A Act.

Where a consent or determining authority considers that a proposed development or activity may result in a significant effect on *Elaeocarpus williamsianus* or its habitat, a SIS is required to be provided and approval cannot be granted without the concurrence of the Director-General of the DEC.

##### ***Local Government Act 1993***

The NSW *Local Government Act 1993* (LG Act) requires councils to have regard for the principles of ecologically sustainable development. Section 8(1) of the LG Act requires a council to manage, develop, protect, restore, enhance and conserve the environment of the area for which it is responsible, in a manner that is consistent with and promotes the principles of sustainable development. This includes the integration of biodiversity considerations into the decision-making process. The LG Act also requires that Recovery Plans be taken into account when preparing management plans for community land.

##### ***Native Vegetation Conservation Act 1997***

The clearing of native vegetation in NSW is subject to consent from the Department of Infrastructure, Planning and Natural Resources (DIPNR) in accordance with the NVC Act. This Act is integrated with the EP&A Act, and requires that threatened species such as *Elaeocarpus williamsianus* are taken into account by the DIPNR when considering clearing applications under Part 4 of the EP&A Act.

Where an activity or development that may impact upon *Elaeocarpus williamsianus* or its habitat is not subject to approval under the EP&A Act, an approval may nevertheless be required under the NVC Act or the TSC Act. These approvals should take this Recovery Plan into consideration.

Landholders may enter into Property Agreements with the DIPNR whereby government assistance can be provided to protect significant native vegetation.

#### **Forestry and National Park Estate Act 1998**

In NSW, an Integrated Forestry Operations Approval (IFOA) granted under part 4 of the NSW *Forestry and National Park Estate Act 1998* (FNPE Act) regulates the carrying out of certain forestry operations, including logging, in the public forests of a region. The terms of the Threatened Species Licence of the IFOA outline the minimum protection measures required to limit the impact of forestry activities on threatened species and their habitats and forms the basis for DEC regulation of those activities. The Threatened Species Licence for the Upper and Lower North East Regions (1999) include measures for the protection of *Elaeocarpus williamsianus* in north-eastern NSW.

#### **Rural Fires Act 1997**

The NSW *Rural Fires Act 1997* (RF Act) requires that all parties involved in fire suppression and prevention must have regard to the principles of ecologically sustainable development when exercising their functions and when preparing Plans of Operations and Bush Fire Risk Management Plans. Consideration of the principles of ecologically sustainable development must include the conservation of biological diversity and ecological integrity. Within this, consideration must be given to the impact on threatened species and their habitats, including *Elaeocarpus williamsianus*.

#### **Rural Fires and Environmental Assessment Legislation Amendment Act 2002**

The NSW *Rural Fires and Environmental Assessment Legislation Amendment Act 2002* amends the RF Act and several environmental assessment-related Acts. This Act provides for mapping bush fire prone lands and the development of a Bush Fire Environmental Assessment Code. This code is aimed at streamlining the assessment process for hazard reduction works. To this end, the Code will include general ameliorative prescriptions and, in some cases, species specific prescriptions. Threatened species and their habitats are one of the items considered in the code.

#### **Rural Lands Protection Act 1998**

The NSW *Rural Lands Protection Act 1998* makes provision for the preparation of draft Function Management Plans for all Travelling Stock Reserves. These plans must have regard to the conservation of wildlife, including threatened species, populations and ecological communities and their habitat.

### **3 Species Information**

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#### **3.1 Description and taxonomy**

*Elaeocarpus*, the largest genus of the family Elaeocarpaceae, has about 350 species distributed in temperate, sub-tropical and tropical zones throughout south-east Asia, Australia, Chile, New Zealand and the West Indies. The majority of the 21 species occurring in Australia are endemic, with eight of these being found within NSW (Harden 2000; Rossetto *et al.* 2003).

*Elaeocarpus williamsianus* is a small rainforest tree that can grow up to 16 m in height and is often multi-stemmed. The leaves are alternate but tend to be clustered at the ends of branches in pseudo-whorls. They are simple, with eight to ten pairs of inconspicuous irregular broad teeth, broadly oblanceolate, 9–17 cm long, rounded at the tip and tapering quickly to the base. The upper surface of the leaf is dark-green, glossy and smooth except for the basal half of the midrib, which is rusty-brown. The under surface is dull and covered in dense rusty-brown hairs. Petioles are 23–32 mm long, densely hairy, swollen and slightly bent where the leaf base is attached. Inflorescences are 11–16 flowered, 2.5–5 cm long and borne on rusty axillary racemes near the ends of branchlets or in the axils of the upper leaves. Flowers are pale-green and pendulous and flowering occurs between November and December. The fruit is a globular Prussian blue drupe, 2–3 cm long and resembles that of *E. grandis*. Fruit is ripe from April to July and occasionally November to December (Floyd 1989; Harden 2000).

#### **3.2 Distribution**

*Elaeocarpus williamsianus* is currently known from nine populations in north-eastern NSW extending from the Tweed Valley, south to the Byron Bay area. The known range for the species covers an area of approximately 50 km north-south by 30 km east-west.

#### **3.3 Land tenure**

*Elaeocarpus williamsianus* is only known to occur within the Byron and Tweed local government areas. Six populations occur on privately owned lands, one population occurs within a road reserve managed by Byron Shire Council and two sites occur in conservation reserves. These reserves are Mooball National Park and Inner Pocket Nature Reserve.

