Inland Fisheries SERVICE

Penstock Lagoon Fishery Management Plan

September 2006

PENSTOCK LAGOON

EXECUTIVE SUMMARY

This Fishery Management Plan establishes a vision, a set of goals with linked objectives and a series of actions for the management of fish and the recreational trout fishery at Penstock Lagoon. The plan encompasses the trout fishery, native fauna, aquatic environment, pest biota and infrastructure.

The vision for the fishery of Penstock Lagoon is, *"To provide a high quality sports fishery and associated angling experience, while protecting integral environmental values."* Policy positions and statements on fishery management matters reflect this vision.

The primary focus of the plan is the maintenance of the trout fishery as it is presently managed and performing. This involves maintaining the fishery within the historical limits (catch rate, fish condition and average weight) for which it has previously been value. To deliver this outcome, an annual stocking program using wild strain fish will used to manage recruitment of brown and rainbow trout into the fishery. The minimum size limit for both brown and rainbow trout will be set at 420 mm and the daily bag limit of three fish will remain unchanged. Penstock Lagoon will remain a fly fishing only water. Evaluation of the trout fishery will be conducted under the Fisheries Performance Assessment program using both in-situ monitoring of the fish population and assessment of angler's catches through the annual postal survey and opportunistic creel surveys. Penstock Lagoon, in conjunction with Great Lake, will be used to maintain and protect the important wild rainbow trout resource of the State.

The goals and objectives of the Tasmanian Galaxiidae Recovery Plan 2005 – 2009, will guide management of threatened native fish. In addition, maintaining the stocking of trout within existing limits will assist in protecting the conservation status of galaxiids, as will the adoption of the goals and objectives for pest species as outlined within this plan.

The plan highlights the threats that pest fish and other introduced biota pose to the fishery, and seeks to minimise threats by raising community awareness regarding the introduction of aquatic weeds, exotic fish species and the transfer of disease. To complement these actions, commercial eel fishing will not be allowed and private fishery developments will be prohibited within the catchment if deemed a risk to the values of the fishery.

An emphasis is given to improving community awareness, education and interpretation with reference to the trout fishery. The development and provision of information for both local and tourists anglers is identified as important element in delivering these objectives. Infrastructure requirements, such as formal camping areas and the provision of boat launching facilities are recognised, although greater consultation and more detailed consideration is required before seeking their delivery. Hydro Tasmania will be the principal instigator in developing outcomes in these areas.

LIST OF ABBREVIATIONS

DPIWE Department of Primary Industries, Water and Environment

IFAC Inland Fisheries Advisory Council

IFS Inland Fisheries Service

MAST Marine and Safety Tasmania

1 INTRODUCTION

1.1 Purpose Of The Plan

The purpose of this fishery management plan is to provide a structured approach to management of the Penstock Lagoon fishery and to ensure its sustainability, in addition to providing a formal means for stakeholder input.

The plan identifies priority areas of management necessary to achieve the vision, goals and objectives for the Penstock Lagoon fishery. The plan will assist the Service to plan work programs and assign resources to meet the vision for the fishery.

1.2 Scope Of The Plan

The primary focus of the plan is the Penstock Lagoon trout fishery, in addition to management of native fish and pest fish issues. However, it is also necessary to consider other facets of Penstock Lagoon such as the environment and infrastructure that have a direct association with the fishery. The intention of the plan is to work more closely with the relevant Government departments, agencies or bodies regarding those issues where the Service does not have direct responsibility. The Service will be a strong advocate on issues that are important to the Penstock Lagoon fishery.

1.3 Implementation And Funding

The plan will be implemented after it has been formally accepted by the Director of Inland Fisheries. The actions in the plan will be subject to availability of funding and resources and the cooperation of other agencies. Where possible, external funds will be sought to support actions. Commencement of angling regulations contained in this plan will take effect once gazetted and will be timed where possible to coincide with the commencement of the angling season.

1.4 Term Of The Plan

The term of the plan is 5 years, where upon the plan will be reviewed.

2 BACKGROUND

Penstock Lagoon (Figure 1) is a relatively small and shallow water with a surface area of 1.4 km^2 and a maximum depth of 1.8 m. The lagoon was once part of the now decommissioned Waddamana/Shannon Power Scheme that operated in various stages between 1916 and 1993. The scheme was constructed to make use of water flowing from Great Lake via the Miena dam and onto Penstock Lagoon, before falling some 80 metres into the Ouse River valley to run the turbines of the Waddamana A and B power stations. During this period, Penstock Lagoon was subject to large inflows of cold clear water from Great Lake. The total scheme continued operating between 1916 and 1993 with a total generating capacity of 107.5 MW. However, the building of the Poatina Power Station to the east of the Great Lake led to the closure of the Shannon Station in 1964 and Waddamana A in 1965. The final power station left in the scheme, Waddamana B, closed in 1993. Consequently, water flowing through the lagoon was reduced significantly with lagoon levels being maintained with inputs of water from the Shannon River and by localised inputs from the catchments of Waddamana no 1 and 2 canals. Internal sediment loading and resuspension, in conjunction with long nutrient retention times, contributed to the decline in water quality in the lagoon. In addition, turbid inflows of water from Shannon Lagoon further exacerbated this situation. Consequently, fish quality, catch rates and the general fishing experience also declined. Associated with these changes in water management, natural recruitment of both brown and rainbow trout became highly variable. In some cases, no brown trout spawning occurred in the inflowing canal for multiple years.

