

INLAND FISHERIES COMMISSION NEWSLETTER

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OPENING WEEKEND REPORT

The majority of inland waters in Tasmania opened for trout fishing on 3 August. Only the designated rainbow trout waters – Great Lake, Lagoon of Islands, Lake Rowallan and Dee Lagoon – remained closed.

North-West Coast anglers were greeted by early morning rain, but in other areas severe overnight frosts on both Friday and Saturday night were followed by clear mild days.

In the Highlands, ice prevented morning fishing on all major waters. Several small, 0.5 kg rainbows were landed by a party at Penstock Lagoon. An angler at Woods Lake landed a 1.45 kg brown trout and at Arthurs Lake seven anglers were interviewed who had landed a total of eight brown trout to 0.9 kg.

Fly fishermen had considerable success late in the day at Little Pine Lagoon. A party reportedly took 16 fish, whilst one angler bagged eight.

In the Tarraleah area, 92 anglers were checked and they had landed 53 fish. One angler using natural bait at Bradys Lake caught four brown trout and four rainbow trout. A party of anglers, using worms for bait, bagged 17 brown trout from 0.5 to 0.9 kg at Lake Catagunya.

At Lake Pedder, two lucky anglers landed eight excellent brown trout while trolling in the Scotts Peak area on opening day. The largest fish weighed 3 kg, a big headed specimen which had seen better days. This catch was exceptional as most trollers found the calm conditions at Pedder particularly testing.

Lake Sorell was also quiet. Twenty-one anglers were checked on Sunday and only six fish were recorded, the best weighing 2.0 kg.

In the South, 25 anglers on the Derwent only landed seven trout, the largest being 1.75 kg. Twenty-four senior and eight juvenile anglers entered a New Norfolk Angling Club competition and fished various waters, weighing in only five trout.

On the North-West Coast, 30 anglers were interviewed and they had bagged only nine trout. However, successful fishing was reported from the Guide Dam where numerous small trout of 0.5 kg were landed.

In the North, juveniles enjoyed the opening weekend at Lake Waverley with a good number

SALMON AT SALMON PONDS

After an interval of fifty years, the Inland Fisheries Commission's Salmon Ponds hatchery at Plenty can again live up to its name.

Following the lifting of quarantine conditions in late March 1985, over 27 000 Atlantic salmon fingerlings were transferred from the Department of Sea Fisheries Research Laboratory at Taroona into specially constructed rearing tanks at Salmon Ponds. This facility, which was constructed at a cost of \$22 500, replaced old concrete raceways and includes four four-metre diameter fibreglass tanks, security fencing and electronic monitoring of the water supply.

Following a small trial transfer in late March, four groups of fish with average weights between 25 g and 60 g, were successfully transported during April. The transition from a totally controlled, disease free environment to the new system at Plenty was accomplished with minimal problems. With the continued use of specially imported Norwegian pelleted salmon feed, excellent growth occurred until water temperatures dropped to below 5°C. Despite a virtual cessation of feeding during mid-winter, the total biomass had doubled to 1 600 kg by 15 August and the largest fish were well over 200 g.

A close monitoring of fish health has been maintained, and mortality has been extremely low. An interesting fact to be noted has been the number of male fish to become sexually mature at one year old. These "precocious males" formed approximately 5% of the stock and as they do not adapt well to saltwater life, a low incidence is very desirable for sea cage farming.

Fish raised in captivity grow at different rates and to prevent cannibalism and fin nipping, grading into various sizes was carried out every four to five weeks. Regular monthly growth rate checks were also necessary to monitor

performance and to calculate optimum feeding rates.

It is anticipated that most of the fish will undergo "smoltification" over the next few months. This refers to certain physiological changes within the fish which allow them to tolerate a gradual transfer to sea water.

Commencing in late September, the smolts will be transported in oxygenated tanks to acclimatisation facilities currently being constructed by the new salmon company Saltas Pty. Ltd., close to sea water at Dover. Over a five to seven day period, acclimatisation is achieved by gradually increasing the salinity until full strength saltwater can be tolerated. When acclimatised, the smolts will be placed in large floating net cages and fed intensively for up to two years until maturity is reached.

Apart from the stock at Plenty, an additional 10 000 Atlantic salmon were successfully acclimatised to saltwater at Taroona in May and are currently being raised in sea cages at Bruny Island. Despite initial slow growth, these fish are in excellent condition and only minimal losses have been recorded.

Considerable interest is still being expressed in marine farming of both Atlantic salmon and rainbow trout and, to date, the Commission has issued ten licences for cage culture of salmonids in Tasmanian marine waters.

From 1865 onwards, numerous attempts were made to establish Atlantic salmon in Tasmanian rivers. Without exception these attempts failed and the last authentic record of an Atlantic salmon from our waters was in the early 1940's. At this stage there are no plans to establish wild stocks in Tasmanian rivers or to liberate fish in any inland waters. Breeding from salmon reared in sea cages will also be strictly controlled.



Atlantic salmon smolt, typical of those currently held at Salmon Ponds.

of transferred adult trout being grassed on natural bait. Twenty-four anglers were interviewed on Northern rivers but only six trout had been creeled.

On the West Coast the story was no different. Although a double figure fish was reported from the Henty River, the nine anglers checked had met with little success, recording only three trout. Of the 17 anglers checked at Lake Rosebery on opening morning, only one had landed a fish.

In general, inspectors reported a very quiet opening weekend. Frozen lake margins and snow melt in rivers restricted success and most anglers admitted that it was really too early to expect to catch good quality fish.

