INLAND FISHERIES COMMISSION
NEWSLETTER
VOLUME 24 NUMBER 3 – DECEMBER 1995

IFC goes on the road

Question: What were IFC staff, a life size cut-out of a 1970's angler and numerous baseball caps with fish poking out of them, all doing in Melbourne in early October?

(a) Performing in a comedy festival?
(b) Taking their annual holiday?
(c) Attending the Melbourne Fishing Show?

Yes, for the second year running the Commission went "on the road" to promote our world class trout fishery to Victorian anglers.

The response was extremely positive. Many people commented that they had been to Tasmania and thoroughly enjoyed the fishing and hospitality, whilst others said that they were planning a visit in the near future and were eager for more information. Visitors to our stand frequently spoke of the quality and diversity of angling in Tasmania compared with Victoria.

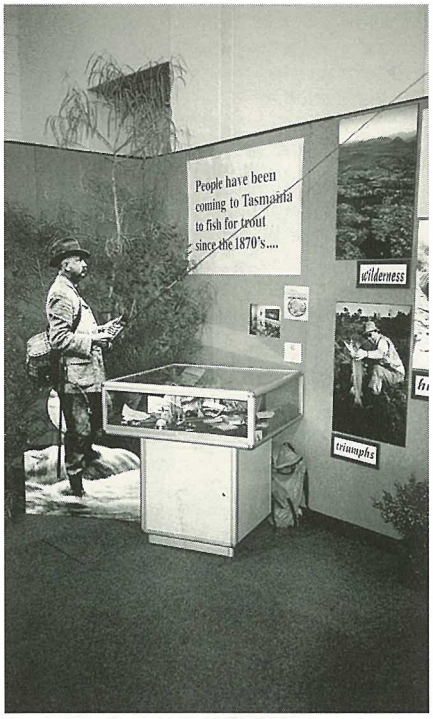
This year's IFC display was part of a combined Tasmanian stand, which included Tourism Tasmania and local tourism associations, the Tasmanian Professional Trout Fishing Guides, Parks and Wildlife Service and various manufacturers including Anchor Wetsuits and Stormy Seas. This combined approach meant that our stand had a real impact because of its size and it was easy to refer visitors to other people for more information. Our location, just inside the entry/exit point, also meant we had great exposure to the 30 000 plus show visitors.

The IFC display was based on the theme: "People have been coming to Tasmania to go trout fishing since the 1870's - why don't you join them?".

To convey this theme we used the large cut-out of a 1970's angler from one of the Museum of Trout Fishing displays, together with some of the items from the collection to create a sense of history. Adjoining this was a series of large photographs showing the variety of fishing opportunities we could offer current day anglers.

The angling memorabilia from the collection created much interest and through this we promoted the Museum and Salmon Ponds itself. Selected items from the Museum gift shop were also on sale and the response to these was pleasing.

When it came time to pack up on Sunday night, we were feeling tired but happy with the contacts made in the past three days. Follow up has already been noted with several visitors to the Salmon Ponds commenting that they had seen the display in Melbourne. A generous donation of two reels and assorted flies for the Museum was also received from a show visitor.



A section of the IFC display at the Melbourne Fishing Show. (Photo: Gabrielle Balon)

IN BRIEF

Free fishing day

Australia Day (26 January 1996) will be a free fishing day and an angling licence will not be required to fish inland waters.

The IFC hopes to attract new anglers (and those who have not fished for a while) to the sport. The assistance of angling clubs has been enlisted and club members will be on hand at selected venues to assist anyone on the day.

To get involved you do not have to go to one of these waters but just take the opportunity. Win Television and Daiwa Australia have also contributed to the free fishing day which will become an annual event.

New inspector for north west

John Dowling was appointed to the position of Fisheries Inspector on the north west coast on 18 October 1995.

John is originally from Tasmania and has spent the last ten years working for New South Wales Fisheries in a similar role. Just to soften him up a little he has been thrown headlong into the whitebait poaching which is unfortunately all too prevalent on the coast.

John is a keen angler and should fit in well with the local community.

More brook trout for Lake Plimsoll

A recent netting survey of Lake Plimsoll recorded brook trout from 500 to 1500g. This suggests that there has been some natural recruitment to this water as the year classes do not all relate to past stocking.

At the conclusion of the survey a further 10 000 brook trout fingerlings were released into the lake.

CONTENTS

ARTICLE

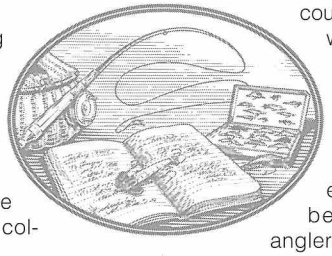
Museum of Trout Fishing

Feeling friendly?

Are you between the ages of 8 and 98, with time to spare and a desire to 'get involved'.

If so, then the Salmon Ponds needs you!

I am currently investigating the establishment of a 'Friends of the Salmon Ponds' group to provide support and assistance with tasks such as:



- cataloguing items in the Museum of Trout Fishing collection;
- staffing the Museum gift shop;
- leading guided tours of the grounds and organising special event days;
- various conservation and development works around the grounds.

In return, the members of the Friends Group could enjoy benefits such as:

- discounts on entry fees and Museum gift shop purchases;
- opportunities to meet others with similar interests and develop new skills;
- the opportunity to actively pursue a personal interest in aspects of angling history;
- the satisfaction of helping to conserve this very important part of Tasmania's heritage.

By way of example it would be of great assistance to the museum if we could get the support of people with specialist knowledge in various fields such as fishing tackle, lures, flies or other areas such as old hatcheries. They would then have the opportunity to expand on their interest and benefit the museum and all anglers. Even if you don't already have such knowledge it would be of assistance to find people with time to pursue any of these subjects (or others).

If you are interested in becoming a friend of the Salmon Ponds, or would like more information, please contact:

Gabrielle Balon
Museum Manager

Museum of Trout Fishing
Salmon Ponds
RMB 5060
New Norfolk Tas 7140
Phone: (002) 61 1076
Fax: (002) 61 4485

A register of interested people will be established and a meeting will be held in early February 1996.