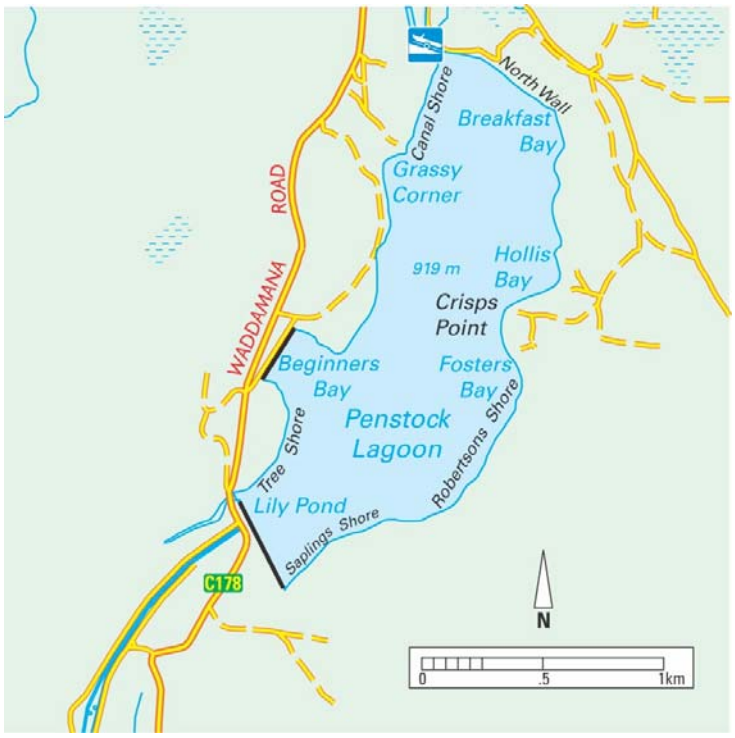

Figure 1: Map of Penstock Lagoon.

Following extensive examination of the lagoon by the Service during the mid-1990's, a number of water management options were examined and consequently implemented (Blühdorn *et al* 1998). These changes resulted in the water of the lagoon returning to a clear water state. At the same time, the Service reviewed fisheries management options for the lagoon. Consequently, the lagoon was stocked with a combination of adult brown trout, brown trout fry and rainbow trout fry. These stockings, combined with significant improvements in water quality, resulted in the fishery performing to levels it was previously renowned. The Service has since decided that an annual stocking program is the most successful and reliable method of delivering desired outcomes for the fishery, rather than relying on variable natural recruitment.

This Fishery Management Plan aims to build upon these management regimes and maintain a high quality trout fishery at Penstock Lagoon, which encapsulates the traditional Tasmanian angling experience.

3 LEGISLATION AND GUIDING DOCUMENTS

There are several significant statutes, guiding policies and strategies that have a direct bearing on the management of the biota and the environment of Penstock Lagoon. These are listed below:

3.1 Statutes

- *Threatened Species Protection Act 1995*[1]
- *Threatened Species Protection Regulations 1996*[1]
- *Environment Protection and Biodiversity Conservation Act 1999*[2]
- *Nature Conservation Act 2002*[1]
- *Inland Fisheries Act 1995*[1]
- *Inland Fisheries (Recreational Fisheries) Regulations 1999*[1]
- *Water Management Act 1999*[1]
- Electricity Supply Industry Act 1995[1]

[1]www.thelaw.tas.gov.au

[2]www.ea.gov.au/epbc/about/index.html

3.2 Guiding Documents

The following documents provide information and prescribe policy relevant to this plan.

- Inland Fisheries Service Translocation and Fish Stocking Policy
- State Policy on Water Quality Management 1997[3]
- Hydro Tasmania Environmental Policy
- Tasmania's Nature Conservation Strategy 2002-2006[3]
- Threatened Species Strategy for Tasmania[3]
- Tasmanian Galaxiidae Recovery Plan 2005-2009[3]

[3]www.dpiwe.tas.gov.au

4 VALUES

Penstock Lagoon has many significant values that require highlighting within this plan, these are listed below.

Environmental
- High standard of water quality

Conservation
- Two endemic threatened fish species

Recreational
- Important recreational trout fishery that has a significant angling heritage
- Popular water for boat angling
- Small permanent shack community
- Popular camping area for anglers who fish this water

Tourism
- Professional fishing guides
- Popular water for the tourist angler

5 VISION AND GENERAL MANAGEMENT GOALS

5.1 Vision Statement

VISION	To provide a high quality sports fishery and associated angling experience, while protecting integral environmental values.

5.2 Management Goals

The Service aims to manage the fishery resources to maintain the current performance of the recreational fishery, while advocating for a high level of water quality and associated environmental values for which Penstock Lagoon is respected.

Primary management goals are to maintain the present status of the fishery and to protect associated environmental values. A number of general goals have been established for different components of the fishery. These goals reflect the overall vision for Penstock Lagoon and provide a framework to focus the Service's management approach, policies and actions.

6 RECREATIONAL FISHERIES MANAGEMENT

6.1 Introduction

Penstock Lagoon is a small water of approximately 1.4 square km. The trout fishery is highly valued for its capacity to grow large to trophy sized brown and rainbow trout. Unlike most trout fisheries within the State, Penstock Lagoon is essentially a sports fishery, with an increasing number of fly fishing anglers practising minimal take or catch and release fishing. In recent times, the fishery has become very popular and the trend towards fly fishing from a boat has contributed to significant numbers of vessels being on the lagoon at particular times of the angling season. The lagoon is also popular amongst tourist anglers and provides a much valued angling experience for the visiting angler.

Brown Trout

Brown trout (*Salmo trutta)* have essentially been the mainstay of the fishery representing 60% of the total annual harvest of trout from the Penstock Lagoon fishery. Data collected during past spawning runs (1980-2003) indicate an average weight for brown trout in the range of 2.0 – 2.5 kg, with larger fish being 3.0 – 3.5 kg. Prior to changes in the water management regime, brown trout spawned regularly in the inflowing canals that convey water from Shannon Lagoon via the Shannon River. However, following the decommissioning of Waddamana power station, flows in the canals became highly variable and frequently contained high levels of suspended sediment and elevated nutrient loads. Consequently, access to spawning grounds and the success of recruitment was severely affected. Moreover, excess nutrients and high sediment load resulted in the lagoon becoming moderately turbid. These changes resulted in highly variable and often poor recruitment of both brown and rainbow trout.

Alterations to water management and changes in the trout stocking strategy have resulted in the fishery improving dramatically. The Service and anglers both now believe the fishery is performing at a highly acceptable level.