A special feature of opening weekend was the official opening of new boat launching and toilet facilities at Lake Pedder and the official opening of Lake Waverley at Launceston.

BROWN TROUT SPAWNING RUNS

Great Lake

The brown trout spawning run in Liawenee Canal commenced early this year with spawners reported from 12 March; the early start to the run was associated with steady flows in the canal. By mid April spawning brown trout began to enter other tributary streams around Great Lake and excellent runs were observed in the major streams.

3 762 spawners had been counted through the trap on Liawenee Canal by 7 April; and it was estimated that a further 10 000 trout had passed the trap by 30 June. On 17 May, 50 male and 50 ripe female brown trout from Liawenee Canal were measured and weighed and the details are set out below.

	Male	Female
Number measured	50	50
Average length mm	498.3	455.8
Range of length mm	430 - 556	387 - 529
Average weight g	1 327.5	1 150.5
Range of weight g	950 - 1 850	650 - 1 750

Arthurs Lake

Brown trout spawners began to move up Hydro Creek during mid April and more than 3 000 were present in the trap early in June. Good runs of brown trout occurred in other Arthurs Lake tributaries during May and June. One hundred brown trout spawners were measured and weighed at the Hydro Creek trap on 6 June and details are given below.

	Male	Female
Number measured	50	50
Average length mm	402.3	383.9
Range of length mm	266 - 538	320 - 479
Average weight g	698.5	644.5
Range of weight g	255 - 1 400	375 - 1 050

Lake Sorell

Brown trout spawners first appeared in Mountain Creek, Lake Sorell, towards the end of March. By 15 April, several thousand fish were utilising the improved spawning beds and by the end of April more than 7 000 trout were present. A similar number of spawning trout remained in Mountain Creek throughout May and June. On 7 June spawning trout were sampled for length and weight and details are given below.

	Male	Female
Number measured	50	50
Average length mm	454.9	500.4
Range of length mm	222 - 582	417 - 549
Average weight g	1 291.2	1 617.5
Range of weight g	250 - 2 300	950 - 2 100

Lagoon of Islands

The new Ripple Creek spawning channel has enabled brown trout to spawn at Lagoon of Islands for the first time in many years. The spawning run was carefully monitored during May and June in order to determine minimum flow requirements. Sixty-five brown trout spawners were observed in the channel on 21 May and more than 100 spawning redds had been formed by the end of June. Twenty-eight brown trout were sampled on 12 June and the details are given below.

	Male	Female
Number measured	23	5
Average length mm	572.7	528.6
Range of length mm	466 - 705	469 - 695
Average weight g	2 231.5	1 910.0
Range of weight g	1 225 - 3 900	1 325 - 3 650

Plenty River

The temporarily repaired upstream trap on the Plenty River was closely monitored during the 1985 brown trout spawning run. All fish larger than approximately 200 g were weighed, measured and scale sampled. Before release above the trap, the tip of the caudal fin was removed so as to allow recognition of already counted individuals. Only a few such marked fish were subsequently re-trapped.

The run commenced on 20 April and continued until 23 July. A total of 144 fish was recorded, however, on at least two occasions the trap was inundated for a considerable time and fish almost certainly passed on upstream unrecorded. The largest fish was a female of 3 800 g and 667 mm total length. All catches were made following freshes in the river, although the trap was monitored every 2-3 days regardless of river conditions.

Other waters

Excellent runs of brown trout spawners were reported throughout the Highlands during the period April to June. Spawning brown trout were more numerous than previously recorded in

Lake Pedder tributaries. More than 100 fish were counted in Sandfly Creek on 29 May; 200 in Twin Creeks on 17 June; and 80 in Village Creek on 17 June. The increased spawning run at Lake Pedder is consistent with the greater number of smaller (1 to 2 kg) trout reported by anglers during the season.

At Penstock Lagoon, brown trout took advantage of the improved spawning beds in No. 2 canal and more than 100 fish were reported on 25 May. Good numbers of spawners were observed on many occasions between 12 May and the end of June. Spawning brown trout were sighted during May in Bradys Whitewater, Lake King William tributaries, the Snowy River at Lake Leake and tributary streams entering Laughing Jack Lagoon. The spawning run was monitored at Lake Echo during the season and more than 1 000 brown trout were reported in the Monpeelyata Cascades on 4 May. Many brown trout also spawned in Surveyors Creek.

On the West Coast, brown trout appear to spawn later than in other areas and good numbers of spawners were not reported until June. On one occasion more than 100 fish were observed spawning in the Sterling River, Lake Rosebery.



Superb 3 kg brown trout from the new spawning channel at Lagoon of Islands.

LAKE PEDDER FACILITIES

The Minister for National Parks, Mr John Beswick, officially opened the new anglers' and visitors' facilities at the Edgar and Scotts Peak dams on 3 August. In his address to the invited gallery, the Minister said that Tasmania is now internationally recognised as having some of the finest fishing waters in the world. This recognition has already attracted thousands of interstate and overseas angling enthusiasts, many of whom have become regular visitors to our State - contributing significantly to Tasmania's economy.

The Minister said that with the rapid increase in popularity of the sport of angling, the Tasmanian Government realised that many of the existing facilities were inadequate to cope with the demands placed on them, especially during the holiday season and angling competitions. To improve and extend the present facilities, Tasmania's National Parks and Wildlife Service was given the task to initiate and supervise the construction of the development at Lake Pedder.

A spacious new launching ramp, constructed next to the Scotts Peak Dam, has a substantial

jetty to help fishermen with the launching and retrieval of boats. At the end of the jetty a navigation light will be installed as a guide for anglers who are forced to return in darkness.

