

# Tasmanian Freshwater Eel Fishery - Application on Ecological Sustainability

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**Application to the Department of the  
Environment for the re-assessment of the  
Tasmanian Freshwater Eel Fishery.**

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**January 2014**

**Submitted by the Inland Fisheries Service  
Tasmania**

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## 1. Description of the fishery

The Tasmanian Freshwater Eel Fishery is a small commercial fishery based on two species of anguillid eels; short-finned eel (*Anguilla australis*) and the long-finned eel (*Anguilla reinhardtii*). The fishery has remained viable since 1965 with the majority of the harvest focusing on short-finned eels. The fishery is focused on “brown” feeding eels harvested in inland waters with migrating spawning “silver” eels generally comprising a minor part of the overall harvest.

The short-finned eel is distributed around South East Australia, and New Zealand. In Australia, this eel is more abundant in Victoria and Tasmania and abundance recedes northwards in New South Wales and Queensland. The distribution of long finned eels is similar except that the pattern of abundance is reversed. This eel is also found in the northern parts of the Northern Island of New Zealand and is only a minor component of the New Zealand eel fishery (Jellyman 2007).

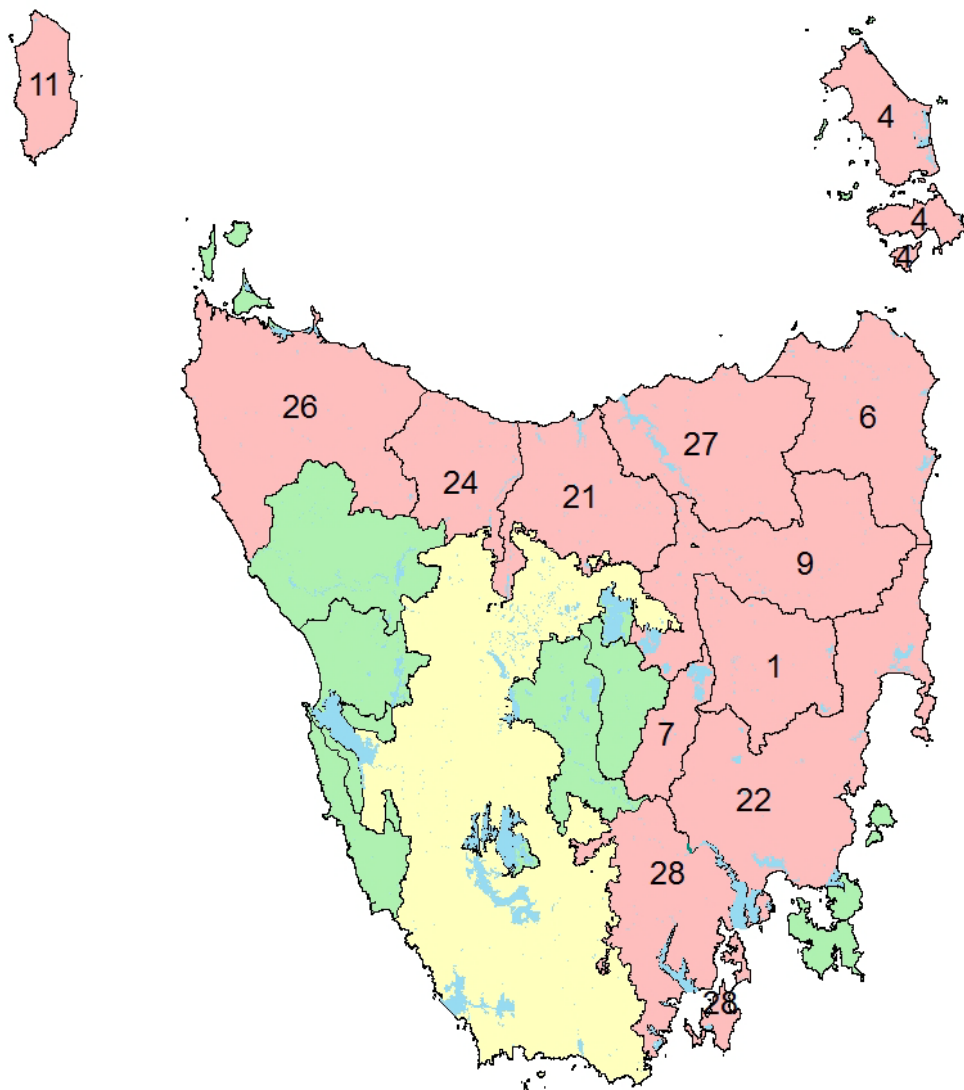
These species are exploited in other jurisdictions including New South Wales, Victoria, Queensland, some South Pacific islands and New Zealand, the reliance of the fishery on populations from these jurisdictions is unknown and there is no overall coordination in their management.