#### **3.4 Habitat**

*Elaeocarpus williamsianus* occurs along the coastal range within Notophyll vine rainforests and wet

sclerophyll ecotones on metasediment-derived soils (Hunter *et al.* 1991). The species is typically found on steep and eroding slopes at low altitude in gullies, toe slopes, steep drops adjacent to creeks and the headwater areas of creeks. Common dominant canopy species include Camphor Laurel (*Cinnimomum camphora*), Brush Box (*Lophostemon confertus*) and Flooded Gum (*Eucalyptus grandis*). Other dominant species include Lantana (*Lantana cammara*) and Black Apple (*Planchonella australis*) (Kooyman 2003).

### 3.5 Climate

The climate over the range of *Elaeocarpus williamsianus* is subtropical with a well-defined summer-autumn wet season. The driest months are August and September and rainfall is generally in excess of 2000 mm per year. Humid winds from the south-east prevail in summer, and dry west to north-westerlies in the winter and spring. Temperature ranges from an average annual minimum of 15°C to an average annual maximum of 26°C (Commonwealth of Australia 2003).

### 3.6 Life history and ecology

#### Genetics

Recent genetic work by Rossetto *et al.* (2003) has looked at the genetic variation within seven populations of *Elaeocarpus williamsianus*. This study found that six of the populations examined contained a single genet, or genetic individual, and that all plants within the population were clones. The seventh population contained two genets that formed sub populations occurring on separate escarpments on either side of a creek line. The two populations that were not examined were subsequently found to also contain only a single genet (M. Rossetto pers. comm. 2003).

#### Population structure

Within each population clones are thought to be the result of vegetative reproduction (Rossetto *et al.* 2003). The diversity between *Elaeocarpus williamsianus* ramets, distinct stems but part of a clone, and the area which some of them occupy (up to 300 m across) suggest that some clones must have survived for a considerable period of time. Most populations have a range of size classes of ramets ranging from small suckers to mature individuals. Some of these ramets are still interconnected whereas some have become isolated from the parent tree. The sharing of resources between interconnected ramets may create a competitive edge and enhance survival potential for new stems (Rossetto *et al.* 2003).

#### Pollination and seed dispersal

The pendulous flowers of *Elaeocarpus williamsianus* are likely to be mostly insect pollinated, however, flying foxes have also been observed feeding on *Elaeocarpus* blossoms (Russ 1999). Research carried out by Gross (1996) at two *E. williamsianus* populations found that fruit could be produced without pollen vectors but that no seed were detected in any of the fruit. As a result of fragmentation the majority of pollination events will involve self-pollination between ramets.

Bats and native pigeons extensively consume *Elaeocarpus* drupes and are thought to be major seed dispersers (Russ 1999).

#### Seed productivity and viability

Research into seed production and germination at two populations of *Elaeocarpus williamsianus* found large variation in the fecundity within and between the sites. No seed germinated in the trials despite the application of a number of germination methodologies (Gross 1997; NPWS 1998).

Further investigations into seed production and viability were carried out at four *Elaeocarpus williamsianus* populations (Rossetto *et al.* 2003). Fruit were produced in all four populations, however sterile fruits were common and seed was only produced at the multi-clonal site. Seeds produced at this site were generally shrivelled and only two trees commonly produced healthy looking seed. None of the seed responded to germination trials, although 100% of seed from one of the trees producing healthy looking fruit and 40% of seed from another were viable according to tetrazolium tests.

Although the two clones at the multi-clonal site are genetically different they are the most closely related of all the clones (Rossetto *et al.* 2003). The possible reason for low seed production at this site is that inbreeding depression is preventing successful sexual reproduction between the two clones. The fact that no seed was produced at sites containing a single clone suggests that *Elaeocarpus williamsianus* does not self-fertilise and that a self-incompatibility system may be in place (Rossetto *et al.* 2003).

#### Disturbance

Clearing and habitat fragmentation throughout the range of *Elaeocarpus williamsianus* has been widespread. It is thought that these factors have significantly contributed to changing the original balance between sexual and vegetative reproduction in the species by isolating populations and reducing the number of genetic individuals. Fragmentation of the species into small isolated sites and disturbance from agricultural and logging activities are thought

to have favoured the persistence of a single clone at each site. It is only within the largest and least disturbed site that two genets can be found (Rossetto *et al.* 2003).

All *Elaeocarpus williamsianus* populations are located either on disturbed sites, on steep and actively eroding slopes, or areas that have been subject to clearing. Vegetative dispersal in this unstable environment may provide a competitive advantage over species that rely on the establishment of seedlings. Vegetative dispersal can result in increased stability of new stems and allow transfer of nutrients between stems. However, reliance on clonality alone can increase susceptibility of a species to extreme environmental and climatic changes, as well as stochastic factors (such as the introduction of new pathogens).

### Origin and distribution

Rossetto *et al.* (2003) suggests the most probable explanation of the origin and distribution of *Elaeocarpus williamsianus* results from a former balance between sexual and vegetative propagation. The diversity recorded between populations of *E. williamsianus* is most likely the consequence of sexual reproduction, rather than the result of multiple hybridisation events or vegetative expansion. Sexual reproduction often constitutes a very important component of clonal species' evolutionary and persistence strategies, with sporadic sexual events successfully maintaining diversity and providing the means for dispersal. Rossetto *et al.* (2003) suggests that *E. williamsianus* was once more wide spread and that the current populations are likely to be the result of pre-fragmentation seed dispersal events.

