

Suntag Report

Ross River Freshwater Tagging

Tagging above Aplin Weir

Bill Sawynok

Report No: ST200402



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Cover photographs: Aplin Weir is now the upper tidal limit of the Ross River with a tagged barramundi about to be released below the weir (Vern Veitch photographs).

Information in this publication is provided as general advice only. For application to specific circumstances, professional advice should be sought.

Infofish Services has taken all steps to ensure the information contained in this publication is accurate at the time of publication. Readers should ensure that they make the appropriate enquiries to determine whether new information is available on a particular subject matter.

Report No: ST200402

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Support for Suntag by the Department of Primary Industries and Fisheries (DPI&F) over a long period of time.

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The Twin Cities Fishstocking Society Inc for their efforts in stocking of local waterways around Townsville and especially the freshwater sections of the Ross River.

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The efforts of stocking group members that assisted in the tagging of fish when being stocked, especially Keith "Doc" Harveyson.

Vern Veitch of Tag and Release Sportfishing Club has coordinated tagging efforts in Townsville for a number of years and provided photographs for the report.

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The support of the Australian National Sportfishing Association Queensland Branch Inc for its Suntag program that has made projects such as this possible.

The efforts of all taggers involved in Suntag in the Townsville area that have contributed to the tagging data collected on this project.



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1. Summary

The Ross River at Townsville is a highly regulated river dammed to supply water to the cities of Townsville and Thuringowa however it is still important for recreational fishing. From the mouth of the river to above Kelso there are 3 weirs and 1 dam that regulate flow with Aplin Weir now the tidal limit for the estuary. Aplin Weir and the other weirs prevent upstream movement of species that previously accessed the freshwater reaches of the Ross River.

As barramundi and other marine species accessed the reaches of the Ross River above Aplin Weir prior to the building of the weirs there has been an ongoing effort to stock these reaches with barramundi, and in more recent times, mangrove jack. The Twin Cities Fishstocking Society, in conjunction with DPI&F, has stocked barramundi above Aplin Weir since 1991/92 with over 162,000 fingerlings released to date. Mangrove jack have been stocked above Aplin Weir since 2002/03 with over 7,400 fingerings released.

The objectives of the tagging were to monitor the effects of stocking of fish in the freshwater sections of the Ross River by obtaining data on:

- ❑ Growth of fish in the impounded sections of the river.
- ❑ Fish movement and the impact of stream barriers.

A total of 482 fish, including 475 barramundi, have been tagged in the freshwater reaches of the Ross River above Aplin Weir. Apart from 8 fish tagged earlier all fish have been tagged since 1998/99.

Of the 475 barramundi tagged above Aplin Weir there have been 67 recaptures (14.1%) of individual fish with three fish recaptured twice making a total of 70 recaptures.

For recaptured fish the average yearly growth increment of 300mm long fish was 180mm and for 1000mm fish reduced to 100mm, although growth increments varied considerable for all sizes of fish.

No barramundi tagged below Aplin Weir have been recaptured above the weir as it is an effective barrier to upstream migration of fish. No fish tagged in any location have been recaptured upstream above the next weir. A total of 87.5% of barramundi were recaptured in the same weir pool they were tagged in.

Of seven fish recaptured below Aplin Weir one barramundi tagged in Black Weir was recaptured 75km to the south in the Haughton River. Two fish tagged in Aplin Weir were recaptured downstream at the base of the weir. One fish was recaptured in Ross Creek, another in the Townsville Marina, another to the north in the Bohle River and another 130km to the south in Groper Creek near the mouth of the Burdekin River.

The results show that the stocking of barramundi has been a success in creating a freshwater fishery above Aplin Weir. There were 63 (12.4%) fish recaptured above Aplin Weir and 49 (77.8%) of these were recaptured and reported by recreational fishers. Researchers reported the remaining recaptures. With the overall recapture rate for Suntag fish recaptured at 8.7% for the whole of Queensland the recapture rate above Aplin Weir indicates a high level of usage of the area for recreational fishing.

Ross River Freshwater Tagging

Tagging above Aplin Weir

2. Background

The Ross River at Townsville is a highly regulated river dammed to supply water to the cities of Townsville and Thuringowa however it is still important for recreational fishing. From the mouth of the river to above Kelso there are 3 weirs and 1 dam that regulate flow with Aplin Weir now the tidal limit for the estuary. Aplin Weir and the other weirs prevent upstream movement of species that previously accessed the freshwater reaches of the Ross River (V Veitch *pers comm*).