Rainbow Trout

Rainbow trout (*Oncorhynchus mykiss*) have previously represented on average, 40% of the total annual harvest of trout from Penstock Lagoon. Data collected during past spawning runs (1980-2003) indicate an average weight for rainbow trout in the range of 2.0 – 2.5 kg, with larger fish being 3.0 – 3.5 kg. Like brown trout, recruitment to the fishery has been highly influenced by the changes in water management. While the overall rainbow trout population of Penstock Lagoon is lower in numbers than the brown trout population, the faster growing potential of rainbow trout maintains a substantial head of fish in the range of 3.0 - 3.5 kg. Rainbow trout therefore play a significant role in the composition of the fishery.

Present Management

As highlighted previously, the management of the fishery has altered somewhat in recent years. Whilst natural recruitment and occasional supplementary stocking were previously used to maintain the trout fishery, an annual stocking program using a mix of adult brown trout and both rainbow and brown trout fry is now used to sustain the fishery. All fish are derived from wild strain stock, with fry being introduced at an early stage therefore negating much of the inherent hatchery selection process.

During 1999, in an attempt to overcome multiple years of failed recruitment, the Service introduced adult brown trout as part of the stocking strategy. The initial stocking was conservative with just 250 fish introduced. This strategy proved to be so successful in terms of catch returns to anglers and substantial growth of fish, that the number of fish stocked was increased, firstly to 500, then to 750. These adult fish, in conjunction with cohorts of brown and rainbow trout from previous fry stockings, is proving to be well within the capacity of the fishery. Moreover, the increased angling effort that has resulted from the recent popularity of the fishery, appears to be a regulating factor in maintaining a healthy and acceptable population level of both brown and rainbow trout.

Currently, the average weight of both brown and rainbow trout is 1.6 kg. The average catch rate is 0.6 fish per day. The estimated annual harvest of brown trout is 4 000 – 4 500 fish compared to 2 500 – 3 000 for rainbow trout (IFS 2003). The condition of both species is generally good to excellent with the proportion of brown trout greater than of 500 mm being approximately one-third of the takeable fish.

Presently, at Penstock Lagoon the 220 mm minimum size limit for rainbow trout does not afford any protection to juvenile fish. Rainbow trout can be legally harvested before they have the opportunity to reach their highest potential growth rate. A minimum size limit set at 420 mm will in this case, protect fish during their period of highest growth rate. This should optimise the number of fish reaching their potential before being fairly harvested.

Presently, brown trout are protected by a 420 mm minimum size limit, this restriction is proving to be highly successful and has gained the broad acceptance of anglers. It serves to protect fish prior to maturing and therefore maximises the number of fish surviving through their period of highest growth rate.

A 420 mm minimum size limit for both brown and rainbow trout also represents a compromise between social considerations of anglers and a meaningful biological size restriction. A single size limit for both species also satisfies the expectations of anglers, in that it allows for individual water (fishery) management, while keeping regulations reasonably simple.

Regulations / Orders

Previously, many of the fishing regulations that applied to the Penstock Lagoon fishery had a strong historical basis and remained unchanged for many years. However, following a review of the Inland Fisheries Commission and the Inland Fisheries Act and associated regulations, the Commission recommended changes to bag limits for several fisheries be undertaken to signal a change in direction of management of the Tasmanian trout fishery. These changes were based on a general knowledge of those fisheries effected and did not consider management of individual fisheries or individual species within a water. The bag limit for Penstock Lagoon was reduced from 12 fish per day (both brown and rainbow trout inclusive) to 3 fish per day inclusive of both species. This bag limit remains today and is generally well accepted by anglers.

Historically, the minimum size limit for trout within the waters of the State has remained at 220 mm. This limit remained until 1999, when to overcome a short fall in recruitment of brown trout at Penstock Lagoon, a stocking of 250 adult brown trout was conducted. These fish ranged in size from 304 – 522 mm, and from an analysis of fish lengths it was recommended that a size limit of 420 mm be introduced. This limit was implemented and has gained the broad acceptance by anglers, as it serves to protect fish prior to maturing and therefore offers protection to fish during their period of highest growth rate. Additionally, this allows a proportion of fish to survive and progressively enter the catchable size range as the season proceeds, with some fish surviving into the next season. This strategy appears to be achieving its intended goal with transferred fish continuing to be captured throughout the season, and on average, increasing 60% in weight (IFS 2003).

Fishery Performance

The performance of the Penstock Lagoon fishery is monitored by an annual angler postal survey, in-situ population surveys, opportunistic creel interviews by Fisheries Inspectors and periodic sampling of the spawning run of both brown and rainbow trout when required. The angler postal survey provides information on catch rates, harvests, angling effort and participation in the fishery. Trout spawning runs at Penstock Lagoon have been monitored in detail over time. This information provides data to measure the performance of management strategies. Moreover, Penstock Lagoon has been included on a schedule of assessment under the Fisheries Performance Assessment Program and should be intensively surveyed on a five year cycle. Recent assessment of Penstock Lagoon under the Fisheries Performance Assessment Program indicates the fishery is performing well and to the expectation of anglers.

6.2 Issues

There are only a few issues that need to be addressed to ensure that the fishery can be sustained and developed consistent with the expectations and aspirations of anglers.

- Control of inputs of fish into the lagoon.
- Management and regulation of both the rainbow and brown trout populations.
- Development of meaningful and effective regulations that balance fishery performance and social needs.
- Assessment of fishery management actions.
- Provision of interpretative and education information about the fishery at Penstock Lagoon.

6.3 Goal For Future Management

GOAL	To provide a high quality sport fishery and associated angling experience based primarily on wild brown trout with a complementary fishery for wild rainbow trout.

6.4 Objectives

- To minimise the risk of unwanted fish being introduced into Penstock Lagoon.
- Catch rates and the average weight for both brown and rainbow trout are maintained within historical limits.
- The catch ratio for trout is maintained at 60% for brown trout and 40% for rainbow trout.
- The general condition of fish is in the range good - excellent.
- Ensure that the fishing experience of anglers is maintained at a higher level of expectation for which the fishery is presently regarded.
- Evaluate specific management strategies essential to the performance of the fishery.
- Compliance activities are planned and implemented in accordance with the goals and objectives of this plan.
- Improve community awareness and education with regard to the objectives and actions contained within this plan.

6.5 Actions

- All IFS trout stockings will be in accordance with the IFS Translocation Policy.
- Canals 1 & 2 to the white post markers will remain closed to angling. However, consideration is given to moving the post slightly upstream to provide for improved shore-based angler access.
- Penstock Lagoon to remain a fly fishing water and the trolling of flies will not be permitted.