### 3.7 Ability of species to recover

It is likely that more unrecorded populations of *Elaeocarpus williamsianus* exist in isolated and less accessible areas within its range. However, based on recent genetic work (Rossetto *et al.* 2003) it is also likely that new populations would also only contain one genetic individual.

If further populations can not be found the total genetic population size consists of only ten individuals. The ability of this species to recover relies on the protection, enhancement and active management of all known populations.

## 4 Threats and Management Issues

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### 4.1 Habitat clearing and fragmentation

Extensive clearing and habitat fragmentation in the range of *Elaeocarpus williamsianus*, primarily for agricultural activities, has occurred. Clearing has most likely resulted in the destruction of unknown *E. williamsianus* populations. A number of populations of *E. williamsianus* are still at risk of accidental disturbance or clearing.

Habitat fragmentation isolating known *Elaeocarpus williamsianus* populations exposes these populations to increased edge effects such as fire, weed invasion, trampling by livestock, and reduces the potential for genetic transfer between populations.

### 4.2 Habitat disturbance

*Elaeocarpus williamsianus* generally occurs on unstable metasediments, and some sites occur on actively eroding slopes. If processes of erosion are accelerated the potential exists for individuals within a site to become destabilised or the root system exposed resulting in decreased population viability. Activities which may result in habitat disturbance include development above *E. williamsianus* populations, excessive access to sites by bush regenerators, researchers or bushwalkers, access by livestock or catastrophic natural events.

### 4.3 Weeds

Weed invasion is a threat to *Elaeocarpus williamsianus* at a number of locations. Dominant weed species include Lantana, Camphor Laurel and Small Leaf Privet (*Ligustrum sinense*). Weeds have the potential to displace *E. williamsianus* by competing for resources or altering the microclimate in which the species occurs.

### 4.4 Introduced pathogens

Limited collection of *Elaeocarpus williamsianus* material has occurred for propagation experiments and herbarium collection. If appropriate harvesting procedures are not implemented, there is the potential for pathogens to be introduced during material collection. Appropriate hygiene protocols are also required to prevent the introduction of pathogens during habitat regeneration activities.

### 4.5 Loss of genetic diversity and genetic isolation

Genetic work carried out by Rossetto *et al.* (2003) identified populations to consist of usually a single

clone. This discovery means that *Elaeocarpus williamsianus* is much rarer than previously thought. Although some clones are represented by a greater number of ramets than others, the respective value of each clone is equal. For the long-term survival of the species the loss of any clone would represent a substantial reduction in the species overall genetic diversity. This would significantly reduce the potential for any actions aimed at improving the genetic fitness of the species.

The capacity for long distance pollen dispersal between *Elaeocarpus williamsianus* populations may be lost given that populations are isolated (Rossetto *et al.* 2003). Chances of pollen transfer from one site to another via insects or flying foxes are extremely low, reducing the potential for genetic recombination and the production of viable seed.

#### 4.6 Inappropriate fire regimes

The impact of fire on *Elaeocarpus williamsianus* is unknown. There is some evidence that the species resprouts after a fire event indicating a level of fire tolerance. However, like most species, an inappropriate fire regime may threaten the viability of populations of *E. williamsianus*. The species occurs in rainforest and wet sclerophyll ecotones which have a low fire tolerance and which would indicate that a high frequency fire or intensity may be detrimental to the species. Further research is required to determine the most appropriate fire regime for the species.

## 5 Previous Recovery Actions

### 5.1 Recovery team

An Endangered Rainforest Plants Recovery Team was established in 1993 to guide the recovery process for threatened rainforest plants including *Elaeocarpus williamsianus*. The Recovery Team met regularly until 1997 but has now been disbanded.

### 5.2 Surveys and monitoring

Targeted surveys for *Elaeocarpus williamsianus* have been undertaken since the species was first discovered, however, many of these surveys have not been successful in identifying new populations. The majority of populations have been recorded during general flora and threatened species surveys.

Monitoring of populations of *Elaeocarpus williamsianus* has been undertaken at most sites to identify threats to the population and the response to recovery actions such as weed control activities.

However, only one population has been recently monitored.

### 5.3 Management plans

A site specific management plan has been prepared for one *Elaeocarpus williamsianus* population occurring on private property (Kooyman 2003). Management actions in the plan include weed control works, replanting native species to provide a buffer around the *E. williamsianus* site and fencing of the buffer area to exclude live stock. The plan has also identified an area which may be used as a translocation trial site if appropriate.

### 5.4 Habitat protection and management

Weed control and regeneration programs have been carried out at a number of *Elaeocarpus williamsianus* sites since 1993. Follow up weeding has also occurred in 1997 and 1998, however no recent work has been undertaken.

Although *Elaeocarpus williamsianus* has not been recorded in state forest, measures for the conservation of the species in wood production areas of state forest are included in the Threatened Species Licence for the upper and lower north-east region of NSW. State Forests NSW (SFNSW) is required to implement the conditions set out in each IFOA, whilst DEC is required to monitor and enforce compliance with conditions. These conditions specify that:

- Pre-logging and pre-roading surveys must be conducted in compartments where known or potential habitat occurs.
- Where there is a record of *E. williamsianus* within a compartment or within 50 m outside the boundary of the compartment an exclusion zone of at least 50 m must be imposed around all individuals and an exclusion zone of at least 50 m must be imposed around all groups of individuals.

As an alternative SFNSW may, with written approvals from DEC, prepare a species management plan for *Elaeocarpus williamsianus* if it is considered that the species can be more appropriately managed by specific conditions not listed in the IFOA licence. A species management plan has not been prepared for *E. williamsianus*.

