

|  |
| --- |
| **Victorian Eel Fishery Management Plan**  **2017** |

Victorian Eel Fishery Management Plan

August 2017

Victorian Fisheries Authority

|  |
| --- |
| Published by the Victorian Fisheries Authority (VFA), August 2017  © The State of Victoria, VFA, Melbourne August 2017 This publication is copyright. No part may be reproduced by any process except in accordance with the provisions of the *Copyright Act 1968*.  Authorised by the Victorian Government, 1 Spring Street, Melbourne.  Printed by VFA Melbourne, Victoria.  Preferred way to cite this publication: Victorian Eel Fishery Management Plan 2017  ISBN 978-1-925629-53-8 (Print)  ISBN 978-1-925629-54-5 (pdf/online)  Author Contact Details:  Victorian Fisheries Authority  1 Spring Street  Melbourne VIC 3001  Copies are available from the website www.vfa.vic.gov.au  For more information contact the Customer Service Centre 136 186  Disclaimer  This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.  Accessibility  If you would like to receive this publication in an accessible format, such as large print or audio, please telephone 136 186, or email customer.service@ecodev.vic.gov.au  Deaf, hearing impaired or speech impaired? Call us via the National Relay Service on 133 677 or visit www.relayservice.com.au  This document is also available in PDF format on the internet at [www.vfa.vic.gov.au](http://www.vfa.vic.gov.au) |

Minister’s foreword

I am pleased to be able to declare this management plan for the Victorian eel fishery. This is the third plan for the fishery declared under the *Fisheries Act 1995* and builds on the progress made in the previous two plans and ensures that the fishery remains viable, profitable and sustainable for all users of the resource.

Victoria has some of the best eel fishing available in Australia and it’s vital that we continue to look after this important fishery by ensuring it remains sustainable. Victoria’s commercial eel fishery is relatively small at over 300 tonnes in recent times, but is an important exporter worth $3-4 million annually, more when waterway conditions are favourable. The catching and processing sectors employ up to 70 people across the state in a good season. Eels are also popular amongst a small but active group of recreational anglers who recognise their excellent eating qualities.

This plan recognised that eels are of particular importance to Aboriginal people, both personally and communally. Eels were traditionally bartered and traded by Aboriginal people, and to this day eels are still used for food.

Consistent with our commitment for effective stakeholder consultation, the strategies in the plan have been developed through intensive consultation with key stakeholder groups. Effective stakeholder input was achieved through the stakeholder based Steering Committee. I would like to thank members of the Steering Committee for the sustained effort put into working through some complex issues. I would also like to thank all stakeholders who made a submission to the draft plan during the public consultation period.

Once again, I would like to congratulate all those involved in the development of the Victorian Eel Fishery Management Plan. I am confident that the plan will help ensure that the fishery continues to be managed on a sustainable basis into the future while allowing for ongoing development of the industry that it supports.

Jaala Pulford, MP

**Minister for Agriculture**

# Contents

[1 Executive summary 1](#_Toc482012682)

[2 Background to the fishery 3](#_Toc482012683)

[2.1 Introduction 3](#_Toc482012684)

[2.2 Species, stocks and biology 3](#_Toc482012685)

[2.3 Legislative and policy framework 4](#_Toc482012686)

[2.4 The fishery 6](#_Toc482012687)

[3 Risk assessment 9](#_Toc482012688)

[4 Objectives of the Victorian Eel Fishery Management Plan 10](#_Toc482012689)

[5 Managing the fishery 14](#_Toc482012690)

[5.1 Aboriginal Victorians’ involvement in management of eels 14](#_Toc482012691)

[5.2 Aboriginal Victorians’ access to eels 14](#_Toc482012692)

[5.3 Sustainability of Victorian eel fishery 14](#_Toc482012693)

[5.4 Harvest regulations 15](#_Toc482012694)

[5.5 Management of ecosystem interactions 18](#_Toc482012695)

[5.6 Performance indicators, targets, monitoring and reporting 18](#_Toc482012696)

[6 Review of the Management Plan 18](#_Toc482012697)

[7 References 19](#_Toc482012698)

[8 Appendices 19](#_Toc482012699)

[Appendix 1 21](#_Toc482012700)

[Appendix 2 22](#_Toc482012701)

List of Figures

Figure 1: Distribution of longfinned and shortfinned eels in Victoria (Data Source: 'Victorian Biodiversity Atlas', © The State of Victoria, Department of Economic Development, Jobs, Transport and Resources (February, 2017). 3

Figure 2: Commercial eel fishery sectors 7

Figure 3. Commercial catches of longfinned eels and short-finned eels in Victoria from 1979 to 2016 (data source: Fisheries Victoria) 8

List of Tables

[Table 1. Factors considered to be high and moderate level risk in the ESD risk assessment process. 9](#_Toc482012706)

[Table 2. Fishery level objectives, strategies and actions for the Victorian Eel Fishery. 11](#_Toc482012707)

[Table 3. Allocation of waters to Eel Fishery Access Licences 16](#_Toc482012708)

# Acknowledgements



For Dave Molloy, in memoriam. The Eel Fishery Management Plan Steering Committee wish to acknowledge Dave’s long and dedicated contribution to the management of the Victorian eel fishery. He managed the fishery for many years and was well-respected by all those involved.

# Executive summary

The development and implementation of the Plan is a collaborative process between Department of Economic Development, Jobs, Transport and Resources (DEDJTR) working with stakeholders to achieve the objectives of the Plan. DEDJTR has prepared the Plan, in consultation with a stakeholder-based steering committee, comprised of representatives from Seafood Industry Victoria, Eel Fishery Access Licence and Crown Land (Eel) Aquaculture Licence holders, VRFish and an indigenous representative, and in accordance with Part 3 of the Fisheries *Act 1995*. The Victorian Fisheries Authority appreciates the strong interest by stakeholders to contribute to the management of the resource. The Plan will be in effect for 5 years pending the results of a review process outlined in section 6.

In addition to taking adult eels for sale, the Victorian commercial fishery also takes juveniles from the wild and on-grows them within confined lakes and impoundments (culturing) before harvesting them as adults. The commercial eel fishery is a relatively small but important export fishery for the State. While affected by environmental conditions including prolonged drought, annual production has exceeded 300 tonnes worth $3-4 million. The catching and processing sectors can employ up to 70 people across Victoria in a good season. The eel fishery is also prized by a small number of recreational anglers who recognise their excellent eating qualities.

This Plan recognises that eels are of particular importance to Aboriginal people and there is extensive evidence throughout Victoria of historical Aboriginal use of eels for both personal and communal use and for barter and trade. It should also be remembered that this resource is shared more widely as a consequence of their extraordinary migrations from freshwater habitats to the coral sea where spawning takes place. From ocean spawning grounds, larval drift provides recruitment to south eastern Australia, New Zealand and some countries in the south Pacific.

Information on the status of eels is limited and mainly collected from fisheries dependent data on catch and effort and by-catch reporting. However, there is an opportunity to improve this information to ensure the fishery remains sustainable and can continue to meet export requirements.

