



6.4 CCSBT SCIENTIFIC RESEARCH PROGRAM TAGGING PROGRAM

1. INTRODUCTION

Five tagging programs are operating under the auspices of the CCSBT using scientific research program mortality allowance:

- i. a program in the surface fishery in the waters off the south and western Australian coasts being managed by the CCSBT Secretariat
- ii. a program being conducted by Japan in the longline fishery in the western Indian Ocean
- iii. a program being conducted by Australia in the east coast and west coast longline fisheries
- iv. a global spatial dynamics program being conducted by Australia across the geographical range of SBT using Australian vessels and vessels of other members
- v. a program being conducted by New Zealand in its domestic longline fishery

This paper reports on the fifth year of activity of the surface fishery tagging program

2. GENERAL

As designed at the Tagging Program Workshop this element had the following features:-

- tagging of 5-7,000 one year old SBT in Western Australia
- tagging of 8-10,000 two to four year old SBT in South Australia
- fish to be caught using pole and line techniques
- five year timescale

A total budget of \$716,000 was agreed for the fifth year of the program. \$110,000 was for coordination expenses and \$606,000 for tag deployment costs.

3. RESULTS OF TAG DEPLOYMENT IN SURFACE TAGGING PROGRAM

In the 2005-06 season more fish were tagged in both States than in any of the previous four years. (Table 1). The general impression for both States was that there was a greater concentration of fish of all age groups in the inshore areas, rather than a single age group. In South Australia this impression was reinforced by the recapture of a large number of fish tagged in previous years, i.e. fish from a range of age classes. In Western Australia despite the tagging of a large number of one-year old fish last year there were no recaptures of these as two-year old fish this year, again suggestive of the appearance of a different group of two-year old fish this year.

The reason for this greater concentration is unclear but summing up the environmental conditions, it is probably the result of more suitable conditions inshore leading to a greater concentration of surfacing fish over a wider shelf area than for previous years. Certainly the final figures of about 10,000 fish tagged per state, rather than reflecting a greater abundance of fish on the shelf, were largely a result of tagging greater than normal numbers of fish from single patches on days when surfacing behaviour was pronounced. Thus in South Australia 4,900 fish were tagged in 7 such days when all the tags blocked up ready for use (enabling the tagging of about 750 fish) were used. Similarly in Western Australia 5,900 fish were tagged in 11 days.

In total 20,111 fish were tagged and tagging was finally discontinued because the stock of tags was exhausted.

Table 1. Numbers of Fish Tagged.

Season	WA	SA
2001/02	2855	464
2002/03	6735	6412
2003/04	5268	5009
2004/05	7846	9036
2005/06	10,231	9880

Western Australia

Slightly over 10,000 fish were tagged during 45 days charter in January and February 2006, consisting of about 90% 1-year old and 10% 2-year old fish, the same ratio between these age classes as last year. (Figure 1). In January the general situation was that many small patches of presumably travelling fish were located and as a result the number of fish tagged per patch was small. Later in the charter period there was a tendency for the formation of some much larger patches of surfacing fish which enabled the tagging of greater numbers of fish.

The differences between the length frequency structures for all fish tagged during the CCSBT program and the previous RTMP program, as reported last year still exist.