### 5.5 Research

Research has been carried out on seed production and viability (Rossetto *et al.* 2003) and pollination mechanisms (Gross 1996). Germination trials have also been undertaken (Rossetto *et al.* 2003 and

Gross 1997), however, these were unsuccessful despite a range of techniques being trialed.

### 5.6 Genetic studies

Peakall (1994) surveyed two *Elaeocarpus williamsianus* populations for genetic variation. Genetic differences were identified between populations but the technique used was not able to detect variation within populations.

Rossetto *et al.* (2003) carried out a study that made a direct comparison between two different types of genetic analysis (SSR and RAPD)<sup>1</sup> in their potential for qualifying and quantifying clonality in *Elaeocarpus williamsianus*. This study found most populations to consist of a single clone.

### 5.7 Ex-situ conservation

A number of attempts have been made to propagate *Elaeocarpus williamsianus* from seed and cutting (A. Bundock, pers. comm. 2003; Rossetto *et al.* 2003; Gross 1996; Gross 1997). These attempts have generally been unsuccessful, however Cutting Edge Natives had some success at propagating cuttings. The nursery now has eight potted plants in stock (A. Bundock, pers. comm. 2003).

Three marcots established in 1995 were successful and have since been planted at Mt Warning arboretum, Brunswick Valley Heritage Park (Mullumbimby), and Coffs Harbour Botanic Gardens.

### 5.8 Community awareness

Liaison with private property holders who have populations of *Elaeocarpus williamsianus* on their properties has been undertaken since 1991. A VCA has been under negotiation for one population occurring on private property, however, this has not yet been finalised.

An information pamphlet for *Elaeocarpus williamsianus* has been developed by the former NPWS outlining the conservation requirements of the species and steps that landholders could take to protect the species.

## 6 Proposed Recovery Objectives, Actions and Performance Criteria

The overall objective of this Recovery Plan is to protect known populations of *Elaeocarpus*

*williamsianus* from decline and to ensure wild populations remain viable 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.

### 6.1 Coordination and implementation of the Recovery Plan

**Specific objective 1: Ensure a coordinated and efficient approach to implementation of the Recovery Plan.**

*Action 1.1:*

*Maintain regular correspondence between the DEC and other relevant parties to ensure a coordinated approach to the implementation of the recovery plan.*

The main role in implementation of the Recovery Plan will lie with the DEC. However, as most populations of *Elaeocarpus williamsianus* occur on privately owned lands the recovery of the species will rely on coordinated implementation of recovery actions with private landholders and other relevant parties.

Performance criteria: Regular correspondence occurs between the DEC and other relevant parties throughout the life of the plan.

### 6.2 Surveys and monitoring

**Specific objective 2: Establish the full extent of *Elaeocarpus williamsianus* and the condition of each population to enable protection of all sites.**

*Action 2.1:*

*The DEC will coordinate targeted surveys for *Elaeocarpus williamsianus*.*

It is likely that more populations of *Elaeocarpus williamsianus* exist throughout the range of the species. The clonal nature of each *E. williamsianus* population makes the identification of new populations important to increase the known number of genets. An increased number of genets will potentially increase the opportunity for genetic recombination within the species. Identification of new population will also allow for better management of threats at these sites.

Potential habitat for *Elaeocarpus williamsianus* exists throughout the meta-sediments on the north-eastern side of the Tweed shield volcano.

Performance criteria: Surveys for unknown populations of *Elaeocarpus williamsianus* are undertaken within the first year of implementation of

<sup>1</sup> SSR: simple sequence repeats, RAPD: random amplified polymorphic DNA.

the Recovery Plan and the range of the species is defined.

*Action 2.2:*

*The DEC will coordinate a census of all known Elaeocarpus williamsianus populations.*

A census of all *Elaeocarpus williamsianus* populations will be undertaken to monitor population sizes, threats and response to disturbance. A further census will be undertaken within five years of implementation of the Recovery Plan to monitor the success of recovery actions and provide advice on ongoing management requirements.

Any immediate restorative actions identified in the initial census will be discussed with the relevant land manager.

Performance criterion: A census of all *Elaeocarpus williamsianus* populations is undertaken within the first and fifth years of implementation of the Recovery Plan.

### 6.3 Habitat and threat management

**Specific objective 3: Minimise the risk of *Elaeocarpus williamsianus* declining by the implementation of *in-situ* habitat protection measures.**

*Action 3.1:*

*The DEC will develop standard survey and environmental assessment guidelines for Elaeocarpus williamsianus and distribute them to all relevant consent authorities.*

A standard minimum survey effort should be undertaken when determining if *Elaeocarpus williamsianus* is present in or near an area of potential development. Presence of the species should require implementation of effective mitigation measures to reduce the impact of proposed development.

Performance criteria: Standard survey and environmental assessment guidelines are developed and are being used by proponents within the life of the plan.

*Action 3.2:*

*The DEC will prepare a species information profile for Elaeocarpus williamsianus and distribute the profile to relevant land managers and consent authorities.*

The DEC will prepare and disseminate a species profile to provide information about the conservation status and management issues affecting *Elaeocarpus williamsianus* and its habitat. The dissemination of this information will facilitate

understanding of the ecological requirements of the species and management actions required for its ongoing survival.

Performance criteria: A species profile for *Elaeocarpus williamsianus* is prepared and distributed within the first two years of the plan.