- The daily bag limit for salmonids (both brown and rainbow trout) will be 3 fish.
- The continuation of fishing will be permitted after the bag limit is achieved, provided all subsequent fish caught are returned to the water.
- The minimum size for brown trout will be 420 mm.
- The minimum size for rainbow trout will be 420 mm.
- Wild brown and rainbow trout will be the only source of restock used at Penstock Lagoon. Domesticated rainbow trout will not be used to stock Penstock Lagoon.
- The fishery will be sustained by regular stockings of wild fish in preference to unknown inputs via natural recruitment. An annual stocking program of 20,000 rainbow trout fry and 20,000 brown trout fry (or advanced fish equivalent), in addition to 750 adult brown trout (average weight 1kg) or equivalent will be used. No additional stocking above this limit will be sanctioned without an acceptable examination of fauna conservation issues.
- Supplementary releases of water into the lagoon for the purpose of trapping spawning fish will be minimised to prevent inputs of turbid water and excess nutrients.
- Encourage the adoption and promotion of a code of ethics for the general angling public.
- Provide access information to anglers as required.
- The Penstock Lagoon fishery will be monitored on a five year cycle as part of the Fishery Performance Assessment program and will include the following elements.
  - Monitoring of the brown and rainbow trout spawning runs.
  - Monitoring of brown and rainbow trout populations and the collection of biological information such as growth and age structure.
  - Detailed analysis of the Angler Postal Survey with respect to Penstock Lagoon.
  - Collection and analysis of angler creel survey data, and
  - Preparation of a report that details the performance of the fishery.

- Fisheries Officers will be involved in an angling community awareness and education program addressing Penstock Lagoon and general fishery management issues, and the implementation of new regulations.
- General compliance activities will be identified and prioritised in the annual compliance service plan, with the following compliance issues to be addressed:
  - ensuring anglers are appropriately licensed;
  - compliance with angling regulations and responsible boating and,
  - improve community awareness and education regarding the implementation of the plan and rationale for new regulations and fishery management actions.

6.6 Responsibilities

- The Inland Fisheries Service is responsible for fisheries management at Penstock Lagoon.

7 NATIVE FISH MANAGEMENT

7.1 Introduction

There are four species of native galaxiids known to be present in Penstock Lagoon. The climbing galaxias (*Galaxias brevipinnis*) and the spotted galaxias (*G. truttaceus*), are widespread and common in Tasmania whilst the two other species the Great Lake paragalaxias (*Paragalaxias eleotroides*) and Shannon paragalaxias (*P. dissimilis*), are only found in Great Lake, Penstock and Shannon lagoons. Short-finned eels *(Anguilla australis)* occur in low numbers in Penstock Lagoon.

There have been no specific management actions undertaken for native fish in Penstock Lagoon to date. The Service has conducted research into the ecology of the paragalaxiids of Great Lake during the 1970's (Fulton 1982) and presently, Hydro Tasmania are examining the importance of the charophyte beds of Great Lake to native fish (Hydro Tasmania 2003). This information can be applied to the populations of galaxiids that inhabit Penstock Lagoon.

The Service has recently submitted threatened species nominations for the Great Lake paragalaxias and Shannon paragalaxias. The nominations propose these species to be listed as 'vulnerable' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. These fish are presently listed under the Tasmanian *Threatened Species Protection Act 1995* as 'vulnerable'. The *Inland Fisheries Act 1995* and subordinate legislation also offers mechanisms to provide protection of native fish.

The initiation and implementation of community awareness and education regarding native fish has been identified in the Fishery Management Plan for Great Lake. Actions resulting from this plan will contribute to the protection of native fish within Penstock Lagoon.

7.2 Issues

The following issues relate to the protection of native fish within Penstock Lagoon.

- Potential impacts of trout management strategies.
- Possible introduction of pest fish species such as redfin perch.

7.3 Goal For Future Management

GOAL	Conserve the native fish fauna of Penstock Lagoon.

7.4 Objectives

The issues identified in relation to native fish are primarily addressed in the Tasmanian Galaxiidae Recovery Plan 2005-2009 (DPIWE 2005). This plan identifies conservation

strategies for the Great Lake and Shannon paragalaxiids. The conservation strategies are similar for both species and include management and research components. Management strategies include monitoring of populations, reviewing the potential impacts of trout stocking rates on the paragalaxias populations, preparation of threat abatement contingency plans and public awareness programs.

7.5 Actions

- Implement the relevant sections of the Tasmanian Galaxiidae Recovery Plan 2005-2009 to ensure the conservation of the native fish fauna of Penstock Lagoon.
- Implement the actions of the Pest Fish section of this plan.

7.6 Responsibilities

- The Inland Fisheries Service is responsible for the management of native fish, other freshwater fish species and most aquatic invertebrates.
- The Threatened Species Unit in the Department of Primary Industries, Water and Environment (DPIWE), administers threatened species legislation, policy and programs and collaborates with other agencies responsible for managing key threatened groups and habitats.
- Hydro Tasmania is a significant water manager and has obligations to ensure that its operations are consistent with the *Water Management Act 1999* and the *Threatened Species Protection Act 1995*, particularly in relation to native fish, aquatic invertebrates and habitat.
- The Commonwealth Department of the Environment and Heritage administers the *Environment Protection and Biodiversity Conservation Act 1999*.

8 COMMERCIAL FISHERIES MANAGEMENT

8.1 Introduction

Penstock Lagoon has never supported a commercial fishery of any type and is presently not included in any commercial fishing licence. There are also no registered private fisheries within the catchment that could inadvertently compromise the wild trout stocks of the lagoon with escapee domestic fish. The present prohibition on eel fishing prevents conflict with recreational anglers and eliminates any fish translocation risk that might be associated with the movement of commercial fishing equipment between waters and during the restocking of eels. The present situation where eels are transferred into Lake Meadowbank ensures natural recruitment of eels into the system, with low numbers of eels being sustained within Penstock Lagoon.

8.2 Issues

- Impacts of commercial activities (including risks associated with eel stocking) on native fish, particularly threatened fish.