An emergency ramp has been constructed at Airport Harbour. This ramp, located on the bank of an inlet, is protected from wave action from the lake and can be used to run for safety during bad weather. The existing amenities block at the Lake Edgar campsite had become inadequate and has now been substantially upgraded.

The Minister said that the National Parks and Wildlife Service will continue its program of upgrading other facilities such as enlarging the campsites. The \$300 000 development was built with dam compensation money; five million dollars has been earmarked for tourism projects in Western Tasmania.

As Mr Beswick addressed the gathering at the opening ceremony, two anglers returned from their mornings fishing with six fine trout which they proudly displayed to those present.

BROWN TROUT POPULATIONS IN TASMANIAN STREAMS

by Peter Davies,
Liawenee Research Station

TROUT POPULATION ESTIMATES FOR TASMANIAN STREAMS

A special State Government funding allocation has enabled the Inland Fisheries Commission to commence a two year survey of trout populations and stream habitat. To date, this has included a survey of stream fish populations around the state, with repeat sampling of the North Esk and St. Patricks river systems in order to follow up the work of Nicholls in 1955. Detailed trout habitat measurements have been recorded at many sites and an investigation of invertebrate stream drift as trout food has been initiated. These aspects will be the subject of a number of general articles in future newsletters.

In the first summer of the stream survey, thirty streams around the state were sampled (see map) at a total of 78 sites. All sites were sampled by two successive electrofishing runs, a technique found to yield 70 - 75% of the trout population. All trout were scale sampled for later age determination and then weighed and measured before being returned to the water.

The 30 streams sampled included the North Esk and St. Patricks rivers which have been the subject of a previous newsletter article and are not included here. Of the other 28 streams sampled, 23 had been electrofished previously in the late 1970's and two streams, the Clyde and the Plenty, had been electrofished by Nicholls in 1955. The results of the population surveys are shown in Tables 1-3 for sites previously sampled in the 1970's, and in Table 4 for the Clyde and Plenty Rivers.

Of the 21 sites in Tables 1 - 3 at which results can be confidently compared, 15 showed an increase in total trout numbers since last sampling, five showed no change and one a decrease. Total trout weight per 100 m increased in 18 sites out of 21, two showed no change and one a decrease. An increase in both numbers and weight has occurred since last sampling in 1978/79 at 15 out of 21 sites. Of great interest to the angler is the number of takeable fish (larger than 22 cm). Of the 20 sites at which comparisons could be made, 14 showed a significant increase, and four showed no change.

It appears that statewide, stream brown trout numbers, both total and takeable, have increased compared to when last sampled in 1978/79, and that total weight of trout has increased significantly. However, this does not appear to be solely due to recovery from the recent (1982/83) drought. Although the majority of sites which showed an increased trout population also showed an increase in number of fry and yearlings, all such sites showed an increase in 2 and 3 year old fish numbers as well. This indicates that the recovery has been spread over the last three to four spawning seasons at least.

Samples of the populations in the Rubicon River (Elizabeth Town) and Falls Creek (Wilmot) in the north were also taken in 1983. Falls Creek was stocked prior to 1983 and showed an increase in numbers and total weight of trout. However, so did the Rubicon and Lake Rivers, which had not been stocked. The 1985 samples showed that Falls Creek has maintained numbers and increased in total weight through all age classes. At the same time, the Rubicon River site has decreased in numbers and total weight since 1983. This shows that, despite the improvement in the fishery in most streams studied, the wild brown trout stream populations show considerable local fluctuations from year to year. These fluctuations are due to seasonal rains, flows, spawning success, food availability, predation and angling pressure. The results suggest that selected streams should be sampled on an annual basis in order to understand these fluctuations better.

When the data are corrected for electrofishing efficiency, narrow, shallow nursery streams (less than 4 m width, less than 30 cm depth) with year

Stream	Site	Sample Date	N/100m	Nt/100m	W/100m (kg)
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TABLE 1: SOUTHERN SITES

Jordan R.	Elderslie	2/85	3.3	3.3	0.66
		2/76	11	-	1.08
Prosser R.	Ardross	2/85	2	2	0.57
		2/78	3	1	0.22
Styx R.	Bushy Park	2/85	30	7.8	2.45
		2/78	7	0	0.12
Tyenna R.	Westerway 20 km below National Park	2/85	194	76	23.62
		2/78	43	2.5	1.53
		2/85	108	46	15.46
Mountain R.	Above Grove	2/85	26	11	3.59
		2/78	19	1	0.52
Russel R.	Hermitage	2/85	40	12	4.14
		2/78	0.5	0.5	0.13
Little Denison R.	Twin Rivers	2/85	11	2	0.94
Arve R.	Forestry Rd. Bridge	2/78	5	0.5	0.14
		2/85	114	2	2.89
Esperance R.	upper reaches	2/78	26	0.5	0.67
		2/85	9	3	0.67
Coal R.*	Tunnack	2/78	4	1	0.24
		2/85	40	3.3	2.56
Montos Ck.*	Baden Area	2/76	200	13	3.49
		2/85	6	4.4	1.53
		2/76	7	2	1.82
Jones R.*	Darby Siding	2/85	9	8	2.11
		2/76	3.4	-	0.32
		2/85	2	2	0.74
Jones R.*	Above Lowdina	2/76	1.7	-	0.92
		2/85	31	1	1.05
Jones R.*	Ellendale	12/83	60	6	-
		2/85	26	17	6.85
		12/83	87	21	8.55