*Action 3.3:*

*The DEC will liaise with private landholders to convey the conservation significance of populations of Elaeocarpus williamsianus on or adjacent to their property.*

The majority of populations of *Elaeocarpus williamsianus* occur on privately owned land. The DEC will seek to secure sympathetic management of *E. williamsianus* habitat by private landholders. The DEC will undertake consultation with private landholders to identify the most appropriate form of engagement for each landholder. The precise nature of management arrangements will depend on the circumstances and co-operation of individual landholders.

Liaison with private landholders will commence in the first year of the plan and, depending on the level of interest shown in the implementation of other conservation mechanisms, continued through out the life of the plan. Local councils will be informed of any management agreements and the information recorded on the councils' property information system.

Performance criteria: Landholders are aware of the conservation significance of populations of *Elaeocarpus williamsianus* on or adjacent to their properties and appropriate conservation mechanisms are negotiated within the life of the plan.

*Action 3.4:*

*The DEC will support funding applications for weed control works carried out in Elaeocarpus williamsianus habitat and integrate weed control works required on DEC estate into regional works programs as appropriate.*

Weeds have invaded a number of *Elaeocarpus williamsianus* sites that occur on private property. The DEC will encourage regeneration at these sites by supporting funding applications and providing advice to landholders to develop weed management strategies and undertake weed control works.

Known populations of *Elaeocarpus williamsianus* occurring on DEC estate are not at immediate risk from weed invasion, however, weeds do occur on the edges of these populations and need to be controlled to prevent spread into *E. williamsianus* habitat. The DEC will engage contractors to carry out weed control at these sites and any future

populations of *E. williamsianus* found on DEC estate, or integrate weed control works at these sites into their works program.

Performance criteria: Weed control work is carried out at sites that are at risk from weed invasion over the life of the plan.

*Action 3.5:*

*Populations will be managed for the fire regime of the habitat in which they occur until the most appropriate fire regime for *Elaeocarpus williamsianus* is known.*

The most appropriate fire regime for *Elaeocarpus williamsianus* is unknown, however, it is likely that a high fire frequency or intensity may be detrimental to the species. Until the appropriate fire frequency for the species is known, the DEC will encourage land managers to manage fire in populations of *E. williamsianus* for the habitat in which it occurs or occurred prior to disturbance (Appendix 4).

Performance criteria: Fire management for populations of *Elaeocarpus williamsianus* reflect the fire management requirements for the habitat in which the population occurs.

*Action 3.6:*

*The DEC will investigate the need to declare Critical Habitat for *Elaeocarpus williamsianus*.*

The level of knowledge of *Elaeocarpus williamsianus* is insufficient to declare areas of habitat that are critical to the survival of the species. Targeted surveys (Action 2.1) and ecological and biological investigations (Actions 4.1 and 4.2) will provide additional information that may enable Critical Habitat for *E. williamsianus* to be defined. Where recommended management arrangements fail to adequately prevent threats or adequately conserve *E. williamsianus*, the Director-General of the DEC will assess Critical Habitat as a conservation option for this species.

Performance criteria: Listing of Critical Habitat for *Elaeocarpus williamsianus* is investigated and pursued if appropriate.

## 6.4 Research

**Specific objective 4: Improve the recovery and management of *Elaeocarpus williamsianus* and its habitat based on an enhanced understanding of its biology and ecology.**

*Action 4.1:*

*The DEC will support the development of a project proposal for an in-situ trial to investigate the reproductive potential of *Elaeocarpus williamsianus*.*

It is possible that the remaining genetic diversity within the *Elaeocarpus williamsianus* is sufficient for sexual reproduction to take place. The DEC will support the development of a project proposal for an *in-situ* trial into the reproductive potential of the species. Site selection will involve the establishment of trials at new sites to avoid any detrimental impacts on existing populations and ensure even representation of each genet. Cuttings or marcotts may be used in the trial, collection of material will be undertaken under strict hygiene protocols to prevent introduction of pathogens.

The re-establishment of populations capable of sexual reproduction within one or more conservation areas is potentially the most valid long-term conservation option for *Elaeocarpus williamsianus*.

Performance criteria: An *in-situ* trial aimed at investigating the potential for sexual reproduction within the species is carried out over the life of the plan.

*Action 4.2:*

*The DEC will encourage and facilitate scientific investigation into the key aspects of the biology and ecology of *Elaeocarpus williamsianus* that are likely to provide information valuable to the recovery of the species.*

Little is known about the biology and ecology of *Elaeocarpus williamsianus*. An enhanced understanding of key aspects of the biology and ecology of *E. williamsianus* will be essential for land managers to make informed judgments as to the conservation requirements for the species. Research should be conducted in a way that involves land managers and keeps them informed of advances in the understanding of the species. Any collection of material will be undertaken under strict hygiene protocols to prevent introduction of pathogens.

The DEC will encourage and facilitate research into the following priority areas:

- propagation techniques;
- key habitat requirements;
- impacts and response to fire;
- pollination mechanisms;
- germination and dormancy mechanisms;
- treatments to enhance survival of transplants;
- seed viability and longevity; and
- seed dispersal and predation.

If *in-situ* trials described in Action 3.1 are successful, other priority areas include:

- recruitment, including the survival of seedlings and cause(s) of mortality;
- growth rate and development of individuals;
- correlation between clonal diversity and seedling viability / fitness;
- appropriate combinations of genets for translocation.

Performance criteria: an increased understanding of the biology and ecology of *Elaeocarpus williamsianus* is used to improve future management strategies throughout the life of the plan.