- Potential for inadvertent introduction of domestic rainbow stock from sources other than restock introduced by the Service.

8.3 Goal For Future Management

GOAL	Ensure the present values of the trout fishery and native fish species are not compromised by commercial fisheries activities.

8.4 Objectives

- To limit, and where appropriate, prohibit all commercial fisheries related activities to preserve the benefits of the recreational trout fishery and to protect native fish populations.

8.5 Actions

- Commercial eel harvesting will be prohibited in Penstock Lagoon.
- Private fishery developments within the catchment should be discouraged and only proceed if the Penstock Lagoon fishery is protected with the aid of stringent restrictions on stock type and source, and the containment of fish is ensured.
- To maintain a low level, natural population of eels within Penstock Lagoon, the continued restocking of eels within Lake Meadowbank is encouraged as an alternative to the direct stocking of the lagoon.

8.6 Responsibilities

The Inland Fisheries Service is responsible for the management of commercial freshwater fisheries.

9 PEST SPECIES MANAGEMENT

9.1 Introduction

Tasmania has several fish species that are classed as pest fish or 'controlled fish' under the *Inland Fisheries Act 1995*. These include European carp (*Cyprinus carpio)* and freshwater crayfish of the genus *Cherax* (eg mainland yabby). These species are not known to be present in Penstock Lagoon. Other pest fish present in Tasmania that are considered a serious threat to native species but are not known to exist in this location include redfin perch *(Perca fluviatilis*), tench (*Tinca tinca*), goldfish (*Carassius auratus*) and Eastern gambusia (*Gambusia holbrooki*).

Regulations exist to prohibit the introduction of fish as bait to Penstock Lagoon and to prohibit the translocation of controlled fish (eg European carp). The Service conducts an awareness campaign to inform and educate the public regarding pest fish issues.

The aquatic 'weed species' Canadian Pondweed *(Elodea canadensis)* occurs in the lagoon. However, the impact of this species on the fishery and the aquatic health of the lagoon, does not appear to be a significant threatening process. The management of pest aquatic weed species is the responsibility of DPIWE. However, it is in the interest of the Service to ensure that pest species are not translocated by its activities or by anglers.

It has recently been confirmed that a potentially lethal frog disease the chytrid fungus, exist in Tasmania. At this stage it is unclear how long the disease has been in the State or how widespread it may be. The ramifications of this are enormous for our native frog populations. The release of, or movement of diseased frogs, and the movement of the pathogen between infected and non-infected catchments and waterways, may spread the chytrid fungus by means of fungus on boots, boats or other field equipment. The Service has implemented as a precautionary measure, the New South Wales hygiene protocol for diseased frogs to minimise the disease risk involved in moving field equipment between waterways. Anglers also need to be made aware of the obligation to adopt appropriate hygiene protocols when boating and fishing.

9.2 Issues

- Translocation of undesirable fish species, aquatic weed species and diseases into Penstock Lagoon.

9.3 Goal For Future Management

GOAL	To maintain an aquatic environment free of pest fish and diseases and to prevent further introductions of aquatic weed species.

9.4 Objectives

- To minimise the risk of introduction of pest species and disease within Penstock Lagoon and its immediate catchment, by educating and informing the public regarding these issues.

9.5 Actions

- Ensure the community is informed and aware of the environmental risks associated with pest fish and the spread of frog and fish diseases and the spread aquatic weeds.
- Ensure that the community complies with angling regulations, specifically the prohibition of baits.
- Ensure that all trout stockings are conducted in accordance with the IFS fish translocation protocols.
- Manage potential threats from commercial fisheries activities in accordance with the goals and objectives of this plan.
- Ensure hygiene protocols for IFS survey equipment are adhered to.

9.6 Responsibilities

- The Inland Fisheries Service is responsible for the management of pest fish within the inland waters of Tasmania.
- DPIWE is responsible for development of noxious weed policy and the management of noxious weeds including aquatic species within the State.

10 ENVIRONMENT

10.1 Introduction

Water Quality and Water Management

With the closure of the Waddamana B Power Station in 1994, the throughput of water in Penstock Lagoon was minimised and the lagoon was held at a higher level. These alterations resulted in significant increases in turbidity and algal growth in the lagoon. Modification to water management and establishment of a target water level in 1995, alleviated the algal problem to some degree, but some turbidity problems persisted (Blühdorn *et al* 1995, 1998). Following further alterations to water management, water quality parameters have been constrained within acceptable limits. The current management regime allows for an exchange of water during the winter period. This exchange promotes the export of excess nutrients and sediments from the lagoon. Once this period has past, the level of the lagoon is managed at a minimum level of 919.4 mASL during the summer months (Andrews *et al, in prep*). The IFS through Hydro Tasmania, has the ability to seasonally control water levels in the lagoon if required to ameliorate water quality issues.

The Service also occasionally makes requests to Hydro Tasmania for small releases of water from the Shannon River for the purpose of trapping trout during the spawning run. This action is kept to a minimum, as it is desirable to limit the input of turbid water.

The Inland Fisheries Service - Biological Consultancy, during the period 1991 to present, has routinely monitored a range of water quality parameters within Penstock Lagoon. In general, presently, there are no systematic problems with water quality in Penstock Lagoon. Occasionally wind events cause short term increases in turbidity. However, resuspended materials settle rapidly when wave action eases and low turbidity is the normal state.

Boating

Penstock Lagoon is a small, shallow water with a maximum depth of 1.8 m. Many areas are between 0.5-1.0 m and as a result, boat motors can disturb the substrate and vegetation. In general, this has not been a significant issue, and it has only been with the renewed interest in this fishery and a change in fishing technique, that the number of boat users has increased. Most of the issues arise for only a short period during December – February. At these times, congestion is as much an issue for anglers as is the potential impacts on the lagoon's environment.

Anglers suggest that increased boating is causing environmental harm, with sediments being disturbed and hydrocarbons from outboard motors potentially polluting the waters of the lagoon. Monitoring of turbidity and other associated parameters have shown no signs of any decline in water quality. Moreover, monitoring of hydrocarbons within the lagoon

indicates that hydrocarbons are within the acceptable environmental levels for such a water body.