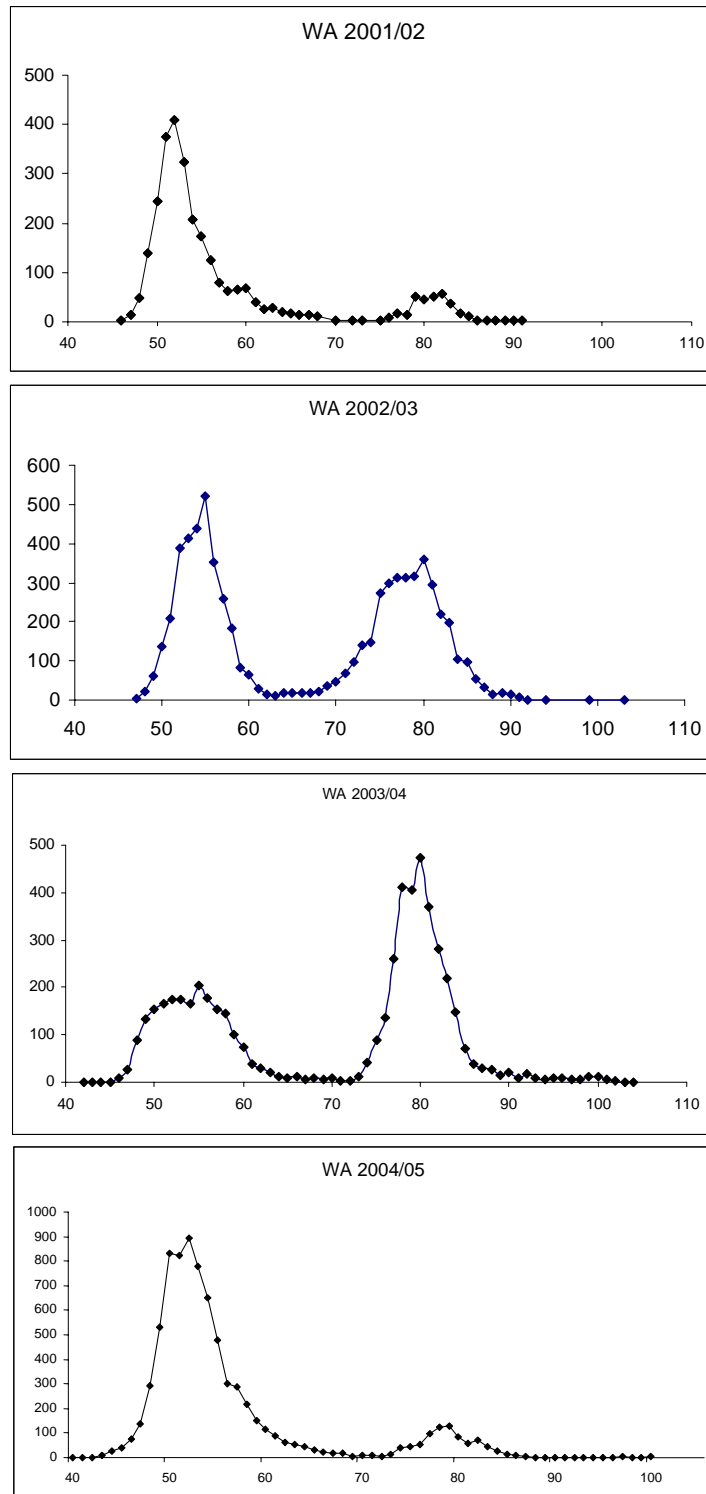
In contrast to recent years fish were found over a more extended inshore area this year, including Dampier Reef and Baynes Reef, both to the west of the area where fish have been

located previously. It was also noticeable that fewer fish were located in the east at Daw Island, a main locality where many fish were tagged in previous years. (Figure 2).

Sea surface temperatures were on occasion half a degree higher this year than last year, with temperatures of 20.0 to 20.5°C being recorded at times. This may have encouraged greater surfacing behaviour at times.

No recaptures were made of fish tagged in previous years in Western Australia.

Fig 1.Length Frequency distributions of fish tagged in Western Australia



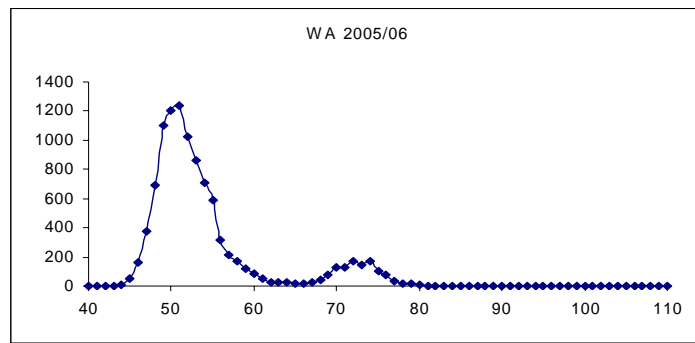
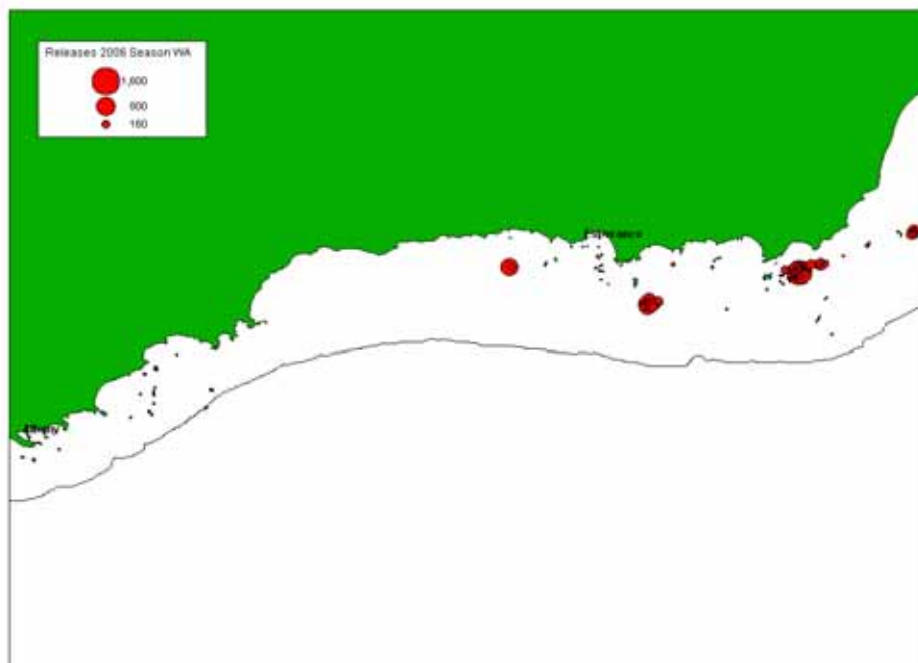


Fig 2. Tagging Positions in Western Australia.