TABLE 2: NORTHERN SITES

Liffey	Hermitage	2/85	20	16	8.03
		2/78	11	8	0.91
Brid R.*	Below Scottsdale Rd	2/85	38	12	6.62
		2/78	50	7	6.97
Great Forester R.	Upper reaches	2/79	61	10	3.38
		2/85	1	1	0.51
North Esk R.	See I.F.C. Newsletter Vol. 14 No. 1				
St. Patricks R.	See I.F.C. Newsletter Vol. 14 No. 1				

TABLE 3: NORTH WESTERN SITES

Minnow R.	Old Beulah Rd.	2/85	169	55	10.78
		2/85	51	2	2.93
		2/78	7	1	0.18
Dasher R.	Paradise Rd.	2/85	26	11	3.92
		3/78	10	2	0.17
Don R.	Nook	2/85	55	20	5.82
		2/85	19	19	6.31
		2/85	22	22	6.73
Rubicon R.	Elizabeth Town	1/83	68	30	14.99
		2/79	5	3	0.36
		2/78	0.5	0	0.04
Coiler Ck.	Moltema area	2/85	1	1	0.47
		2/79	2	2	0.88
Falls Ck.	Wilmot	2/85	47	28	6.60
		1/83	45	15	4.47
		2/79	6	4	1.79
		3/78	1.5	1	0.35
Lobster Rt.	Chudleigh	2/85	58	14	4.65
Leven R.	Loongana	2/85	52	23	6.02
		2/85	67	23	9.52
		3/78	23	1	0.39
Gawler R.	Above Isandula	2/85	36	6	2.71
Inglis R.	Pages Rd.	3/85	67	16	5.69
		3/78	9	1.5	0.51
Duck R.	Lades Rd.	2/85	27	15	5.73
		2/79	15	3	1.45
		2/78	2	-	-

TABLE 4: TROUT POPULATION ESTIMATES - CLYDE & PLENTY RIVERS

Clyde R.	At Cluny Creek	2/85	9	7	2.23	
		12/55	27	-	1.01	
		2/85	31	10	3.02	
Plenty R.	Bothwell	12/55	39	-	3.22	
		Salmon Ponds	2/85	20	10	5.81
			1/55	84	-	4.33
		Below Salmon Ponds	2/85	27	3.3	2.27
			2/78	15	3	1.13
2/55	74		-	1.74		

Nt = Number of takeable trout

- = Figures not available

* = Earlier figures unreliable for accurate comparison

N.B. All above figures are for 2 electrofishing runs. Approximately 40% must be added to figures for N/100 m and Nt/100 m and 30% to figures for W/100 m to obtain absolute figures.

round flow were found to support, on a statewide basis, an average total trout weight of 2.5 kg and an average of 40 trout per 100 m. The larger rivers sampled (greater than 10 m wide and greater than 30 cm deep) were found to support an average total weight of 8.3 kg and average of 76 trout per 100 m. The majority of sites sampled were nursery areas supporting a high number of fry and yearling fish. Those dominated by older fish were larger rivers with good nursery streams as tributaries.

There did not appear to be inadequate natural recruitment to any of the healthy streams studied; the Prosser River and Coiler Creek were the only exceptions and this was related to poor flow and pollution, respectively. Tasmanian streams are probably faced with a problem of over population by small trout not considered worthy of local anglers' attention. Reduced angling pressure does not help to alleviate this problem. The deeper holes and lower river stretches support the trout populations most suited to the angler, with older, larger fish predominating. These will be sampled in more detail next summer.

The Tyenna River below Russell Falls has shown a dramatic increase in trout standing crop since 1978 (mean number/100 m = 151, mean wt./100 m = 19.55 kg), well above the average total trout weights and numbers of around 3.7 kg, 46/100 m for this type of stream. This appears to be due to the operations of the Russell Falls trout farm, which commenced operations in 1978, and the consequent increases in nutrient levels entering and enriching the stream. This has caused the Tyenna River to have the highest number of takeable fish in the State, at an average of 60/100 m, although lengths in the population samples did not exceed 420 mm.

Other interesting cases include the Plenty and Clyde Rivers (Table 4) in which the overall total trout weights have increased since 1955 despite a decrease in numbers. Neither of these rivers have been stocked in the past ten years, whereas they were both stocked up to and including 1955. These streams now support more large fish, a result which reinforces the Commission's general

policy against stocking streams with good natural recruitment. In this context it is interesting to note that despite the release of some 10 000 brown trout fingerlings into the lower Leven River at Purton's Flats by the Ulverstone Branch of the NWFA, electrofishing some two months later of about 300 m of this stream yielded a number of older fish but no fingerlings. Overseas studies have confirmed that it is wasteful to introduce hatchery reared stock where natural recruitment is already more than adequate to populate the available adult habitat in streams.

If any problem exists in the stream fishery, it is that of overpopulation resulting in large numbers of small trout in otherwise fishable streams. It appears that anglers have tended to neglect stream fishing in recent years in favour of the larger trout available in lakes and farm dams. We hope that anglers will be encouraged by the survey results and will return to fish the streams in greater numbers and with increased confidence next season.

Footnote

Reaction from anglers to the sight of the fish numbers caught by our survey teams resulted in some humorous moments during the summer electrofishing trials. One angler on the Don River suggested that one of the sites fished was unrepresentative. The survey team therefore decided also to sample a stretch further down where the angler had "fished for years" but recently had "never even seen a fish there".

The first electrofishing run was under way by the time the angler had arrived. Observing from the stream bank, he questioned our success. Pulling his leg quite unashamedly, the team pretended that very few fish had been caught. At this, the angler expounded at great length on the accuracy of his predictions and the value of his years of experience.