In view of the wide range of stakeholders, this Plan is intended to be a blueprint for future actions to the benefit of all users of the resource: Indigenous communities, recreational and commercial fishers, including those harvesting from culture waters. This is reinforced by the key objectives of this Plan which provide for:

* Long term sustainability of eel resources;
* Allow for sufficient adult eel escapement and recruitment thus stock sustainability;
* Ensure that the harvest is kept within limits that are consistent with the long term sustainability of the fishery;
* Allow fishing for eels in a manner that has minimal ecological impact; and
* Minimise biosecurity risks from imported product.
* Equitable resource access and use;
* Maintain, and where possible improve, access to the fishery for recreational, commercial (including culture) and indigenous interests, taking existing regulations and legislation relating to access in inland and coastal waters into account; and
* Promote an efficient and effective eel culture sector.
* Cost effective and participatory management;
* Enable participation by fishers and other relevant stakeholders in fisheries management, taking account of the respective responsibilities of government and fishers; and
* Ensure that the management of the fishery and the provision of associated services are efficient, effective and responsive.
* Improving economic viability of the fishery;
* Encourage a profitable and viable commercial eel fishery that can support industry growth.

Each one of these objectives has actions and identified performance indicators which can be measured to track the progress of the Plan. All users of the resource are key in evaluating the success of this Plan to contribute to the sustainability and vitality of the eel fishery in Victoria.

# Background to the fishery

## Introduction

This management plan (the Plan) applies to the Victorian eel fishery and replaces the previous management plan (McKinnon 2002). Eel fishing in Victoria is based on two species the shortfinned eel (*Anguilla australis australis*) and the longfinned eel (*Angilla reinhardtii*) which have different but overlapping distributions in estuarine and freshwaters east and south of the Great Dividing Range (Figure 1). A system of closed waters where commercial eel fishing is prohibited, allows for escapement of eels during their seaward spawning migration.

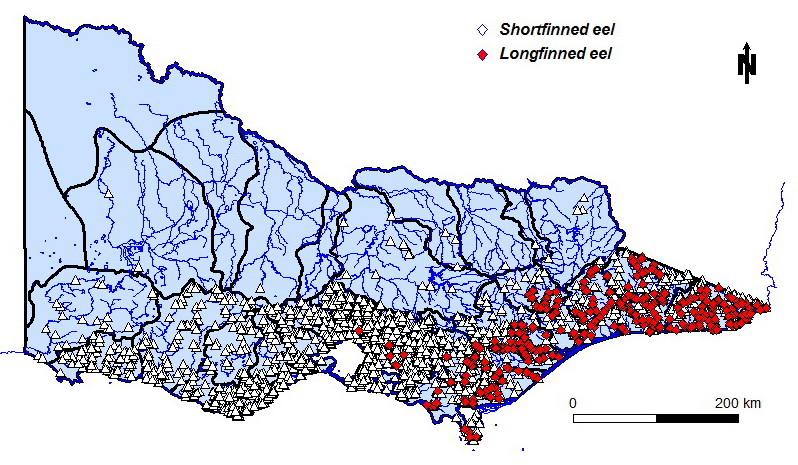


Figure 1: Distribution of longfinned and shortfinned eels in Victoria (Data Source: 'Victorian Biodiversity Atlas', © The State of Victoria, Department of Economic Development, Jobs, Transport and Resources (February, 2017).

The Plan came into effect following its declaration in the Victoria Government Gazette and remains in place until a new Fishery Management Plan is declared or it is cancelled in accordance with the requirements of the *Fisheries Act.*

Under the Fisheries Act, the Minster may amend a management plan by notice published in the Victoria Government Gazette*.*

The Plan recognises the ongoing economic and social importance of all sectors, including commercial, recreational, traditional owner and conservation interests. It sets out strategies and management arrangements to achieve the objectives including an implementation plan and an evaluation and review process.

## Species, stocks and biology

There are 19 species of eels from around the world belonging to the genus Anguilla, four of which occur in Australia. A subspecies of the shortfinned eel (*Anguilla australis australis*) and the longfinned eel (*A. reinhardtii*) are the only Anguillid eel species which occur naturally in Victoria and are the target species of the Victorian Eel Fishery. The mainland distribution of the shortfinned eel is from the Murray River in South Australia to the Pine River in Queensland and it is also found on Flinders Island, Tasmania, New Zealand and Fiji (Jellyman 1987). The longfinned eel is distributed from Wilsons Promontory in Victoria to the Jardine River in Cape York, as well as northern and eastern Tasmania, New Caledonia and New Zealand (Jellyman 1987). Both species were considered to be panmictic (i.e. random mating within a breeding population, consistent with each species having a singular genetic stock (Kailola, et al. 1993)). More recently however, it was found that shortfinned eels belong to separate subspecies found on either the western side of New Zealand (*Anguilla australis schmidtii* ) or the south eastern side of Australia *(Anguilla australis australis* ) (Shen, et al. 2007; Watanabe, et al. 2006).

The following features of their biology are relevant to eel fishery management:

* Both species are catadromous, spending most of their lives in fresh water or estuaries and reproducing once only in the ocean before dying
* Eels are relatively long lived, maturing at between 8 to 30 years of age depending on a number of factors including sex, species and food source
* After hatching, larval eels are transported by currents towards the Australian coast and recruitment into estuaries and rivers within the respective distribution of each species is random
* Eels are opportunistic feeders utilising a wide range of food types
* In both species males are much smaller than females
* Sex determination is influenced by salinity, temperature, diet and population density (more females as the population density decreases)
* Shortfinned and longfinned eels typically undertake their oceanic migration in warmer months (December to February)

Both species, like other anguilid eel species, are catadromous, spending the much of their life cycle in estuaries or fresh water, before returning to the ocean to reproduce and die. Australian eel species are thought to spawn in the Coral Sea region of the West Pacific Ocean (Aoyama *et al.* 1999, Kuroki *et al.* 2009). Following hatching, larvae (leptocephali) are transported toward the eastern Australian coastline by the South Equatorial Current, and then along the coast by the East Australian Current. Larvae metamorphose to glass eels, which actively swim toward and into the embayments and estuaries of the eastern Australian continent. Glass eels are between 50-60mm in length and weigh between 0.1-0.2g each. Shortfinned glass eels migrate mainly in the winter and spring, while longfinned glass eels migrate mainly during summer and autumn, although glass eels of each species may continue to arrive at some estuaries throughout the year (McKinnon *et al.* 2002).

## Legislative and policy framework

The Eel Fishery is managed in accordance with the *Fisheries Act* and the *Fisheries Regulations*. The *Fisheries Act* provides the legislative framework for managing Victoria’s fisheries resources and sets out the general provisions applicable to all recreational fishing activities and commercial access licences including the Eel Fishery Access Licence.

The objectives of the *Fisheries Act* are:

* to provide for the management, development and use of Victoria's fisheries, aquaculture industries and associated aquatic biological resources in an efficient, effective and ecologically sustainable manner;
* to protect and conserve fisheries resources, habitats and ecosystems including the maintenance of aquatic ecological processes and genetic diversity;
* to promote sustainable commercial fishing and viable aquaculture industries and quality recreational fishing opportunities for the benefit of present and future generations;
* to facilitate access to fisheries resources for commercial, recreational, traditional and non-consumptive uses;
* to promote the commercial fishing industry and to facilitate the rationalisation and restructuring of the industry; and
* to encourage the participation of resource users and the community in fisheries management.