South Australia

Slightly fewer than 10,000 fish were tagged during 30 days charter, about 5,000 in the pre fishery phase in December 2005, and a similar number during the fishing season in January 2006.

The length frequency distribution of fish tagged (Figure 3) has again changed and in contrast to last year the proportion of three-year old fish tagged has increased. However over the period of the CCSBT program fewer three-year old fish have been tagged in comparison to the previous RTMP program.

In contrast to previous years fish were located on a greater number of the inshore lumps, and apart from tagging at Nuyts and Yatala Reefs, the only two lumps that have been productive

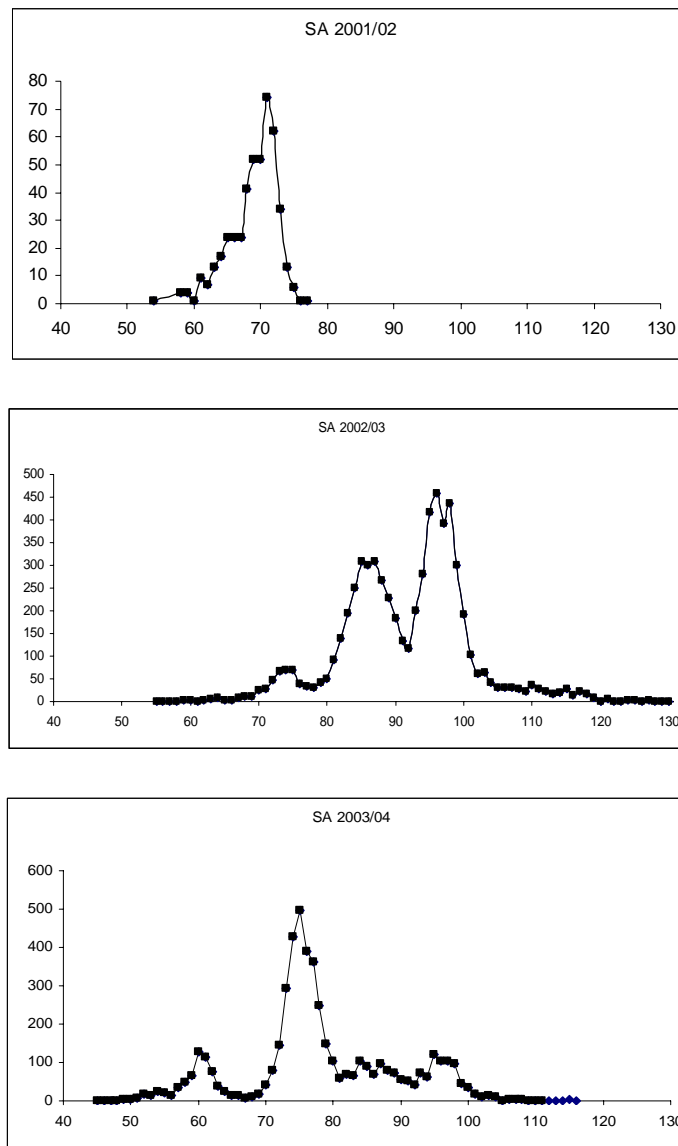
previously, fish were also tagged at various localities to the east of these reefs, notably St Francis Island, Scales Bay, Cannon Reef, Bell Point, and Ward Island. (Figure 4)

Weather conditions were on average worse this year, with more days of windy, rough and cold days encountered.

56 tagged fish released over a number of previous years and states were recaptured during tagging operations.

A contributory factor this year leading to tagging fish over a greater area was that it was possible to pre plan tagging activities to a greater extent as support from spotter planes was more than in previous years. This resulted in the ability to move to other localities with the pre knowledge of surface fish being present.

