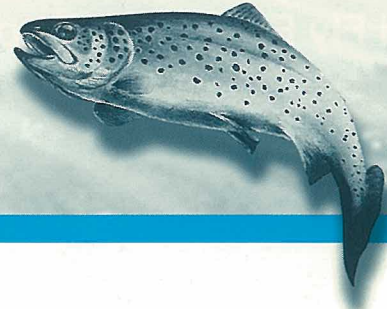


On the Rise



Volume 27 No. 2
December 1998

A strategy for addressing the fishery and environmental issues at Lake Sorell

Introduction

The Commission shares anglers' concerns over problems with the fishery at Lake Sorell and is now moving to urgently address the situation. The main constraint in recent years has been limited resources and this has severely hampered efforts to make rapid progress in line with the expectations of anglers. However, the Commission is reviewing internal resource allocation and assessing opportunities for obtaining assistance from other agencies so that more rapid progress can be achieved.

The importance of the recreational fishery at Lake Sorell is widely recognised and acknowledged (IFC Newsletter 1992). In the late 1980's surveys of angler expenditure

The problem

The deterioration in the condition of fish at Lake Sorell was brought to the attention of the Commission by anglers in late 1995. Poor conditioned trout are found commonly in many of our fisheries but generally only form a small proportion of the population. In Lake Sorell the proportion of poor conditioned fish was much greater than would normally be expected. Also, after these initial reports of poor conditioned fish, anglers reported a decline in catches which indicated either a reduction in the size of the population or some sustained environmental factor that may make it more difficult for anglers to catch fish, e.g. increased turbidity.

Currently, the problems with the fishery are confined to brown trout although a more

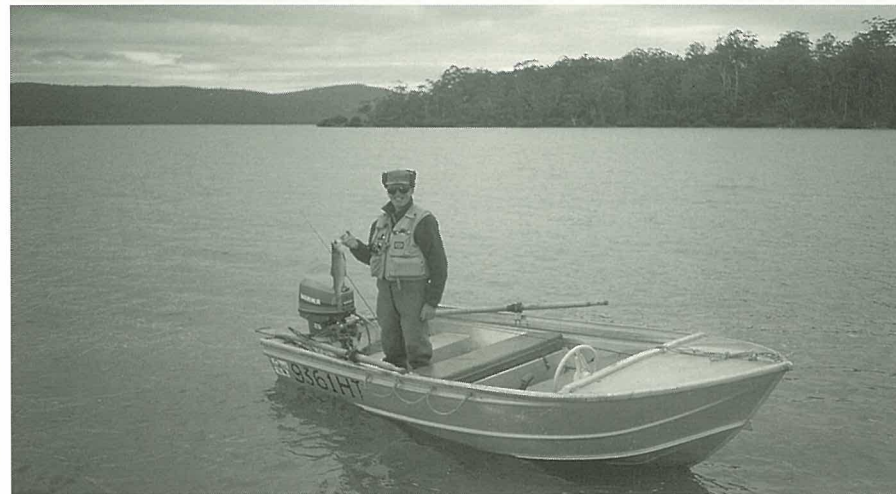
detailed examination is necessary to confirm that the problem is not also expressed in the rainbow trout population or in other fish species.

The problems with the fishery are being expressed in two ways:

- Low numbers of brown trout
- Poor condition of brown trout

These problems are considered in slightly more detail on page seven.

continued on page 7...



A satisfied angler during better times in Lake Sorell

valued the fisheries at lakes Sorell/Crescent at approximately \$2.5M on an annual basis. At this time the Lake Sorell fishery would have been of far greater value than the Lake Crescent fishery. Lake Sorell was generally featured in the most popular lake fisheries in the State prior to the decline in the fishery. Thus, the recent decline has had a significant impact on the State's anglers, particularly those based in the south.

Lake Sorell has populations of both brown and rainbow trout and is managed as a brown trout fishery. Lake Sorell also supports eels, and the endemic native fish – the golden galaxias. The golden galaxias is only found in lakes Sorell and Crescent. European carp are also present in the lake but are not abundant, particularly when compared to Lake Crescent.

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Boating news from Marine and Safety Tasmania (MAST)

Most anglers with boat licences would know some changes have occurred to boating laws.

Marine and Safety Tasmania intends to make these changes for the betterment of boating. However anglers, as with other boat users, may be a little confused by some of the changes. The following information should help clear up any misunderstandings.

Licences are required to drive any registered recreational boat of 4HP or more. Licences are valid for five year and are issued free. If your licence expires, you will

be required to sit the appropriate exam available at Service Tasmania outlets.

Registration is required for any boat with a motor of 4HP or more. Registration expires at the end of the calendar year and renewal notices are sent out in November. Registration in another State or with the Commonwealth is acceptable.

The following safety equipment is required for boats of less than six metres in smooth water:

- Anchor, rope and chain

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World Fly Fishing Championships – Poland

by Jason Garrett, Captain, Australian Fly Fishing Team

The XVIII World Fly Fishing Championships were held at Zakopane, Poland in August 1998.

Australia achieved a credible eleventh in the field of 18 countries.

The Czech Republic won the event followed by Poland, England, Italy, Slovakia, France, Spain, Scotland, Wales, Belgium, Australia, Germany, United States of America, Norway, Canada, New Zealand, Ireland and Finland.