So..... go on, get involved!

Some of the tackle just waiting to be researched (Photo: Gabrielle Balon)

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127 Davey Street
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Rainbow trout spawning runs

The spawning runs of rainbow trout were monitored at Lagoon of Islands, Penstock Lagoon, Great Lake and Lake Sorell between August and October 1995.

The excellent condition of the spawning rainbows at Penstock Lagoon this year was a highlight for staff monitoring the run. The improvements to the in-flowing canal appear to be working well. Anti-jump screens were installed on the canal to control the timing of migrations as well as the area the fish could get access. The spawning area has also been improved by narrowing the channel and decreasing the depth to create better spawning habitat. If the condition of the spawners is any indication, there is no doubt that some anglers will be more than pleasantly surprised during the season.

Once again the spawning run at Lake Sorell occurred over an extended period due to inconsistent and variable water flows in Mountain Creek. Despite this, the rainbows appeared to spawn successfully throughout the creek and drop back into the lake without any assistance.

The rainbow trout run at Great Lake was fairly small with less than 700 fish counted through the Liawenee trap. However, this number is likely to be an underestimate of the total number of trout in the run because many rainbows were observed by-passing the trap by leaping over the anti-jump screen in the main canal. These trout were not trapped or counted.

Superbly conditioned trout are generally expected at the spawning run at Lagoon of Islands and this year was no exception. Trout moved into Ripple Creek to spawn in two runs. The first run comprised a small number of larger, older fish whilst the second run included many smaller, younger fish. All fish were in excellent condition. The run of young fish indicates that there may well be some "beauties" caught in the future!

A Penstock rainbow (photo: Brett Mawbey)

LAGOON OF ISLANDS (RIPPLE CREEK) — **21 AUGUST & 18 SEPTEMBER 1995**

Range of weight (g)	600-3 650
Average weight (g)	1 623
Range of length (mm)	360-648
Average length (mm)	480

PENSTOCK LAGOON — **21 AUGUST1995**

Range of weight (g)	800-2 550
Average weight (g)	1 466
Range of length (mm)	375-603
Average length (mm)	474

GREAT LAKE (LIAWENEE CANAL) — **OCTOBER 1995**

Range of weight (g)	200-1 450
Average weight (g)	984
Range of length (mm)	245-540
Average length (mm)	459

LAKE SORELL (MOUNTAIN CREEK) — **29 SEPTEMBER & 18 OCTOBER1995**

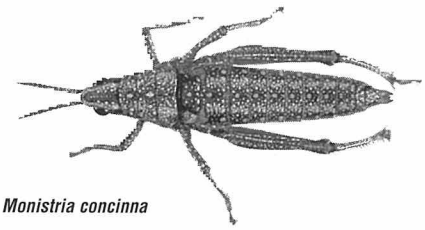
Range of weight (g)	500-2 000
Average weight (g)	1 033
Range of length (mm)	363-543
Average length (mm)	458

Highland Grasshoppers

by Peter McQuillan, University of Tasmania

Grasshoppers are conspicuous in the Tasmanian highlands in the warmer parts of the year. Although they may look superficially similar, closer examination reveals a variety of species and colour forms.

Despite their common name, most Tasmanian grasshoppers do not prefer to eat grass. Instead, they graze small herbs, prostrate, or mat-forming plants which often grow in the spaces between grass tussocks and in damp areas such as lake margins. Native daisies and buttercups also feature in their diet. Flower petals are another favourite food source, especially for small immature hoppers.



Monistria concinna

All our highland grasshoppers have a similar life cycle, beginning with an egg laid in the ground. A number of eggs are cemented together to form a pod. From the egg hatches a juvenile grasshopper which looks similar to a miniature but wingless adult. Juveniles disperse by walking and moult their outer skin several times as they grow. Depending on the species, the life cycle from egg to adult may take one or more years. The larger species take at least two and possibly more years to mature.

Noteworthy in much of the highland grasshopper fauna is a big difference in the size of male and female individuals at adulthood. Mating pairs are obvious in summer with the smaller male carried on the back of the bulky female who may be three times her partner's mass. The reasons for this sexual dimorphism are not well understood but this phenomenon occurs in some other alpine grasshoppers overseas and may relate to energy efficiency in a cold climate

Grasshoppers are eaten by native birds, lizards and snakes and are also parasitised by a range of flies, wasps, nematodes and micro-organisms.

The following species are of particular interest:

■ D'Albertis' grasshopper
Russalpia albertisi

This is the most common grasshopper in the highlands and western parts of the state. Named after the notorious Italian naturalist-adventurer Count Luigi D'Albertis, this handsome grasshopper is endemic to Tasmania. It grows to 3cm in length, is flightless, and has several distinct colour forms. Most common is a bright green form, but straw brown and grey forms exist also, especially in rocky areas. It is commonly flushed from low vegetation and is able to climb low shrubs to graze on their flowers. Females commonly drill their egg pods into cushion plants in late summer.

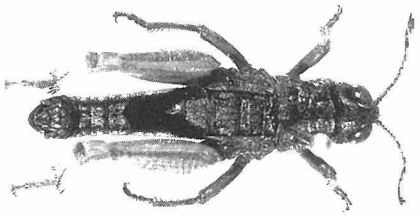
■ Tasmanian grasshopper
Tasmaniacris tasmaniensis

This flightless insect is very widespread from sea level to mountain tops. It is endemic to Tasmania and reaches just over 3cm in length. Most individuals are grey or brown but those in scrubby areas can be mottled with olive green or dark brown blotches. It is a rather sluggish insect compared to the other species and shares the strong sexual dimorphism in size.

■ Scree grasshopper
Tasmanalpina clavata

This endemic species is locally common at the highest altitudes where it can be seen on sunny days basking on rock screes. It is distinctively coloured in black and has bright red hindlegs which it displays on settling. The antennae are swollen towards the tip (hence *clavata*) and are black with a white terminal band. If examined in the hand, this grasshopper is seen to be covered in very fine dense short hair. On a hot day it is extremely wary and difficult to approach, being one of the fastest moving grasshoppers I have seen in Australia. On cold or overcast days it shelters under or among rocks and boulders.