Fig 3. Length Frequency distributions of fish tagged in South Australia



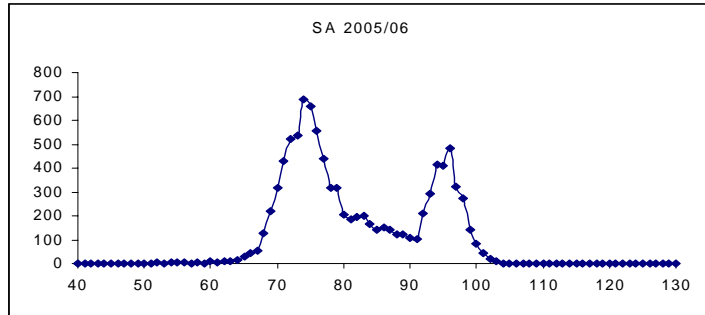
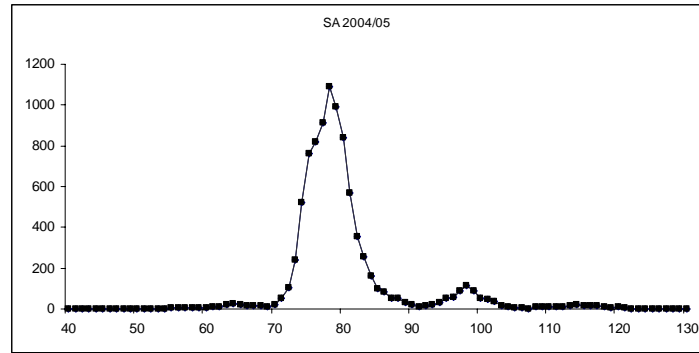
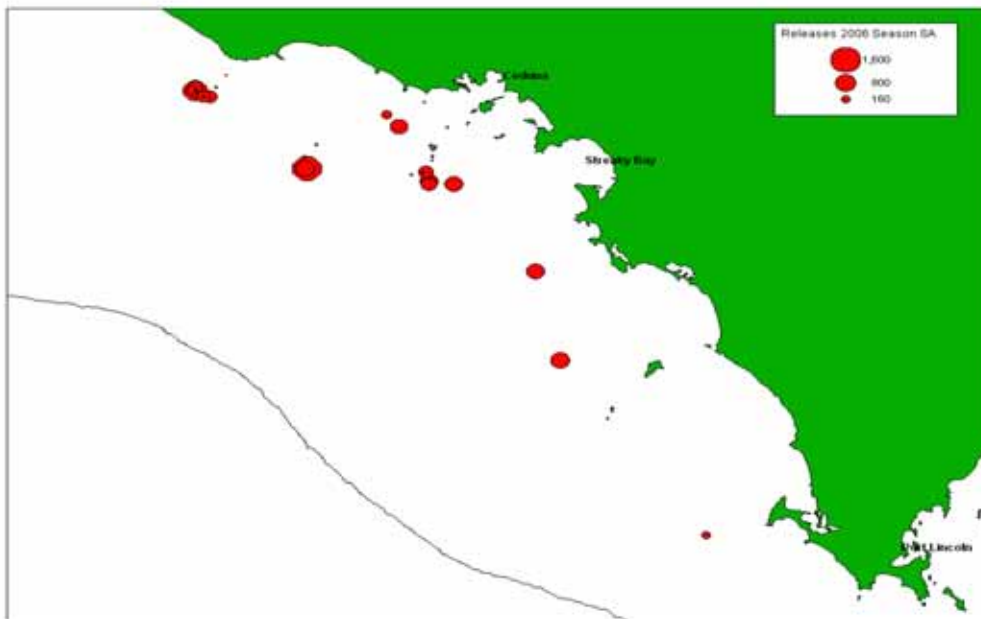


Fig 4. Tagging Positions in South Australia



4. RESULTS OF TAG RECOVERY

As at 4 August 2006, a total of 4,179 fish were reported as being recaptured from the surface fishery tagging program. As would be expected, most (3,670) of these fish were recovered from the sea cages in Port Lincoln tuna farms. 473 of these fish were recaptured from the

wild, including 293 commercial fishing captures, 128 while conducting tagging in the surface fishery, 52 from amateur fishers and 36 from other sources including tags found on beaches.

If releases in the past two seasons are excluded because the fish are unlikely to have entered the longline fisheries, the tag recovery rate from commercial fishing now stands at 1.1%.

Attachment A shows the straight line movement pattern for fish tagged in the surface fishery and for fish tagged in the other SRP projects.

Summary information on tag releases and recaptures are set out in Attachment B. The information in Attachment B includes details of all CCSBT tags recaptured including those released in the surface fishery, releases in the various longline fisheries and some other minor releases.

Attachment C shows recaptures by source.

Tag recovery activity in 2006 has comprised:

- a private contractor at Port Lincoln acting on behalf of the CCSBT in promoting the return of tags; the collection of data on tag recapture details; and providing the information with the recovered tags to the Secretariat
- a recovery mechanism with Taiwanese representatives in Mauritius
- members' fishing authorities promoting the tag recovery program in their fisheries
- recreational fishing associations in Australia publicising tag recovery by their members
- an arrangement with the Indonesian catch monitoring team at Benoa
- providing rewards and feedback (usually in the form of recapture certificates that provides a history of the recaptured fish) to people who reported the capture of tagged fish

In addition, in the light of concern over the low recovery rate from farm cages as indicated by the tag seeding program, a tag recovery arrangement was initiated on freezer vessels where history suggested tag recovery was given low priority. A tag recovery officer was arranged for twenty days whose role was to attend operations on freezer vessels and recover tags and collect associated data. Five freezer vessels were attended to cover operations from all farm operators. The tag recovery officer was also required to report where there was evidence that a tag had been removed recently or had been shed at some earlier time. The data from this activity has been maintained as a subset of the database and is reported in Attachment D.