A total of 6 573 fish were caught by 90 anglers who fished a total of 1 350 hours – an average of five fish per hour being caught.

Most fish were stocked rainbow and brown trout, the average length probably about 25cm. A number of grayling, one native salmon and a hunchun were other fish recorded.

The venue consisted of four river sectors, and one lake sector which was

fished from boats. The lake sector proved a problem for all countries. Only 47 fish were caught in the lake sector.

Chris Hill was the only Australian competitor to score on the lake and the only Australian competitor to win a group session. Chris caught 46 fish in three hours – an excellent effort.

Individual performances were:

• Terry Elmer	44th place	68 fish
• Chris Hill	45th place	64 fish
• Jonathan Stagg	53rd place	62 fish
• Blair Scott	60th place	67 fish
• Jim Davis	63rd place	65 fish

The World Fly Fishing Championships provide excellent experience for Australian anglers in competitive angling. I am sure all team members benefited from the experience, though no doubt returned home looking forward to catching more sizeable trout.

de-commissioning of the Waddamana Power Station.

A camp was set up on the canal and manned 24 hours a day for seven days. This allowed enough time for the fish to "run" up into the old spawning area where traps were in place. Without a constant presence in the past, excessive poaching has occurred in this area. Even with staff on site this year, there were a lot of "visitors" who were deterred on seeing the Commission in attendance. A bit of a surprise for them! This is the first time that this has been attempted by the IFC.

A total of 135 rainbow trout were stripped on 28 September 1998 and 50 000 eggs were transported to the Salmon Ponds hatchery. Fish were also weighed and measured to assist with the management of the lagoon.

Bonus for some, disappointment for others

Recent heavy rains in the north of the State caused many farm dams to overflow. Some of these dams contained brown and rainbow trout. Farmers have their dams screened to prevent trout

In Brief

IFC Review – progress report

The Minister for Primary Industries, Water and Environment David Llewellyn has been briefed by the Commission on the IFC Review and indicated his support for implementation of the review findings.

The Commission endorsed all Review recommendations except those relating to the advisory body and the proposed Board. The Review recommended the establishment of two bodies to advise and manage the proposed Freshwater Fisheries Service. The Associate Commissioners of Inland Fisheries have proposed that creation of a Freshwater Recreational Fisheries Council in addition to the Freshwater Anglers Council of Tasmania and the Tasmanian Recreational Fishing Council would be rather confusing. It has therefore been recommended that the body to advise the Minister on freshwater fisheries be known as the Freshwater Fisheries Management Advisory Committee.

The Review also recommended establishment of a Board to manage and monitor, at a strategic level, the activities of the FFS. It has been proposed that this is a highly bureaucratic method of management for a small organisation. In addition some of the proposed members who were previously in different Government Departments are now together in the combined portfolio Department of Primary Industries, Water and Environment. It has been suggested that the board be replaced by an interdepartmental committee to ensure cooperation of all bodies involved in management of the various uses of water systems.

By the time this is read, Cabinet will probably have considered the review and made a decision on its implementation.

Advertising to fill the positions of Director Inland Fisheries, the title of which will change when the FFS is established, and Deputy Director (formerly Senior Scientific Officer) has been arranged.

The Minister has agreed that the new advisory body begin to work with the existing Commission members to initiate strategic planning for the future of the organisation.



Penstock Lagoon project... the dog helped a lot

Fisheries habitat improvement trust

Legal requirements to establish the fund are nearing completion. Implementation work is expected to begin not later than early in the New Year.

Rod Hayes
Manager
Inland Fisheries Commission
Tasmania
Telephone: (03) 6233 3960

Rainbow Trout Spawning Run – Penstock Lagoon

Following recent negotiations, the Hydro Electric Corporation released water from Shannon Lagoon down Penstock No 2 Canal. This allowed the Commission to trap, strip and on-grow rainbow trout eggs for the restocking of Penstock Lagoon. This is necessary for the survival of the water as a trout fishery.

Trout can have limited spawning. There will however, be no water to allow the survival of eggs or fry for the lagoon with the

from escaping but the unusually heavy downpours caused a large number of fish to escape into our streams.

So all you anglers out there be prepared – the next fish you catch in your favourite stream may be 3lb, which no doubt will test your small river gear.

Many farm dams overflowed



Tasmania's Giant Freshwater Lobster

Astacopsis gouldi (Part Two)

by Dr Sally Bryant, Threatened Species Unit, Parks and Wildlife Service

In the final section of this two-part article, some in-situ management issues are discussed as well as how you as an individual can help stop the further decline of this unique creature.

Good Management of Rivers

If you manage land within the species' range consider these practices:

- Do not put large, heavy machinery or structures eg excavators or bridge supports in the streambed. This will directly kill lobsters and alter habitat for other aquatic species. The sedimentation caused by large machinery accumulates and destroys fragile habitats.
- Do not remove shingle or large quantities of rock from the streambed. This contains aquatic fauna, provides cover and disperses water flow.