The Tasmanian Freshwater Eel Fishery is focused on wild harvest of “brown” feeding eels and migrating spawning “silver” eels over 300mm in length. Fishing is restricted to the use of fyke nets, eel traps or downstream migratory traps. There is currently no aquaculture of either species in Tasmania.




There are 48 major defined water catchments in Tasmania (DPIWE 2000) and 38 are allocated to the commercial eel fishery. The fishery is managed by 12 geographically defined commercial fishing licenses (see map below) that are transferrable and provide exclusive commercial rights within the defined area. Within licence areas fishing activity occurs in both public and private waters. Access permission is required from landowners, water authorities or land managers. Most activity is focused on still water-bodies and fyke netting in rivers is prohibited or specifically limited for all licenses. For the total fishery less than 1% of all rivers are permitted to be fished (Boxall 2003) and this management control, in combination with the closed catchments underpins sustainability of the fishery.

Commercial Freshwater Fishing Licenses are issued under the *Inland Fisheries Act 1995*, each licence includes a suite of conditions that reflect management measures appropriate to the waters included in the licence. Subordinate legislation, specifically the *Inland Fisheries (Commercial Nets and Fees) Regulations 2009*, *Inland Fisheries (Recreational Fishing) Regulations 2009* and *Inland Fisheries (Seaward Limits) Order 2004* also apply.

# Commercial freshwater fishing licence catchments



### Legend

-  World Heritage Area
-  Eel licences
-  Un-licensed catchments

0 25 50 100  
Kilometers



There is no total allowable catch for the fishery given the exclusive access rights of each licence holder and their imperative to manage for economic sustainability. Each licence holder pays an annual licence fee and a royalty for each kilogram of eel taken from the fishery to the Inland Fisheries Service. Variations and requests to use different gear configurations to suit specific situations are dealt with under Exemption Permit or incorporated in the licence conditions.

A fyke net is a net that (a) does not exceed 670 mm in opening height, (b) does not exceed 670 mm in width, (c) has mesh that is not less than 15 mm and not more than 39 mm and (d) any wing or leader of which does not exceed 10 m in length and does not exceed 1 200 mm in drop. An eel trap is a trap that (a) does not exceed 500 mm in height, (b) does not exceed 2 m in length, (c) does not exceed 500 mm in width, (d) does not have wings or leaders and (e) has a mesh of at least 39 mm.

Fyke nets and eel traps set fully submerged must have a platypus exclusion screen fitted with no opening greater than 220mm. In certain waters a screen with a 280mm opening may be used provided that the cod end is raised 300mm above the water surface. There is no limit on the number of nets or traps that can be used however each fyke net or trap must be inspected and emptied within a 24 hour period. Logbooks issued by the Inland Fisheries Service are used to record catch and effort in the fishery, logbook returns are submitted monthly, by-catch is also recorded for sustainability reporting purposes.

Commercial fishers are prohibited from taking eels less than 300mm in length, the Inland Fisheries Service provides annual restock for the fishery and for environmental stocking programs from migratory barriers in the Derwent River and South Esk River catchments. Commercial fishers may transfer small eel over 300mm as restock within a licensed catchment with the approval of the Inland Fisheries Service.

Recreational fishers also participate in the eel fishery and total annual harvest estimates are not routinely collected. A National Recreational fishing survey published in 2003 indicated that 8 250 eels were taken recreationally in Tasmania during 2000-01 (Henry and Lyle 2003). This figure combines marine conger eels with freshwater eels caught. If an assumption is made that around half were freshwater eels with a release rate of 44% then the recreational harvest would amount to less than 5% of the commercial harvest. On this basis the recreational harvest is generally considered low to insignificant. Additional statistics on recreational eel fishing will be gathered through a collaborative recreational survey project with DPIPWE Marine resources due to be published later in 2014.

There is no indigenous sector within the fishery.

The Tasmanian Freshwater Eel fishery was first assessed against the guidelines for the ecological sustainable management of fisheries in 2003 and has been declared as an approved Wildlife Trade Operation (WTO), under Part 13A of the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999)* since this time. This current declaration expires in May 2014.

## 2. Management

There have been no changes in the management arrangements for the commercial eel fishery since the last assessment in 2009. There has been some industry change with a move from single licence operator arrangements to a one group owning multiple licences. This trend is continuing in 2014 with

a further three licences in the process of transfer to the main group, which will then hold seven of the twelve licences.