The *Fisheries Regulations* provide the general detail regarding the activities authorised by a recreational fishery licence and specific detail regarding authorised activities and the obligations of the Eel Fishery Access Licence holder and persons acting on their behalf. In addition, there may be further conditions which will be expressed or referred to on the licence itself.

All Australian governments, including Victoria, have made a commitment to manage fisheries according to the principles of ecologically sustainable development. These principles include:

* ensuring that fishing is carried out in a biologically and ecologically sustainable manner
* ensuring that there is equity within and between generations regarding the use of fish resources
* maximising economic and social benefits to the community from fisheries within the constraints of sustainable utilisation
* adopting a precautionary approach to management, particularly for fisheries with limited data
* ensuring that the processes and procedures involved in management of a fishery are appropriate, transparent and inclusive.

Management of the Eel Fishery will not be inconsistent with other key legislation, and policy including, but not limited to:

* *Environment Protection and Biodiversity Conservation Act 1999;*
* *Environment Protection Act (Victoria) 1970;*
* *National Parks Act 1975;*
* *Water Act 1989;*
* *Land Act 1958;*
* *The Traditional Owner Settlement Act 2010;*
* The Aboriginal Fishing Strategy 2012;
* Victorian Aquaculture Strategy 2017 – 2022*;*
* [*Wildlife Regulations 2013*](http://www.gma.vic.gov.au/laws/hunting-laws/wildlife-regulations-2013)*;*
* [*Wildlife (State Game Reserve) Regulations 2004*](http://www.gma.vic.gov.au/laws/land-management-laws/wildlife-state-game-reserve-regulations-2004)*;*
* [*Crown Land (Reserves) Act 1978*](http://www.gma.vic.gov.au/laws/land-management-laws/crown-land-reserves-act-1978)*;*and
* *Occupational Health and Safety Act 2004.*
* Translocation guidelines*:*
  + *Guidelines for Assessing Translocations of Live Aquatic Organisms in Victoria* (DPI & DSE 2003)
  + *Protocols for the translocation of fish in Victorian inland public waters* (Department of Primary Industries 2005)
  + *Victorian Protocol for the Translocation of Eels* (McKinnon 2005).

The *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Government. The EPBC Act provides for the identification of key threatening processes and the protection of critical habitat and promotes the conservation of biodiversity and provides for the protection of listed species, protected areas and communities in Commonwealth areas.

Under the EPBC Act, all Australian export fisheries must be assessed against the Guidelines for the Ecologically Sustainable Management of Fisheries to ensure that fisheries are managed in an ecologically sustainable manner.

A submission was made to the Commonwealth Department of Environment (DE) who re-assessed the Victorian Eel Fishery against the *Guidelines for the Ecologically Sustainable Management of Fisheries* in January 2014. The submission was assessed for the purposes of the wildlife trade provisions of parts 13 and 13 A of the EPBC Act. In April 2014 DE conditionally approved the management arrangements for the fishery and amended the list of exempt native species to include fish taken from the Victorian Eel Fishery for a further five years, until May 2019.

Existing Aboriginal rights in Victoria

Aboriginal Victorians currently have a number of existing rights to access natural resources recognised under law. Members of Traditional Owner groups with a native title determination under the Commonwealth’s Native Title Act 1993 have non-exclusive rights to hunt, fish and gather natural resources for personal, communal and cultural purposes, without the need to obtain a licence. This includes fishing for eels. At the time of writing, three Victorian Traditional Owner groups have positive native title determinations: Gunaikurnai, Gunditjmara and Wotjobaluk.

In addition to rights recognised in a native title determination, section 211 of the Native Title Act also applies to preserve native title rights and interests in natural resources by removing legal restrictions on activities such as fishing. This provision essentially allows native title claimants and holders to access resources (in non-commercial quantities) without a licence, in accordance with their traditional laws and customs.

Aboriginal rights are also recognised under Victoria’s Traditional Owner Settlement Act 2010 (TOS Act). Under this alternative settlement framework, the State partners with Traditional Owner groups to negotiate a comprehensive settlement that recognises their relationship to land and water, confers certain access, ownership and management rights over the land, determines decision making rights for land development and natural resource management, and sustainably resources the Traditional Owner group to give effect to the settlement. A settlement may include access to eels for traditional and specified commercial purposes.

At the time of writing, settlements had been reached with the Gunaikurnai and the Dja Dja Wurrung peoples. A number of Traditional Owner groups intend to reach settlements under the TOS Act and are in the pre-negotiation or negotiation phase with the State.

A number of areas and objects found throughout Victoria and its coastal waters are of cultural heritage significance to the Aboriginal people of Victoria. These are protected under the Aboriginal Heritage Act 2006 from activities likely to harm Aboriginal heritage values.

## The fishery

***2.4.1 The Indigenous fishery***

Aboriginal people have a strong connection to country and water that is central to their identity and culture. For Aboriginal people, cultural values are informed by and interconnected with traditional uses, spiritual connection, ancestral ties and respect for waterways, land, sea and the resources these provide.

Fishing is an integral part of the cultural and economic life of coastal and inland Aboriginal communities. It provides an important source of food and is part of cultural and ceremonial life.

Eels were, and continue to be, an important resource for certain Aboriginal communities. Their use for communal gatherings and for barter and trade was extensive in pre-colonial times. Today, eel is often a prominent item on menus for community events.

***2.4.2 The commercial fishery***

Victoria’s commercial eel fishery comprises both a wild catch sector and a culture (stock enhanced) sector. The culture sector has developed strategies for growth consistent with the species life cycle by translocating juvenile eels (elvers and “snigs”) from other parts of Victoria into lakes and impoundments (culture waters) in western inland Victoria for on-growing. Fishing for glass eels has been of limited success due to the highly variable abundance in Victoria. Most of Victoria’s eel catch is taken by commercial fishers and is comprised of adult eels during different phases of their migration (Figure 3). Currently there are no eels being on-grown in intensive aquaculture facilities.

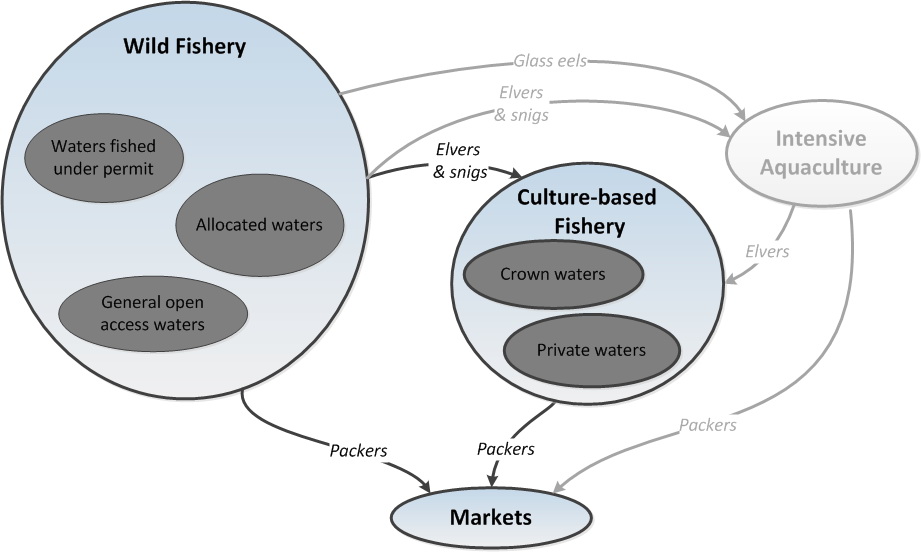


Figure 2: Commercial eel fishery sectors

Eels are recognised as relatively long-lived fish, maturing at 8 to 20+ years of age. Because eels have reducing levels of natural mortality as they progress to older life stages, it is suggested that sufficient spawning stocks should be protected from commercial fishing as a priority, but the early life history stages can sustain greater levels of exploitation without adversely affecting recruitment to the fishery (McKinnon 2002).