### 6.5 Ex-situ conservation

**Specific objective 5: Safeguard populations of *Elaeocarpus williamsianus* against extinction in the wild.**

*Action 5.1:*

*The DEC will coordinate an ex-situ conservation program for *Elaeocarpus williamsianus*.*

Due to the low number and viability of *Elaeocarpus williamsianus* seed, the establishment of cuttings or marcots appears to be the most appropriate method of obtaining material for the *ex-situ* conservation of *E. williamsianus*. Cuttings or marcots will be established from all known population and maintained in appropriate locations such as regional and National botanic gardens and universities. *Ex-situ* conservation will aim to sample the genetic variation within the species and provide resources for future research into the biology and ecology of *E. williamsianus*. Collection of material will be undertaken under strict hygiene protocols to prevent introduction of pathogens to populations.

Performance criteria: An *ex-situ* population of *Elaeocarpus williamsianus* is established representing the full known genetic range of the species within the life of the plan.

### 6.6 Translocation

**Specific Objective 6: Investigate the need for the development and implementation of a translocation proposal for *Elaeocarpus williamsianus*.**

*Action 6.1:*

*The DEC will investigate the need for the development and implementation of a translocation proposal for *Elaeocarpus williamsianus*.*

The DEC will investigate the need for translocation of *Elaeocarpus williamsianus*, as populations will continue to remain at risk. The decision for the

implementation of translocation will consider the outcomes of targeted surveys, population census, liaison with private property owners, the results of *in-situ* reproduction trials or other available information.

Any translocation program will take into consideration the Translocation Guidelines for Australian Threatened Plants (Australian Network for Plant Conservation 1997).

Performance criteria: In the event of continued threats to existing populations or to facilitate ongoing viability in the wild the DEC will implement translocation, when and where appropriate.

## 7 Implementation

Table 1 outlines the implementation of recovery actions specified in this Recovery Plan for the period of five years from publication. The DEC is the responsible for this Recovery Plan.

## 8 Social and Economic Consequences

The total cost of implementing the recovery actions will be \$64 470 over the five-year period covered by this plan if it is found that a translocation program is not required or \$78 550 if a translocation program is implemented. The inclusion of two populations of *Elaeocarpus williamsianus* into DEC reserves provides some formal protection for the species. Management of these areas will be in accordance with the requirements of the NPW Act and any costs incurred will be met by the DEC.

The implementation of the Recovery Plan will have a social and potentially an economic impact on private landowners with populations of *Elaeocarpus williamsianus* on their property. Positive benefits for these private landholders may arise through conservation initiatives with associated government support. The implementation of this Recovery Plan may also affect the pattern of development up slope from populations of *E. williamsianus* if they are likely to have a significant impact on the species. It is unlikely that development will occur on the actively eroding slopes which *E. williamsianus* inhabit.

Under current forestry practices, the IFOA applies prescriptions to harvesting operations where known or potential *Elaeocarpus williamsianus* habitat occurs, however, at this stage no individuals or populations have been recorded in the state forest network. The implementation of this Recovery Plan would not affect current SFNSW harvesting operations and it is unlikely that the locations of new

populations would significantly affect future harvesting operations.

It is anticipated that there will be no significant adverse social or economic costs associated with the implementation of this Recovery Plan and that the overall benefits to society of implementation of the Recovery Plan will outweigh any specific costs.

## 9 Biodiversity Benefits

The occurrence of *Elaeocarpus williamsianus* contributes to the high biodiversity of the flora of northern NSW. The protection of *E. williamsianus* populations will also assist in the protection of other threatened species which occur in the same area such as Coolamon (*Syzygium moorei*), *Fontainea australis*, Red Lilly Pilly (*Syzygium hodgkinsoniae*), Rusty Rose Walnut (*Endiandra hayesii*), and Three-leaved Bosistoa (*Bosistoa transversa*).

The rainforests and wet sclerophyll forest ecotones where *Elaeocarpus williamsianus* is found are also habitat to fauna species of conservation significance, including the threatened Grey-headed Flying Fox (*Pteropus poliocephalus*), Rose-crowned Fruit-dove (*Ptilinopus regina*), Superb Fruit-dove (*Ptilinopus superbus*), White-eared Monarch (*Monarca leucotis*) and Wompoo Fruit-dove (*Ptilinopus magnificus*).

## 10 Preparation Details

This draft Recovery Plan has been prepared by Kersten Tuckey. Comments on the plan have been provided by Maria Matthers, John Hunter, Lynn Baker and Maurizio Rossetto.

## 11 Review Date

This Recovery Plan will be reviewed within five years of the date of its publication.

## 12 References

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## 13 Acronyms Used in this Document

<b>DEC</b>	Department of Environment and Conservation
<b>DIPNR</b>	Department of Infrastructure, Planning and Natural Resources
<b>EP&amp;A Act</b>	NSW <i>Environmental Planning and Assessment Act 1979</i>
<b>EPBC Act</b>	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>

<b>FNPE Act</b>	<i>Forestry and National Park Estate Act 1998</i>	<b>NSW</b>	New South Wales
<b>IFOA</b>	Integrated Forestry Operations Approval	<b>NVC Act</b>	<i>NSW Native Vegetation Conservation Act 1997</i>
<b>IUCN</b>	International Union for the Conservation of Nature and Natural Resources	<b>RF Act</b>	<i>NSW Rural Fires Act 1997</i>
<b>LG Act</b>	<i>NSW Local Government Act 1993</i>	<b>SFNSW</b>	State Forests NSW
<b>NPW Act</b>	<i>NSW National Parks and Wildlife Act 1974</i>	<b>SIS</b>	Species Impact Statement
<b>NPWS</b>	NSW National Parks and Wildlife Service	<b>TSC Act</b>	<i>NSW Threatened Species Conservation Act 1995</i>
		<b>VCA</b>	Voluntary Conservation Agreement