A Tasmanian industry development plan is in currently being developed funded through FRDC. The plan is being coordinated jointly by the University of Tasmania, Inland Fisheries Service, commercial fishers, with input from recreational fishers, conservation groups and other stakeholders. The objective of the plan is to maximise the potential of the fishery, whilst ensuring ecological and economic sustainability. It has focused on maintaining current management controls and exploring opportunities to develop fisheries in closed lake systems or fattening of wild caught fish. The plan will convey a common set of performance objectives indicators and measures agreed by industry management and other stakeholders it is envisaged that this will form the basis for future reporting. The development of this document has been the priority for IFS and its key output for the sector and will be completed in 2014. The draft Performance indicators and measures are listed in the table below.

| Objective                             | Performance indicator  | Performance measure  | Management Response  |
|---------------------------------------|--|--|--|
| <b>Target species</b>                 |  |  |  |
| Sustainable harvest at current levels | Catch (kg) per net per day from each licence catchment   | No more than three consecutive years of decrease in CPUE from each licence catchment | If performance measure exceeded then review restocking allocations for each licence catchment                                  |
| Ongoing natural recruitment           | Total harvest (kg) of juvenile eels from indicator sites at Lake Meadowbank and Trevallyn Tailrace | Total harvest is within 50% of five year rolling average                             | If performance measure exceeded then initiate a detailed assessment of local issues that may have impacted harvest             |
|                                       | Number of juvenile eels per kg from indicator sites at Lake Meadowbank and Trevallyn Tailrace      | Number of juvenile eels per kg is within 50% of five year rolling average            | If performance measure exceeded then initiate a detailed assessment of age structure and recruitment strength of juvenile eels |
| Continued stock enhancement           | juvenile eel stocked   |  |  |
| <b>Protected species</b>              |  |  |  |
| Platypus                              | Number caught and killed   | No more than 5 individuals per year  | Initiate targeted compliance operation   |
| Water rats                            | Number caught and killed   | No more than 5 individuals per year  | Initiate targeted compliance operation   |

|  |   |  |   |
|--|---|--|---|
| <b>Ecosystem Impacts</b>   |   |  |   |
| Translocation of pest fish species                                 | Change in distribution of pest fish species | No change in the distribution of pest fish species | If pest fish distribution increases in licence area then commence investigation |
| Translocation of pathogens<br>Platyplus mucor or<br>Chytrid fungus | Change in distribution of pest fish species | No change in the distribution of pathogens         | If pathogen distribution increases in licence area then commence investigation  |

In the absence of a finalised suite of stated measures and indicators, the Service has continued to manage the fishery in an adaptive manner to ensure that target species are harvested within historical limits, by-catch is minimised and protected species by-catch is avoided.

Compliance risk is managed through a close and effective relationship with the small number of commercial eel fishers in the industry. Outstanding or emerging issues are dealt with timely, effectively and often on a one to one basis in the field. In addition to formal compliance operations by Inland Fisheries Authorised Officers, there is a level of scrutiny from the public typically recreational fishers who report any unusual activities. The highest risk areas are in maintaining platypus exclusion screens in fyke nets, cleaning and emptying nets between catchments or water bodies, meeting the requirement for 24 hourly net checks and submitting log book returns monthly.

The general lack of change in the management of the fishery has not required extensive consultation. The Industry Development Plan currently being developed has consulted widely with recreational groups, water managers, conservation groups, fisheries managers and industry. The Inland Fisheries Advisory Council remains the statutory advisory body for the provision of advice for the Minister of Inland Fisheries and is also used by the Service for consultation on a range of matters. This body has statutory requirements for representation across several interest areas in inland waters including importantly the commercial sector. Similarly the Tasmanian Professional Eel Fishers Association remains an important body for consultation for the Service.

In regard to cross-jurisdictional management Tasmania has worked closely with Victorian eel fishers and the Victorian Government in a number of areas. Tasmania has continued to supply juvenile eels to Victoria for stocking impoundments and this year provided further industry support through a 4 year deferred payment scheme brokered by the Victorian Government. By invitation the Inland Fisheries Service participated in a Ecological Risk Assessment Workshop held in Melbourne in December 2013. Co marketing arrangements have also been negotiated between Victorian and Tasmanian eel fishers to improve the capacity of the industry. There has been no arrangement with other jurisdictions regarding the eel fishery.

### 3. Research and Monitoring

No research projects relevant to the fishery have been completed in the past five years.

Hydro Tasmania is investigating methods to prevent eel entrainment into power station intakes, in order to reduce mortality in migrating (downstream) adult eels

The primary source of information on the eel fishery is gathered through a fishery dependant logbook program. Logbooks form a mandatory part of the administrative responsibilities of each fisher. These are to be completed on a daily fishing basis and submitted to the Service each month. Data recorded, includes, date, water fished, species, effort, catch, released quantity, sale quantity, details of eel transfers and details of by-catch.

#### 4. Catch Data

The unit of data used to indicate the total catch of eels from the fishery is the weight of eels retained by fishers this excludes the quantity of eels caught but released due to being of insufficient size to meet the market requirements. The fishery is strongly season dependant with most fishing occurring from September to April.