As barramundi and other marine species accessed the reaches of the Ross River above Aplin Weir prior to the building of the weirs there has been an ongoing effort to stock these reaches with barramundi, and in more recent times, mangrove jack. The Twin Cities Fishstocking Society, in conjunction with DPI&F, has stocked barramundi above Aplin Weir since 1991/92 with over 162,000 fingerlings released to date (S McLean *pers comm*). Mangrove jack have been stocked above Aplin Weir since 2002/03 with over 7,400 fingerings released (M Pearce *pers comm*).

Tagging of fish in the Ross River has been occurring as part of Suntag since at least 1986/87. Concerted tagging of fish in the freshwater above Aplin Weir has occurred since 1998/99, in association with monitoring of stocked fish by DPI&F, however a small number of fish had been tagged earlier.

In 2000/01 the Townsville City Council provided funding to support local tagging efforts in the Townsville area to obtain data on local recreational fish species and this included tagging of stocked fish in the Ross River. A project was developed to focus tagging effort (*appendix 1*).

3. Objectives

Stocking of the Ross River has been ongoing since 1991/92.

The objectives of the tagging were to monitor the effects of stocking of fish in the freshwater sections of the Ross River by obtaining data on:

- ❑ Growth of fish in the impounded sections of the river.
- ❑ Fish movement and the impact of stream barriers.

4. Description of Sites

There are 4 barriers (*figures 1 to 4*) to fish movement from the estuary to the freshwater on the Ross River. These are by distance upstream from the mouth:

- ❑ Aplin Weir 11km
- ❑ Gleeson Weir 15km
- ❑ Black Weir 17km
- ❑ Ross River Dam 28km



Figure 1: The saltwater reach immediately below Aplin Weir is a popular fishing spot



Figure 2: Gleeson Weir on the Ross River



Figure 3: Black Weir on the Ross River



Figure 4: Spillway on the Ross River Dam

Aplin Weir is the downstream barrier that now defines the limit of tidal movement in the Ross River. As this weir is 6m high, and there is no fishway on the weir, it effectively prevents marine fish species from accessing the freshwater above the weir (V Veitch *pers comm*). During flooding events fish from the freshwater can migrate downstream to the estuary and beyond, but must survive the 6m drop over the weir wall and a rock rap energy diffuser 20m below the weir. This is an artificial rock bar and fish become trapped between the weir wall and the rock bar. Aplin Weir is shown in *figure 1*.

The next barrier upstream is Gleeson Weir that is 4 km above Aplin Weir as shown in *figure 2*. This is a lower barrier that is 2-3m high. A distance of 2km above Gleeson Weir is Black Weir as shown in *figure 3* that is 3m high. A further distance of 11km upstream from Black Weir is the Ross River Dam as shown in *figure 4*.

5. Stocking of Sites

Stocking of barramundi in the Ross River above Aplin Weir has been ongoing since 1991/92. A total of over 162,000 fish have been stocked since that time with numbers of fish stocked in each area shown in *table 1* (S McLean *pers comm*).

Most stockings of barramundi fingerlings have been of small fish up to 50mm however smaller releases have been made of larger fish from 170-300mm. *Figure 5* shows larger barramundi fingerlings being released.

DATE	APLIN WEIR	GLEESON WEIR	BLACK WEIR	TOTAL
Feb-92	2000	0	8000	10000
Feb-93	3000	0	0	3000
Feb-94	2600	0	14000	16600
Dec-94	6000	0	5000	11000
May-96	0	3000	0	3000
Feb-97	12000	0	10000	22000
Dec-97	10000	0	9000	19000
Dec-98	0	0	1000	1000
Apr-99	3500	0	0	3500
Sep-00	0	12	0	12
Oct-00	10000	2500	11100	23600
Nov-00	3000	0	0	3000
Feb-02	0	0	9975	9975
Mar-02	2200	0	22000	24200
Dec-02	0	0	4700	4700
Feb-03	8000	0	0	8000
TOTAL	62300	5512	94775	162587

Table 1: Numbers of barramundi stocked in the Ross River above Aplin Weir

Since 2002/03 a limited number of mangrove jack have also been released above Aplin Weir. A total of over 7,400 fish have been stocked since that time with numbers of stocked fish in each area shown in *table 2* (M Pearce *pers comm*). Mangrove jack ranged in size from around 40-170mm when stocked. Mangrove jack fingerlings were microtagged and those released in 2003 were marked with oxytetracycline (OTC).