Despite the favourable results from these monitoring programs, it may be prudent to adopt a pro-active role in protecting the fishery against potential environmental problems. This should however, be done with the proviso that any restrictions on usage are reasonable, and do not impact on the ability of the general angling public to share in the fishery. Presently, Hydro Tasmania are reviewing its activities within the Derwent Catchment and also its management of recreational activities on Hydro Tasmania land. The Service has, and will continue to have, an active role in advocating for sensible environmental outcomes that provide for the continued recreational use of the Penstock Lagoon fishery and associated facilities.

10.2 Issues

- Water management regime that ensures the continued maintenance of high water quality at Penstock Lagoon.
- Manage boating issues regarding water quality at Penstock Lagoon.

10.3 Goal For Future Management

GOAL	Maintain and protect the aquatic environment of Penstock Lagoon while ensuring fair and reasonable use of the fishery and associated activities.

10.4 Objectives

- Contribute to the maintenance and protection of water quality and other aquatic environmental values of Penstock Lagoon.

10.5 Actions

- Establish and maintain an effective relationship with Hydro Tasmania with respect to the aquatic environment and boating issues at Penstock Lagoon.
- Increase general community awareness about aquatic environmental issues and their management at Penstock Lagoon.
- Provide advocacy for the aquatic environment at Penstock Lagoon.
- Advocate of the continuation of water quality monitoring at Penstock Lagoon.

Actions in other sections also contribute to the achievement of the goal and objectives in this section.

10.6 Responsibilities

- Hydro Tasmania manages water resources under licence from DPIWE that administers the *Water Management Act 1999*. The Act requires that ecological considerations be taken into account in the management of water resources. Hydro Tasmania is identifying environmental issues through a review of its water management activities in the Derwent catchment (Hydro Electric Corporation 1999).
- The Inland Fisheries Service is responsible managing the State's freshwater fisheries.
- Marine and Safety Tasmania (MAST) are the government agency responsible for management of boating related infrastructure and rules pertaining to boating in both marine and inland waters.

11 INFRASTRUCTURE

11.1 Introduction

Hydro Tasmania is responsible for management of a large area of land that borders the north-western and western shorelines of Penstock Lagoon. Hydro Tasmania is also responsible for water management infrastructure at the lagoon, including the dam, spillways and inflowing canals. They also hold the water licence for this catchment. Hydro Tasmania is therefore a key stakeholder in the management of Penstock Lagoon and the surrounding area. It is therefore important that a close working relationship is maintained with this organisation and they are encouraged to take a proactive role in leading management of the lagoon and associated public infrastructure.

In addition to Hydro Tasmania, the Central Highlands Council is an important stakeholder in relation to infrastructure and promotion of the Central Highlands area. It would be prudent for Service to establish links with the council concerning promotion of the area as a prime destination for local and interstate anglers.

Marine and Safety Tasmania (MAST) are the government agency responsible for management of boating related infrastructure and rules pertaining to boating in both marine and fresh waters. The Service, MAST and Hydro Tasmania have maintained communications over boating management on a number of inland waters within the State. However, these communications have potential for improvement and more formal arrangements would be advantageous.

While Penstock Lagoon is a very important trout fishery, the Inland Fisheries Service has minimal fisheries infrastructure at the lagoon. The Service maintains an anti-jump screen and occasionally erects a temporary trapping structure to trap spawning fish for management purposes.

Camping

Penstock Lagoon has traditionally been a fishery where anglers could establish both short and long term camps in a relatively sheltered location. Camping has mostly been self regulating, although Hydro Tasmania's policy is to limit long term camping to less than 28 days, although this is rarely enforced. Generally, campers have caused little impact and campsites are normally kept clean and tidy. However, an increasing trend in the number of campers is causing some concern amongst members of the angling community, and new informal camping areas are being established on the western shore of the lagoon. In order to access these areas additional vehicle tracks are being formed, or existing tracks are receiving more traffic. These tracks often traverse wet areas, consequently boggy sections and track braiding are becoming more apparent.

Toilet waste disposal is a concern in some areas and is not consistent with the present situation of shack owners having to install septic systems to minimise environmental

degradation and nutrification. Suitable toilet facilities should be made available to campers.

Boat Ramps

Over the years, Penstock Lagoon has been serviced by a single low standard boat launching area located adjacent to the campground at the north - western end of the lagoon. This boat ramp has served boating anglers adequately in the past and has generally restricted the size of boats that could be easily launched. However, due to a need to cater for additional and larger vessels, a secondary launching area below the weir on canal number one was utilised. This area was upgraded by MAST to minimise wheel rut formation. However, the area soon became the primary site for launching boats and additional usage caused the area to become very muddy and degraded. Hydro Tasmania moved to stop this damage by preventing all vehicle access to this area. Boat launching now occurs only at the original boat ramp area. The need for a new boat ramp still exists and several options have been put forward by a number of interested groups. However, all proposals have their inherent environmental problems, with the need to undertake extensive works and disturbance of the lagoon foreshore and access areas.

Any boat ramp development must consider the implications it would have on the lagoon and the facilitation for launching larger vessels. The Service needs to liase closely with Hydro Tasmania and MAST to ensure the best outcome for the fishery and the general angling public.

Boat ramps that require excessive fill or protrude into the lagoon on shallow areas will not be supported. The maintenance of the existing campground launching area is recommended, provided arrangements for the general launching of boats can be provided for at an alternate location, and the movement of boats through the sandbank area is minimised. A non motorised boat zone could be established in this specific area to limit impacts, while still providing fair and reasonable access to the lagoon by campers utilising boats.

Access General

The majority of access to Penstock Lagoon is over Hydro Tasmania land, situated on the western shore. Anglers have used this area to access the lagoon since its construction in 1915. While public access across this land has been an accepted practice, ongoing free ranging access may not always be assured. Hydro Tasmania has in recent years sold a number of its land holdings adjacent to several popular fisheries and where required, have provided for continued access to the trout fishery. Presently, Hydro Tasmania has indicated they have no plans for the disposal of the land adjacent to Penstock Lagoon.