Tasmaniacris tasmaniensis



Tasmanalpina clavata

■ The Great Lake grasshopper
Kosciuscola tasmanica

This is a very interesting but rare and restricted species. It is related to several grasshoppers occurring in the Australian Alps which evolved from tropical ancestors in the past. It is a bright green species about 2cm long and with a bullet shaped body. It can be very active if pursued. I have some concern for its security because its only known populations are restricted to a portion of the western margin of Great Lake where it could be vulnerable to habitat loss and other disturbances.

■ Yellow spotted grasshopper
Monistria concinna

This is a species also shared with the adjacent mainland of Australia. It is dark brown but peppered with fine yellow spots. It has tiny wing cases on the thorax which, if lifted, reveal a bright red reduced hind wing which is useless for flying. If handled this grasshopper commonly regurgitates a yellow smelly liquid from the mouth presumably a deterrent to predators. It has a patchy distribution around Tasmania and often feeds on aromatic plants such as native rosemary (*Westringia* species). The sexual dimorphism in size is also strong.

Grasshoppers play an important role in the ecology of the highlands. Through their selective grazing of some plants over others, they are important in helping determine the make up of the native plant communities. The abundance of some species and their longevity make them reliable food sources for native vertebrates including birds. Further study of them will illuminate our understanding of how animals survive and flourish in cold environments and this knowledge will in turn influence our land management practices so that future generations of Tasmanians can enjoy and study our state's unique grasshoppers.

CARP UPDATE

There are a number of questions that are now regularly asked regarding the carp. The answers to some of these change routinely such as "how many fish have been caught?". Others, such as "how did they get there" or "what problems do they cause?", remain constant. This update will review some of the background information and hopefully bring the reader up to date with the latest findings.

The present situation

The total carp catch as of early January 1996 is:

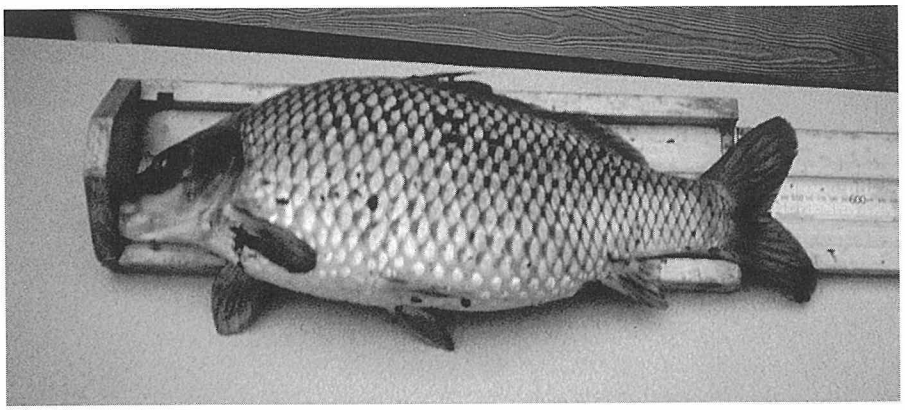
Lake Crescent	1100
Lake Sorell	7
Clyde River	1

The fish that have been captured do not exceed 2.5kg in weight although one of 4.2kg was caught in Lake Crescent. This may well have been one of the original fish.

As shown by these catch figures, and despite persistent rumours to the contrary, large catches of carp have not been made outside Lake Crescent. Even in Lake Crescent these numbers are low by mainland standards. The Commission has continued to look in the Clyde River and dams in the Bothwell area as well as Lake Meadowbank with no result.

Catches in Lake Crescent have been very patchy. Some areas hold more carp than others and catches from one day to the next are highly variable. For example, two individual catches of 200+ carp have been made since November 1995.This is very much the exception rather than the rule. Take this haul from the total and only about 500 carp have been taken since the program began.

The big hauls were taken from the Bullies Marsh area which has consistently produced carp. Other hot spots appear to be the rocky shores of the island and Jacks Point. Whilst the best conditions for finding carp appear to be sunny, still days, they do not always cooperate in such conditions.



The largest carp of 4.25 kg (photo: Chris Wisniewski)

No evidence of carp spawning has been observed yet. In the early part of spring some male fish appeared to be mature. However, at this stage no mature female fish have been seen. Observations now suggest that the frequency of ripe males is declining without any change to the females. Whilst there is some hope that spawning may not occur this summer, this still needs to be confirmed.

Water level management

Water temperatures have been quite variable and probably not high enough in the lakes to promote spawning. The shallow areas of Lake Crescent were observed to get quite warm even early in the season hence the water levels have been kept down to limit access to the marshes which is the preferred spawning area for carp. Certain access points to the marshes have also been fenced with netting to prevent large carp moving in.

Some structural works will be undertaken at the outlets from both lakes later in the summer. These works will include:

- new outlet gates at Lake Sorell to match the capacity of the outlet at Lake Crescent;
- a new culvert under the Interlaken Road to match the increased outlet capacity;
- widening of the Sorell-Crescent canal, again to match the outlet capacity;
- installation of permanent fine mesh screens on the Clyde River below the Lake Crescent outlet.

The purpose of these works is basically twofold. There is a need to keep Lake Crescent low during certain times of the year to limit the likelihood of carp spawning. However, there is still a need to provide water for downstream users and therefore better control of water in Lake Sorell is required, hence the improved outlet structures at Lake Sorell.

The second purpose is to improve the fine screens at Lake Crescent so that the full capacity of this lake can be manipulated and alternatively so that a full flood flow can be passed through the fine screen.

The works are likely to commence early in 1996.

For the purposes of water releases from both lakes there is close cooperation between IFC staff and the Clyde Water Trust. The Commission is at present undertaking the cleaning of the screens and maintaining flow. Staff keep a daily record of water levels in the lakes and flows in the Clyde River.