DATE	APLIN WEIR	GLEESON WEIR	BLACK WEIR	TOTAL
May-03	1271	0	0	1271
Jan-04	244	0	0	244
Mar-04	17	0	0	17
Apr-04	5947	0	0	5947
TOTAL	7479	0	0	7479

Table 2: Numbers of mangrove jack stocked in the Ross River above Aplin weir



Figure 5: Releasing fish above Aplin Weir that were trapped below the weir between the weir wall and the rock bar

6. Methods

Fish were caught, tagged and released, in accordance with the procedures in the Austag Tagging Manual (available at www.info-fish.net). Records were collected and recorded in accordance with the procedures set out in the Manual.

Tagging data was collected on Suntag form QF 0018. This form was superseded by QF0026 in November 2003 and some later data was collected using this form. Recapture data was collected using form QF0020/1. Tagging and recapture data was entered and stored in the Suntag database.

The target species was barramundi however a small number of mangrove jack have been tagged following their stocking in 2002/03.

Specific tagging of fish in the freshwater reaches above Aplin Weir commenced in 1998/99 however some sporadic tagging occurred prior to that time. Fish were tagged while recreational fishing using rod and line, when larger fish were

released as part of the stocking program, while electrofishing to monitor fish stocks or when released from a fish tank.

Some recreational caught fish recorded in the Suntag database at the base of Aplin Weir in early tagging records prior to 2001/02 may have been tagged above the weir in the freshwater as there was some ambiguity due to the manner in which the data was recorded.

Also there were fish caught below Aplin Weir, tagged and then moved to the freshwater above the weir however these are not clear in the data. A small number of fish captured in the freshwater were tagged and then moved to the saltwater and these are also not clear in the data (V Veitch *pers comm*).

Not all data of fish tagged in the study area are available. There are recaptures of fish that are likely to have been tagged in the area for which there are no tagging records. Attempts to trace these tagging records continue and some may be located in the future.