Vegetation Clearing and Buffers

- Avoid clearing native vegetation from streamside zones or stream banks. Vegetation provides shelter, shade (maintains water temperature) and essential food for lobsters and other aquatic fauna. It also filters impurities from the water table and maintains slope and bank stability.
- Stream zones should contain a mix of native understorey and overstorey plants, including reeds, grasses, shrubs and trees. Dense undergrowth can provide more resistance to bank erosion than tree trunks. Establish vegetation as far down the base of the bank as possible. This may require specialist work to stabilise or batter the toe of the bank enabling vegetation to establish.
- The width of habitat buffers depends on the situation. In sensitive areas buffers of at least 40m or greater provide protection for the stream zone. A distance equivalent to the average dominant tree height is recommended as a minimum buffer width for all streams in the lobster's range.
- Buffers are especially important at points where surface water enters smaller channels, landscape depressions and where flow concentrates.
- An effective buffer zone should also provide for the continuing input of large woody debris and nutrients into the stream.

Weed and Willow Removal

- Leave roots and stumps of willows intact to aid bank stability.
- Removal of willows or dense weed mats must coincide with a revegetation program so that streambanks are not exposed to excessive erosion, light or loss of organic foliage. Remember that lobsters like cool, shady places.
- Use only sprays which are registered as suitable in watercourses (eg Roundup

Bioactive). Contact the DPIWE for more information on types of sprays and preferred alternatives.

Snags or Woody Debris

Woody debris including snags are natural in the river system. They are essential for modifying water flow enabling a diversity of plants and animals to establish in different parts of the river system. They provide shade, shelter and more importantly their gradual decay and leaf litter is the food source for most aquatic fauna. The main diet of the Giant Freshwater Lobster (GFL) is decaying wood.

- Do not remove woody debris or snags from the river system. If a snag is completely blocking flow seek advice on how to move it to a 20° - 40° angle to the stream bank.
- Lop selected branches near the water surface if they have a tendency to trap debris and cause logjams, but do not remove shade species.
- If the woody debris requires complete removal, try relocating it to a position of low water velocity in the stream or place it on the outside of banks to improve stability.

Fertilisers, Chemicals etc.

- Use only sprays which are registered as suitable in watercourses. Lobsters are extremely sensitive to chemicals, especially pyrethrin.
- Time any fertiliser or chemical application to avoid periods of intense runoff. Instead of broadcast applications, try direct placement in the soil or under trash blanketing, use stubble mulching etc.
- Trial the use of alternative 'environmentally friendly' applications, which may also be safer for stock and human health.

Managing Stock Access

Stock naturally favour riverbanks and, if poorly managed will completely degrade crossings, watering points and foul the water. This results in erosion, loss of species, soil compaction, weed invasion and build up of bacteria and viruses in the water.

- Fencing and smart planning will enable you to manage the riparian zone and your stock. Hanging fences, electric and electronic fences, drop fences and alternative watering points should be used depending on the situation.
- Timing, intensity and duration of stock in sensitive riparian zones can also be regulated to maintain the area.

Culverts

Interestingly many animals, especially the GFL avoid using culverts. Culverts channelise the water flow over the smooth concrete surface. Poorly designed or embedded culverts prevent upstream migration of aquatic

species and force larger species like lobsters onto roadsides or into open situations.

- Wherever possible use bridges instead of culverts. Try alternative inverted 'U' shape designs or irregular shapes. If round culverts are necessary they should be fully embedded in the streambed and ideally should have an artificial substrate provided down the midline of the pipe (eg rocky gravel cemented).

So much more to know

Ecological research questions which will help the species conservation include:

- the effects of habitat fragmentation on recruitment and population dynamics
 - barriers to movement, dispersal and colonisation
 - critical population size and characteristics
 - patterns of recruitment and habitat requirements for all life-history stages
 - water quality, pesticides and nutrient levels
- Forestry-related questions include:
- the effects of culverts, road crossings or stream barriers on lobster movements
 - the use of class 4 streams by lobsters
 - the effectiveness of current prescriptions to protect stream classes, especially buffer widths

Agricultural related questions include:

- the impacts of agricultural practices
- management prescriptions for riparian and in-stream habitat modifications, eg weed and willow removal, flood mitigation, snag removal, etc.

We need your help

The most essential and critical action you can do is to protect and restore lobster habitat. If habitat is improved then lobsters will naturally recover and re-enter traditional water systems. Catching, relocating, breeding and other research actions are secondary in importance to habitat protection.

- Let everyone know that fishing is illegal. Help change the view that lobsters are only there to be eaten.
- Report the presence of any strings or baitlines to the Inland Fisheries Commission or via BushWatch ph 1800 00 5555.
- Help instil a sense of pride that Tasmania's northern rivers hold one of the world's most unique creatures.
- Be proud to say that "...the GFL occurs in your stream and that's where its stays."
- Act as a watchdog to report offences and warn of developments that threaten the species and its habitat. This includes any activities impacting on riparian vegetation, streambeds and water quality.
- Raise money to promote conservation and awareness, including assisting research programs and providing more posters, notesheets etc.
- Become part of a local group that cares for lobster habitat.

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Western Lakes Rehabilitation Works – Lakes Paget and Ada

The Parks and Wildlife Service have received a \$200 000 grant from the Natural Heritage Trust Fund to conduct land rehabilitation works on degraded areas of the Central Plateau.