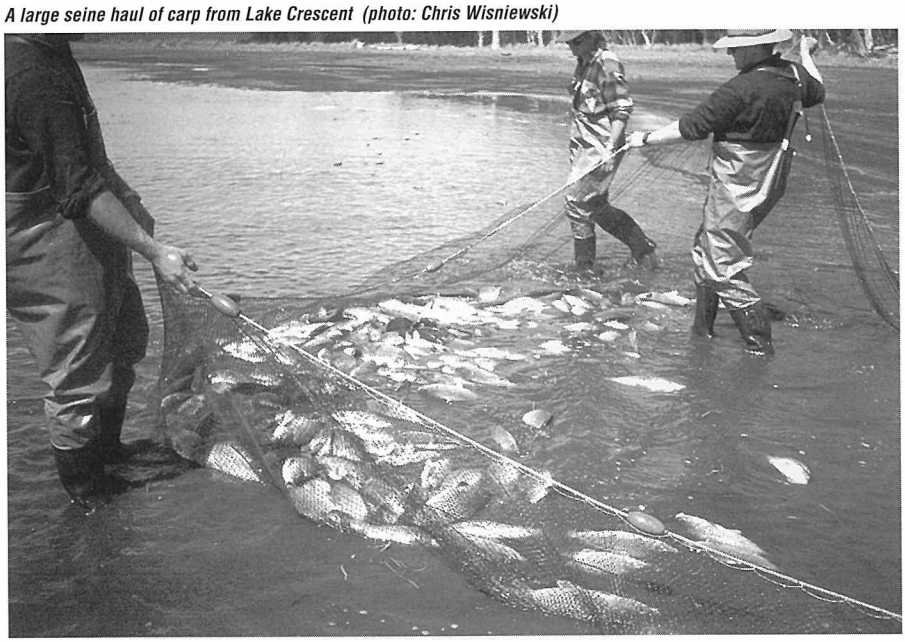
Commercial eel fishing

Under strict conditions, commercial eel fishing has been permitted in Lake Crescent for two reasons:

- the presence of the screens in the lake prevent eels from migrating downstream where they were normally trapped by a licensed fisherman;
- the use of fyke nets in the lake provides additional information on carp distribution and abundance in the lake.

As indicated, the fishing is strictly controlled with a permit issued on a short term basis only. It is contingent upon total cooperation with the carp management objectives of the Commission.

A large seine haul of carp from Lake Crescent (photo: Chris Wisniewski)



COMMON QUESTIONS

There are a number of questions that are regularly asked of staff and whilst some of these have been answered in previous newsletters as well as elsewhere in this edition, they are also included here. For details on known biology or life history of carp, the reader is referred to IFC Newsletter 24(1) February 1995.

- *What are the potential impacts of carp?*

In high density, carp may cause a number of problems:

- destruction of aquatic plant communities;
- increases in water turbidity;
- damage to stream beds, irrigation channels, etc;

- nutrient enrichment of waterways leading to algal blooms;
- competitive interactions with desirable fish species;
- introduction of new parasites and diseases to desirable fish species.

- *Where have they been found?*

Lake Crescent (728), Lake Sorell (7), Upper Clyde River (1). None have been found in Lake Meadowbank or any other waterway.

- *How did they get into the lakes?*

We will probably never know for sure.

- *Are they good to eat?*

They are not generally regarded as a desirable table fish in this country although they are highly sought after in some after parts of the world.

- *Can you catch them on a rod and line?*

They are usually taken on some form of bait such as dough-balls or corn-kernels. However, they will occasionally take a lure or fly.

- *What do we do if we catch a carp?*

Any fish suspected of being carp should be immediately killed and given to IFC staff or held for collection. The capture location should be noted.

- *Why is Lake Crescent closed and Lake Sorell open?*

There are a number of reasons for this decision. The number of carp is much higher in Lake Crescent than in Lake Sorell and bait fishing is not allowed in Lake Sorell. Both of these factors mean that the chances of catching a carp in Lake Sorell are minimal. In contrast, there is a much higher chance of catching one in Lake Crescent.

In addition, the Commission will be undertaking population reduction in Lake Crescent by netting and electrofishing and doesn't wish to inconvenience anglers or in turn be inconvenienced by anglers. Having the lake closed offers better security as well. It is unfortunately a fact in other states that carp have often been transferred deliberately, hence we do not wish to allow easy access to these fish.

The most likely chance for accidental transfer of carp is by contact with the adhesive eggs after spawning. If spawning of carp appears likely in Lake Crescent, then the Commission can exercise its option to close Lake Sorell as well. At this stage Lake Crescent will probably remain closed until the end of this season. The situation for next season is yet to be considered but at least a period of fishing is likely.

FUTURE PLANS

The more information we gather on carp from overseas and the more we look at the Lake Crescent population, the less certain we are about the likely life history pattern of this population.

In many cool water situations carp do not spawn successfully every year. The Lake Crescent population appears to be in that situation. Consequently, the present approach is as follows.

- Secure the catchment to prevent passive migration.
- Continue surveys elsewhere to determine distribution.
- Actively reduce the Lake Crescent population.
- Study the life history of carp in this lake to determine the likely cycle it will follow, for a number of reasons:
- assessment of likely impacts of the population;
- possibility of habitat manipulation to limit spawning;
- opportunities within the life cycle to reduce numbers.
- Investigate the options for eradication of carp and assess their feasibility.

HOW ANGLERS CAN HELP

The Commission gratefully acknowledges the many offers of assistance that have been received from individuals and angling groups. We are also conscious that these offers are yet to be taken up on any large scale.

One of the problems is the nature of the work. Training and safety aspects prevent the use of volunteers with the electric fishing equipment, whilst the use of seine nets on the muddy shores is very demanding physically and is also only appropriate under certain weather conditions. A problem for staff has been knowing what they will be doing on a day to day basis until they see what the conditions are like. It is consequently not possible to give volunteers the advance notice they require and then guarantee that they can be given anything to do.

The Commission is nevertheless mindful of the assistance that has been offered and our appreciation is again extended. We hope that these offers can be taken up in some way in 1996.