The total industry combined annual harvest (kg) (retained) for the past five years is summarised in the table below. \*for 2013-14 data is to the end of October only.

|                  | 2013-14       | 2012-13       | 2011-12       | 2010-11       | 2009-10       |
|------------------|---------------|---------------|---------------|---------------|---------------|
| Short-finned eel | 7 590*        | 51 710        | 75 422        | 30 755        | 32 185        |
| Long-finned eel  | 1 800*        | 1375          | 74            | 3 609         | 5 402         |
| <b>Total</b>     | <b>9 390*</b> | <b>53 085</b> | <b>75 496</b> | <b>34 364</b> | <b>37 587</b> |

The total annual harvest (kg) (retained) by commercial licence for the past five years is summarised in the table below, short-finned eel/long-finned eel.\*for 2013-14 data is to the end of October only.

| Licence      | 2013-14       | 2012-13       | 2011-12       | 2010-11       | 2009-10       |
|--------------|---------------|---------------|---------------|---------------|---------------|
| 1            | 0*            | 0             | 1 972         | 767           | 1148          |
| 4            | 0/0*          | 0/0           | 0/0           | 627/163       | 0/0           |
| 6            | 1 950/1 800*  | 1 773/1 375   | 7 599/74      | 5 367/3 346   | 1 847/5 402   |
| 7            | 0*            | 8 422         | 10 554        | 7 344         | 5 668         |
| 9            | 1 490*        | 15 252        | 9 729         | 4 597         | 10 690        |
| 11           | 800*          | 2 000         | 1 595         | 763           | 347           |
| 21           | 0*            | 15 741        | 14 649        | 9 388         | 7 336         |
| 22           | 3 350*        | 5 854         | 18 179        | 705           | 4 214         |
| 24           | 0*            | 4             | 201           | 0             | 60            |
| 26           | 0*            | 617/0         | 6 569/0       | 427/100       |               |
| 27           | 0*            | 658           | 2 277         | 0             | 815           |
| 28           | 0*            | 0             | 0             | 0             | 0             |
| Permit       |               | 1 389         | 2148          |               | 60            |
| <b>Total</b> | <b>9 390*</b> | <b>53 085</b> | <b>75 496</b> | <b>34 364</b> | <b>37 587</b> |

There is considerable variability in the annual harvest driven by environmental factors such as the amount of rainfall and market demand in terms of size and price per kilogram. Short-finned eels dominated the harvest in line with historical records with long-finned eels only taken from three

licence areas. The annual harvest over the past five years was within the historical limits of the fishery (maximum harvest of 94 490 kg in 1967-68) although 2011-12 was the second highest harvest year recorded since the fishery commenced. Licences 1, 4, 24 and 27 were fished spasmodically and licence 28 was not fished at all for the period

In addition to the retained catch of eels there is a significant proportion released each year, these fish are typically under market size and depending on the particular water they are released or transferred to an understocked water with better growth potential. The total industry combined annual catch (kg), released at point of capture or transferred to another water within each respective licence catchment area over the past five years is summarised in the table below. \*for 2013-14 data is to the end of October only.

|                  | 2013-14       | 2012-13       | 2011-12      | 2010-11      | 2009-10      |
|------------------|---------------|---------------|--------------|--------------|--------------|
| Short-finned eel | 1 425*        | 14 401        | 5 616        | 8 906        | 7 004        |
| Long-finned eel  | 0*            | 0             | 0            | 637          | 2 583        |
| <b>Total</b>     | <b>1 425*</b> | <b>14 401</b> | <b>5 616</b> | <b>9 543</b> | <b>9 587</b> |

The total annual catch (kg) Long-finned eels (LF) and Short-finned eels, (released/transferred) by commercial licence for the past five years is summarised in the table below.

| Licence      | 2013-14       | 2012-13       | 2011-12      | 2010-11             | 2009-10            |
|--------------|---------------|---------------|--------------|---------------------|--------------------|
| 1            | 0/0*          | 0/0           | 227/0        | 518/0               | 480/0              |
| 4            | 0/0*          | 0/0           | 0/0          | 123/0               | 0/0                |
| 6            | 0/930*        | 450/6 874     | 0/0          | LF 637/0<br>1 086/0 | LF 2 583/0<br>49/0 |
| 7            | 0*            | 442/0         | 2 294/0      | 0/0                 | 0/0                |
| 9            | 0*            | 0/650         | 0/0          | 0/0                 | 5/0                |
| 11           | 495/0*        | 1 134/0       | 710/0        | 424/0               | 111/30             |
| 21           | 0*            | 3 182/0       | 2 363/0      | 4 602/76            | 3 144/0            |
| 22           | 0*            | 40/0          | 0/0          | 170/0               | 2 460/700          |
| 24           | 0*            | 0/0           | 22/0         | 0/0                 | 0/0                |
| 26           | 0*            | 0/1 400       | 0/0          | 1293/0              | 0/0                |
| 27           | 0*            | 0/0           | 0/0          | 120/0               | 15/10              |
| 28           | 0*            | 0/0           | 0/0          | 0/0                 | 0                  |
| permit       |               | 229/0         |              | 570/0               |                    |
| <b>Total</b> | <b>1 425*</b> | <b>14 401</b> | <b>5 616</b> | <b>9 543</b>        | <b>9 587</b>       |

Most catchments showed good numbers of released fish in most years, the exception was 2011-12 when only 5 616 kg were released, advice from commercial fishers indicated that a broader size range were sold due to market opportunities for smaller fish in this year.