Parks and Wildlife Service Rehabilitation Officer Mike Comfort said: "Many areas of

(frost heave, short growing season, strong winds etc) and browsing pressure both from rabbits and marsupials. Without active rehabilitation works many of these sites will not recover or recover extremely slowly.

Detailed planning is currently underway to prepare a Rehabilitation Plan for the



Looking east from end of Lake Augusta boat ramp and lunette

the Plateau have suffered severe soil erosion caused by a history of burning, domestic stock grazing, infestation by rabbits and construction of roads and dams."

Natural revegetation of these areas is extremely slow due to the harsh climate

Boating news from MAST

...continued from front page

- Bailer or bilge pump
- Personal flotation device (PFD)— two for all on board (AS 1499)
- Fire extinguisher
- Oars or auxiliary propulsion

MAST will be doing some safety and licensing patrols on inland waterways but initially will issue warnings only. It plans to conduct a training and licensing 'course' in the highlands this summer. The third week of January 1999 is being considered and MAST will publish details.

For information on the safety equipment for boats in other types of water please contact MAST. Information is also available on work currently being undertaken on inland waters.

Keeping safe on the water this summer

The message for this season from MAST is to BE WATER SAFE.

The ways to ensure that you have a safe day on the water is to:

- Make sure you check your motor
- Make sure you have your PFD on board
- Make sure you stick to the 'rules of the road'

BE WATER SAFE and have a great day on the water.

Any queries on recreational boating can be directed to MAST at GPO Box 607, Hobart 7000 or phone 6233 8801.



Rehabilitation works at the old Lake Ada car park

area and a Supervisor has been recently appointed to oversee works planned for early in the New Year. The planned works on the Plateau will include earthworks, fencing, direct seeding and laying of geotextiles to stabilise mobile soils. Some areas of sheet erosion may be fenced to encourage revegetation in the absence of browsing pressure.

Proposed earthworks will include landscaping at a number of scars along the Lake Augusta Road by redistributing windrowed soil and encouraging revegetation of bare ground.

A number of the sandy dunes or lunettes will be targeted for stabilisation works. These Lunettes are unique landforms in Australia due to their high altitude setting, and derivation from dolerite glacial debris of young geological age.

An inspection was made by staff from the Inland Fisheries Commission and Parks and Wildlife Service in September 1998 concerning proposed regeneration works at lakes Paget and Ada.

It is proposed is to remove the rock wall in Lake Ada in an attempt to return the area to its natural state and to alleviate the ongoing siltation problem. The rock wall was installed approximately five years ago.

At Lake Paget the idea is to make a smaller water area creating a more natural look rather than the existing "quarry" appearance. Rocks will be relocated from Lake Ada to Lake Paget to create uneven islands and then covered with earth and vegetation which is available on site. It must,

however, be accepted that the wall or roadway will still be a long straight road. Unfortunately, the cost of addressing this issue is prohibitive.

A request from the Commission that the water depth be increased whilst excavations are being carried out is being considered by DPIWE. This will allow the survival of fish during hot and dry periods.

Weather permitting, works will commence in December this year.

MAST funding for boating infrastructure

MAST sets aside \$200 000 from each year's boat registration revenue to improve boating facilities. This initiative commenced in 1998 and although some mistakes have been acknowledged, the program should be regarded as a positive initiative. In the first year funds were evenly divided between inland and marine waters. However, in future it is intended to approve projects on the basis of their relative merit and necessity. This will mean that the proportion of funding approved for inland and marine projects will vary.

A MAST representative recently met with the Inland Fisheries Commission to agree on a process for handling submission of inland waters project proposals in the future. It was decided that IFC should provide advice to MAST and the process for the forthcoming year was agreed as:

- MAST has sent out registration renewal notices including information on how clubs or individuals can nominate development projects,
- submissions received by MAST will be passed on to IFC,
- IFC staff will contact Angling Clubs to identify their ideas,
- MAST requests that IFC, advised by the proposed Freshwater Fisheries Management Advisory Committee, nominate five significant projects (\$10 000 – \$20 000) and five of less significance (under \$10 000) by end Jan 99,
- MAST Board will consider submissions in mid-Feb 99,
- MAST will then consult IFC on detail of implementing approved projects and will subsequently hold public meetings to review design proposals.

Native fish news

by Jean Jackson, Scientific Officer, Native Fish Conservation

Conservation of Tasmania's threatened *Galaxias* species has received a boost with funding for the 5 year recovery plan for the Pedder, Swan, Clarence, and swamp and saddled galaxias.

The plan was prepared by Dave Crook and Andrew Sanger in 1997, and replaces individual recovery plans for the Pedder and Swan galaxias. Conservation and sustainable management of all native freshwater fauna is a key responsibility of the IFC.

What is a threatened species?

A species is considered threatened if it is at risk of becoming extinct without active management for its conservation. Each of the threatened galaxias species is found in a very limited area and is threatened by an unnatural process. Other threatened Tasmanian fish are the Australian grayling (*Prototroctes maraena*) and the dwarf galaxiid (*Galaxiella pusilla*), which also occur in south-eastern Australia.

Why are these fish threatened?