Shortfinned eels are the most abundant and the most keenly targeted eel species in Victoria, comprising 33-97% (mean 80%) of the total annual catch which has been as high as 326.7 tonnes (Fisheries Victoria catch and effort statistics). In addition to taking adult eels for sale, the Victorian commercial fishery also takes juveniles from the wild and on-grows them within confined lakes and impoundments (culture waters) before harvesting them as adults. Productivity from the fishery is highly susceptible to short and long term and seasonal environmental variations, particularly drought.

Longfinned eels are harvested from the eastern half of Victoria and there is no restocking of this species into culture waters. Although the annual catch of longfinned eels in Victoria was historically much smaller than the annual catch of shorfinned eels, this species was much more important between 2000 and 2011. For the past 6 years annual catches have fallen back to historical levels of less than 20 tonnes.

The development of the Victorian commercial eel fishery is well documented since its expansion to supply European migrants in Melbourne in the 1950s (McKinnon 2002). This includes the practice of ‘culturing’ eels by stocking juvenile eels into lakes in western Victoria which, started during the 1960s. The commercial viability of this practice is highly dependent on access to seed stock.

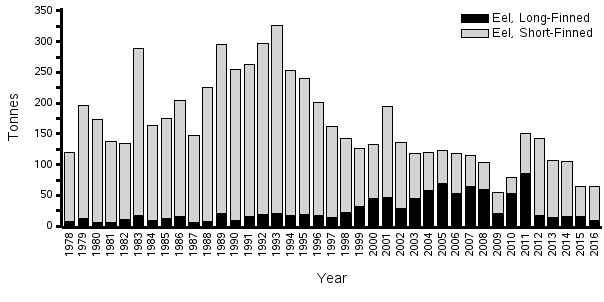


Figure 3. Commercial catches of longfinned eels and short-finned eels in Victoria from 1979 to 2016 (data source: Fisheries Victoria)

Between 1978 and 2016, annual catch ranged from 55.3-326.7 t/annum (mean 165.7 t/annum). From 6 to 86 t (mean 26.2 t) and 26.2-306.4 t (mean 139.5 t) of longfinned eels and shortfinned eels, respectively, were harvested annually. Shortfinned eels represented 84% of the catch over this period, and 33-88% (mean 64.5%) over last decade. Regionally, 54% of the catch was from the Western Victorian coastal region, followed by the eastern Victorian region (28%) and eastern-inland region (18%). Over the reporting period from 1978 to 2016, catch was highest in the western Victorian coastal region during much of the 1980s and 1990s, but declines observed in the western regions during the late 1990s and 2000s were attributed to the millennium drought reducing the area of harvestable waters, especially culture waters.

A protracted and significant drought which began in the mid-1990s has reduced both culture and wild shortfinned eel production. The longfinned eel production has been less impacted by drought.

***2.4.3 The recreational fishery***

Unlike commercial fishing, the number of recreational fishers and the amount of catch taken by them is unknown. The previous management plan for this fishery cited anecdotal evidence that the recreational catch of both species of eel is significant and this is supported by the estimate of recreational catch in 2000/01 (see section 5 below on monitoring). Since then, anecdotal observations suggest that recreational eel fishing has generally become less popular. A survey of 3,025 Recreational Fishing Licence holders to gauge inland fishing preferences in 2012 found that < 0.4% preferred to catch eels (Australian Survey Research 2012).

Recreational anglers are limited to 10 eels per person per day and all other rules under the Recreational Fishing Licence apply. There is no legal minimum length for eels taken by the recreational fishing sector, nor is this applied to any other sector in Victoria. Recreational eel fishing is permitted in all Crown waters which are open to recreational angling, including those stocked for commercial eel culture.

# Risk assessment

A risk assessment was undertaken to inform the development of this management plan. The method used for this assessment was based on the *National Ecologically Sustainable Development (ESD) Reporting Framework for Australian Fisheries* but taking into account the information available and scale of likely risk for the fishery. The assessment involved input from a stakeholder-based steering committee. The result is that risks have been prioritised taking into account how seriously they could affect the fishery and the likelihood that this will occur.

The ESD risk assessment identified the following priority issues to be addressed in this management plan.

Table 1. Factors considered to be high and moderate level risk in the ESD risk assessment process.

|  |  |  |
| --- | --- | --- |
| **Risk (Issue)** | **Risk Rating** | **Proposed Management Response** |
| Impacts of the environment on the fishery (culture sector) - Reduced water quantity (including drought and modification of flow regimes) | High | Development of a Victorian Eel Fishery Exceptional Circumstances Strategy |
| The costs for management of the fishery exceeds the recovered fees from the commercial industry, those received from the recreational fishing trust and associated public monies. | Moderate | Ensure management arrangements are effective at achieving management objectives whilst minimising costs and uses risk based approaches to ensure resources are targeted at the highest risks. |
| Access and management arrangements do not support commercial harvest resulting in reduced fisher income and employment in the sector | Moderate | Ensure management arrangements are effective at achieving management objectives whilst minimising costs. |
| Legislation and regulation does not adequately support efficient, effective and responsive management resulting in suboptimal fishery outcomes. | Moderate | Consider the feasibility of developing a harvest strategy for the Victorian eel fishery.  Ensure eel fisheries are part of a fisheries legislation review in 2019. |
| Impacts of the environment on the fishery - Reduced water quantity (including drought and modification of flow regimes) | High | Development of a Victorian Eel Fishery Exceptional Circumstances Strategy |
| Impacts of the environment on the fishery - Reduced water quantity by human activities (construction of barriers, water abstraction, change of land management activities etc.) | High | Ensure fishery’s information and interests are considered in the decision making processes, including those of other agencies |
| Impacts of the environment on the fishery - Reduced water quality (non-human) (eg. blackwater, toxic algal blooms, impacts of droughts, floods and fires) | Moderate | Development of a Victorian Eel Fishery Exceptional Circumstances Strategy |
| Impacts of the environment on the fishery - Reduced water quality by human activities (chemical spills, pollution, siltation, illegal estuary mouth openings etc.) | Moderate | Development of a Victorian Eel Fishery Exceptional Circumstances Strategy |
| Impacts of the environment on the fishery - effect of exotic species introductions (habitat change, competition, predation disease etc.) | Moderate | Advocate for improved biosecurity standards for imported eel products |
| Effect of fishery on environments - deliberate or accidental translocation of non-endemic species during re-stock. | Moderate | Ensure all stocking of eels into Victorian waters follows the *Protocols for the translocation of fish in Victorian inland public waters* and *Victorian Protocol for the Translocation of Eels* |

# Objectives of the Victorian Eel Fishery Management Plan

The objectives contained in Section 3 of the *Fisheries Act* 1995 (listed in Section 2.3 of the Plan) require Victoria’s fisheries to be managed in an efficient, effective and ecologically sustainable manner. The following fishery-specific, ‘guiding’ objectives and subsequent strategies for the Victorian Eel Fishery are consistent with these legislated objectives. Table 2 outlines the actions and performance measures for each strategy.