There is a small recreational take mainly of short-finned eels, however this is not considered significant to the sustainability of the fishery, past surveys have indicated that the quantum is less than 5% of the commercial harvest. There is no specific recreational licence for taking eels and most are taken and released while fishing for other recreational species primarily brown trout.



In addition to the commercial and recreational sectors fishing for adult eels, the Inland Fisheries Service harvests juvenile eels from two locations below large Hydro Tasmania power generation dams. The two locations are the Trevallyn Tailrace at Riverside in Launceston and below the Meadowbank Dam on the Derwent River. The dams present an insurmountable obstacle for juvenile eels migrating upstream where they are subject to high mortality due to predation and stranding. The IFS considers this a “dead end” with the assumption that none of the accumulating fish will have the opportunity of completing their life cycle. On this basis juvenile eels are harvested and allocated to environmental stocking programs above Hydro Tasmania dams to commercial eel fishers for stock enhancement and for sale.

The juvenile eel harvest for the past five years is presented in the table below. The figure for 2013-14 is for the season to the end of January 2014.

| Year     | Meadowbank Dam (kg) | Trevallyn Tailrace (kg) | Total (kg) |
|----------|---------------------|-------------------------|------------|
| 2009-10  | 330                 | 820                     | 1 150      |
| 2010-11  | 230                 | 1 163                   | 1 393      |
| 2011-12  | 295                 | 588                     | 883        |
| 2012-13  | 663                 | 967                     | 1 630      |
| 2013-14* | 1379*               | 922*                    | 2 301*     |

The commercial eel fishery is mainly exploited using fyke nets which can result in the capture of fish, water birds, platypus, water rats, frogs or crayfish. The issue of larger birds and mammal is managed by gear restrictions primarily platypus exclusion screens which physically prevent entry provided they in good order and fitted correctly. The following table describes the typical by-catch for the past five years

| By-catch species                                   | Scientific name                 | 2013-14 | 2012-13 | 2011-12 | 2010-11 | 2009-10 |
|--|---------------------------------|---------|---------|---------|---------|---------|
| trout  |                                 | many    | many    | many    | many    | many    |
| tench  | <i>Tinca tinca</i>              | many    | many    | many    | many    | many    |
| redfin perch                                       | <i>Perca fluviatilis</i>        | many    | many    | many    | many    | many    |
| sandies  | <i>Pseudaphritis urvillii</i>   | many    | many    | many    | many    | many    |
| blackfish  | <i>Gadopsis marmoratus</i>      | -       | many    | many    | many    | many    |
| carp   | <i>Cyprinus carpio</i>          | -       | few     | few     | many    | -       |
| lamprey  |                                 | -       | -       | 1       | -       | -       |
| Large silver unidentified fish<br><i>Mulloway?</i> |                                 | -       | -       | -       | 4       | -       |
| Galaxias spp                                       | <i>Galaxias spp.</i>            | many    | many    | many    | many    | many    |
| pigmy perch  | <i>Nannoperca australis</i>     | many    | many    | many    | many    | many    |
| platypus   | <i>Ornithorhynchus anatinus</i> | 4       | 2       | 4       | 1       | 5       |
| water rat  | <i>Hydromys chrysogaster</i>    | -       | -       | -       | -       | -       |
| cormorants   |                                 | -       | 1       | -       | -       | -       |
| frogs  |                                 | -       | -       | -       | 3       | 5       |
| yabby  | <i>Cherax destructor</i>        | -       | few     | few     | few     | few     |
| crayfish   | <i>Astacopsis gouldi</i>        | -       | -       | -       | 5       | -       |

The dominant by-catch in terms of number and weight for the period was redfin perch followed by tench and trout, these introduced fish are abundant in the State with only trout of interest from a sustainability perspective due to a large recreational fishery around these fish. Trout survive well in fyke nets and are released unharmed, the other introduced species are retained and disposed of. Both carp and yabbies are noxious species with access to carp in particular closely managed in Lake Sorell. For the native species pygmy perch, blackfish, sandies and galaxias were quite abundant in certain dams fished with most released unharmed, *Galaxias auratus* and *Galaxias tanycephalus* were part of this by-catch in lakes Sorell and Crescent and Woods Lake respectively, all three lakes have abundant populations and their exposure to the eel fishery is low. A single water returned 5 *Astacopsis gouldi*, again these survive well in nets and were released unharmed and overall there was very little interaction with this species. The main by-catch concern remains around the capture of platypus by the eel fishery. The capture rate reported was very low but the take of protected fauna is of concern. The take and reporting of platypus in the eel fishery has been the subject of a major investigation by the Inland Fisheries Service and Wildlife enforcement officers in 2013, the outcome from this process will be used to formulate a more targeted compliance routine for the fishery in future years.