Introduced fish (brown trout and redfin perch) eat the galaxias and compete for food and habitat. Other introduced species – such as carp, were it to become widespread – degrade habitat through changes such as increased water turbidity.

Habitat is being lost and degraded through the draining of swamps, damming of rivers, clearing of native vegetation and water pollution, so that the fish have fewer places to live.

The Pedder galaxias has suffered major habitat loss and predation from introduced fish, including trout. The Swan galaxias is eliminated by brown trout which have spread through much of its former range in streams of the upper Swan and Macquarie River catchments in the east. The Clarence galaxias is found in a few lakes, streams and marshes in the Clarence Lagoon region. It is also eliminated by brown trout although it can live with brook trout in Clarence Lagoon.

What is being done?

The recovery plan describes what we know of the biology of these species, their conservation status and what processes are threatening their survival. Most importantly, the plan gives details of actions required for improving the survival chances of the five galaxias species. Funding for these actions is provided by the Inland Fisheries Commission, Environment Australia, the Hydro Electric Corporation and Parks and Wildlife Service.

The IFC is coordinating implementation of the conservation actions and carrying out many of them. The main actions are monitoring of the remaining natural populations, establishment and monitoring of populations in new secure sites, management to maintain habitat quality, trials of breeding in captivity and providing information to the public about the threatened species.

Success with conserving the three endangered species

Some progress has been made towards ensuring the ongoing survival of the three endangered species (Pedder, Swan and Clarence galaxias), although they are far

from being secure.

The Pedder galaxias is now on the verge of extinction in what remains of its natural habitat i.e. in streams flowing into the Lake Pedder impoundment and has not been found there for two years. Hope for the future survival of the species lies with a few fish which were moved from Lake Pedder streams to Lake Oberon in the Western Arthur Range in 1991-92. In February 1998 these fish were found to have bred successfully.

The Swan galaxias now has only three surviving natural populations. Three other known natural populations rapidly became extinct after trout or redfin perch entered their streams. Nine new populations have successfully been established in sites without introduced fish.

The Clarence galaxias was, until recently, known from only a few populations in sites isolated from brown trout in the Clarence River catchment. In late 1997 and early 1998, two new populations were discovered in the Nive and Derwent catchments. This is exciting news that gives hope for finding more populations in refuges in these catchments.



Brett Mawbey releasing Swan galaxias into Tater Garden Creek after measuring them to determine population structure. Photo: Brad Emmerton



Brett Mawbey electrofishing for Clarence galaxias. Photo: Jean Jackson

What can you do for native fish?

Don't transfer any kind of fish or other aquatic animals or plants between streams or other water bodies, including different parts of the same stream. A large population of the Swan galaxias was wiped out by illegal introduction of trout above Hardings Falls on the Swan River in the late 1980s.

If you become aware of trout or redfin being introduced to a new area, let the Commission know. If prompt action is taken it may be possible to lessen the threat to the native fish populations. Protect native fish habitat by looking after and not disturbing freshwater and riparian environments.

Learn about our native freshwater fish. There are 25 species in 10 families!

Useful references:

Fulton, W. 1990 Tasmanian Freshwater Fishes. Fauna of Tasmania handbook number 7, University of Tasmania.
McDowall, R. (editor) 1996. Freshwater Fishes of South-eastern Australia. Reed Books.

University of Tasmania Freshwater Studies

Zoology Department students from the University of Tasmania are conducting research in the field of freshwater biology. Details of two research projects of interest to anglers are provided below from post-graduate students, Lee Miles and Adam Utenyaal.



Has your lake got a dirty bottom?

Turbidity in shallow highland lakes of central Tasmania.

By Adam Uytendaal (PhD student)

Anglers will be well aware of poor water clarity in several shallow lagoons in the Central Plateau, such as Shannon and Penstock lagoons. A joint project is presently being undertaken by the University of Tasmania and the Hydro Electric Commission to determine the factors causing this problem and how these systems are best managed to improve water clarity.

Turbidity is loosely defined as lack of water clarity, or the 'murky' appearance of water. It is due to light being scattered by suspended matter present in the water column. This material can be divided into two categories, inorganic matter, such as clay particles and silt, and organic matter such as phytoplankton and detritus that originates from the breakdown of aquatic plants. Turbidity limits light penetration and therefore affects the light climate of the water body in turn limiting plant growth and development. High levels of suspended matter may also be detrimental to the organisms present in a number of ways, for example; fouling of fish gills and interfering with fish feeding by limiting their vision. Furthermore, high turbidity reduces the aesthetic appeal of the water and interferes with sight fishing and dry-fly fishing.

Determining the nature of turbidity

Firstly, the type of material responsible for increased turbidity levels shall be determined. This will provide an insight into the origin of the material and the processes responsible for it being present. For example, if high turbidity levels are due to high levels of algae, then management initiatives would focus around management of nutrients in the hope of reducing the levels of algae present. However, if the problem is due to inorganic material originating from the bottom of the lagoon,

then management would focus around reducing processes which are stirring up the bottom, such as wind re-suspension of bottom sediments or turbulence from boat wake.

Modelling wind-induced turbidity

Secondly, detailed modelling of wind re-suspension of bottom sediments will also take place. This will involve looking at the relationships between local wind speed and direction, depth profiles of the lagoons, levels of turbulence produced by wind-driven waves, and turbidity levels of the study lagoons. This will provide an understanding of relationships between local weather conditions, water clarity, and water level management in the systems of interest.