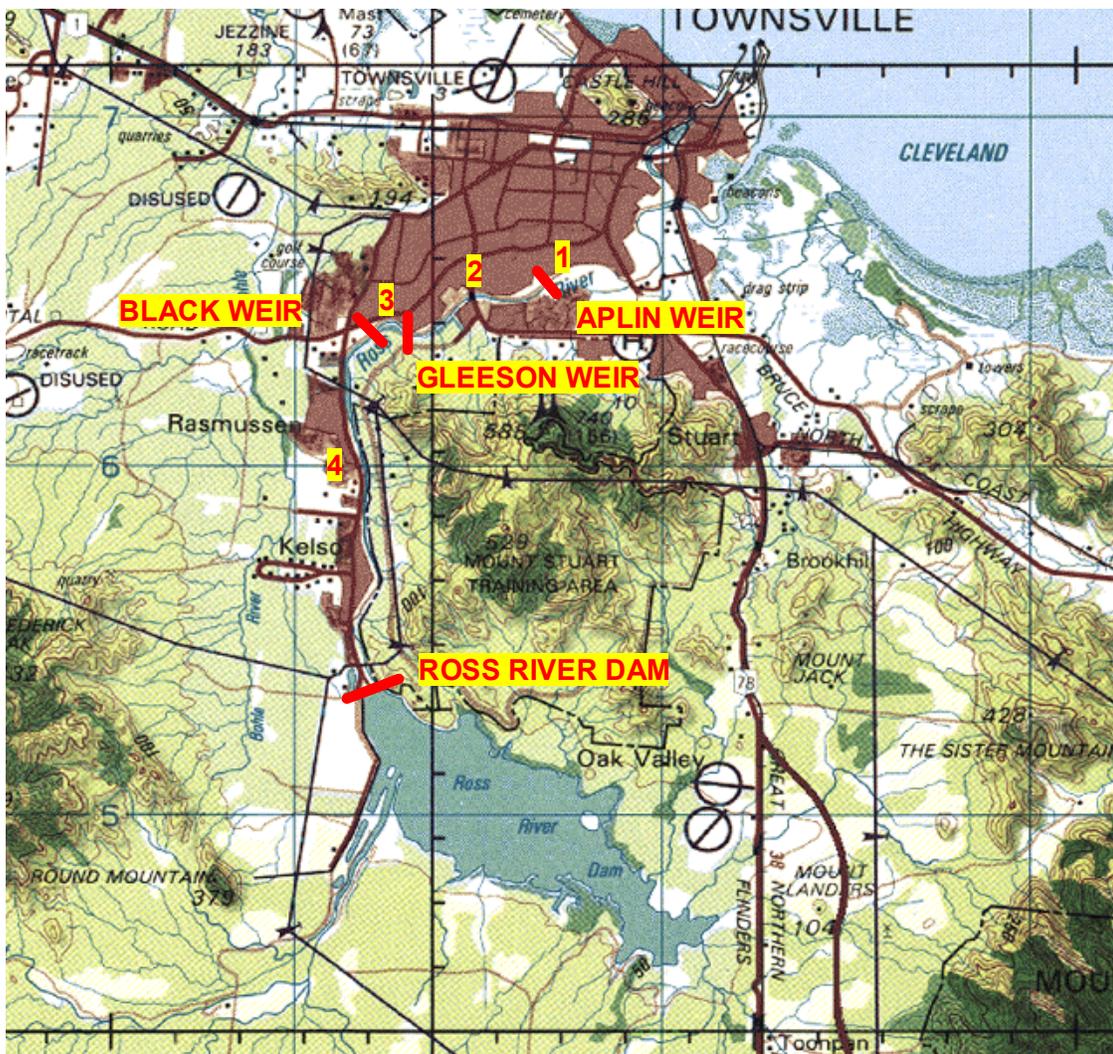


Figure 6: Tagging sites on Ross River

Measurements of fish were to the nearest centimetre or half centimetre. Growth rates of fish were calculated where lengths of fish were available both at tagging and when recaptured. Fish that were at liberty for less than 30 days and those that indicated negative growth were excluded. Fish that indicated negative growth were interpreted as having at least one incorrect measurement. Growth rates were calculated as linear yearly increments of fish at tag size.

Locations where fish were tagged were based on Suntag grid maps covering the Townsville area (available at www.info-fish.net). These maps identify tag and recapture locations to within approximately 1km. Movement of fish was calculated using MapInfo GIS software and the distance moved was calculated as the shortest distance by water between the tag and recapture locations.

Locations where fish have been tagged in the freshwater reaches of the Ross River were aggregated for analysis. These locations are shown in *figure 6* and can be defined as:

1. In the Ross River immediately below Aplin Weir.
2. Aplin Weir upstream of the weir to the base of Gleeson Weir.
3. Gleeson Weir upstream of the weir to the base of Black Weir.
4. Black Weir upstream of the weir to the base of Ross River dam.

7. Results

A total of 482 fish have been tagged in the freshwater reaches of the Ross River above Aplin Weir. Apart from 8 fish tagged earlier all fish have been tagged since 1998/99. *Table 3* shows the total numbers of each species tagged at each location. The number of fish tagged during different fishing operations at all locations is shown in *table 4*.

SPECIES	APLIN WEIR	GLEESON WEIR	BLACK WEIR	TOTAL
BARRAMUNDI	189	6	279	475
MANGROVE JACK	6	0	0	6
TARPON	1	0	0	1
OVERALL	196	6	279	482

Table 3: Total fish tagged by location in freshwater above Aplin Weir

SPECIES	FISHING	STOCKING	ELECTROFISHED	FISH TANK	NETTED	TOTAL
BARRAMUNDI	89	128	195	4	59	475
MANGROVE JACK	0	4	2	0	0	6
TARPON	1	0	0	0	0	1
OVERALL	90	132	197	4	59	482

Table 4: Total fish tagged by fishing method in freshwater above Aplin Weir

Numbers of barramundi tagged each year above Aplin Weir since 1998/99 is shown in *figure 7* and the size range of fish tagged each year are shown in *figure 8*. Fish tagged on 1998/99 were tagged during monitoring of stocked fish by DFI&F and the peaks in the size ranges in *figure 8* are indicative of fish stocked at the same sizes in previous years. In October 2000 a total of 80 fish from 170-300mm were tagged

during stocking. The size range of fish in 2003/04 indicates a wide range of fish sizes with no particular size class being dominant.