Lake water levels

Over the past five years or so the Inland Fisheries Commission has negotiated with the Hydro-Electric Commission to reach an agreement on the operating conditions for certain lakes. The objective has been to maintain the level of these lakes above or about a point that would create favourable conditions for angling.

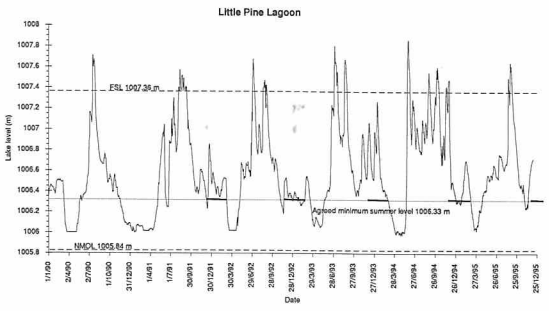
The HEC has agreed to do this in some waters where this agreement does not compromise their overall power generation objectives, and with the clear understanding that it is not a legally binding agreement but an undertaking given in good faith. At times one wonders if this arrangement has been worthwhile as there now seems to be more complaints and comments about water levels in some of these waters than there were before the agreements were made – even when the lakes are being operated within the agreement.

Some of the agreements are considered below and graphs of water levels are given for information. Further rationale for these arrangements was given in a previous IFC Newsletter 21(2) October 1992.

Little Pine Lagoon

The lagoon has a full supply level (FSL) of 1007.07m and a normal minimum operating level (NMOL) of 1005.85m.

Agreement: For the months of December to February inclusive, a minimum level of 1006.33m applies. This present agreement was put in place in 1992.

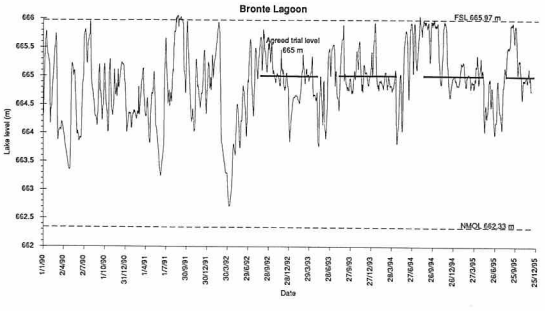


Comment: The graph shows that generally the HEC has stuck to its agreement. Whilst the IFC cannot see why the water level was reduced in late November 1995, it was not contrary to the agreement. It must be kept in mind that a drop in level of only 10cm on this lagoon can mean a big shoreline change.

Bronte Lagoon

Bronte Lagoon has a FSL of 665.97m and a NMOL of 662.33m.

Agreement: The arrangement in this case is for a stable level of 665.0m in the period prior to Christmas.



Comment: The outlet gates on Bronte are not very good for controlling levels. In addition, inflows can vary.

The arrangement here is for the level to remain near to a point, which is not to be regarded as a minimum level. With less than 1m of storage above this point before spilling (which results in lost revenue for the HEC) it is not surprising that achieving this target is difficult. The HEC also advises that operating Bronte in this way results in inefficiencies further downstream and therefore some lost revenue.

From all reports this arrangement, implemented in 1992, has improved fishing conditions at Bronte with better fish quality also being reported.

continued on page 8...

Turbidity in Tasmanian lakes

by Andrew Sanger, Senior Scientific Officer, Inland Fisheries Commission

One of the most frequent questions asked of the IFC by anglers would have to be "why is the water in Lake Thingummyjig so dirty"? This can usually be answered in general terms by reference to the typical causes of water turbidity. However, each lake and every situation can be different, and so it is occasionally difficult to answer some of the specific questions without being able to go out and sample the lakes.

So what are the typical causes of turbidity?

The first thing to say is that turbidity is caused by scattering and absorption of light by particles suspended in the water. These particles can be in a variety of forms, and it is useful to distinguish between the various forms when assessing management options for excessive turbidity levels in lakes. This breakdown is summarised below.

Algal

- Buoyant forms:
  Primarily small single celled and colonial algae which remain suspended for long periods.
- Sinking forms:
  Primarily larger filamentous algae which settle out of suspension in calm weather.

Non-Algal

- Inorganic – fine particles:
  Clays, muds and fine silts. Remain in suspension for long periods.
- Inorganic – large particles:
  Larger silts and sand. Settle out of suspension quickly.
- Organic:
  Dead plant and animal material. Generally large particle sizes. Usually settle out quickly.

Algal turbidity

Phytoplankton (microscopic algae) can cause elevated turbidity levels when present in high concentrations. In this situation there is often a correlation between turbidity measurements and algal concentrations. The best example of this phenomenon seen in recent years in Tasmania was the severe algal bloom which affected Lagoon of Islands. During the worst period of the bloom (from 1989 to 1990) chlorophyll-a levels (a measure of the concentration of algae) were strongly correlated with turbidity measurements. Since the bloom has been brought under control, the correlation between chlorophyll-a and turbidity has been much weaker, and other seasonal factors have been more reliable predictors of turbidity.

Non algal turbidity

Severe algal blooms don't occur very often in our major lakes, and yet there are quite a few lakes which are relatively turbid from time to time. In the majority of cases this turbidity is caused by non-algal particles. This material can be classified into separate categories based on both its origin and its size.

- Organic material (primarily the remains of dead plants and animals) can cause elevated turbidity levels. In the majority of cases this material is composed of large particles which tend to settle out of suspension quickly with a consequent decrease in turbidity.
- Inorganic particles can also be suspended in the water column and cause high turbidity. Large particles, such as sands and silts tend to settle out quickly, in much the same manner as large organic particles. A good example of this is the temporary turbidity which is caused by wave action along the shores of Great Lake on a windy day. As soon as the wind changes and the water calms down, most of the particles which cause this turbidity settle out of suspension and the water becomes clear once more. On the other hand, where the bed of a lake is largely composed of fine muds and clays, such as at Shannon Lagoon and Woods Lake, there is usually enough water movement to maintain a relatively high turbidity level all of the time. These fine particles take a very long time to settle out of suspension, and are easily resuspended by wind driven water movements.

How is turbidity measured?