Only when the grinning field assistant (who happened to be the F.A.C.T. President and N.W.F.A. Secretary) lifted the holding cages from the stream holding some twenty superb brown

trout, all takeable and ranging from 1/2 to 2 1/2 lb., did he abruptly fall silent! We only hope that more anglers can take part in these field trials and see for themselves what is really in their local streams. It can be a real eye-opener.

Conclusion

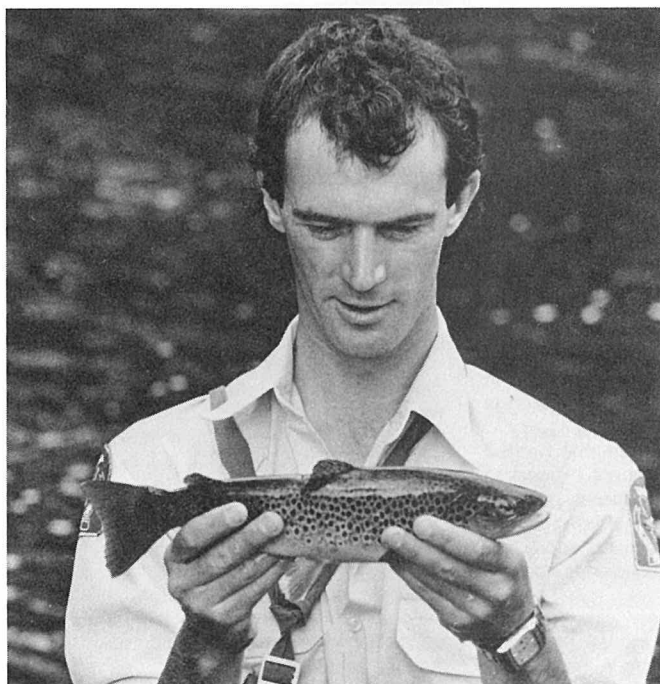
The stream survey has so far shown that in all streams sampled, brown trout have established resident populations supported by strong recruitment with the exceptions of Coiler Creek and the Prosser River. Populations in all other streams sampled show an improvement in numbers and total weight since sampling in the 1950's and 1970's.

The survey findings also indicate that Tasmanian stream trout populations were probably in a depressed state when sampled in the late 1970's due to the increased impact of predation by cormorants resulting from the "plague" of 1976/77. However, the 1978/79 surveys did indicate that headwater streams retained adequate recruitment to maintain populations without the need for supplementary stocking. The recovery since that time has borne out this suggestion and the populations found in 1985 generally exceed all previous records over the last 30 years in Tasmania.

How do our trout streams compare with those overseas? Table 5 shows typical values for numbers and total weight of brown trout per hectare (100 000m²) of stream area for a variety of streams around the world. Figures are shown for streams that are the original home of the brown trout in the U.K., Denmark and Belgium, as well as for the U.S.A. and N.Z. where the trout was introduced into waters often in competition with other trout and salmon species. The waters sampled in the 1985 survey would all be classed as smaller trout streams, and do not include the deeper waters and larger rivers. Even so, the typical values and ranges of the numbers and weights of brown trout in Tasmanian streams are equal even to the famed chalk streams of southern England and the rivers of Scotland.

TABLE 5
RANGES AND TYPICAL VALUES FOR BROWN TROUT NUMBERS AND TOTAL WEIGHT PER HECTARE IN STREAMS AROUND THE WORLD

Country	Water	Number per Hectare	Weight per Hectare (kg)
England	River Dart, Devon	0 - 4800	-
	River Erme, Devon	0 - 1400	-
	River Exe, Devon	0 - 6600	-
	Chalk Streams, Dorset	800 - 2000	-
	Walla Brook, Dartmoor	-	5 - 20
	Upper River Thames	-	475
	Becks, N. England	2000 - 40000	-
Wales	River Brefi, Cards	4800 - 9300	86 - 196
Scotland	River Bran, N. Scotland	100 - 400	-
	Shelligan Burn	12000 - 19000	70 - 140
	Forest Stream, Peebleshire	5300 - 6200	51 - 192
Ireland	River Camowen, Co. Tyrone	850 - 7630 5100	29 - 160 100
Belgium	Trout stream	-	300
Denmark	Brandstrup Brook	-	176 - 315
U.S.A.	Forest streams, Oregon	-	20 - 120
	36 streams, Wyoming	-	10 - 300
	Trout streams, Minnesota	-	56 - 280
	Trout streams, Susquehanna	-	51 - 392
	Trout streams, Michigan	-	4.8 - 200
New Zealand	Horokivi River	-	225
	Rough'ns Creek, Nelson	400 + 1700	7.6 - 230
Tasmania	Small streams	2000	125
	Larger trout streams	630	70
	North Esk River	634 - 1542	60 - 2300
	30 streams sampled 1985	50 - 7000	33 - 400



Bill Thompson examines a small brown trout, typical of those taken during the stream survey.

SAFE BOATING

With the new angling season under way, it is an appropriate time to stress boating safety.

The most important item of equipment to use in your boat is your life jacket. Each year tragedies occur which could have been prevented by proper use of life jackets. Too often drownings

occur and life jackets are found in the boat's locker or floating free on the water.

Buy a life jacket that fits comfortably and will adequately support you by keeping your nose and mouth clear of the water. Floating in a brightly coloured life jacket you will be more easily located by searchers and will have a far greater chance of survival in the event of a mishap.

Have you ever tested your boat for buoyancy - if your boat is overturned or swamped by a wave, will it float? This could mean the difference between life and death.