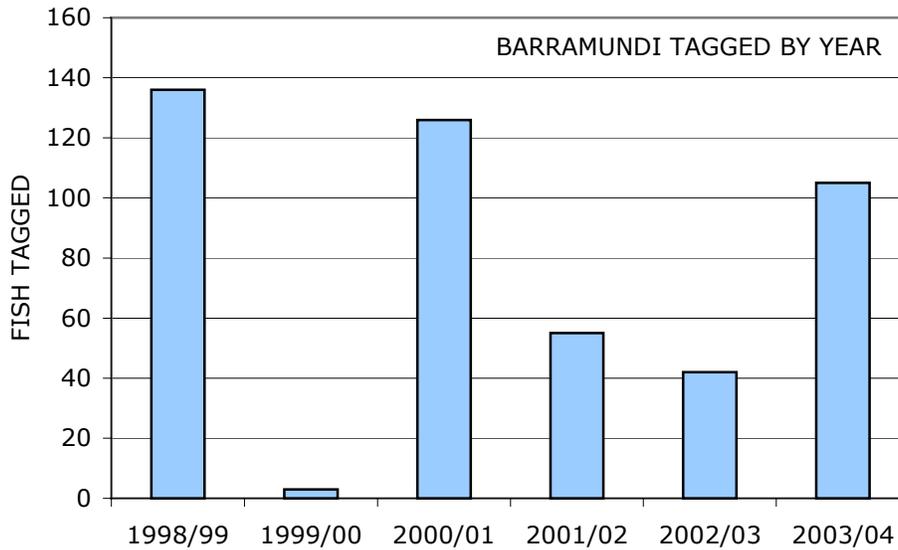


Figure 7: Numbers of barramundi tagged each year above Aplin Weir

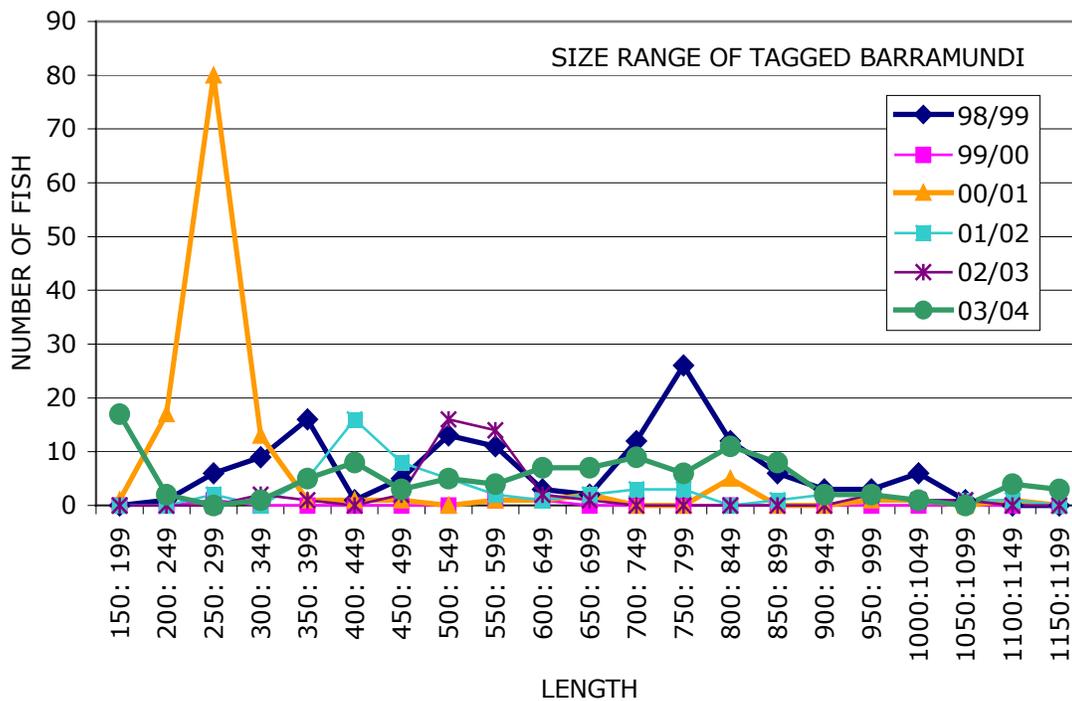


Figure 8: Size range of barramundi tagged each year above Aplin Weir

Growth rates for barramundi tagged in the freshwater reaches above Aplin Weir were calculated. Of the 70 recaptures there were 60 fish that had sufficient data to determine growth.

Growth rates calculated as linear yearly increments of fish at tag size are shown in *figure 9*. The average yearly growth increment of 300mm fish was 170mm and for 1000mm fish reduced to 99mm, although growth increments varied considerable for all sizes of fish. The yearly growth increment of 773mm for one 390mm fish is probably the result of measurement error.