IFC staff routinely measure turbidity using an electronic meter called a turbidimeter. This device measures the amount of light scattered by particulate matter in water, and calculates a turbidity value in standard units called nephelometric turbidity units (NTU). The turbidimeter is calibrated with standard solutions of known turbidity, and so, in theory, provides an accurate measure of turbidity in any sample. The IFC has two different turbidimeters, one which incorporated into a multi function water quality monitoring meter, and another which is a small portable unit that can quickly give a reading of turbidity in a small sample of water.

The HEC and the Land and Water Resources Division of DPIF have installed several permanent turbidity monitoring sites in streams and canals around the State. These are essentially probes which measure turbidity and store the data on an electronic datalogger. These instruments are very valuable because they can provide a continuous record of turbidity variation throughout key events such as a flood peak or a pollution incident.

Other means of measuring the transparency of water include the secchi disk, (see below) which has been widely used by limnologists for many years, and the turbidity tube which is in use by Waterwatch groups around the State.

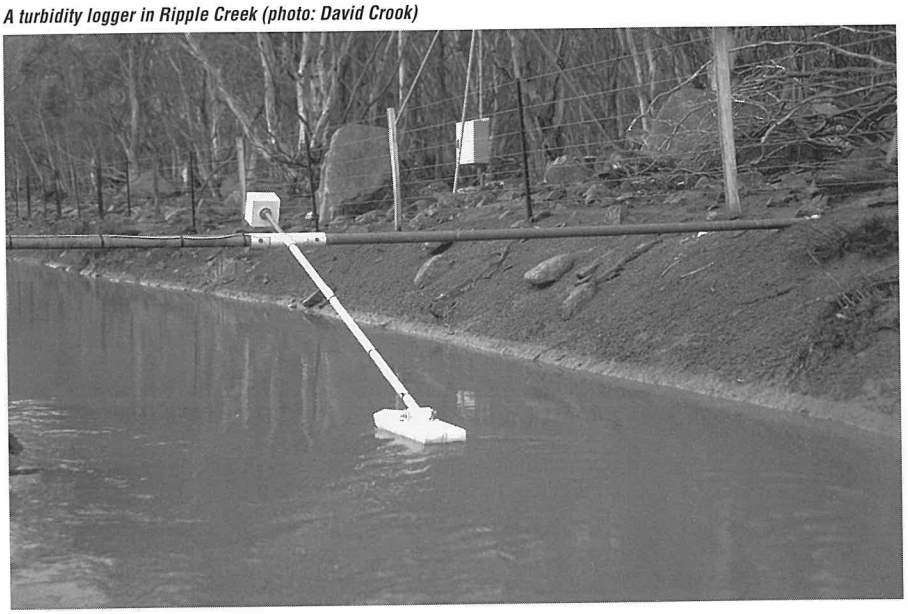
How turbid are Tasmanian lakes?

IFC measures turbidity in over 40 lakes around the State. Some lakes are measured more frequently than others, particularly those where turbidity is causing problems to anglers or water managers. In general, the results of the surveys undertaken between 1991 and 1994 show that Tasmanian lakes are fairly clear by Australian standards, and even compare favourably with some of the 'clear water' areas of the world such as New Zealand and Canada. The most turbid lakes in our samples were Woods Lake, Lake Crescent and Lake Sorell (all greater than 10 NTU). The lakes with the lowest turbidity levels include Lake St Clair, Olive Lagoon, Lake Naomi and Lake Nameless (all less than 1 NTU). Many of the West Coast lakes are highly coloured (tea stained) however, this dissolved colour does not affect transparency to a large extent, with turbidity measurements generally below 2 NTU.

Turbidity readings for various Tasmanian lakes

LAKE	TURBIDITY	LAKE	TURBIDITY
Woods Lake	32.0	Dee Lagoon	1.4
Lake Crescent	22.0	Lake Catagunya	1.4
Lake Sorell	11.4	Wayatinah Lagoon	1.3
Lake Trevallyn	9.3	Lake Echo	1.3
Penstock Lagoon	8.0	Cluny Lagoon	1.3
Lake Ada	6.5	Lake Augusta	1.2
Lagoon of Islands	4.9	Great Lake	1.2
Bronte Lagoon	4.7	Lake Mackintosh	1.2
Lake Lea	3.6	Lake Pieman	1.1
Mentmore Marsh	3.5	Lake Rosebery	1.1
Bradys Lake	3.3	Lake Pedder	1.0
Little Pine Lagoon	2.2	Lake Explorer	1.0
Lake Murchison	2.1	Lake King William	1.0
Lake Gordon	2.0	Pine Tier Lagoon	1.0
Arthurs Lake	1.9	Lake McKenzie	0.9
Clarence Lagoon	1.8	Lake Nameless	0.8
Lake Meadowbank	1.8	Lake Naomi	0.8
Lake Repulse	1.6	Olive Lagoon	0.8
Lake Plimsoll	1.6	Lake Burbury	0.8
Lake Barrington	1.5	Lake Rowallan	0.7
Lake Gairdner	1.5	Lake St Clair	0.3

A turbidity logger in Ripple Creek (photo: David Crook)



This baseline data is part of a study of long-term trends in water quality in Tasmanian lakes being funded by the HEC as part of the consultancy agreement with the IFC. The data set will provide a valuable reference for comparison with similar studies being undertaken elsewhere in the world, primarily in the northern hemisphere (the US, Scandinavia and Europe).

Solving turbidity problems

The data is also being used in helping to manage problems which occur from time to time in many of our lakes, particularly those which are subject to disturbances from land and water management practices. Recent changes that have been observed since the initial study are that both Woods Lake and Penstock Lagoon have been more turbid than usual. The causes of these changes are under examination at present, and solutions to the problems are being sought in collaboration with the HEC.