5. A 2007 PROGRAM

The 2006 program, was the last year of the five-year program agreed by the CCSBT. Unless the Extended Scientific Committee recommends and the Extended Commission agrees, tag deployments will not continue in 2007. Recovery activity will continue on an on-going basis.

The Extended Scientific Committee needs to consider whether the surface fishery tagging program is to be continued and in what form.

A draft budget for 2007 based on a continuation of the original plan for the surface fishery tagging program, is at Attachment E.

Prepared by the Secretariat

Figure 1: Movement of recaptured fish that were tagged in the surface fishery.

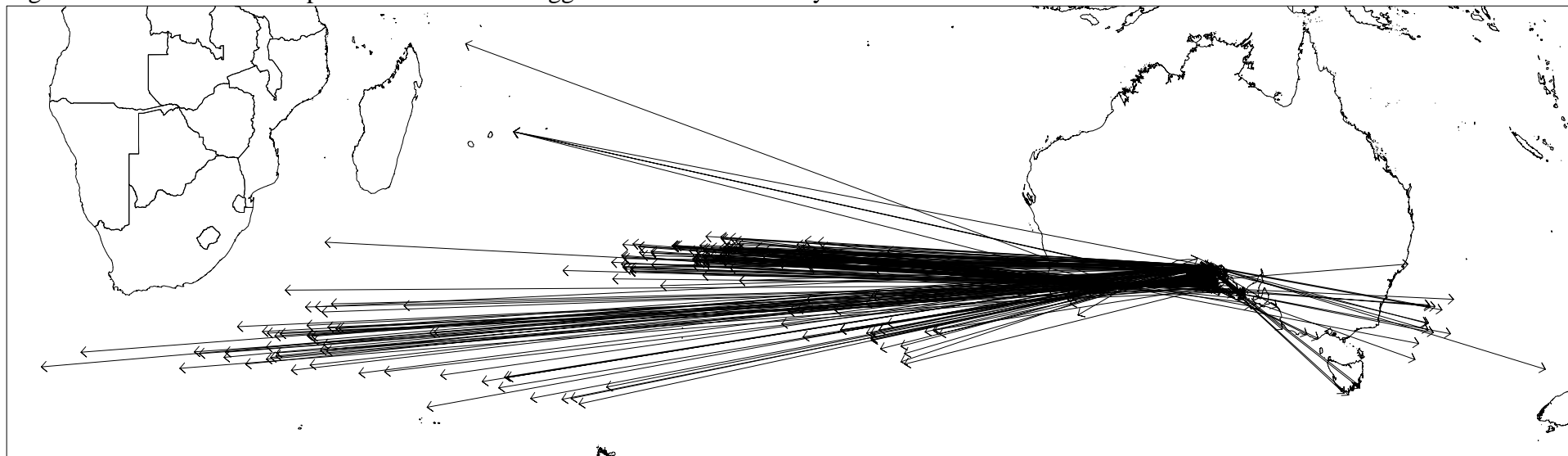
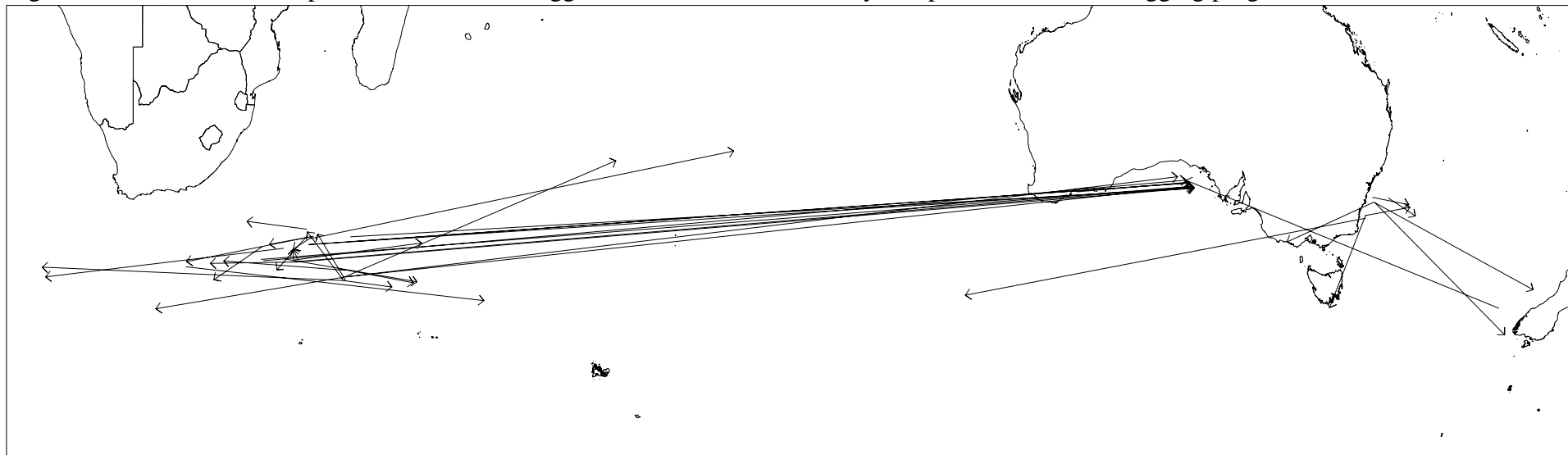