Objective 1: Long term sustainability of eel resources;

* Allow for sufficient adult eel escapement and recruitment thus stock sustainability;
* Ensure that the harvest is kept within limits that are consistent with the long term sustainability of the fishery;
* Allow fishing for eels in a manner that has minimal ecological impact; and
* Minimise biosecurity risks from imported product.

Objective 2: Equitable resource access and use;

* Maintain, and where possible improve, access to the fishery for recreational, commercial (including culture) and indigenous interests, taking existing regulations and legislation relating to access in inland and coastal waters into account; and
* Promote an efficient and effective eel culture sector.

Objective 3: Cost effective and participatory management;

* Enable participation by fishers and other relevant stakeholders in fisheries management, taking account of the respective responsibilities of government and fishers; and
* Ensure that the management of the fishery and the provision of associated services are efficient, effective and responsive.

Objective 4: Improving economic viability of the fishery;

* Encourage a profitable and viable commercial eel fishery that can support industry growth.

**4.1 Actions and performance measures**

Table 2. Fishery level objectives, strategies and actions for the Victorian Eel Fishery.

|  |  |  |  |
| --- | --- | --- | --- |
| **Objective** | **Strategy** | **Actions** | **Performance measure** |
| **1. Long-term sustainability of eel resources** | 1. Allow for sufficient adult eel escapement and recruitment thus stock sustainability. | 1(i) Identify waters specifically closed to commercial eel fishing, including a range of river sizes across the state. | 1(i) At least 30% of all connected rivers, creeks and streams with a common mouth opening to the sea, including their branches or tributaries are closed to commercial eel fishing. Excluding lakes, dams, swamps, marshes and morasses that exist or form off tributaries and their connecting streams. |
| 2.Ensure that the harvest is kept within limits that are consistent with the long term sustainability of the fishery | 2 (i) Consider the feasibility of developing a harvest strategy for the Victorian shortfinned and longfinned eel fisheries. | 2 (i) Decide on the suitability of the development of a harvest strategy by January 2018. |
| 2 (ii) Develop an improved and cost effective monitoring program to inform stock status | 2 (ii) Delivery of an enhanced monitoring program by July 2018, in consultation with commercial fishing industry. |
| 2 (iii) Maintain appropriate recreational bag and possession limits. | 2 (iii) Provisions to review recreational eel fishery management arrangements when needed are incorporated in the Victorian Eel Fishery Harvest Strategy. |
|  | 3. Allow fishing for eels in a manner that has minimal ecological impact | 3 (i) Ensure the operation of the fishery is consistent with the principles of ecologically sustainable development and the precautionary principle | 3 (i) Provide a robust and efficient reporting system for bycatch including TEP species. Ensure reporting is fit for purpose with high levels of confidence in the associated data and discuss with industry possible adaptation strategies where needed. |
|  |  | 3 (ii) Ensure bycatch management is considered as part of the Fisheries Regulation review | 3 (ii) Response to bycatch management has been considered as part of the Fisheries Regulation review. |
|  | 3 (iii) Fisheries Victoria and Industry to work collaboratively to improve the management of fyke nets, including trials of gear. | 3 (iii) Fisheries Regulation review to allow for the adoption of improved fyke net management. |
|  |
| 4. Minimise biosecurity risks from imported products | 4 (i) Engage with Biosecurity Victoria on imported eel products | 4 (i) Advocate for improved biosecurity standards for imported eel products |
| **2. Equitable resource access and use** | 1. Maintain, and where possible improve, access to the fishery for recreational, commercial and indigenous interests, taking existing regulations and legislation relating to access in inland and coastal waters into account | 1(i) Ensure fishery’s information and interests are considered in the decision making processes, including those of other agencies. | 1(i)(a) Commercial eel fishing is considered as part of recreational fish stocking decisions. |
| 1(i)(b) Commercial eel fishing is advocated for and recognised in the forward planning of applicable land and water managers. |
| 1(ii) Work with stakeholders and agencies to discuss access on game reserves. | 1(ii)(a) Meetings to discuss access to game reserves have been held and a decision conveyed to industry.  1(ii)(b) Fisheries Victoria advocates for commercial eel fishing which is recognised in the forward planning of game reserves. |
| 1(iii) Work with industry to identify and facilitate access to new waters. | 1(iii) Meetings with industry to scope potential new waters, including floodplains, have been held by July 2018. |
| 1(iv) Work with the Department of Justice and Aboriginal people to ensure that Aboriginal Victorians have ready access to eel resources for personal and communal purposes and for specified commercial purposes. | 1(iv) Engage with Victorian aboriginal groups to identify opportunities to harvest eels and support initiatives in this area. |
| 2. Promote and efficient and effective eel culture sector | 2(i) Develop, in consultation with industry, transparent and fair criteria by which permit applications are assessed. | 2(i) Transparent and fair criteria drafted under this plan (Appendix 2) to assess permit applications reviewed, in consultation with stakeholders, by July 2018. |
| 2 (ii) In consultation with the appropriate agencies and industry, develop a Victorian Eel Fishery Exceptional Circumstances Strategy. | 2(ii) A Victorian Eel Fishery Exceptional Circumstances Policy is drafted by December 2018. |
| **3. Cost effective and participatory management** | 1. Enable participation by fishers and other relevant stakeholders in fisheries management, taking account of the respective responsibilities of government and fishers | 1(i) Encourage Aboriginal Victorians to play a role in the management of eels in Victoria. | 1(i) Fisheries Victoria will work collaboratively with Aboriginal organisations, groups and individuals over time to build and foster relationships and beneficial partnerships that support Aboriginal participation and leadership in eel management. |
|  | 1 (ii) Provide opportunities for regular engagement with industry, indigenous and recreational sectors with fisheries managers. | 1 (ii)(a) Annual meeting to discuss eel fishery management has taken place. |
| 2. Ensure that the management of the fishery and the provision of associated services are efficient, effective and responsive | 2(i) Remove the need for a Private Land (Eel) Aquaculture Licence for any purposes other an intensive aquaculture. | 2 (i) A Private Land (Eel) Aquaculture Licence is no longer needed, where an EFAL is already held, for the stocking and fishing of water on private land. |
| 2(ii) Ensure management arrangements are effective at achieving management objectives whilst minimising costs. | 2(ii) Licence fees recovered from commercial licence holders are in accordance with the Government’s cost recovery policy. |
| **4. Improving economic viability of the industry** | 1. Encourage a profitable and viable commercial eel fishery that can support industry growth | 1 (i) Explore opportunities for industry to capitalise on market awareness. | 1(i) Organise a meeting with market access and trade promotion in DEDJTR by December 2017. |
| 1(ii) Complete work required for 10 year export approval under the EPBC. | 1(ii) Obtain 10 year certification for eel export under the EPBC by 2019. |
| 1(iii) Improve community awareness about the industry. | 1(iii) Work with Seafood Industry Victoria to implement a community education strategy by July 2018. |

# Managing the fishery

This section describes how the fishery will be managed to meet the fishery objectives from section 4 and to manage the risks identified in section 3.