The role of aquatic plants in influencing turbidity

The third area of interest is to investigate the benefits of aquatic plants in stabilising bottom sediments. Aquatic plants have the ability to reduce flow thus buffering the action of waves on bottom sediments. In reducing water velocity or 'sheer stress', rates of re-suspension are reduced and levels of deposition are increased. They may also increase the stability of sediments via root growth thus binding sediments together and reducing water velocity. By investigating the relationships between these factors and plant growth, form and biomass, an understanding into the potential for manipulating systems to increase aquatic plant cover will be realised.

It is hoped that this research will assist in identifying management options and the development of strategies to improve water clarity in systems as Shannon, Penstock and Little Pine lagoons.

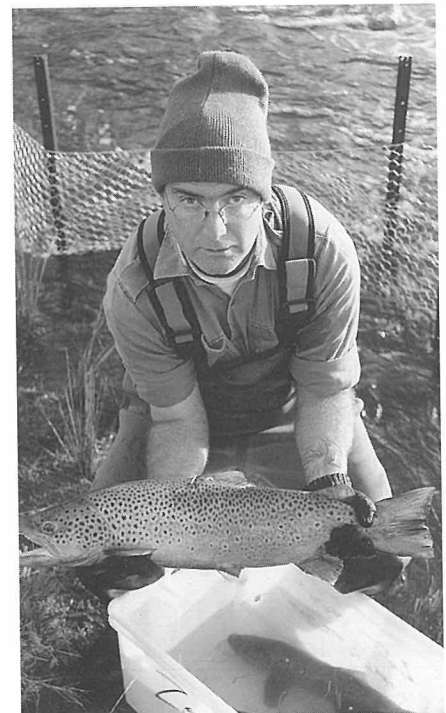
Movements of river trout during the spawning season

by Lee Miles (Honours student)

University of Tasmania Honours student, Lee Miles, has been conducting research into the movements of adult spawning brown trout and immature trout within a spawning stream. The study is being conducted in the Huonville area, and aims to examine the movement patterns of adult, spawning sea-run and stream resident brown trout. Movement patterns of resident immature trout will also be examined. Comparisons will be made of the movement of sea-run trout and stream resident trout.

Trout have been trapped entering and exiting a spawning stream off the Huon River, and they have been marked with individually numbered tags. Fish already in the stream prior to spawning have been captured by electrofishing and similarly marked. By marking individual fish, and recapturing them, it is possible to determine their movements.

Preliminary results indicate that that adult spawning fish spend between 14 and 35 days in the spawning stream, and that both sea-run trout and stream resident trout



Lee Miles holds a just tagged brown trout

spawn together. Young trout already in the stream prior to spawning appear to remain within about the same 50 metre reach of the stream through the spawning period.

Tagged trout from the project are likely to be found in the Huon estuary and the Huon River or its tributaries. Tags are red, white or yellow and are located on the fishes back close to the dorsal fin. Anglers catching a tagged trout are requested to record and report the following details: tag number, colour, location, date of capture, contact name and phone number. It would be appreciated if these details could be given to Lee Miles at the Zoology Department, University of Tasmania (6226 2613/6225 4535).

Lake Sorell issues

...continued from front page

Low numbers of Brown Trout

Explanation

The low numbers of trout is thought to be a consequence of two factors; (a) highly variable natural recruitment and, (b) active erosion in the spawning beds in the primary spawning stream (Mountain Creek).

It will be extremely difficult to manage the highly variable natural recruitment characteristic of the fishery, however, opportunities exist to supplement the fishery after failures in recruitment. This would mean detecting the recruitment failure and appropriately stocking.

Mountain Creek is the primary spawning stream for trout at Lake Sorell and is of critical importance to the sustainability of the fishery. Given that highly variable recruitment occurs naturally, it is crucial that the stream is kept in an optimal condition for spawning trout. Any instability or erosion will exacerbate the problem of variable natural recruitment and may actually become the more important causative factor. Currently, the stream is unstable with many actively eroding points. This situation has probably been primarily responsible for the complete failure of recruitment from this year's brown and rainbow trout spawning runs.

Solution

A partial solution to the problem of recruitment failure is to rehabilitate the spawning beds at Mountain Creek. If this is not done then recruitment will continue to fail annually. The natural recruitment of brown trout is an important feature of the fishery and, therefore, the rehabilitation of the spawning beds needs to be addressed this summer. The fishery will always suffer from variable natural recruitment but the gross failures can be overcome by intervening with a trout stocking program.

Poor condition of trout

Explanation

Perhaps the most likely cause of poor conditioned trout is a decline in food resources (tadpoles, aquatic invertebrates and golden galaxias). This decline may be due to a combination of factors such as the poor production of food resources, limited food availability due to competitive pressures or an impaired ability to capture prey. A key element responsible for these changes in this factor may be turbidity. Turbidity can arise from a variety of sources such as poor land practices, particle re-suspension due to low lake levels and wind, algal blooms and declines in the coverage of aquatic macrophytes (plants) and fringing marshes.