Figure 2: Movement of recaptured fish that were tagged in the non-surface fishery component of the SRP tagging program.



Summary of the number of SBT recaptured for each month of tag releases in SRP tagging projects
(Includes all data received by the Secretariat as at 4 August 2006 - most of the 2005/06 recaptures have yet to be received)

Notes:

- (1) The season shown is the season starting in 1 December each year and ending at 30 November each year
- (2) Project codes are: SRP_SEED is tag seeding into farms, SRP_TAG is the surface fishery tagging project, SRP_TAGA is the Australian east coast tagging; SRP_TAGJ is the Japanese tagging in the Indian Ocean; and SRP_TAGN is New Zealand tagging.
- (3) The column "Farming Related Recaptures" refers to captures from the farm in the case of the SRP_SEED project and the wild capture (before going into the farm) for all other data.
- (4) Similar to "2" above, the data for the fishing seasons columns relate to the farm capture date for the SRP_SEED project and the wild capture date (before going into the farm) for all other data.

Project Code	Release Area	Calendar Year of Release	Month of Release	Total Number of Fish Tagged	Total Number of Recaptures	Number of Recaptures in 2000/01	Number of Recaptures in 2002	Number of Recaptures in 2002/03	Number of Recaptures in 2003/04	Number of Recaptures in 2004/05	Number of Recaptures in 2005/06	Commercial Fishing Recaptures	Research Fishing Recaptures	Amateur Fishing Recaptures	Farming Related Recaptures	Other Recaptures
SRP_SEED	Area 03	2003	12	26	6	0	0	0	6	0	0	0	0	0	6	0
SRP_SEED	Area 03	2004	1	39	22	0	0	0	22	0	0	0	0	0	22	0
SRP_SEED	Area 03	2004	2	50	11	0	0	0	11	0	0	0	0	1	10	0
SRP_SEED	Area 03	2004	3	90	66	0	0	0	66	0	0	0	0	0	66	0
SRP_SEED	Area 03	2004	4	19	5	0	0	0	5	0	0	0	0	0	5	0
SRP_SEED	Area 03	2004	12	20	5	0	0	0	5	0	0	0	0	0	5	0
SRP_SEED	Area 03	2005	1	91	21	0	0	0	0	19	2	0	0	2	19	0
SRP_SEED	Area 03	2005	2	110	44	0	0	0	44	0	0	0	0	1	43	0
SRP_SEED	Area 03	2005	3	90	28	0	0	0	28	0	0	0	0	0	28	0
SRP_SEED	Area 03	2005	4	30	22	0	0	0	22	0	0	0	0	1	21	0
SRP_SEED	Area 03	2006	1	49	2	0	0	0	0	0	2	0	0	0	2	0
SRP_SEED	Area 03	2006	2	139	13	0	0	0	0	0	13	0	0	2	11	0
SRP_SEED	Area 03	2006	3	140	11	0	0	0	0	0	11	0	0	0	11	0
SRP_TAG	Area 02	2002	12	51	3	0	0	1	1	1	0	1	1	0	1	0
SRP_TAG	Area 02	2004	1	34	1	0	0	0	0	1	0	0	1	0	0	0
SRP_TAG	Area 02	2004	12	50	0	0	0	0	0	0	0	0	0	0	0	0
SRP_TAG	Area 02	2005	1	137	0	0	0	0	0	0	0	0	0	0	0	0
SRP_TAG	Area 02	2006	1	62	0	0	0	0	0	0	0	0	0	0	0	0
SRP_TAG	Area 03 (SA)	2002	4	464	87	0	0	12	66	9	0	10	2	0	74	1
SRP_TAG	Area 03 (SA)	2002	12	4284	766	0	0	363	327	72	4	44	2	4	713	3
SRP_TAG	Area 03 (SA)	2003	3	1928	551	0	0	6	450	90	5	29	0	1	519	2
SRP_TAG	Area 03 (SA)	2003	4	200	45	0	0	0	34	9	2	1	1	0	43	0
SRP_TAG	Area 03 (SA)	2003	12	4914	906	0	0	0	346	524	36	34	8	2	861	1
SRP_TAG	Area 03 (SA)	2004	4	80	17	0	0	0	0	16	1	2	0	0	15	0
SRP_TAG	Area 03 (SA)	2004	12	3394	168	0	0	0	0	119	49	9	27	4	128	0
SRP_TAG	Area 03 (SA)	2005	1	5642	206	0	0	0	0	88	118	18	55	17	115	1
SRP_TAG	Area 03 (SA)	2005	12	4385	24	0	0	0	0	0	24	0	6	5	12	1
SRP_TAG	Area 03 (SA)	2006	1	5495	19	0	0	0	0	0	19	0	3	9	7	0
SRP_TAG	Area 03 (WA)	2002	1	522	15	0	1	1	12	1	0	0	0	0	14	1
SRP_TAG	Area 03 (WA)	2002	2	1655	127	0	1	39	69	16	2	16	1	3	106	1
SRP_TAG	Area 03 (WA)	2002	3	678	27	0	0	2	24	1	0	0	1	0	26	0
SRP_TAG	Area 03 (WA)	2003	1	1760	392	0	0	7	275	106	4	43	4	1	343	1
SRP_TAG	Area 03 (WA)	2003	2	3310	394	0	0	10	274	104	6	39	7	0	346	2
SRP_TAG	Area 03 (WA)	2003	3	1614	79	0	0	2	48	27	2	6	0	0	71	2
SRP_TAG	Area 03 (WA)	2004	1	2386	148	0	0	0	3	128	17	12	3	1	130	2
SRP_TAG	Area 03 (WA)	2004	2	2848	170	0	0	0	11	142	17	24	4	1	134	7
SRP_TAG	Area 03 (WA)	2005	1	3703	11	0	0	0	0	5	6	3	1	1	1	5
SRP_TAG	Area 03 (WA)	2005	2	2794	8	0	0	0	0	2	6	1	0	0	3	4
SRP_TAG	Area 03 (WA)	2005	3	1162	4	0	0	0	0	1	3	0	1	0	2	1