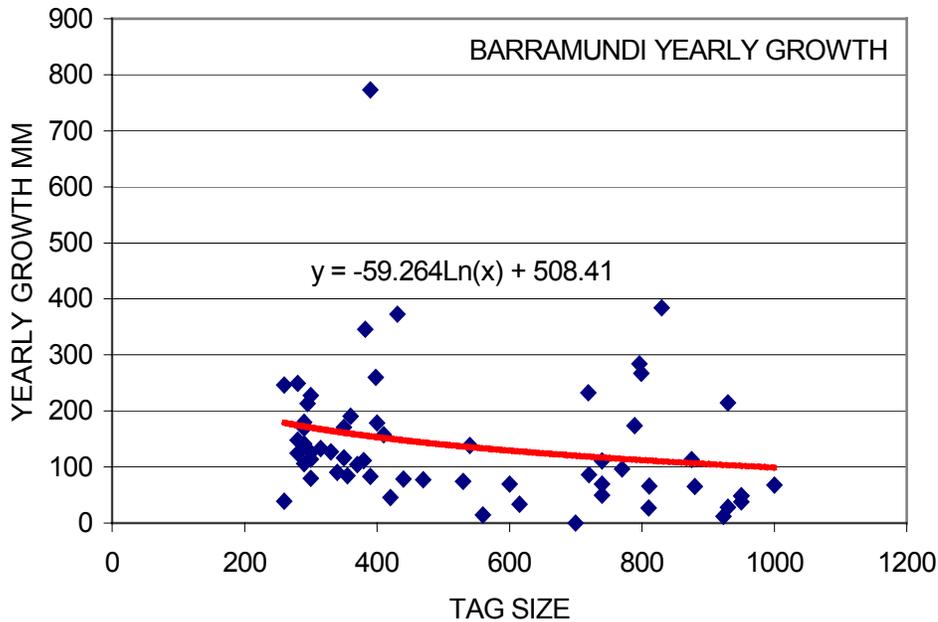


Figure 9: Yearly growth increment for tagged barramundi

Of the 475 barramundi tagged above Aplin Weir there have been 67 recaptures (14.1%) of individual fish with three fish recaptured twice making a total of 70 recaptures. Of these one large recreationally caught fish (1020mm) was found dead the same day it was tagged in April 2002 and two fish (815 and 1120mm) were found dead within two days of being tagged during an electrofishing survey in November 2003.

No barramundi tagged below Aplin Weir have been recaptured above the weir as it is an effective barrier to upstream migration of fish. No fish tagged in any location have been recaptured upstream above the next weir. *Table 5* shows the movement of barramundi compared to their tag location. Locations shown as elsewhere are locations downstream from Aplin Weir or in other systems to the north and south.

LOCATION TAGGED	RECAPTURES	BLACK WEIR	GLEESON WEIR	APLIN WEIR	ELSEWHERE
BLACK WEIR	16	12	1	2	1
GLEESON WEIR	2	0	2	0	0
APLIN WEIR	52	0	0	46	6
TOTALS	70	12	3	48	7

Table 5: Summary of recaptures of fish tagged in each location

Of the total 70 recaptures 60 (85.7%) were in the same weir section that the fish were tagged in. Three fish (4.3%) were recaptured downstream in another weir

section while seven fish (10.0%) were recaptured elsewhere downstream of Aplin Weir. *Figure 10* shows where barramundi were recaptured compared to where tagged.

There were ten fish recaptured in other than the weir section the fish were tagged. Three were recaptured in another weir section and seven were recaptured below Aplin Weir. One fish tagged in Black Weir was recaptured in Gleeson Weir and two were recaptured in Aplin Weir. *Figure 11* shows the distance individual barramundi have moved from the tag location over time.

Of the seven fish recaptured below Aplin Weir one barramundi tagged in Black Weir was recaptured 75km to the south in the Haughton River. Two fish tagged in Aplin Weir were recaptured downstream at the base of the weir. One fish was recaptured in Ross Creek, another in the Townsville Marina, another to the north in the Bohle River and another 130km to the south in Groper Creek near the mouth of the Burdekin River. *Figure 12* shows where fish tagged above Aplin Weir have been recaptured below the weir.