**Table 1. Estimated costs of implementing the actions identified in the Recovery Plan.**

Action no.	Action Title	*Priority	Cost Estimate (\$'s/year)					Total Cost (\$)	Responsible Party/Funding sources	#In-kind	^Cash
			Year 1	Year 2	Year 3	Year 4	Year 5				
1.1	Coordination and Implementation	1	3500	1750	1750	1750	1750	10500	DEC	10500	
2.1	Targeted survey	1	5000					5000	DEC		5000
2.2	Population census	1	2000				♦2000	4000	DEC		4000
3.1	Develop survey and environmental assessment guidelines	2	1750					1750	DEC	1750	
3.2	Develop species information profile	2	1050					1050	DEC	1050	
3.3	Liaison with private landholders	1	=	=	=	=	=	=	DEC		
3.4	Weed control	1	5600	3360				8960	DEC		8960
3.5	Fire management ♣	1							DEC		
3.6	Critical habitat investigation	2					700	700	DEC	700	
4.1	(a) Prepare <i>in-situ</i> reproduction trial proposal	1	1050						DEC		
	(b) Implement <i>in-situ</i> reproduction trial	1	7380	2000	2000	2000	2000	16430	DEC	1050	15380
4.2	Research into biology and ecology	1	4500	4000				8500	DEC		8500
5.1	(a) Prepare <i>ex-situ</i> conservation proposal	1		2000					DEC		
	(b) collect stock for <i>ex-situ</i> conservation	1		2000					DEC		
	(c) Implement <i>ex-situ</i> conservation*	1		1380	500	500	500*	6880	DEC	700	6880
6.1	(a) Investigate need for translocation	1		700					DEC	700	
	(b) Development of translocation proposal	1		2000 o					DEC		
	(c) Implementation of translocation proposal*	1		7380 o	2000 o	2000 o	2000 o*	16080	DEC	700	15380
Total	<b>Annual cost Recovery Program if translocation is not implemented</b>		<b>31830</b>	<b>17190</b>	<b>4250</b>	<b>4250</b>	<b>6950</b>	<b>64470</b>		<b>15750</b>	<b>48720</b>
	<b>Annual cost Recovery Program if translocation is implemented</b>		<b>31830</b>	<b>26570</b>	<b>6250</b>	<b>6250</b>	<b>8950</b>	<b>78550</b>		<b>17150</b>	<b>64100</b>

Priority ratings are: 1 - action critical to meeting plan objectives; 2 - action contributing to meeting plan 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, contractors and other costs such as the purchasing of survey and laboratory equipment.

♦ Cash funds for this action may increase pending assessment and recommendations from implementation of other actions.

o Cost of this action will be dependent on the identified need for the action.

= Costs incorporated into other actions.

\* This action requires ongoing funding beyond the life of this plan.

♣ Operational funds.

## Appendix 1 IUCN Red List Categories and Criteria: Assessment of *Elaeocarpus williamsianus*

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An assessment by DEC to determine the conservation status of *Elaeocarpus williamsianus* under the IUCN Red List Categories and Criteria Version 3.1 (2001) is detailed below. This assessment recommends that *E. williamsianus* be assigned a conservation status of Critically Endangered.

### IUCN Red List Categories and Criteria Version 3.1 (2001) definitions

A taxon is **Critically Endangered** when the best available evidence indicates that it meets any of the criteria A-E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

A **population** is defined as the total number of individuals of the taxon and for functional reasons is measured as numbers of mature individuals only.

**Subpopulations** are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (one successful migrant individual or gamete per year or less).

**Mature individuals** are the number of individuals known, estimated or inferred to be capable of reproduction.

**Severely Fragmented** refers to a situation in which increased extinction risk to the taxon results from the fact that most of its individuals are found in small and relatively isolated subpopulations. These small subpopulations may go extinct, with a reduced probability of recolonisation.

**Extent of Occurrence** is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrences of a taxon.

**Area of Occupancy** is defined as the area with its 'extent of occurrence' which is occupied by a taxon. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may contain unsuitable or unoccupied habitats.

**Location** defines a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations.

### *Elaeocarpus williamsianus* assessment

**Criteria A. 2.c** An observed, estimated, inferred or suspected population size reduction of  $\geq 80\%$  over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on a decline in area of occupancy, extent of occurrence and/or quality of habitat.

Extensive clearing has occurred throughout the range of *Elaeocarpus williamsianus* primarily for agricultural purposes. Although the extent to which *E. williamsianus* previously occurred is unknown, it is possible that over the last three generations 80% or more of the *E. williamsianus* population may have been cleared. Rossetto *et al.* (2003) suggests that the current distribution of *E. williamsianus* is the result of a former balance between sexual and vegetative reproduction. However, sexual reproduction is no longer known to occur between populations, suggesting a high level of fragmentation between existing populations has occurred. Clearing causing this fragmentation may have resulted in the destruction of populations of *E. williamsianus* that previously facilitated sexual reproduction. Population size may have been reduced either by the destruction of entire subpopulations or the destruction of individuals within the known populations, many of which show signs of past disturbance. Factors causing the reduction of *E. williamsianus* numbers have not ceased as land clearing and land uses which impact on the species continue. Past clearing activities may not be reversible due to the development of industry in these areas and social expectations around the right to maintain existing land use. The quality of habitat at all known *E. williamsianus* sites, excluding one, has decreased significantly as a result of weed invasion and other impacts from adjoining land uses.