Signage

Currently, the Service has several small signs located around the lagoon. These signs give a general overview of the fishery and present some of the regulations that are specific for

the water. However, there is an identified need to provide additional interpretative and fishery related signage. Hydro Tasmania is planning on upgrading signage at Penstock Lagoon upon completion of its Recreational Management Plan for Hydro lands. Hence, the Service should where appropriate, consult with Hydro Tasmanian in providing signage to ensure consistency and rationalisation of signage.

Inland Fisheries Service Facilities

The Service has minimal fisheries infrastructure at the Penstock Lagoon. An anti-jump screen exists and an occasionally temporary trapping structure is erected to trap spawning fish for management purposes. There is an identified need to upgrade this infrastructure to effectively trap fish when required and to avoid injury to fish on the anti-jump screen.

11.2 Issues

- Provision for the continuation of both long and short term camping and establishment of day use only areas.
- Provision of suitable boat launching facilities.
- Surety of continued access.
- Establishment of suitable signage.
- Upgrading of existing fisheries infrastructure.

11.3 Goal For Future Management

GOAL	To ensure adequate facilities are developed and maintained to support the recreational trout fishery and to ensure that visitors to Penstock Lagoon are suitably provided for.

11.4 Objectives

- Provide strong advocacy and where appropriate support the development, maintenance and improvement of boat ramps, parking areas, amenities and camping facilities at Penstock Lagoon.
- Ensure fisheries management infrastructure is suitable so it can be used to assist in achieving the objectives for the recreational trout fishery.
- Provide information to anglers to enhance their fishing experience at Penstock Lagoon and to ensure they are aware of the angling requirements and regulations.

11.5 Actions

- Initiate discussions with Hydro Tasmania for the provision, management and maintenance of camping grounds at Penstock Lagoon, ensuring on-going camping.
- Initiate discussions with Hydro Tasmania and the Central Highlands Council for the development of public facilities at Penstock Lagoon.
- Review the provision of boat ramps at Penstock Lagoon to ensure there is fair, reasonable and appropriate access for anglers using boats.
- Establish and maintain suitable fish trapping facilities and associated infrastructure to secure trout for management purposes.
- Provide advocacy resources to maintain angler access.
- Provide signage to inform and assist anglers. Were appropriate, liase with Hydro Tasmania over the provision of suitable signage.

11.6 Responsibilities

- The Inland Fisheries Service is responsible for fisheries management infrastructure at Penstock Lagoon.
- MAST contributes to the establishment and maintenance of boating related infrastructure, such as boat ramps.
- Hydro Tasmania and the Central Highlands Council are responsible for other infrastructure and land management.

12 IMPLEMENTATION, EVALUATION, REVIEW AND AMENDMENTS

12.1 Implementation Of The Plan

- A schedule of implementation of the actions from this plan will be developed on an annual basis and included in operational planning.
- To ensure that proper and sufficient progress of the plan is achieved, the Services will prepare an annual report reviewing the implementation of the plan and evaluation of management actions.
- It is intended that the plan remain as a guide for fisheries management for five years.

12.2 Evaluation Of The Plan

The evaluation of the plan will be undertaken at two levels – project and action level and plan level. Individual actions will be monitored and progress towards completion evaluated and reported on regularly. This monitoring will provide the basis for higher level evaluation of the plan which will occur annually and be reported to the Inland Fisheries Advisory Council (IFAC), the Minister and be presented in annual reports.

12.3 Review Of The Plan

The term of the plan is five years, where upon the plan will be opened to public review.

12.4 Amendments To The Plan

Any person seeking to amend the plan should make a written submission to the Director of Inland Fisheries. Submissions should clearly state the nature of the amendment, the reasons for the amendment and, if submitted on behalf of an organisation, contain a statement of support by that organisation. Submissions should also provide evidence that the proposed amendment embraces the goals and objectives of the fishery management plan and does not contravene the management requirements of other organisations.

The Director of Inland Fisheries may seek advice from IFAC and other relevant bodies about any submission. Submissions sent to the Director will be open to public scrutiny if an application is made to view the submission. The Director of Inland Fisheries will determine whether to accept or reject the proposed amendment.

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14 FURTHER INFORMATION AND ACKNOWLEDGMENTS

Further Information
Further information can be obtained from the Inland Fisheries Service.

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15 GLOSSARY

Term	Definition
Fishery	Generic description of the general area, but more specifically to mean, all elements of the freshwater fauna including native and introduced species.
Freshwater fish	The definition of freshwater fish under the *Inland Fisheries Act 1995*, includes all freshwater fauna which spends a portion of their life history in freshwater and includes, fish and aquatic invertebrates (crustaceans, insects and molluscs) and includes the spawn, fry or young of such an animal.
Native	Occurs naturally in a specified region or locality.
Pest fish	An undesirable fish species, whether native or introduced, that exists outside its natural distribution where it may have a significant detrimental impact on existing native species or a desirable introduced species.
Turbidity	Is the measure of the capacity of light to pass through water and generally reflects the amount of suspended material in the water. Measured in nephelometric turbidity units (NTU).
Vulnerable	A category of threat defined under the *Threatened Species Protection Act 1995* as “a taxon of native flora or fauna may be listed as vulnerable if it is likely to become an endangered taxon while the factors causing it to be vulnerable continue operating.