Lack of lights on boats using inland waters after dark is also causing serious concern. It is only a matter of time before a serious collision will occur involving boats without identifying lights returning to a launch ramp after dark. Would you

STUDIES ON THE TASMANIAN FRESHWATER CRAYFISH – ASTACOPSIS GOULDI

by Dr Nigel Forteach, Lecturer in Aquaculture
Tasmanian State Institute of Technology

Introduction

Biologists at the Tasmanian State Institute of Technology have been investigating the aquacultural potential of the large freshwater crayfish *Astacopsis gouldi*. There has been increasing commercial interest in this crayfish following publicity on marron farming and yabbie farming on the Mainland. Experimental tanks were set up in the Aquaculture Unit of the T.S.I.T. and the Inland Fisheries Commission made facilities available at the Corra Linn trout hatchery. A field study site was selected in a remote area above the Mersey River.

Studies concentrated on the reproductive biology, growth, temperature range and habitat preference of the species.

Methods

Thirty crayfish were kept in aquaria at the Aquaculture Unit of the T.S.I.T. All aquaria were recirculating units and water quality measurements were taken daily. These included water temperature, ammonia, oxygen and pH. The water in some of the aquaria was kept at ambient temperatures while water temperatures were carefully controlled in others. The animals in the aquaria were divided into three categories depending on size. Measurements of orbit/carapace length (OCL) formed the basis for the categories. Size I animals were those that had an OCL within the range 25 mm to 50 mm. Size II animals had an OCL within the range 60 mm to 85 mm and Size III animals were those within the range 99 mm to 150 mm.

Juvenile crayfish were fed *Tubifex* worms and finely chopped tiger worms once a week. Small slices of carrot also were placed in the rearing troughs. Size I and II crayfish were fed maggots, wireworm larvae and earthworms as well as red meat and fish. Carrot and pieces of rotting wood were always present in their aquaria. Size III animals were given a similar diet to that of Size I and II animals, but live fish were introduced into their aquaria. The fish were rainbow trout, pigmy perch and galaxids.

Two hatchery raceways were used at the Corra Linn trout hatchery. One raceway held two egg-bearing (berried) females and their subsequent offspring. The second was used for mating trials. A study area was selected along a small creek flowing into the Mersey River. This creek was remote and a reasonable number of crayfish always were present. Frequent visits were made to the site and data were collected on the reproductive behaviour, habitat selection and food preferences of *Astacopsis gouldi*.

Results

Reproduction: The two berried female crayfish at Corra Linn carried their eggs on the pleopods of their abdomens from May 1984 to the end of November 1984. The eggs hatched during the last week of November and first week of December. Post-larvae remained attached to the pleopods of the females until the end of January 1985. All surviving juveniles left their parents by the first week in February and immediately excavated horizontal tunnels in the gravel substrate under rocks and logs placed in the raceways.

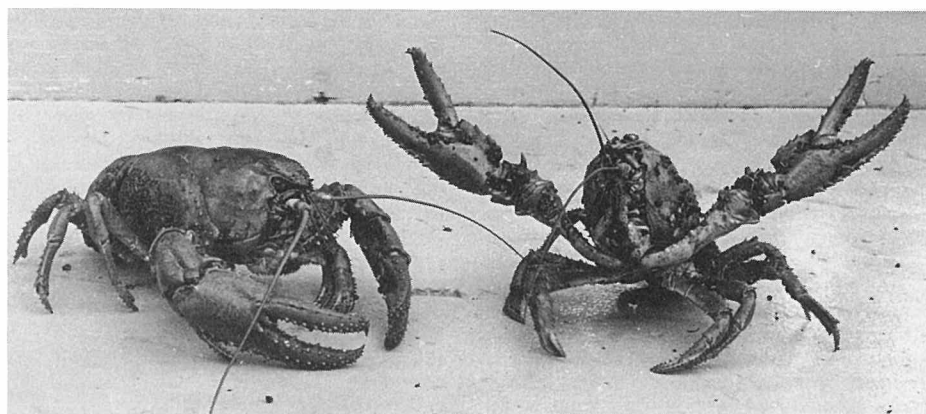
Growth: The crayfish eagerly accepted all the various food items offered. Juveniles at Corra Linn moulted 5 times between February and the end of May and reached an overall body length of 3.5 cm. No moulting occurred in June or July. Size I animals moulted twice a year; once in the spring and again in the autumn. Size II animals

moulted in the spring but did not moult again in the autumn. Animals in the Size III category did not moult over a twelve month study period. There was considerable variation in the percentage increase in length of animals which moulted. One Size I animal increased in size (OCL) by 36% while other size I animals increased by only 8% (OCL). Similar variations were recorded in Size II animals.

Temperature range: The crayfish fed well and moulted successfully when the water temperature was between 12° and 15°C. Some feeding took place below 12°C and ceased below 6°C. Temperatures above 16°C for periods greater than three or four weeks stressed the animals and feeding ceased after two or three weeks. Animals died when water-temperatures exceeded 20°C greater than three weeks. Animals kept at water temperatures

above 20°C regularly climbed out of the water. Stressed animals were found to be very susceptible to infection by the bacterium *Aeromonas hydrophila*.

Habitat preference: Field studies suggest that Size II and Size III animals prefer to live in deep pools. These animals excavate shallow horizontal holes in the mud banks below the water line or live under fallen logs and tree roots. Size I are most commonly found in much faster water than either Size II or III animals and they excavate horizontal tunnels under large rocks or logs by removing the gravel. Laboratory observations show that stones are carried in the large claws and deposited outside the entrance of the burrow. Newly dug burrows can be detected easily by the presence of piles of clean pebbles deposited at the entrance to the animal's retreat.