The solutions to turbidity problems generally revolve around managing catchments,

Using a Secchi disk in Woods Lake (photo: David Crook)

water flows and lake ecosystems so as to minimise the concentrations of particulate material suspended in the water. Depending on the source of the particulate matter, this might involve one or a combination of the following:

- reducing nutrient inputs to control algal blooms;
- increasing flushing rates to dilute concentrations of nutrients and suspended particulate matter;
- encouraging macrophyte growth to stabilise loose sediments and provide refuges for zooplankton;
- managing lake levels to minimise wind driven re-suspension of sediment;
- managing catchments to minimise erosion of stream or canal banks;
- chemical treatment of water with flocculating agents such as aluminium sulphate.

These approaches are under consideration for future management of turbidity problems. For example, at Penstock Lagoon a flushing flow is being trialed as a solution to elevated nutrient and turbidity levels. On the other hand, Woods Lake is more likely to be managed by controlling lake levels to minimise wind driven re-suspension of sediments. A complete explanation of the rationale behind these approaches and the results of the trials will be published in a future newsletter.

The Secchi Disk:

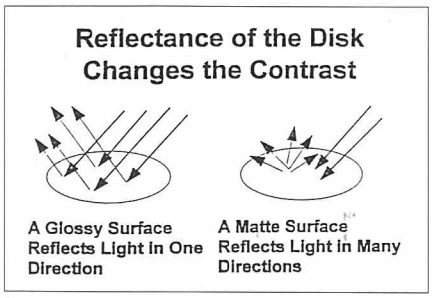
A tool for the volunteer interest in measuring water transparency

Acknowledgment: *Adapted with the permission of the author from an article by Robert Carlson in the April 1995 edition of Lakeline, the magazine of the North American Lake Management Society*

The Secchi disk is perhaps the oldest and most durable tool used by professional limnologists. The disk is a means of measuring the transparency of water, and the scientific literature abounds with Secchi depth measurements. The disk is also highly suitable for use by volunteers because it is an inexpensive and uncomplicated instrument that can be used to give reliable information.

The Secchi disk has been in use in one form or another since at least the 1860's. In its current form it is most usually a 20 cm disk divided into alternate black and white quadrants which is attached to a weighted graduated cord. In theory the black and white quadrants should be painted with a matt finish so as not to accentuate any reflectance of light from the surface of the disk when taking readings in bright sunshine.

Similar disks have also been used in various situations around the world, including smaller and larger disks, and all white and



all black disks. The specific situations where it may be appropriate to use these specialised disks are not important. However, it is important to realise that changing the size or colour of the disk, or the manner in which the Secchi depth is calculated affects the value of the reading. For this reason, professional limnologists tend to rely more on electronic meters, such as the turbidimeter described in the previous article, for measuring water turbidity. However, for the recreational angler, Secchi depth is probably a more useful measurement because it directly measures transparency in units of metres rather than turbidity in the somewhat artificial nephelometric turbidity units (NTU).

The general procedure for taking a Secchi disk reading is to lower the disk over the side of a boat and observe the disk as it descends vertically through the water. The boat should be relatively still in the water (either at anchor or held steady with the throttle if necessary). The disk should be lowered over the sunny side of the boat, and glare should be minimised by shading the surface of the water through which the disk is being viewed (eg with a hat) or by wearing polaroid sunglasses. A more high tech way of eliminating glare is to use a view scope (a tube, with or without a sealed transparent lens at the bottom) so that the disk can be viewed from the surface of the water.

As the disk is slowly lowered through the water it becomes harder to see, and at some depth it disappears from view. When recording this depth it is important to allow sufficient time (up to two minutes) for one's eyes to completely adapt to the prevailing light level. The depth at which the disk disappears from view should be recorded as should the depth at which the disk reappears upon being slowly raised. The Secchi depth for that site is the average of the depth of disappearance and reappearance.

What are typical Secchi depths in Tasmanian lakes?

For the lakes mentioned in the previous article on turbidity the minimum Secchi depths recorded so far have been 0.1 m for Woods Lake, while the maximum recorded has been 10m at Lake St Clair. The deepest Secchi depth measurements recorded with a 20cm black and white disk in a lake is 39m at Crater Lake in the US. There are also many lakes which have very small Secchi depths; eg 1-2 cm in Spirit Lake after the eruption of Mount St Helens in the USA. Many farm dams in Australia probably have similarly small Secchi depths because of the high concentration of clay particles suspended in the water.

Volunteer use of Secchi disks

At present the only angler group using a Secchi disk on a regular basis in Tasmania is a band of dedicated Penstock Lagoon specialists. Jim Ferrier and his colleagues have found the measurements useful when discussing the state of the lagoon amongst themselves, and when reporting back to the IFC and the membership of the Fly-Fishers Club of Tasmania. Based on the experience overseas, there is certainly scope for greater use of Secchi depth measurements by volunteers in Tasmanian Lake monitoring programs.

In North America there is a program called 'The great all American Secchi dip-in', which in 1995 involved about 1 800 volunteers in 35 states in the USA, as well as Canada and Mexico. The program calls for volunteers to record Secchi depths in as many lakes as possible during one week in July (ie in the northern summer). Secchi depth is recorded along with weather conditions and data on the uses and condition of the lake. As data is accumulated from this program both geographic and temporal trends in water transparency will be analysed.

The coordinator of the American program, Dr Robert Carlson of Kent State University in Ohio, is keen to establish a worldwide dip-in program, and has asked if the IFC would like to organise a similar event in Tasmania. We believe it is a good idea, but it will require the involvement of a large number of volunteers who will need to be equipped with Secchi disks and instructed in their use. There are probably about 50 lakes in Tasmania that are suitable for inclusion in this study. These range from large hydro electric reservoirs to natural lakes and large farm dams. The main requirement is that the depth of the lake is sufficient in comparison to its transparency for a reliable measurement to be recorded. Anyone interested in signing up for a Tasmanian Secchi dip-in should contact Dr Andrew Sanger at the IFC (Phone 002 23 6622). The most likely time for the dip-in would be a week in the summer of 1996-97, to allow adequate time to supply the disks and train volunteers.

Ronald Munro Stephenson

On 3 May 1995 Ron Stephenson passed away. Ron was Associate Commissioner of the Inland Fisheries Commission representing the Northern Tasmanian Fisheries Association district with distinction and dedication from 1978 to 1984.