Fishing effort in the fishery typically varies due to market demand and climatic conditions. The effort data below represents the landed catch only, in some cases there has been significant transfer or release of size fish that do not meet the market demand which otherwise may have increased the catch per effort. Total effort in net days is presented for each licence together with catch (kg) per net day, calculations are based on total catch held for both long-finned and short-finned eels combined and noting that 2013-14 is year to end of October 2013 only. Data entered for 2009-2011 is yet to be checked and validated so has not been included.

| Licence | 2013-14  |                  | 2012-13  |                  | 2011-12  |                  | 2010-11 |   | 2009-10 |   |
|---------|----------|------------------|----------|------------------|----------|------------------|---------|---|---------|---|
|         | Net days | Catch kg/net day | Net days | Catch kg/net day | Net days | Catch kg/net day |         |   |         |   |
| 1       | 0        | 0                | 0        | 0                | 1868     | 1.06             | -       | - | -       | - |
| 4       | 0        | 0                | 0        | 0                | 0        | 0                | -       | - | -       | - |
| 6       | 3750     | 1.30             | 7400     | 0.43             | 4688     | 1.64             | -       | - | -       | - |
| 7       | 0        | 0                | 5700     | 1.48             | 6194     | 1.70             | -       | - | -       | - |
| 9       | 20       | 74.50            | 6091     | 2.50             | 1817     | 5.35             | -       | - | -       | - |
| 11      | 376      | 2.13             | 341      | 5.87             | 234      | 6.82             | -       | - | -       | - |
| 21      | 0        | 0                | 5143     | 3.06             | 5073     | 2.89             | -       | - | -       | - |
| 22      | 1470     | 2.28             | 2850     | 2.05             | 6003     | 3.03             | -       | - | -       | - |
| 24      | 0        | 0                | 14       | 0.29             | 86       | 2.34             | -       | - | -       | - |
| 26      | 0        | 0                | 650      | 0.95             | 2774     | 2.34             | -       | - | -       | - |
| 27      | 0        | 0                | 513      | 1.28             | 1050     | 2.16             | -       | - | -       | - |
| 28      | 0        | 0                | 0        | 0                | 0        | 0                | -       | - | -       | - |

There was a trend of reduced catch per net per day in the fishery in 2012-13 following the high harvest in 2011-12. This trend appears to be inflated by a higher release and transfer figure in 2012-13 which possibly relates to a higher proportion of smaller eels in the catch or a change in the size required in the market. Overall the catch per net day is generally in the quantum of that reported in the early days of the fishery, Sloane (1984) reported an industry average of 3.08 kg per net day for

the period 1966 -1982. There were also several licence catchments that had no or very little effort for the period, this has related to a limited capacity to fish multiple licences, resting of catchments and in one case a long term period of inactivity. The catchments with low activity have most likely enhanced sustainability in the fishery through enhanced capacity for escapement of migrating adult eels.

## **5. Status of Target Stock.**

The Tasmanian eel resource is tightly managed with significant areas protected from fishing, the fishery has been exploited within historical limits and has been viable since 1966. Eel recruitment as indicated by the monitored sites at Meadowbank Dam on the Derwent River (South) and the Trevallyn Tailrace on the Tamar River (North) remains variable but continuous with interpretation of recruitment strength complicated by seasonal factors, river discharge, power station operations and fishing effort. Catch rates from the commercial fishery remain within historical limits and accordingly there is no immediate concern with the fishery resource.

Drought imposes a serious resource concern in terms of loss of habitat and fishing areas, combined with reductions in the total eel population. Despite this concern it is worth noting that the fishery over the past five years has emerged from 15 years of drought in relatively good shape, with consistent harvest and CPUE across most fished catchments.

One of the main concerns expressed by industry is the potential impact on the Tasmanian fishery through the exploitation of eel stocks in other jurisdictions and the impacts of drought and other human activities such as instream dams on the species. Again this does not appear to have manifested in the Tasmanian fishery to date although the potential remains for future impacts if management measures reduce in other jurisdictions.

Whilst not a direct resource concern the market price and capacity of the Tasmanian fishery to supply sufficient volumes to meet market demand is a major concern to industry. This is a significant driver of fishing activity and there is some risk that the industry may not be economically sustainable into the future without improved production capacity from some form of aquaculture.

Stock assessments have not been conducted for the eel fishery in Tasmania due to the relatively small scale of the industry. Preference has been given to an assessment of catch and CPUE data from the 12 licensed catchments and self imposed assessment and management within licence areas by fishers. Given the lack of resource concern in the fishery, stock recovery strategies have not been required. The Inland Fisheries has however offered a minimum of 50kg of juvenile restock to each licence holder each season to allow for stock supplementation where natural recruitment is restricted by manmade structures such as dams or weirs or where productivity is sufficiently high to sustain high harvest rates.