**Criteria B. 1.a&b (ii&iii)** Geographic range in the form of either the extent of occurrence is estimated to be less than 100 km<sup>2</sup>, and estimates indicate that populations are severely fragmented or known to exist at only a

single location, and there is a continuing decline, observed, inferred or projected, in the area of occupancy and the area, extent and/or quality of habitat.

The extent of occurrence *Elaeocarpus williamsianus* is estimated to be 50 km by 30 km and populations are considered severely fragmented as they are most probably genetically isolated and have a significantly reduced probability of recolonisation. There will continue to be a decline in the area of occupancy and quality of *E. williamsianus* habitat as it will continue to be exposed to degrading processes by the nature of its proximity to agricultural land use activities.

**Criteria B. 2.a&b (ii&iii)** The area of occupancy is estimated to be less than 10 km<sup>2</sup>, and populations are severely fragmented. There is a continuing decline, observed, inferred or projected, in the area of occupancy and the area, extent and/or quality of habitat.

Only nine populations of *Elaeocarpus williamsianus* have been recorded covering a total area of significantly less than 10 km<sup>2</sup>. These populations are severely fragmented as they are most probably genetically isolated and have a significantly reduced probability of recolonisation. There will continue to be a decline in the area of occupancy and quality of *E. williamsianus* habitat as populations will continue to be exposed to degrading processes by the nature of its proximity to agricultural land use activities.

**Appendix 2 Submission Form**

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**Recovery Plan Submission**Name Individual/  
Organisation:

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Postal Address:

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Postcode:

Contact Number(s):

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Date:

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**Draft Recovery Plan:**                      ***The Elaeocarpus williamsianus* Draft Recovery Plan**

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The DEC will consider all written submissions received during the period of public exhibition and must provide a summary report of those submissions to the Minister for the Environment prior to final approval of this recovery plan.

Please note that for the purposes of the NSW Privacy and Personal Information Protection Act 1998, any comments on this draft recovery plan, including your personal details, will be a matter of public record and will be stored in DEC records system for a period of up to 2 years from the closing date. The submission of personal information is voluntary. Copies of submissions will be available on request, at the DEC Office responsible for the preparation of the recovery plan<sup>2</sup>.

Should you not wish to have your personal details disclosed to members of the public, please indicate below why you wish your personal details to remain confidential to DEC<sup>3</sup>. Please note that access to the details may be requested under the Freedom of Information Act 1989. You will be consulted if this happens.

Further information on the Privacy and Personal Information Protection act 1998 and the Freedom of Information Act 1989 may be obtained from the DEC FOI/Privacy Contact Officer (ph: 02 9585 6460) or the DEC website: [www.nationalparks.nsw.gov.au](http://www.nationalparks.nsw.gov.au)

**Yes, please keep my personal details confidential to DEC (explain why)**

Submissions should be received no later than the advertised date. Submissions should be addressed to the:

Director-General of Department of Environment and Conservation  
c/o DEC Threatened Species Unit  
*Elaeocarpus williamsianus* Recovery Plan Coordinator  
Locked Bag 914  
**COFFS HARBOUR NSW 2450**

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<sup>2</sup> Note: Members of the public may inspect submissions for free or ask for a copy. Copying charges are to be charged at the current FOI rate ie \$30/hr

<sup>3</sup> an assessment must be made by the relevant DEC Threatened Species Unit, as to whether the request for confidentiality will be agreed to. The DEC must contact the affected person as to its decision as per the DEC guide to privacy and handling public submissions (NPWS 2002).



### Appendix 3 Public Authority Responsibilities

Public authority	Relevant responsibilities
DEC	<ul style="list-style-type: none"> <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 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 style="list-style-type: none"> <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 <i>Rural Fires Act 1997</i>.</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 1993</i>.</li> </ul>
Department of Infrastructure, Planning and Natural Resources	<ul style="list-style-type: none"> <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 Local Environmental Plans 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	<ul style="list-style-type: none"> <li>• Implementation of prescriptions detailed in IFOA terms of threatened species licence granted under Part 4 of the FNPE Act.</li> </ul>
Rural Fire Service	<ul style="list-style-type: none"> <li>• Preparation of Bush Fire Risk Management Plans and Plans of Operations.</li> <li>• Fire management.</li> </ul>
Other State government agencies	<ul style="list-style-type: none"> <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 4 Fire Thresholds for *Elaeocarpus williamsianus* Habitat**

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<b>Vegetation Communities</b>	<b>Biodiversity Fire Regime Thresholds</b>
Wet Sclerophyll Forest	<ul style="list-style-type: none"><li>• Avoid inter-fire intervals of less than 25 years.</li><li>• Avoid inter-fire periods of &gt; 60 years.</li><li>• Crown fires should be avoided in the lower end of the interval range.</li></ul>
Rainforest	<ul style="list-style-type: none"><li>• Any fire occurrence (a limited recovery ability exists).</li></ul>



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SERVICE

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Hurstville NSW 2220  
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Website [www.nationalparks.nsw.gov.au](http://www.nationalparks.nsw.gov.au)