## Aboriginal Victorians’ involvement in management of eels

Fisheries Victoria recognises the importance of Aboriginal Victorians’ engagement in decision making about their country and commits to working with Traditional Owners to establish joint management arrangements that will ensure Aboriginal Victorians play an important role in the management of eels throughout Victoria.

Fisheries Victoria will work collaboratively with Aboriginal organisations, including recognised Traditional Owner Group Entities, and individuals to build and foster relationships and beneficial partnerships that support Aboriginal participation and leadership in eel management. To achieve this, relevant groups and interested parties will be invited to an annual forum to discuss eel management issues.

A statement will also be developed in collaboration with the Federation of Victorian Traditional Owner Corporations, recreational and commercial fishing representatives and existing eel fishing licence holders outlining how the various groups will work together to communicate and share information, develop a shared understanding of goals and experiences and how problems will be solved together.

## Aboriginal Victorians’ access to eels

Fisheries Victoria recognises that access to eel resources is fundamental to the wellbeing of many Aboriginal Victorians and will work to actively recognise and facilitate access rights to eel for personal, communal and cultural use and specified commercial purposes.

Fisheries Victoria will achieve this through continued participation in Traditional Owners Settlement (TOS) Act settlement negotiations and a commitment to deliver the fisheries-related components detailed in existing TOS Act settlements. Fisheries Victoria also recognises the fishing rights provided for by the Native Title Act 1993.

For Aboriginal Victorians that aren’t currently part of a Traditional Owner group pursuing a settlement or a native claim, Fisheries Victoria will work with individuals on a case-by-case basis to provide relevant access to eels through existing permit arrangements under section 49 of the Fisheries Act 1995.

## Sustainability of Victorian eel fishery

***5.3.1 Waters specifically closed to commercial eel fishing***

The sustainability of the eel fishery is dependent on allowing for the escapement of a sufficient number of adult eels during their migration from coastal rivers to the marine spawning grounds and subsequent recruitment of juveniles into waterways to grow. To achieve this, at least 30% of all Victorian connected rivers, creeks and streams with a common mouth opening to the sea, including their branches or tributaries, whether or not on private property, will be closed to commercial eel fishing for a minimum of the life of this Plan. This excludes still water bodies that exist or form off tributaries and their connecting streams. The closed waters are listed in Appendix 1.

The waters listed in Appendix 1 were identified using the following rationale:

* Any waterway which currently provides access to commercial fishing in the system (through either an EFAL, CLE or Permit), including branches, tributaries or still water bodies located close to the entrance of the system, cannot be included as a closed water;
* Waterways mostly surrounded by Parks/Reserves are closed;
* Waterways known to have a high risk of TEP wildlife interactions or significant community values are closed;
* Waterways mostly surrounded by highly built up/urban growth areas are closed;
* An even distribution of closed waterways across the state is desirable;
* An even distribution of large (>60 km), medium (20>60 km) and small (<20 km) stream lengths between closed and possibly fished waters.

The waters identified using the above rationale and listed in Appendix 1 represent around 35.7% of all Victorian connected rivers, creeks and streams with a common mouth opening to the sea and includes eight of the thirty waters identified as ‘large’. This arrangement is conservative as the remaining waters beyond the list in Appendix 1 are not all fished, and considerable escapement and recruitment of eels is expected as a result of input controls applied to commercial fishing, and the limited areas of access in those waters from which harvesting occurs.

***5.3.2 Export accreditation***

Section 2.3 describes how all Australian export fisheries must be assessed against the *Guidelines for the Ecologically Sustainable Management of Fisheries* to ensure that fisheries are managed in an ecologically sustainable manner. The Victorian eel fishery has won conditional approval to continue eel exports until May 2019. A further application will need to be drafted to continue the export accreditation for the fishery beyond that date.

There is now opportunity for, and precedent set, for a 10 rather than 5 year export accreditation which will reduce resources spent preparing applications and improve business security.

Fisheries Victoria will facilitate the application to the Commonwealth Department of Environment for extended export approval on behalf of industry when required and will seek ten year accreditation.

***5.3.3 Harvest strategy development***

Monitoring of the Victorian eel fishery is heavily dependent on commercial fishery dependant catch and effort data. The monitoring requirements of the fishery are further discussed in section 5.4 of this Plan.

An action of this Plan is to consider further work on the development of a harvest strategy.

## Harvest regulations

***5.4.1 Commercial harvest regulations***

Commercial fishing for eels in Victoria is authorised through an Eel Fishery Access Licence as set out in Division 6 of the Fisheries Regulations. The authority of exclusive commercial access to a waterway stocked for the purpose of grow out under natural conditions is provided through either an Aquaculture (Crown Land - Eel) Licence (CLE) or Aquaculture (Private Land – Eel) Licence (PLE). Following the implemented of this Management Plan, new arrangements will be made so that a PLE will only be needed for intensive aquaculture of eels. Exclusive commercial access to the stock enhanced water for grow out under natural conditions on private land will be provided through an agreement with the land owner, the authority to stock private waters will be provided through a separate authority (in accordance with the Translocation Evaluation Panel process) and the fishing conducted under an EFAL.

EFALs are transferable licences and a maximum number of 18 can be issued. Allocated waters may also be transferred between EFALs. Maintaining the current limit on EFALs allows for consolidation within the fishery and for the benefits of strengthening management arrangements to be shared across current licence holders. This builds security while continuing to allow for new entrants through transferable licences. CLEs are also a transferable entitlement. Current legislation does not preclude issuing a CLE to someone who does not own an EFAL, however this goes against the intention of the licence class and the previous Management Plan. For similar reasons for retaining the cap on EFALs, the Department is not likely to allow this in the future.

There are no legal minimum lengths, closed seasons, catch quotas or total allowable catch limits for the harvest of eels in the commercial fishery. The wild fishery is managed by restricted access to waters, a cap on the total number of EFALs and limits on the number, dimensions and mesh size of fyke nets.

The fishery is managed using input controls including:

* spatial restrictions (a network of closed waters where commercial eel fishing is prohibited)
* gear restrictions, and
* regulation of activities (e.g. nets must not obstruct more than 50% width of any river or stream).

Eels are harvested almost exclusively with fyke nets which are set and must be checked within 48 hours. A shorter timeframe is specified as a permit/licence condition when there is a greater risk to wildlife.

To ensure sustainability of eel stocks this Plan specifically closes a minimum 30% of Victorian connected rivers, creeks and streams with a common mouth opening to the sea. Of the allocated waters fished, and waters fished under permit, the majority are able to be fished only in the downstream reaches, the upper limit clearly defined by a major landmark (see Table 3). The closures under this Plan, in addition to other input controls, geographical restrictions and the opportunistic nature of commercial eel fishing, ensure adequate escapement of eels migrating to spawning grounds at sea.

Licence conditions of the EFALs and CLEs include waters which are able to be fished on each licence. Table 3 shows the allocation of waters specific to EFALS.