Giant freshwater crayfish from the Forrester River (approximately 1 kg each).

Discussion

This study has shown that mature females lay their eggs either in the autumn or in the spring. Field observations suggest that the majority of females lay their eggs in April and May. Autumn spawners complete the reproductive cycle in early February but Spring spawners continue to carry post-larvae into February. Egg development can be speeded up by maintaining water-temperatures at 12°C. Obviously the eggs of spring spawners do develop much faster than eggs laid in the autumn and this is due to the warmer water temperatures.

It should be noted that mated female animals are carrying eggs or young throughout much of the fishing season. Great care is necessary in handling these animals since they will shed eggs or young if roughly treated.

Laboratory studies have shown that berried females require special treatment. Brooding animals must be disturbed as little as possible and should be kept in well shaded tanks. Stressed animals will kill their young soon after they hatch if environmental conditions are not correct.

Astacopsis gouldi is a very slow growing crayfish. Growth studies suggest that with increasing size there is a decline in the number of moults per annum. It is also important to realise that in the case of animals which spawn in the autumn, the juveniles will be less than 5 cm in total length 15 or 18 months later. It is very likely that Size III crayfish (OCL 99 mm to 150 mm) are at least six and possibly as many as eight years old. One probable reason for the slow growth of the species is its adaptation to cold water. The optimum water temperature for the successful rearing of the animal appears to be between 12°C and 15°C. Field data would tend to confirm these finds. Water temperatures in the study area seldom rose above 15°C for any length of time.

The creek was heavily overgrown with vegetation and set in a valley. Both factors provided very efficient shade and prevented the water temperature increasing much above 15°C even in mid-summer.

Stomach analyses carried out in the field showed that crayfish eat detritus. Leaves and pieces of wood were nearly always present. Detritus harbours enormous numbers of bacteria and fungi. Small insect larvae and crustacea often are to be found amongst the detritus of creeks and ponds. Therefore, the diet of *Astacopsis* is rich in protein. Fish bones were found also. Laboratory experiments confirmed that *Astacopsis* catch and eat live fish.

Providing a suitable diet for crayfish in captivity did not appear to be a major problem and there was no reason to suspect that dietary deficiency slowed down the growth of experimental animals in this study. Food items fed to the animals were considered rich in protein.

Conclusions

Astacopsis gouldi is not a suitable animal for intensive farming. Growth rates are too slow and cannot be enhanced by increasing water temperatures above 16°C for long periods of time. Typical pond systems used in marron or yabbie farming will become too warm in summer for *A. gouldi*.

It is possible to hatch eggs and rear juveniles in captivity, but brood tanks must be carefully constructed to ensure minimum disturbance of females and to provide shade at all times. Stocking ponds with juveniles may not be successful since it appears that juvenile crayfish have a different habitat preference to that of both larger and mature animals.

This work was supported by a grant from the Rural Credits Development Fund.

drive your car on the road at night without lights? Why try this potentially suicidal act in a boat?

Alcohol and boating is also a potentially lethal mix. If you must drink alcohol on your fishing trips then make sure you don't drink in the boat or before you go out on the water. Save the alcohol for the camp fire at night.

A booklet entitled "Your Power Boat" is available free of charge from Port Authorities throughout Tasmania. This booklet sets out basic safety rules, applicable boating regulations, emergency procedures and local area requirements.

ITEMS IN BRIEF

Information for Central Highlands Visitors

The Hydro-Electric Commission has recently published a brochure which provides information on the Do's and Don'ts in relation to HEC land in the Central Highlands. The brochure details policies regarding access roads, camping grounds, litter disposal, firewood collection etc. and is available from the HEC, major sports stores and from visitor centres in the Highlands.

Licence Fees Unchanged

The Inland Fisheries Commission angling licence fees for the 1985/86 season have remained unchanged from the previous year.

	\$
Full Season (male and female)	24.00
Full Season (juveniles 16 and 17 years)	4.00
14 days duration	16.00
3 days duration	8.00

A person under 16 years does not require a licence nor does a person in possession of a Pensioner Health Benefit Card. TPI pensioners may make application to the Commission for a complimentary licence.

Forestry Study Under Way

The Commission's study on the effects of forestry operations on stream fauna which was announced in the March 1985 newsletter is now under way. A study area has been selected on tributary streams of the Huon River. Commission research staff have begun monitoring water quality and invertebrate abundance and diversity in the streams, prior to logging.

Whitebait Study Under Way

Commission research staff have held discussions with former whitebait fishermen in order to select sampling sites around the State for the commencement of the whitebait study. Past commercial catch returns and preserved samples of whitebait have been re-analysed. Commission field staff have begun to monitor whitebait runs in the selected rivers and the biology of sea-run trout stocks will also come under scrutiny.

Lake Waverley

On Sunday 4 August, Mr Neil Robson, M.H.A., officially opened Lake Waverley, a newly created dam in the suburbs of Launceston. The 2.5 ha storage was created by the construction of a 400 metre wall on low lying land between the Waverley Primary School and Distillery Creek. The project was begun in 1982/83 season and funds totalling \$25 000, administered by the Commission, have been provided from a State Government grant scheme to assist angling associations. Most work to date has been conducted under the direction of the Launceston Branch of the Northern Tasmanian Fisheries Association and landscaping the area will be the responsibility of the Waverley Progress Association. The lake is open to juvenile anglers only and fishing is restricted to daylight hours.

PROSECUTIONS

Successful prosecutions since the last Newsletter are listed below.