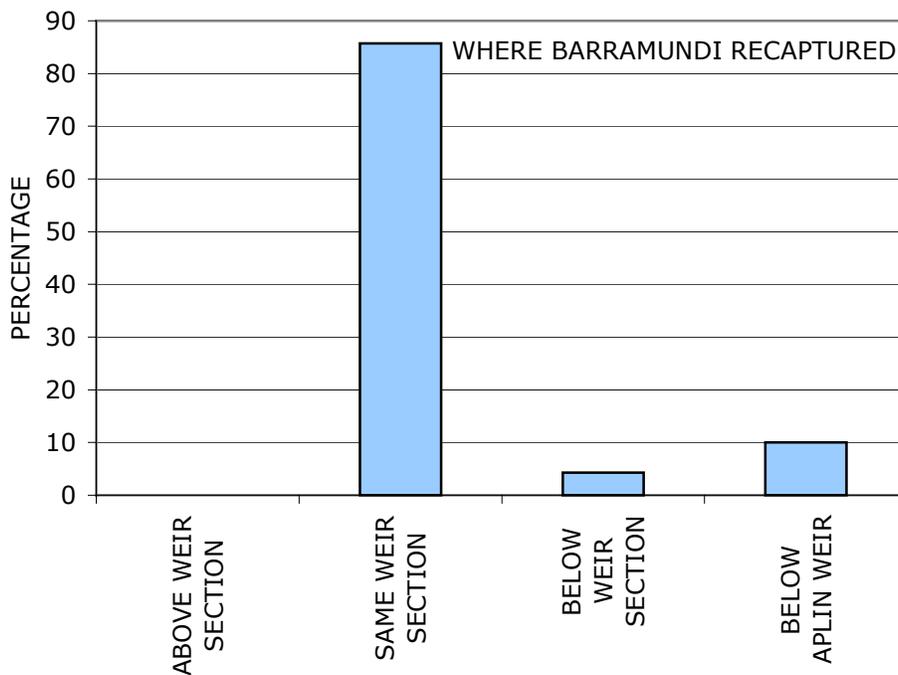


Figure 10: Where tagged barramundi recaptured in freshwater reaches of Ross

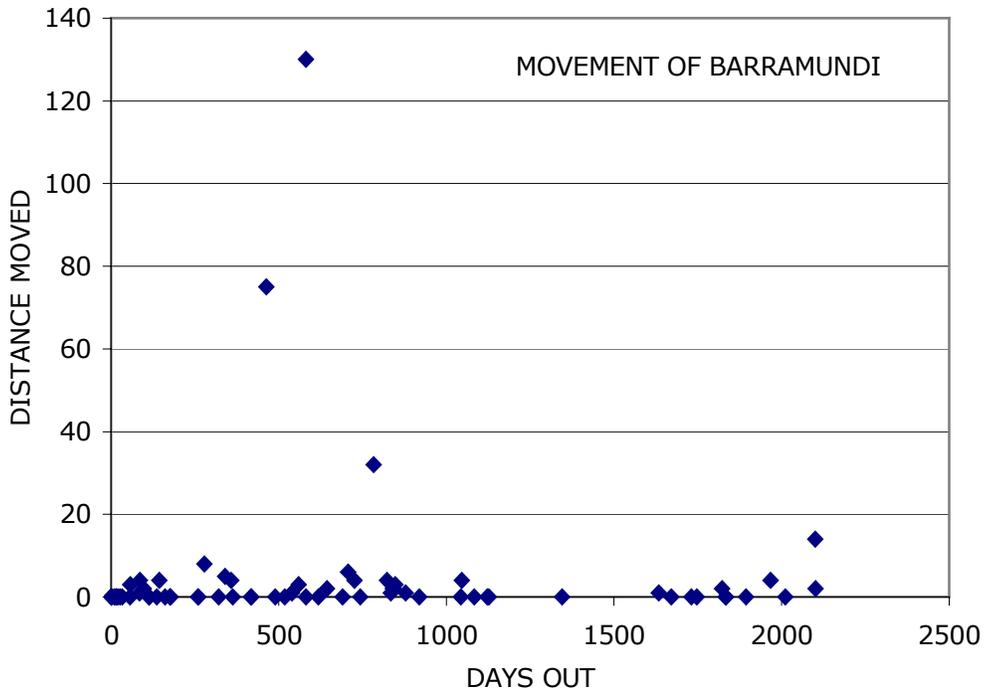


Figure 11: Distance barramundi moved over time between tagging and recapture

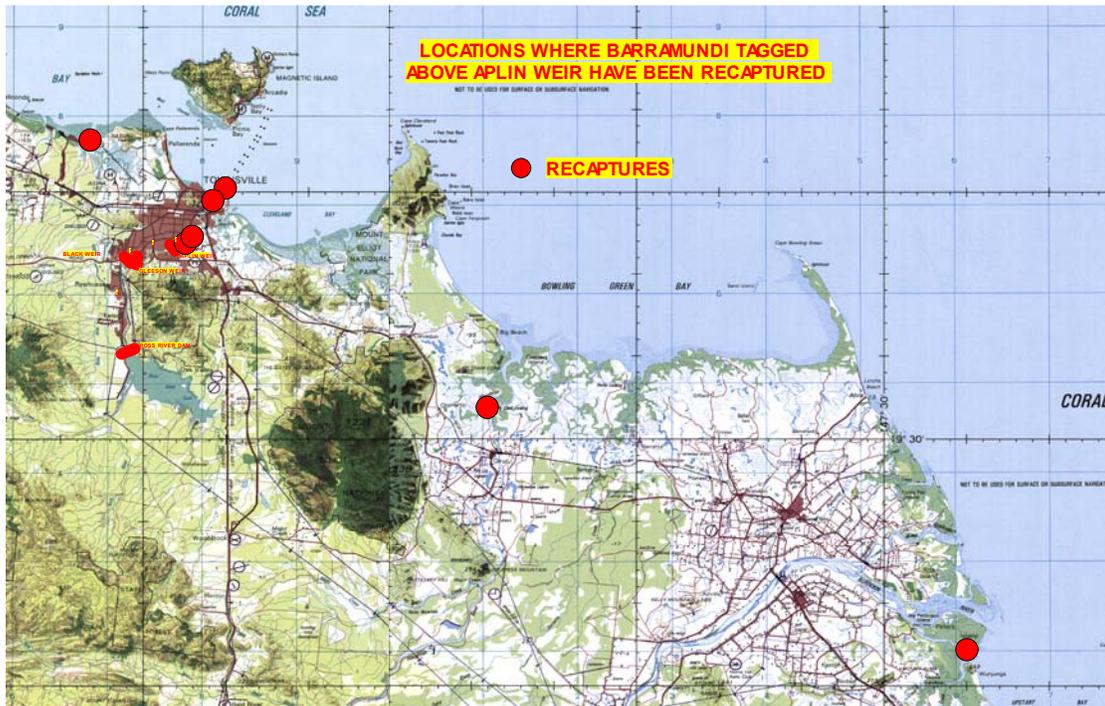


Figure 12: Locations below Aplin Weir where barramundi tagged above Aplin Weir have been recaptured

Of the six mangrove jack tagged there has been one recapture. This was of a fish caught in Aplin Weir just five days after it was tagged.

8. Discussion

The results show that the stocking of barramundi has been a success in creating a freshwater fishery above Aplin Weir. There were 63 (12.4%) fish recaptured above Aplin Weir and 49 (77.8%) of these were recaptured and reported by recreational fishers. With the overall recapture rate for Suntag fish recaptured at 8.7% for the whole of Queensland (Sawynok 2003) the recapture rate above Aplin Weir indicates a high level of usage of the area for recreational fishing.

The size range of fish caught above Aplin Weir in 2003/04 indicates a range of fish from 160mm (tagged when stocked) to 1190mm with no particular size range being dominant. Of the fish recaptured by recreational fishers there were 22 fish that were above 800mm that were kept and only five fish over that size that were released. This would suggest that the level of re-release of these fish is low and is supported by the low numbers of larger fish tagged during monitoring and fishing activities.

Movement data shows that 87.5% of fish were recaptured above Aplin Weir. This is indicative of the limited number of flow opportunities where fish could move downstream past the weirs. However a number of fish have been able to move down the river during flood events and have moved to the saltwater section of the Ross River and to other adjacent systems. This indicated a low level of mixing of stocked fish with the wild population.