Solution

There is likely to be no easy and quick solution to the problem of poor conditioned fish particularly if it is caused by turbidity and possibly land-use practices. Water level management may provide scope for a medium-term solution but it is likely that risk assessment objectives established in the Carp program water management plan will conflict with possible options for improving environmental conditions in the Lake Sorell.

The exact causes of the poor fish condition needs further detailed study. These studies include: (i) an examination of the diets of all fish species, (ii) examination of food resources in various key habitats in the lake, (iii) examination of turbidity and water quality in relation to storm

events and (iv) detailed description of the fish diets in relation to storm events.

A wider, more comprehensive approach is required to investigate the primary causes of any environmental degradation such as turbidity. These studies would include (i) an audit of land-use practices including recommendations for improving poor practices, (ii) a re-assessment of the Carp program water management plan in respect to wider environmental considerations.

Other important considerations

Fishery issues

There are many other fishery-related elements that need to be investigated to provide a comprehensive understanding of the fishery. These would include: (i) examination of recruitment and mortality in the fish population, (ii) intensive study of the spawning run, (iii) fish population estimates, (iv) examination of catch returns and fishery performance statistics derived from the angler postal questionnaire, (v) interactions (direct and indirect) with carp, and (vi) assessments of the impacts of the commercial eel fishery (stocking rates etc).

Wider ecological issues

There is a suite of wider ecological factors that need examination to varying degrees. This would include the following: (i) survey of the plankton communities, (ii) an assessment of the impacts of lake level management and (iii) review of water quality monitoring and a possible increase in water quality monitoring.

Original proposal

Several years ago a brief study outline was announced to anglers that would provide a basis for understanding the important and fundamental ecological and environmental factors that affect the fishery at Lake Sorell. The study proposal was to also investigate gaps in our knowledge of the fishery. There is no doubt that the project had merit but a major failure was that the project was poorly resourced in order to meet objectives within an adequate time frame. Consequently, many elements of the study were deferred because of the lack of staffing resources. Anglers' expectations remained high as they were not informed about the necessary deferral of elements of the project. Despite this situation some progress has been made.

Progress to date

Several elements of the original study outline have been completed or are currently underway. Some of these elements have long-term objectives whilst others can be realised in the short-term. A brief summary of some of these project elements is provided below.

- The Commission conducted an estimate of the brown trout population in Lake Sorell in mid-1997. This was an estimate for a single point in time and may be meaningless next year or the year after as new recruits enter the fishery. A more sophisticated approach may be used in the future to give multiple estimates within a year, estimates for several years and estimates of mortality. However, such a study would be dependent on the allocation of resources.
- The monitoring of recruitment at Mountain Creek has continued for the third year.
- The condition of fish is being regularly monitored although the frequency of the surveys has decreased.
- Spawning runs have been routinely monitored.

- Fish have been collected to aid in the validation of scale ageing. Analysis of ages ascertained from otoliths (ear bones) has also been conducted.
- A review of historical water quality data and phyto-plankton community data has commenced.
- Monthly water quality data is being collected as part of the Carp Management Program.
- A turbidity logger has been purchased and will be deployed in Lake Sorell as soon as possible.

The proposed strategy

The proposed strategy is based on several elements and includes an internal review of some of the objectives of the Carp Management program to maximise resource utilisation. This review is necessary as some specific elements (eg water level management) may conflict with possible solutions to the Lake Sorell problem. This conflict needs to be assessed, resolved and managed so that any solution takes into account the requirements of the carp management program but also addresses and is sympathetic to general or specific needs of the fishery and the environment.

There are some overlapping project elements such as the impacts of water level management that would be useful to the Lake Sorell project and the Carp management project. However, it remains to be seen if the Carp project has immediate financial and staffing capacity to examine these elements.

The proposed strategy is composed of several major elements, some of which have been identified previously. These elements include the following:

- A review of past land and water management practices, including an audit of current practices.
- A review of biological and environmental data (including water quality and water levels).
- An examination of fish diets including trout, golden galaxias and eels in conjunction with turbidity events.
- An assessment of the impacts of de-watering fringing marshes and declines in open water aquatic macrophytes.
- An assessment of the invertebrate resources in the lake, primarily invertebrates associated with key habitats such as open water aquatic macrophytes (plants) and fringing marshes.
- An assessment of the nature of turbidity including identification of the source(s) and causes.
- A integrated review of water level requirements necessary to reduce turbidity, encourage growth of fringing marshes and aquatic macrophytes and provide adequate levels of risk protection against carp escapement.
- Analysis and reporting on work conducted to date.

Currently (November '98), this proposed strategy is being considered by the Commission together with options for the provision of crucial additional resources. Detailed scoping, planning and resourcing will commence on these project elements as soon as the strategy is endorsed by the Commission and the Minister.