During this period the Commission underwent fundamental policy changes. Emphasis changed from such matters as legal size of fish and duration of fishing season, to the development of policy based on directed research. To achieve these objectives suitable accommodation, facilities and staff were needed. Ron made a satisfying contribution to achieving these objectives with the completion of the Liawenee field station. The results now provide accommodation for staff, laboratory, workshop and storage at Liawenee. Further, the recruitment of qualified staff to carry out research into matters which would lead to appropriate fisheries management was fostered.

Ron was gifted with manual skills and excelled in making equipment in wood or metal. These talents were freely available to, and appreciated by the Commission in times when funds were so limited that they sufficed for little more than staff wages.

From his long experience as a shooter and angler in the Western Lakes, Ron was able to make a valuable contribution to the Commission's input into the Central Plateau Management Plan.

Ron will be remembered for his tenacity in pursuing the Four Springs project over so many years, against all sorts of difficulties. It now seems that his wish has been fulfilled. Few are the politicians, State or Federal, who have not been lobbied by Ron about this project.

What about Ron, the man? A dedicated and gifted sportsman, footballer, runner, shooter, golfer and angler. Beneath a somewhat gruff manner he was a generous, warm hearted person who got on well with people of varied backgrounds and cultures. To his colleagues on the Commission he was loyal, dependable and a positive contributor to debate.

Dan Lynch

PROSECUTIONS

Infringement notices

During the six months from 1 July 1995 to 31 December 1995 the following 'on the spot fines' were issued.

Offence	Number
Fish without a licence	4
Fish with more than one rod and line	16
Use strike indicator	1
Fish with unattended set rod	2
Take whitebait without permit or licence	5
Possess whitebait without permit or licence	3
Possess or use a net	2
Total	**33**

Court proceedings

Offences that were proceeded with by summons from 1 July 1994 to 30 June 1995 are listed below.

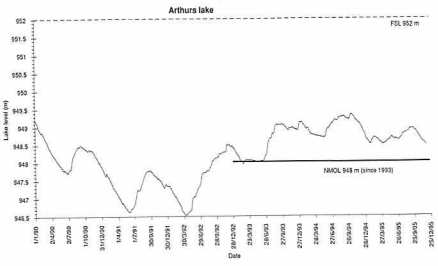
...continued from page 5

Arthurs Lake

The FSL of Arthurs Lake is 952m and the NMOL is 943.0m. Water from Arthurs Lake is pumped into Great Lake for use via Poatina. Great Lake is the HEC's most valuable storage.

Agreement: The HEC agreed in 1993 to raise the NMOL to 948.0m which is some 5m above the former minimum drawdown level and 1.5m above the recorded low levels of 1991 and 1992 which saw the Cowpaddock dry.

Comment: The HEC has to be cautious in its management of water in this storage in a longer term sense as it cannot afford to spill water via the subsidiary dam.



As far as assigning value to the water in this lake as compared to its recreational value as has been suggested, the figures would indicate that it is about ten times more valuable for power generation. The best solution would be to accept a good compromise that both uses can be accommodated and work on amicably improving arrangements rather than ignorantly destroying them.

1996 level: In looking at the graph it can be seen that the water level in Arthurs Lake was heading towards the agreed minimum in late 1995. Anglers may also be aware of releases from Arthurs down the Lake River and of recent work on the siphons at the dam.

The reason for this is that water levels in Woods Lake are too low to supply *legal* requirements for water down the lake river *and* maintain sufficient water in Woods Lake to ensure the survival of the native fish species found in that lake.

It is hoped that recent heavy rains may have helped water levels in Woods Lake but it is unfortunately the case that Arthurs Lake may have to go below the 948.0m level this summer. This will be done for operational reasons and not simply because anglers interests are not being considered.

Other lake level arrangements

In recent years other agreed lake levels have also been established and generally maintained in Lagoon of Islands, Penstock Lagoon and Shannon Lagoon. The arrangement for Lagoon of Islands has been central to the return of this fishery.

The IFC will continue to work closely with the HEC in such matters in an effort to benefit anglers.

Offender	Location	Offences Summary	Total fine + costs ($)
William Allan WATSON, Campbell Town	WOODS LAKE	Other than rod and line	245 spec. pen: 20
Cecil Tasman HELM, Ross	WOODS LAKE	Other than rod and line	305 spec. pen: 30
Jason Lee MURFETT, Hadspen	CORRA LINN	Unlicensed/Possess assembled rod	335
Ricky Grant WEST, Ravenswood	NORTH ESK RIVER	Unlicensed/Possess assembled rod	335
Jamie Andrew RUSHTON, Prospect	NORTH ESK RIVER	Unlicensed/Possess assembled rod	285
Rodney James MCDONALD	NORTH ESK RIVER	Unlicensed/Possess assembled rod	285
Brendan Wesley GOSS	LAGOON OF ISLANDS	Other than rod and line/Use net	568
Leigh John MOLES	LAGOON OF ISLANDS	Other than rod and line/Use net	368
Gordon Lewis BADCOCK, Relbia	CANAL BAY, GREAT LAKE	Fishing closed waters	100
Alfred Charles WICKS, Newstead	ARTHURS LAKE	More than one rod and line	135
Rodney James ALLAN, Sheffield	MERSEY RIVER	Take whitebait	435
Timothy Charles OATES, East Devonport	FORTH RIVER	Take whitebait/Possess net	435
Shane Allan DICKINSON, Devonport	FORTH RIVER	Possess net	235
Nathan John SMITH, Devonport	BELLS PARADE, MERSEY RIVER	Take whitebait/Incite another person to assault an inspector	685
Simon Paul SMITH, Devonport	FORTH RIVER	Take whitebait/Possess net	535
Scott Andrew SMITH, Devonport	FORTH RIVER	Take whitebait/Possess net	535
Paul Victor HAMILTON, Devonport	FORTH RIVER	Take whitebait/Possess net	1 535
Shane Geoffrey WEBBER, Devonport	BELLS PARADE, MERSEY RIVER	Take whitebait	335