Source of Recaptures for the SRP Tagging Projects

(Includes all data received by the Secretariat as at 4 August 2006 - most of the 2005/06 recaptures have yet to be received)

Notes:

- (1) The season shown is the season starting in 1 December each year and ending at 30 November each year
- (2) Project codes are: SRP_SEED is tag seeding into farms, SRP_TAG is the surface fishery tagging project, SRP_TAGA is the Australian east coast tagging; SRP_TAGJ is the Japanese tagging in the Indian Ocean; and SRP_TAGN is New Zealand tagging.
- (3) With the exception of "Australian Other" (which includes beach and recreational recaptures in Australia), and where otherwise indicated, the country/fishing entity listed below is the flag of the vessel, not the nationality of the person who returned the tags. For example, returns from Indonesian crew on Japanese vessels are recorded under the column for Japan.

Project Code	Recapture Season	Australian Farms	Australian Other	Taiwan Mauritius Agent	Taiwan Other	Japan	New Zealand Japanese Charter Fleet	Thailand	Unknown
SRP_SEED	2003/04	109	1	0	0	0	0	0	0
SRP_SEED	2004/05	116	2	0	0	0	0	0	0
SRP_SEED	2005/06	24	4	0	0	0	0	0	0
SRP_TAG	2001/02	0	1	1	0	0	0	0	0
SRP_TAG	2002/03	389	26	13	4	13	0	0	1
SRP_TAG	2003/04	1784	25	53	48	29	0	2	1
SRP_TAG	2004/05	1286	74	43	13	49	0	0	1
SRP_TAG	2005/06	216	98	0	6	3	1	0	5
SRP_TAGA	2001/02	0	0	0	0	1	0	0	0
SRP_TAGA	2002/03	0	1	0	0	0	1	0	0
SRP_TAGA	2003/04	0	0	0	0	1	1	0	0
SRP_TAGA	2004/05	0	0	0	0	2	0	0	0
SRP_TAGA	2005/06	0	1	0	0	1	0	0	0
SRP_TAGJ	2001/02	0	0	1	0	2	0	0	0
SRP_TAGJ	2002/03	3	0	0	0	8	0	0	0
SRP_TAGJ	2003/04	3	0	1	0	12	0	0	0
SRP_TAGJ	2004/05	5	0	0	0	3	0	0	0
SRP_TAGN	2004/05	1	0	0	0	0	0	0	0

**Tuna Farming Operations – Freezer Vessels
Tag Recovery**

Background

The Secretariat uses an agent in Port Lincoln to recover tags from the tuna farm operations. The arrangement provides for the collection of tags from the farms, recording of data, distribution of rewards and the promotion of tag recovery.

Tag seeding has suggested relatively low recovery rates of tags from farming operations. One possible contributing factor cited was the harvesting arrangement involving processing directly on freezer vessels. In these operations speed of processing is high and tag recovery is given either a low priority or recovery is difficult.