In addition, waters which can be commercially fished for eels by holders of EFALs and their nominated operators include:

1. Franklin River downstream from the South Gippsland Highway
2. Agnes River downstream from the South Gippsland highway
3. All Crown lakes, dams, swamps, marshes and morasses south of the Great Dividing Range\*, except:
   1. Lake Wendouree,
   2. those water bodies forming part of any Wildlife Reserve unless specified in a permit issued by the Executive Director, Fisheries,
   3. any water allocated to another licence holder,
   4. any water subject to an Aquaculture Licence under the Fisheries Act, 1995 specifying eels.
4. All rivers, creeks, channels and drains downstream of the South Gippsland Highway between Dandenong and the junction of the South Gippsland and Bass Highways, excluding those closed under this Plan
5. All rivers, creeks, channels and drains downstream of the Bass Highway between the junction of the South Gippsland and Bass Highways, and Wonthaggi, excluding those closed under this Plan.

Table 3. Allocation of waters to Eel Fishery Access Licences

|  |  |  |
| --- | --- | --- |
| **Eel Fishery Access Licence No.** | **Allocated Waters** | **Basin Name** |
| 1 | Tarwin River downstream from Mardon Rd Bridge (West Branch)  Albert River downstream from the railway bridge 2.4 km west of Alberton.  Gippsland Lakes | South Gippsland (27)  South Gippsland (27) |
| 2 | Eumerella River downstream from the Princes Highway Bridge, including Lake Yambuk.  Darlet Creek downstream from the Princes Highway Bridge  Fitzroy River downstream from the Princes Highway Bridge  Moyne River downstream from the Princes Highway Bridge  Surrey River downstream from the Princes Highway Bridge at Heathmere,  Shaw River downstream from the Princes Highway Bridge, plus all lakes, dams, swamps, marshes and morasses in the Portland and Glenelg River Basins | Portland (37) |
| 3 | Lake Purrumbete | Otway Coast (35) |
| 4 | No specific allocation. |  |
| 5 | Lower Barwon River between Queen’s Park and Grab Hole Drain  Lower Barwon River (inc. section of Connewarre Game reserve). | Barwon (33) |
| 6 | No specific allocation. |  |
| 7 | Tarra River downstream from Pound Rd Bridge. Gippsland Lakes.  Lower Lake Mallacoota. | South Gippsland (27)  East Gippsland (21) |
| 8 | Belfast Lough.  Shared allocation\* |  |
| 9 | Lake Gillear.  Shared allocation\* | Hopkins (36) |
| 10 | Merri River (inc. Kelly Swamp), downstream from the Wollaston Weir.  Shared allocation\* | Hopkins (36) |
| 11 | No specific allocation. |  |
| 12 | Aire River downstream from the Great Ocean Road.  Lake Corangamite. | Otway Coast (35)  Lake Corangamite (34) |
| 13 | Hospital Swamp  Lake Learmonth.  Reedy Lake section of Lake Connewarre | Hopkins (36)  Barwon (33) |
| 14 | No specific allocation. |  |
| 15 | Deep Lake  Lake Tooliorook. | Hopkins (36) |
| 16 | LaTrobe River downstream from Yallourn Storage Dam to the Swing Bridge at Sale  Moe Drain downstream from the Princes Highway Bridge.  Gippsland Lakes. | LaTrobe (26) |
| 17 | Lake Connewarree | Barwon (33) |
| 18 | Curdies River downstream from “The Narrows”.  Curdies Inlet.  Gellibrand River | Otway Coast (35) |

\*Shared allocation includes Belfast Lough, Darlet Creek downstream from the Princes Highway Bridge, Fitzroy River downstream from the Princes Highway Bridge, Moyne River downstream from the Princes Highway Bridge, Surrey River downstream from the Princes Highway Bridge at Heathmere, Shaw River downstream from the Princes Highway Bridge, plus all lakes, dams, swamps, marshes and morasses in the Portland and Glenelg River Basins

***5.4.2 Commercial glass eel fishery***

The utilisation of glass eels for stock enhancement requires glass eels to be on-grown in closed, intensive rearing systems prior to stocking in natural waterways. This condition is in place to boost the commercial production of eels in Victoria.

***5.4.3 Recreational harvest regulations***

There is a recreational daily bag and possession limit of 10 for eels (long and shortfinned) in Victoria. No minimum or maximum size limit applied to recreational take of eels.

Unless you are exempt, a Recreational Fishing Licence is required in Victoria when taking, or attempting to take, any species of fish by any method including line fishing, bait collection, gathering shellfish, yabby fishing, prawning and spear fishing.

As it is recognised that the recreational take of eels is likely to have only minor impact on Victorian eel resources, no changes to the recreational harvest regulations are required at this time.

## Management of ecosystem interactions

***5.5.1 Ecosystem influences on the fishery***

One of the greatest risks to the eel fishery is related to prolonged drought which causes habitat modifications with direct and profound effects on eel resources. This has been most notable for the culture of shortfinned eels where the loss of suitable culture waters and access to restock eels has limited production for more than a decade.

Other ecosystem influences on the fishery include the risk of pollution and poor water quality, shift in oceanic current patterns, introduced pests and disease. These are generally of less significance because those risks with high consequence (e.g. shift in oceanic current patterns) are viewed as unlikely to impact the fishery in the short/medium term, while those with higher likelihood have more localised impacts which are of only minor consequence to the Victorian fishery as a whole.

The development of a Victorian Eel Fishery Exceptional Circumstances Strategy would ensure that all procedures and permit conditions required to respond to environmental changes are pre-agreed and can be put in place as they are required.

***5.5.2 Impacts of fishery on habitats***

Environmental impacts of activities undertaken as part of the fishery are negligible. Potential impacts may include damage to riverine habitats, riparian and instream vegetation, and disturbance of the substrate and river banks due to deployment and retrieval of gear and the use of four-wheel-drive vehicles, boats, and water pollution due to the operation of outboard motors. Vessels are maintained and operated in such a way as to have minimal impact on the environment in terms of wash or pollution from leaking fuel or oil. Fyke nets are set with timber poles and/or steel pickets driven into the substrate and/or removable weights, and as such interfere little with instream or riparian habitat, and disturbance of the substrate is minimal. The partial or complete loss of nets, and subsequent effects of “ghost fishing” rarely occurs, however this could be an environmental issue if it became more widespread.

The gear used in the commercial eel fishery, and the methods employed to operate it, are managed in such a way as to have minimal impact on the environment and thus are considered to be relatively benign.

***5.5.3 Bycatch***

The incidental catch (bycatch) of aquatic animals including fish, mammals, reptiles and birds, occurs in the commercial eel fishery. Most fish bycatch species caught in fyke nets will remain alive and generally uninjured for extended periods of time. Some smaller species such as tupong, gudgeons and galaxiids, as well as juveniles of larger species such as bream and estuary perch, may become meshed in the fyke net material itself and may consequently perish. Potential bycatch species such as platypuses, water rats, turtles and water birds may not survive extended immersion in water whilst trapped inside fyke nets, however bycatch reduction grids and/or raised cod ends are used as a permit condition on fyke nets in some Wildlife Reserves for the purpose of minimising the capture or mortality of aquatic animals other than eels.

Fisheries Victoria recognise that in the course of undertaking licenced commercial fishing operations, listed fish under the Flora and Fauna Guarantee Act 1988 (FFG Act) and protected wildlife under the Wildlife Act 1995 (Wildlife Act) may inadvertently be taken, killed or harmed. A prosecution amnesty under the FFG Act and Wildlife Act was established for CLE and EFAL licence holders and operators in 2014 where the interactions are unintentional and reported to government.