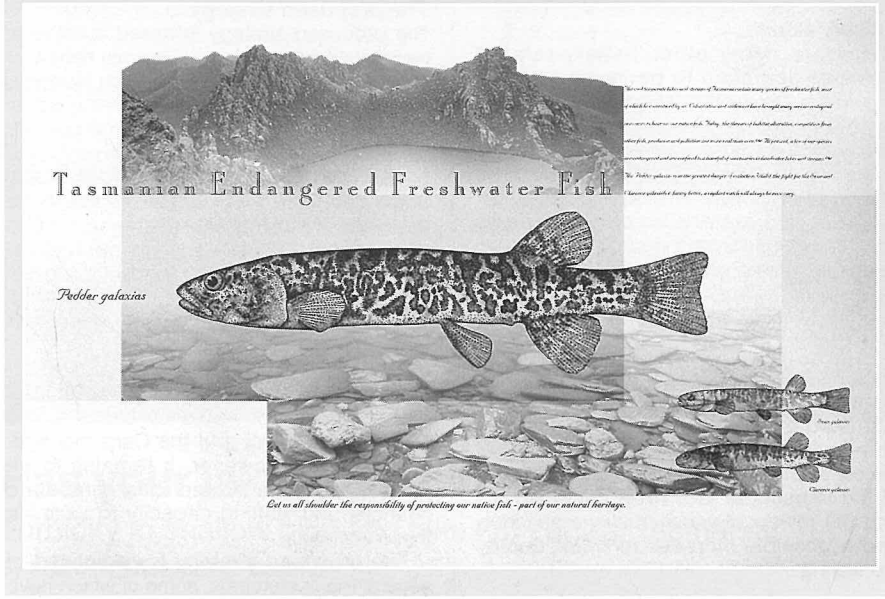
Anglers should be aware that, although there are probably no immediate solutions to the problems at Lake Sorell, the Commission is committed to restoring the fishery as far as possible.

Tasmanian Endangered Freshwater Fish poster

This attractive and informative poster, designed by Lynda Warner and published by the Commission, was released in conjunction with Threatened Species Day activities in September. It features Tasmania's three endangered galaxias species, the Pedder, Swan and Clarence galaxias. Each of the three

species are found in very small areas and are now confined to headwater streams and lakes which are free of brown trout and other introduced fish.

The poster measures 65 x 45 cm and can be purchased from the Commission at 6B Lampton Avenue, Derwent Park for \$6.00, or \$10.00 including postage and handling.



Carp and Water Level Management in lakes Sorell and Crescent

by John Diggle (Scientific Officer – Carp Management)

Water levels in lakes Sorell and Crescent have been managed by the Inland Fisheries Commission since the discovery of carp in 1995. Prior to this, water levels in the lakes were controlled by the Clyde Water Trust. The Commission currently operates a water management plan developed by the Hydro Electric Corporation in conjunction with the DPIWE water resources section.

Over the past three years there has been varying success in meeting water level management objectives. Initially there were major problems with the fine screens used to prevent the passage of carp. This led to a lack of control of water levels in 1995 and 1996 culminating in very high lake levels

in both lakes Crescent and Sorell in the winter of 1996, as illustrated in Figure 1. Unfortunately this lack of control contributed to successful carp spawnings in 95/96 and 96/97. The situation was improved by the installation of higher capacity screens and the El Nino induced drought of last summer, which in combination resulted in better water level manipulation in 97/98.

Since Autumn 1997 lake levels have been maintained at or below preferred operating levels. At this stage it appears that water level control and reducing fish populations have prevented carp from spawning successfully in either Lake Crescent or Lake Sorell in summer 97/98. Furthermore all downstream requirements were met for

Silver Plains shoreline following the 'El Nino' drought last summer



Freshwater Lobster

...continued from page 3

- Rapid revegetation of redundant roads and controlling access to key areas will help reduce illegal fishing.
- Local authorities have powers to control adverse actions and to promote rehabilitation of riparian and in stream habitats. Have your say to make sure this happens.

Support the name 'Tayatea'

The term lobster or crayfish evokes thoughts of tasty flesh. Historical accounts suggest the Tasmanian Aborigines referred to freshwater lobsters as 'Tayatea'. To help change the ethos from eating to preserving why not adopt the cultural name in recognition of the species unique link to Tasmania and our people.

Further Information

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- Inland Fisheries Commission 1993. Changes to freshwater crayfish regulations. Inland Fisheries Commission Newsletter 22 (2) (July 1993): 6.
- Lynch, T. & Bluhdorn, D.R. 1997. Reservation assessment and habitat requirements of the giant Tasmanian freshwater lobster, *Astacopsis gouldi*. Report to the Tasmanian RFA Environment and Heritage Technical Committee, Hobart.

Contacts

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Inland Fisheries Commission, 6B Lampton Avenue, Derwent Park, Hobart, Tas 7009, Ph (03) 6233 8767, Fax (03) 6233 8733.

domestic and irrigation supply. The downside was the low level reached by Lake Sorell in April this year, though it should be noted that the main cause of low levels over this period was evaporation and the lack of inputs from rain. The lack of inundation of marsh habitat is of concern, however as long as there is inundation in the next two years it is anticipated that there will be no long term effects on marsh health.

There is still a need to further refine the screening process to enable better lake level control and better provision for other lake values. The Commission will be seeking information on better screening options this financial year, with the goal of seeking funds and improving the system next financial year. The whole containment strategy including lake closure and screening is based on carp being restricted in distribution to lakes Sorell and Crescent. Discovery of carp outside of this distribution is still a possibility and would impact greatly on future management strategies and options. In this respect future water management will also depend on the findings of distribution surveys this summer.