## **6. Interactions with Protected Species.**

The commercial fishery interacts with protected species although the nature of these interactions is determined by specific local circumstances including the very restricted distribution of certain fish species. The interaction with protected species is generally limited with considerable attention given to gear restrictions aimed at addressing interactions with platypus and other large air breathing animals. Platypus and water rats are common in Tasmania and past experience shows that they will enter fyke nets. Significant effort and consultation has been expended on establishing the best measures to minimise interactions and to mitigate against the risk of harm to particularly to platypus. The Service mandates measures to address this impact through conditions on each eel fishing licence. Fyke nets must have platypus exclusion screens or set with cod ends raised to allow survival of platypus until the net is cleared. Water rats are regularly encountered but rarely caught as they

typically chew their way out of nets. The exclusion screens also limit the chance of water birds and larger fish from entering fyke nets or traps. The bycatch of protected species listed in the Catch section above shows that very small numbers are taken by the industry each year.

Whilst protected freshwater fish can be captured during fishing they are typically larger individuals that are released without harm back to the water. The large mesh size of fyke nets limits the interactions with small fish such as paragalaxias as they pass through the mesh. The interaction is very limited spatially being restricted to Arthurs Lake and Woods Lake where the saddled galaxias (*Galaxias tanycephalus*) is found and lake Sorell and Crescent where the golden galaxias (*Galaxias auratus*) is found. The abundance of these species is very high but restricted and the interaction is considered unlikely to constitute any threat to the status of either species.

The management actions to reduce interactions with threatened fauna include unexploited catchments 38 of the 48 defined major river catchments in the state are allocated for commercial eel fishing, all of the area managed as World Heritage Area is excluded including where it overlaps the 38 exploited catchments. Further restrictions apply to licence catchments with fishing excluded from 99% of river reaches and fishing restricted to farm dams and other still water bodies. These measures provide spatial refuge across the State for the overall populations of protected fauna. Gear restrictions apply in the fishery with a standard fyke net and fish trap design applied. There is a specified mesh size that allows small fish to pass through the nets and traps, exclusion screens are installed at the entrance of nets and traps that physically prevent larger fish animals and birds from entering. The passive netting and trapping methods allowed allow fish and non air breathing animals that do enter to be released unharmed. Survival of any bycatch is also enhanced by a mandated net checking and emptying regime of once every 24 hours. Monthly catch data is recorded in log books provided by the Inland Fisheries Service and includes reference to all bycatch, this reporting is a condition of licence. Compliance operations are conducted to ensure that reporting is accurate.

Overall the total bycatch of protected fauna is very low for the fishery and it is assumed that the suite of management measures has been instrumental in achieving this outcome.

## **7. Impacts of the fishery on the ecosystem in which it operates.**

The Tasmanian freshwater eel fishery comprises two species of anguillid eels; short-finned eel (*Anguilla australis*) and the long-finned eel (*Anguilla reinhardtii*). These species have a complex lifecycle with adults spawning in the Coral Sea and juveniles migrating down the East Coast of Australia and then into river systems where they grow to maturity and then run out to sea. The short-finned eel is the most common eel species in Tasmanian waters present in all major river catchments, long-finned eels are restricted to eastern catchments.

The Tasmanian freshwater eel fishery operates primarily using fyke nets set using a stake at either end in shallow water or weights in deeper water. Fyke nets can be deployed from shore or from small runabouts typically under 5m in length. Habitats fished are primarily still waters although these range from small farm dams to large impoundments. Nets are set and checked and emptied every 24 hours. Fyke nets are fished passively and are basically a fish trap that holds the target species and other non target fish in good condition until collected. The capture of larger air breathing animals including platypus and water birds is avoided through the use of exclusion screens. In some circumstances nets are set with larger exclusion screens or none in which case the wellbeing of air breathing bycatch is maintained through the elevation of the cod end 300mm above the water surface. Other activities include stock enhancement using juvenile eels sourced from below major instream dams used for power generation and transfer of undersized eels to other waters within a licence catchment area. Fishing is excluded from World Heritage Areas and most river systems.