Protected species interaction reporting is critical to the fishing industry’s public profile as a sustainably managed, low impact and environmentally responsible sector. Most commonwealth based fisheries require this, and in Victoria this has been a requirement for rock lobster, giant crab and scallop fisheries since 2007 and all other commercial fisheries likely to interact with protected species since 2015. Further, it is a requirement for export approval under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act).

Fisheries Victoria will work with stakeholders to provide a robust and efficient bycatch reporting system for threatened, endangered and protected species.

## Performance indicators, targets, monitoring and reporting

***5.6.1 Performance indicators, targets and sustainability measures***

The distribution and biology of eels render traditional stock assessment methods inappropriate for the fishery. The Commonwealth Department of Environment recognises that the input control mechanisms used to manage the Victorian eel fishery, including limiting the number of commercial licences, placing restrictions on commercial fishing gear and restricting commercial fishing to specified waters, provide adequate mechanisms to ensure that sustainable fishing practices occur.

***5.6.2 Monitoring of the fishery***

At present Victoria collects commercial fishery dependent information via catch and effort and bycatch reporting.

# Review of the Management Plan

This Victorian Eel Fishery Management Plan will be reviewed after 2 years to determine progress against the objectives outlined in section 4.1. A report will be provided to the CEO of the Victorian Fisheries Authority describing progress against the performance indicators.

# References

Aoyama, J., Mochioka, N., Otake, T., Ishikawa, S., Kawakami, Y., Castle, P., Nishida, M. and Tsukamoto, K. (1999). Distribution and dispersal of anguillid leptocephali in the western Pacific Ocean revealed by molecular analysis. *Marine Ecology Progress Series* 188: 193-200.

Australian Survey Research (2012). *Improving Inland Recreational Fishing Survey Report. DPI: Fisheries Victoria*. Australian Survey Research Group Pty Ltd, Ormond, Victoria. 89 pp.

Department of Primary Industries (2005). *Protocols for the translocation of fish in Victorian inland public waters*. Fisheries Victoria Management Report Series No. 24. Department of Primary Industries, Melbourne, Victoria.

DPI & DSE (2003). *Guidelines for Assessing Translocations of Live Aquatic Organisms in Victoria*. Department of Primary Industries & Department of Sustainability and Environment, East Melbourne, Victoria. 24 pp.

Kuroki, M., Aoyama, J., Miller, M.J., Watanabe, S., Shinoda, A., Jellyman, D.J., Feunteun, E. and Tsukamoto, K. (2009). Distribution and early life-history characteristics of anguillid leptocephali in the western South Pacific. *Marine and Freshwater Research* 59 (12): 1035-1047.

McKinnon L. (2002). *Victorian Eel Fishery Management Plan*. Department of Natural Resources and Environment, Melbourne. 48 pp.

McKinnon L.J. (2005). *Victorian Protocol for the Translocation of Eels*. Department of Primary Industries, Fisheries Report Management Series No. 27., Melbourne, Victoria.

McKinnon, L., Gasior, R., Collins, A., Pease, B. and Ruwald, F. (2002). Assessment of eastern Australian *Anguilla australis* and *A. reinardtii* glass eel stocks. In: *Assessment of eastern Australian Glass Eel Stocks and Associated Eel Aquaculture. Final Report FRDC Project No. 97/312 (and No. 99/333)* (Gooley, G.J. and Ingram, B.A. eds.), pp. 13-82. Marine and Freshwater Resources Institute, Alexandra, Australia.

Shen, K.N. and Tzeng, W.N. (2007). Genetic differentiation among populations of the shortfinned eel *Anguilla australis* from East Australia and New Zealand. *Journal of Fish Biology* 70 (Suppl B): 177-190.

Watanabe S., Aoyama J. & Tsukamoto K. (2006) Confirmation of morphological differences between *Anguilla australis australis* and *A. australis schmidtii.* *New Zealand Journal of Marine and Freshwater Research* 40 (2), 325-331.

# Appendices

# Appendix 1

**Waters closed to commercial eel fishing**

The following list of waters, including their branches or tributaries, whether or not on private property, are closed to commercial eel fishing for a minimum of the life of this management plan. This excludes lakes, dams, swamps, marshes and morasses that exist or form off tributaries and their connecting streams.

| **Eastern Victoria**  *Basin No. Water*  21 Shipwreck Creek  21 Wingan Inlet  21 Benadore River  21 Red River  21 Easby Creek  21 Thurra River  21 Cann River  21 Tamboon Inlet  27 Merriman Creek  27 Sealers Creek  27 Tidal River | **Western Victoria**  *Basin No. Water*  35 Spring Creek  35 Freshwater Creek  35 Anglesea River  35 Painkalac Creek  35 Erskine River  35 St George River  35 Wye River  35 Kennett River  35 Barham River |
| --- | --- |
| **Westernport and Port Phillip Bay Streams**  *Basin No. Water*  27 Saltwater Creek  27 Bass River  28 Kananook Creek  28 Lang Lang River  28 Yallock Creek  28 Bunyip River Catchment  28 Cardinia Creek Catchment  28 Merricks Creek  28 Balcombe Creek  28 Patterson River  28 Mordialloc Creek  29 Yarra River  29 Elwood Canal  30 Maribyrnong River Catchment  31 Little River  31 Kororoit Creek  31 Laverton Creek  31 Skeleton Creek  32 Limeburners Lagoon/Hovell  Creek |  |

# 

# Appendix 2

**Criteria for the assessment of commercial eel fishing permit applications**

To assess the suitability of a water for commercial eel fishing:

1. The water must not be specifically closed under the Management Plan;
2. The water cannot be directly connected to another license holders culture water – unless written endorsement from the relevant license holder is obtained;
3. The permit application should take into consideration connectivity with allocated waters on another license holders Eel Fishery Access License and seek written endorsement from the relevant license holder;
4. The permit application should take into consideration high cultural and community values\* –
   1. Is the water regularly stocked for recreational fishing purposes
   2. Is the water a Premier River or Premier Lake
   3. Is the water a Ramsar site or located in a National Park
   4. Is the water used for other mutually exclusive activities (e.g. water skiing, regular fishing competitions)
5. The permit application should take into consideration high risk for interactions with threatened, endangered or protected (TEP) species\* –
   1. Is this water known to have large populations of TEP species including platypus and water rates
   2. Is this water situated in a Wildlife Reserve

\*Additional permit conditions may be considered to mitigate risks if the water falls under some of this criteria to an extent.

If a water is deemed suitable for commercial eel fishing following the above criteria, and there is more than one application received then the following principles should be applied, in the subsequent order of significance:

1. If the water is connected to one of the applicants currently allocated and/or culture waters then that license holder is automatically the preferred applicant;
2. If the water has catch history relating to the take of re-stock eels, then the license holder who holds an entitlement to a culture water has preference, taking into account the following should there be more than one –
   1. The drying cycle, flooding frequency and other security aspects of the culture waters
3. If the water does not have a catch history relating to the take of re-stock eels, or both applicants do not hold an entitlement for a culture water, then should an applicant have no exclusive access to fishing in an allocated water on their EFAL, under permit or a culture water, then they have first preference;
4. If the above principles do not clearly determine a preferred applicant, then the applicants will be required to reach an agreement. This could involve a transfer of existing entitlements or shared access to the water under application.