Court Date	Offender and Address	Nature of Offence	Fine	Costs	Penalty
14.5.85	Shane William SMITH Lease St. Gormanston	Other than rod and line. Possession of net.	60.00 50.00	15.10	
14.5.85	Trevor Henry SMITH Lease St. Gormanston	Other than rod and line.	60.00	15.10	
14.5.85	Ian William BUCHANAN 41 O'Brien's Lane, Templestowe, Victoria	Fishing without licence.	100.00	15.10	
6.5.85	John Albert MINCHIN 28 Saunders St. Wynyard	Fishing without licence.	100.00	15.10	
18.5.85	Roger George FREEMAN RSD 574, Longford	Take fish from closed waters. Other than rod and line.			Probation of Offenders Probation of Offenders
14.5.85	Rex Graham DAVIS Quakers Hill, N.S.W.	Fishing without licence.	100.00	15.10	
22.5.85	Ricky Colin RATTRAY 60 North St. Devonport	Fishing without licence.	100.00	15.10	
22.5.85	Denis Rowan PAGE 43 North St. Devonport	Fishing without licence.	100.00	15.10	
22.5.85	David Arthur McCULLAGH RSD 617, Sassafras	Fishing without licence.	100.00	15.10	
22.5.85	Paul Maurice DEWHURST 135 Roland Hwy. Spreyton	Fishing without licence.	100.00	15.10	
22.5.85	Gregory BERNE 36 Tarleton St. Devonport	More than 1 rod and line.	30.00	15.10	
24.5.85	John Douglas PAGE Waverley Rd. Don	Take whitebait. Possession of net.			Adjourned Sine Die Adjourned Sine Die
17.6.85	Kerry Edwin FEBY 2 Springfield Ct. Devonport	Take whitebait. Possession of net. Possession of whitebait.			Probation of Offenders Adjourned Sine Die Adjourned Sine Die
20.6.85	Graeme Charles ALLEN Post Office, Don	Take whitebait. Possession of net. Possession of whitebait.	100.00 100.00	15.10	Conviction Recorded
20.6.85	Anthony John BROWN 4 Esperanza Ct. Zeehan	Fishing without licence.			Adjourned Sine Die
5.7.85	Barry ROUSE 17 Coraki St. East Devonport	Take whitebait. Possession of net.	50.00 50.00	15.10	
6.5.85	Patrick Edward GARLAND 38a Hogg St. Wynyard	Take whitebait. Possession of whitebait. Possession of net. Use whitebait net.	50.00 50.00	15.10	Adjourned Sine Die Adjourned Sine Die
6.5.85	Patrick Edward GARLAND 38a Hogg St. Wynyard	Take whitebait. Possession of net Possession of whitebait.	100.00 100.00	15.10	Adjourned Sine Die
14.5.85	William Harold BUCHANAN 27 Simms Rd. Briar Hill	Fishing without licence.	100.00	15.10	
24.6.85	Michael Bruce McWAIDE 3 Dromana Ct. Ravenswood	More than 1 rod and line.	80.00	15.10	
24.6.85	Christopher FARQUHAR RSD, Bridgenorth	Other than rod and line. Possession of net.	75.00	15.10	130.00 Conviction Recorded
24.6.85	Garry John JARMAN 269 Invermay Rd. Launceston	Other than rod and line. Possession of net.	75.00	15.10	130.00 Conviction Recorded
24.6.85	John Hilton BOURKE 13 Waterloo St. Ravenswood	More than 1 rod and line.	45.00	15.10	
24.6.85	Sean ROBERTSON 12 Blair St. New Norfolk	Fishing without licence. Unattended set rod.	100.00 25.00	15.10	
25.6.85	Ross Albert WILSON 76 Charlotte St. New Norfolk	More than 1 rod and line. Unattended set rod.	25.00 25.00	15.10	
25.6.85	Steffan Eli WALSH 76 North Cres. New Norfolk	Unattended set rod.	25.00	15.10	
25.6.85	Shaun Patrick BROWN 86 North Cres. New Norfolk	More than 1 rod and line. Unattended set rod.	25.00 25.00	15.10	
25.6.85	Gavin McKENZIE 9 Fitzgerald Cres. New Norfolk	Unattended set rod.	25.00	15.10	
26.6.85	George Russell KETTLE Springfield	Unattended set rod.	20.00	15.10	
26.6.85	Paul John KOOZAK 24 Micklegohn Street Camperdown	Fishing without licence.	100.00	15.10	50.00
26.6.85	Raymond Oleh KOOZAK Cross Forest Rd. Naroghid	Fishing without licence.	100.00	15.10	50.00
26.6.85	Michael Leigh EVANS 29 Carrawga Drive, Chigwell	Fishing without licence. Unattended set rod.	100.00 20.00	15.10	
26.6.85	Roger PRINCE 10 Croyden Place, Bridgewater	Fishing without licence. Unattended set rod.	100.00 20.00	15.10	
26.6.85	Trevor John BRITTEN P.O. Box 764, Wakery, S.A.	Fishing without licence. Unattended set rod.	100.00 20.00	15.10	
11.6.85	Paul William SMITH 12 Westwood St. Zeehan	Fishing without licence.	100.00	15.10	
11.6.85	Frederick WOODWARD 3 Esperanza Ct. Zeehan	Fishing without licence.	100.00	15.10	
1.7.85	Malcolm Ronald HYDE 1 Jorgenson St. Montello	Fishing without licence.	100.00	15.10	
11.7.85	Reginald BESSELL 19 Kaihi Place, East Devonport	Fishing without licence. Falsely representing to be licensed	100.00	23.10	Probation of Offenders