9. References

Sawynok (2003): Austag Annual Report 2002/03: 48pp

Sawynok (2004): Townsville Area Tagging: Report ST200403: 19pp

10. Appendix 1 - Townsville Tagging Project

The project as originally defined. This report is one of two reports resulting from this project.



Australian National Sportfishing Association
Queensland Branch
SUNTAG PROJECT
PROJECT NO: QLD/2001/108

Project Title:	Townsville tagging
Contact Person:	Vern Veitch TARSC/Bill Sawynok Suntag
Clubs involved	Townsville clubs
Objective 1:	Collect tag and recapture data on recreational species in Townsville
Objective 2:	Obtain data on movement and impact of stream barriers
Objective 3:	Obtain data on growth
Objective 4:	
Methodology:	Tag data will be collected through Suntag Trip/Tag sheets (QF 0002/1 WI / T03) Data will be stored in the Suntag database
Timeframe:	2000/2001 – 2003/2004
Locations:	Bohle River to Haughton River and Townsville offshore
Species:	Barramundi, Mangrove Jack, Estuary Cod-Black Spot, Cod-Tripletail, Estuary Cod-Gold Spot, Javelin-Barred, Javelin-Speckled, Threadfin-Blue, Threadfin-King, Sea Perch-Fingermark, Mackerel (all species), Cobia, Queenfish, Trevally-Giant, Trevally-Golden, Sea Perch-Large Mouth, Sea Perch-Small Mouth, Bream – Pikey, Bream - Yellowfin
Funding:	Funding provided by Townsville City Council
Supported by:	Townsville City Council
Researchers:	
Community Groups:	ANSA Qld, SUNFISH
Project Status:	Current
SUNTAG PO Box 9793 Frenchville Q 4701	Enquiries to: Bill Sawynok Telephone: 07-4928-6133 Fax: 07-4926-3335 Email: infofish@zbc.com.net

This project form is part of the ANSA Quality Management System and is to be used for projects being undertaken as part of Suntag. For more information see Work Instruction QF 0002/1 WI / T04.

This form is part of the Suntag Manual and the current version is available from www.infofish.net.

Last updated: 29 June 2003

QF0021/2 15 June 2003