16 APPENDIX 1. SUMMARY OF ACTIONS AND IMPLEMENTATION SCHEDULE

A. Recreational Fisheries Management			**Timeframe**	
Goal	**To provide a high quality sport fishery and associated angling experience based primarily on wild brown trout with a complementary fishery for wild rainbow trout.**	**Responsibility**	**Short Term (1-2 years)**	**Medium Term (1-5 years)**
Objective	***To minimise the risk of unwanted fish being introduced into Penstock Lagoon***			
Action	• All IFS trout stockings will be in accordance with the IFS translocation policy.	IFS		
Objective	***Catch rates, catch ratio, average weight and condition of both brown and rainbow trout are maintained within historical limits.***			
Action	• The minimum size for brown trout will be 420 mm. • The minimum size for rainbow trout will be 420 mm. • The daily bag limit for salmonoids (both brown and rainbow trout) will be 3 fish.	IFS		
Action	• The fishery will be sustained by regular stockings of wild fish in preference to unknown inputs via natural recruitment. An annual stocking program of 20,000 rainbow trout fry and 20,000 brown trout fry (or advanced fish equivalent), in addition to 750 adult brown trout (average weight 1kg) or equivalent will be used. No additional stocking above this limit will be sanctioned without an acceptable examination of fauna conservation issues. •	IFS		
Objective	***Ensure that the fishing experience of anglers is maintained at a higher level of expectation for which the fishery is presently regarded.***			
Action	• Encourage the adoption and promotion of a code of ethics for the general angling public. • As required, provide access information to anglers.	IFS		
Action	• Canals 1 & 2 to the while post markers will remain closed to angling. • Penstock Lagoon to remain a fly fishing only water and the trolling of flies not be permitted. • The continuation of fishing will be permitted after the bag limit is achieved, provided all subsequent fish caught are returned to the water. • Wild brown and rainbow trout will be the only source of restock used at Penstock Lagoon. Domesticated rainbow trout will not be used to stock Penstock Lagoon. • Supplementary releases of water for the purpose of trapping spawning fish are to be kept to a minimum.	IFS		
Objective	***Evaluate specific management strategies essential to the performance of the fishery.***			

Action	• The Penstock Lagoon fishery will be monitored on a five year cycle as part of the Fishery Performance Assessment Program	IFS		

B. Native Fish Management			**Timeframe**	
Goal	**Conserve the native fish fauna of Penstock Lagoon.**	**Responsibility**	**Short Term (1-2 years)**	**Medium Term (1-5 years)**
Objective	***Adopt objectives as stated in the Draft Tasmanian Galaxiidae Recovery Plan 2005-2009***			
Action	• Implement the relevant sections of the Tasmanian Galaxiidae Recovery Plan 2005-2009 to ensure the conservation of the native fish fauna of Penstock Lagoon.	IFS, HT, DPIWE & DEH		
Action	• Implement the actions as identified in the Pest Fish section of this plan.	IFS, HT, & DPIWE		

C. Commercial Fisheries Management			**Timeframe**	
Goal	**Ensure the present values of the trout fishery and native fish species are protected.**	**Responsibility**	**Short Term (1-2 years)**	**Medium Term (1-5 years)**
Objective	***To limit and where appropriate, prohibit all commercial fisheries related activities to maximise the benefits of the recreational trout fishery and to conserve native fish populations.***			
Action	• Commercial eel harvesting will be prohibited in Penstock Lagoon. • To maintain a low level natural population of eels within Penstock Lagoon, the continued restocking of eels within Lake Meadowbank is encouraged as an alternative to the direct stocking of the lagoon.	IFS		
Action	• Private fishery developments within the catchment should be discouraged and only proceed if the Penstock Lagoon fishery is protected with the aid of stringent restrictions on stock type and source, and the containment of fish is ensured.	IFS		

D. Pest Species Management			**Timeframe**	
Goal	**To maintain an aquatic environment free of pest fish and diseases and to prevent further introductions of aquatic weed species.**	**Responsibility**	**Short Term (1-2 years)**	**Medium Term (1-5 years)**
Objective	***Minimise the risk of introduction of pest species and disease within Penstock Lagoon and its immediate catchment, by educating and informing the public regarding these issues.***			
Action	• Ensure the community is informed and aware of the environmental risks associated with pest fish and the spread of frog and fish diseases and the spread aquatic weeds.	IFS & DPIWE		
Action	• Ensure that the community complies with angling regulations, specifically in regard to the fly fishing only status of Penstock Lagoon.	IFS		
Action	• Ensure that all trout stockings are conducted in accordance with the Service's fish translocation protocols.	IFS		
Action	• Manage potential threats from commercial fisheries activities in accordance with the goals and objectives as presented in this plan	IFS		
Action	• Ensure hygiene protocols for IFS survey equipment are adhered to.	IFS		

E. Environment			**Timeframe**	
Goal	**Maintain and protect the aquatic environment of Penstock Lagoon while ensuring fair and reasonable use of the fishery and associated activities**.	**Responsibility**	**Short Term (1-2 years)**	**Medium Term (1-5 years)**
Objective	***Contribute to the maintenance and protection of water quality and other aquatic environmental values of Penstock Lagoon***			
Action	• Establish and maintain relationships with Hydro Tasmania with respect to the aquatic environment and boating issues at Penstock Lagoon.	IFS & HT		
Action	• Increase general awareness about aquatic environmental issues and their management at Penstock Lagoon	IFS & HT		
Action	• Provide advocacy for the aquatic environment at Penstock Lagoon.	IFS		
Action	• Advocate of the continuation of water quality monitoring at Penstock Lagoon	IFS		

F. Infrastructure			**Timeframe**	
Goal	**To ensure adequate facilitates are developed and maintained to support the recreational fishery and to ensure that visitors to Penstock Lagoon are suitably provided for so that they may have an enjoyable and rewarding experience.**	**Responsibility**	**Short Term (1-2 years)**	**Medium Term (1-5 years)**
Objective	***Provide strong advocacy and where appropriate support the development, maintenance and improvement of boat ramps, parking areas, amenities and camping facilities at Penstock Lagoon.***			
Action	• Initiate discussions with Hydro Tasmania for the provision, management and maintenance of camping grounds at Penstock Lagoon, ensuring on-going camping.	IFS & HT		
Action	• Initiate discussions with Hydro Tasmania and the Central Highlands Council for the development of public facilities at Penstock Lagoon.	IFS, HT & CHC		
Action	• Review the provision of boat ramps at Penstock Lagoon to ensure there is fair, reasonable and appropriate access for anglers using boats.	IFS HT & MAST		
Action	• Provide advocacy resources to maintain angler access.	IFS		
Objective	***Ensure fisheries management infrastructure is suitable so it can be used to assist in achieving the objectives for the recreational trout fishery.***			
Action	• Establish and maintain suitable fish trapping facilities and associated infrastructure to secure trout for management purposes	IFS		
Objective	***Provide information to anglers to enhance their fishing experience at Penstock Lagoon and to ensure they are aware of the angling requirements and regulations.***			
Action	• Provide signage to inform and assist anglers. Were appropriate, liase with Hydro Tasmania over the provision of suitable signage.	IFS & HT		