To gain an insight into tag recovery where freezer vessels are involved, the Secretariat arranged for its agent to:

- attend processing operations on 20 days with coverage of all processors and freezer vessels
- recover all tags
- report evidence of prior tag removal
- if possible record length/weight details of the fish
- record the total number of fish processed on each day attended

Results

All farms and vessels cooperated fully. The Secretariat's agent reported a range of approaches to tag recovery by individual farm operations. Some were very diligent in tag recovery at harvest while others gave recovery low priority. This is reflected in the number of tags recovered by the agent from the different farms.

The speed and nature of processing did not permit the capture of weight and/or length data. The agent was also not able to record the precise number of fish processed on each day. However, it was possible to record the approximate number of fish processed because activity is dictated by the blast freezer capacity of the vessel.

In total 14,480 fish were processed on the attended freezer vessels and 94 tags from 66 fish were recovered. Evidence of prior removal of tags was recorded on 27 fish.

Summary details are shown in the table below. More detailed information including tag numbers, weights and lengths where recorded has been placed on the CCSBT Database

Freezer Vessels – Recovery of Tags

Date	Farm ID*	Vessel	Number of Fish Processed	Number of Fish with Tags	Tags	Previous Recovery Wounds
18 Jul	41	Houta Maru	572	5	7	-
19 Jul	225	Tuna Queen	743	4	6	-
21 Jul	35	Meita Maru	603	8	11	-
23 Jul	41	Houta Maru	499	5	6	-
24 Jul	30	Tuna Queen	872	-	-	3
25 Jul	21	Meita Maru	570	2	3	3
26 Jul	41	Houta Maru	900	5	7	1
27 Jul	23	Tuna Princess	733	8	12	-
29 Jul	225	Tuna Queen	754	-	-	1
30 Jul	30	Tuna Queen	622	1	2	2
31 Jul	29	Corona Reefer	732	-	-	2
1 Aug	34	Meita Maru	857	-	-	-
2 Aug	29	Corona Reefer	657	-	-	4
3 Aug	23	Tuna Princess	1026	9	13	-
5 Aug	34	Meita Maru	788	8	11	-
6 Aug	21	Houta Maru	798	-	-	1
10 Aug	29	Corona Reefer	538	-	-	8
10 Aug	41	Kena Christina	783	11	16	-
11 Aug	528	Meita Maru	698	-	-	-
14 Aug	528	Meita Maru	735	-	-	2
TOTAL			14480	66	94	27

* Code numbers are those used in the CCSBT Database.

**SURFACE FISHERY TAGGING PROGRAM
PROPOSED BUDGET 2007**

Expenditure Type	Budget \$
Coordination Expenses	
- Tag purchase	31,000 ¹
- Tag rewards	65,000 ²
- Advertising material	8,000 ³
- Promotion expenses	5,000 ⁴
- Tag collection expenses	9,000 ⁵
- Tag collection on freezer boats	10,000 ⁶
- General administration	5,000 ⁷
Total Coordination Expenses	133,000
Tag Deployment Expenses	
- Tag placement contract	260,000 ⁸
- Vessel charter	400,000 ⁹
Total Deployment Expenses	660,000
Total Expenditure	793,000

¹ The stock of tags was depleted in the 2005-06 tagging season. Some additional tags will be purchased in 2006, however, the stock of tags will not be sufficient for 2006-07 targets. If it is agreed to extend the program to 2006-07, additional expenditure of \$31,000 will be required for 35,000 tags. If the program extends beyond 2006-07, a further 50,000 tags may be required plus new tagging needles. This is not included in the budget and the cost is estimated at \$63,000.

² Estimated outlays in 2007 are \$65,000. The estimate is based on past patterns of tag recoveries from all sources and the increased population of tagged fish (the total number of fish tagged increased by 45% to 66,197 fish in the 2005-1006 season). However, until returns from the farms in 2006 are available in sufficient numbers to make judgements about 2007 activity, this estimate should be regarded as tentative.

³ New advertising material will be developed and provided to fishers and other sectors of the industry to maintain momentum in tag recovery once deployment activity ceases. Costs reflect the experience of the original printing of publicity material.

⁴ This budget is for the placement of advertisements in fishing industry publications in member countries.

⁵ The Secretariat contracts an agent at Port Lincoln to recover tags and recapture details. The agent also promotes tag recovery to industry.

⁶ Return rates on freezer boats tend to be low reflecting the urgency of the processing and limited space available on the boats. The Secretariat's agent is contracted to attend a sample of the boats and directly recover tags from fish being processed.

⁷ The budgeted amount includes provision for freight and mailing costs for reward materials.

⁸ Provides for a 3% increases in wage costs of tag deployment personnel.

⁹ Calculated on the basis of the number of charter days and vessel hire rates in 2006 plus a provision for cost increases, particularly fuel expenses.