The issue of ecological risk was considered in the Industry Development Plan that is currently being developed for release in 2014. Through a number of workshops it was agreed by the group that the main ecological risks posed by the industry were translocation of pests and diseases, bycatch of protected fauna, welfare of animals generally including target species and accurate and timely data reporting. These issues along with standard components have been considered in the table below. The issue of pests and disease is managed through check clean and dry protocols as well as treatment with “Phytoclean” for equipment used between catchments.

| Component  | Consequence | Likelihood | Risk | Comments  |
|--|-------------|------------|------|---|
| Retained species over fishing                        | 2           | 5          | 10   | There is a moderate risk of overfishing however there is suite of management measures in place and capacity to restock particular catchments if required.   |
| Non retained species                                 | na          |            |      |   |
| Protected species                                    | 2           | 6          | 12   | There is demonstrated take of protected species by the fishery. There is a possible compliance risk regarding reporting and compliance with management prescriptions in the conditions of licence.              |
| Habitat  | 0           |            |      |   |
| Ecosystem retained species                           | 2           | 3          | 6    | The eel fishery operates on a small proportion of the freshwater system in Tasmania and eels are not fulfilling a keystone role.  |
| restocking-transfer of pest species                  | 4           | 2          | 8    | There is potential for the transfer of pest species primarily redfin perch and Eastern Gambusia from restocking activities. A strict chemical grading protocol has been applied since 2012 to manage this risk. |
| Transfer of undersized eels-transfer of pest species | 4           | 4          | 16   | This issue is not well understood and requires a management response as soon as possible. There has been no recorded incidence of such a transfer occurring to date   |
| Social/Political                                     | 1           | 5          | 5    | The Tasmanian industry is a small export industry bringing revenue to the State, a small number of fishers are employed across the State.   |

The risk of the transfer of pest species through the Tasmanian freshwater eel fishery is rated as high requiring a modified management response. There is a risk of transfer of species primarily redfin perch into pest free waters through the activity of catch and transfer of undersized eels within each licence catchment. There is currently no compliance monitoring with this activity.

If redfin are introduced into new waters then there is the capacity for the local extinction of vulnerable fish and frog species and significant impacts on other fish populations and fisheries.

The Inland Fisheries Service will consult with industry to develop a process to address this issue by June 2014.

A similar risk was identified with juvenile eel restocking activities due to the potential presence of Eastern Gambusia and redfin perch at the harvest sites in the Derwent and Tamar River systems. The Inland Fisheries Service has moved away from a mixture of hand grading and chemical grading from multiple locations to an exclusive system of chemical grading from the Inland Fisheries Salmon Ponds holding facility at Plenty. The process involves the use of the clove oil based anaesthetic product "AQUI-S" The anaesthetic is delivered at a high rate lethal to most fish except eels. This has required the transport of all juvenile eels harvested to the central location for processing although the mitigation of risk has resulted in increased stress to the target species.

## **8. Consolidated detailed information outlining progress in implementing recommendations and conditions resulting from the Department of the Environment and Water Resources previous accreditation of the fishery.**

- 1. "Operation of the fishery will be carried out in accordance with the management regime in force under the *Inland Fisheries Act 1995* and the *Inland Fisheries Regulations 1996*."**  
The industry has continued to operate under the Inland Fisheries Act 1995 and Inland Fisheries Regulations 2009.
- 2. "IFS to inform DEWHA of any intended amendments to the management arrangements that may affect the assessment of the TFEF against the criteria on which *Environment Protection and Biodiversity Conservation Act 1999* decisions are based. "**  
No changes have been made to the management arrangements that would affect the assessment of the TFEF against the criteria that *Environment Protection and Biodiversity Conservation Act 1999* decisions are based.
- 3. "IFS to produce and present reports to DEWHA annually as per Appendix B to the *Guidelines for the Ecologically Sustainable Management of Fisheries 2nd Edition*. "**  
The IFS has provided a combined summary of the fishery since the last assessment in 2009.
- 4. "IFS to collaborate with other jurisdictions in pursuing consistent and complementary research needs and management arrangements for target species."**  
The IFS has collaborated primarily with Victoria in the management of the fishery, this has involved the negotiated supply of restock to Victorian fishers as well as participation in project and planning activities. This will benefit the sustainability of the resource through some escapement from Victorian catchments of migrating adult eels. The industry will also benefit from enhanced capacity to co-supply overseas markets.
- 5. By 1 November 2012 IFS to:**
  - (a)**  
**"develop and implement fishery specific objectives linked to performance indicators and performance measures for target, bycatch, protected species and impacts on the ecosystem; "**

The Inland Fisheries Service took the opportunity in 2012-13 to undertake an industry development plan funded through the FRDC. The development of fishery objectives linked to performance indicators and measures was incorporated into the project. The project is due for completion in 2014.

**(b)**

**“to monitor the status of the fishery in relation to the performance measures once developed;”  
and**

Given the delay in developing the performance measures and indicators these are yet to be monitored against.

**(c)**

**“within 3 months of becoming aware of a performance measure not being met, IFS to finalise a clear timetable for the implementation of appropriate management responses. “**

This will be actioned should a performance measure not be met.

**6. IFS to:**

**(a)**

**“undertake an Ecological Risk Assessment (ERA) for the TFEF”; and**

An ERA has been undertaken see section 7 above.

**(b)**

**“identify and implement appropriate management responses, to address and mitigate risks and impacts identified in the ERA.”**

The Inland Fisheries Service is yet to action the management response to mitigate the high risk identified in the ERA. It is planned to work with industry to resolve the issue prior to 30 June 2014.

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